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EDITORIAL

An overview of thriving through transformation

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The articles published in this special issue come from the blind peer review and refinement of papers presented to the biennial conference of the Australia New Zealand Society for Ecological Economics (ANZSEE) held at the University of New England (UNE) in Armidale, New South Wales (NSW), Australia on 19-23 October 2015. All papers jointly contribute to helping transform the human existence toward one that is socially, culturally, environmentally, ecologically, economically and politically sustainable. Transforming our human existence to meet these multiple dimensions of 'true' sustainability is a difficult task, balancing potentially competing interests and, inevitably, involving trade-offs between these dimensions.

As current President of ANZSEE and Chair of the organising committee of the 2015 biennial conference of the same name as this special issue, I am pleased to provide an overview of the conference and discuss the articles presented in this issue.

INTRODUCTION

At the foundation of transforming human existence to one that is socially, culturally, environmentally, ecologically, economically and politically sustainable is the concept of efficiency; that is, where there are gains in a number of dimensions of sustainability without trade-offs in others. Such efficiency forms the foundation for the principle of Sustainable Economic Development promoted in 1972 by the Club Rome.¹ Today the concept of efficiency is as important as it was in 1972 when considering how to reach our ‘transformation goals’. Indeed, the need to transform has carried over into many facets of life, as evidenced by various events such as with the global nomination of the Pope, Herman Daly and the Club of Rome for a Nobel Peace Prize in Sustainable Development² to the locality of Armidale (NSW, Australia)³ having the hottest year on record when the supply of air cooling capital was uncharacteristically surpassed by demand.⁴

Transformation entails changing from one state to another or several sequential states. An underlying philosophy of the conference and the papers contained in this special issue is for the need to take action by ‘walking the talk’ as well as ‘talking the talk’; that is, to take action to change current human behaviour. Understanding, measuring and describing change is inherent in economic analysis, as is the concept of efficiency. Both concepts are critical to the study of biology and ecology and are indeed important in a range of other disciplines. Our conference was, therefore, designed to connect the intellectual to the practical and the applied, and attempted to ‘walk the talk’ by including the following initiatives:

- Workshops on integrating Aboriginal knowledge systems with those from the pure and social sciences brought academics from across the disciplines of Art, Humanities, Education, Economics, Park Management, Northern Institute, Health and many other disciplines.
- Field trips exposed participants to: Australia’s Gondwana World Heritage rainforests; the local Aboriginal Keeping Place; New England Regional Art and Printing Museums’ Community Garden; and a UNE linguist’s backyard, which was a homegrown food bowl for his family and the broader Armidale community.⁵
- Delegates received stainless steel water bottles embossed with the ANZSEE logo rather than plastic bottles to ensure reduced landfill, waste and embodied energy.
- Conference transport was by bus and bicycle to further reduce the ecological footprint of our conference.

All conference talks were recorded and are available at (<https://capture.une.edu.au/ess/portal/section/1d7d7b8b-8301-4a5d-aa8e-d912d45922ef>). Also available is a parallel series of refereed conference papers, which should be read in conjunction with the articles presented here (see <http://anzsee.org/2015conferencepapers/>). The recordings include a virtual collaborative event with Griffith University, where we joined with leading global evolutionary economists to discuss and debate the alternative paths to sustainable transformative states (www.griffith.edu.au/business-government/griffith-business-school/departments/department-accounting-finance-economics/news-and-events/managing-the-transition-to-a-stable-economy). The conference web page, at <http://anzsee.org>, is designed to provide readers with more ideas of how to make transformative changes.

¹ Donella H Meadows, Dennis L Meadows, Jorgen Randers and William Behrens III, *The Limits to Growth: A Report on the Club of Rome’s Project on the Predicament of Mankind* (Universe Books, 1972), <www.donellameadows.org/wp-content/userfiles/Limits-to-Growth-digital-scan-version.pdf>.

² *Nobel Peace Prize for Sustainable Development* (2015) Nobel Peace Prize Themed for Sustainable Development <<http://np4sd.org>>.

³ *Hottest Year on Record Since 1891* (2017) The Weather at Armidale NSW <www.weatherarmidale.com>.

⁴ Jacinta Tutty, ‘Queensland Heat Wave Sparks Fan Shortage’, *Courier Mail* (online), 13 January 2017 <www.couriermail.com.au/news/queensland/queensland-heatwave-sparks-fan-shortage/news-story/c1e8e8e3a51a8d33f0cce169f856df8d?from=htc_rss>.

⁵ We enjoyed homemade baked apple pies (made from homegrown apples) in our cross-cultural workshop because of the generosity of the Bruderhof people from Danthonia in the New England region; they joined with us in discussing taking transformation action at Dr Nash’s homegrown and cooked vegetarian lunch and garden tour (the meal accompanied with freshly baked bread made by the famous ‘Nick’ of the Gold Fish Bowl). Simply sharing good food with good people can nourish and connect the souls of people for an indefinite period of time.

The success of conference activities achieved is reason to celebrate, as is our success in filling four Aboriginal and Torres Strait Islander scholarships for attendance at the conference. While four scholarships may not sound like many, such an achievement is a significant first-time milestone in the society's and UNE's history, and a positive reflection of what is a promising future for cultural understanding and respect in our local to global regions.

One of the key themes of the conference was to consider issues of importance to sustainable rural, regional and remote areas. There was a range of events, including talks, workshops and field trips that supported 'local to global' research and initiatives, including improving soil and pasture health, delivering enduring community value from mining, and enhancing indigenous wellbeing. Improving the wellbeing of rural, regional and remote areas is a part of UNE's strategic goals, and the conference helped provide impact for researchers' findings in these areas as well as promoting the profile of UNE to a global audience through the international linkages offered by ANZSEE and its parent institution, the International Society for Ecological Economics (www.isecoeco.org).

I would like to formally thank the fantastic organising committee for delivering the conference, and our sponsors (see Table 1) who helped support the conference; without their support, the success of the conference would not have been possible, including the production of research outputs such as those discussed in the articles contained in this special issue. It was only through the strong, hard work of a connected 'local' but also 'afar' team (eg, in Melbourne, Canberra, Adelaide and New Zealand) that we could deliver such a successful conference.

Table 1: Sponsors of the Biennial 2015 ANZSEE Conference

Sponsor	Type
Commonwealth Science and Industry Research Organisation and UNE School of Environmental and Rural Science	Silver
NSW Government, Local Land Services, Northern Tablelands	Bronze
Ninti One Ltd: Innovation for Remote Australia and UNE VC's Office	Indigenous Participation
UNE School of Behavioural, Cognitive and Social Sciences	HDR attendance
UNE Institute for Rural Futures, UniSA, UNE Life, Sustainable Living Armidale (Armidale Road to Paris), The Goldfish Bowl, Bruderhof, Armidale Community Garden	In-kind and cost-recovery
UNE Smart Farm: Sustainable Manageable Accessible Technologies, UNE Business School and Dr Nash and his family	Hosts and In-kind

Source: <https://anzsee.org/sponsors/>

Overview of the articles

The four articles (see Table 2 for a summary) in this special issue should be viewed within the context of the conference described above. The articles are not presented in order of priority or quality, rather in what may appear to be a 'natural flow' of topics.

Table 2: Articles contained in this special issue

No.	Transformation title	Location	Author(s)
1	Enduring Community Value from Mining: Measuring the Employment Impacts of Mine Closure for Remote Communities and Considering Issues for Transformation	Northern Territory, South Australia, Australia	Blackwell, McFarlane & Fischer
2	Sustainable Remote Australian Transport for Living on Country and Going Out Bush	Australia	Spandonide
3	Ecological Economics of North American Integration: The Reshaping of the Economic Landscape in the Santiago River Basin	Mexico, North America	Peniche Camps
4	Australian Local Government Sustainability and Transformation: Structural Reform and the Fit For Future (F4F) Reform Initiative in New South Wales - Forced Council Mergers	New South Wales, Australia	Tiley

In article 1, Blackwell, McFarlane and Fischer ‘track and map’ mining expenditure and the fallout from anticipated mine closure *ex ante* at Jabiru in the Northern Territory (NT) and Leigh Creek in South Australia (SA).⁶ The authors model job and employment income losses for a number of scenarios, including best, worst and most likely cases. The results show, as would be expected, that with mine closure, the economic viability of these towns is brought into question. Less expected is that jobs are lost in not only the mining sector but also across the entire range of industries within the inherently vulnerable economic profile of these settlements. Also, the spatial impacts are surprising and the impact on Aboriginal and Torres Strait Islanders is significant. However, the closure of the main economic activity in these remote towns pushes all stakeholders, especially local people, towards the urgent need for transformation to futures beyond mining, and a number of institutional reforms including, for example, democratically elected local representation and government that can deliver and implement transformation in the ‘unincorporated’ areas.

In the second article, Spandonide considers how transport occurs in remote Australia, again with some surprising and unexpected evidence that smashes through standard paradigms. Indeed research on the complexities of transport for people in remote locations is ‘paradoxically’ under-done when one considers the inherent difficulties involved: extreme distances, high supply chain costs, and limited access to services and economic participation. The latest accessibility-driven technological innovations in both the digital and the sharing economies are highly topical in transport projects in urban agglomerations, but are still a distant reality for remote Australia. There is a need for researching an appropriateness framework for such technologies because of the strong relevance of the multiple outcomes in terms of wellbeing that some of these innovations provide. What defines a good quality of life can sometimes be very similar and other times greatly differ between remote and urban contexts. Some solutions which require additional thinking in remote locations, for obvious reasons, include affordable, active, more inclusive and less emission-intensive public transport systems supported by virtual networks, sharing vehicles (*vis-à-vis* Uber), recycling equipment, electric vehicles and driverless cars. An essential consideration in devising transformative transport systems for the bush is that remote people have a strong desire to ‘care for country’; this contrasts with the compromise often made in urban environments for road development ‘at all costs’. The range of research for improved transport liveability and social sustainability for remote communities presented by Spandonide is fresh, new and exciting. I implore you to read the article for yourself.

The third article by our colleague, Peniche Camps, takes us across the seas to North America, where he reviews the impact of the North American Free Trade Agreement of 1994 (NAFTA) on a region in Mexico. In order to meet the requirements of the agreement, Peniche Camps indicates that Mexico’s federal and local governments implemented regulations and policies which transformed the industrial structure of the country such that traditional sectors disappeared or were ‘absorbed by foreign capital’. Only a few sectors remained: those that benefited from access to the American market - mainly subcontracting plants or ‘maquiladoras’. Another ill effect identified in the article was the concentration of the urban population and associated urban sprawl. With China’s recent growth, Mexico has undergone another transformation resulting from the Chinese global demand for natural resources, heightened through the integration with the American economy. Focusing on the Santiago River Basin, the article outlines the political economy of this ‘neo-extractivism’ development model, which has transformed in Mexico to integration with the global economy. Water shortages in regions favoured by the integration policies, which support car manufacturing, mean that water needs to be obtained from another, traditionally agricultural food producing region through dam and aqueduct construction. The new water allocation leaves the agricultural region short of water, resulting in the replacement of local food production with imports from other Mexican regions or the US. With China’s growth waning, the loss of extracted natural resources through subsidisation of industrial exports from the integration, and the proceeds from extraction no longer being used to fund social service provision, the sustainability of this development model is uncertain.

The fourth article, by Tiley, returns the reader to where we began, focused on the wellbeing of local people and their democratic local representation and provision of local public services. The article reviews

⁶ The mine has subsequently closed and this research helped inform the SA Government Transitional Policy, directly impacting the wellbeing of these remote people.

the current universal phenomena of ‘forced’ local government amalgamations in NSW, where policy has been based primarily on the economies of scale for the amalgamation of local public services. The article outlines the evolution of recent policy development and reform in NSW, including arguments for and against council amalgamations and the *Fit For the Future* initiative which provided \$1 billion to encourage councils to undergo structural mergers. Tiley points out that many services traditionally provided by state or territory governments have been imposed on local government without necessary resources and financial reform. Despite this, Tiley argues that these reforms are a necessary requirement for the financial sustainability of local governments in NSW, given that many of the council boundaries were established more than a century ago, transport and communication systems have rapidly improved, and community demands on councils continue to grow. The proposed mergers are likely to reduce the number of NSW councils from 152 to 112.

Concluding remarks

Together, these articles might seem like a disparate collection of papers without common themes, but the threads are apparent within each: the need to consider whether people are in remote or urban Australia; the significance for democratic local representation to help transform places into healthy spaces, with local government transformations being one example of the desire to ensure financial sustainability of the local governance system without compromising democracy and other forms of sustainability; the need to ensure that less well-off places (such as remote Australia) have adequate yet innovative solutions to their transport problems and needs. Similarly at the regional, national and global scales, we see that global trade policies, while benefiting a particular region, may have long lasting detrimental effects on the wellbeing of local people in another region through the attrition of their natural resources. The need to transform to sustainable solutions at the ‘local to global’ scales is critical to ensuring the wellbeing of our globe’s people. Ecological economics is as much about the ecology of our social, cultural and political systems as it is about the ecology of our natural systems and economics.

A final important point to make as part of this special issue is that ANZSEE is a society based on ecological economics which is inherently inclusive of other disciplines. Achieving ANZSEE’s integrating aim is no easy task, and requires members to exert additional effort and persistence to understand one another’s concerns, approaches and thinking; it also involves empathy and empathetic action. For this conference and special issue, the organising committee and others involved in the conference made significant efforts to include other disciplines. This resulted in greater debate, improved understanding, and greater opportunities for transforming the human existence to the fully dimensional sustainability goal outlined above. It is truly incredible what can be achieved by a group of hard-working people who, despite their disparate backgrounds, work together collegiately rather than in silos. I, therefore, hope you enjoy the articles contained within this special issue, learn from the authors’ experiences and journeys, embrace with other disciplines, and gain inspiration and encouragement for your efforts to transform our existence to a more sustainable future - ‘locally to globally’ and by ‘walking the talk’.

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<www.couriermail.com.au/news/queensland/queensland-heatwave-sparks-fan-shortage/news-story/c1ebe8e3a51a8d33f0cce169f856df8d?from=htc_rss>.



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ARTICLE

Enduring community value from mining: Measuring the employment impacts of mine closure for remote communities and considering issues for transformation

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ABSTRACT

Tracking and mapping the employment impacts from mine closure forms an important element in planning for the economic transformation of remote communities and delivering enduring value from mining. This paper presents the results from two case studies of the employment impacts from mine closure: 1) the Ranger uranium mine in the Northern Territory and 2) the Leigh Creek coal mine in South Australia. The impacts for both locations are significant and link to a number of supporting industries, particularly construction, but also more broadly across other sectors of the economy. The spatial impacts are principally felt locally, but are also distributed more broadly at regional, state and national scales because of modern-day work commuting practices. Loss of jobs and associated income to Aboriginal and Torres Strait Islander people are also significant. Developing policy options to prepare for managing imminent mine closures in remote locations requires careful analysis of the structure of the local economy, within the context of a globalised world, in order to help identify sustainable transformation opportunities for these remote communities.

Keywords

mine closure, remote communities, employment impact

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Introduction

Since the height of the mining boom in 2011, mining companies across the globe have been cutting costs and raising the efficiency of their operations in response to falling global commodity prices.¹ Falling global commodity prices also mean that many mining operations are no longer viable, resulting in a succession of mine closures and associated significant job losses; some reports suggest a halving of the global labour force of the mining industry.²

As a case in point, Australia has experienced a succession of recent mine closure announcements. Rio Tinto recently announced that it would no longer financially support the continued operation through expansion of the Ranger uranium mine owned by Energy Resources Australia (ERA).³ The mine is close to the town of Jabiru (see Figure 1) in the Northern Territory (NT) and has an authority to mine that expires in 2021.⁴ Similarly, Alinta Energy in South Australia (SA) has closed the Leigh Creek coal mine (see Figure 1), with the concomitant May 2016 closure of the Port Augusta power stations that rely on the mine for their coal supply.⁵

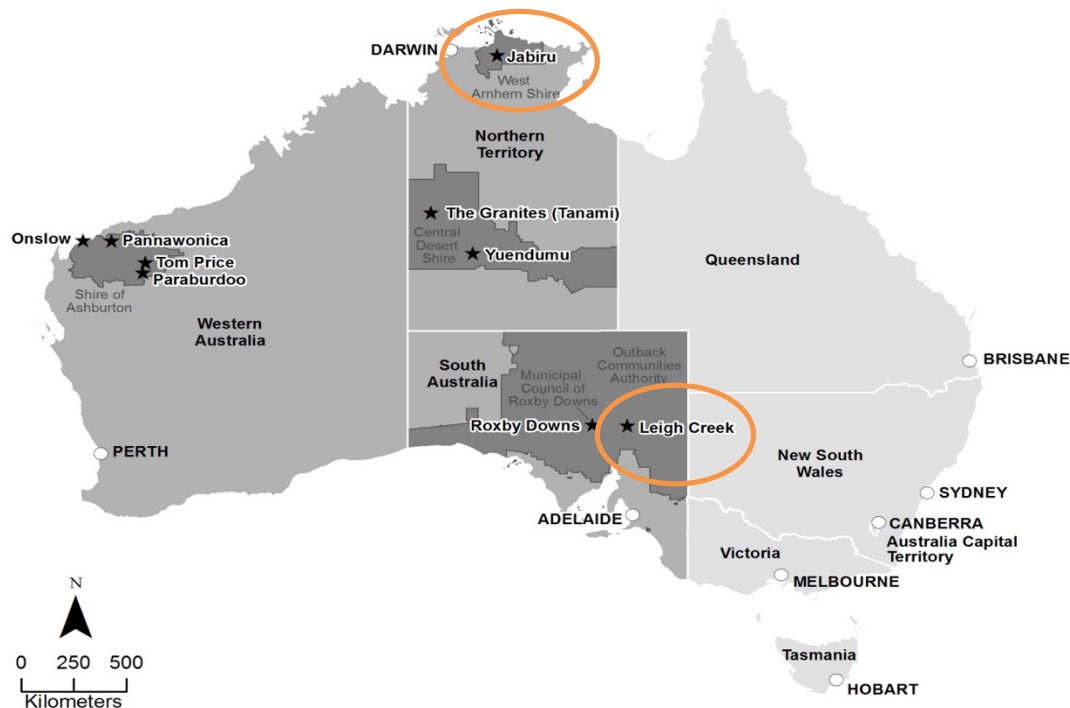


Figure 1: Location of Jabiru and Leigh Creek relative to other case study locations of the CRC REP Enduring Community Value from Mining (ECVM) project. (Source and notes: Prepared by Kate Rampellini, 2014, dark grey areas are ECVM case study Local Government Areas)

These mines and their associated communities exist in remote and sparsely populated areas where towns and hinterlands are particularly vulnerable to the loss of business activity, and the associated services and benefits

¹ Office of the Chief Economist, 'Resources and Energy Quarterly' (Department of Industry, Innovation and Science, June 2015), <<http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Pages/Resources-and-energy-quarterly.aspx>>.

² UN Industrial Development Organisation, Mining and Utilities Statistics (UN, 2015), <<http://www.unido.org/en/resources/statistics/statistical-databases.html>>; S Lannin, *Around 30,000 Mining Jobs Threatened as Industry Looks into 'Painful' Future: Survey*, ABC News, 29 June 2015 <<http://www.abc.net.au/news/2015-07-29/thousands-of-mining-jobs-threatened-ahead-painful-future-survey/6657882>>.

³ M Stevens, 'Rio Tinto Signs Ranger Uranium Mine Death Warrant', *Australian Financial Review*, 12 June 2015 <<http://www.afr.com/business/mining/rio-tinto-signs-ranger-uranium-mine-death-warrant-20150612-ghmp9j>>.

⁴ ERA ASX, 'Interim Report', 30 June 2015 <<http://www.energyres.com.au/documents/1457306.pdf>>.

⁵ Leigh Nicholson, 'Alinta Extends Port Augusta Power Station Closure Deadline', *In Daily*, 22 January 2016 <<http://indaily.com.au/business/2016/01/22/alinta-extends-port-augusta-power-station-closure-deadline/>>; Natalie Whiting, 'Leigh Creek for Sale after Alinta Energy Closes SA Coal Mine', *ABC News*, 22 January 2016 <<http://www.abc.net.au/news/2016-01-22/sa-outback-town-leigh-creek-for-sale/7107922>>.

this provides,⁶ such as loss of jobs, both directly - for those related to and in support of mining - and indirectly for related jobs which deliver key services for remote peoples and for which there are no feasible substitutes.⁷ Knowing the spatial extent of the job losses and their associated income in advance of closure is critical to better understanding the extent of economic impact and how and where policy can be directed to ensure the most efficient transition to alternative economic futures for these communities.

Using Ranger and Leigh Creek as cases, we model and analyse the employment impacts from mine closure to help inform the transformation of these economies to viable futures beyond mining. Doing so can help to deliver policy prescriptions that ensure mining provides enduring value to these remote communities rather than leaving them vulnerable and short of economic opportunity.

The remainder of the manuscript is set out as follows: the second section outlines the methods used to model and analyse the employment impacts in both locations; the third section provides the results of the modelling, quantifying the employment impacts spatially and in monetary terms; the fourth section discusses these results in the context of the cases at hand and identifies some limitations and areas for future research; the paper ends with concluding remarks.

Methods

The key to estimating the employment impacts of mine closure is to know how many people are currently employed in the mine and more broadly across the local economy in its various industry subsectors. Establishing the employment structure of a local economy *ex ante* (before the impact) also helps to identify the connections between mining, mining support industries and other sectors of the economy.⁸ Having a map of the economic structure of the local economy then allows a 'what-if' analysis to proceed by withdrawing mine-related employment from the economic base to help predict the loss of jobs and associated income.

Estimating current levels and spatial distribution of impacts

We identified, through the Australian Bureau of Statistics' (ABS)⁹ census data using the Tablebuilder Pro interface, employees' place of work in 2011 by Local Government Area (LGA). We collapsed the industry subsectors from the four-digit level (ie, 720 subsectors) to an equivalent of the two-digit level (ie, 111 subsectors) of the economy, then matched these with employee place of usual residence.

For Jabiru, workers' place of work was fixed on West Arnhem, while the place of usual residence was allowed to expand from West Arnhem to all other territory LGAs and the rest of Australia. In this way, only people working in West Arnhem were analysed, rather than people who may commute out of the LGA to work elsewhere.¹⁰ In the case of Ranger Creek, we were also able to establish the 'spatial impact' of whether employees identified as Aboriginal and Torres Strait Islander.

Given that Jabiru fits within the West Arnhem LGA, the first step in analysing the impacts of mine closure for Jabiru was relatively straightforward. For Leigh Creek, however, the analysis was not so simple because it falls within the vast area of unincorporated SA and does not have its own LGA. This means that people who work in Leigh Creek in any industry cannot be representatively identified from the ABS data. However, by working backwards and identifying people's place of residence as Leigh Creek and their place of work as Outback SA, we could reasonably identify those people employed 'locally'; we tagged these as Local2. This measure of local

⁶ Boyd D Blackwell, Brian Dollery and Bligh James Grant, 'Institutional Vehicles for Place-Shaping in Remote Australia' (2015) 19 *Space and Polity* 150, DOI: 10.1080/13562576.2015.1014227; M Stafford Smith, 'The 'Desert Syndrome': Causally-Linked Factors that Characterise Outback Australia', (2008) 30 *The Rangeland Journal* 3, DOI: 10.1071/RJ07063.

⁷ Stuart Robertson and Boyd Blackwell, 'Remote Mining Towns on the Rangelands: Determining Dependency Within the Hinterland', (2015) 37 *The Rangeland Journal* 583, DOI: 10.1071/RJ15046.

⁸ Boyd D Blackwell, Andy Fischer, Jim McFarlane and Brian Dollery, 'Diversifying Cores but Stagnant Peripheries: Mining and Other Industry Employment Contributions to Development in Local Government Areas of the Northern Territory', (in press) *Economic Papers*, DOI: 10.1111/1759-3441.12182.

⁹ ABS, TableBuilder: Place of Usual Residence by Place of Work by Local Government Area for the Northern Territory and SSC SA2 for South Australia 2011 (2015) <<http://www.abs.gov.au/websitedbs/censushome.nsf/home/tablebuilder>>.

¹⁰ For an analysis of people commuting to work between LGAs in the NT see Boyd D Blackwell, Andy Fischer, Jim McFarlane and Brian Dollery, 'Mining and Other Industry Contributions to Employment Leakage in Australia's Northern Territory', (2005) 49(6) *Journal of Developing Areas* 26, DOI: 10.1343/jda.2015.0105.

employment is, therefore, different to that of Jabiru because Jabiru local employment is truly local - place of work matches place of usual residence. This process means that only one scale of spatial impact is presented for Leigh Creek: Local2, while three are known for Jabiru: local, rest of the NT, rest of Australia.

Predicting future employment levels

Once the employment structure of a local economy was estimated, the likely loss of jobs as a result of mine closure could be estimated by considering the likely loss of jobs in the subsector concerned (mining), supporting and related subsectors (eg, construction) and then indirectly related industry subsectors (eg, all other sectors). This deduction results in an *ex post* (after impact) number of employees by industry subsectors in the medium-to-long run once subsequent rounds of indirect effects take their course through the economy. Subtracting the *ex post* number of people employed in each industry subsector from the *ex ante* employment levels provides the change, marginal or loss of jobs resulting from the mine's closure for each subsector.

Given our analysis was undertaken at a micro economic level of 111 subsectors, we are able to identify those people directly employed with the mine in question through the identification of the mineral resource being extracted. This precision of industry subsector analysis also allows for mine supporting industries to be identified and for less related subsectors to be identified, helping to identify strong, mild or weak connections between industry subsector employment and income.

Sensitivity analysis

We also undertook a sensitivity analysis of the loss of jobs, taking account of the variation in the connection between mining and mining support industry subsectors, and other subsectors of the local economy at three levels:

1. Base case or best estimate
 2. Upper bound
 3. Lower bound
- In this way, our best estimate of the loss of jobs is provided within a range of possible job losses to help guide policy makers. No doubt the actual loss of jobs will be different from our best estimate but, in effect, it will never really be known because economies can only be modelled rather than exactly known.

Tables 1 and 2 outline the connection factors used to determine the job loss results from the Ranger and Leigh Creek mine closures, respectively, for the above three levels. We established the best estimate connection factors through expert experience and studying the structure of the economy subsectors and their connections. Each local economy is different¹¹ and hence there are different employment connections between industry subsectors, resulting in different connection factors: best estimate and bounded estimate connection factors.

Table 1: Inter-industry connection factors for mine closure case: Jabiru, Ranger uranium mine, NT

Level	Spatial scale			
	Local	Aboriginal	Rest of territory/state	Rest of Australia
Base case (best estimates)	26%	35%	33%	35%
Upper bound	50%	50%	50%	50%
Lower bound	10%	10%	10%	10%

Table 2: Inter-industry connection factors for mine closure case: Leigh Creek, Leigh Creek coal mine, SA^a

Level	Spatial scale
	Local2 ^b
Base case (best estimates)	48%
Upper bound	58%
Lower bound	38%

Notes: a. The previous methods section describes ABS census limitation on spatial analysis for Leigh Creek versus Jabiru.
b. Local2 = employees who live in Leigh Creek and work in Outback SA2.

¹¹ Boyd D Blackwell, 'Local and Regional Government in Remote and Unincorporated Australia: Sui Generis?' (2012) 7 *Public Policy*, 23-46 (2012), DOI: 10.1071/RJ15046.

Predicting changes in employment concentration

A further extension of our analysis was to estimate the location quotients from the *ex ante* 111 division of subsector employment of the local economies. Location quotients provide a measure of employment concentration relative to territory or state levels.¹² Through our approach, the concentration of employment losses can be estimated *ex post*, as can the vulnerability of the local economy, in turn helping to better inform policy responses.

Results

Jabiru

The total employment impacts from the Ranger uranium mine closure are significant: 298 (219-393) jobs lost, worth approximately \$28 million (\$23m-\$33m) in employment income, representing a 49% (36-64%) reduction on current employment levels and a 61% (51-73%) reduction in employment income. The mining and building industries lose a majority of the jobs, with 148 and 28 jobs respectively, accounting for \$18 million (mining) and almost \$3 million (building) in employment income. The next most effected is the trade and accommodation industry, which mimics the mining cycle with the advent of the FIFO phenomenon; this industry incurs 58 jobs lost and a reduction in employment income of \$2 million. The public and personal services industry is the next most adversely impacted with 44 total jobs lost, accounting for over \$3 million in employment income.

Figures 1, 2 and 3 present base case (best estimate), upper bound and lower bound spatial and industry impacts of the mine's closure. In the bottom left corners of the figures, the pie charts show that the majority, or around 60%, of jobs and income are lost locally, with 25-30% of the job loss falling to the rest of the NT and 10% to the rest of Australia. Losses of income and employment to Aboriginal and Torres Strait Islander people are also significant and equate to around 10% of total employment loss and income.

Of the local losses, 86 jobs and \$10 million in income are lost from the mining industry, and 22 jobs and over \$2 million in income from the building industry. A further critical insight from the spatial analysis represented in Figures 1 to 3 is that it is not just mining jobs and mining support services that are impacted; second round or indirect job losses are also significant, particularly in the public and personal services industry, but also noticeably in the business services, and trade and accommodation industry.

Interestingly, as shown in the bottom right of Figures 1 to 3, the indirect impact on Aboriginal and Torres Strait Islander jobs and income is particularly felt through the public and personal services industry, in addition to the initial direct losses through the mining and building industries. Also appearing to be impacted are Aboriginal and Torres Strait Islanders employed in the business services sector.

The results for Aboriginal and Torres Strait Islanders are in stark contrast to the indirect impacts felt by the rest of Australia by the mine's closure (top right hand graphs of Figures 1 to 3). For the rest of Australia, the impacts are predominantly in the trade and accommodation industry, followed by the business services then public and personal services industries.

The trade and accommodation industry plays a critical role in connecting the flow of loss of jobs and employment income across the local, regional and national economies, as is shown by the relatively large light blue bars as one scans from left to right in the bar graphs in Figures 1 to 3.

The bottom set of bar graphs on the left of Figure 1 summarises the change in concentration of employment (location quotients - LQs) as a result of closure of the mine. Naturally, the economy contracts with very high levels of greater concentration in the public and personal services, business services, and trade and accommodation industries.

¹² Boyd D Blackwell, Andy Fischer, Jim McFarlane and Brian Dollery, 'Diversifying Cores but Stagnant Peripheries: Mining and Other Industry Employment Contributions to Development in Local Government Areas of the Northern Territory', (in press) *Economic Papers*, DOI: 10.1111/1759-3441.12182.

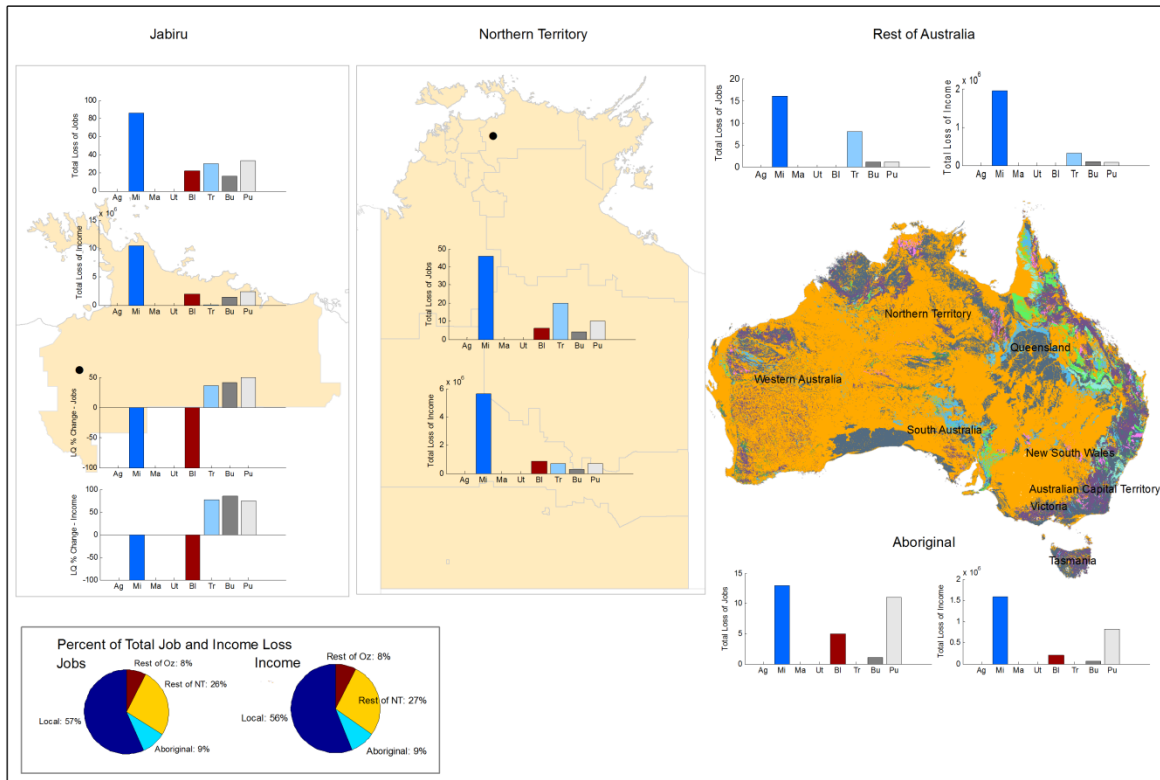


Figure 1: Employment impacts of Ranger uranium mine closure: *Base Case*

Notes: Ag=agriculture, Mi = Mining, Ma = Manufacturing, Ut = Utilities, Bl = Building, Tr = Trade and accommodation, Bu =Business services, Pu = Public and personal services; $\times 10^6 = 1,000,000$; oz = Australia; Income is in AUD\$

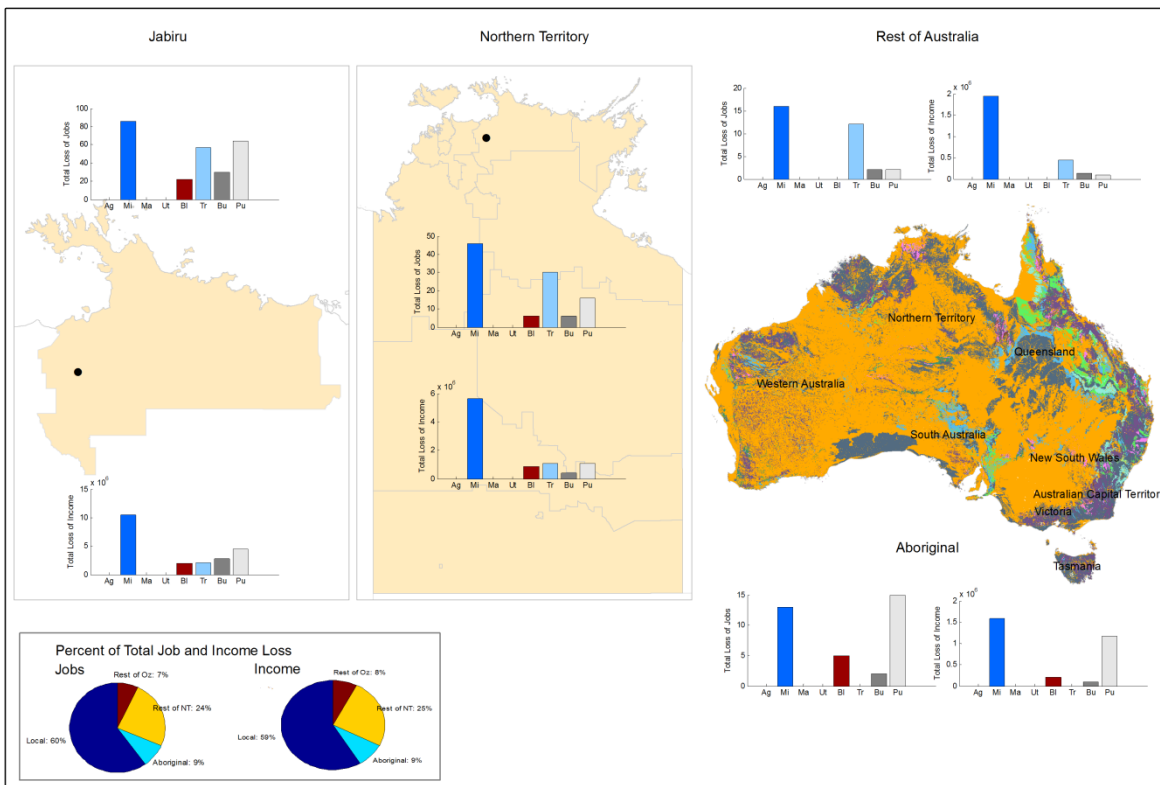


Figure 2: Employment impacts of Ranger uranium mine closure: *Upper bound*

Notes: Ag=agriculture, Mi = Mining, Ma = Manufacturing, Ut = Utilities, Bl = Building, Tr = Trade and accommodation, Bu =Business services, Pu = Public and personal services; $\times 10^6 = 1,000,000$; oz = Australia; Income is in AUD\$

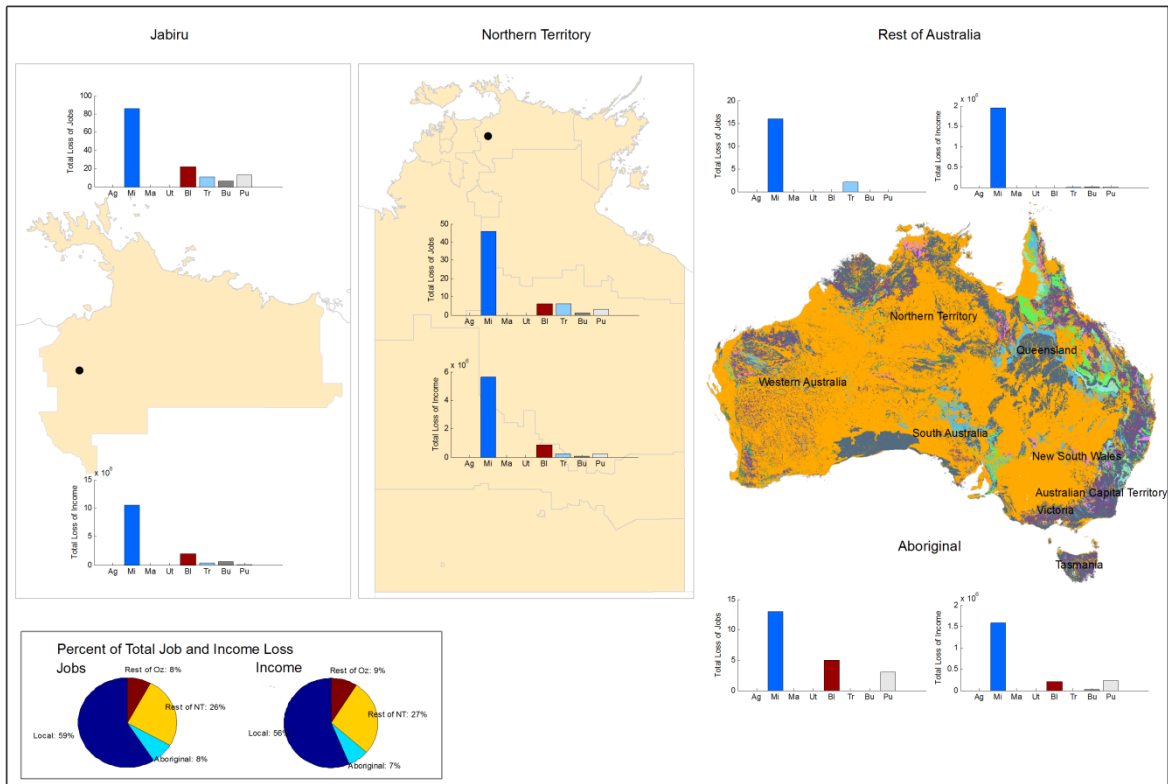


Figure 3: Employment impacts of Ranger uranium mine closure: *Lower bound*

Notes: Ag=agriculture, Mi = Mining, Ma = Manufacturing, Ut = Utilities, Bl = Building, Tr = Trade and accommodation, Bu =Business services, Pu = Public and personal services; $\times 10^6 = 1,000,000$; oz = Australia; Income is in AUD\$

Leigh Creek

The local impacts from Leigh Creek coal mine closure are also significant, more so than Jabiru in relative terms: 196 (183-209) jobs lost¹³ accounting for 73% of current employment levels, with \$24 million (\$23m-\$25m) million or 87% of current employment income. Mining again accounts for the majority of jobs lost, with 132 jobs accounting for \$21 million in employment income. In contrast with Jabiru, there are no building employees on record from the ABS Census for Leigh Creek place of usual residence. The next industry most heavily impacted is public and personal services, followed by trade and accommodation, and business services, as depicted in Figure 4. In contrast to the impact on the building industry, jobs in the utilities industry and employment income are halved as a result of the mine closure.

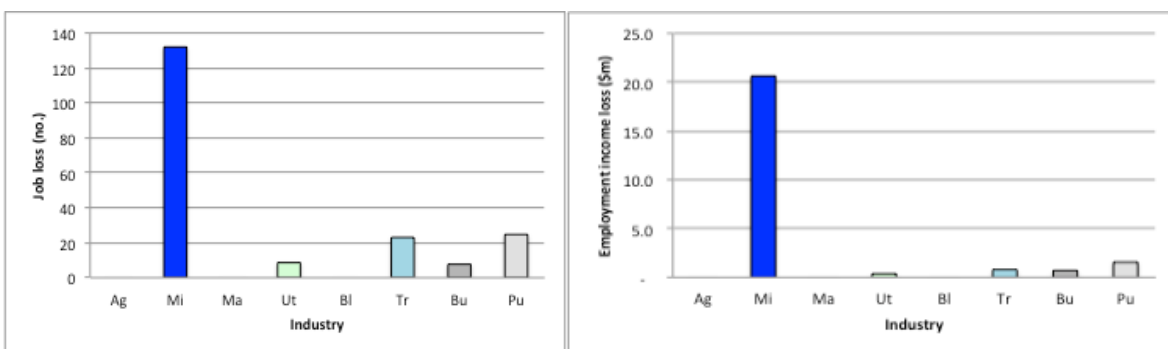


Figure 4: Local2 employment impacts of Leigh Creek coal mine: *Base Case*

Notes: Ag=agriculture, Mi = Mining, Ma = Manufacturing, Ut = Utilities, Bl = Building, Tr = Trade and accommodation, Bu =Business services, Pu = Public and personal service

¹³ Job losses of about 240 have been reported by the media (Nicholson, above n 5), noting that our estimates represent a degree of local employment only and not total employment sourced from across Australian residential locations. Given this context, our estimates appear to be in the ball park.

Figure 4 shows the relative Local2 impacts by industry. Similar to Jabiru, there are a number of other industry jobs that the mining industry supports locally, notably public and personal services, trade and accommodation, business services and utilities industries that are adversely impacted by the mine closure. In total income terms, the public and personal services industry provides the next greatest loss to local employment income after mining industry, similar to Jabiru.

Figure 5 shows the results of the changes in employment concentration. Because of the loss of jobs in the mining industry, all other industries experience increased concentrations in terms of jobs (left) and employment income (right). These are extraordinarily higher than that experienced in Jabiru.

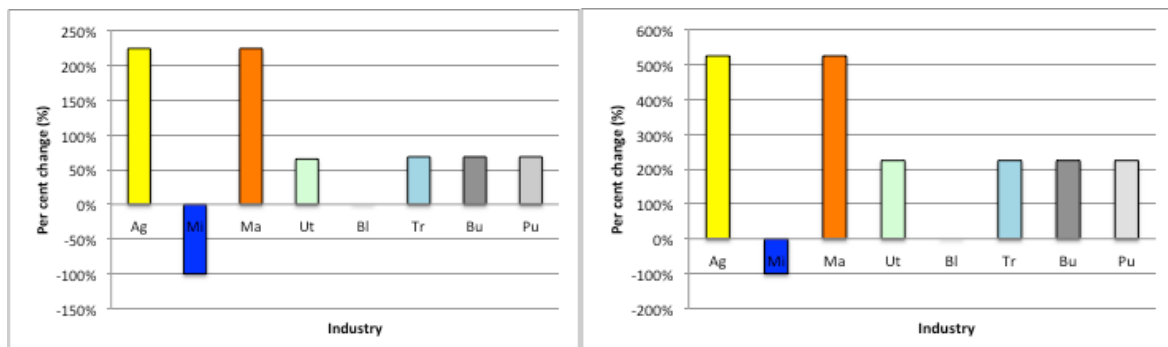


Figure 5: Changes in employment concentrations (LQS) from Leigh Creek mine closure: Left - jobs; Right - Income. (Notes: Ag=agriculture, Mi = Mining, Ma = Manufacturing, Ut = Utilities, Bl = Building, Bl = Building, Tr = Trade and accommodation, Bu =Business services, Pu = Public and personal services)

Discussion

Jabiru

A number of prescient insights can be drawn from the results presented for Jabiru. Firstly, the employment impacts from the Ranger mine closure are predominantly felt locally and will cause significant financial and economic hardship to the people of Jabiru and East Arnhem. Secondly, while the local impacts are extenuating, the trade and accommodation industry provides critical connective tissue for more adverse impacts from the local level to flow to regional and national levels. This is particularly true given that mining work practices are now dominated by FIFO operations. This is also apparent in other sectors, such as in the business services, and public and personal services industries.

Thirdly, Figures 1 to 3 show that Aboriginal and Torres Strait Islander employment impacts, particularly those that are indirectly felt, fall more greatly across the public and personal services sector. Given this result and the second insight, it is clear that mining plays a far more important role in remote economies than simply providing direct income and jobs. The direct jobs and income, in turn, support a range of second-round jobs and employment income across the building, trade and accommodation, public and personal services, and business services industries, with the public and personal services industry being equally impacted in second round effects for Aboriginal and Torres Strait Islander people.

Indeed, mining, while in existence, contributes to a much greater diversity of jobs across the economy, potentially leading to enduring value, but once the mine is gone, the impacts are significant and, unless alternative plans are laid for diversity creation after the closure, and policies are put in place to help people, particularly those that are local and regional, to transition to alternative futures, then much of mining's value is lost and is not enduring.

Fourthly and related to the third point, some anecdotal evidence suggests that Aboriginal and Torres Strait Islander communities may be considerably better off as a result of mine closure in both locations. This could be argued for a number of reasons, including the need for local people to be no longer economically tied to an outside interest that may have goals which are incongruent to their own, particularly in relation to respect of

the land, country, descendants and culture. Leigh Creek was a closed town, meaning only mine or mine support workers could live in the town; there has never been a plan for enduring value for the regional community from the mine, and no royalties have been paid to the traditional owners. These measures are argued to have bred distrust, contempt and racial separation. This is not ideal for building lasting benefits for local communities and the mining industry; rather it is likely to create lasting disbenefits. In this case, the closure of the mine presents an opportunity for an improved future for greater cross-cultural and community respect.

Fifthly, the increased concentration of employment presented in Figure 1 provides some insights as to strategies and plans for Jabiru and West Arnhem's future without the mine. Historically, Jabiru was established as a package deal between the Commonwealth and Territory governments and the mine proponent.¹⁴ The mine contributed to much of the town's infrastructure, including airport, power supply, streets and homes, sports fields etc.¹⁵ Part of this package was the development of Kakadu National Park as a Commonwealth asset¹⁶ that was promoted as World Heritage to the domestic and international tourism markets. Since these initial investments, renewed investment would be useful in revitalising the tired assets and reinvigorating these opportunities, particularly given the lower value of the Australian dollar. This provides a potentially better mix for the employment of local Aboriginal and Torres Strait Islander people whose interests may lie better with conserving and protecting their lands and culture rather than being employed to mine uranium. While the tourism dollar development presents an opportunity, it is not the only opportunity to reinvigorate the economy once the mine closes and, in fact, other small business and employment opportunities need to be considered, as has been outlined by others.¹⁷

Leigh Creek

Again, a number of timely insights can be drawn from the Leigh Creek impact results. Firstly, the census data for Leigh Creek indicate no building industry employees; an event that is in stark contrast to the experience of Jabiru. Leigh Creek may have very little building activity that helps explain this inconsistency relative to Jabiru and may hint to underlying poor business confidence given the looming closure.

Secondly, similarly to Jabiru, mining employment in Leigh Creek helps support a number of other local industries indirectly, most notably the public and personal services, and the trade and accommodation industries. However, in contrast to Jabiru, Leigh Creek mining supports local jobs in the utilities industry. The business services industry earns considerable income for local employees, so much so it surpasses in lost income terms other non-mining industries.

Thirdly, the data indicates that half the jobs and employment income of the utilities industry in Leigh Creek will be lost because of the mine closure. This is to be expected, given that the coal mine supplies coal to Alinta Energy and closure of the mine resulted from the planned closure of the power stations at Port Augusta owned by Alinta Energy, the major utility in the region.

Fourthly, the data also shows that the changes in employment concentrations for Leigh Creek were extraordinarily higher than those of Jabiru, showing that Leigh Creek is particularly vulnerable due to its highly concentrated employment in mining. This is further compounded by there being no public plan prepared early in the mine's lifecycle to deliver enduring value beyond mining, no royalties paid to traditional land owners, and a closed-town policy for mine development.¹⁸

¹⁴ D R Knight, *Jabiru Town Development Amendment Bill 2008* (Northern Territory Second Reading Speeches. 2008), <www.austlii.edu.au/au/legis/nt/bill_srs/jtdab2008354/srs.html>.

¹⁵ B D Blackwell and B Dollery, 'The Impact of Mining Expenditure on Remote Communities in Australia: The Ranger Uranium Mine and the Tanami Gold Mine in the Northern Territory' (2014) 20 *Australasian Journal of Regional Studies*, 61 <<http://www.anzrsai.org/system/files/f8/f4/f82/f85/o546/Blackwell%20and%20Dollery.pdf>>.

¹⁶ Director of National Parks, *Kakadu National Park Management Plan 2007-2014* (Canberra, 2007).

¹⁷ Robertson and Blackwell, above n 2; D A Carson and D B Carson, 'Mobilities and Path Dependence: Challenges for Tourism and "Attractive" Industry Development in a Remote Company Town', (2014) 14 *Scandinavian Journal of Hospitality and Tourism* 460, DOI: 10.1080/15022250.2014.967997.

¹⁸ Robertson and Blackwell, above n 17.

Limitations and areas for future research

There are a number of limitations in our analysis that provide opportunities for future research. Firstly, our analysis assumes that anyone who loses their job in a mine will not immediately find work elsewhere. In reality and with time, some people will, doubtless, find jobs elsewhere. However, there is no question that the local economy will be particularly adversely impacted. People who live and work locally in a remote town are likely not to have as many opportunities for employment compared to workers from the rest of the NT or Australia, particularly where this latter group live in large populated cities and economies. Moreover, people who are mobile with their employment and reside in large capital cities with major airports may be more flexible and able to take up a job in another location compared to people who have established their residence in a remote town.

Secondly, our analysis is relatively narrow, particularly when one considers that sustainability should typically occur socially and culturally, economically and politically, as well as environmentally and ecologically. As one example, we have not included the ecological or human health related impacts which will be lasting beyond the life of the mine. For an ecological-economics conference, to which this paper was presented, not considering these impacts would demonstrate first-class incompetency for the authors. We are, however, conscious of the limitation and decided to constrain our analysis to employment economic impacts only. Further research would, naturally, incorporate these broader environmental impacts.

Thirdly, as noted in the methods section, our analysis of Leigh Creek employment impacts was constrained by the unincorporated nature of Leigh Creek being part of a considerably larger area of Outback South Australia. This points to two possible policy prescriptions. The first is that democracy must be delivered to the remote people of this region, given they currently have little or no democratically and locally elected and accountable representation. Such democracy can be delivered through the traditional mechanism of establishing a local government for the Northern Flinders Ranges or through less traditional means.¹⁹ The second is reform of the ABS collection of data that would follow the democratic reform, providing more precise information about the people of this region.

Finally, our analysis only captures the employment and employment income impacts of mine closure. While employment impacts are an important and natural first step, further research could include additional analyses such as an input-output analysis to gauge the full impact on the economy. Our measures of lost economic activity are, therefore, inherently conservative.

Conclusion

Mining, and particularly mining in the remote locations that are considered in this manuscript, provides an important employment and income base for regional economies. Once mines close a local economy can be short of employment opportunities, with a renewed concentration and inherent vulnerability falling on a few other industries. Part of planning for mine closure requires some assessment of the employment impacts: how these are felt across industry subsectors directly and indirectly, with subsequent contraction of employment income and further jobs losses in second round effects. The impacts for the remote locations considered in this manuscript are extenuating to say the least, and even more so for the people of Leigh Creek in South Australia. Without early and ongoing mine life cycle planning, and town and regional development strategies, these towns and their regions will no doubt suffer severe financial and economic hardship. In the case of Leigh Creek, this is particularly so with no pre-mining plan, no royalties paid to traditional owners to leverage alternative futures, and no open-town policy to encourage the early development of alternative futures.²⁰

¹⁹ As outlined by Boyd D Blackwell, Brian Dollery and Bligh James Grant, 'Institutional vehicles for place-shaping in remote Australia' (2015) 19 *Space and Polity* 150, DOI: 10.1080/13562576.2015.1014227; Smith, above n 6.

²⁰ Since undertaking this impact analysis, the SA Government has released a request for information for commercial opportunities to rejuvenate the Leigh Creek economy given the closure announcement: South Australian Government, *Request for Information on Commercial Opportunities for Leigh Creek* (2015) <<http://www.oca.sa.gov.au/?q=LeighCreekRFI>>. This also includes the unusual offer to sell the town. At the time of writing, received submissions were under review.

Indeed, significant investment from Commonwealth, state or territory, and local governments is warranted in these *prima facie* cases for the urgent need for transitional funding and development. The role of community and mining companies is also clear. Enduring value from mining may only be delivered where there is ongoing trust and mutual respect, and a fair agreement and plan drawn on how mining will deliver lasting benefits to communities at various stages of the mine lifecycle.

Moreover, the work in this manuscript provides a sound starting point for better understanding the current employment structures of these remote economies and how these will be impacted as a result of mine closure. Impact work of this nature represents a first and necessary step in planning for the transition to alternative futures, by estimating the loss of benefits to employees and how these losses fall spatially across Australian society and industrial subsectors.

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ARTICLE

Sustainable remote Australian transport for living on country and going out bush

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ABSTRACT

Domestic and international academic literature analyses of links between transport and wellbeing focus mainly on urban settings and vulnerable population groups including older people, people with health issues, socioeconomically disadvantaged people, or people undergoing frequent and extreme climatic events. While the relationship between the wellbeing of remote Australians and travelling activities is evident, its complexity is an under-researched topic. This is paradoxical considering that extreme distances, high supply chain costs, and limited access to services and to economic participation are well recognised obstacles for sustaining vibrant remote Australian communities. Moreover, the latest accessibility-driven technological innovations in the digital and sharing economies are highly topical in transport projects in urban agglomerations but still a distant reality for remote Australia. There is a need to develop an appropriateness framework for such technologies because of their strong relevance to multiple outcomes in terms of wellbeing. Furthermore what defines a good quality of life between remote and urban contexts can sometimes be very similar but also very different. In the light of some recent transport and mobility research, this paper analyses the potential connections between more appropriate transport systems and innovations and the increased resilience of remote communities.

Keywords

transport, remote Australia, sustainability, wellbeing, livelihoods

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Introduction

Aboriginal and Torres Strait Islander people who live in remote areas face many challenges beyond those generally faced by non-Aboriginal and Torres Strait Islander people who live in urban areas. Many of the difficulties are connected with poor access to transport.

The purpose of this article is to explore how appropriate transport activities can promote wellbeing. The article begins by highlighting the specific needs for good transport in remote communities then discusses the links among transport and the social and cultural systems and processes that characterise the livelihoods of the 1 200 Aboriginal and Torres Strait Islanders living in very remote communities.

The appropriateness of transport initiatives is examined in the light of a dedicated wellbeing framework. In order to provide practical examples, a model lists a few appropriate transport initiatives extrapolated from the responses of a transport survey and a mobility survey undertaken in remote communities around Central Australia; they are summarised and evaluated through the framework.

The conclusions of the paper will provide insights into the types of transport alternatives that would be the most likely to contribute to developing increasingly more resilient remote Aboriginal and Torres Strait Islander communities, and improving their wellbeing and sustainability.

Remote Australian transport an oxymoron of sustainability?

Living in remote Australia has been perceived as challenging for a long time.¹ Generally, people agree that living in the Outback is tough, and economic and physical survival requires robust and reliable equipment, satellite telecommunications, and good air and land transport.² The requirements of the remote Australian transport system, in particular, tend to converge towards highly unsustainable livelihoods by world standards. The most privileged remote Australians display some of the highest annual consumptions of fossil fuel per capita in the world for transport activities, with an average of seven tonnes of CO₂ per person per year; this is around four times the average of OECD countries and almost 30 times sustainable levels.³ The reason for such a high consumption is that the relatively small number of people living in remote Australia needs to travel long distances through vast tracts of isolated areas. To do so, they rely heavily on large four wheel drive vehicles or need to travel by air. Both transport systems primarily rely on petroleum types of fossil fuels.⁴

Because Aboriginal and Torres Strait Islander people have been dislocated from their traditional country and cultural identities, and from accessing services and participating in the economy,⁵ a structural situation of physical, socio-economic and cultural isolation and marginality has developed.⁶ As a result, Aboriginal and Torres Strait Islander people comprise a larger proportion of the population in remote Australia than in urban areas, and access to good land and air transport equipment is unavailable for the vast majority. Indeed their transport storyline is vastly different to that of the privileged rest of Australia, with an average of ten times fewer vehicles per person, a fleet of old inappropriate vehicles, the need to travel over long stretches of unsealed roads, and effectively half of the population not having access to public transport or air transport at all. This narrative uncovers a rhetoric of sustainability based on radically different issues and relationships between wellbeing and transport.⁷ Spandonide has described the vast

¹ G Gerard, "Everyone will be Jealous for that Mutika", *Mankind* (1989) 19(2) 95; R Lawrence, 'Motorised Transportation in Remote Aboriginal Australia' *Australian Aboriginal Studies* (1991) 2 62.

² P Bishop, 'Off Road: Four-Wheel Drive and the Sense of Place' *Environment and Planning D: Society and Space* (1996) 14(3) 257; A Taylor and B Prideaux, "Profiling Four Wheel Drive Tourism Markets for Desert Australia", *Journal of Vacation Marketing*, 14(1) 71.

³ N Holyoak, B Spandonide, B Stazic and R Zito, (2016), 'Travelling in Remote Australia Might Come a Gutsa: An Extreme Case of Transport Carbon Vulnerability' Adelaide.

⁴ Ibid.

⁵ G Currie and Z Senbergs, 'Indigenous Communities: Transport Disadvantage and Aboriginal Communities' in Graham Currie, Janet Stanley and John Stanley (eds), *No Way to Go: Transport and Social Disadvantage in Australian Communities* (Monash University Press, Melbourne, 2007), 1-9,12.

⁶ J Finlayson and A Auld, *Shoe or Stew? Balancing Wants and Needs in Indigenous Households: A Study of Appropriate Income Support Payments and Policies for Families* (Australian National University - Centre for Aboriginal Economic Policy Research, Canberra, ACT, 1999).

⁷ G Currie and A Delbosc, 'Exploring Transport Disadvantage, Social Exclusion and Well-Being in Spatial Context', (Paper presented at World Congress on Transport Research, 12th, Lisbon, Portugal, 2010).

difference between the circumstances of the two groups of people (privileged and not privileged) living in remote communities as a two speed transport system⁸ which exacerbates socio-economic inequalities.

In this context, and from a transport point of view, social sustainability is related to concepts such as transport equity, liveability, community development, social justice and support, human rights, place making, cultural competence, community resilience, and human adaptation⁹. One of the main challenges, in terms of transport sciences, is the fact the transport crisis affecting remote Aboriginal and Torres Strait Islander communities remains particularly poorly understood from a socio-cultural perspective.¹⁰

Relationship between transport and wellbeing

The relationships between transport and wellbeing in the remote Australian context are evident in many ways. Transport provides opportunities for interacting with different environments, accessing goods, information and services, contributing to social networks and developing cultural activities, and enabling participating in economic activities (Fogarty 2005).¹¹ In this sense, good transport can lead to better health outcomes, improved access to health services, positive social and community dynamics, and economic participation and productivity.¹²

Transport and wellbeing in remote Australia

The links between transport and livelihoods in remote Australia are particularly complex. Indeed, in remote Australia, transport is a major factor for a large set of livelihood elements with multiple levels of interconnection, as illustrated in Figure 1.

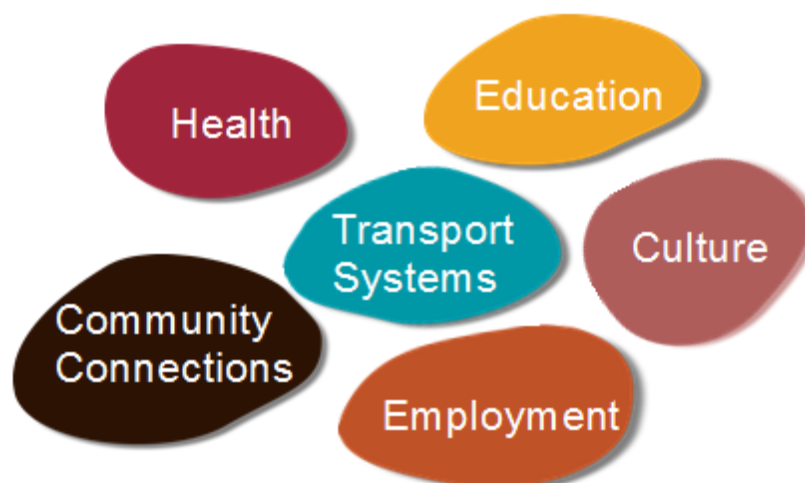


Figure 1: Links between transport and livelihoods in remote Australia

⁸ B Spandonide, *Transport Systems in Remote Australia: Transport Costs in Remote Communities* (Ninti One Limited, Alice Springs, 2014).

⁹ R Costanza and B C Patten, 'Defining and Predicting Sustainability' *Ecological Economics* (1995) 15(3) 193; L Magee, A Scerri, P James, J Thom, L Padgham, S Hickmottt, H Deng and F Cahill, 'Reframing Social Sustainability Reporting: Towards an Engaged Approach' in *Environment, Development and Sustainability: A multidisciplinary Approach to the Theory and Practice of Sustainable Development* (2013) 15(1) 225.

¹⁰ Currie and Senbergs, above n 5, 12; R Raicu, M Taylor, L Meng and G Currie, *Scoping Study on Regional Transport in Desert Australia* (Ninti One Limited, Alice Springs, 2011).

¹¹ W Fogarty, "'You got any Truck?'" Vehicles and Decentralised Mobile Service-Provision in Remote Indigenous Australia', (Centre for Aboriginal Economic Policy Research (CAEPR), ACT, Working Paper No. 30/2005, 2005).

¹² T Litman, *Transportation Cost and Benefit Analysis II* (Victoria Transport Policy Institute Canada, 2013); T Litman and E Doherty, *Transportation Cost and Benefit Analysis, Techniques, Estimates and Implications* (Victoria Transport Policy Institute, Canada, 2011).

In effect, the relative level of transport accessibility defines a certain level of ill or wellbeing.¹³ Contributors to ill and wellbeing that are often ignored include physical resources, social capital, relationships and other forms of human interaction, knowledge, experiences and networks.¹⁴

Given that access to good transport is an essential determinant of wellbeing, providing affordable and efficient transport is a fundamental way to reduce transport inaccessibility in areas which are physically isolated from the rest of the country.¹⁵ Improving remote transport systems can enable stronger social attributes and build a more positive sense of belonging to the wider community. The section goes on to focus on the appropriateness and the strengths of current transport systems and their potential for improving the liveability of remote communities, and outlines the transport impacts on wellbeing. The discussion also examines the dimension of appropriate transport in terms of reducing ill-being as a function of socio-economic disadvantage and socio-cultural injustice.

Wellbeing in remote Australia

Ill and wellbeing refer to the individual or collective conditions and quality of life, and include different forms of interrelated physical, cultural, psychological, social and economic elements. The two concepts of ill and wellbeing have been studied in Australia for more than 30 years, with the different sets of underlying causes extensively discussed.¹⁶ Figure 2 describes some of the individual types of wellbeing conceptualised by the Australian Bureau of Statistics that are specific to Aboriginal and Torres Strait Islander people.¹⁷

Nguyen and Cairney have developed a framework specific to the wellbeing of Aboriginal and Torres Strait Islander people (Nguyen and Cairney 2013),¹⁸ as illustrated in Figure 3.

The Nguyen and Cairney framework is the outcome of an extensive participatory study carried out by the authors and comprises six interconnected domains (culture, community, empowerment, education, employment and health).

A significant recent finding is that, in Aboriginal and Torres Strait Islander communities, socio-cultural and psychological forms of wellbeing are very important; that is, for Aboriginal and Torres Strait Islander remote community members, non-material forms of wellbeing are particularly significant.¹⁹ However, at present, for non-Aboriginal and Torres Strait Islander people living in remote Australia, economic forms of wellbeing as well as wellbeing related to accessing different types of services (housing, health, employment, education) tend to be over considered.²⁰ In addition, even for innovative transport projects, advanced quadruple bottom line framework evaluations and methodologies are used as indicators with a predominant focus on dominant norms that correspond to economic forms of wellbeing²¹. Socio-cultural forms of wellbeing, however, can be effectively integrated into the evaluation of spin-off effects and the wider benefits of transport projects.²² Indeed, in the framework illustrated in Figure 3, the different forms

¹³ Y Kinfu, *Spatial Mobility Among Indigenous Australians: Patterns and Determinants* (ANU Demography and Sociology Program, Research School of Social Sciences, Canberra, 2005); P Starkey, S Ellis, J Hine and A Ternel, *Improving Rural Mobility: Options for Developing Motorized and Nonmotorized Transport in Rural Areas* (World Bank, 2002).

¹⁴ S Nutley, 'Indicators of Transport and Accessibility Problems in Rural Australia' *Journal of Transport Geography* (2003) 11(1) 55.

¹⁵ G Currie, J Stanley and J Stanley, *No Way To Go: Transportation and Social Disadvantage in Australian Communities* (Monash University ePress, 2007).

¹⁶ B Headey, E Holmström and A Wearing, 'Well-Being and Ill-Being: Different Dimensions?' *Social Indicators Research* (1984), 14(2) 115.

¹⁷ Australian Bureau of Statistics (ABS), 'Framework for Measuring Wellbeing: Aboriginal and Torres Strait Islander Peoples' (4703.0, 2010).

¹⁸ O K Nguyen and S Cairney, *Literature Review of the Interplay between Education, Employment, Health and Wellbeing for Aboriginal and Torres Strait Islander People in Remote Areas Working Towards an Aboriginal and Torres Strait Islander Wellbeing Framework* (Ninti One Limited, Alice Springs, 2013).

¹⁹ M Dockery, 'Reconceptualising Mobility for Aboriginal and Torres Strait Islander Australians' (Working Paper CW015, CRC-REP, Alice Springs, 2014).

²⁰ A Morton and L Edwards, *Community Wellbeing Indicators: Measures for Local Government* (Australian Centre of Excellence for Local Government, University of Technology, Sydney, NSW, 2013).

²¹ T Litman, 'Well Measured: Developing Indicators for Sustainable and Livable Transport Planning' (Victoria Transport Policy Institute, 2016); T Litman, 'Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transportation Planning' (Victoria Transport Policy Institute, 2017).

²² B Spandonide, 'Understanding Transport Costs in Remote Australia' *International Journal of Transport Economics* (2016) XLIII.

of wellbeing are highly inter-related; the authors suggest that wellbeing can be accurately defined and evaluated by studying appropriate indicators of the nature and degree of the integrated relationships.²³

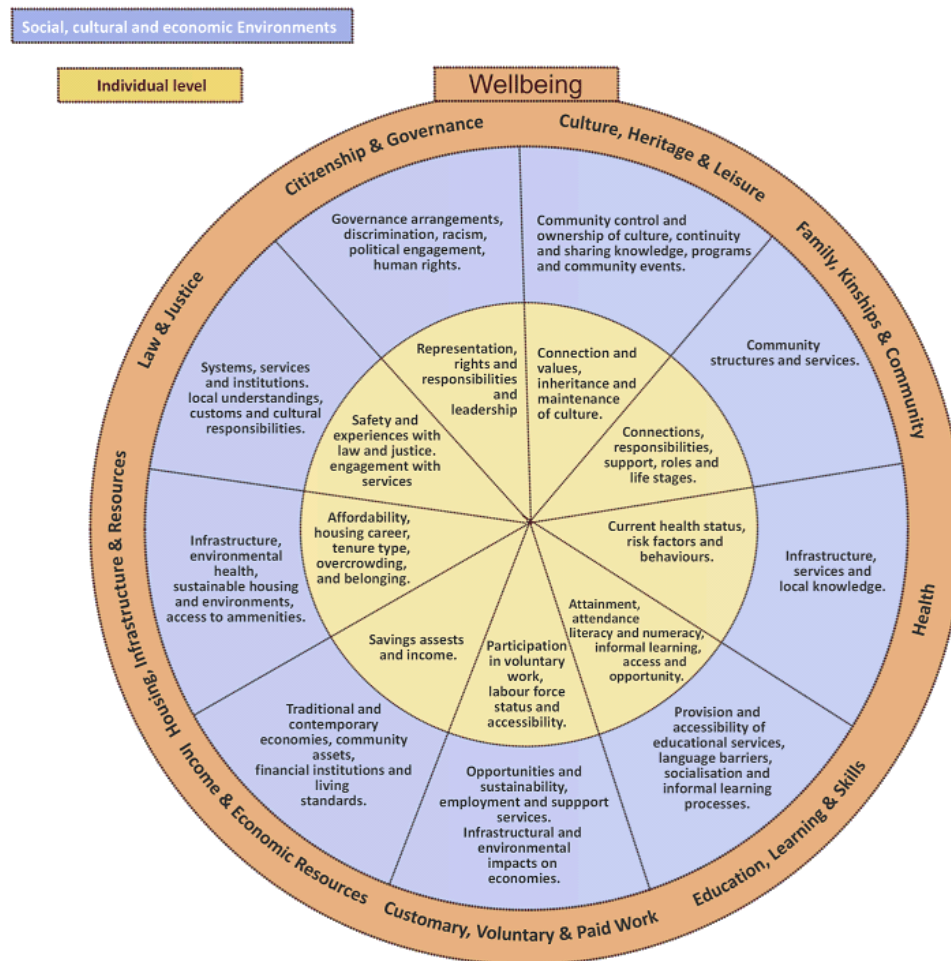


Figure 2: Framework for measuring wellbeing: Aboriginal and Torres Strait Islander people (Source: ABS, 4703.0, 2010)

Yet, for Aboriginal and Torres Strait Islander people living in remote Australia, while the elements of wellbeing that rely on accessing goods and services (such as health, housing, or transport services) are recognised, accessing goods and services are articulated around avoiding ill-being and are perceived as a decisive contributing factor of subjective wellbeing.²⁴ The ABS notes that ‘in 2008, 72 per cent of Torres Strait Islander people aged 15 years and over (adults) reported being a happy person all or most of the time, with rates higher among adults living in remote areas (78 per cent) than non-remote areas (71 per cent)’.²⁵ Rates were also higher among adults living in the Torres Strait Indigenous Region (84 per cent) than elsewhere (70 per cent). This is the case even though remote Australian Aboriginal and Torres Strait Islander people have access to significantly fewer health, housing and transport services.²⁶ That is, low well-being is not directly associated with specific places, and living in remote areas is generally linked with

²³ Nguyen and Cairney, above n 15.

²⁴ N Biddle, ‘Measures of Indigenous Wellbeing and Their Determinants Across the Lifecourse’ in N Biddle (ed), *Income, Work and Indigenous Livelihoods* (Australian National University. Centre for Aboriginal Economic Policy Research, Lecture 5, 2011).

²⁵ ABS, *Framework for Measuring*, above n 16.

²⁶ Australian Bureau of Statistics (ABS), *Aboriginal and Torres Strait Islander People Public Transport Access* (ABS, 2010); N Biddle, J Taylor and M Yap, ‘Indigenous Participation in Regional Labour Markets, 2001-06’ (Centre for Aboriginal Economic Policy Research (CAEPR), ACT, Caep Discussion Paper No. 288, 2008); J Taylor, ‘The Spatial Context of Indigenous Service Delivery’ (Centre for Aboriginal Economic Policy Research (CAEPR), ACT, CAEPR Working Paper No. 16 2002).

higher levels of well-being.²⁷ But low levels of well-being are associated with poorer health outcomes, and loss of family links and social support.



Figure 3: Framework specific to the wellbeing of Aboriginal and Torres Strait Islander people (source: Nguyen and Cairney, 2013)

Half of Aboriginal and Torres Strait Islander people aged 15 years and over had a disability or long-term health condition in 2008 and 8 per cent had a profound/severe core activity limitation. In non-remote areas, Aboriginal and Torres Strait Islander adults were one and a half times as likely as non-Indigenous adults to have a disability or long-term health condition, and more than twice as likely to have a profound/severe core activity limitation.²⁸

Eight per cent of all Aboriginal and Torres Strait Islander adults reported having been removed from their natural family and 38 per cent had relatives that had been removed from their families. Furthermore, the ABS notes that 'people who were able to have a frequent say on community issues were more likely to report feeling happy all/most of the time than those with little or no input (81 per cent compared with 67 per cent)'.²⁹ Employment was also a positive factor in reported rates of happiness, but income level was less correlated to wellbeing.³⁰

Within the international literature, a large number of publications examine wellbeing issues in remote areas in the world. The relationship between transport and wellbeing in remote areas is also the object of a number of studies, particularly in the regional development industry.³¹

Currently, in remote Australia, access to transport is perceived as a fundamental way to avoiding ill-being; access to transport is necessary for accessing critically important services (such as health or administrative services) and for maintaining the lifeline of socio-cultural community connections that define the livelihoods of Australian Aboriginal and Torres Strait Islander remote communities active. From both perspectives, the lack of access to transport is a source of structural inequality in remote Aboriginal and Torres Strait Islander communities.³² Extrapolating on the wellbeing framework of Nguyen and Cairney,³³ Table 1 presents some of the relationships between transport and wellbeing for people living in remote

²⁷ Australian Bureau of Statistics (ABS), *The Health and Welfare of Australia's Aboriginal and Torres Strait Islander Peoples* (ABS, Oct 2010); Australian Bureau of Statistics (ABS), *Australian Social Trends, Aboriginal and Torres Strait Islander Peoples' Labour Force Outcomes* (ABS, 2013); Australian Bureau of Statistics (ABS), 'Australian Social Trends: Exploring the Gap in Labour Market Outcomes for Aboriginal and Torres Strait Islander Peoples' (ABS, no. 4102.0, 2013).

²⁸ ABS, *Framework for Measuring*, above n 16; Productivity Commission, 'Disability Within the Indigenous Community' in *Disability Care and Support*, (Australian Government, Chpt 11, 2011).

²⁹ ABS, *Framework for Measuring*, above n 17.

³⁰ Biddle, above n 24.

³¹ G Fitzgerald, *The Social Impacts of Poor Access to Transport in Rural New Zealand* (NZ Transport. Agency Research Report 48, Wellington, NZ, 2012); P Starkey, 'A Methodology for Rapid Assessment of Rural Transport Services' (Working Paper No.87-A, World Bank, Washington, DC. US, (2007).

³² Raicu et al, above n 10.

³³ Nguyen and Cairney, above n 16.

Aboriginal and Torres Strait Islander communities. This model will enable the identification of the contribution of transport factors to wellbeing by relating it to the results of two surveys, one on transport and the other on mobility.

Table 1: Relationships between transport and wellbeing framework for people living in remote Aboriginal and Torres Strait Islander communities

Community	Access to extended kinship networks, community members, social events, shared and inclusive spaces (Memcott et al, 2006; Raicu et al, 2011). Mobility to avoid social conflict (Currie and Senbergs, 2007).
Culture	Access to emotional relationship with places of spiritual significance and people, connection to homelands is important (Nguyen and Cairney, 2013). Strong mobility dependency over maintaining cultural obligations and being able to fulfil different types of commitments (Currie and Senbergs 2007; Young and Doohan, 1989).
Education	Transport to access education services (Raicu et al, 2011).
Health	Access to health services and safe transport are essential (Helps et al, 2008). Environmental friendly transport and active transport are able to provide very significant benefits at a societal level (Clifford, Pearson, Franklin, Walker and Zosky, 2015; Thompson, Gifford and Thorpe, 2000) and a psychological one (Campbell, Burgess, Garnett and Wakerman, 2011).
Economic participation and standards of living	Access to transport instrumental in economic participation in both customary economy and mainstream economy (Altman, 2010; ABS (Public Transport Access), 2010; Dockery, 2015) access to goods, meeting living standards and managing living costs (Biddle, 2011; Dockery and Colquhoun, 2012; Young and Doohan, 1989).
Empowerment and governance	Access to decision making situations, opportunities to live sustainably on country (Memcott et al, 2013; Smith, 2004).

Transport surveys

Two surveys of Central Australian remote communities were conducted in 2014-2015; one on mobility and the other on transport access. The surveys collected information on transport and mobility practices, and examined the perceived satisfaction and sustainability of transport. Additionally, participants in the survey expressed their views on transport issues.

The mobility survey asked questions about the last trips involving an overnight stay over a three-month period with origins and destinations. In 2014 and 2015, primary data about mobility was collected in 25 very remote communities. A total of 750 individuals living across Central Australia were involved in this process.³⁴

The transport survey investigated transport practices that took place in Lajamanu, Santa Teresa and Hermannsburg in Central Australia and involved 75 participants. A team of Aboriginal Community Researchers undertook the field work, conducting 25 surveys in each community (4-6% of the population) using consent forms and in accordance with the code of practice of the Business Development Unit of Ninti One Ltd.³⁵ Preferences for transport alternatives were examined in detail using questions related to perceived transport sustainability (safety, comfort and reliability of infrastructures, vehicles and services), recommendations to improve transport networks, vehicles and services and ratings of travelling conditions, and future transport alternatives (including non-transport solutions).

Results

Several findings pointed to the fact that people derive wellbeing from the experience of mobility - from the journey itself. According to Dockery, people are generally happy to travel: '36 per cent didn't mind going, 47 per cent felt good and 8 per cent very good about going'.³⁶ Dockery's survey work was based on the conceptualisation of mobility as a means to access things that promote wellbeing, with a focus on attachment to country, culture and kinship networks as drivers of Aboriginal and Torres Strait Islander mobility and wellbeing.³⁷ Indeed the results of both surveys reported that visiting friends and family, and doing shopping were the major reasons to travel (Figure 4).

³⁴ M Dockery, 'On the Move: A Key to Remote Australian Success' (Media Release, CRC-REP, Ninti One Limited, 2015).

³⁵ B Spandonide, 'Preferred Transport Futures in Remote Australia' (CRC-REP Working Paper CW, Alice Springs, 2015).

³⁶ Dockery, 'On the Move', above n 34.

³⁷ Ibid; Dockery, 'Reconceptualising mobility', above n 17; Dockery and Hampton, above n 25.

Travel purposes

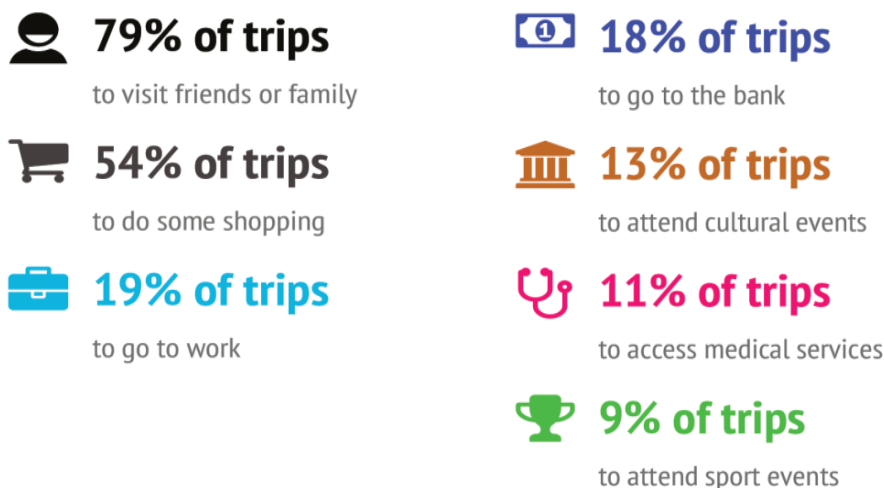


Figure 4: Trip purposes in very remote Aboriginal Central Australian communities (Source: Spandonide, 2015)

Relating these findings to the wellbeing frameworks supports the contention that transport is important for achieving high levels of wellbeing by fulfilling the demand and aspirations for community interaction, economic participation, and empowerment and governance. Access to cultural activities and health services, however, responds to different time constraints, which demonstrates the complexity of specific areas of wellbeing and the unique characteristics of the associated transport demand. The research shows that travel is undertaken for a great variety of purposes. Figure 5 provides information about trip characteristics.

Travel characteristics

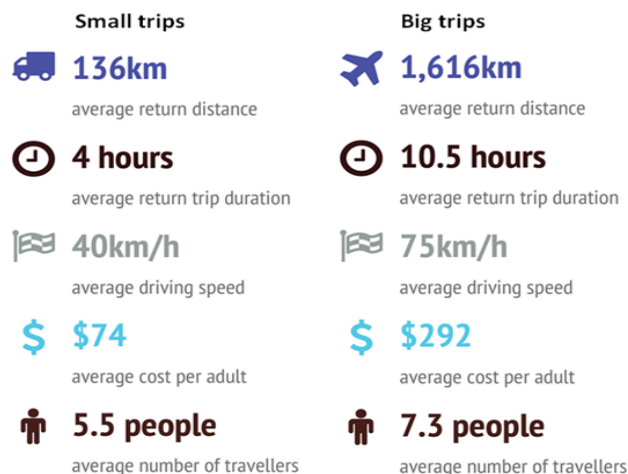


Figure 5: Trip characteristics in very remote Aboriginal Central Australian communities (Source: Spandonide, 2015)

In summary:

- People living in very remote Central Australian communities display a high level of local, regional and long distance mobility and undertake more than one small trip per day (with a portion of these trips allocated to travel to the nearest service centre) and more than one return big trip per month.
- This is remarkable considering the levels of transport disadvantage which affects a majority of Aboriginal people living in remote communities in Central Australia.

- A majority of people perceived transport affordability and accessibility as the main limitations to sustaining their travelling needs but judged transport as being safe and reliable.

Transport disadvantaged groups and ill-being in remote Australia

Low-income people, females, youth/children and elderly, disabled people, people living in outer-urban or regional and remote communities, and people belonging to an ethnic minority are all more likely to experience transport disadvantage.³⁸ These elements often operate in a cumulative way. For instance, people with disabilities experience a large number of barriers to travel and are more likely to be unemployed or to be on a lower income.³⁹ For transport disadvantaged groups, prohibitive costs, low frequency and poor coverage of suitable transport result in a structural loss of independence and decreased liveability.⁴⁰ There is much evidence of latent transport demand from transport disadvantaged groups at a national level.⁴¹

In remote Australia, transport disadvantaged groups are similar; however, the magnitude of disadvantage is different: over half of the population of very remote Australian communities is composed of Aboriginal and Torres Strait Islander people. In remote Aboriginal and Torres Strait Islander communities, low-income people, children or young adults, and people with disabilities are over-represented. Furthermore, while at a national level transport issues start to be more pronounced for age groups over 80 years, in remote Aboriginal and Torres Strait Islander communities, mobility issues are more prominent for age groups over 55.⁴²

As a result, over 75 per cent of the population in remote Aboriginal and Torres Strait Islander communities belong to four or more transport disadvantaged groups. An estimated total of 55 000 people experience very advanced forms of transport disadvantage characterised by the combination of different structural access issues.

Poor infrastructures and equipment, insufficient and uncoordinated services and inappropriate transport regulations tend to increase travelling times and transport costs.⁴³ In some specific areas, transport services have improved over the years. For instance, substantial transport resources have been developed for accessing health services even though significant inequalities still exist;⁴⁴ as an example, the Purple House mobile dialysis truck is an example of best-practice.

A majority of remote Aboriginal and Torres Strait Islander communities are accessible only via unsealed roads.⁴⁵ This requires the use of particularly robust and expensive vehicles. A majority of Aboriginal and Torres Strait Islander people living in remote communities can only afford to purchase conventional vehicles which are at the last stages of their lives.⁴⁶ The average life span of vehicles is, therefore, particularly short with a majority of the cars not able to be used after six months to two and a half years.⁴⁷

Low access to registered vehicles is also a structural challenge for the regional development of remote communities. Holcombe reported typical levels of 5-10 per cent of registered vehicles in remote Aboriginal communities⁴⁸ and Pleshet observed similar levels.⁴⁹ The most recent data and observations from a

³⁸ J Dodson, B Gleeson and N Sipe, 'Transport Disadvantage and Social Status: A Review of Literature and Methods' *Urban Policy Program Research Monograph* (2004) 5.

³⁹ J Evans and M White, 'A Review of Transport Resources for People with Disabilities: A State-of-the-Art Review' (ARRB Transport Research, Review Report 3, Verment South, Victoria, 1998); L Gething, 'Sources of Double Disadvantage for People with Disabilities Living in Remote and Rural in Australian Desert Aboriginal Development' *The Rangeland Journal* (1997) 30(1) 55; Productivity Commission, above n 27.

⁴⁰ Currie et al, above n 15.

⁴¹ Currie and Delbosc, above n 7; J Stanley, D Hensher, J Stanley, G Currie, W H Greene, and D Vella-Brodrick, *Social Exclusion and the Value of Mobility* (Institute of Transport and Logistics Studies, The Australian Key Centre in Transport and Logistics Management, The University of Sydney, 2010).

⁴² Spandonide, above n 35.

⁴³ J F Smoker, *The Terra Nullius of Infrastructure : Roads to Remote Indigenous Towns* (Curtin University, School of Humanities Curtin University of Sustainability Policy (CUSP), 2011).

⁴⁴ Department of Health Northern Territory, 'Review of the Patient Assistance Travel Scheme' (NT Government, 2013); NT Council of Social Service Inc, 'Cost of Living Report Tracking Changes in the Cost of Living, Particularly for Vulnerable and Disadvantaged Northern Territorians: The Cost of Transport in the Territory' (NT COSS, October 2013).

⁴⁵ Smoker, above n 43

⁴⁶ D Young, 'The Life and Death of Cars: Private Vehicles on the Pitjantjatjara Lands South Australia' in D Miller (ed), *Car Cultures* (Berg Publishers, 2001) 35.

⁴⁷ Gerard, above n 1.

⁴⁸ S Holcombe, 'Indigenous Australians and Transport: What can the NATSSIS tell us?' in B Hunter (ed), *Assessing the Evidence on Indigenous Socioeconomic Outcomes: A Focus on the 2002 NATSSIS* (ANU E Press, 2006) 183.

transport study conducted in three remote Aboriginal communities in Central Australia indicated that the situation was the same in 2015.⁵⁰

Access to public transport is another critical issue. Some new transport operators have started supplying a number of remote Aboriginal and Torres Strait Islander communities in Central Australia, but many Aboriginal and Torres Strait Islander communities in Western Australia and Queensland still have no access to regular public transport services.⁵¹

There is a lack of appropriate regional transport policy specific to remote Aboriginal and Torres Strait Islander communities. There are some recent improvements to increase the licensing of people living in remote communities.⁵² Fuel costs are particularly high in these communities and the situation has not changed over the last 30 years.⁵³ Around 8 per cent of average income of those living in these remote communities is allocated to fuel costs with fuel taxes corresponding to about 3 per cent of the average income as opposed to less than 1 per cent nationally.⁵⁴ These extra costs magnify business expenses at several levels of the supply chain, resulting in largely amplified living costs in remote communities - about double the national average for a typical basket of goods.⁵⁵

A vast majority of people living in very remote Aboriginal and Torres Strait Islander communities experience financial hardships in their efforts to cover the essential transport expenses of registering and maintaining a vehicle, or purchasing a public transport ticket.⁵⁶ A lack of appropriate concession policy across different transport services was highlighted in the responses of the transport access survey to the questions about perceived transport issues in remote Aboriginal Central Australian Communities (Figure 6).

Perceived transport issues



Figure 6: Perceived Transport Issues in Remote Aboriginal Central Australian Communities
(Source: Spandonide, 2015)

Dockery and Hampton report that financial issues and poor transport access are the main barriers to transport, before cultural and family reasons (Figure 7).⁵⁷

Moreover, in terms of transport access, subsequent layers of transport inequalities exist: for instance a number of gender transport needs have been reported (Figure 8), with generational differences also identified.

The different factors demonstrate the complexity of travelling activities and access to transport, and the links to different values; these are all considerations necessary for understanding how ill-being can be a consequence of poor transport practices. For example, when promoting culturally inclusive, accessible and safe transport, the different transport needs and access levels of gender and age groups also should be considered.

⁴⁹ N Pleshet, *On the Move in Central Australia: Remote Transportation Update* (Our Place 39, Centre for Appropriate Technology, CAT, 12-15, 2007).

⁵⁰ Spandonide, 'Understanding Transport', above n 35.

⁵¹ ABS, *The Health and Welfare*, above n 27.

⁵² Holcombe, above n 48.

⁵³ G Crough and B Pritchard, *Too Poor to Pay Tax? Aborigines and the Australian Taxation System* (Central Land Council, Alice Springs, NT, 1991).

⁵⁴ NT Council of Social Services, above n 44.

⁵⁵ Department of Health NT, above n 44.

⁵⁶ Spandonide, 'Transport Systems', above n 35.

⁵⁷ Dockery and Hampton, above n 24

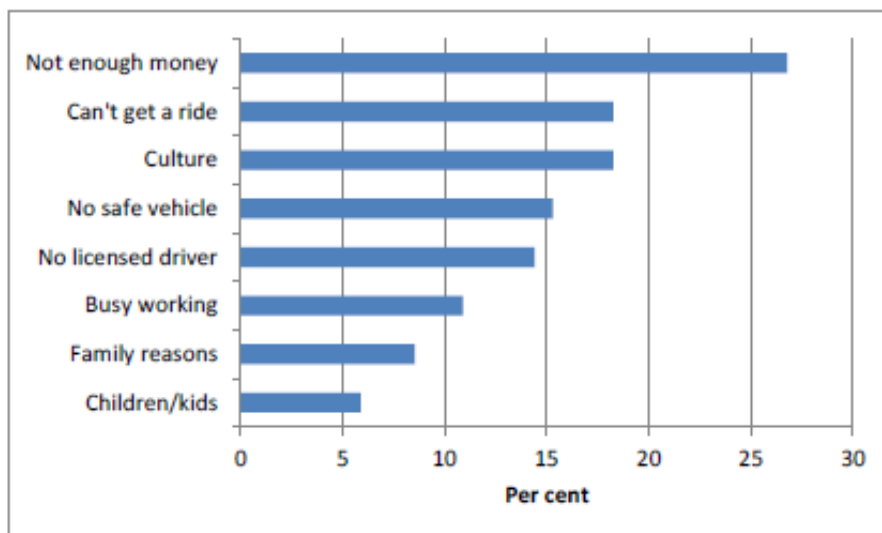


Figure 7: What stops you travelling? (People who wanted to make a trip but could not in the past 12 months)

Gender preference specificities



travel twice more

for education purposes or to go to the bank



travel twice more

to look for work, go to Centrelink and attend sport events



travel twice more

as car passengers or in a bus



travel twice more

driving cars, walking, or by plane

(source: Dockery and Hampton, 2015)

Figure 8: Gender preference specificities in remote Aboriginal Central Australian communities (Source: Spandonide, 2015)

Appropriate transport to foster wellbeing in remote communities

Aboriginal and Torres Strait Islander people living in remote communities have organised several innovative transport systems. For instance, car sharing and lift taking practices respond to the critical shortage of transport vehicles and services. As a result, average car occupancy rates are among the highest in the world.⁵⁸ Bush mechanic and advanced eco-driving practices have also been developed.

In terms of transport safety, Brice (2000) reports that the relative road casualty rate of Aboriginal and Torres Strait Islander people is three times higher the rate of non-Aboriginal and Torres Strait Islander people.⁵⁹ However, the urban NT Aboriginal and Torres Strait Islander population represents just over 10 per cent of the total NT urban population⁶⁰ but 60 per cent of road casualties occurring in urban areas involve Aboriginal and Torres Strait Islander people. That is, there is some evidence indicating that transport-related accidents affect Aboriginal and Torres Strait Islander people much more often in non-remote locations. The rural NT Aboriginal population, representing around 50 per cent of the rural area population, accounts for less than 40 per cent of road fatalities. Post-crash care factors include lack of

⁵⁸ Holyoak et al, above n 3.

⁵⁹ G Brice, *Australian Indigenous Road Safety: A Critical Review and Research Report, with Special Reference to South Australia, other Indigenous Populations, and Countermeasures to Reduce Road Trauma* (Aboriginal Health Council of South Australia Transport, Walkerville, 2000).

⁶⁰ School for Social and Policy Research, *Population Studies Research Brief*, (Charles Darwin University, 2008).

access to care and lack of insurance.⁶¹ In very remote areas, non-Aboriginal and Torres Strait Islander people are over-represented in road casualty rates and as likely to be involved in an accident on remote and rural roads than Aboriginal and Torres Strait Islander people. The statistics published indicate that over the last ten years, the road fatality rate for Aboriginal and Torres Strait Islander people has decreased while the road fatality rate for non- Aboriginal and Torres Strait Islander people has increased.⁶²

Table 2 summarises some areas of research that could lead to improved transport liveability and social sustainability in remote Aboriginal and Torres Strait Islander communities.

Table 2: Areas of research for improved transport liveability and social sustainability in remote Aboriginal and Torres Strait Islander communities.

Categories	Innovation	Benefit
Transport infrastructures	One lane roads, solar roads, new pavements, community road maintenance projects	Improving physical access, more affordable and inclusive infrastructures, encouraging economic participation opportunities, reducing emissions
Transport vehicles	Vehicle sharing, low-cost hybrid four wheel drive, mobile mechanics	Improving physical access, more affordable transport, encouraging economic participation opportunities, reducing emissions
Public transport	Frequent door to door services, community transport	Improving physical access, encouraging economic participation opportunities, reducing emissions
Other transport services	Discounted individual and group travel ticketing	Improving physical access, more affordable and inclusive services, reducing travel needs, encouraging travelling, reducing emissions
Renewable fuel	Electric mobility	More affordable transport, reducing emissions
Transport policy	Integrated planning, tax (registration, license, fuel)	More affordable transport, encouraging travelling
Non-transport solutions	Communication services, services in communities	Reducing travel needs, reducing emissions
Active transport	Green waves, culturally safe planning and payment	Improving physical access, more affordable and inclusive services, reducing travel needs, encouraging travelling, reducing emissions

Some innovative social responses display a number of characteristics of the currently booming sharing economy: sharing vehicles, recycling equipment and encouraging positive relationships are key drivers of transport activities in the bush, and contribute towards enhancing the wellbeing of people living in remote Aboriginal and Torres Strait Islander communities. These transport systems also incorporate specific socio-cultural elements that allow extending transport access in Aboriginal and Torres Strait Islander communities.

Other transport initiatives could be developed. A portfolio of general and targeted transport initiatives has been identified from the transport survey, including infrastructure, private vehicle and public transport access improvements, integrated transport, sharing transport resources, innovative policy frameworks and non-transport solutions, as well as high and low-tech technical innovations.

As transport operating in remote communities is highly capital intensive, transport industry stakeholders (for both freight and public transport services) would greatly benefit from enhanced coordination to better use resources and connection and cross-modal integration. Remote service providers could also benefit from sharing transport resources and capitalising on the existing practices in communities to develop transport sharing schemes for community development projects.

Innovative policy frameworks could include providing additional low cost transport solutions which would contribute to decreasing living costs, supporting active transport (including non-motorised forms of transport involving physical activity, such as walking and cycling), and taking steps towards a long-term future of renewable energy-based transport. Therefore, there is a need for developing a culturally appropriate framework for fast-tracking the adoption of new technologies and innovations in the transport sector.

⁶¹ N Thomson, I Krom and K Ride, *Summary of Road Safety Among Indigenous Peoples* (Australian Indigenous HealthInfoNet, 2009).

⁶² Department of Transport, *Northern Territory Road Injury Statistical Summary* (NT Government, 2013).

Discussion

In the transport survey, a clear majority of respondents expressed an aspiration for purchasing a public transport ticket, registering a vehicle, purchasing fuel or undertaking vehicle repairs (Figure 9).

What would people do with more disposable income?

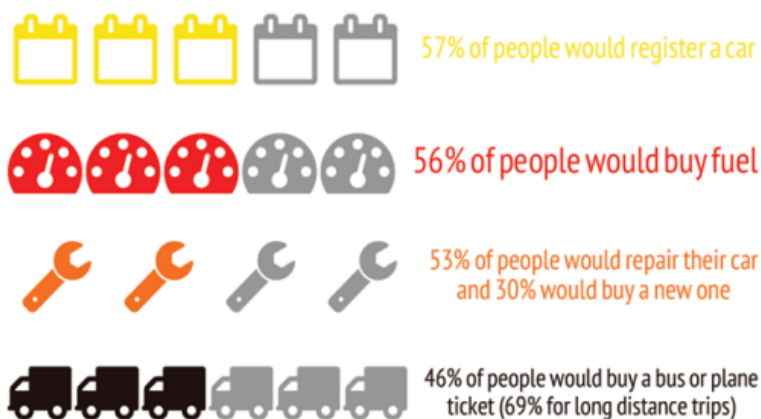


Figure 9: Transport issues in Central Australian Aboriginal communities: What would people do with more disposable income? (Source: Spandonide, 2015)

It is a remarkable finding that, despite a low level of access to public transport (only half of remote Aboriginal and Torres Strait Islander communities in Australia has access to public transport, and the public transport network in Central Australia is not well connected, have a limited coverage, and is based on very low frequencies), public transport incorporates the highest latent transport demand. This illustrates the potential for more appropriate public transport systems in remote Australian Aboriginal and Torres Strait Islander communities.

An inclusive growth of the public transport industry will have to integrate new pricing technologies to increase the convenience of using public transport. The success of the ticketing system of the Centre Bush Bus and the Bodhi Bus in Central Australia (with direct charging from Centrelink accounts) illustrates the importance of convenient payment systems. Moreover, improved public transport access, frequency and pricing would lead to great co-benefits in terms of social sustainability. Despite the benefits, public transport adequacy is decreasing in rural Australia.⁶³ For decades there have been reports of transport cost discrimination and abuses, with overcharging practices in different transport sectors (for purchasing vehicles and maintenance services but also for taxi and bus services). An increased price transparency could be achieved by the use of modern digital technologies and could allow a greater inclusiveness of Aboriginal and Torres Strait Islander people living in remote communities. Having more affordable public transport contributes to more active transport and less emission generation.

From the results of the surveys discussed above, it is possible to extrapolate the potential appropriateness and positive impacts in terms of wellbeing from a range of transport projects and initiatives. In Table 3 the different transport innovations have been plotted in a matrix within the wellbeing framework.

The table presents key conclusions/recommendations. Improving transport infrastructures might be perceived as an obvious but costly priority but other transport alternatives might well be more cost effective and appropriate as ways to improve wellbeing in remote Aboriginal and Torres Strait communities.

⁶³ Morton and Edwards, above n 20.

Table 3: Matrix of transport innovations related to the wellbeing framework

Transport innovations	Community	Education	Health	Culture	Economic participation / living standards	Empowerment and governance
One lane sealed vs double unsealed	x	x	x	x	x	
Solar roads					x	
New pavements	x	x	x	x	x	
Community road maintenance	x				x	x
Vehicle sharing (govt)		x	x		x	x
Low-cost hybrid four wheel drive	x	x	x	x	x	x
Mobile mechanic services	x	x	x	x	x	x
Frequent door to door services	x	x			x	
Discounted ticketing	x	x			x	
Community transport	x	x	x	x	x	x
Electric mobility					x	
Integrated planning	x	x	x	x	x	
Concession registration/license	x	x	x	x	x	x
Fuel excise	x	x	x	x	x	
Communication services	x	x	x	x	x	x
Services in communities	x				x	x
Active transport	x		x	x	x	x
Culturally safe planning	x	x	x	x	x	x
Tolls and road subsidies			x		x	x

The transport initiatives which would have the broadest positive impacts in terms of wellbeing are providing concessions for registrations and licenses, mobile mechanic services, access to low cost four wheel drive efficient vehicles, and appropriate community transport systems, as well as two non-transport solutions: operating with culturally safe and inclusive planning standards, and supporting projects which would improve access to communication. The advantage of these alternatives consists of the particularly low level of entry costs and a relatively high level of cost-effectiveness.

Non-transport innovations are also essential for improving transport efficiency, reducing transport needs (which would be particularly appropriate in the context of the very high latent transport demand in remote communities) and reducing transport emissions. This includes developing additional local services for remote Aboriginal and Torres Strait Islander communities, encouraging local production of goods, promoting on-line access to services and information, providing appropriate maintenance services within communities and providing appropriate services for people with disabilities (Figure 10).

When asked about the options that would effectively reduce transport needs, participants of the transport survey also mentioned community transport services and special services for mobility impaired people. This is a reminder that transport initiatives targeting the specific inaccessibility of the most disadvantaged groups of people at a community level is particularly important. Indeed the framework does not encapsulate the complexity of wider impacts of ill-being at a community level caused by the inability of the most disadvantaged sub-categories of people living in remote Aboriginal and Torres Strait Islander communities to access transport, nor does it capture the extent of the wider benefits that transport innovations could provide at a societal level.

Travel reduction options

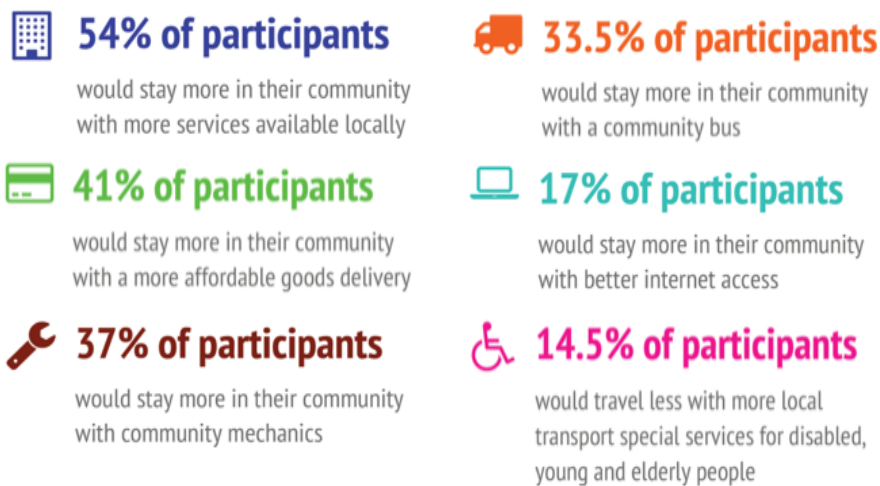


Figure 10: Travel reduction options for people living in remote Aboriginal Central Australian communities (Source: Spandonide, 2014)

For instance, while the relative distances between remote communities and large service centres seem to exclude the use of non-motorised or low powered transport, active transport is still relevant in remote communities for local transportation. Active transport costs less public and private money in terms of infrastructure investment and is generally more inclusive of groups of mobility-impaired people. Encouraging active transport can also lead to substantial benefits in reducing externalities. Health cost benefits are obviously significant, both in terms of direct positive impacts of increased physical activity and in terms of reduced local pollution.⁶⁴ Pollution from transport activities claims more lives each year than road accidents.⁶⁵ The amount of CO₂ emission reduction delivered by active transport compared to motorised transportation significantly differs between different studies, ranging from 1.5⁶⁶ to around 30.⁶⁷ The variations can be explained by the distance differences in the relative baseline scenarios: walking and cycling most often occur over shorter distances⁶⁸ and are not able to effectively replace the needs for motorised transport for long distance trips. Even then, local trips represent 15-20 per cent of the annual distance travelled and switching to active transport for local trips still provides a 20-30 per cent reduction both in GHG emissions and carbon footprint.

This is further justified by the fact that (as shown in Table 3) integrated planning and cross-agencies collaboration and active transport would also have broad positive impacts. These types of transport alternatives perform as well in terms of appropriate ways to enhance wellbeing as do low-cost road projects or a fuel excise policy, and would be able to be implemented with substantially less capital investment.

Furthermore, the social benefits of increased disposable incomes at a community level in a context of durable economic disadvantage should not be underestimated. Further research is needed to understand the line-up and the scale of the multiple benefits at a community and an interpersonal level of active transport in terms of the cultural appropriateness, socio-cultural engagement and quality of life.⁶⁹ As the mutually beneficial outcomes derived from reduced emissions and increased uses of active transport are shared among the society, there is robust scope for providing financial incentives and high quality infrastructures for developing active transport in large remote communities.

⁶⁴ C G Pooley et al, 'Can Increased Walking and Cycling Really Contribute to the Reduction of Transport-Related Carbon Emissions?' in T Ryley and L Chapman (eds), *Transport and Climate Change* (Emerald, Bingley, 2012).

⁶⁵ Bureau of Transport and Regional Economics, 'Health Impacts of Transport Emissions in Australia: Economic Costs' (Australian Government, Canberra, ACT, 2005); J Lelieveld, J S Evans, M Fnais, D Giannadaki and A Pozzer, 'The Contribution of Outdoor Air Pollution Sources to Premature Mortality on a Global Scale' *Nature* (2015) 525 (7569) 367.

⁶⁶ A Duffy and R Crawford, 'The Effects of Physical Activity on Greenhouse Gas Emissions for Common Transport Modes in European Countries' *Transportation Research Part D: Transport and Environment* (2013) 19 (March) 13.

⁶⁷ Camden Council, *Carbon Emissions per Transport Type* (Clear Zone Partnership, 2009).

⁶⁸ C Mason, 'Transport and Health: En Route to a Healthier Australia?' *Medical Journal of Australia* (2000) 172 230.

⁶⁹ C Gray, R Macniven and N Thomson, 'Review of Physical Activity Among Indigenous People' *Australian Indigenous Health Bulletin* (2013) 13 (3).

Using the same logic, accelerating the technological readiness of remote communities could have a number of significant long-term sustainability benefits. With increased battery capacity and renewable energy generation facilities in remote communities, an integrated energy system could be created via the use of electric driverless shared vehicles as potentially mobile energy storage components. Such a system could considerably improve off-the-grid livelihoods and effectively reduce the costs associated with living in very remote locations.

Work practices are likely to become less place-independent as the general trend towards ultra-mobility develops around the world over the next 50 years. Moreover, future technological innovations are anticipated to deliver significant progress in terms of wellbeing in the transport industry itself.⁷⁰ A broad reflection on future sustainable remote livelihoods could include access to goods and services, employment, enhanced social capital, socio-cultural activities, and has to integrate safer and more affordable and inclusive means of transportation.⁷¹

This article highlighted the importance of transport access for remote ill-being and wellbeing. Having good appropriate transport access to country allows fulfilment of the aspiration to care for country, which is one of the most positive connections between people and places and is highly related to level of wellbeing. By establishing a link between different multi-disciplinary community-based research programs and combining some of the key findings, this research informs on the type of policy that might be suitable for remote Aboriginal and Torres Strait Islander communities: the study confirms that long-term low wellbeing levels tend to cause exponential costs and externalities,⁷² and that an effort to plan and develop a comprehensive set of well-designed cost-effective remote transport resources at a systemic level is necessary to sustain the exceptional and singular socio-cultural potential that defines each of these communities. There is also a strong relevance to other remote regional areas in the world where ethnic minorities are confronted with similar types of transport inequality issues because their transport policies and systems are not appropriately designed.

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⁷⁰ L Mason, A Lederwasch, T Prior and D Giurco, 'Vision 2040 Mining, Minerals and Innovation Starting a National Conversation about Sustainable Mineral Production (Institute for Sustainable Futures, UTS, Consultation Paper, prepared for CSIRO Minerals Down Under Flagship, Sydney, NSW, May 2011).

⁷¹ A Goller, *Picture the Future of Mobility* (Siemens, Australia, 2011).

⁷² T Rath and J Harter, (2010), *The Economics of Wellbeing* (Gallup, 2010).

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ARTICLE

Reshaping the economic landscape in the Santiago river basin, Jalisco, Mexico: An ecological economics perspective of regional integration

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ABSTRACT

Ecological Economics studies social metabolism; that is, the material and energy flow into and out of the economy. Using the ecological economics perspective, we analyse the transformation of the economic landscape of the Santiago river basin, Mexico. We discuss why the appropriation of water resources is one of the most important drivers of North American economic integration. We argue that the theoretical model of neoextractivism can explain the dynamics of social metabolism behind the North American Free Trade Agreement (NAFTA).

Keywords

social metabolism; regional integration; neo-extractivism; NAFTA

Introduction

In this paper, we explore the transformation of the productive space in Mexico from the perspective of the economic specialisation of globalisation. We premise our arguments on the idea that the prevailing capitalist system is experiencing a crisis of a structural nature. The paper discusses the thesis of authors such as Harvey,¹ Klein,², Farley et al³ Foster⁴ and Toledo,⁵ which argues that the distinguishing feature of the current stage of globalisation is the synergy between environmental degradation and recurrent economic crises.

The main focus of this paper's discussion is the scarcity of water resources from the Santiago river basin in western Mexico. Recent developments in the region show how the North American Free Trade Agreement (NAFTA) has impaired the life support systems of the river basin. Local and federal efforts related to the promotion of Mexican exports do not consider environmental externalities, even though such externalities are significant enough to call into question the very premises of economic efficiency and the legitimacy of capitalism as an appropriate operating system for Mexico.

NAFTA caused a fundamental transformation of the economic structure of Mexico, transforming economic regions and impacting local economic agents. Most traditional sectors disappeared or were absorbed by foreign capital. In effect, only a few economic activities, such as maquiladoras (exporting assembling plants) and high value agricultural commodities exports, benefited from access to the US market enabled by NAFTA.

In recent years, the emergence of the Chinese economy as a global force has greatly impacted the Latin American economy and NAFTA, generally, by changing market conditions in the US and thus the market conditions for Mexican exports. The effect has been an increase in the exploitation rate of Mexico's natural resources.

This paper focuses on the developments related to the transformation of the Santiago river basin as a result of the implementation of a new model of participation in hemispheric integration, called neo-extractivist policies. These policies have reshaped the local economy and the environment. We analyse the concept of neo-extractivism in relation to the exploitation of water resources as a source of competitive advantage in hemispheric markets.

Methods

The context of this paper is the theory of the systemic crisis of capitalism. For Amin,⁶ the distinguishing feature of the current situation is the increasing hegemony of transnational corporations which control the investment and trade policies of nation states. Using the logic of capital accumulation, the current rate of exploitation of the natural environment exceeds its limit of resiliency. Therefore, the depletion of natural resources has become the main factor in the recurrent financial and economic crises.

The current systemic crisis has its roots in old-style capitalism. As authors such as Soddy,⁷ Boulding⁸ and Polanyi⁹ note, the dynamics of sustained growth of the world economy inevitably leads to a metabolic rift; that is, 'a rift of the interdependence process of the social metabolism, a metabolism prescribed by the natural laws of life itself'.¹⁰

¹ David Harvey, *Diecisiete Contradicciones y el Fin del Capitalismo* (IAEN, 2014).

² Naomi Klein, *This Changes Everything: Capitalism vs the Climate* (Penguin, 2014).

³ Joshua Farley et al, 'Monetary and Fiscal Policies for a Finite Planet' (2013) 5(6), *Sustainability*, DOI 10.3389/su5062802.

⁴ John Bellamy Foster, 'The Epochal Crisis' (2013) 65(05) *Monthly Review* <<http://monthlyreview.org/2013/10/01/epochal-crisis/>>.

⁵ Víctor M Toledo, 'Diez Tesis Sobre la Crisis de la Modernidad' (2012) 33 *Polis*, DOI: 10.4067/s0718-65682012000300014>.

⁶ Samir Amin, *Escritos para la Transición* (Oxfam, 2010).

⁷ Frederick Soddy, *The Role of Money: What it should be, Contrasted with what it has Become* (Routledge, 1934).

⁸ Kenneth E Boulding, 'The Economics of the Coming Spaceship Earth' in H Jarrett (ed) *Environmental Quality in a Growing Economy* (MD: Resources for the Future/John Hopkins University Press, 1966), 3 <http://arachnid.biosci.utexas.edu/courses/THOC/Readings/Boulding_SpaceshipEarth.pdf>.

⁹ Karl Polanyi, *La Gran Transformación. Los Orígenes Políticos y Económicos de Nuestro Tiempo* (Fondo de Cultura Económica, 1992).

¹⁰ Karl Marx, *Capital* (Vintage, vol 3, 1981), 949.

The current stage of the systemic crisis has found expression in the instability of the global economy and the realignment of world powers, in particular, the rise of China's economy. In the first decade of the twenty-first century, the Chinese economy became one of the leading importers of most raw materials in the world. For Latin America, the important consequence of the shift in world economy was the implementation of a new strategy for the region: neo-extractivism.¹¹

'Neo-extractivism' is defined as the abandonment of former strategies aimed at achieving industrial development through regional integration, to strategies aimed at specialising in the exploitation of natural resources. Revenues from exports as a result of the implementation of neo-extractivist policies in countries with progressive governments (Bolivia, Venezuela, Argentina and Brazil) were used for the development of social programs and alleviation of poverty. In countries with conservative governments (Mexico and Columbia), however, the revenues from extraction of natural resources were not used in social policies but as incentives for foreign investment; that is, neo-extractivism served as a tool for foreign companies to obtain access for the purposes of exploiting minerals, energy and water.

The economies of both progressive and conservative states have been negatively impacted by the deceleration of the Chinese economy in the second decade of the twenty-first century, and the resultant slowdown of Chinese demand for raw materials from Latin America. Reduced demand has affected social programs, exacerbated the struggle for markets and raw materials, and has intensified the pressure for control of natural resources.

The Mexican economy was differently impacted because of its participation in NAFTA; the influence of the China factor for Mexico must be interpreted in the context of the economic disputes between the US and China. This situation has led to a reorientation of trade and investment flows in Mexico and to a new configuration of productive space (ie, special distribution and organisation of production). Such is the case of the Santiago river basin and the exploitation of its water resources.

One of the main forms in which North American economic integration reshapes the productive space in Mexico is through water resources relocation. This relocation occurs through real water transfers and through virtual water exports. Both real and virtual water relocation occurs because water has been used as a competitive factor for Mexican exports due to its apparent low price relative to water prices around the world. In Mexico, water is free in the agricultural sector and priced extremely low for industry and domestic use (less than US\$0.50 per cubic metre).

Access to high quality water resources is one of the main factors necessary for regional development, and the main driver for their economic organisation.

The Santiago river region is an extremely important socio-economic and environmental area in the country. Our research examined the new geo-economic configuration in the upper basin of the Santiago River; that is, the region that stretches from Chapala Lake to the city of Guadalajara, in the state of Jalisco (see Map 1). Following Mesclier's methodology,¹² we describe how changes to the socioeconomic space have been driven by structural changes in the regional economy. According to Mesclier, the new organisation of the space results from a combination of international and local factors. In order to understand the logic of the new organisation of the space, we analyse changes in the social metabolism of the area; that is, the allocation of production areas and the economic and water resources flows.

¹¹ Maristella Svampa, 'Consenso de los Commodities y Lenguajes de Valoración en América Latina' (2013) 244 *Nueva sociedad* <<http://nuso.org/articulo/consenso-de-los-commodities-y-lenguajes-de-valoracion-en-america-latina/>>.

¹² Evelyne Mesclier, 'Por Qué y Cómo Estudiar y Comparar las Evoluciones de los Territorios Locales en un Mundo Globalizado' (2013) 25 *Espacio y Desarrollo* <<http://www.documentation.ird.fr/hor/fdi:010065656>>.

Results

Eden describes the logic of the economic integration of Mexico with the US as a process in which Mexico and the US went 'from silent integration to strategic alliance'.¹³ The main impact of the integration strategies is expressed in the transformation of the economic landscape. Because of Mexico's economic policy orientation to the American market as a result of NAFTA, local Mexican producers focused on export-oriented activities and, by doing so, modified land use patterns and the exploitation of natural resources, particularly the exploitation of water resources.

Disputes over the allocation of water resources have now become a significant political and economic factor in the region. Water scarcity has become the major limiting factor of economic growth in the Santiago river basin as well as a risk factor for the stability of major local cities of the state, such as the capital, Guadalajara.¹⁴ The state of Guanajuato, which borders the Santiago basin and is the home to an industrial cluster, also suffers from significant water limitations. Tagle states that the water deficit in Guanajuato has reached 128 million cubic metres.¹⁵ To solve the water deficit problem, a decision was taken to construct a 140 kilometre aqueduct to carry 3.8 cubic metres per second of water from the Santiago River to the industrial districts and the development of urban areas in Guanajuato.



Map 1: Mexico, showing the study area: Santiago basin¹⁶

The change of water allocations, especially the transfer (export) of water¹⁷ from the basin, has resulted in a demise of traditional agriculture, a growth of high value agricultural exports, an increase in numbers of firms that subcontract to the US industry (maquiladoras), a growth of export oriented industries and the acceleration of urban sprawl.

Changes in agriculture

Agricultural production has transformed significantly as a result of NAFTA. The production and total harvested area of traditional crops, such as maize, has greatly reduced and Mexico currently imports 43 per cent of its

¹³ Lorraine Eden and Maureen Appel Molotov, 'From Silent integration to strategic Alliance: The Political Economy of North American Free Trade' in Gustavo Vega, *Liberalización Económica y Libre Comercio en América del Norte* (COLMEX, 1993) 23.

¹⁴ Daniel Tagle, *La Crisis Multidimensional del Agua en el Estado de Guanajuato* (Porrúa, 2014).

¹⁵ Ibid

¹⁶ Manuel Guzmán, *Chapala una Crisis Programada* (Grupo Parlamentario del Partido Verde, 2003).

¹⁷ The quantity of water embedded in the production of commodities produced for international markets is termed 'virtual water exports'. Virtual water is the water that loses its opportunity cost after being used in the production of commodities.

food.¹⁸ Simultaneously, there has been a boom in the agro industrial sector, particularly in high-value commodities such as berries and vegetables. These agricultural products use great quantities of water. The low costs of water in Mexico give Mexican berries and vegetables an important comparative advantage in the US market. Therefore, virtual water exports play an important role in the boom of Mexican agricultural commodities.¹⁹

Industrial policy

The maquiladora industry is considered the most important success story of the Mexican integration policy. In 2015, 83 per cent of Mexican export sales came from the maquiladora sector.²⁰ The figure in the state of Jalisco is similar. In 2013, 203 plants were active in the state, most in the Santiago river basin. The 'Mexican silicon valley', which contains the maquiladoras' productive clusters, is located in the suburban area of Tlajomulco in Guadalajara. In 2012, maquiladoras generated sales of more than US\$17 520 million.²¹

Initially, the creation of the free trade region enabled Mexican producers to compete with relative success against Chinese producers. However, Chinese producers have steadily gained a higher competitive edge, necessitating a profound transformation in Mexico's development strategy. The main elements of the new strategy were the opening of the energy sector to foreign direct investment and the realignment of the economic policy on export oriented infrastructure. This is particularly visible in the case of policies aimed at developing the auto industry.²² The industrial development policy of the Mexican Federal Government specifies special 'dynamic areas' as 'appropriate' regions for the export auto industry.²³

Figure 1 shows the increased performance of exports from the automobile sector since the 2008 global financial crisis.

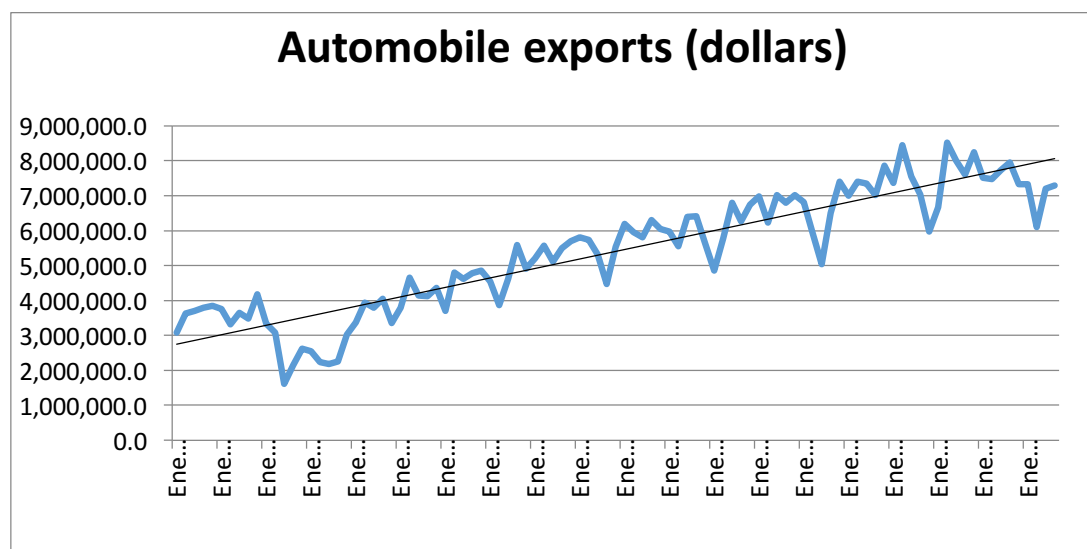


Figure 1: Fuente: Banco de México (source: Banco de México, *Balanza de pagos* (March 2016))

¹⁸ Ernesto Medez, 'Es Hora de Ir al Grano; México Importa 43% de los Alimentos', *Excelsior*, 17 de Mayo 2013 <<http://www.excelsior.com.mx/nacional/2013/05/05/897514>>.

¹⁹ Salvador Peniche, *Agua y Economía Fresera en la Cuenca del Río Duero. La Transformación del Modelo Hidroagrícola Mexicano* (Guadalajara UDG, 2005).

²⁰ Anilu Esquivel, 'Industria Maquiladora de Exportación: La Joya de la Corona' (2015) 283 *Manufactura* <<http://www.manufactura.mx/industria/2015/07/01/industria-maquiladora-de-exportacion-la-joya-de-la-corona>>.

²¹ Laura Gutiérrez, *La Industria Maquiladora de Exportación, Importante en el Desarrollo Económico de Jalisco* (12 September 2013) *Axopolis* <<http://www.axopolis.com/organismos-ip/8060-la-industria-maquiladora-de-exportacion-importante-en-el-desarrollo-economico-de-jalisco-jose-palacios.html>>.

²² Jorge Suarez, *Ahora o Nunca. La Gran Oportunidad de México para Crecer* (Debate, 2012); Tonatiuh Moreno, 'Plan Maestro del Corredor Logístico Industrial Automotriz del Bajío' (2015) 17(1) *Quivera* 3.

²³ The focus on the automobile sector resulted from of the 2011 *Wassenaar Agreements*, which established a strategic cooperation for the strengthening of the American economy under the new conditions of globalisation.

Urban sprawl

In addition to the changes in the pattern of economic exploitation of water resources, the new industrialisation model caused an increase in urban populations, particularly in Guadalajara. According to the state statistics agency, in 2010, 83 per cent of the states' 4 434 878 inhabitants lived in urban areas, with 60.33 per cent in Guadalajara.²⁴ In all, in the 22 years of NAFTA, a new organisation of space was created in the Santiago river basin, and it was access to cheap water that played a significant role in the reshaping of the socio-economic landscape.

Conclusion

There is evidence to suggest a close relationship between the instability of the world economy and the problems of over-exploitation of natural resources. The new developments in the world economy continue to deepen the metabolic rift, especially in Latin America. One expression of this process is the creation of a new development strategy called neo-extractivism. With the decline in the demand for natural resources in industrialised countries, the strategy for gaining revenue from the export of raw materials is at a crossroads. In most Latin American countries with liberal governments the revenues from natural resource exports have been the main source of most social programs; the decline in the foreign sales of these commodities has therefore caused serious structural consequences, threatening long-term growth strategies.

In the case of western Mexico, the overexploitation of water reserves through trade in virtual water from the upper basin of the Santiago River has been a central element in the realignment of the productive space. Because water is a 'free' resource for Mexican peasants, it has been used as a subsidy for Mexican export sales. Changes in water use patterns, the virtual export of water and water relocation strategies have caused important regional disparities, threatening the future basis of water as central to the economic development model.

The new economic context can be seen as an area of challenge for the Mexican economy. The viability of the country's economy will depend on the implementation of proper integration strategies. It is necessary to reverse the neo-extractivist model and start a new national project that aims to protect and develop scarce natural resources.

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²⁴ IIEG (Instituto de Estadística y Geográfica), (March 2016) <<http://iieg.gob.mx/index.php>>.

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ARTICLE

Australian local government sustainability and transformation: Structural reform and the fit for the future (F4F) reform initiative in New South Wales — forced council mergers

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ABSTRACT

For decades, sustainability and, especially, long-term financial sustainability and transformation, primarily through structural and other modes of reform, have constituted major concerns and problems for 'grass roots' Australian government. Usually the catalyst for change in these areas has emanated from state and territory jurisdictions which have imposed reforms, often with little regard for local councils or the communities they serve.

Since August 2011, a structured process of dialogue and consultation has continued in the New South Wales local government sector, with the objective of implementing beneficial reform. The paper briefly explains this transformation initiative, particularly the NSW Government Fit for the Future (F4F) process and the current 35 council merger proposals.

The process is considered from the perspective of a long-term local government practitioner, elected representative, Mayor, and former member of the NSW Local Government Acts Taskforce (LGAT).

Keywords

local government, mergers, transformation, Fit for the Future, financial sustainability.

Introduction

Local government transformation in Australia is not new. Consolidation of local government areas has been occurring over many decades, accelerating from the early 1990s when the Kennett reforms were imposed in Victoria (VIC).¹ The Kennett reforms commenced the major changes that have since been implemented across all Australian jurisdictions. From 1910 to 2012, the mainly compulsory consolidation of local councils in Australian jurisdictions has reduced council numbers in New South Wales (NSW) from 324 to 152; VIC from 206 to 79; Queensland (QLD) from 164 to 73; South Australia (SA) from 175 to 68; Western Australia (WA) from 147 to 139; Tasmania (TAS) from 51 to 29; and, since 1995, in Northern Territory (NT), from 63 to 16.²

Structural reform through council mergers has been the 'blunt instrument' and predominant local government change mechanism, mostly initiated by state governments. Other reform methods have included introducing new legislation, a common feature in each jurisdiction, especially new local government legislation, facilitating the structural reform process; and functional reform through transfer of various tasks usually by state or territory governments. The latter process has occurred without commensurate resources and financial reforms.³

Garcea and LeSage⁴ identified five primary types of local government reform:

1. Structural reforms: Involve changes to the 'overall configuration' of the boundaries, number and types of municipal authorities; Functional reforms: Consist of changes to both the formal and informal functions performed by municipal governments, including the realignment of functions between local councils and other levels of government or other kinds of local governments;
2. Financial reforms: Represent revisions to the financial and/or budgetary frameworks of local councils, including changes to revenue sources, expenditures (in the form of financial responsibilities, requirements or restrictions on expenditures), and the general management of financial resources;
3. Jurisdictional reforms: Involve changes to the powers conferred on local councils to make decisions regarding, among other things, the structures, functions and finances of municipal governments; and
4. Internal organizational and
5. managerial reforms: Represent changes to the legislative, executive, management, and administrative structures and processes of local councils.⁵

This paper has eight sections: section two briefly notes the local government mergers in NSW to 2004 and introduces the current NSW local government transformation process; section three considers the roles of the government-established Independent Local Government Review Panel (ILGRP) and the Local Government Acts Taskforce (LGAT); section four considers integrated planning and reporting (IP&R) in the NSW local government context; the NSW Government response to the ILGRP and LGAT final reports, termed Fit For the Future (F4F), is addressed in section five; the role of the Independent Pricing and Regulatory Tribunal (IPART) in the transformation and F4F process is considered in section six; the current NSW Government merger proposals and public examination processes, announced on 18 December 2015, are considered in section seven; and concluding remarks are offered in the final section.

Current NSW local government transformation process

In 1910, there were 323 NSW local government councils.⁶ There have been several council merger processes since 1973-74, when the Barnett Committee reduced the then 198 councils to 177.⁷ A voluntary process

¹ R Kiss, 'Local Government to Local Administration: The New Order', in B Costar and N Economou (eds), *The Kennett revolution: Victorian Politics in the 1990s* (University of NSW Press, 1999) 110; D O'Neill, 'Victoria: Rolling back - or reinventing - The Kennett Revolution?' (2000) *Australian Journal of Public Administration*, 59(4) 109.

² B Dollery, B Grant and M Kortt, 'An Evaluation of Amalgamation and Financial Viability in Australian Local Government (2013) *Public Finance and Management* 13(3) 215, 218.

³ P Allan, *2009 NSW Local Government Financial Sustainability Review: How Sustainable are the Existing Financial and Infrastructure Policies of NSW Councils?* (Fiscal Star Services, 2009) i-vi, 1-22.

⁴ J Garcea and E C LeSage, *Municipal Reform in Canada: Reconfiguration, Re-Empowerment and Rebalancing* (Oxford University Press, 2005).

⁵ Dollery et al, above n 3, 855.

⁶ Ibid.

occurred in 1999-2000, resulting in only five reductions from 177 to 172 councils.⁸ The small number of voluntary amalgamations at that time underlined that councils were reluctant to voluntarily merge. Forced amalgamations in 2003-04 reduced council numbers to 152⁹ and there have been no further NSW council voluntary mergers since that time.

The present, ongoing NSW local government reform process commenced with the 'Destination 2036' assembly at Dubbo in August 2011,¹⁰ an initiative of the then NSW Minister for Local Government, Hon Don Page. All NSW mayors and general managers attended or were represented. There was agreement that changes should and would occur in NSW local government and that reform was essential.¹¹

The Dubbo gathering culminated in the *Destination 2036 Action Plan*,¹² released in June 2012. The ambitious plan objectives were to achieve efficient and effective service delivery; quality governance; financial sustainability; appropriate structures in local government; and stronger relationships between state and local government.¹³

Independent Local Government Review Panel (ILGRP) and Local Government Acts Taskforce (LGAT)

Minister Page then appointed the three-person ILGRP, led by Professor Graham Sansom, and requested that it consult widely and take into consideration the government's 'no forced amalgamations' policy. The ILGRP was provided broad terms of reference to investigate and identify options for governance models, structural arrangements and boundary changes for local government in NSW.¹⁴ ILGRP produced five discussion papers which stimulated much discussion, debate and well over 1000 submissions. The papers were: *Better, stronger local government: The case for sustainable change*; *Strengthening your community: Consultation paper*; *Better, stronger local government: The case for sustainable change*; *Future directions for NSW local government: Twenty essential steps*; and *Strengthening NSW remote communities: The options*.

In October 2013, the ILGRP delivered its final report, *Revitalising local government*, containing 65 recommendations.¹⁵ The principal recommendations concerned fiscal responsibility; strengthening revenues; meeting infrastructure needs; improving productivity and accountability; political leadership and good governance; advancing structural reform; establishing regional joint organisations; rural councils and community boards; metropolitan, rural and regional areas; the far west; and state-local relations. The ILGRP strongly held the view, as did councillors at Dubbo two years earlier, that no change was not an option.¹⁶

To assist the ILGRP, the NSW Division of Local Government requested NSW Treasury Corporation (TCorp) to provide material on council financial sustainability and to prepare reports for all 152 NSW Councils. TCorp's tasks included creating a definition of financial sustainability; establishing a set of appropriate benchmark indicators; developing an assessment methodology to compare councils against a sustainability definition; and reviewing historical financial results and the long term financial forecasts of each council.¹⁷

TCorp's key findings included that the majority of councils were reporting operating deficits; that financial sustainability was deteriorating; that an asset management gap existed; and that prevention of further financial deterioration was essential. The TCorp made recommendations that, at least: break-even operating

⁷ I Tiley, *Australian Local Government Council amalgamations: A Case Study of Clarence Valley Council, New South Wales*, (Doctor of Philosophy, University of New England, 2011).

⁸ Ibid 142-144.

⁹ Ibid 165.

¹⁰ Office of Local Government, *Destination 2036* (2011) 1 <<http://www.olg.nsw.gov.au/strengthening-local-government/local-government-reform/destination-2036>>.

¹¹ Elton Consulting, *Destination 2036* (Draft Action Plan, December 2011).

¹² Elton Consulting, *Destination 2036 Outcomes Report* (NSW Division of Local Government, 2011b).

¹³ Destination 2036 Action Plan Implementation Steering Committee, *Destination 2036 Action Plan June 2012* (Division of Local Government NSW, 2012).

¹⁴ Independent Local Government Review Panel, *Revitalising Local Government: Final Report of the NSW Independent Local Government Review Panel* (Sydney, NSW, 2013) 9.

¹⁵ Ibid.

¹⁶ Ibid 16.

¹⁷ New South Wales Treasury Corporation, *Financial Sustainability of New South Wales Local Government Sector: Findings, Recommendations and Analysis* (Sydney NSW, 2013).

positions were essential; pricing paths were needed for the medium term; rate increases must meet underlying costs; asset management planning must be prioritised; councillor and management capacity must be developed; there be improved use of restricted funds; and increased use of debt.¹⁸ Assessing the finances of all NSW councils, TCorp found that 25 per cent of councils were then in a weak or very weak financial position with a further 46 per cent expected to be in that position by 2016. An audit of each NSW council's infrastructure backlog was also delivered in June 2013. The combined backlog was \$7.4 billion, of which roads comprised \$4.5 billion.¹⁹

In 2012, the Minister also established the four-member Local Governments Acts Taskforce (LGAT), including the author, and charged it with making recommendations for a new local government Act for NSW and reviewing the *City of Sydney Act*.²⁰ The LGAT released two discussion papers: a *Preliminary ideas paper* and *A new local government Act for NSW: Discussion paper*. In October 2013 LGAT provided the Minister a final report: *A new local government Act for New South Wales and review of the City of Sydney Act 1988*, which concluded that many aspects of the *Act* still worked well; that the *Act's* effectiveness had been eroded because of about 170 incremental amendments since 1993; and that the Integrated Planning and Reporting (IP&R) provisions of the *Act*, while providing the primary strategic planning mechanism for local government, needed greater prominence and centrality in a new Act. The LGAT also recommended a range of means for streamlining and simplifying a new Act.²¹

Integrated planning and reporting in NSW local government

Integrated planning and reporting (IP&R) is a generally well-accepted major transformation introduced into NSW local government in 2010,²² which changed how councils planned and conducted their activities. IP&R is predicated on genuine up-front community engagement. The IP&R framework allows NSW councils to draw their various plans together, to understand how they interact, and to secure the maximum leverage from their efforts by planning holistically for the future. The framework consists of a 10-year community strategic plan; a resourcing strategy comprising a long term financial plan, workforce management plan and asset management plan; a four-year delivery program; a one-year operational plan and an annual report.²³ During the LGAT consultations it became evident that local government valued IP&R and strongly supported its strengthening and centralising in a new local government Act. In October 2014 the government responded by essentially supporting all the LGAT recommendations.

NSW Government response to ILGRP and LGAT: Fit for the Future (F4F)

In September 2014, the government adopted about two-thirds of the ILGRP recommendations.²⁴ The most important recommendations were to: establish an integrated fiscal responsibility program to address the TCorp findings referred to in section three; place local government audits under control of the NSW Auditor General; replace rate-pegging with a system of rate benchmarking or by removing complexity, costs and constraints to sound financial management; establish a borrowing facility to encourage increased use of debt where appropriate; adopt a uniform core set of performance indicators for councils linked to IP&R requirements; provide additional options for structures such as joint regional organisations, rural councils and community boards; and encourage voluntary council mergers.²⁵ For reasons which were not explained, the government did

¹⁸ Ibid 8-9.

¹⁹ Ibid.

²⁰ Division of Local Government, *Local Government Acts Taskforce Terms of Reference* (2012).

²¹ Ibid.

²² NSW, *Second Readings Speech Local Government Amendment (Planning and Reporting) Bill 2009: Agreement in Principle*, 25 June 2009 (B Perry).

²³ Division of Local Government, *Integrated Planning and Reporting Guidelines for Local Government in NSW* (2013).

²⁴ NSW Office of Local Government, *Fit for the Future: NSW Government Response - Independent Local Government Review Panel Recommendations and Local Government Acts Taskforce Recommendations* (NSW Government, 2014).

²⁵ Ibid 3-21.

not support the ILGRP recommendation to refer a number of council merger proposals to the Local Government Boundaries Commission for examination.²⁶

Also in September 2014, as part of its response to the ILGRP Report and Recommendations, the government announced a F4F package²⁷ and made available up to \$1 billion, primarily to assist council mergers, with the bulk of up to \$600 million as concessional finance rather than grants, assessed as F4F only. The package included \$258m to assist councils deciding to merge to make the transition; \$13m to support local transition committees; \$5.3m to establish Joint Regional Organisations (JOs); \$4m to help small councils develop innovative ways of working; and up to \$600m potential savings from concessional finance for F4F councils to invest in local infrastructure.²⁸

All NSW councils, except eight in the far west, were required, by 30 June 2015, to examine their financial situations, and to consider their future needs and the ILGRP recommendations. Councils were to make submissions as to how they would be F4F. The Office of Local Government provided mandatory submission templates. Council submissions needed to provide evidence in key areas of: scale and capacity; sustainability; efficiency; effective management of infrastructure and delivery of services for communities; and other areas, including the 'rigour of community consultation'.²⁹

NSW IPART and its findings

IPART was required by the government to develop a methodology for assessing F4F proposals that would be consistent with the State Government's local government reform agenda and, inter alia, included an assessment of councils' scale and capacity as a threshold criterion. Moreover, IPART was to undertake an assessment of whether each NSW council was financially fit for the future.³⁰ IPART used criteria and measures to assess sustainability, effective infrastructure and service management, and efficiency by employing seven local government financial ratios.³¹

IPART assessed council submissions under the F4F process, rating council proposals as 'fit' or 'not fit', and submitted its report to the government in October 2015.³² The assessments largely depended on information provided by the councils and the examination of long-term financial reports and other available data.³³ One hundred and forty-four councils across NSW submitted 139 proposals to IPART, which received 1550 submissions from residents and other stakeholders on the council proposals. Eighty-seven proposals were assessed as not fit. Only nine councils indicated any interest in voluntarily amalgamating, whereas the ILGRP had recommended mergers as a preferred option for 41 per cent of councils.³⁴

The IPART report demonstrated that there were major concerns about the sustainability of the NSW system of local government, with 60 per cent of NSW councils rated as not financially fit for the future, including 71 per cent of Sydney metropolitan councils and 56 per cent of regional councils. IPART analysed the business cases submitted by councils and estimated that up to \$2 billion in benefits could be realised over 20 years if mergers were to occur in Sydney alone.³⁵

Local Government NSW (LGNSW), the peak body for NSW local government, had long advocated voluntary mergers only, and opposed forced amalgamations. It established a new 'No Forced Amalgamation' campaign ('Our Council, Our Voice, Our Choice') with a website and a suite of posters, web banners, bumper stickers

²⁶ Ibid 17.

²⁷ NSW Office of Local Government, *Fit for the Future: What's on Offer for my Council?* (NSW Government, 2014).

²⁸ Ibid, 4; NSW Office of Local Government, *Fit for the Future: A Blueprint for the Future of Local Government* (NSW Government, 2014) 6.

²⁹ NSW Office of Local Government, *Fit for the Future: A Blueprint* 12.

³⁰ Independent Pricing and Regulatory Tribunal, 'Methodology for Assessment of Council Fit for the Future Proposals' (Local Government Consultation Paper, NSW, 2015).

³¹ Ibid 7.

³² Ibid.

³³ Local Government New South Wales, 'Communities Now Critical to Local Government' (Media Release, 20 October 2015) 1-3.

³⁴ Independent Pricing And Regulatory Tribunal New South Wales, 'Assessment of Council Fit for the Future Proposals' (Local Government Final Report, NSW, October 2015).

³⁵ Ibid 1-2.

protest signs, postcards and template letters, providing councils and communities with support to strongly demonstrate opposition to the likely forced council mergers.

Aggressive media releases from LGNSW President Keith Rhoades at the October 2015 Association State Conference, and his statements, for example, that the Minister had ‘incredible gall to claim councils are greedy’ and ‘he is trying to scare the community with the prospect of rate rises’, signalled inevitable conflict, given Minister Toole and the government had clearly expressed a determination to implement reforms.³⁶

NSW Government council merger proposals

Following the release of the IPART F4F report, the NSW Government notified a final 30-day consultation opportunity, until 18 November 2015, to inform the government’s position on NSW local government reform and to enable councils to respond to the IPART findings. For those councils assessed as not F4F, the government sought their merger preferences. Virtually no councils responded.³⁷

On 18 December 2015, the NSW Premier and the Minister for Local Government announced that the government had decided to refer 35 NSW council merger proposals, which it had approved, to the Chief Executive of the Office of Local Government for examination.³⁸ The Chief Executive provided Instruments of Delegation under Section 745(1) of the *Local Government Act* to 18 delegates who would independently assess each proposal through meetings with affected councils, public inquiries and a submissions process. If all proposals were implemented, the number of NSW councils would be reduced from 152 to 112. On 26 February 2016, the government referred a further five of its alternative merger proposals for examination by delegates.³⁹

The examination reports prepared by the delegates on the merger proposals were submitted to the reconstituted Local Government Boundaries Commission⁴⁰ for comment and to the Minister for Local Government for decision as to whether mergers would proceed. On 12 May 2016 the government by proclamation formed 19 merged councils across NSW.

Conclusion

Opposition to mergers, particularly by councils, and community fear of change and loss of local democracy has been prevalent in NSW for a long time. It has now been adequately demonstrated that most councils can and should perform much better, especially in terms of services and infrastructure provision for the communities they represent. Opposition to amalgamation in some quarters on the basis of perceived lack of empirical evidence is often a smokescreen, usually for maintaining existing power bases. Clarence Valley Council, for example, experienced net economic benefits from its merger since inception in 2004 until 2010. That study demonstrated that, at least in some circumstances, council amalgamations as a reform method do work and that, from a fiscal standpoint, bigger is indeed better but perhaps not obviously cheaper.⁴¹

Council mergers will not always be appropriate and one would probably not commence the structure of local governments in Sydney now with 41 councils, as existed prior to the current mergers. Nor for example, in the Richmond-Tweed region in northern NSW, would local government be comprised of the present six general purpose and three county councils. After almost four-and-a-half years of consultation and dialogue, the stage is undoubtedly set for significant council mergers in NSW. In fact, in 2016, 20 merged councils were constituted and several more may be merged depending on the outcome of current council-initiated litigation against the government.

³⁶ B Smith, *From the President: IPART Assessment of NSW Fit for the Future Proposals* (IPART NSW, 20 October 2015) 1-4.

³⁷ Office of Local Government NSW, *Council Circular Release of IPART’s Fit for the Future Report: Announcement of Stronger Communities Fund* (Sydney, NSW, 20 October 2015).

³⁸ NSW Office of Local Government, *Council Boundary Reviews* (2015) 1-14 <www.councilboundaryreview.nsw.gov.au/>.

³⁹ Local Government NSW, *New Merger Proposals Listed* (Local Government NSW Weekly 08/16) 1.

⁴⁰ NSW Office of Local Government (2015), above n 39.

⁴¹ Tiley, above n 8, 258.

There exists a continuing, long term, often uninformed and unjustified resistance, even intransigence, towards structural reform from within local government leadership and some councils. Furthermore, the LGNSW catchcry of 'fix the funding first'⁴² could be seen as seeking to sideline the vital importance of more appropriate and modern local government structures for the future. The sector needs to demonstrate effective leadership and a preparedness to improve capacity and performance for the communities they represent.

Present boundary structures were established more than a century ago. The imperative of financial sustainability establishes the case for structural change in NSW local government, given rapidly improving transport and communications and ever growing community demands on councils. New and improved methods of community engagement can address perceptions of loss of local democracy and community. Citizens are rightly demanding better services and more efficient and responsive councils.

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CONFERENCE ABSTRACTS

Thriving through transformation: Local to global sustainability

2015 ANZSEE Biennial Conference

Name: 2015 ANZSEE Biennial Conference

Location: Armidale, NSW, Australia

Dates: 19th to 23rd October 2015

Host Organisation: University of New England, Australia

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Synopsis

The conference themes centred on ideas for transforming to a sustainable human existence at all geographical scales, particularly at the local, regional, and remote scales, but also at the national and global scales:

- A. Place-based perspectives on sustainability & transformation
- B. Institutions for resilience & transformation
- C. Economics of equity & distribution in transformation
- D. Making the marginal mainstream: expanding horizons

Special sessions: Indigenous Wellbeing; Wilderness; & Local Government

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Changing places and shifting wilderness: Is place attachment and landscape preference a problem or a plus for biodiversity?

Robyn Bartel, University of New England
Don Hine, University of New England
Methuen Morgan, University of New England

The growing recognition of the ecological and social benefits of nature to humanity, alongside the accelerating demise of biodiversity due to human activities, is attracting increasing research attention towards the efficacy of traditional protection measures, as well as to human attitudes and behaviours regarding the environment. Wilderness preservation and biodiversity conservation have generally been thought of as mutually exclusive to human presence, and human activities antithetical to environmental objectives. This is due to the history of anthropogenic harms and concerns that place attachment and landscape preferences may act as barriers to preservation and restoration efforts. However, the idea of wilderness as human-free has undergone sustained attack, as have binarised and binarising conceptions of human-nature more generally. This case study of 300 urban residents in a highly modified area found that place attachment and landscape preference acted as supports rather than barriers to place-change. Positive correlations were found between place attachment and preferences for more ecologically functional landscapes and environmentally friendly behaviours, including place-changing restoration practices such as tree-planting. These results suggest that public participation and involvement in conservation may be valuable rather than antithetical for biodiversity, particularly where connections to nature are strong. Participation may also encourage the development of place ties and environmental awareness and appreciation, which may lead to further pro-environmental behaviours. Biodiversity projects supportive of public participation are likely to maximise gains in, and promote positive feedbacks between, pro-environmental attitudes and behaviours. Exclusion may undermine the potential for such benefits to be realised.

Enduring community value from mining: Transforming remote communities through their resource lifecycles

Boyd Blackwell, University of New England, Ninti One Ltd/CRC REP
Stuart Robertson, University of New England, Ninti One Ltd/CRC REP
Anne Fordham, University of South Australia, Ninti One Ltd/CRC REP

Enduring community value from mining is a vexed issue for researchers and practitioners in delivering lasting value to communities across the globe. Indeed, ECVM is a necessary ingredient in transforming communities to alternative societal and economic structures after the dizzy heights of a mining boom are gone. ECVM is a term that has been developed by mining peak bodies and is associated with the concepts of Corporate Social Responsibility, Social License to Operate, and Mine Lifecycle Planning. These four elements will be discussed and analysed within the context of remote Australian mining regions, drawing on case studies from the Northern Territory, South Australia and Western Australia. The three presenters are funded through the CRC for Remote Economic Participation (CRC REO), managed by Ninti One Ltd, forming part of the 'ECVM team' and 'Regional Economies Program' and will present their recent findings around:

- Measuring the employment impacts of mine closure and considering issues for transformation
- Planning for the Mine Lifecycle and Creating Enduring Value for Remote Communities
- Corporate Social Responsibility: Towards a Framework that Provides for Lasting Value

Each of these separate talks is summarised in the three attached abstracts. Please refer to these for more detail. Other presenters are welcome to join the session. NB: This session links with ANZSEE Indigenous Participation Sponsorship provided by Ninti One Ltd.

Acknowledgements:

We are grateful to Ninti One Ltd and the Universities of New England and South Australia for funding to support this research. We are also grateful to Ninti One Ltd for providing an Indigenous Participation Sponsorship to ANZSEE for the 2015 conference.

Invasive animal management

Tanya Howard, University of New England
Paul Martin, University of New England
Don Hine, University of New England
Patty Please, University of New England
Lyndal Joy Thompson, University of New England

Invasive species in Australia have economic, environmental and agricultural impacts. Invasive species take hold in landscapes that are segmented by land tenure boundaries, suffer fragmented governance and short-term planning cycles. Management and control approaches are informed by technical expertise in species ecology; however successful implementation also requires sustained and coordinated collective community action. Ongoing investment of human and financial resources is necessary to transform current strategies, and this has implications for equitable distribution of economic impacts across the Australian landscape.

This paper reports on a current multi-disciplinary research program that integrates behavioural science, institutional analysis and community engagement scholarship to build more effective and equitable strategies for invasive species governance. The program seeks to augment technical and scientific knowledge of invasive species with applied research about the human dimension of invasive species management. The human dimensions approach aims to integrate legal and policy frameworks, behaviour change and motivations for collective action into a strategic approach to this complex problem.

This paper discusses how the research problem has been defined, the methods that are being used and early indications of strategic directions from this work.

Acknowledgements:

This research is sponsored by the Invasive Animals CRC: Program 4 - Facilitating effective community action.

Environmental justice in the ANZSEE region

Anitra Nelson, Royal Melbourne Institute of Technology (RMIT) University
Lisa de Kleyn, RMIT University
Victoria Kearney, RMIT University
Lee Tan, RMIT University

The term 'environmental justice' has only recently developed visibility in Australia, specifically in environmental campaigns, such as 'climate justice' (global warming) and 'nuclear racism' (uranium developments impacting on Indigenous peoples), and in legal spheres, such as class actions. In the US, Europe and the global South (especially in Central and South America and Africa) the term has had longer and broader yet contested and varied applications. This panel will discuss aspects of the concept and practical applications, especially in Australia.

Lisa de Kleyn explores the environmental justice approach emerging in Australia and its unique expression in the academic literature, non-government organisations and government bodies. Her doctoral research is an environmental justice analysis of the conflict over use and management of the Toolangi State Forest on the north-eastern margins of suburban Melbourne. She discusses concepts of Australian environmental

justice in the context of global variations as communities work within distinct histories, cultures, institutions, vulnerabilities and environmental pressures.

Anitra Nelson will introduce the recently initiated Australian Environmental Justice (AEJ) research project, a partnership between RMIT University and Friends of the Earth (Australia) – associated with the scholar-activist international Environmental Justice Organisations, Liabilities and Trade (EJOLT – <http://www.ejolt.org/>) research project centred on cataloguing the conflicts and analysing the cases of environmental injustice. EJOLT was initiated by past-president of ISEE Joan Martinez-Alier (UAB, ICTA) with EU funding. Anitra discusses the findings produced from more than 1500 cases worldwide on an online interactive atlas (<http://ejatlas.org/>), including the history, use and critical appraisals of terms such as ‘ecological debt’, ‘ecologically unequal trade’, ‘biopiracy’ and ‘water justice’, and the growth in legitimacy of specific methods such as ‘popular epidemiology’.

Victoria Kearney has uncovered environmental injustice in her professional work and doctoral studies on the connections between health, the environment and sustainable communities and their implications for education and public policy in Australia. Kearney will refer to a couple of case studies to analyse the policy challenges that environmental injustices present and offer some strategic ways of addressing such challenges.

Lee Tan focuses on environmental injustices arising from the establishment and workings of a rare earth minerals processing plant near Kuantan, Malaysia – owned and managed by Australian company Lynas Corporation. Pollution from the plant threatens the regional environment, and employment and health of residents. This case study reveals a typical global North-South dynamic. Malaysia’s laxer environmental standards, poorer enforcement of regulations and political corruption have made processing of rare earths from WA attractive to Lynas.

The art value chain: Aboriginal and Torres Strait Islander art enterprises in remote Australia

Tim Acker, Curtin University

Aboriginal and Torres Strait Islander art has been a major cultural, creative and economic feature of remote Australia for more than forty years. Despite this importance, there has been only limited detail on the scope and the scale of the art businesses that are so prominent in remote communities. This presentation will highlight findings from the CRC-REP Aboriginal and Torres Strait Islander Art Economies Project. In particular, the value chain research that investigated the complexity, variability and detail of remote art business and identified trends that point to both challenges and opportunities for the future for artists and their art enterprises.

A systematic review and agenda for using alternative water sources for consumer markets in Australia

Sujana Adapa, University of New England
Navjot Bhullar, University of New England
Simone Valle de Souza, University of New England

A systematic review of existing research in the area of alternative sources of water for consumer markets is presented. The researchers discuss the background of the importance of water as a precious resource to sustain human life; review relevant literature about the alternative sources of water, mainly recycled and desalinated water; and the issues surrounding centralised and decentralised water systems. Results are reported from the extant research in the areas of public acceptance, consumer satisfaction, contextual factors, demographic variables and perceived benefits and barriers associated with the intention to adopt,

adoption, and use of recycled and desalinated water. Findings presented highlight the knowledge gaps and limitations of prior studies and outline the strategic importance of a much needed marketing-related research for promoting the consumption and use of alternative water sources for consumer markets in Australia. The systematic review also highlights the need for local government councils, other government bodies and institutions to work cohesively with various stakeholders and embrace marketing-related information as a strategic tool for promoting alternative sources of water. The relevance of customer driven market strategy including segmentation, targeting and positioning aspects in influencing the awareness and uptake of alternative sources of water is discussed.

Diversification and productivity in crop-livestock farming systems in the Forest Savannah Agro-ecological Zone of Ghana

Bright O Asante, University of New England
Renato A Villano, University of New England
Ian W Patrick, University of New England
George E Battese, University of New England

Agricultural diversification has been found to potentially lead to synergies in farm enterprises, and aid in spreading production risks and offering farmers with stable incomes. This paper investigates whether crop-livestock diversification is desirable among smallholders in the Forest Savannah Agro-ecological Zone of Ghana. An econometric analysis is used to examine the economies of scope and risks at the farm level. The results present evidence of scope economies in crop-livestock diversification and the risk effects were significant in determining diversification motives. Economies of scope were evident in producing crops, such as cowpea, groundnut and yam in combination with small ruminants, such as sheep and goats. Our results imply that to improve productivity and associated benefits from crop-livestock diversification; there is the need for policy makers to include strategies for enhancing the production of these crops in crop-livestock diversification systems among smallholders in Ghana.

Acknowledgements:

We are grateful to the farmers in the Forest Savannah Agro-ecological Zone of Ghana for their time and patience in contributing to the data collection. We are also thankful for the financial support of the Australian Government through the Department of Foreign Affairs and Trade (DFAT), towards the data collection. The logistical support of the CSIR-Crops Research Institute of Ghana during the field work is also duly acknowledged. We are not aware of any conflict of interests.

‘Globalisation from below’: The value of ethnography in examining the lived experience of the power and politics of change

Claire Baker, University of New England

This research aims to link ideas of the role of the social imaginary, expressed in and through dominant economic and political priorities, to the lived experience of change through the examination of an explicitly situated ethnographic case study of a small farming community in North-West NSW during the period 1945-2015. Characterised by soldier settlement post-WWII, the economics and social life of the area have been transformed during this period and, as such, provide a valuable example of a changed social and agricultural landscape. Established under particular policy priorities focusing on ideas of nation-building and heavy protection for agricultural production and government investment in infrastructure, the move to a neoliberal position has had a clear impact upon the community being looked at, including the loss of small-scale holdings and a move to hyper-productivist mono-agriculture. Thus, while having been established under a very different organising logic and orientation to definitions of growth and development, the community being studied sits at the nexus of economic and social outcomes of policy change. In this sense

this project seeks to integrate an account of the shifts in macro and meso contexts associated with neoliberalism with an examination of the impact those shifts had on what is conceived, perceived and experienced at the individual level.

Acknowledgements:

Supervisors: Professor Alan Scott, Professor Neil Argent, Associate Professor Adrian Walsh.

Scope for multidisciplinary approaches to the analysis of value addition for products in remote areas

Derek Baker, University of New England
Emilio Morales, University of New England

Value chain analysis has become a popular way of representing contributions to consumers' willingness to pay for a final product, along with the allocation of the associated costs and benefits to participants in the production, transformation and marketing processes. Value chains are often seen as the focus of business development, particularly for innovation issues such as market access and new product development. They also are often seen as instrumental in defining needs for skills, strategies and other elements of remote firms and communities in serving high value markets. However, standard analytical methods and performance metrics have not emerged to enable comparisons across commodity sectors, between social contexts, nor even within chains. Measures of environmental impact, and sustainability of benefit flows form interventions, are therefore difficult to bring to bear on the value chain. Small firms, diverse enterprises, primary industry and geographic remoteness all offer some analytical challenges. This presentation reviews economically-oriented methods relevant to these subjects, and then identifies opportunities for multidisciplinary contributions. The presentation maintains a focus on key research questions from the points of view of decision-makers.

Are natural environments restorative environments?

Navjot Bhullar, University of New England
Elizabeth McAllister, University of New England

Humans have an innate appreciation of close contact with nature, which can be in the form of urban nature, natural forests or wilderness. The biophilia hypothesis (Wilson, 1984) suggests that humans possess an inclination to affiliate with nature and other living things and therefore experience positive outcomes from experiencing this connection. Connectedness with nature is one of the mechanisms through which beneficial effects of nature are experienced. Evidence also suggests that the beneficial effect of contact with nature is due to restoration of attentional capacity in people as they recover from stress and attentional fatigue. This paper will present a case study employing an experimental design. This study examines the effectiveness of exposure to natural environments (wilderness vs. urban nature compared with a control condition) on human health and vitality. Implications and future research directions will be discussed.

Identifying strategies to increase the adoption of conservation programs and practices on farmland in the Northern Tablelands and Nandewar bioregions of NSW

Madeleine Black, University of New England

Nick Reid, University of New England

Graham Marshall, University of New England

Julian Prior, University of New England

Lack of financial capital, high opportunity costs and loss of management flexibility have been identified as potential reasons why farmers do not adopt conservation programs or practices in the Northern Tablelands and Nandewar Bioregions of New South Wales. This is important because these bioregions have a large proportion of biodiversity on farmland and high levels of biodiversity decline. Both bioregions are officially recognised as ‘under-represented’ in the Interim Biogeographic Regionalisation of Australia Framework (2014 edition). Moreover, there are low levels of conservation program and practice adoption on farms, compounded by a failure to engage a broad cross-section of the farming community in extension events (e.g. field-days) and programs. To address the problem of low levels of adoption and engagement, we identify strategies to increase adoption rates, specifically of remnant vegetation management and re-vegetation. To do this, we present the results of a systematic review of literature, specifically focusing on how financial considerations influence adoption. To conclude, we present practical strategies which may assist in increasing adoption rates on the Northern Tablelands and Nandewar bioregions.

Acknowledgements:

We would like to thank the Brigalow Nandewar Biolinks Group for funding this research.

Enduring community value from mining: Measuring the employment impacts of mine closure for remote communities and considering issues for transformation

Boyd Blackwell, University of New England, Ninti One Ltd/CRC REP

Jim McFarlane, University of New England

Andy Fischer, University of Tasmania

Tracking and mapping the employment impacts from mine shut-down forms an important element in planning for the economic transformation of remote communities and delivering enduring value from mining. This paper presents the results from two case studies of the employment impacts from mine closure: the Ranger uranium mine in the Northern Territory, and the Leigh Creek coal mine in South Australia. The impacts for both locations are significant, and link to a number of supporting industries, particularly construction, but also more broadly across other sectors of the economy. Because of modern day work commuting practices, the impacts are in the majority local, but are also felt more broadly at regional, state and national levels. Developing policy options for preparing for managing imminent mine closures require careful analysis of the structure of the local economy, yet within the context of a globalised world, to help identify transformation opportunities for these remote communities.

Acknowledgements:

We are grateful to Ninti One Ltd and the University of New England for funding to support this research. We are also grateful to Ninti One Ltd for providing an Indigenous Participation Sponsorship to ANZSEE for the 2015 conference.

Mining wilderness, food and traditional peoples: How to transcend and transform the imbedded conflicts presented through multiple and sequential use of remote resources

Boyd Blackwell, University of New England

This presentation reviews a number of remote and regional resource developments in Australia to reconsider the trade-offs involved in the multiple and sequential use of lands and cultures in the extraction of mineral resources. These resources have historically fuelled local, regional, national and, more recently, overseas globalised economies. In doing so, the sovereignty of local people is sold to overseas interests. Trade-offs involved in mineral extraction can therefore be potentially bought or sold, particularly to the detriment of public goods such as the conservation wilderness areas (e.g. National Parks), traditional lands and their people, and prime agricultural land. Improved legislative frameworks for constraining the market veracity for resource development are emerging. However, these instruments are very specific (e.g. CSG exclusion zones), tending to be less protective of the range of assets which may be eroded through the mining process. In contrast, broader protective mechanisms modelled on those from wilderness management (i.e. protected area management) could better meet local and national interests. Agricultural Protect Areas and Aboriginal Protected Areas (APAs) are therefore suggested as a 'new' instrument that can help conserve the essential needs of a nation to feed itself, and to protect its cultural heritage and traditional peoples.

The economic value of the social, cultural, environmental and financial impacts of a common-good institution operating in remote Australia: A decade of success in the improvement of remote people's wellbeing

**Boyd Blackwell, University of New England
Mike Dockery, Curtin University**

This paper presents the results of an economic assessment of the impacts of a common-good* institution operating in remote Australia since its inception in 2013. Social, cultural, environmental, and financial impacts are assessed by transferring values from the literature for the goods and services provided by the institution. Using an assets-based approach drawing on capital theory (e.g. human, natural), a representative sample of programs and projects are assessed and compared to their costs of delivery. The benefit-cost ratios are obtained and then used to estimate like program returns, giving a complete assessment of the benefit returns from the institution's entire operation.

Since its inception, the institution has generated an estimated \$239.2 million in economic and social benefits for remote Australia, and continues to generate around \$30 million per annum of benefits, delivering a return on money invested of 4.5 to 1.

Without institutions such as these, remote peoples, particularly Aboriginal and Torres Strait Islanders, would be considerably worse-off and more easily overlooked. Our framework is useful for similarly assessing other common good institutions across the globe, the results from which can be used to gauge the contribution made by any institution, corporate or otherwise, to society.

Acknowledgements:

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Positive psychology and Indigenous education

**Simon Burgess, University of New England
Anthony Dillon, Australian Catholic University**

While positive psychology has been incorporated into educational programs provided at a number of elite Australian schools, it has not been explicitly incorporated into any programs to which many Australian Indigenous students have access. In fact some education scholars are sceptical about the suitability of positive psychology in Indigenous education. In this paper we consider the reasons for such scepticism. We then argue that the scepticism is misplaced and that positive psychology could give rise to initiatives in Indigenous education that are both distinctive and promising. In advancing this argument we choose to focus on the personal strengths of perspective, citizenship, forgiveness and mercy, gratitude, hope, and humour. The evidence suggests that these strengths, like all of those recognised in positive psychology's official inventory, are valued in all cultures. We focus on these particular strengths, however, because there are challenges associated with helping to cultivate them in young Indigenous Australians while also providing important lessons in social injustice, colonialism, racial and cultural oppression, and reconciliation. Without imagining that our suggestions provide 'the final word' on such matters, we sketch out certain ways in which these challenges might be met, while also calling upon others to contribute to the discussion.

Strength, authenticity, and Aboriginal identity

**Simon Burgess, University of New England
Anthony Dillon, Australian Catholic University**

This paper relates research in psychology to some difficult issues confronted by many Australians of Aboriginal ancestry. Most importantly, we draw upon research concerning the value of authenticity and the vital role that processes of exploration, support and commitment can play in the development of an authentic sense of self. Many people of Aboriginal ancestry have long faced scepticism about their Aboriginal identity. In connection with this, we discuss some of the challenges associated with cultural loyalty and identity politics. We then outline four suggestions concerning how these challenges may be met. First, we emphasise the importance of support for social norms and cultural expectations that forbid or discourage abuses of cultural loyalty. Second, we urge the adoption of a deflationary view about the importance of cultural loyalty. Third, we reject the assumption that genealogy determines identity. Our fourth suggestion is to celebrate the valuable and well established role that humour and irony can play as people go through the process of exploring the possible forms that their identities may take.

Social, cultural and empowerment indicators from the Interplay Wellbeing Framework for Aboriginal and Torres Strait Islander people in remote Australia

**Sheree Cairney, Flinders University
Tammy Abbott, Ninti One Ltd/CRC REP
Byron Wilson, Ninti One Ltd/CRC REP
Stephen Quinn, Swinburne University
Oanh Nguyen, Flinders University**

Quality of life (e.g. wellbeing) can be severely affected for cultural or social minority groups when available mainstream services are incongruent to their needs. Governments can struggle to engage these populations in empowering ways towards the delivery of appropriate services and consequent wellbeing gains. Wellbeing frameworks are increasingly used to understand, monitor and guide the progress of societies. The top-down nature of national frameworks can mean they neglect the needs of cultural and

social minority groups. A collaborative and capacity development approach was used to develop an Interplay Wellbeing Framework to genuinely and accurately represent wellbeing for Aboriginal and Torres Strait Islander people in remote Australia. Culture and empowerment were identified as key elements of wellbeing. The framework aims to represent cultural and community values objectively to understand their impact on wellbeing. Indicators were therefore developed and validated to measure empowerment and cultural factors including language, land and kinship, and these will be presented.

Travelling stock routes: Public farms or threatened species homes?

David Carr, University of New England
Rachel Lawrence, University of New England

Travelling Stock Routes and Reserves (TSRs) are Crown Lands reserved in NSW for the movement of stock. They provide a reserve of grass for drought when many landholders take to ‘the long paddock’ to feed their stock. Under such a policy TSRs have been grazed for short periods of time followed by long periods of rest, a management regime that has preserved the species diversity of those vegetation communities, which include many Threatened Ecological Communities. Responsibility for the management of TSRs has recently passed from the Livestock Health and Pest Authority to a new government department: Local Land Services. Local Land Services now view the TSRs as a means of raising revenue, a change that has seen them move to leasing TSRs for grazing for five-year periods. This arrangement is likely to place the significant environmental assets they support at risk of degradation. At the same time, the Office of Environment and Heritage, another government department, is planning to spend \$100 million over five years to protect Threatened Species and Communities, many of which depend on TSRs for survival. We will present a case study that highlights the threat posed to these endangered communities under such a leasing arrangement.

Sacred ground is all around: Health, well-being and the environment

Julie Collins, University of New England
Warlpa Kutjika Thompson, Wilcannia Public School

The theme for this year’s National Aboriginal and Torres Strait Islander Day of Celebration (NAIDOC) was ‘We all stand on sacred ground: Learn, respect and celebrate’. It was both universal and singular: it reflected the sacredness of landscape: rivers, lakes, coastal areas, deserts, forests and mountain ranges to all Indigenous Australians, but it also commemorated the handover of Uluru to the Pitjantjatjara and Yankuntjatjara traditional owners, thirty years ago. The significance of this theme was the juxtaposition of the local with the global, which had implications for how we all relate to country, whether Indigenous or non-Indigenous. Implicit is the recognition that all land is sacred and should be cared for in a sustainable way, it nourishes us all; but there is also acknowledgement that wherever we are, there are specific Indigenous groups for whom country has special spiritual significance. Indigenous well-being is intimately connected to the health of environment and community; this is not only holistic in the sense of referring to the whole body but also to cultural well-being. This paper will explore a strengths-based approach to Indigenous health, recognising the significance of family, culture and land in delivering better health outcomes to Indigenous peoples.

Ecological footprints and wellbeing in Australian cities

Christopher Ambrey, Griffith University
Peter Daniels, Griffith University

This study investigates how the per capita ecological footprint of an individual's household may determine an individual's wellbeing and how this relationship may differ for individuals that reside in Australian cities. The approach employed is quite novel matching detailed and disaggregated data from the Household, Income and Labour Dynamics survey to ecological footprints (or embodied greenhouse gas emissions) obtained environmentally extended input-output analysis; specifically, the Eora MRIO database. The findings of this study indicate that cities are not more sustainable and happier places. Further, the environmental impacts captured by ecological footprints suggest that the direct and indirect effects of individual's lifestyle consumption choices have a detrimental impact on an individual's wellbeing, reflecting an implicit psychological cost associated with consumption decisions which involve higher ecological footprints.

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This paper uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. The HILDA Project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either DSS or the Melbourne Institute.

Contrasting the collective social value of outdoor recreation and the substitutability of nature areas using hot spot mapping

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Jos Van Orshoven, University of Leuven
Liesbet Vranken, University of Leuven

This paper investigates one specific cultural ecosystem service: outdoor recreation. We present a methodology to map the collective social value of outdoor recreation and identify the substitutability among nature sites within a specific spatial context. This methodology is applied to the province of Antwerp, Belgium. We propose an indicator of substitutability among nature areas, contrasting unique but poorly substitutable sites (hot spots) with highly substitutable sites (cold spots). Using a combination of survey information, public participation GIS (PPGIS) and kernel density mapping, we produce density surfaces representing the distribution of the collective social value attributed to outdoor recreation. We also compute Getis-Ord G_i^* spatial statistics to identify local outdoor recreation clusters. In addition, we explore how recreational behaviour affects substitutability. Our results suggest a duality between the social value of outdoor recreation and the level of substitutability among nature sites. Highly substitutable sites tend to be found near areas of higher population density, which are as well sites of higher social value. Individual-specific parameters such as the type of recreational activity appear to substantially modify substitutability patterns among nature sites. We conclude by discussing the methodological and policy-related implications of this research.

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Valuation and mapping of cultural ecosystem services: A case study of outdoor recreation in Flanders, Belgium

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This paper introduces a methodology to better understand the role played by different site characteristics in influencing people's choice of outdoor recreation destinations. Contrary to prior studies, we do not restrict the scope of this analysis to specific natural sites but intend to encompass various landscapes, including production landscapes (e.g. arable lands) and natural landscapes (e.g. heathlands, forests). Our experiment looks into a large diversity of landscapes that are depicted using photomontages. We use a discrete choice experiment (DCE) that propose respondents to choose among hypothetical destinations described in terms of eight site characteristics. We study the trade-offs made by different profiles of respondents among those site characteristics, which lead to different destination choices. An important innovative aspect of this research is that the DCE attributes are spatially-explicit so that we are also able to represent the observed recreational patterns in the form of suitability maps, using Geographic Information Systems (GIS). We conclude the paper by pointing to the implications of this research for land management policy-making.

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Natural resource management agencies as learning organisations

Katrina Dickson, University of New England

Natural resource management (NRM) agencies are faced with increasingly complex environmental, economic and social issues, while perversely, public funding is declining. Past research and its practical application have prioritised technical solutions. An increased focus on the human dimensions aspects of continuous learning, that is the 'social' component of 'socio-ecological,' including communication, collaboration and change management, has the potential to improve the adaptability and resilience of NRM agencies, and the multi-stakeholder networks with which they work; and on-ground outcomes, through improvements to learning in the technical practices of NRM. Building on adaptive management principles and social learning insights, embedding continuous learning in organisational structures, strategies, policies and cultures, could potentially improve the effectiveness and speed of response to external and internal changes facing NRM agencies. This paper will elaborate on a case study being conducted in South African National Parks to identify and evaluate their strengths and weaknesses as a learning organisation, and potential principles, processes and practices which may be considered in other NRM agencies to enable the

institutionalisation of a systematic approach to continuous learning. The case study is a component of a PhD which is part of the Invasive Animal Co-operative Research Centre's Program 4 'Facilitating Effective Action.'

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Willingness-to-pay for healthy waterways in South East Queensland: Evidence from a contingent valuation survey

Christopher Ambrey, Griffith University
Jim Binney, MainStream Economics and Policy
Christopher Fleming, Griffith University
Jim Smart, Griffith University

South East Queensland's catchments, lakes and coastal waters are valuable natural assets that provide multiple economic, social and environmental benefits for communities. They provide clean drinking water, underpin agricultural production, enable the disposal of treated waste water, and sustain tourism and fishing industries. However, with a rapidly growing population and increasingly unpredictable climate, the region's waterways are under increasing pressure from threats such as soil erosion, storm water run-off, litter and land clearing. This paper employs data from the Healthy Waterways Limited Report Card and an online contingent valuation survey of SEQ residents to assess their willingness-to-pay to prevent a decline (or achieve an improvement) in waterway health in the region.

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Corporate social responsibility and long term community value: Views from mining company employees in selected Australian jurisdictions

Anne Fordham, University of South Australia

This study examines how the corporate social responsibility (CSR) programs of resource companies within Australia align to the concept of creating long term community value (i.e. 'enduring community value from mining'). In-depth interviews were conducted with 30 resource company employees across the resource sector within South Australia, Northern Territory and Western Australia. Most employees saw the ideal of creating lasting value/benefit as integral to their CSR practice. This was associated with other CSR philosophies such as creating a long term social license to operate (SLO), becoming integral to the community and facilitating social change. Employees also planned and implemented their CSR strategies with a long term view in mind. However, such sentiments were primarily driven by employees' personal ethical values rather than company values. Employees also drew upon a range of backgrounds and experiences to facilitate the creation of CSR and long term value. Despite employees being able to map approaches and pathways for achieving long term value, it was difficult to achieve due to barriers such as industry contractions, community capacity and availability of agreed strategies going forward. In most cases, areas where companies created long term value intersected with business needs and company capacity; however, there were examples where employees went beyond compliance/SLO and were able to envisage and support futures well away from the mine.

Use of the Sustainable Livelihood Framework as a tool for tracking CSR outcomes in the resource sector

Anne Fordham, University of South Australia

Corporate Social Responsibility (CSR) in the resource sector is a complex concept reflecting the need to mitigate negative development impacts but also achieve positive benefits to regional communities. This study examines these issues through linking companies' CSR programs in Australia to wider community development outcomes using a Sustainable Livelihood Framework. This framework comprises five key interacting capitals: natural, human, social, physical and financial. Through our analysis it has become increasingly apparent that this framework is incomplete and requires a further capital to be added: cultural capital. This will acknowledge the importance of valuing and preserving Indigenous culture, particularly Aboriginal and Torres Strait Islander culture.

Our study found that cultural capital was a significant component of CSR practice and was both a consequence and requirement to build the other forms of capital. Companies demonstrated a capacity in some cases to reveal inherent cultural capital in unique and profound ways for Indigenous communities.

The primary focus of resource companies was on building financial and human capital which led to a range of tangible benefits to communities, including major projects, community investment programs, skills and training, local employment, and business development. Opportunities to develop this capital were restrained by limitations on existing community capacity, lack of knowledge on how to transition to opportunities, and lack of strategic support and participation by at times corporations, government and other participating organisations.

Resource companies also demonstrated a capacity to support the conservation of natural capital and in some cases to contribute to wider strategic NRM outcomes. Resource companies were also able to improve social capital for communities primarily by connecting them to new expertise and opportunity and through encouraging them to define their own directions and future visions. However, there was limited opportunity for communities to participate in corporate decision making and communities relied on key agents within companies to translate their messages. Furthermore, particularly in remote contexts, companies were able to support communities through the provision of some shared infrastructure such as roads, telecommunications, water and health infrastructure. Finally, SLF proved a valuable framework for examining the wider contribution made by resource companies to regional communities.

The security of water resources

John Greenway, University of New England

In considering the security of water resources two concerns arise. Firstly, how water is envisaged seems to strongly influence water management decisions. Water resources being framed chiefly as inputs into economic production and urban water supply drives the dominance of dams and pipes. This perspective denies water has value and functionality beyond utility as an economic and social input. Water resources are multi-functional within interconnected socio-environmental-ecological spheres. Therefore, the second concern relates to how water resources are managed so as to develop the conditions for water security. In this context, water resources as an entire entity, recognising the multi-functionality of water resources, requires protecting to stimulate conditions of water security. Protecting water resources, it is argued, requires reflection on current processes and a re-defining of water management criteria. This is the challenge for policy makers. This paper reviews the water governance literature to evaluate emerging 'new water paradigm' approaches, such as the water soft path, in the context of developing water security.

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Working less to save the planet? The contributions of working hours, consumption trends and policy choices to reducing environmental pressures

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In recent decades, Australians have quietly shifted towards shorter average working hours and experience oriented consumption, raising the possibility of a consumer driven decoupling of economic activity from environmental pressure. We explore this through quantifying recent shifts in consumption trends (from 1999) and working hours (from 1979) and using scenario modelling to assess the impact of these trends continuing to 2050, in the context of different potential trends in energy and water efficiency, rural land use, and greenhouse gas abatement effort. Results are analysed using input output analysis to provide environmental footprint and national production indicators for energy, greenhouse gas emissions, water extractions, and agricultural output. We find that consumption and leisure trends contribute to net reductions in environmental pressures, with the effects of shorter working hours outweighing those of increased expenditure on (energy and emissions intensive) vacations. We find voluntary choices to implement water and energy efficiency options also reduce environmental pressures, contrary to concerns about ‘rebound’ effects, and make a larger difference when policy settings are less stringent. Overall, however, we find that collective policy choices offer the greatest potential for achieving reductions in environmental pressures. We conclude that while individual consumer choices make a difference, our collective policy choices as citizens matter the most in promoting sustainability.

Note: The findings outlined in the abstract are preliminary, and subject to change.

Another walk on the wildside: a phenomenology of rewilding and edgelands

Stephen Harris, University of New England
Fiona Utley, University of New England

The recently popularised call to ‘rewild’, considered a practical modeling of an ethical relationship with nature, promises the expansion and flourishing of species and habitats and, potentially, a re-connection with nature. Some of the implications of ‘rewilding’ follow those of other models for understanding our relationship with nature, including the sense that we can return to/reclaim a ‘wildness’, and so, by implication, a form of authenticity and a fundamental state of wonder or awe. Thus, ‘rewilding’ asks again that we re-visit the logos of radical division and transcendence as species. The notion of wilderness as pristine or pure nature has supported a radical separation between humans and nature—this is well recognised in a range of disciplinary literature. Largely through Thoreau’s pivotal essay “Walking”, wildness became synonymous with wilderness and has profoundly influenced the way we see and negotiate this sense of otherness, and sparking what has been called a ‘cult’ of wilderness. In this paper we take up an eco-phenomenological approach to exploring the spaces of contact between humans and nature. While the concept of wilderness itself implies a radical spatial separation, ‘wildness’ is not necessarily or only ‘out there’, away from civilization/urbanity/modernity, but exists/thrives in the interstices – the ‘interzones’ in urbanity, where intensely localised ‘wild places’ come into existence; drains/highway culverts – the

'edgelands' of which British poets/writers have celebrated in recent years. The desire to experience a fundamental wonder also implies the possibility of a reconnection through an intertwining with nature, as source, and its 'more natural' rhythm within the flow of time; such temporality must also be questioned and explored. Using Merleau-Ponty's notions of reversibility, depth and chiasm/intertwining, in this paper we interrogate these spatial and temporal intertwining in order to further develop ways of seeing and negotiating our relationship with nature.

Closing system-wide yield gaps to increase food supply and mitigate GHGs among mixed crop-livestock smallholders in Sub-Saharan Africa

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In this study we estimate yield gaps for mixed crop-livestock smallholder farmers in seven Sub-Saharan African sites covering five countries and we assess their potential to increase food supply and reduce the GHG emission intensity of livestock production, as a result of closing these yield gaps. We use stochastic frontier analysis to construct production frontiers for each site. Sizeable yield gaps were estimated to be present in all of the sites from each of the five countries. Expressed as potential percentage increases in outputs, the average site-based yield gaps ranged from 28 to 167% for livestock products and from 16 to 209% for crop products. The emission intensities of both livestock and crop products registered substantial falls as a consequence of closing yield gaps.

The relationships between farm attributes and technical efficiency were assessed to help inform policy makers about where best to target capacity building efforts. We found a strong and statistically significant relationship between market access and performance across most sites. We also identified an efficiency dividend associated with the closer integration of crop and livestock enterprises.

Introducing compliance-based inspection protocols to Australia's biosecurity system

Susie Hester, University of New England, Centre of Excellence for Biosecurity Risk Analysis
Anthony Rossiter, Victorian Department of Treasury and Finance, Centre for Market Design

As the volume and range of products traded globally continues to expand, managing the spread of invasive species becomes more challenging. Each year the Australian government spends significant amounts of money on its biosecurity inspection regime in order to reduce the likelihood of biosecurity hazards entering Australia. The Australian government has recently replaced full inspection on several plant-product pathways with an adaptive-sampling protocol where the sampling frequency is based on an importer's inspection history. The new inspection protocol may also provide impetus for behaviour change and may decrease the likelihood of biosecurity hazards being present in consignments. This paper discusses the potential for compliance-based inspection protocols to increase efficiency of Australia's biosecurity inspection system, focusing on several case-study pathways.

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Centre of Excellence for Biosecurity Risk Analysis, University of Melbourne

Green infrastructure economic framework for local government

John Symons, Victoria University

Roger Jones, VISES

Celeste Young VISES

This presentation discusses the economic aspects of valuing green infrastructure at the local government scale. Green infrastructure includes parks and reserves, backyards and gardens, waterways and wetlands, greenery on streets and transport corridors, pathways and greenways, squares and plazas, roof gardens and living walls, sports fields and cemeteries. Green infrastructure benefits include economic, social and environmental benefits. The project explores the multiple benefits of green infrastructure in order to develop an understanding of potential returns on investment by adapting urban environments at the local government scale. Conventional economics is not well suited to valuing green infrastructure, but there are many different views within the literature and practice about how this should be carried out. Existing local government infrastructure investment processes were mapped and adapted to incorporate comprehensive economic value (an extension of total economic value) and various valuation approaches to create an economic framework that examines values at the individual, community and institutional level. Due to the organic nature of green infrastructure, suitable discount rates are also examined. The goal of the project is to put investment in green infrastructure at the local government level on a more even footing with investment in grey infrastructure whereby green infrastructure investment becomes the norm.

Risk perception

Shalini Lata, University of New England

The complex nature of climate change is an impediment in achieving sustainable solutions to the issue. The past two decades have witnessed a good shift of research focus from discipline confined research to a more holistic or interdisciplinary focus. Research on the human dimensions of climate change due to this shift has gained momentum in the past two decades; however, research concentration has been confined to the 'geographical north'. This shortfall in research is being realised in the southern hemisphere. Research into the social, economic, institutional realm is slowly strengthening in Australia, New Zealand and other developing countries.

In Pacific Island countries, for a sustainable future, climate change adaptation is an imperative. The equity dimensions of climate change, again is complex, with the burden of impacts being disproportionate across the society. The physical characteristics of Pacific islands make them vulnerable, no doubt, but disparities in vulnerability across the society also exist (coastal dwellers, natural resource dwellers, the poor, the aged, and disabled for instance). The question of how to achieve sustainability the in Pacific Island countries in terms of climate change adaptation is different from the developed countries; coastal management for instance in the Pacific will have to be focused on people rather than on structures as being focused in resource-rich countries.

This study looks at the role of perceptions of people in Fiji (a small island state in the South-west Pacific). The people of Fiji and other Pacific Island countries traditionally have had a direct relationship with their environments, governing resources, and finding solutions for issues. With recent global challenges, perceptions are important to understand how adaptation can be mainstreamed into communities and embedded into current national policies and planning. Results from a pioneer empirical social survey measuring public risk perception conducted in Fiji (n = 420) will show the role of psychological and situational variables in influencing climate change adaptation and policy support. Overall, the findings of this research are applicable to the wider Pacific region, where social structure/capital needs to be

balanced with science to help improve environmental management, policy development and also risk communication, and risk perceptions will inform this.

Managing livestock grazing in a changing climate: Potential for improved biodiversity and landscape function outcomes with highly planned rotational grazing management

Rachel Lawrence, University of New England

Nick Reid, University of New England

Romina Rader, University of New England

Climate change models predict that the New England slopes and tablelands will experience rainfall patterns with increased variability and longer periods between large rainfall events compared with historical rainfall patterns. This unpredictability has major implications for the viability of commercial grazing operations as well as the conservation of endangered plant communities. Some livestock managers in this region have adopted grazing management systems that allow adaptability to unpredictable rainfall patterns through careful pasture monitoring and proactive stocking and destocking of livestock based on rainfall. These graziers commonly rotate stock intensively, are aware of the benefits of biodiversity in their pastures and value native plants as an important part of their feed-base. Research on grazing properties under this alternative style of management has documented improvements in three measures of landscape function, increases in perennial grass cover and increases in insect diversity. Several native grass species that characterise endangered box-gum grassy woodland communities and are also of high grazing value, may persist or even increase under these grazing regimes.

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Evaluation of financial mechanisms to enhance the long run supply of ecosystem services at different stages in the investment cycle

Laura J Levetan, University of Melbourne, CSIRO Land and Water Flagship

Lauren T Bennett, University of Melbourne, CSIRO Land and Water Flagship

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The financial gap between funding needed for ecosystem conservation and that provided by the public and private sectors remains wide. Innovative financial mechanisms that scale-up the flow of funds and broaden the supply beyond the traditional public sector and philanthropic sources are required. This paper examines the ecological and economic properties of selected market-based conservation finance mechanisms according to a set of criteria at consecutive stages in the investment cycle. The criteria for evaluation are proposed in three groups: policy goals and context, property rights, and market structure. Four types of mechanisms are assessed: carbon taxes, conservation concessions and easements, environmental impact investment, and non-securitised and securitised environmental impact bonds. The potential is assessed for these mechanisms to address part of the conservation finance gap whilst providing wealth preservation or a return on investment to investors and the owner/s or lessee/s of ecosystem assets and their associated ecosystem service flows.

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Do farmers value soil information for soil health management? Exploring farmers' motivations in collecting and using soil information in agriculture

Lisa Lobry de Bruyn, University of New England

Soil health is a critical requirement of a sustainable agroecosystem that can function effectively, with some functions easier to determine than others such as crop production versus nutrient cycling. Participation by farmers in gathering soil information at the farm and paddock scale has been examined over the last two decades by reviewing their use of farm planning, and participation in soil testing. The premise is that with good quality, local soil information on soil types and their soil health status, farmers can determine the best course of action to either improve soil productivity or stem the flow of land degradation by better matching of land use to land quality at the farm scale or at the paddock scale to rectify any nutrient deficiencies or toxicities. However, the level of participation in farm planning or soil testing has remained static, with only 25% to 30% of landholders participating nationally. Also, making the link between the use of soil information embedded in farm plans and collected with soil testing to improved soil management, and ultimately the capacity for soil health improvement is difficult to determine. The difficulty in establishing such causal links is because the survey data cannot be interrogated to establish the relationship between farmers' actions, such as soil testing to certain land management practices, which could improve soil health.

Co-management in restricted protected areas in Brazil inhabited by non-indigenous traditional populations

Marcia Leuzinger, Centro Universitario de Brasilia

Brazil has a very complex system of protected areas, composed of three different types: conservation units, areas under specific protection and protected areas *stricto sensu*. This paper will focus on the types of conservation units that are classified as IUCN I, II and III categories, and do not allow direct use of natural resources within its boundaries. In those cases, any human population, including non-indigenous traditional groups, will have to be removed from the area when the conservation unit is created and sent to another place as agreed with the competent environmental agency. But the problem is that those traditional groups maintain a very specific relation with the land they and their ancestors have been living in for many generations, and removing them means violating their cultural fundamental right to the land and also the loss of valuable traditional knowledge. Therefore, studies about the impact they cause to the ecosystem that will be protected by the creation of the conservation unit should be mandatory and only when their activities are able to cause a major damage it would be possible for the government to remove them from their homeland. On the other hand, if this is not the case, co-management, as used in Australia with Aboriginal populations, could be a solution.

The Central Queensland local government infrastructure backlog and climate change adaptation

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Brian Dollery, University of New England

Michael Kortt, Southern Cross University, UNE Centre for Local Government

In common with comparable countries, local government infrastructure in Australia exhibits a significant infrastructure backlog. The Commonwealth 'Hawker Report' (2004) Rates and Taxes and the PWC (2006) National Financial Sustainability Study established that local infrastructure deficits were common in all Australian local government jurisdictions. A nation-wide review undertaken by PWC (2006) estimated monetary values for infrastructure restoration at around \$15.3 billion. This underinvestment in

infrastructure is further exacerbated by global climatic change. For instance, the Queensland Government 2013/14 budget estimated approximately \$2.1 billion was required for post-flood local government infrastructure reconstruction. Against this background, this paper seeks to quantify the infrastructure backlog in Central Queensland. In addition, it assesses the methods employed to evaluate the expected costs of infrastructure renewal in Central Queensland in the light of a disaster-resilience infrastructure plan designed to cope with the challenges of climate change, such as more frequent flooding and more intense cyclones.

The role of reputation in explaining wine clusters: A spatial analysis of Hunter Valley wine producers

**Peter Lock, University of New England
Stuart Munter, University of New England
Euan Fleming, University of New England
Jonathan Moss, University of New England**

Wineries are often located in close proximity to each other. Obvious reasons include geographic features and climate, or the terroir of a region. However, other factors may also be important such as determinants of geographical concentrations of wineries because of the spatial dependencies or ‘spillover’ effects arising from cluster specific resources. In this paper we apply spatial analysis techniques on 72 wineries in the Hunter Valley wine growing region of New South Wales to assess cluster formation and to examine the spatial relationships among them. In particular we explore the role of winery reputation in geographic clustering and discuss the ‘clustering’ benefits that may result.

A social-ecological systems framework for food systems research: Accommodating transformation systems and their products

Graham Marshall, University of New England

The social-ecological systems (SES) framework was developed to support communication across the multiple disciplines concerned with sustainable provision and/or appropriation of common-pool resources (CPRs). Transformation activities (e.g. processing, distribution, retailing) in which value is added to resource units appropriated from CPRs were implicitly assumed in developing the framework to be exogenous to the SES of focal concern. However, provision and appropriation of CPRs are nowadays often closely integrated with the market economy, so significant endogeneity exists between many CPR provision/appropriation activities and the activities in which appropriated resource units are transformed into the products ultimately marketed. This paper presents a modified version of the SES framework – in which ‘transformation systems’ and their ‘products’ are included as additional first-tier attributes of a focal SES – that is designed to better account for transformation activities and thus be more suitable for diagnosing those sustainability problems where it is inappropriate to define all such activities as exogenous to the SES of focal concern. The need for such modification was identified in the process of designing a research project examining the challenges faced by Cambodian cattle-owning smallholders in accessing value chains for premium-priced beef. This case was used in an illustrative exercise to highlight how the modifications to the framework can broaden the search for factors potentially affecting SES performance, and thereby strengthen diagnosis of reasons for underperformance.

Polycentricity, subsidiarity and adaptive efficiency in environmental governance

Graham Marshall, University of New England

Polycentricity and related concepts have become central to calls for adaptive environmental governance. However, a number of issues have arisen in interpreting these concepts that could lead to miscommunication both within the research community and between this community and political, policy and practitioner communities. These issues include: (1) Does polycentricity refer to the de jure or de facto structure of a governance arrangement? (2) Is polycentricity a property only of polycentric governance arrangements that function as a system? and (3) Does coherence in a polycentric governance system imply effective adaptive governance?

In respect of the third of these issues, it is argued that coherence in the behaviour of decision units within polycentric governance does not necessarily lead to well-performing adaptive governance, and that achieving 'good adaptive governance' is a complex exercise. The principle of subsidiarity is identified as an appropriate starting point in this exercise, at least when interpreted from a polycentric perspective which recognises the self-organising capacities of decision units at all levels.

Critiques of polycentric governance performance typically question its economic efficiency. These critiques have been based on the allocative-efficiency metric of mainstream microeconomics which is blind to the potential benefits of polycentric governance in strengthening robustness against shocks that arise from the positive-feedback dynamics of complex adaptive systems. Douglass North's adaptive efficiency metric accounts for such benefits and thus is appropriate for assessing the economic efficiency of polycentric governance.

Is technological unemployment in Australia a reason for concern?

Jim McFarlane, University of New England
Boyd Blackwell, University of New England
Stuart Munter, University of New England

Technological unemployment refers to the loss of jobs associated with technological change and is far from being a new phenomenon. The fact that adjustments in structural employment occur in response to technological change is unquestioned however controversy exists as to whether long lasting unemployment is consequence of technological progress and the substitution of capital for labour. Two main schools of thought preside over this debate. One view is that productivity gains lead to higher incomes which in turn generates new jobs in response to greater demand for new goods and services. Hence, structural unemployment associated with technological change is short-term. Those harbouring the opposing view have been broadly labelled as 'Luddites'. Modern day proponents advocate that the rapid rate of technological progress is conducive to the possibility of long-term unemployment. Could the Luddites be right? Are we headed into a period of automation not yet witnessed? This paper explores whether technological unemployment is a concern for the Australian economy, and if so, which sectors of the economy appear to be most at risk. This paper provides an important contribution to economic theory in a sustainable ecological way by redirecting policy for building resilient regions.

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Assessing interventions for food security in mixed crop-livestock systems against the background of climate variability and change in Northern Burkina Faso

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Smallholder crop-livestock farming systems are important for food security in Sub-Saharan Africa, but they are vulnerable to the effects of climate variability and change. We tested the impacts of different interventions in two contrasting case study farms in Northern Burkina Faso, against plausible current and future climate scenarios. We developed a dynamic farm-household modeling framework around existing tools: crop and animal production models APSIM and LivSim, household model IAT and the climate generator Marksim. Baseline (2013) and a 2050 projection based on IPCC RCP 8.5 describe two climate scenarios (90 years) for comparison. Results showed that the maximum level of inputs increases farm energy production by 90% and 76% compared to the baseline for the small and the larger farm, respectively. Input levels maximising net incomes are moderate, though higher than those currently used in both farms. The inter-annual distributions of net income show that use of external inputs increase both upside and downside risks, because tested interventions are more effective at increasing highest yields than at preventing the low production levels of some years. We conclude that the best options for adapting mixed crop-livestock systems might be found in the synergies between components, rather than in single interventions.

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Macroeconometrics: a baseless unscientific approach

Samuel Meng, University of New England

Through scrutinising the conditions for applying the probability theory, analysing the problems and implications of the fitting-the-data approach, and demonstrating the performance of macroeconometrics through estimation of GDP identity, the paper demonstrates that, although it is believed that the probability theory provides the foundation for macroeconometrics, the condition for the theory – random experiments – does not hold in time series modelling. The entire macroeconomic modelling is thus based on an inappropriate assumption or false claim that the disturbance in a macroeconomic model is random. The paper further shows that the fitting-the-data approach is unscientific and unable to reveal the truth. On rejecting the fitting-the-data approach, it is suggested that the scientific way to do economic research consists of studying the economic phenomena, finding the truth or the driving forces behind the phenomena, forming a law (or theory) based on these driving forces, and using data to test the law.

Creeks, cows and council mergers in the Northern Territory: From policy evaluation to policy ecology

Thomas Michel, University of Sydney

Evaluation has become an integral part of the modern public sector management cycle in Australia. Has a change process effectively and efficiently achieved its objectives? Can improvements be made? This managerial logic has informed a recent evaluation of the financial sustainability of the Northern Territory's local government sector, in the wake of a sweeping amalgamation reform in 2008. The assessment process of whether the reform had secured the sector's sustainability culminated in a voluminous private consultancy report in 2012 (with an addendum in 2013): the first of its kind for the Northern Territory.

The report was treated as a serious document in technocratic circles, and highlighted many pressing financial issues of the sector. Yet the report is notable for what it omitted: the trenchant unpopularity of the shires, the technological shortcomings, sedimented intercultural tensions, the vast geographic reach of the new council areas - all are relegated to outside the terms of reference. Can these omissions be excused for pragmatic reasons? Or are they symptomatic of the modern policy expert's malaise, whereby the political is rendered technical, the ecological is rendered linear, and the experts' delimitation of their field of expertise is the point of the exercise?

Art and cultural value chains: Challenges and opportunities for regional Australia

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Art and other creative industries represent an economic and cultural value for a country and its people. The contribution of artistic activities for the society exceeds the economic value that derives directly from their production and tourist attraction. Arts based on regional culture allow communities to promote their cultural beliefs, contribute to the regional and national identity, and influence other industries related directly and indirectly to the sector, including services and hospitality. Therefore, government support is required to preserve regional cultures and allow all Australians to learn and engage with Indigenous and regional communities.

Relevant creative segments for regional Australia include music, performing arts, films, publishing, designs and visual art, among others. According to Woodhead and Acker (2014), the estimated value of sold art craft products for regional communities reached \$52,702,676 for the period between 2008 and 2012. This value demonstrates the relevance of this industry for regional economies and local employment. A value chain analysis can be used as a tool to improve the performance of the chain as a whole with direct benefits for all agents that participate in the art and cultural chains. Through this analysis, there will be an increase in the understanding about the different channels used to marketing artistic products, the actors involved in each channel, sustainability of the channels, market opportunities and challenges for the industry.

The main opportunities for the industry include alternative points of sales, such as restaurants and tourist trips, production of a range of products aiming to different consumers, and cultural activities aiming to promote regional cultures that increase awareness and knowledge and, as a consequence, increase demand and willingness to pay for art products with a cultural background, which can be considered as an intrinsic value added to the artistic product. One of the main challenges the industry faces is the differentiation between Australian-made products and those that are labelled as 'Designed in Australia' that lack of identity and cultural background.

Title: Ecological economics and The Cosmic Bank

Joshua Nash, University of New England

This critical essay is about exchange. It places my personal theoretical understanding of economics – the branch of knowledge concerned with the production, consumption, and transfer of wealth – into the practical context of working on my family’s rental property in Armidale, New South Wales, Australia. The theory of developing a rental property for the continuation of ‘good vibes’, for creating community connections, and for the ‘good of humanity’, namely those who come after us, and those who benefit from our evolving natural family environment, is argued using a personal theory of economics dubbed The Cosmic Bank. Accessing free and publicly available resources beneficial to gardening and urban land development, e.g. manure, cardboard, autumn leaves, coffee grounds, composting materials, is advanced to be not only a crucial element in increasing carbon loading when establishing garden beds and thus moving towards self-sufficiency in food production, but is essential to creating community connectedness and a belonging through natural and cultural forms of exchange. The position taken is that through beautifying one’s living environment, whether owned or rented, is a means of reconciling contemporary questions relating to lifestyle, health, wealth generation, sustainability, and links to community, nature, and the possibility of ‘the Good Life’. In conclusion, a resolution over antithesis aspects of time, effort, the fixation with wealth accumulation, belongingness, and the role in self-partner-nature-society dealings and interactions is posed to reach a synthesis between ecological conceptions of economics and The Cosmic Bank.

Economic reforms and environmental quality: Empirical evidence from European and Central Asian transition economies

Rabindra Nepal, The University of Queensland

Global warming and other adverse climate change impacts induced by anthropogenic carbon dioxide emissions is a major public policy concern around the world. This paper examines the impacts of market-based economic reforms on per capita CO₂ emissions in the European and Central Asian transition economies where environmental degradation was pervasive prior reforms. A dynamic panel data model is employed for this purpose for 28 countries covering 22 years from 1990-2012. Our results suggest that reforms in competition policy and corporate governance are the significant driver of emissions reductions in the region. Therefore, advances in competition policy and governance reforms are desirable given the available scope to extend these reforms. The Kyoto Protocol had no significant effect in reducing emissions levels while the relationship between economic growth and emissions seems weak based on our results. The results indicate that reducing energy use by increasing energy efficiency and investments in renewable energy are necessary to reduce the carbon emissions level and mitigate the adverse impacts of climate change in the region.

A dynamic evaluation of a domestic emissions trading scheme on the Australian economy and the environment

Duy Nong, University of New England

Mahinda Siriwardana, University of New England

Sam Meng, University of New England

Judith McNeill, University of New England

This paper applies a modified MONASH model to examine the effects of a domestic Emissions Trading Scheme (ETS) on the Australian economy and the environment. The dynamic ETS scenario is designed for each year from 2015 to 2030 to enable Australia achieve emissions targets of 5% below 2000 levels by 2020 and 26% below 2005 levels by 2030. The database involves details of 24 energy industries, 10 household groups and 10 tiers of occupations. We found that the permit prices increase from A\$4.6 in 2015 to A\$12.7

in 2020 and A\$19.4 in 2030. The main sellers are high energy-intensive sectors due to their natural low marginal abatement costs. Australia's GDPs are 0.7% and 1.9% lower relative to the base case in 2020 and in 2030. The results lend strong support towards the transition to renewable energy and prices of natural energy resources such as coal may increase considerably with the ETS. Households' incomes are slightly reduced over years with increasing degrees and the welfare is significantly worsened relative to the base case from 2026.

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Buy, outsource or partner: The multiple role of actors in water 'collaborations'

Leonie Pearson, University of Canberra

Recent efforts to manage water in Australia and the UK have prioritised the role of local collaborative water arrangements. These devolved governance arrangements are met with challenges such as lack of resources and uncertain roles and responsibilities amongst actors. This paper explores the multiple roles that actors (engaged stakeholders) can have in the local collaborative arrangements. It does this by operationalising a literature based framework exploring the multiple configurations of locally based water arrangements with two constructs; relationship structures (i.e. trust, reciprocity between the actors) and transparency (i.e. how clear and open is decision making of the arrangement). This framework delivers four unique arrangements; outsourcing, transactional, partner and unbalanced. Each of these arrangements has specific roles and expectations of actors. By situating these actor roles within the broader water collaboration literature and experience, it identifies that actor roles within water collaboration can vary across all four arrangements (i.e. buyers, sellers, outsources or partners) depending on the value that actors receive from the collaboration and the actual transaction costs required to engage. The innovation of this paper is to clarify that within any collaborative governance arrangements, actors secure multiple roles, not all of them collaborative.

The role of foreign direct investment in the reshaping of economic regions in Mexico: The case of the Santiago river basin

Salvador Peniche Camps, University of Guadalajara
Alberto Arroyo González, University of Guadalajara

In Mexico, the role played by foreign direct investment through NAFTA has been great, mainly for the economic integration of certain regions to the North American market. On the other hand, the question of water supply has become critical. The access to water is already a great limitation to growth in certain regions and, at the same time, the main incentive for multinationals to invest in Mexico.

The paper focuses on the impacts of water projects in western Mexico. By providing water to transnational corporations the Mexican government is reshaping the economics of important regions, promoting development in certain sectors and preventing others to develop or adapt to the new economic conditions in the hemisphere and the new international division of labour.

Minimising social externalities of major resource projects: A way forward through shared value

Anya (Anna) Phelan, Queensland University of Technology
Les Dawes, Queensland University of Technology
Robert Constanza, The Australian National University
Ida Kubiszewski, The Australian National University

As the size and complexity of major resource projects increases, so do their social and environmental externalities. This paper identifies key themes for evaluating social externalities of major resource projects and analyses them using a mixed-methods approach and structural equation modelling (SEM). A survey was conducted (n=428) in communities affected by coal seam gas (CSG) megaprojects in the Surat Basin in Southeast Queensland, Australia. Results reveal rising economic inequality, sense of uncertainty about the future, and impacts on the standard of living and social capital. For example the majority of the respondents reported being concerned about: rising cost of living in the area (83.4%), groundwater impacts (77.4%) environmental damage (71.8%), and how their community was being affected (77.3%). We found that perceptions of fairness and inequity weigh heavily on land owners and disrupt meaningful participation leading to negative psychosocial effects. Our analysis shows that unresolved concerns of community residents about environmental and social impacts contribute to lower life-satisfaction, inhibit the community to plan for the future, and lead to a weaker local economy. We conclude by discussing the role of inclusive development and shared value opportunities as a way of minimising social externalities.

An investigation into households' expenditure and embodied energy consumption in Australian cities

Lavinia Poruschi, Griffith University
Christopher L Ambrey, Griffith University

In a highly urbanised nation, there is a need to better understand the human dimensions associated with consumption of energy. Understanding the context in which the Australians consume energy either directly or embodied in goods and services can be relevant to understanding future trajectories of energy demand in cities. With the development of powerful new environmentally extended multiregional input-output tables with unprecedented geographic and sectoral detail and coverage it is possible to account for the supply chain and embodied demands of people's consumption and broader lifestyle choices. By linking data on household expenditure and embodied energy consumption or energy footprints (obtained from virtual Industrial Ecology lab (IELab) projects <http://www.isa.org.usyd.edu.au/ielab/ielab.shtml>) this study seeks to understand households' expenditure choices and their associated embodied energy. It is anticipated that the results of this study, by revealing key drivers of energy footprints will both, add to existing knowledge, and provide insights for decision makers regarding consumers' lifestyle choices and their attendant embodied energy consumption.

Investigation of the Environmental Kuznets Curve for carbon emission in Indonesia: Does GDP per capita matter?

Yessi Rahmawati, Airlangga University
Andiga Kusuma Nur Ichsan, Airlangga University

This study aims to look at the effect on GDP per capita - or the economic well-being (affluence) as measured by income per capita - and energy consumption of the environmental impact of CO₂. This study will also examine whether the Environmental Kuznets Curve hypothesis U-shaped is relevant in Indonesia. In addition, this study tries to provide practical steps and strategies that depart from the proposed model.

The analysis in this study uses econometric techniques is Ordinary Least Squares (OLS). The data used is from 1973 to 2013. The results of the regression model estimation of independent variables, GDP per capita and energy consumption have partial significant (t statistics) and, simultaneously, (F statistics). Regression models also have a value of goodness of fit at 99.15% (R²). In other words, the model proposed in this research explains the CO₂ emissions that occur in Indonesia. This study also found that the Environmental Kuznets Curve hypothesis/EKC is applicable in Indonesia; this is evidenced by the coefficient GDPP2, which has a negative value.

Visualising value: Construction and action across cultural boundaries

Paul Reader, University of New England, Arugula Aboriginal Corporation

The difficulty of establishing values across different cultures or epistemes is related to historical experience, cultural artefacts, reasoning and underlying discourse. Various fictions are constructed in order to gain or retain power, and these inform policy, decision-making and the exercise of power. This presentation seeks to visualise the different values that build on and cut across this fictive landscape; values that slip between science and reason, religion, art and pure fantasy. A particular example, the problem of constructing a case for the possible purchase of a Simpson Desert fringe pastoral lease by the Indigenous Land Corporation, is used as a starting point to explore this subject. In examining the indigenous and settler cultural dimensions, it aims to arrive at a different kind of evaluation, the case around future human and ecological wellbeing, a new vision and empowering resilient fiction.

The social and infrastructure benefits and negatives of remote mining communities, Leigh Creek and Roxby Downs

Stuart Robertson, University of New England, CRC for Remote Economic Participation

The built infrastructure of remote mining communities can bring benefits and negatives to the surrounding area and neighbouring communities. Benefits can be increased availability of services and increased social amenity. Whereas, the negatives can be loss of existing services in neighbouring communities as the mine community becomes the major service centre. Numerous Australian studies have highlighted further negative impacts associated with mining developments including; increases in property prices, itinerant workforces and a gender imbalance in the resident population.

This paper presents the findings of research undertaken in the communities of Roxby Downs and Leigh Creek and their hinterlands. Through a survey respondents were asked their views on Roxby Downs and Leigh Creek with follow interviews delving deeper into the social and infrastructure benefits and negatives that both these communities have brought to the region. Whilst there have been many infrastructure and social benefits from these communities, there has been a decrease in services in the surrounding communities which has led to an increase in the dependency upon both Leigh Creek and Roxby Downs. This dependency has implications for ongoing service provision particularly in the case of Leigh Creek's planned closure in 2016.

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Fijian women's role in disaster risk management for climate change

**Priyatma Singh, The University of Fiji
Manpreet Kaur, The University of Fiji**

Climate change is progressively being identified as a global crisis and this has immediate repercussions for Fiji Islands due to its geographical location being prone to natural disasters. In the pursuit for prudent preparedness before disasters, Fijian women's engagement is underpinned due to the socially constructed roles and expectation of women here in Fiji. This paper outlines through theoretical study of literature review exploring ways to better inform and engage women for climate change per se disaster management in Fiji. The focus of this study on disaster management is to outline ways in which Fijian women can be actively engaged in disaster risk management, articulating in decision-making, negating the perceived ideology of women's constricted roles in Fiji and unveiling social constraints that limit women's access to practical disaster management strategic plan. The empowerment of women is believed to be a critical element in constructing disaster resilience, as women are often considered to be the designers of community resilience at the local level. This study will advocate women articulation in disaster risk management, thus giving equal standing to females in Fiji and also identify the gaps and inform national and local Disaster Risk Management authorities to implement processes that enhance gender equality and women's empowerment towards a more equitable and effective disaster practice.

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Future transport policy developments for stronger remote regions

Bruno Spandonide, Flinders University, Ninti One Ltd

The design of the current transport system is at the basis of a situation of structural inequality characterising the everyday lives of a majority of Aboriginal and Torres Strait Islander people living in remote areas: in many aspects of their planning and despite some gradual improvements over the recent decades, remote transport systems still ignore parts of the population they are supposed to be responding to. The findings of some recent transport and mobility surveys invite consideration of how future policy development for regional management of remote Australian communities and enterprises. The design of more sustainable transport systems would aim at leading to greater socio-cultural well-being and economic productivity in large remote communities as well as achieving high quality of lives for people living in very remote areas.

Sustainable remote Australian transport for living on country and going out bush

Bruno Spandonide, Flinders University, Ninti One Ltd.

Both the domestic and international academic literature's analysis of links between transport and wellbeing focuses mainly on urban settings. While the relationship and the dependency between remote Australians wellbeing and travelling activities are evident, its complexity still remains an under-researched topic. In urban areas most research projects concentrate on vulnerable population groups including older people, people with health issues, socio-economically disadvantaged people, or people undergoing more frequent extreme climatic events. The lack of data and research covering these issues in remote locations sounds even more paradoxical when considering that extreme distances, high supply chain costs, limited access to services and to economic participation are well recognised obstacles for sustaining vibrant remote Australian communities. The latest accessibility-driven technological innovations emphasising multiple

outcomes in terms of wellbeing in both the digital and the sharing economies are highly topical in transport projects in urban agglomerations but a distant reality for remote Australia. Furthermore, what defines a good quality of life can sometimes be very similar and other times greatly differ between remote and urban contexts. In the light of some recent transport and mobility surveys, this paper analyses the specific links between future appropriate transport and increasingly resilient remote communities.

Elevator conversations to change minds: A modest proposal – kill all the bees!

Sharolyn J Anderson, University of South Australia
Paul C Sutton, University of South Australia

We present a brief ‘elevator conversation’ as a proposed vehicle for change and invite the audience to critique the logic or effectiveness of the story and/or share their own ‘elevator conversations’. Our conversation is the following:

A modest proposal: Kill All the Bees!

It may come as a surprise to you but killing off the bees actually makes economic sense. This has to do with the dollar value of the ecosystem services provided by bees. Many people have difficulty wrapping their head around how one might put a dollar value on an ecosystem service. Insect pollination is a standard example of an ecosystem service. Insects pollinate our crops for free. If honeybees were to go extinct we would need to find some other way to pollinate honeybee dependent crops - perhaps armies of people wandering from plant to plant with small pollen covered paintbrushes. If bees were to go extinct and disappear it is very likely that many humans would be employed in the task of pollination. This would be a ‘win-win-win’ scenario from a strictly economic perspective: 1) it increases gross domestic product, 2) it creates jobs, and 3) it generates tax revenue. While there may only be a few economists that would seriously argue for this policy it must be recognised that if bees truly did go extinct it would increase GDP, it would create jobs, and it would generate tax revenue.

The ecological economics of land degradation: Impacts on ecosystem services

Paul C Sutton, University of South Australia
Sharolyn J Anderson, University of South Australia

The magnitude of the global economic value of ecosystem services dwarfs the value of the global market economy. Changes to land cover in the past twenty years have reduced the value of the annual flow of ecosystem services by \$4-20 trillion per year. However, these losses do not account for reduced ecosystem function and its impact on the value of ecosystem services. Here we explore the use of a proxy measure of land degradation derived from maps of human appropriation of net primary productivity (HANPP) to estimate losses of ecosystem services due to land degradation. We use two proxy measures of land degradation as a measure of impact on ecosystem function. The first is a representation of the human appropriation of net primary productivity derived from population distributions and aggregate national statistics. The second is theoretically derived from biophysical models and is the ratio of actual NPP to potential NPP. Juxtaposition of these measures of land degradation with a map of ecosystem service values allows for spatially explicit representation of those lost ecosystem service values that result from land degradation. Our estimate of lost ecosystem services is \$6.3 and \$10.6 trillion per year using these two approaches respectively.

Mapping and understanding bushfire and natural hazard vulnerability and risks at the institutional scale

John Symons, Victoria Institute for Strategic Economic Studies (VISES) Victoria University
Professor Roger Jones, VISES
Celeste Young, VISES

Current government spending on natural disaster response is more than 20 times spending on preparedness. Many climate-related natural hazards are increasing and the number of people living in hazard prone areas is also increasing. Large natural disasters can also cross domains, moving from the private to the public realm, and shifting from a local, to a state or national concern. This raises the potential of future, unmanaged risks.

The spending mismatch is well understood, but we also face potential deficits in important social and environmental values that may not be adequately compensated. If a risk is owned then we can assess the balance between preparedness and response. If the risk is un-owned, these values may be damaged and degraded, or lost. The project has undertaken a comprehensive review of disaster risk management ownership in Australia.

The project is also mapping a broad range of economic, social and environmental values and relating these to natural hazards across several case studies. The project explores who owns these values and what happens when they cross domains. A governance framework illustrating such strategies has been developed which will be used to explore how a range of alternative strategies may contribute to improved resilience by sustaining economic, social and environmental values in a changing environment

Assessing risk and performance of agriculture in different agro-ecological zones of Botswana

Omphile Temoso, University of New England
David Hadley, University of New England
Renato Villano, University of New England

In recent years, agricultural growth in Botswana has declined, leading to a progressive increase in food imports. The increase in food imports has been attributed to low productivity caused by inefficiency and the small scale of farms, the semi-arid production environment in Botswana (i.e. poor soils, low and unreliable rainfall and high temperatures) and frequent outbreaks of the disease such as foot and mouth (FMD). This paper measures the importance of technical efficiency and production risk as the two possible sources of production variability in Botswana agriculture. A production function specification that accounts for the effect of inputs on both technical inefficiency and risk is employed to a panel data of traditional farms from six agro ecological regions in Botswana.

Australian local government sustainability and transformation: The current fit for the future reform initiative in New South Wales

Ian Tiley, University of New England

In Australian local government, for decades sustainability and especially long-term financial sustainability, and transformation, primarily through structural and other reform, have constituted major issues and problems for the 'grass roots' third tier of Australian government. Usually the catalyst for change has emanated from state and territory jurisdictions which have imposed reforms. A brief history will be provided of Australian local government transformation in these jurisdictions over the past 25 years.

In NSW, since 2011, a structured process of dialogue and consultation has been ongoing in the local government sector with the objective of securing and implementing beneficial reform. The presentation will explain this process and particularly the current NSW Government Fit for the Future (F4F) process.

From the perspective of a long-term local government practitioner, elected representative, Mayor, and former member of the NSW Local Government Acts Taskforce, the presentation will critique the current NSW reform process and suggest options for successful transformation and future sustainability of the NSW local government sector as a possible model for other Australian and international jurisdictions.

How ideas of distributive justice play out in water planning: The illuminating case of the Murray Darling Basin Plan

**Max Finlayson, Charles Sturt University
Steve Vanderheiden, CSU, CAPPE, Colorado University
Adrian Walsh, University of New England**

Water policy involves inter alia making decisions about the allocation of water between competing users and competing uses. Given the high-stakes at play, it should not be surprising that those disadvantaged by any outcome typically proclaim that it is unjust or unfair. What is surprising, however, in such debates is the lack of any systematic attempt to outline an account of what a fair distribution would look like. Even more surprising is that the debates are rarely understood as involving the concept of distributive justice.

In this paper we begin by outlining the central features of the concept of distributive justice. We argue that water policy cannot avoid normatively based choices between competing conceptions of human value. We then proceed to explore the water plan for the Murray Darling Basin and show the significant decisions that were made in the planning process. We take this as not only of intrinsic interest, but also to illustrate our claim that questions of justice are at the heart of water planning, and as important as the technical considerations that generally drive such planning.

Our work here builds on an earlier discussion of justice and water developed in: Lukasiwicz, A. (2014). "Fair water distribution". In: Opportunities for the Critical Decade: Enhancing well-being within Planetary Boundaries.

'Serf's up': Do divergent incomes create the illusion of macroeconomic energy efficiency gains?

**James D Ward, University of South Australia
Paul C Sutton, University of South Australia**

Aggregate national statistics on energy demand and GDP suggest that energy intensity is decreasing (i.e. GDP is rising per unit energy demand). Is this evidence that as we are growing richer we are dematerialising? What is happening at the individual level within the economy? We assume that the relationship between per-capita energy demand and per-capita income is non-linear. However, the non-linearity suggests that changes in energy demand are not symmetrical for declining versus rising incomes. We contend that as incomes increase for a relatively small, wealthy fraction of the population, the resultant increase in their individual energy demand may be offset by a decline in energy demand on the part of a (larger) fraction of less wealthy people, who are becoming marginally poorer. In this case of growing income disparity, the asymmetry means an aggregate net increase in income is observed while energy demand remains approximately constant. This raises questions around the collection and aggregation of income and energy demand data with implications for projections of economic wellbeing in the face of energy depletion and climate change mitigation. More data is needed on energy consumption at the individual level to test the assumption that energy intensity decreases with increasing incomes.

The emissions trading experience: Factors associated with acceptance and emissions reductions

Neale Wardley, Victoria University

It is widely held that human activity has contributed to global warming due to a steady increase in the level of atmospheric carbon dioxide (CO₂) and an enhanced greenhouse effect. This study sheds light on a market based response to the mitigation of the resultant climate change. The tradeable emission permit approach is also known as cap and trade greenhouse gas (GHG) emissions trading. Despite the strong academic support for GHG emissions trading it has not, as yet, matched the success of prior programs in achieving the required reduction in emissions.

Over the project evidence has been found for the factors that are important during the implementation of a tradeable permit program. There are indications that these factors are either associated with the acceptance of GHG emissions trading or emissions reductions but not both.

The various factors of scheme design have been compared to see how they that have affected performance. There is a trend observed in a group of design factors that are important to gain acceptance of GHG emission trading schemes. The data indicates that these factors may have an inverse correlation with the desired outcome of emissions reductions.

Demystifying sustainability – why it isn't the same as 'sustainable development'

Haydn Washington, University of New South Wales

Twenty-eight years have gone by since 'Our Common Future' came out from the World Commission on Environment and Development, yet we have gone backwards in terms of sustainability. Why? Because the term has been buried under layer upon layer of academic jargon. At the heart of the problem is that sustainable 'development' has been co-opted to be based on endless growth. The UN means this by 'sustainable development', as did WCED. The 'endless growth myth' lies at the heart of our current unsustainability, the key denial that stops real change. This stops us either thriving today or transforming to a sustainable future. However, despite this, many continue to speak about 'sustainable growth' and 'green growth', both of which are actually oxymorons. UNEPs 'green economy' is based on this, as is the 'circular economy'. Both fail to properly consider either overpopulation or overconsumption, key drivers of unsustainability. It is time to demystify sustainability and accept that endless growth on a finite planet is not only impossible, it is the fundamental cause of the environmental crisis. The paper considers seven things sustainability cannot be, and then canvasses what a meaningful sustainability should be - the 'Great Work' of repairing the Earth.

Towards evaluating post-disaster recovery

Roberta Ryan, University of Technology, Sydney
Liana Wortley, University of Technology, Sydney
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Natural disasters are an inherent part of the Australian landscape and impose a range of economic, social and environmental costs on governments, businesses and communities. Since 2009, natural disasters have claimed more than 200 lives, destroyed 2670 houses and damaged a further 7680, and affected the lives and livelihoods of hundreds of thousands of Australians (Productivity Commission, 2014a:3). Over the past decade, the Australian Government has spent around \$8billion on post-disaster relief and recovery (Productivity Commission 2014a, 2014b) and another \$5.7 billion is expected to be spent over the forward estimates for past natural disaster events (Australian Audit Office, 2015: 132). A key objective of this

investment is to increase the resilience of communities to future events. Despite the considerable resource input, there is currently no agreed national framework or indicators for evaluating the appropriateness, effectiveness and efficiency of recovery efforts, or whether these have led to more resilient communities. This paper responds to this gap by providing a detailed analysis of existing evaluation practice materials from post-disaster recovery programs both nationally and internationally. A typology was developed to categorise evaluations of natural disasters and to identify case studies that may inform the development of national evaluation framework.