



Learning Communities

INTERNATIONAL JOURNAL OF LEARNING IN SOCIAL CONTEXTS
**SPECIAL ISSUE: SYNTHESIS & INTEGRATION WRITING FROM
THE COOPERATIVE RESEARCH CENTRE FOR REMOTE
ECONOMIC PARTICIPATION**

Number 19

APRIL 2016

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Publisher

www.cdu.edu.au/northern-institute/lcj
Northern Institute
Faculty of Law, Education, Business and Arts
CHARLES DARWIN UNIVERSITY
Darwin, Northern Territory 0909 AUSTRALIA
CRICOS Provider No. 00300K
RTO Provider No. 0373
ISSN 1329-1440 (online)
ISSN 2202-7904 (print)

Design and Print

The Exhibitionist
Phone: 08 8981 3166

Artwork Credit

Artist: Marina Strocchi
Title: Mystery Train 2007
Etching (workshop proof edn 60)
24.5 x 20cm [image]
Collaborators: Leon Stainer & Dian Darmansjah
Printer: Dian Darmansjah
Gifted by the artist & Northern Editions, 2007
Charles Darwin University Art Collection
CDU 1585

All research articles published in this journal have undergone rigorous double blind peer review, based on initial editor screening, anonymous refereeing by independent expert referees, and consequent revision by article authors when required. Please cite articles within this journal accordingly.

Acknowledgement

The research and development work reported in this edition was undertaken with the financial support of the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (<http://crc-rep.com/>), and its parent organisation Ninti One Ltd (<http://www.nintione.com.au/>). The views expressed here do not, however, necessarily reflect the views of all Ninti One Ltd partners or participant organisations of the CRC for Remote Economic Participation. Errors or omissions remain with the authors.



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Editorial

Dr Judith Lovell

Synthesis and Integration, CRC for Remote Economic Participation, Ninti One; and Northern Institute, Charles Darwin University

This special Synthesis issue brings together practical and theoretical responses to themes arising from the research in the latter course of the seven-year Cooperative Research Centre for Remote Economic Participation (CRC-REP) (2010–2017), with the caveat that research work within the CRC is still underway at the time of writing. The themes are being drawn together in the Synthesis and Integration project, which brings together the major cross-project findings typically of most immediate use to policymakers. Research synthesis consolidates the knowledge gleaned from different projects to describe the impacts of that knowledge for industry, community and policy. In this special issue, the articles describe knowledge about, and founded in, remote and very remote Australia which comes from research designed with local communities, government and industry stakeholders. As a body of research, the mixed quantitative and qualitative methods of CRC-REP are grounded in a substantial evidence base and address questions defined and shaped by stakeholders and partners. Integration is an essential tool to develop from research findings; it contributes to solutions, support or intervention for entrenched and wicked problems and improves the baseline of participation and innovation in remote industry.

In this special issue, the research findings contribute significantly to what is known of the complexity where remoteness, polity and ideology combine and impact on remote Australians, their environments and the stakeholders whose interests lie in these regions. Some background to help contextualise remote Australia includes:

- Remote and very remote Australia make up 87% of the Australian landmass, but only 2.8% of the nation's population. Many Aboriginal and Torres Strait Islander peoples live in the 1,200 or so remote Aboriginal communities spread throughout remote Australia.
- 60% of the nation's mining platforms operate in remote Australia, delivering a significant contribution to national wealth. Mining contributes to 8.4% of Australia's GDP and 55% of Australia's export GDP (ABS, 2012) and directly employs 239,100 people across Australia (ABS 2011).
- There are 40,000 small-to-medium enterprises (SMEs), 1.5 times more per capita than the national average.
- The agriculture industry in remote Australia comprises 2.2% of Australia's GDP.

The CRC-REP is a partnership organisation of more than fifty stakeholders and partners, with its foundations in the work of the previous Desert Knowledge CRC (2003-2010), and the related sectoral activity of its management company Ninti One Ltd (<http://www.nintione.com.au>).

The authors of this special issue include researchers and research partners of the CRC-REP projects Remote Education Systems, Pathways to Employment, Plant Business, Climate Change Adaptation and Energy Futures, Enduring Community Value from Mining, Aboriginal and Torres Strait Islander Tourism Products, and Synthesis and Integration.

The work of the two CRCs (Desert Knowledge and Remote Economic Participation) has produced an extensive body of knowledge and resources made available to diverse audiences. The mission of the CRC-REP is ‘through research, innovation, expertise, education and outreach ... to provide the knowledge base essential to create thriving remote communities and economies’ (CRC-REP, 2010) and the articles that follow provide evidence of that mission being applied. The authors synthesise remote and non-remote positioning across research projects, disciplines and geographies, revealing the tension between urban and non-urban perceptions of ‘remoteness’.

The articles presented here engage with this tension. Local and global market opportunities and non-market economic priorities differ markedly in scale, availability and scope; clearly, one size (or measuring stick) does not adequately fit (or measure) all. Shifting the thinking of urban populations across to the development priorities of sparsely populated remote locales may not seem to contribute significantly to the Australian gross domestic product. Yet, as the resources boom that sustained the nation through the global financial crisis last decade has wound down, perhaps it is time to recognise the value of aspirations, capabilities and resilient local-benefit outcomes as a means of transitioning to greater sustainability in remote Australia. These outcomes are therefore significant for the contemporary national psyche and economic development in all of remote Australia and in the contribution they can make towards a more pluralist Australian society. The tension between remote and non-remote must be renegotiated with an ideology that envisions local benefits linked with greater national and global opportunities. The first four articles in this issue propose that through local knowledge, culture, language and natural resource assets, settlements can develop greater local and sustainable remote economic participation.

Eva McRae-Williams, John Guenther, Damien Jacobsen and Judith Lovell, from the Pathways to Employment, Remote Education Systems, Aboriginal and Torres Strait Islander Tourism Products and Synthesis and Integration projects, describe a shift in the public policy discourse on employment, education and enterprise from remote disadvantage towards engagement with the aspirations of remote residents and the inherent strengths of culture, kinship and knowledge of one’s country. This conceptual shift is based on the strengths and advantages evident when social, identity, cultural and natural capitals are considered assets upon which to develop wellbeing and meaningful and rewarding livelihoods, both of which offset the demands on welfare and health-related expenditure and recognise the ideologically ‘marginalised’ as part of a more pluralist and global reality.

In the next two articles, Samantha Disbray and Ros Bauer, followed by Sam Osborne, from the Remote Education Systems project, propose that informal adult learning practices facilitate an uptake in socio-cultural and economic activity.

Samantha and Ros provide a case study in adult continuing and community education. Learners and facilitators from the language domains of Warlpiri, English and a mix of both use principles of informal learning: available, practical resources and opportunities; healthy social and cultural relationships; adults as capable leaders, teachers and learners in both formal and informal settings. Using these principles in Community Learning Centres, informal learners reach valuable educational outcomes and participate increasingly in the economic development of their region and beyond.

Sam’s case studies of community participatory research practice with Anangu speakers of Pitjantjatjara, Ngaanyatjarra and Yankunytjatjara languages in the tri-State intersection of Western Australia, South Australia and Northern Territory contribute a valuable methodological insight. He describes how existing resources and partnerships could be remanifested to form

an empowering regional knowledge hub, intensifying the capacity of Aboriginal and Torres Strait Islander peoples to 'claim ... the right to research', an immediate means of remote economic participation and a significant contribution to a more pluralist nation.

The narrative thread of enterprise development based on local cultural and natural resource management and knowledge of socio-ecological systems continues in the next article. Keeping with the theme of forms of capital as local assets, Slade Lee and Kim Courtenay, from the Plant Business project, argue for enrichment planting of certain traditional bush foods and medicinal plants to complement wild harvest. Enrichment planting and harvesting facilitate generational learning and maintenance of culture while providing economic benefits and the opportunity for enterprise development.

The next two articles, by Apolline Kohen and Bruno Spandonide, followed by Supriya Mathew, Slade Lee and Digby Race, investigate how transport, internet and climate systems and telecommunications affect remote Australians.

In the cases of internet connectivity and transport systems, a number of rapid and disparate redirections relating to policy have occurred throughout the cycle of CRC-REP, and yet the issues remain consistent in spite of those changes. Apolline and Bruno meticulously layer the capacities and gaps of transport and internet systems. They have produced an *accessibility indicator tool* which considers the specifics of a region, in this case central Australia, and propose that 'bundling' will strengthen existing infrastructure for strategic, local benefits. They offer very practical and cross-sectoral tools that can serve public, private and residents' interests where remote accessibility is an issue.

Supriya, Slade and Digby predict that as the climate continues to change, the crop and wild bush foods industry in remote regions will need to be adaptive to have a resilient future. Failure in these industry value chains will have consequences for both remote and urban stakeholders. They support a pathways approach to encompass climatic, social and technological futures, iterative decision-making and flexibility, proposing that the strategic and innovative thinking of a learning community would better respond to the increasing variables required for successful climate adaptation of the sector and provide evidence for other industries in remote areas.

In the final paper of this issue, Boyd Blackwell and Stuart Robertson analyse resource development, employment and population data for two mines in South Australia and two in the Northern Territory, looking at the definitions of 'enduring value' in these settlements that are dependent on one commodity or a single company. They find that the finer scale settlement-level data for resource development, employment and population paint a different picture than more regional-level or national data. Their ensuing analysis acknowledges the constraints of local data on comparative cross-settlement analysis and the lack of consensus in the measure and evidence for enduring value from mining.

In conclusion, this special *Synthesis* issue provides a commentary on the theme of remoteness and outlines the logic, opportunity and value of making the shift from assuming urbanised modelling and thinking can provide the required frameworks to stimulate remote economic participation in remote Australia. In short, this compendium supports the notion that a more pluralist Australian society is required to reflect qualities and values of 'remoteness' as valid for urban and non-urban planners. The drivers for developing socio-economic pathways and partnerships in remote Australia must entail remotely conceived and grounded ideologies.

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent

the views of the CRC-REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication.

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What are the enablers of economic participation in remote and very remote Australia, and how can we identify them?

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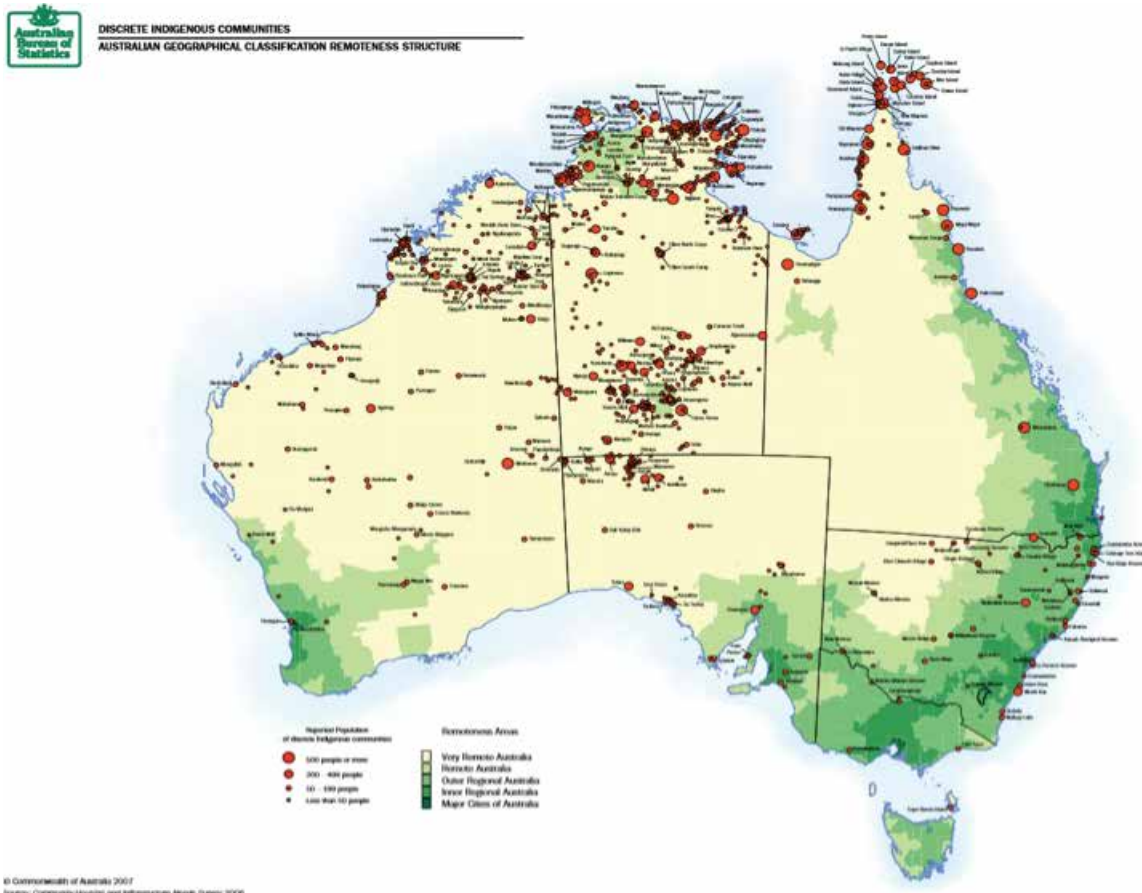
Abstract

In this paper we discuss some of the key learnings from the Cooperative Research Centre for Remote Economic Participation (CRC REP), *Remote Economic Participation, Pathways to Employment and Aboriginal and Torres Strait Islander Tourism Product* research projects. While we do not deny the importance of global markets for remote Australians, we see value in opportunity structures that move beyond the confines of traditional economic and human capital theories. It is through acknowledging and building on local residents' social, identity, cultural and natural capital strengths that, we argue, has a greater potential for supporting increased economic engagement and sustainable participation. Framing our learnings through a theoretical lens of different forms of capital we argue a shift in discourse from one of 'disadvantage' to one of remote advantage would be more supportive of education, employment and enterprise outcomes for local Aboriginal and/or Torres Strait Islander residents. While such a shift will not contribute significantly to the Gross National Product we argue that it would have important tangible and economic benefits for local people and the nation.

Introduction

This paper points to a disjunction between dominant perspectives and associated policy, and the aspirations and capacities of Australian Aboriginal and/or Torres Strait Islander residents of remote and very remote settlements. While we are cognisant of the breadth and depth of theories and methods within the field of economics, we point in this paper to a dominant public and policy perspective which frames remote Australian Aboriginal and/or Torres Strait Islander economic engagement and participation primarily as an issue of disadvantage and deficit. Our findings from the Cooperative Research Centre for Remote Economic Participation (CRC-REP) (2010-2017) research suggests significant limitations with such a frame. Our concern here is not with issues of economic participation generally, but in the discrete communities of remote and very remote parts of Australia, highlighted in the two most lightly shaded areas of the map in Figure 1 on the next page.

Figure 1: Discrete Indigenous communities in Australia



Source: Commonwealth of Australia, 2007

In this paper learnings from the CRC-REP *Remote Economic Participation, Pathways to Employment and the Aboriginal and Torres Strait Islander Tourism Product* research projects are used to highlight a tension between lenses of ‘remote disadvantage’ (Australian Government, 2015a) and those of ‘remote capacity and advantage’ (Guenther, Bat, & Osborne, 2013; McRae-Williams, 2014). It is from this perspective that we question the effectiveness of existing ‘Human Capital Theory’ approaches for supporting increased economic engagement and sustainable development in remote and very remote Australia and argue for an expansion of capital theories for better outcomes.

The learnings from the research projects, *Remote Economic Participation* and *Pathways to Employment*, highlight that by privileging non-remote and non-local assumptions in economic participation and development agendas, initiatives often fail to engage with local (capital) advantages. Both projects have argued that with increased engagement with local aspirations and strengths, education and employment initiatives would be more likely to achieve their desired outcomes (Guenther, 2015; McRae-Williams, 2014). Learnings from the *Aboriginal and Torres Strait Islander Tourism Products* research project similarly point to tensions between Aboriginal business practices and non-Aboriginal standpoints. Such tensions impact on the capacity of the polity to provided effective enablers and supports for sustainable local enterprise based on Aboriginal capacity and advantage (Jacobsen & Tiyce, 2014).

This paper raises salient points regarding local aspirations, actions and agencies for engaging with meaningful livelihood agendas. In addition, the Tourism Project draws attention to the capacities and value of Aboriginal ways of doing business. The paper highlights that while there are numerous education and employment programs rolled out in remote Australia, rarely do they meaningfully engage with Aboriginal ways of doing business or provide resourcing which bolsters enterprise resilience (see also Lovell, Ryder, Williams, Ellis, Wallace, & Hayes, 2011).

This paper argues the interpretations of ‘human capital theory’ which operate and shape policy and program delivery in Australia, are based on flawed assumptions usually reflective of neoliberal positions and non-Indigenous bias (Zipin et al., 2015). By describing local assets as different forms of capital, we aim to open up space for envisioning contemporary and local economic opportunity structures. We argue policies and programs oriented to these forms of capital are more likely to increase enterprise resilience and stable economic participation. We argue that by building from a place that assumes capacity and advantage, the high costs associated with maintaining the current status quo of ‘disadvantage’ can be reduced. In agreement with previous research, we suggest the hegemony of economic value and the associated reduction of human activity to units of monetary cost or gain fails to capitalise on important local assets and agency (Levine, Chan, & Satterfield, 2015). These kinds of ‘human capital’ approaches are unlikely to make a significant contribution to increasing Aboriginal and/or Torres Strait Islanders economic engagement and participation in remote regions of Australia.

Framed by our engagement with Indigenous Standpoint Theories (Foley, 2006; Nakata, 2007) we argue a presupposition of sovereignty (Land, 2015) within such approaches is fundamental for vigorous, culturally embedded, innovative and sustainable economic possibilities and solutions. Ardill (2013) has highlighted that most Australian scholarship, particularly undertaken by non-Indigenous academics, fails to bring First Peoples’ Sovereignities to the fore, and as such persists as colonial knowledge. He has pointed out that while sovereignty is an abstraction for non-Indigenous scholars, First Peoples scholars have consistently maintained “that their sovereignities continue as embodiments of themselves, despite assertions of Crown sovereignty” (p. 318). As authors, we acknowledge Australia belonged to First Peoples before it was colonised and in the absence of a good reason for Crown sovereignty, sovereignty should continue to be assumed to reside with Aboriginal and/or Torres Strait Islander Peoples (Land, 2015). In this paper we are not attempting to define sovereignty, nor do we deny historical and current processes of subjugation. What we want to express is that as authors we share a goal where “reconciliation and rights must be forged on the express presumption that First Peoples’ sovereignities – however they are self-articulated – are a fact of Australian history, and survive as surely as there are First Australians” (Ardill 2013, p. 323).

With this in common, it is still important to acknowledge we come from our own standpoints. As authors, this includes a spectrum of European, feminist, Indigenous, heritages, epistemologies and genders. It is our intention in this paper to continue a process of decolonising our thinking by focusing on the assets of very remote Australia which could be better harnessed in attempts to support ‘resilient remote communities and businesses that enrich Australia through their vigour, cultural integrity, innovativeness and sustainable use of resources’ (Cooperative Research Centre for Remote Economic Participation, 2015d). We believe this requires a shared acceptance that First Nations sovereignty is both axiological and cosmological (Drahos & Frankel 2012). This positions local residents as the authorities who can enable remote economic participation and the futures of their ensuing generations—it asserts custodial heritage as the integrator of multiple forms of capital (Akeyulere, 2014; Sengupta, Vieta, & McMurtry, 2015).

Substantial ground has been made in the study of ‘indigenous entrepreneurship’ (Dana & Anderson 2007), but such advances rarely infiltrate the front line business landscape of remote Australia. An ongoing presupposition applied to Aboriginal and Torres Strait Islander people

in remote Australia is knowledge about 'being business people' can only be imported. People of remote Australia are not unfamiliar with such circumstances, particularly given policy and governance are typically imposed from afar from non-remote 'centres' and knowledge structures (Ferguson 2012). These challenges are ongoing, multi-faceted and cross all sectors of the economy and society, however the outcomes of our applied research identifies some of the re-visioning needed to facilitate the task.

Literature Review

Local knowledges and extant systems of relationships between people, country, ancestry and resources is both ontological and advantageous (Grieves, 2009; Wallace & Lovell, 2009); yet this is avoided in the language of public policy, which uses the discernment of remoteness and Indigenous heritage as measures of disadvantage (Australian Government, 2015a). Often these systems of relationships are, whether blatantly or more subtly, constructed as key 'barriers' to be 'overcome', particularly in the employment engagement and participation policy and program environment (McRae-Williams, 2014). While we recognise Altman's hybrid economy model (see Altman, 2010) has had a significant impact and gone some way towards creating a space for recognising the economic values of local knowledges and relationships, it continues to adhere to an assumption that Aboriginal knowledge and business knowledge are separate phenomena.

This kind of dualism, we argue, hinders initiatives aimed at economic participation and development by constraining evolution of cultural identities. Drawing from authors like Bhabha (2013), we believe culture to be fluid and hybridity possible, where practice can enable 'culture' to acquire new forms that simultaneously affirm old ways. This perspective is distinctly different from the assumptions informing dominant remote economic participation and development initiatives. For example, here the identity given most legitimately is that of 'worker' (McRae-Williams & Gerritsen, 2010), a dissociated individual, who knows and makes choices through a lens of rational self-interest (Hodgson, 2012), primarily for the purposes of wealth accumulation. Identities not obviously or firmly associated with accumulating wealth through productive citizenship, are subsequently viewed in terms of deficit, an individual's failure to value the 'right' things or make the 'right' decisions (McRae-Williams & Guenther, 2012).

It is predominantly such a standpoint that defines the disadvantages and barriers to economic participation and growth in remote Australia and shapes policy and program implementation. From this dominant frame the value of certain assets or types of capital are emphasised at the expense of others in the quest for 'closing the gap' (Australian Government, 2015a; Tudge, 2014).

While there is some indication the current Australian Government is moving towards a more nuanced engagement with economic theory (Hoque & Adams, 2011), assumptions about the nature of a 'productive citizen' are still firmly entrenched in the non-market goals and evaluation of economic engagement and participation initiatives in remote Australia (Dockery, 2014; Haslam McKenzie, 2013). It is perhaps symptomatic of the polity governing the non-market approach to remote Aboriginal and Torres Strait Islander settlements that the values of, and tradeoffs made, by residents are outside the scope of most indicators measured in reports, such as *Overcoming Indigenous Disadvantage* (Steering Committee for the Review of Government Service Provision, 2014a), or the *Closing the Gap, Prime Minister's Report* (Australian Government, 2015a). Levine et al. (2015) have pointed out the focus of such reports is on generating data that provide monetary valuations (however unstable), rather than understanding realistically presented and empirically defensible choice behaviour and tradeoffs. We acknowledge this, and find the tension is prevalent beyond our work and in much of the multi-disciplinary work of the CRC-REP (see Blackwell, Dockery, Blake, Vincent,

Lovell, Bubb & Raggatt, 2014; Blackwell, Mcfarlane, & Blake, 2014; Minutjukur & Osborne, 2014; Osborne, 2014) and its predecessor, the Desert Knowledge Cooperative Research Centre (DKCRC) (McAllister, Izquierdo, Janssen, & Stafford Smith, 2009; Stafford Smith, 2010; Walker, Porter, & Stafford Smith, 2009).

Human capital theory

One of the key theories holding up most current initiatives aimed at increasing the engagement and participation of Aboriginal and/or Torres Strait Islander peoples residing in remote Australia is a certain interpretation of Human Capital Theory. This theory suggests individual investment in knowledge and skills is motivated by a reward in the form of a return on investment or economic benefit (Becker, 1993). Regardless of any other benefit that individuals or communities can derive from learning, whether at school or beyond, the driving rationale for education and training is the imperative of generating income and increasing labour market productivity (Tan, 2014), ultimately for economic growth (Keeley, 2007). The dominance of this perspective means it is not surprising to hear messages like 'A good education can lead to a good job and financial stability for individuals and their families, as well as a better future for the community' (Scullion, 2015).

This reading of human capital assumes a causal link between education/training and employment. The logic stemming from this is if jobs are there and training is linked to jobs, then economic participation and productivity are more likely. However, this logic has been challenged through the findings of the *Remote Economic Participation and Pathways to Employment* projects (see Guenther & McRae-Williams, 2014; Guenther & McRae-Williams, 2015)

Social Capital

The concept of social capital is a response to the disassociated, under socialised view of human nature that has been touched on above. In its most simplistic or traditional sense 'social capital' is something essential to the nature of 'productive citizens' in that it is not simply the financial capital that is in people's bank accounts nor just the human capital inside their heads that are contributors to their capacity to generate wealth and increase labour market productivity. The structure of their 'social' relationships is also essential (Côté, 2005; Portes, 1998). Falk and Kilpatrick (2000) assert social capital is produced and used through the interactions (networks) between people as they create and draw on knowledge resources and as they create and draw on identity resources (including trust, norms and values). They suggest the strength of a community is determined by the quality and quantity of the interactions and that 'interactivity connects with social, civic and economic outcomes' (p. 105).

While being poor and marginal is often associated with having little or insufficient social capital (Knack & Keefer, 1997), Woolcock (2001) argues 'social capital' links between disciplinary, sectorial and methodological divides and at its best:

Recognises that exclusion from economic and political institutions is created and maintained by powerful vested interests, but that marginalised groups themselves possess unique social resources that can be used as a basis for overcoming exclusion, and as a mechanism for helping forge access to these institutions. (p.16)

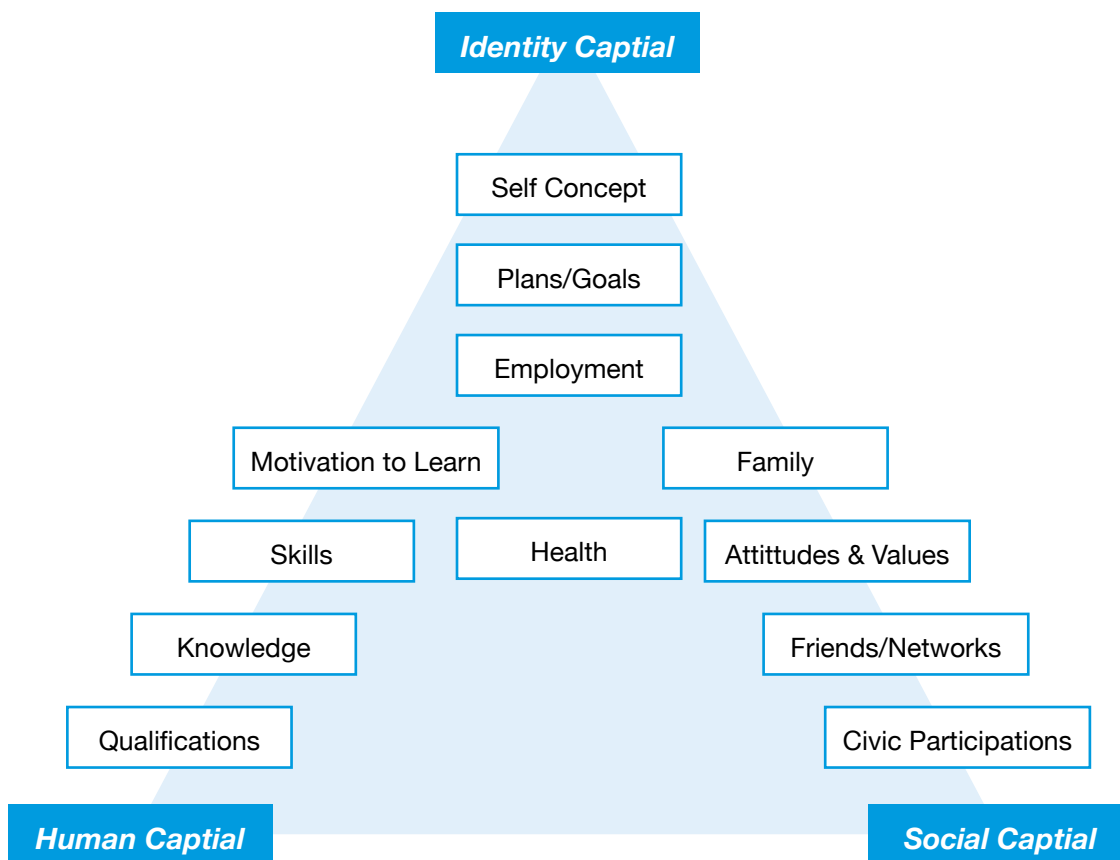
Social Capital, in terms of the purpose of this paper, accepts that social and relationship systems have existed for hundreds of generations and through these, Aboriginal and Torres Strait Islander people have managed resources, survived European colonisation, taken up

intercultural trade and participated in structured and informal economies. Social capital is important as it values local networks as assets, and allows recognition and exploration of both their costs and benefits. However, we also wish to suggest the concept of ‘social capital’ itself is inadequate as a way of explaining the enablers of economic participation in remote Australia.

Identity Capital

In keeping with Côté (2005) we accept identity capital develops as a result of phases of human development where individuals distinguish ‘the systems of value, beliefs ... group affiliations, leisure time pursuits, as well as intellectual and aesthetic preferences’ (p. 225) with which they identify. Identity capital can be defined as ‘the intangible resource in which people ‘invest’ to become ‘who they are’ (Côté & Schwartz, 2002). Identity capital includes psychological factors such as self-confidence, self-efficacy, cognitive flexibility and complexity, self-monitoring, critical thinking and morals (Côté, 2005). While identity capital can be built and drawn on (as an asset) in a number of contexts, it is likely, in the context of education, training and economic participation, there are multidirectional causal links between other capitals. For example, education can lead to the production of identity capital but it also contributes to the kind of learning people engage in (Côté & Schwartz, 2002; Guenther, 2011). Schuller, Bynner, and Feinstein (2004) argue for the intertwined relationship using Figure 2. While this model may not present a full picture, it does explain to some extent how and why individuals make decisions that are not necessarily motivated by purely self-interest and economic gain.

Figure 2: Relationship between capitals



Our triangle has Human Capital, Social Capital and Identity Capital as its three points.

Source: Schuller et al., 2004

Importantly, successful outcomes in this model are not measured in purely financial or economic terms. They could be measured in terms of qualifications, levels of trust, engagement in democracy, as well as through psychological measures - in addition to the financial value that arises from the three capitals shown.

Cultural Capital

Cultural capital can include taste and preferences essential to the agency of social and identity capital (Côté, 2005). This form of capital is described as the various forms of habits, dispositions and knowledges gained via exposure to cultural practices (Prieur & Savage, 2013). Originally 'cultural capital' was conceived by Bourdieu (1993) to explain the relationship in European societies between exposure to 'highbrow' cultural practices (music recitals, theatre and fine art) and increased social capital and privilege. It was applied as a tool for explaining how the success of children in school depended on the level of education of their parents (Prieur & Savage, 2013) and as a form of capital that poor or marginal communities lacked. However, as with social and identity capital, the notion of cultural capital can easily move to one which allows for recognition of local cultural assets and their value in terms of economic development and participation. Biddle and Swee (2012) suggest remote Aboriginal and Torres Strait Islander wellbeing includes use of first language, participation in cultural activity and access to homelands. Woodhead and Acker (2015) have detailed analysis of the value chain association of cultural production with economic, social and cultural capital. While a traditional view of cultural capital was essentially defined as a reflection of European cultural privilege, the definition changes as it re-centres on marginal communities (Yosso, 2005).

Indigenous peoples' ways of living have been constructed in policy evaluation and program design as less than ideal in terms of the 'right' way of being, knowing and valuing economic activity. This is demonstrated in the 'Closing the Gap' rhetoric (Australian Government, 2015a). Yet to suggest remote Australian Aboriginal peoples do not utilise cultural capital in business and as significant participants in the cosmopolitan and local economies, is naïve. Indeed, Aboriginal and Torres Strait Islanders have been engaging in forms of trade for a long time (see chapter 12 in Keen, 2004) and have been part of the model of European capitalist economy since the British first colonised south eastern Australia.

Natural Capital

The stocks of environmental resources measured in terms of their diversity, sustainability, availability and quality are sometimes referred to as 'natural capital' (Greiner, Stanley, Austin, & NAILSMA, 2012). In any discussion about remote economic participation, the natural environment plays an important role. Albeit this discussion is often a binary conversation where on one hand the value of environment is realised through extraction – of animals, minerals or plants - and on the other hand, land and people are a living system under the sovereignty of custodians and the value is in temporal and restorative stewardship (Drahos & Frankel, 2012). In a conservation economy, economic arrangements are designed or re-designed so they restore, maintain or improve natural capital and produce environmental, social and financial value (Putnis, Josif, & Woodward, 2007). Acceptance of the value of a 'conservation economy' then has the potential to justify employment in natural resource management initiatives. Thus, 'caring for country' employment initiatives in remote parts of Australia have grown considerably over recent years (Australian Government, 2015c). Altman (2010) described the inception of a *Working on Country* program in 2007 as a way of demonstrating Australia's international obligations towards greater environmental sustainability. The White Paper on Developing Northern Australia (Australian Government, 2015b) recently reported 78 Working on Country

projects are now in place across northern Australia, justifying the conservation of ‘exceptional biodiversity and heritage value’ (p. 149). The point is at least in some ways, land does have intrinsic value, not just as a means of economic production.

Cooperative Research Centre for Remote Economic Participation Learnings

With the literature in mind, we now turn to three case studies based on research conducted within the CRC-REP. The scope of each project differs considerably as do the research questions they set out to answer and the methodologies employed. However, an assumption shared by all projects within the CRC-REP is the voices of the First Nations peoples who live in and belong to the land must be privileged if issues of economic participation, health and wellbeing, education, justice and culture are to be understood by policy-makers and program designers (Guenther et al., 2015). The three projects have together worked productively with several hundred local Aboriginal and Torres Strait Islanders during the course of the research work. At the same time, those of us (as researchers) who come in from outside, need to carefully critique our assumptions. We have put considerable effort into this (Guenther, 2013; Guenther et al., 2013, 2014; Guenther & McRae-Williams, 2015; McRae-Williams, 2014; McRae-Williams & Guenther, 2012). Each project discussed below has a different scope, not only in terms of geographic reach, but also in terms of the methodology, stakeholders engaged, and budget.

More detailed information about project methodologies and outputs can be found on respective project pages of the CRC-REP website (Cooperative Research Centre for Remote Economic Participation, 2015a, 2015b, 2015c). The common theme that unites all CRC-REP projects relates to a desire to see improved economic outcomes for remote Australia, and particularly for remote Aboriginal and Torres Strait Islander communities. While this sounds fairly straight forward, what we have discovered - and this is reflected in the literature - is that ‘economic participation’ is a contestable concept.

Remote Economic Participation (REP)

The dominant discourse of education systems, both in Australia and internationally, demand education produce productive citizens capable of participating in and contributing to the economy with a certain interpretation of Human Capital Theory as the primary underpinning foundation (Banks, 2010; Keeley, 2007; Swan, 2008). Indigenous knowledge systems tend to be relegated to the margins. Consistent with the RES project’s observations of Australian education systems, Arenas et al. (2009) suggest ‘governments tend to support the inclusion of indigenous knowledge in formal schooling efforts to the degree that they remain nonthreatening to assumptions upholding the governing body itself, and to a key goal of contemporary educational reform, namely, to support late industrial capitalism’ (p. 79).

RES project findings show remote participants want education to support Aboriginal languages, maintain culture, and affirm a connection to land while supporting students’ identities embedded in the context of their communities. The way remote Aboriginal respondents see systems supporting these educational goals is through parent and community power (for a more detailed summary of RES project findings, see Guenther, 2015). They define successful education as parent and community involvement in schooling. But of course, the problem for those actors who hold power over systems, as highlighted by Arenas et al. above, is they are reluctant to cede power and control. There are good pragmatic reasons for this often related to funding arrangements. Philosophically too, if education is purposed around Human Capital Theory assumptions, the opportunities for schools to respond to alternative imperatives related to other forms of capital (social, identity, natural and cultural) become threatening.

The project findings also point to disconnects between the aims of schooling as a means for economic participation and how to achieve that. One of the reasons for this is that system actors with apparent power try hard to work with simple system responses. This is a position that assumes 'best practice' is achievable but at the same time works actively to avoid the inherent complexity of remote education. If the education system was treated as a complex system, then system actors would take into consideration as many controlling variables as possible, recognising there may be unintended consequences due to interactions not accounted for. But they generally do not. What we have found is stakeholders by and large ignore the important 'beyond school' elements of the system which include employers, training providers and other end users. Actors with apparent power in education systems also tend to prefer working with what they can control (Wilson, 2014). They can control what happens in classrooms (at least to some extent) but they cannot control what happens in communities, though sometimes they try to do this by coercive means, for example through the application of threats to welfare (Wright, Arnold, & Dandie, 2012).

With models focused on service delivery rather than ground up community engagement the involvement of employers, community leaders and even parents becomes problematic. Yet our research shows strong support for parent and community involvement in schooling. In the context of a sovereignty and capitals framework, we have learned that production of human capital is inadequate on its own to drive economic participation. We have learned social, cultural, identity, natural capital and potentially sovereignty drivers do work to align local expectations with educational engagement. We have observed this in programs that involve 'learning on country', using local languages, and which work towards cultural maintenance.

Pathways to Employment

The Pathways to Employment research project has been guided by the following research questions:

- How do Aboriginal and/or Torres Strait Islander people navigate their way into meaningful livelihoods?
- What kinds of work might help to support sustainable livelihood outcomes?
- What kinds of learning could support meaningful livelihood agendas, aspirations and pathways?

Making visible assumptions that inform dominant education-employment pathway discourses was identified as essential early on in this project to ensure more marginal or alternative perspectives had space to be heard (McRae-Williams & Guenther, 2012). Through doing this, the project was able to share learnings on how mainstream assumptions about the meaning of education, its links to employment and associated purpose of life, has influenced how pathways between education and employment are engineered and implemented (McRae-Williams & Guenther 2014). Three separate qualitative case studies and one honours project were undertaken as part of this project. All drew from ethnographic and participatory action research methods and aimed to centrally position the experiences and voices of the Aboriginal peoples involved. A key learning from this project was that navigating through such engineered pathways and supports was inherently challenging for Aboriginal and/or Torres Strait Islander peoples in remote Australia whose ways of being, knowing and valuing differed from dominant assumptions (McRae-Williams, 2014). The project has drawn attention to a common aspiration expressed by Aboriginal peoples living in remote Australia, for engaging in learning and work experiences (Parkes, 2013; Parkes et al., 2014). But more importantly, the project has argued the fundamental aspirations for belonging to family, community and country which shape these learning and work perspectives are often invisible, or seen as problematic, from a mainstream perspective.

The project has challenged the notion that simple increases in qualification levels for Aboriginal peoples will equate to improved economic participation outcomes, through pointing to the 30,000 jobs held by non-Indigenous people with no certificate qualifications in very remote Australia. While not denying the complexities of a simple transfer of employment to Aboriginal and/or Torres Strait Islander peoples, the project has posited to some extent ‘there is no educational or skill reason why those in remote communities cannot engage more fully in the broader range of industry options available in very remote Australia’ (Guenther & McRae-Williams, 2014, p. 9-10). The project findings suggest that part of the reason for this lack of engagement, or buy-in, may well relate to ontological, epistemological and axiological mis-alignment where some pathways into economic engagement were understood as potentially fragmenting, rather than fostering, an individual’s sense of local identity and belonging. Gaining community legitimacy and family support for learning experiences and employment positions was enabled when local people’s values and strengths were recognised and spaces for building on these were facilitated. It is from these learnings that the Pathways to Employment project points to the need for a framework of advantage to shape pathway engineering and transitional supports, one that moves beyond traditional human capital models and the assumptions that support them.

The project has also included learnings that point to the potentialities of recognising and developing locally framed *entrepreneurship* (Rindova, Barry & Ketchen, 2009) and enterprise activity for supporting the extensions of local capitals for economic advantage.

Aboriginal and Torres Strait Islander Tourism Product

This research project approaches the Aboriginal and Torres Strait Islander Tourism industry as a sector in which business ownership and entrepreneurial activity are established and at play in the context of wider market forces. Aboriginal and Torres Strait Islander cultures and landscape relationships are a drawcard attraction of tourism in Australia. From an economic participation point of view, this representational symbolism as Australia’s ‘Indigenous cultures’ underlies the regular citation of tourism as a key development industry for Aboriginal and Torres Strait Islander people. But there’s a ‘catch’. While Aboriginal and Torres Strait Islander people are typically perceived as ‘masters of culture’, it is rare for the broad system (comprising the tourism industry, government, support agencies and society at large) to afford genuine regard to Aboriginal and Torres Strait Islander people as ‘masters of business’. For example, there is a body of resource-based view research on Aboriginal and Torres Strait Islander people and tourism that continually ‘concludes’ that Aboriginal and Torres Strait Islander people lack education, understanding about tourism, resources and that cultural ways of being are counterproductive (e.g. Buultjens et al., 2010; Fuller et al., 2005; O’Rourke & Memmott, 2005; Song, 2008). Not only are these research agendas tied to deficit model thinking obsessed with disadvantage, they also uphold the seemingly incommensurable dichotomy between ‘Western’ and ‘Indigenous’ (Aboriginal and Torres Strait Islander) knowledges. Aboriginal and Torres Strait Islander academics (e.g. Moreton-Robinson, 2004) are waging an ongoing effort to not only legitimise Aboriginal and Torres Strait Islander knowledges within academia, they are also redefining long-held ‘boundaries’ (purported by the ‘all-knowing’ Western gaze) of Aboriginal and Torres Strait Islander knowledge itself.

The CRC-REP Aboriginal tourism project takes on this situation at the level it matters most: the applied contexts, which in this case are Aboriginal and Torres Strait Islander people who own and operate tourism businesses (which typically are small enterprises) in remote Australia. The contexts of distance, limited infrastructure, resources, value production chains and market access (to name but a few) in remote tourism are difficult enough for small business, but

Aboriginal and Torres Strait Islander business people have an added challenge to overcome - subjugation via the de-legitimisation of their knowledge, capabilities and ways of being. For example, Aboriginal and Torres Strait Islander people are often treated as being in a perpetual state of start-up level business proficiency, something which the body of resource-based review of Aboriginal tourism research seems all too willing to highlight. There is presently an example which shows that for Aboriginal tourism business people (regardless of whether they are emerging or senior industry operators) they are required to accept an assignment of a business mentor in order to join a recent national Aboriginal tourism government assistance program. A recent study on such programs was unclear about whether mentors are Aboriginal or non-Aboriginal, but concluded that the development and administration of the program is based on limited involvement or consultation with Aboriginal and Torres Strait Islander people (Buultjens & Gale 2013). Hence, programs like this highlight ways tourism development agencies contribute to the 'for and about' of Aboriginal and Torres Strait Islander people, but with non-Aboriginal people holding the 'keys to business knowledge' for Aboriginal and Torres Strait Islander people to learn.

The CRC-REP Aboriginal tourism project is developing a growing pool of evidence to redirect the agenda away from deficit model thinking. Small remote tourism enterprises operated by Aboriginal and Torres Strait Islander people will continually contend with challenges of remoteness, however our research also suggests operators are active agents moulding tourism systems in remote Australia. Forms of value creation, including the development of new industry value chains, are highly varied and indicative of innovative behaviour to create opportunities that improve enterprise competitiveness in what are otherwise challenging market contexts (Jacobsen & Tiyce, 2014). Many operators have business models in place that bear striking resemblance to relational practice perspectives discussed by small enterprise researchers from rural Canada (Young, 2006). According to Young (2006), relational models are born by necessity from unruly market contexts that lead small enterprises (which, by definition, have limited human, financial and other capitals) to create a level of stability across distance. Where big tourism corporations are resourced to create stable production/delivery chains (Young, 2006), our findings on industry value chain creation, enterprise cooperation, diversification and the like utilised by remote Aboriginal and Torres Strait Islander tourism operators, highlight their approach as ongoing, innovative and liberally-oriented (Jacobsen, forthcoming; Jacobsen & Tiyce, 2014). In short, our research demonstrates the ways remote Aboriginal and Torres Strait Islander tourism operators are taking up the call made in the broad tourism literature (e.g. Feser & Isserman, 2009; Schmallegger, Carson & Tremblay, 2010) that for remote tourism to forge ahead; the drive, inspiration and know-how must come from within remote Australia itself.

An additional study carried out by the CRC-REP Aboriginal tourism project also suggests that despite the challenges of distance, Aboriginal and Torres Strait Islander tourism operators in various parts of remote Australia have established or are taking steps to self-organise into clusters (see Ffowcs-Williams 2012; Porter 2000). Impetus behind these initiatives vary, however common drives include overcoming marginalisation from regional economic development and establishing Aboriginal-centric structures for grass roots (e.g. small) operators to represent their own interests in tourism. For Porterian cluster perspectives to flourish among Aboriginal tourism sectors of remote Australia, our research set out to reconfigure Western enterprise clustering concepts within Aboriginal and Torres Strait Islander business knowledge. Through this work we are rethinking the development structures available to Aboriginal tourism operators in Australia, while we are also rethinking the 'boundaries of indigenous knowledge' to further explicate the notion of 'doing business Aboriginal way' and generate, at the very least, culturally appropriate business development resources. According to our research, cultural ways are not counterproductive to business, but instead hold foundations for strength and

building cluster competitiveness. We view Aboriginal and Torres Strait Islander knowledges as inextricably linked to the deep past (i.e. traditional knowledges), but consolidated in the present through articulations of business and development. At the time of writing the present article, our clustering project is in progress, but we assert that Aboriginal and Torres Strait Islander people have legitimate claims to business knowledge and acknowledging this is vital for moving beyond deficit model thinking as we walk to the future.

Discussion

It is fair to suggest that the most common way for politicians, policy makers, program developers and implementers to frame remote Aboriginal residents in Australia is through a lens of disadvantage and deficit. From such a perspective, it is what remote Aboriginal people lack that becomes the key focus and impetus for response. In terms of the 'capitals' we have discussed above, remote Aboriginal peoples are usually constructed as lacking in, or not having the 'right' forms of human, social, identity or cultural capital, and the natural capital they have is fundamentally not recognised as theirs. Yet all three CRC-REP projects point to the inherent assets and strengths of remote Aboriginal peoples and their aspirations for continuing with these as tools for being successful in meaningful livelihoods.

There is a wealth of untapped Aboriginal knowledge, expertise and insight regarding engagement with the economy whether through employment or enterprise. For example, the work of the Aboriginal and Torres Strait Islander Tourism Product project has shown the different forms of capital Aboriginal business people are sharing with each other through clustering. In a sense, the contribution of these operators should be regarded as profound because not only are they reconfiguring business practices, they are also setting out terms of business practices within contexts that are challenging/resistant/incongruous to hegemonic Western discourses of 'best practice' (Ffowcs-Williams, 2012).

In this paper we are arguing a perspective and discourse of advantage, which might use different forms of capital for example, can sit within dominant economic discourse but could also allow emphasis to be placed on local assets - social, identity and cultural (as well as natural). The research discussed includes the insight that local assets are not always a disadvantage or necessarily in opposition to capitalism or economic engagement; rather they are a strong foundation for vibrant, resilient and sustainable livelihoods. The assumption - as is evident in discourses of disadvantage and deficit - that remote Aboriginal peoples lack the 'right' forms of capital and that local ways are in opposition to economic participation and development, creates a barrier to increasing local engagement and participation in initiatives aimed at employment and/or enterprise outcomes.

We contend that working from a basis of 'who and where people are' from local systems of belief and value with their strong indicators of identity capital, facilitates stronger positions for sustainable economic engagement. It is from here that local remote people have agency to define and build on their advantages. These are formative processes where people can consider change on their own terms. Yet we do acknowledge if we envisage economic participation built on the strengths of local assets, the bonding capital ties within the community are inadequate in themselves and linking capital ties that expand local peoples' social networks and cultural connections beyond the local to the regional and cosmopolitan become important.

Similarly, as noted in the Remote Education case study, if maintaining a connection to (or sovereignty over) land is an important purpose of education, the inherent value of the natural capital of that land must be recognised. And indeed, this is exactly what is happening through the 'Working On Country' initiatives mentioned earlier in the literature review. Therefore, investment

in education, training and employment structures that meet those common purposes are likely to yield significant returns for all stakeholders through connection to country and maintaining biodiversity and natural heritage.

The problem with industries like mining and agriculture/pastoralism, which create lots of low skilled employment opportunities, is while they fit well with larger national economic agendas they do nothing to engage or build the remote local social, cultural, natural or identity capitals that are fundamentally important for residents in remote communities. This is evidenced by the fact that while mining is one of the largest private sector employers of Indigenous people, our research shows there is a relatively low up-take of jobs in these industries by local people (Guenther & McRae-Williams, 2014), but there are examples of successful Aboriginal enterprises that work in related industries, such as land management/remediation work (Haslam McKenzie, 2014). Further, a reliance on boom and bust industries like mining and to some extent pastoralism, leaves local people particularly vulnerable. The irony of the current downturn or 'bust' in the mining industry is that it will make virtually no difference to the local economies of remote communities, though of course it will make a difference to the many people who have engaged in the industry on a fly-in fly-out basis.

Both the tourism and pathways case studies point to the importance of engaging people in learning and enterprise activities in spaces where they can identify or develop a sense of 'belonging'. This alignment of social, natural and cultural capital with identity creates opportunities for ownership and participation in work that is meaningful and inherently valuable, similar to the way that creation of financial or built assets creates a sense of satisfaction and purpose relative to social, identity and cultural capital for some people. While identity may well be tied up in the social status of economic assets for remote Aboriginal and Torres Strait Islander locals, the assets that are of advantage are probably more likely to be associated with sovereign control of natural and cultural assets. This is why, as the remote education case study shows, language and culture are so important.

There are of course lessons in all of this for the Australian Government's *Developing Northern Australia* strategy (see Australian Government, 2015b). On the one hand, the strategy recognises that 'The north will only truly achieve its potential with the participation of all the people who live there, including Indigenous Australians' (p. iv). But on the other, it fails to recognise the value of land, language and culture as assets worth investing in - except where they produce direct economic benefit. The strategy argues for the importance of 'real jobs' (p. 109). It argues for 'work for the dole' 'placements in local businesses' as the solution. Yet there is no evidence in the literature we have seen that suggests these kind of assumed pathways to employment have ever worked to create so called 'real jobs'.

We do know that more than 70 per cent of Aboriginal and Torres Strait Islander employment in remote communities where English is not the first language, is clustered around four broad industry categories: 'Public Administration and Safety', 'Health Care and Social Assistance', 'Education and Training' and 'Other Services' (Guenther & McRae-Williams, 2014). We note these are not all low skill industries where apparently poorly educated remote community people should fit (McRae-Williams & Guenther, 2014). These industry groups include jobs that build on assets that are of importance to local people in communities such as ranger work, work in schools, Aboriginal arts workers, Aboriginal community researchers, health clinics, social support services and traditional healing, and local governance.

Conclusion

The title of this paper asks a question about the ‘enablers’ of remote economic participation. This is quite a different question than the one often posed which seeks to identify barriers. The latter question assumes that something needs to be overcome, for example as expressed in the *Overcoming Indigenous Disadvantage* report (Steering Committee for the Review of Government Service Provision, 2014). These kinds of reports regularly reveal the problems with Aboriginal and Torres Strait Islander peoples, as if a certain racial profile and cultural heritage is a disadvantage that needs to be overcome. While the indicators in themselves do not lie, they fail to tell the whole story about the assets that residents in remote settlements possess because they live on their country, maintain traditional cultural practices and speak their own languages. We have presented these assets using a discourse of different forms of ‘capital’. We are not suggesting local people in remote communities - particularly those who do not speak English as their first language - should be denied access to economic opportunities that are promoted in the larger polity, such as in the *Developing The North* proposal.

Our argument however, based in part on the literature and in part on three case studies which bring together learnings from CRC-REP research projects, is the enablers of economic participation as we find them are often discounted as less than important for the livelihoods of those living in remote communities than alignments with non-remote frameworks and values. We suggest that appropriate investment and support for structures that build on these assets and the aspirations of sovereign subjects will nurture sustainable employment and entrepreneurial outcomes. But ultimately, we are not discussing ‘capitals’ defined and contained by ‘outsiders’, but rather to the creation of spaces where local capitals can be explored, questioned, challenged and built upon by locals themselves – it is these individuals, groups and communities that have the greatest stake in terms of investment.

Acknowledgement

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent the views of the CRC REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special Issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication.

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A Place to Learn and Work: Yuendumu Learning Centre

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Keywords: adult education; adult learning; community education; learning centres; Indigenous Australia

Abstract

In recent years, Community Learning Centres have emerged as a new community partnership model providing adult education in remote Indigenous communities in Australia, and in four Warlpiri Communities, funded locally by the Warlpiri Education and Training Trust. They are showing success by meeting local individual and community adult learning aspirations, and pathways to employment. This paper presents a reflective case-study of one such centre, the Warlpiri Triangle College Adult Learning Centre at Yuendumu in Central Australia. The study draws on an account of learning that is broad, diverse and situated in meaningful activity, which is responsive to the social, economic and learning needs of remote settings like Yuendumu. It draws out key elements operating at the Learning Centre in Yuendumu that allow for responsive and sustainable learning and training, with important implications for policy development in community development, education, training and employment in remote Australia.

Introduction: Adult learning in Australian remote Indigenous communities & the Yuendumu Learning Centre

A significant body of qualitative research has identified non-formal learning and informal learning¹ as important means to engage or re-engage learners with poor literacy and numeracy skills, negative experiences of schooling and/or little confidence in, or little need for formal learning, and serve a number of community and individual goals, such as pathways into employment (Adult Learning Australia, 2014, pp. 4-5; Beddie & Halliday-Wynes, 2009; Birch, Kenyon, Koshy, & Wills-Johnson, 2003; Clemans, 2010; Kral & Schwab, 2012). In remote Indigenous contexts in the Northern Territory, secondary education completion rates are low, as are post-primary academic achievement rates (Wilson, 2013, p. 22 and p. 139). While formal training suits the employment and learning needs of some adults in these communities, non-formal learning programs for young people and adults emerge as both important and effective in a number of recent studies (Guenther, McRae-Williams, & Kilgariff, 2014; Kral & Heath, 2013; Kral & Schwab, 2012; Kral & Schwab, to appear; Shaw, 2015). A common thread through the literature is their scope to offer meaningful and responsive models of learning, education and training that resonate with local realities and meet local aspirations.

1. We use non-formal learning to refer to any intentional unaccredited learning, broadly following Adult Learning Australia (2014, p. 5).

In the past, an extensive array of adult education programs with locally based educators working in the community through the Northern Territory Open College, and later, the Community Education Centres, provided the opportunity for post-school learners to undertake basic education, along with formal work-related programs (Arnott, 2003; Collins, 1999, p. 112; Northern Territory Department of Education, 1987). However, in the late 1980s, in response to broader global changes, Australia introduced the National Training Reform Agenda (1987-1996). The development of a Standards Framework for vocational education and training credentials was among the initiatives in the Australian Government's effort to reform the vocational education and training system and its linkages to the workplace. This, along with the shift from Commonwealth delivery of education provision to Territory government and subsequent funding arrangements, led to a more formalised approach not only to school to work transitions, but to adult learning more generally (Adult Learning Australia, 2014; Arnott, 2003; Collins, 1999; Kral, 2010). The prioritisation of block-delivery Vocational Education and Training (VET) programs in remote communities by drive-in, drive out trainers has resulted in a lack of co-ordination of learning and training programs (Collins, 1999, p. 112). In 2007, Young, Guenther & Boyle observed adult learning programs are characterised by low completion rates in formal training programs, and 'a significant misalignment between the content and delivery models of VET and the prior skills, educational demands and aspirations of Indigenous people' (p. 7).

The case study presented in this paper illustrates how one community learning centre facilitated meaningful learning and the achievement of a range of local goals, including but not exclusively, pathways directly to employment. Carried out by Samantha Disbray, Charles Darwin University and the *Remote Education Systems*² researcher, and adult educator Ros Bauer, it explores the establishment and operation of the Warlpiri Triangle College Adult Learning Centre at Yuendumu (referred to locally and forthwith as 'the Learning Centre'). It considers the ways in which the Learning Centre sought to provide a place with a flexible and responsive approach, integrate local priorities and authority structures, and provide some co-ordination of training and learning across the community. The analysis that follows, identifies key elements of this community learning program. The appraisal of these allows for broader consideration of such community education programs in remote Aboriginal contexts, which can inform similar projects and should be incorporated into future education, training and employment policy.

Questioning assumptions

Conventional wisdom, at least as portrayed in the media, suggests attendance at school, completing year 12 and gaining certificates is the key to improving economic participation. These assumptions, which may hold true generally in non-remote contexts, need to be carefully considered, particularly in the challenges governments have faced over decades in affecting change in remote communities. In one study, the *Remote Education Systems (RES)* project investigated the assumed link between school attendance and academic achievement (Guenther, 2013). It found student attendance had little impact on NAPLAN scores in remote schools with more than 80 per cent Aboriginal and Torres Strait Islander student enrolment. In effect, coming to school did not achieve the standard measure of school success. Yet, the focus of education policy and systems for very remote education is on attendance, along with teachers and teaching to overcome the 'education failure' (Guenther, 2015) and closing gaps (Abbott, 2014). However, the situation is more complex and other considerations are at play, significant to education and training policy.

2. The Remote Education Systems project is part of the Co-operative Research Centre – Remote Economic Participation, <http://crc-rep.com/remote-education-systems>.

The work of education anthropologists and sociologists has shown that behind the apparently natural uptake and success of schooling and seamless transition to employment lie specific processes and practices of acquisition, socialisation to and reproduction of habits, behaviours and dispositions. These underpin the acquisition of literacy, schooling and successful transition to work (Barton, Hamilton, & Ivanic, 2000; Heath, 1991; Kral & Schwab, to appear; Schwab, 1998; Watson-Gegeo, 1992). However, in remote Indigenous societies, the institution of Western schooling was introduced very recently (Campbell & Proctor, 2014; Price, 2012) and there has been little time for remote communities to reap the promised returns, or for intergenerational reproduction of the associated learning, literacy and work practices and routines (Guenther, Disbray, & Osborne, 2014; Kral, 2012; Kral & Falk, 2004; Kral & Schwab, 2009); and the overarching goals and aspirations that drive these orientations and practices in day to day life (Guenther & Bat, 2013; Osborne & Guenther, 2013).

Still education, learning and employment are valued for the achievement of personally and socially meaningful goals in remote Indigenous communities (Kral & Falk, 2004). In their synthesis of the purposes and value of education, Fordham and Schwab (2007, p. 33) note the following valued outcomes:

- developing basic literacy and numeracy skills
- a means for gaining employment
- providing an opportunity to develop the necessary skills to deal with the non-Indigenous agencies, services and culture
- ensuring the continuity of their own culture in more contemporary times
- improving the well-being of the community.

In 2014, the Australian Government announced its Indigenous Advancement Strategy, which set five priority areas: Jobs, Land and Economy; Children and Schooling; Safety and Wellbeing; Culture and Capability; and Remote Australia Strategies. In early 2015 the first round of successful applicants were announced. Despite the focus on remote Australia, there is still a risk that programs will be designed with mainstream outcomes, unaligned to the daily realities and goals of communities, resulting in inbuilt failure. Outcomes for the five areas include a continued strong focus on education, with children and school attendance at one end, and training for young people and adults for employment at the other. In 2015, the White paper on Developing Northern Australia was released (Australian Government, 2015), exploring policy and development directions relevant to remote Aboriginal Australia. It acknowledges the economic value of Aboriginal land and the potential for the 'application of traditional Indigenous cultural knowledge to improve environmental understanding, inform ecological management and create new technologies [... and] to strengthen the economic future of northern Australia' (Australian Government, 2015, p. 26 and p. 135), yet the mechanisms for knowledge transmission reflected in the document are restricted to formal education and training.

This paper seeks to show that a community-based learning model the Community Learning Centre offers a site for adults to seek and undertake meaningful and purposeful learning, to fulfil a range of goals (including employment) embedded in the social, cultural and economic dynamics of their community. To do so, we explore adult learning and the emergence of community learning centres in remote Indigenous communities by providing the case study of the Learning Centre at Yuendumu. The Centre operated for just one year, 2013. In 2014, the new Jaru Learning Centre opened and assumed responsibility for adult learning in Yuendumu. It is the result of a tripartite partnership between the Warlpiri Education and Training Trust, the Warlpiri Youth Development Aboriginal Corporation (WYDAC) and Batchelor Institute of Indigenous Tertiary Education, the centre's operator (Kelly, 2015, p. 11). Our study focuses on the predecessor.

Recent research has set the emergence of community learning centres in a broader framework of learning theory (Kral & Heath, 2013; Kral & Schwab, 2012; Kral & Schwab, 2009, to appear). We discuss this research to position the Yuendumu Learning Centre within a broader context. We then detail our case study and discuss the centre's strengths, guided by Kral and Schwab's 'design principles' (2012, pp. 58-92) and 'key elements' (to appear, pp. 10-13). We conclude the paper first by considering further potential of this community-based model, and then by looking at some of the challenges to community learning centres. In particular, we propose the community learning centre model, with thoughtful planning and implementation, could be expanded to provide flexible secondary programs for young people, or play a strong collaborative role in such programs. This is particularly important as the Northern Territory Government, following trends in Cape York, Queensland retreat from provision of secondary education in remote Indigenous communities (Northern Territory Government, 2015).

Our method

The research project began in July 2013 through a partnership between the then Yuendumu Learning Centre (YLC) Co-ordinator Ros Bauer and CRC-REP Remote Education Systems project researcher, Samantha Disbray, to document the activities and outcomes of the Learning Centre. The research arises from our position as qualitative researchers seeking to understand the dynamics of adult learning in a remote community. Our way of working is interpretive, participatory and constructivist (Lincoln, Lynham, & Guba, 2011). We draw on our critical reflexive professional practices through observations within the context of our work (see Patton, 2015, Module 50; Van Manen, 1997) and this reflective process began in 2012 before the Centre opened, while we both were employed with the Northern Territory Department of Education (NT DoE); Ros as adult language literacy and numeracy practitioner, and then the YLC Co-ordinator, and Samantha as the NT DoE linguist working with the four Warlpiri community schools. Reflections were teased out at a workshop held by Batchelor Institute in early 2013, led by Inge Kral and Jerry Schwab, which also raised our understanding of an ethnographic method of observation, artefact collection and participatory practice, and we have used a range of research methods to develop this chapter.

Our respective positions allowed long-term participant observation; on going by Ros Bauer throughout 2013 and since in a range of roles. Once Samantha joined the RES project, targeted observations began, and were carried out between July-December 2013. Throughout this time both kept notes of discussions, brainstorming and observations. In 2014, Samantha undertook in-depth reflective interviews with the Warlpiri staff and community members who used the Learning Centre. We are grateful to these people for their participation. We also draw on learning artefacts, such as texts, photographs and notes gathered throughout. Data generated at the centre, such as activities undertaken and services provided to other organisations in the community provide a further source of information.

Background

Adult learning and community learning centres

The recent emergence of community learning centres in remote Indigenous communities can be set in a broader framework of learning theory and learning contexts globally, where learning becomes 'situated, reciprocal and distributed' in what Gutiérrez (2008, p. 159) describes as a 'Third Space'. Within this frame of reference, learning is seen not just as a formalised vehicle for economic gain, as Human Capital Theory (Becker, 1993) might suggest, but a powerful

and transformative opportunity for individual, group and social change (Lave, 2011; Mezirow, 2012). The study of everyday cognition and cultural development has investigated how people learn across social settings, activities, life spans and pursuits (Gutierrez & Rogoff, 2003). This work recognises the central role of the home and community as spaces for non-formal learning and the development of ‘communities of practice’ (Wenger, 1998), which surround and support learning (Lave, 2011; Rogoff, Paradise, Arauz, Correa-Chavez & Angelillo, 2003). Emphasising the breadth of learning experience throughout life, researchers from the Learning in Informal and Formal Environments (LIFE) Center (University of Washington) identified the following principles to best inform the development of learning programs:

- Learning is situated in broad socio-economic and historical contexts and is mediated by local cultural practices and perspectives.
- Learning takes place not only in school but also in the multiple contexts and valued practices of everyday lives across the life span.
- All learners need multiple sources of support from a variety of institutions to promote their personal and intellectual development.
- Learning is facilitated when learners are encouraged to use their home and community language resources as a basis for expanding their linguistic repertoires. (Banks et al., 2007, p. 15)

These insights have arisen from and fed into a rich and growing global research base of youth-based and community models, which foster and spark learning for marginalised learners (for example Cushman & Emmons, 2002; Hull, 2003). Heath and Street draw common threads in community-based learning projects, identifying among their strengths ‘freedoms of time, space, activity and authority that schools as institutions rarely provide’ (Heath & Street, 2008, p. 5).

In Indigenous communities of remote Australia, the work of Kral, Schwab and Heath has documented the emergence of community learning spaces (Kral & Heath, 2013; Kral & Schwab, 2012; Kral & Schwab, 2009, to appear). Focussing on youth learning they document ‘productive activity that builds on school learning – or makes up for what was not learned at school – and develops the kinds of communication, technological and organisational learning skills required for successful futures for Indigenous youth in the twenty first century’ (2012, p. 19). Further research in northern Australia has pointed to the blurring of boundaries between formal, non-formal and informal adult learning that occurs in communities (Guenther, Falk, Arnott, Lucardie & Spiers, 2008; McRae-Williams, 2014), including the Warlpiri communities (Shaw, 2015), and in the past (Arnott, 2003). These conceptualisations informed the development of the Learning Centre at Yuendumu, which we will explore in the case study.

Yuendumu

Standing at the opening in the chain mesh fence by the petrol bowser, I look out and see Betty³ making her way along the red dirt road in the rising morning heat, between the store and the school. She’s hauling a mass of leopard print blankets, she’s moving ‘camp’. Some noisy kids, little and big, dawdle by, clunking the double school gates, camp dogs slipping in quietly behind them. Jangala walks over, heads into the Learning Centre for a chat and ‘naliija’ - cup of tea. I follow him through the wide, plastic fly-proof strips at the store, into the windowless room off to the left, where Nerida is showing a group of women how to set up an I-Pad. (Ros Bauer, reflection)

3. Pseudonyms are used throughout

Yuendumu is a remote Indigenous community 300 km north west of Alice Springs in the Northern Territory. Between 500 and 900 Aboriginal people live in the town, along with 100 non-Aboriginal people (Musharbash, 2008, p. 19). Yuendumu is a Warlpiri community, one of four communities in the Tanami region. The other communities are Nyirrpri, Willowra and Lajamanu. People here have a strong sense of local and regional Warlpiri identity. Warlpiri is spoken in most everyday interactions, though there are high levels of bi- and multilingualism. Even the oldest residents speak at least some English, though it is very much a second language, largely for communication with those outside of their speech community.

Warlpiri have long shown their commitment to their language and identity through, for instance, the local media association and bilingual education programs (Disbray, 2014). Pintupi, Anmatjerre, Warlpiri Media (PAW Media, still widely known by its previous name Warlpiri Media) has an impressive output of Warlpiri (and other) language products, as well as a radio broadcaster, reflecting masterful adoption of new technology for communication, self-expression and contemporary identity. Warlpiri have also been very proactive in supporting education regionally, establishing a trust negotiated from royalty payments, the Warlpiri Education and Training Trust, which funds a range of learning and training initiatives in the four communities (Warlpiri Education and Training Trust, 2013).

Yuendumu was established as reserve in the late 1940s and Warlpiri have a relatively short history of intensive contact with non-Aboriginal people, language and culture. According to anthropologist Yasmine Musharbash contemporary practice is deeply informed by traditional Warlpiri identity and guided by the core values of immediacy, mobility and intimacy (Musharbash, 2008). For many Warlpiri adults, engagement in community civic matters has been intensive, with past and on-going negotiations for their Land Claims, Community Council, mining agreements and royalty associations, Indigenous Protected Areas and numerous government and non-government projects and programs, always requiring community consultation. There are a number of organisations in the town, some local, some provided from outside, with many Yuendumu residents involved as steering committee and board members or staff. These organisations include the Warlpiri Youth Development Aboriginal Corporation (WYDAC) with its youth highly successful diversion program Jaru Pirrijidi (Stojanovski, 2011) and informal learning program (Shaw, 2015); an arts centre, Warlu-kurlangu; Mampu Maninja-kurlangu Jarlu Patu-ku Aboriginal Corporation (Yuendumu Old Peoples Programme; a Women's Centre; Yantarnili Ngurujarrinjaku (Health Clinic); Central Land Council office with a Ranger Program; the three stores; an Early Childhood Centre; and Yuendumu School. These organisations are the key employers of Warlpiri people, and 2011 census data show eighty per cent of the Indigenous labour force at Yuendumu is employed, at least part-time. On the other hand, the employment rate among the non-Indigenous population is ninety-five per cent. This civic life, along with family commitments, sports weekends, trips to town (Alice Springs and beyond) and the many pressures associated with decades of rapid social change, such as ill-health, poverty, incarceration and a regular cycle of sorry business, characterise Warlpiri community life.

Adult education in the NT and Warlpiri communities

Adult education has been provided in the NT since the 1950's (Berzins & Loveday, 1999; Frawley, 2003). In the mid-90s the Commonwealth Teaching Service took responsibility for education in the NT and, in 1975, appointed a Senior Education Advisor in Aboriginal Adult Education, along with 16 senior teachers located in communities. The following year Aboriginal Assistant Adult Educators were added (Arnott, 2003, pp. 45-46). In 1979, the NT Government assumed responsibility for education, establishing a TAFE branch and, through to the late 1980's, further developed the workforce dedicated to community adult education, increasing the number of locally based educators and adding a number of travelling specialist lecturers and funds for part-time teachers (Arnott, 2003, p. 46). According to Arnott (2003), citing Bond (1977),

the objectives were oriented towards individual and community development, and clearly responsive to locally defined needs. In 1984, regional TAFE staff developed a checklist for adult educators which listed: Aboriginal initiative, management and control; high relevance of the course to the learners; flexibility within the program; good relationships between instructor and participants, among other characteristics (Arnott, 2003, p. 49). By 1986, the responsibility for community-based adult education rested with the newly established Northern Territory Open College (NTOC) (Frawley, 2003).

The development of adult education was responsive to the broader context of politicisation and self-determination across Aboriginal Australia of this period. The establishment of 'Aboriginal organisations' such as community-controlled health services, housing authorities, legal services and media organisations were means for Aboriginal people to assert their Indigenous identity and aspirations for community control. Adult education was critical for Aboriginal people to take active roles in these enterprises. The NT bilingual program, including the programs in the Warlpiri schools, was a further vehicle for adult learning, employment and critical reflection (Walton & Eggington, 1990). Indeed Yuendumu, as one of the first schools in the bilingual program was well-serviced in adult education and teacher training specifically from the early 1980's, with a locally based Batchelor Institute educator (then Batchelor College) and a school based mentor. In 1987, the Northern Territory Education Department established a program of Community Education Centres (CEC), which combined Adult Education and post-primary resources, to provide accredited courses including general studies and TAFE Certificate award courses 'relevant to community self-management, enterprise development and self-sufficiency' and bridging to further learning (Northern Territory Department of Education, 1987, p. 1). Yuendumu was among the first eight trial sites for the program, and under it, was assigned community educators and instructors. The CEC program ended in the mid 2000's, around the same time the Batchelor Institute lecturer based at Yuendumu was relocated. Until the establishment of the Learning Centre at Yuendumu and the WETT Community Learning Centres at the other communities, locally based lecturers have been ad hoc and temporary.

In 2005 a group of Warlpiri educators from the four communities working with the Central Land Council negotiated with Newmont mining company to establish the Warlpiri Education and Training Trust (WETT), which funds five project areas, one of which is the Community Learning Centre Program (Kelly, 2011, 2015; Schwab, 2006). These educators were involved in adult education in the 1980's and so have experience of the adult community learning of previous decades. In partnership with the Central Land Council and Batchelor Institute, WETT Learning Centres opened at Nyirripi and Lajamanu in 2010, at Willowra 2013, and the Jaru Learning Centre, in partnership with the Warlpiri Youth Development Aboriginal Corporation at Yuendumu in 2014. These centres support formal and non-formal learning, as well as community-driven intergenerational projects. The learning centres are guided by a local reference group as well as the WETT Advisory Committee, drawing on local authority structures.

Adult education at Yuendumu

At Yuendumu, Warlpiri people work in the community initiatives and workplaces mentioned earlier. Training is frequently integrated with, rather than a pre-requisite for these employment opportunities. Training often involves a mix of on-the-job learning and formal attainment of vocational certificates. When the Learning Centre opened, a range of training providers were offering accredited training in Yuendumu, generally on a workshop delivery basis, with 'drive-in, drive-out' trainers. Ros Bauer came to work in Yuendumu in June 2012 as an adult educator on a Workplace English Language Literacy (WELL) project with the Warlpiri Youth Development Aboriginal Corporation (WYDAC). Yuendumu community did not have a WETT Learning Centre or any permanent adult learning or adult language literacy numeracy (LLN) provision at the time. WYDAC and the regional Northern Territory Education Department

principal⁴ had identified the need for this service for its workforce and the broader community. Ros was based at WYDAC as a LLN educator.

The WYDAC service is well used by the community. Its in-house youth worker training is a very successful learning program, with significant well-being and employment outcomes (Shaw, 2015). People come to WYDAC for all manner of purposes, many involving learning, and accessing or requesting support was an established facet of service. Prior to the establishment of the Learning Centre, there was a need for learning support directly related to vocational or formal training, but also for the development of personal literacies; support with banking, resumes, personal technologies, and responding to letters. Some people liked to be in the space, did not have specific goals, but rather an interest in getting involved. As Ros became the 'go-to' person learning increasingly took place in the 'community classroom' - in a front yard, under a tree, at the basketball court, or sitting in the back of a 'troop carrier' (four wheel drive vehicle) – *wherever* people felt comfortable and *whenever* the service was required.

It quickly became clear that some young local women who showed interest in working with Ros could be mentored to support the literacy demands of many of these learning interactions, such as the reading and writing requirements of document applications, technology for banking, music downloads, and phone and i-Pad activation. The idea of community literacy tutors came into being. The local Social Club committee offered the use of their storeroom in one of the local stores as a learning space. Various other community partners contributed computers, furniture and other useful hardware. With this support and a small amount of funding from the College to employ the tutors, the Learning Centre was born. WYDAC Youth Workers and the Mental Health Worker also spent a proportion of their work time as tutors, providing a larger pool of community literacy tutors. Other organisations such as Waltja Money Mob and PAW Media contributed special expertise in their industry roles.

The Learning Centre - A place for learning

The Learning Centre opened in February 2013. That month there were 19 learner contacts and by September this had increased to 171 people, and a total of 870 over the course of the year. The Centre opened all day on week days, and at staggered times on weekends. Independent of the structure of a strict timetable, people could access support in sync with other community, family and cultural commitments.

There wasn't a place like that before. There was only school for kids, but not for adults. It was a good place for people to come to have a cuppa, too. To tell stories, Yapa stories. [Older men] Freddie came, and Tom loved it, Oli, Mr. F and Gardner. They could listen to old time stories, Yapa stories. My father was proud when I got this job.

Some young ladies came, our age, for work, but we could talk about [events] at camp⁵, like news you know. Sometimes they wanted to know what the new rules were for Centrelink or for [school] attendance, and we could talk about that.
(Reflections from two of the young community literacy tutors)

It was a place for learning, formal and informal, and a place that recognized and realized intergenerational practices and values related to learning, work and sociality.

4. At the time, the Warlpiri schools administration was under a college model, the 'Warlpiri Triangle College', overseen by a single Principal, Darrel Fowler, who was responsible for Early-Childhood to post-schooling provision in the four communities. This Northern Territory Education Department initiative, reminiscent of the CEC model, was short-lived, and ended in 2013.

5. 'At camp' is a common term for 'at home'.

Non-formal learning opportunities

Non-formal learning was central and the cycle of engagement can be best described through a learning model that set out to address social, emotional, intellectual and aspirational learning. For some, the cycle might begin with an engagement for social purposes. As the participant began to feel more confident in the space, they sought support for personal and community literacies. This includes tasks such as setting up and using electronic services for banking, applying for a driver's license or activating i-Pads. Often it acted as a springboard, as taking part in a learning interaction involving a personal literacy lead to other connections. With the confidence to come in and take part in one interaction, people often identified more learning needs and took part in more activities.

Formal learning opportunities

Accredited training was provided through the Learning Centre to a range of groups. The senior girls class from Yuendumu School completed a skills set from Certificate I in Education and Skills Development. They undertook a project-based course to explore their understanding of learning styles and their own skills in relation to job roles in the community. As part of the course each participant constructed a profile of herself as a learner using italk™⁶ libraries software to import local images and self-generated audio, each creating a multimedia and multilingual product. The training was auspiced by Batchelor Institute, but delivered by the Ros and supported by the tutors. The tutors completed the course themselves alongside other learners, reflecting on their own learning styles, and, as learning facilitators. With this experience and expertise, they led the other young women through the course materials using Warlpiri language to clarify key concepts and consolidate learning.

We did the certificate, work about how you learn and how other people learn. Then we could tutor them. We helped them with writing in the book and making the italk project. They liked italk. They got experience. One young girl got job straight away [at the old people's centre]. Old people need to get looked after. The Learning Centre was giving her ideas. Young people need to work, not stay at home. (Reflection from a community tutor)

The Learning Centre also brokered partnerships for accredited vocational training for trainees. One group enrolled in a Building & Construction Pathways certificate course were working on the local housing refurbishment project. The collaboration enriched the training by providing targeted language, literacy and numeracy learning for speakers of English as an Additional Language. Participants were supported in the classroom sessions by the LLN educator (Ros Bauer), the tutors and with the VET trainer undertook practical tasks. This allowed a combination of individualised and applied learning approaches.

Community tutors as learners and educators

The tutors held multiple roles, as learners and learning facilitators, kin, peers and community members, and as employees. The three key tutors who took up the roles, had followed learning/working trajectories common in their communities. The three were close kin and of similar ages, and had moved through their education and employment lives as a cohort. Together they

6. italk™ is bi-lingual story making software that makes it easy to create and listen to stories in two languages.

had completed primary school and some secondary schooling in the community and gone briefly to boarding school before leaving or attaining formal qualifications. They had undertaken some work in the community (in aged care), some relevant training at Batchelor Institute and started their own families. This shared history, and the core Warlpiri value of intimacy, expressed in the importance of being in company, or 'marlpa' (Musharbash, 2008, p. 44) was reflected in the way the tutors worked, collaborated and negotiated as a group in the Learning Centre.

In the Learning Centre these three young women continued to work together in a working and learning environment that supported and benefited from this dynamic. The Learning Centre was a safe learning place, where adults could learn together and from each other. Two of the tutors reflected on their own learning and problem solving (G & N with Interviewer – I):

G: Ros helped sometimes, sometimes we got along ourselves.

N: With each other, worked it out together, to work out ourself, we tried a lot things a little bit.

I: Were you worried about trying things out?

G: No, it always worked.

N: We could ask someone, Ros or another Kardiya or a Yapa person.

In the learning interactions the tutors managed with community members using the Centre, to draw on and build their language, literacy and knowledge funds as bilinguals. For instance, supporting a learner to complete a form in English involved reading through the form together, discussing the meaning of individual words, phrases and purposes in Warlpiri and re-iterating the key or novel terms in English. In such interactions, there were often significant learning opportunities for English language and literacy and interaction with English texts, their purpose and meaning. This 'third space' (Gutiérrez, 2008), where the communicative repertoires of the tutors and learners is drawn and built on, is only opened up in interactions between bilinguals.

The Centre presented other opportunities for developing communication skills. The tutors also became skilled in developing video tutorials, filming and talking through common procedures, such as logging in to a service, changing a password and other technological tasks. The tutors' confidence as learners, learning facilitators and employees grew over the course of the year. Their active role in professional gatherings was important in this. In July 2013 they attended the Warlpiri Triangle Workshop, an annual professional learning event for school staff across the region. Later in the year, they attended the annual conference of the Australian Council of Adult Literacy in Sydney and gave a presentation about their work in the Learning Centre.

Their work hours were part time and flexible to allow for attention to family and community commitments. At the beginning of each week a planning meeting was held and each person wrote the hours they were prepared to work that week on a white board, with the goal that at least two of the three were at the Centre for the busiest times.

Spread the learning

One final set of learners is important to discuss. Much of the vocational training was being delivered through an imported 'drive-in drive-out' workforce. It became clear that a more strategic approach could harness the skills of many staff already working in the community's main industries, media and community services. Those working in the community already had strong relationships with local people and could work more flexibly in response to the ebb and flow of community life. They were living in Yuendumu and, in the case of non-Indigenous staff,

mindful of their own reliance on Warlpiri people in the community to orient and guide them on local protocols and social dynamics required to succeed in their workplaces. By developing their training skills with a specific focus on supporting language and literacy, the incidental, on-the-job training they were already providing could be formalised. It was also a chance for Warlpiri and non-local staff to reflect together on the Two-Way nature of learning in the workplace and in the community.

Overall, this heightened everyone's sense of workplaces as places to learn and provided pathways that accommodate learner identities, skills and dispositions. Thus, face-to-face training for a Certificate IV in Workplace Training and Assessment was provided in Alice Springs to a number of employees from the school, WYDAC, the Learning Centre and PAW Media, with weekly study sessions at the Learning Centre to complete assessments, contextualised for delivery to diverse learners. The participants completed the course and acknowledged having a much clearer understanding of how to identify the language and literacy challenges in training material and to support the language and literacy needs of the learners they were working with at Yuendumu.

Approaches to Learning

Learning approaches reflected the principles identified by the LIFE group discussed above, as situated in the social context of Yuendumu and responsive to local skills sets, aspirations and opportunities. For Ros, this demanded an instructive flexibility, as a sense of 'being in the world' (Musharbash, 2008), as the logic of the push and pull of daily life is not immediately clear to the non-local colleague in this cross-cultural setting (akin to 'rhythms of the community' in Arnott, 2003, p. 57). Actively seeking to understand and respond on this logic was crucial and supported opportunities for learning, for Ros, tutors and a wide and diverse network of learners in Yuendumu.

In addition, as an LLN educator Ros's approach to learning interactions with the tutors, other trainers and learners drew on principles of adult learning (Knowles, 1980), an awareness of (many of the) learners' needs as users of English as an additional language, and these came together in the conception of multi-literacies (Cope & Kalantzis, 2000), which focuses on message, meaning and media. And finally, use and mastery of technology, known to contribute to literacy development as well as social capital gains (Boyle & Wallace, 2008), were central to most learning interactions at the Learning Centre.

From an adult literacy perspective, I was very explicit in teaching learning awareness with a focus on practical strategies, working towards higher levels of reading, writing and numeracy. I drew on my knowledge of TESOL to target the learning at a level above the learner's current competence. This was especially evident in the way that the tutors navigated the digital environment, providing a means to extend the literacies they already had. Also the Learning Centre energy and culture was welcoming, unstructured, learner centred and free from anxiety or stress, creating optimal conditions for learning. I had high expectations of the tutors and nurturing their own self-belief was crucial to their achievement. You could say that it was skills based approach, sitting within a broader framework of social practice. (Ros Bauer, Reflection)

Ros was recognised for her expertise and innovation as she received the 2013 Language, Literacy and Numeracy (LLN) Practice Award for her work at the Learning Centre (Australian Training Awards, 2013).

Discussion

In their research focussing on youth learning, Kral and Schwab have discussed ‘design principles’ for learning spaces in remote Australia (2012, p. 58-92) and later, from a set of case studies of four Learning Community Centres co-ordinated by Batchelor Institute (to appear, p.10-13) they identify ‘key elements’, positing that a Learning Centre is:

- A vibrant, community-based learning facility that brings adults of all ages together, to help each other, to work together and to learn together.
- A place where individual and community development aspirations can be achieved.
- A place where there is a commitment to local ownership and management.
- A place where there is co-ordination of informal and formal learning, individual learning, group learning, observational learning, and peer-to-peer learning.
- A place where accredited training is delivered.
- A place where local people offer training and there is local employment.
- The hub, the point of communication that streamlines training planning and delivery.

They found the key elements, critical to the success of the Learning Centre model include:

- Open access for all
- Desirable learning resources
- Good will
- An understanding that pathways to success require nurturing of confidence and self-esteem and essential, timely conversations
- Connections to the community
- ‘Embeddedness’ in the community and a broad sense of community ownership.

We consider these key elements in the following appraisal of the key elements of the Yuendumu Learning Centre.

Flexibility and accessibility

In terms of practical matters such as opening hours and access to computers and tutors, flexibility and accessibility were key elements. In providing both non-formal and formal learning (and training) as required, the Learning Centre was highly responsive.

A further powerful means of access to learning anywhere is language. As discussed above, the Learning Centre in Yuendumu is a bilingual space, where Warlpiri is both the natural code for learning and a valued cultural resource. Fostering bilingualism and language learning are important for access to learning. With a skilled adult LLN educator, the English language and literacy learning needs are understood and addressed in learning interactions, training planning and delivery. The importance of this expertise in adult learning delivery is noted elsewhere (Balatti, Black, & Falk, 2009; Hunter & Schwab, 1998; McRae-Williams, 2014).

The centre was a safe environment, where learners were encouraged to enrich and extend themselves through learning in their own style and pace. They could be self-directed and experimental in their learning, and pursue personal, practical and professional goals, short and long-term. In this way, learners are both controllers and producers of knowledge, and this gives rise to discovering passions and strengths, and crucial autonomy and agency in learning (Kral & Schwab, 2012, pp. 69-73). It recognises the core of how learning is done – in

situ, in achieving goals, drawing on resources, knowledge and experience from outside of the immediate learning interaction, through experimentation, trial and error and practice to mastery, and with others.

A culture of learning

The open-ended and diverse learning supported in the Learning Centre sets it apart from other sites. Here there is no obligation to take part, the value is intrinsic. As Kral and Schwab (forthcoming, p. 12) observe, in community learning centres, learning is a normal, sometimes useful, often essential, generally satisfying part of life. Learning is not something that is “owned” by others, it does not need to be measured or compared. It offers no threat, only value. But perhaps most significantly, they facilitate and validate a culture of learning. They create a place where learning is normal and valuable and for everyone. The impact of the public display of adult engagement in learning and literacy is powerful and transmits an important message to the next generation.

Role modelling learning practices is central to intergenerational uptake and reproduction. However, the culture of learning creates further roles and networks. As discussed earlier, the tutors at the Learning Centre expanded their roles and responsibilities as peers, mentors and facilitators, as their learning and mastery expanded. The development of roles and networks can be considered in capital theory terms, which sets social capital in ‘networks of relationships [that] can facilitate access to other resources of value to individuals or groups for a specific purpose’ (Balatti, Black & Falk, 2009, p. 11). Learners achieve social capital outcomes as they experience changes ‘in the way they interact with members of their existing networks and also the changes in the types and numbers of networks that they access or of which they become members’ (Balatti, Black & Falk, 2009). By taking part in a learning interaction, members of the community both entered and contributed to a network of learners. This leads to a further important element of the Learning Centre - the potential it has to create and nurture partnerships throughout the community.

Community and partnerships

The range of partnerships that Ros, as Learning Centre Co-ordinator was able to explore, negotiate and trial with individuals and organisations was a major strength of the Learning Centre. In the year the Learning Centre operated, local organisations such as WYDAC, the School, and the Shire office negotiated customised training and support. The training as trainers and learning facilitators for staff within organisations across the community provided through the Learning Centre (described in the section ‘Spread the Learning’ above) was particularly innovative, and made a significant contribution to improving the co-ordination of learning and training in the community. Wallace (2008) discusses learner identities and promotes the role of local experts as non-accredited facilitators and assessors, and the potential for local workplace-based accredited assessment via partnerships between educational institutions and local experts. This offers ‘an opportunity to develop a shared understanding about the role of learning and connections between formal and informal learning’ (p. 13). Such arrangements provide wide benefit as:

[[learning partnerships have the potential to affirm everyone’s identity as valued and essential participants in knowledge construction and expression. This can occur through the use of peer conversations and workplace-based action learning. (Wallace, 2008, p. 13)

The contribution a learning centre can make in embedding learning and learning interactions in sites across the community is a further strength. This is an instance of the learning centre as a social asset, a repository and generator of social capital throughout a community.

Building pathways

With each new government, a raft of new employment policies and packages are rolled out in remote communities, rarely tailored or responsive to local histories, settings or aspirations. The pathway set is from individual unemployment to employment, sometimes with a crash-course in work or employability skills. The success rate is low in terms of preparation for, or support into employment. Clearly both the training and its delivery along with motivation and engagement by trainees are crucial (Guenther, McRae-Williams & Kilgariff, 2014). The learning centre model provides a locally responsive set of ways into learning, and learning for various purposes; social, civic and vocational. At Yuendumu, it offered a safe and flexible learning setting for entry to, and preparation for, employment. All of the tutors have followed through with employment goals they expressed when they began working at the Learning Centre.

Future possibilities: Pathways beyond school

In remote contexts, many education and training initiatives fail to take seriously the cultural distance and local aspirations and meet little success in long-term change (Osborne & Guenther, 2013). Post-primary education has been limited in remote Indigenous communities in the Northern Territory historically, and secondary students have long been required to travel away to boarding schools and residential colleges to undertake secondary studies. However, few students remain in these facilities for the duration of secondary education and yet NT DoE has proposed reducing remote delivery of secondary schooling in remote locations in 2016, with all secondary learners to take up off-site options.

Currently at Yuendumu, the school offers a secondary program and WYDAC has re-engaged secondary learners, who do not attend the school program. Informal learning is providing those learners with opportunities, including Vocational Learning, particularly in Sport and Recreation, often coupled with employment in youth work (Shaw, 2015; Warlpiri Youth Development Aboriginal Corporation, 2013). There is scope for new partnerships, particularly given the commitment, expertise and funds invested in the Warlpiri Education and Training Trust. The role of the new Jaru Learning Centre may extend and adapt, with new opportunities and challenges, to meet local aspirations and goals for learning at Yuendumu.

Challenges to community learning centres

Two key challenges are discussed in this section; funding and staffing. During its year of operation, the Learning Centre was funded through the Warlpiri Triangle College NT DoE, in part through WYDAC's WELL program, and was able to generate additional funds through VET program delivery to outside organisations. Funding from NT DoE ceased with policy changes after the first year. The WETT Learning Centres operate in partnership with Batchelor Institute to oversee its operation, and their viability under this established remote training organisation may be well-served. However, Kral and Schwab (forthcoming) have discussed the challenges for learning centres where funding is directly linked to accredited training delivery. This pushes community learning centres towards a narrow model of delivery of centralised labour market and adult literacy programs. This tightly structured training has high monitoring and reporting demands on educators, leaving less time for individual learners or to support re-engaging learners. A key element of learning centres was flexible, responsive and meaningful learning,

and there is a risk that such spaces lose the ‘freedoms of time, space, activity and authority that [...] institutions rarely provide’ (Heath & Street, 2008, p. 5). Thus, funding streams to support re-engagement and non-formal learning are crucial.

Recruiting and retaining suitable staff in remote contexts poses a further challenge. Non-local staff are notoriously transient, and local staff are frequently mobile in the wider region. The skill set required for community learning centre co-ordinators extends beyond being a good LLN educator. Innovation, flexibility and preparedness to learn, work, and mentor others in a cross-cultural setting are needed. Promoting recruitment, training and empowerment of staff locally is also important for long term succession planning. In the shorter term, knowledgeable and authoritative community tutors can induct and guide new non-local staff. Many Warlpiri have a range of civil and family responsibilities, contributing to their mobility. Thus providing a number of flexible part-time positions is more responsive than recruiting to one fixed position.

In conclusion

The case study of the Yuendumu Learning Centre has revealed a dynamic learning place, with a range of learning, training and employment possibilities and uptake. However, this uptake is not automatic and rarely involves a seamless transition by an individual from school to employment. Overwhelmingly, residents at Yuendumu wish to stay and work in their community and seek the skills needed to do this. These aspirations were supported well by the Learning Centre during the research period. It provided a culturally safe place with flexibility to respond to individual and group needs. In contrast to education programs aimed at individual certification, the Learning Centre approach was holistic and placed-based. It provided expert support to learners and the wider community, and co-ordination and development of training opportunities. Thus it responded to Yuendumu as a learning community and made learning opportunities available by and for local people for local needs.

Future policy frameworks, including the ‘Developing the North’ program need to take notice of the great potential for community learning centres to support skill development and social enterprise with local Indigenous people, who have the greatest investment in this plan. This investment is not only social and cultural, given the financial commitment WETT has and continues to dedicate to community learning. The value of Indigenous languages, knowledge and local authority structures that already provide significant support to non-market services, such as clinics and schools, will increase in demand with any projected growth; and should be a part of this economic blueprint. A truly shared and inclusive vision would include the development of community learning centres in the Northern Territory in the northern development agenda.

Acknowledgements

We are grateful for the helpful comments provided by John Guenther on a previous draft of this paper.

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent the views of the CRC REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special Issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication.

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Cultural Capacity and Development; the case for flexible, interdisciplinary research in remote Aboriginal and Torres Strait Island communities

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Abstract

Policies in relation to remote Aboriginal and Torres Strait Islander communities tend to adopt a logic of intervention, where current policy discourse has been narrowed to measures of school attendance, workforce participation and community safety (see Gordon, 2015). In this context, culture is sometimes viewed as unimportant, or even a problem to be overcome within efforts to 'Close the Gap' (Abbott, 2015) between Aboriginal and Torres Strait Islanders and other Australians. This paper draws on the work of Arjun Appadurai, who argues that strengthening cultural capacity, more specifically, the 'capacity to aspire' and 'voice' (Appadurai, 2004, p. 66) generates future-oriented thinking, foundational to notions of development.

Two case studies are shared as examples of remote community research methodology in practice and where the logic of strengthening cultural capacity has been applied. In each case, this approach has required flexibility, working across research disciplines, and complex negotiations across points of significant epistemological difference as local voices and aspirations are privileged. Methodological adjustments are required and negotiated for strengthening local voices, language and conceptual development in each case, and the emergence of a language of aspiration and future thinking informs the analysis.

Finally, in arguing for institutional structures that might assist in strengthening cultural capacity in remote communities, the concept of a tristate hub is proposed. Such a model offers potential for 'decolonial knowledge-making' (Nakata et al., 2012) and pursuing research-informed social and economic justice in remote Aboriginal and Torres Strait Islander communities.

Introduction

Current government priorities work from a logic of intervention and the language of Closing the Gap (Australian Government, 2014) through measuring and comparing 'gaps' between Aboriginal and Torres Strait Islander and other Australians in health, education and life expectancy - among others. This logic and language can position remote Aboriginal and Torres Strait Islanders, their communities and their cultures as being behind, even lesser in the minds of policy makers, and has created a sense of a problem in need of a solution. Appadurai advocates for a strengthening cultural capacity approach to address issues of poverty and social inequity, as opposed to institutional tendencies towards the logic of intervention and philanthropic catch up. Appadurai's (2004) notion of 'cultural capacity' (p.63) is a starting point for pursuing social and economic justice in remote Aboriginal and Torres Strait Islander communities, therefore privileging local voices in remote Indigenous research is vital for generating future-oriented narratives towards social and economic justice. In Pearson's essay, 'A Rightful Place' (2014), he questions whether the institutions of government and those who

shape Indigenous policies and funding priorities are able to imagine a space between notions of culture and development. He suggests culture tends to be viewed through an anthropological lens as being anchored in the past, whereas notions of development that are firmly entrenched in the neoliberal imagination represent the pathway to improving Indigenous lives.

Two short case studies provide examples of research that demonstrate the importance of local language, culture and cultural capacity as a rich source for generating knowledge and informing notions of the future that can practicably be taken up for 'the re-building of Indigenous lives and communities' (Nakata et al., 2012, p. 124). In the context of the remote research described in the case studies, flexible and interdisciplinary methods and structures are required in adopting a strengthening cultural capacity approach.

The research described in the case studies aligns to the work of the Remote Education Systems (RES) project, which sits within the Cooperative Research Centre for Remote Economic Participation (CRC-REP, see crc-rep.com.au). RES has gathered and analysed data from remote education stakeholders across Australia with a view to identifying ways that outcomes for Aboriginal and Torres Strait Islander students in remote schools can be improved, and what the linkages between those improvements and remote economic participation might be. As part of the CRC-REP, RES research methodologies have been designed to inform policy and government, working from the demands and voices of remote Aboriginal stakeholders. In the tristate region (the region where Western Australia, South Australia and the Northern Territory meet) of remote Australia, this has occurred through surveys, qualitative research methods, collaborative research projects, focus groups and supporting remote Aboriginal educators and stakeholders in public presentations and publications (see Burton & Osborne, 2014; Minutjukur & Osborne, 2014; Minutjukur et al., 2014; Osborne et al., 2014; Tjitayi & Osborne, 2014).

My position

I am an 'outside' researcher (Foley, 2003; Martin, 2006; Smith, 1999), but with a sense of membership within the remote educational leadership alumni, having worked as a remote school principal, and with an unusual degree of access, particularly in tristate remote communities where familial ties and local language proficiency 'place me' differently within the 'contact zone' (Rigney & Hemming, 2014). 'Entanglements' (Adams, 2015) of personal and professional relationships and reciprocal obligations need to be recognised as points of potential conflict, but also as providing for alternative modes of engagement through which research has potential to strengthen 'cultural capacity' (Appadurai, 2004, p. 63).

This environment of close relationships and reciprocal obligation ('ngapartji ngapartji', see Tur, Blanch, & Wilson, 2010) places a double burden of responsibility for ethical engagement in research activity. I need to be careful that the research work I am involved in leaves local community members feeling positive and empowered through the work as these relationships will continue well beyond the life of any research project or activity and much is at stake if research is felt to have been exploitative or misrepresentative in any way. Feminist scholars (Haraway, 2004; Harding, 1992), critical theorists (Delpit, 1993; Ladson-Billings, 1999; Milner, 2008) and Indigenous scholars (Bishop, 2011; Martin, 2006; Moreton-Robinson, 1998; Nakata, 2007f; Smith, 1999) argue the importance of researchers being aware of, and accounting for the implicit cultural, systemic and institutional bonds that inform researcher assumptions, priorities and methodological approaches, particularly when working in 'other' communities (Delpit, 1993; Sarra, 2011; Smith, 1999) where significant points of cultural, epistemological and socioeconomic difference exist. These are fundamentally important ideas when engaging in remote Aboriginal community research as such interactions are largely held 'on location' where remote Aboriginal community members are typically located as subordinate in relation to the various institutions and positions of ordained power.

Culture and development

In 'The capacity to aspire', Appadurai (2004) challenges 'deep-seated images of the opposition of culture to economy' (p. 59), where 'culture' can be viewed as an impediment to notions of 'development' (p. 59). Rather, Appadurai argues 'it is in culture that ideas of the future, as much of those about the past, are embedded and nurtured' (p. 59), describing culture as 'a dialogue between aspirations and sedimented traditions' (p. 84). Drawing on Taylor's (1992) concept of the 'politics of recognition... an ethical obligation to extend a sort of moral cognizance to persons who shared worldviews deeply different from our own' (p. 62), Appadurai seeks to 'strengthen the idea of aspiration as a cultural capacity' (p. 62), stating 'the issue is whether cultural recognition can be extended so as to enhance [economic] redistribution (see especially Fraser, 2001; Fraser & Honneth, 2003)' (p. 63).

Appadurai's theoretical contentions are grounded in practical actions within poor communities in Mumbai, India (see Appadurai, 2004, 2006). Whilst this is far removed from the remote Aboriginal community context that is the focus of this paper, questions of unequal power and society, the impact of neoliberal ideology and the cultural capacity for voice and aspiration as a means for strengthening development offer a useful framework for considering how remote Aboriginal and Torres Strait Islander participation in future-oriented dialogue might address 'some of the most peculiar cruelties of economic exclusion' (p. 82).

Appadurai calls for a 'sea change in the way we look at culture in order to create a more productive relationship between... culture and development' (p. 84). More recently, Aboriginal leader Noel Pearson (2014) called for 'indigenous Australians to become active agents in our own development' (p. 48), stating, 'Our poverty is a development problem that can only be solved by reversing our disenfranchisement' (p. 48). Appadurai's primary concern is addressing poverty and the social structures in India that maintain an unequal society, taking a local community approach to initiating actions that address these concerns. Pearson's arguments also focus around notions of poverty and structured inequality, but the context is vastly different, drawing on historical policies of assimilation, protectionism and annihilation that mark historical interactions with colonialism. Despite differences between Pearson's and Appadurai's descriptions of the conditions of poverty, both contexts are described as conditions of social and economic exclusion and in both cases, the need to challenge the notion of culture and development as binary opposites is argued.

Both Appadurai and Pearson draw on the work of Amartya Sen (Sen, 1984, 1995, 2006) who 'place[s] matters of freedom, dignity and moral well-being at the heart of welfare and its economics' (Appadurai, 2004, p. 63). Pearson (2014) is also drawn to Sen's nuanced approach to the role of identity membership in cultural terms, but also in terms of citizenship and participation in democracy. He argues against 'identity fundamentalism' (p. 32), 'when individuals and groups elevate one level of their identity to the exclusion of all others' (p. 32) complementing Sen's analysis of the 'illusion of singular identity'. Appadurai also draws on Sen's notion of 'cultural capabilities', arguing 'culture is a dialogue between aspiration and sedimented traditions' (Appadurai, 2004, p. 84). These arguments provide fertile ground for exploring the relationship between notions of cultural development and economic participation, and they underpin the collaborative research approach described in the cases below.

Appadurai (2006) explains reflection is required on the very nature of research itself, where '[r]esearch is so vital to our [institutional] academic common sense that it is not a surprise that there is not a lot of direct reflection on it' (p. 169). In particular,

...what research is, and how research as an idea has evolved in the west, what its meanings are, what people think they are doing when they say they are 'doing

research' or when they are teaching others to do research. And how do people who are entering the world of research, from outside its western historical home, try to do so? What are the conditions of entry to that world? (p. 169)

Further, Appadurai (2006) argues that globally, '[r]esearch is normally seen as a high-end, technical activity, available by training and class background to specialists in education, the sciences and related professional fields' (p. 167), and that research 'is rarely seen as a capacity with democratic potential, much less as belonging to the family of rights (p. 167). He states:

...the 30% of the total world population ... who may get past elementary education to the bottom rung of secondary and post-secondary education, ... ought to claim ... the right to research – to gain strategic knowledge – as this is essential to their claims for democratic citizenship. (p. 167)

According to Appadurai's logic, a significant cohort of remote Aboriginal and Torres Strait Islanders are well placed to 'claim...the right to research' in a wider pursuit of a more equal place in Australian society. Indigenous scholars such as Smith (1999), Grande, (2004), Nakata (2007f) and Rigney (1999) have challenged colonialist models and methodologies where unequal power relationships have typified interaction between Indigenous communities and the various institutions. Smith argues that continuing unequal power relationships 'exclude, marginalise and 'Other'...indigenous peoples' (p. 35), where the silencing of Indigenous voices and disregard of Indigenous peoples, histories and knowledges denies 'the power to transform history into justice' (p. 35).

Nakata (2007a) highlights the inadequacy of colonialist, anthropological approaches in generating accounts of Indigenous lives, pointing to the need to acknowledge and account for significant differences between 'Indigenous... and Western knowledge systems' (p. 8), where

[d]ifferences at these levels mean that in the academy it is not possible to bring in Indigenous knowledge and plonk it in the curriculum unproblematically as if it is another data set for Western knowledge to discipline and test. (Nakata, 2007a, p.8)

Aboriginal and Torres Strait Islander experiences of exclusion, subjugation and the devaluing of their cultures explain Indigenous claims for recognition (Fraser, 2009) within the dominant culture context, but Nakata et al. (2012) caution against 'reifying the colonial binaries' (p.127) of Indigenous and Western knowledge systems. Rather, they propose pedagogical tools for critical engagement at the contested and complex 'cultural interface' (Nakata, 2007a). Like Sen, Appadurai and Pearson, Nakata et al. (2012) argue for deeper and more reflective engagement with Indigenous knowledges beyond static, essentialised notions of culture and identity:

For Indigenous students the stakes are high as they seek to honour the intelligence and knowledge of their forbears and transform the possibilities for their families and communities in an everchanging world. They need more than analytical and language tools for simple critique and a decolonising framework that slips them too quickly across the Western-Indigenous binary. (p.136)

It is this space between Indigenous knowledge and Western knowledge, between more traditional understandings of culture and the exploration of continuing worlds of meaning as cultural capacity, that needs further investigation in remote community research, to inform notions of development.

Methodology

Indigenous scholars such as Smith (1999), Rigney (1999), Nakata (2007f) and Bishop (2011) point to historical and continuing concerns where colonial approaches to Indigenous research have generated a body of scientific knowledge about Indigenous peoples, their lives and aspirations, but largely exclude Indigenous voices, epistemologies and values in the research process. They call for decolonial research methodologies, including: Indigenist research, where Indigenous researchers undertake Indigenous research (Rigney, 1999), privileging Indigenous peoples, narratives and epistemologies in research (Bishop, 2011; Smith, 1999), and pedagogical tools for more nuanced and contextually responsive engagement at the 'cultural interface' (Nakata, 2007a) between Western (scientific) and Indigenous knowledges (Nakata et al., 2012). These arguments highlight the need for 'outside' researchers (Foley, 2003, p. 46) to be aware of the institutional assumptions and representations they bring to the Indigenous research context as a beginning point for comprehending and responding to issues of unequal power raised by Indigenous scholars.

A 'power-sensitive' (Haraway, 2004) methodological approach requires time and space not merely to *include* Indigenous voices in Indigenous research, but to work from Indigenous voices, epistemology and experiences to address continuing unequal, colonial approaches to research. The two case studies that follow describe different methodological approaches developed by researchers in the tristate region. A Participatory Action Research (PAR, see Wadsworth, 1998) methodology was adopted with teams of Aboriginal Community Researchers (ACRs) employed and trained to develop local approaches to commercial research tasks (see Abbott & Cairney, 2014; Ninti One Ltd, 2014). In the case studies, PAR included translating and re-contextualising mainstream surveys, developing appropriate methodologies, language and concepts to engage community members in research, working across points of significant epistemic difference (see for example, case study two where language and concepts relating to 'mental health' need careful negotiation).

Case Studies

One of the arguments used in favour of universal, large scale interventions is remote communities are too small, diverse and disparate (see Stafford-Smith & Huigen, 2009) to generate significant economic opportunities and adequately provide services. This argument encourages remote community members to seek opportunities for economic participation located within large-scale economies such as mining and tourism and in larger townships. Guenther and McRae-Williams (2014) draw on 2011 census data, showing that large scale, externally located employment opportunities are not being taken up by remote Aboriginal and Torres Strait Islanders to any significant degree. They also argue there are plenty of 'real' jobs in remote communities that are frequently filled by non-locals who frequently hold minimal qualifications. With large-scale projects such as mining currently in decline, there is a need for a strengthening cultural capacity approach in remote communities where existing local opportunities can be re-invigorated and new possibilities explored.

As well as describing the research undertaken, these case studies are evidence of the development of local community research as an economic and participatory activity in a region where research is generally undertaken by externally located experts who travel to remote communities, and engage local 'informants' to provide them with information. Ninti One (see nintione.com.au) manages the CRC-REP and provides a structure where research and research-generated action can occur across borders, and between government and non-government entities, bringing remote communities and academic, government, philanthropic and community organisations together. This structure has enabled a strengthening cultural capacity approach, where the cultural capacities of aspiration and voice are critical components of the research that informs local action.

Demographic context of case studies

The tristate area is geographically large, covering around 500 000 km² equating to around 6% of Australia's land mass, with a population of around 5, 500 people (see ABS, 2012; Osborne, forthcoming). The region features strong cross-border family connections and diverse, yet connected languages where desert survival informs a distinct and unique (Strehlow, 1965; Sutton, 2010; Tindale, 1937) social and pedagogical model for interaction across vast tracts of desert country. Anangu are easily able to work within this social frame, but the various state and territory jurisdictions are not so well-equipped to accommodate seamless collaboration. In the case of law and order, it was deemed necessary to be able to work across borders and the Cross-border Justice Act was legislated in 2008 to make this possible (WA Attorney General, 2008). The Ngaanyatjarra Pitjantjatjara Yankunytjatjara Women's Council (NPYWC) operates in a cross-border environment, but health, education, employers and service providers, for example, seem unable or unwilling to find practical and structural avenues for regional collaboration.

Case Study 1

Between 2010 and 2013, Ninti One undertook a project for Strengthening Community Research in Remote Service Delivery for the then Australian Government Department of Families, Housing, Community Services and Indigenous Affairs, and through this mechanism reviewed aspects of the Local Implementation Plans under the Remote Service Delivery policy in several communities in Northern Territory and South Australia. Through the project, Aboriginal Community Researchers were employed to explore questions of interest to the community within seven interrelated 'building blocks': early childhood, schooling, health, economic participation, healthy homes, safe communities, governance and leadership (see Australian Government, 2015). In Amata, a South Australian community, we took Appadurai's (2006) argument that more 'direct reflection' on research, 'it's meaning' and 'the conditions of entry' to 'the world of research, from outside its western historical home' (p. 169) was required, and an intensive period of local community researcher training was undertaken. This included workshops covering research ethics, methods, the purpose of research and the social and economic potential research offers local communities. During this process, three senior men attended sessions on the first few days, often interrupting with questions like, 'who is paying for the research?', 'who is this research for?', and 'why do they want to know about our lives?'. This is consistent with claims from Indigenous scholars such as Smith (1999), Nakata (2007f), Grande (2004, 2009) and Rigney (1999) that Indigenous communities are slow to trust research and its associated institutions where research has typically excluded, objectified and denigrated Indigenous peoples and their communities.

After a couple of days of senior community members interrogating narratives of research, research ethics, governmentality, and testing the claims for community benefit, the men delegated carriage of the work to younger members of the community. We were to undertake two cycles of action research using a PAR methodology and report the findings back to the community, and to the Commonwealth Government via Ninti One. The research team, aged between their early twenties and mid-forties, were keen to use the opportunity to explore questions of importance to their own lives, in particular, to understand how cultural knowledge informs participation in social and economic activities in the community. They chose two separate projects: The first titled, 'Beneath the Canvas: exploring the cultural connections that underpin the work of senior artists in Amata community' and the second, 'Bush Medicine: the benefits and the risks – economic, social and health'. These projects were chosen as the research team felt the cultural, historical and ecological knowledge held by senior community members underpins social and economic engagement in the community and there were concerns that younger people needed to engage with these cultural elements if they are to

be sustained into the future. In particular, the researchers were keen to better understand the relationship between culture and economy through the work of Tjala Arts, the local arts centre (see tjalaarts.com.au).

Remote art centres are complex and busy spaces (see Acker & Sullivan, 2014) working between the pragmatic demands of running an international arts business from a remote and intercultural space and serving as a vital local social, cultural and intergenerational knowledge generation space. Requests on time, expertise and resources place further pressure on art centres and outside groups such as researchers need to be sensitive to this, ensuring projects cause minimal disruption and contribute to the work and aims of the art centre. More importantly, there are ethical considerations regarding interaction with stories, knowledge and intellectual property; particular to this case was how these stories are represented and might be developed for the benefit of the narrators, their families and the wider community rather than privileging the needs of the external institutions. The research of 'Beneath the Canvas' required careful negotiation between the ACRs, the community and Tjala Arts' local decision making body, with particular care in involving senior artists in conversations about their work and how the research might benefit Anangu, the arts centre and the wider community. In this case, the artists were happy to share their stories in local language with the Anangu researchers but did not want them to be shared more publically. It was agreed that transcripts and translations would be produced and stored at Tjala Arts so that the artists could retain control and access to these stories for sharing within their families or to contribute to future social, economic or cultural outcomes as the narrators saw fit.

The process of preparing and conducting the research, producing transcripts and translations provided employment and opportunities to build capacity within the research team, a number of whom were artists already working in various capacities at Tjala Arts. In Amata community, a number of Anangu are skilled in this type of work but are committed to full time work in the school. In accordance with the commitment to building capacity and adding value, we did not request that currently employed school staff join the team, but provided an opportunity for others to develop skills and research experience in a supported and professional environment.

For the 'Bush Medicine' project, the researchers developed surveys in Pitjantjatjara language and in English to better understand the nature of engagement with bush medicine in the community, including the work of a small, locally based commercial enterprise that was underway. For the 'Beneath the Canvas' project, researchers who held close familial relationships with senior artists held interviews solely in Pitjantjatjara language with few questions, allowing opportunities for artists to share stories and describe, in depth and in local language, their approaches to cultural maintenance, knowledge transfer and the relationship between these sites, stories and the art they produce. Tjala Arts is an example of what Altman (2005) calls a 'hybrid economy', where market and non-market sources (such as government funding, see Wolf, 1998) resource dynamic spaces for social, cultural and economic activity (Acker & Sullivan, 2014; Lovell et al., 2016; Woodhead & Acker, 2014). These topics were selected as the researchers believed that developing an understanding of the relationship between cultural knowledge, the social context of knowledge transmission and potential economic opportunities was of utmost importance to the community. The stories documented in the research have informed and inspired subsequent presentations, publications (Tjala Arts, 2015) and exhibitions, adding value to the significant cultural and economic development model that has risen to prominence in the community as well as the national and international stage (Rothwell, 2012).

Foremost in the minds of the researchers was the importance of 'cultural capacity' (Appadurai, 2004, p. 63) as young people consider the conditions required to drive a dynamic social, cultural, artistic and economic enterprise that embodies Anangu identity and knowledge,

and ACRs were firmly of the view that research could assist in better understanding this process. The data was analysed by the ACRs with support, and a community presentation of the findings was made in local language to a packed audience in the school hall. The research found that families continue to engage with sites, stories and the environment, primarily as a family activity. The continual harvesting and production of bush medicine (mainly *irmangka-irmangka*, or *eremophila alternifolia*) was seen as an important social and health activity, but there was little desire to develop economic or commercial enterprises outside of a small family-run business which was operating at the time. The process of getting out of the community and interacting with the family and the environment was seen as a crucial activity for the maintenance of health, identity, wellbeing and strong, intergenerational relationships within families. In the case of the 'Beneath the Canvas' project, artists described a strong commitment to sharing and handing down important *tjukurpa* (stories) as vital to strengthening the identity and cultural connections of younger family members, but it was also argued that this knowledge would be vital in ensuring the continued strength and integrity of future art works, including the ongoing ability to sell higher price art pieces.

The research suggested ideas about pursuing strong and viable opportunities for economic participation were evident, and the social fabric of the family, Anangu identity and continuing connection with the land, knowledge and the *tjukurpa* were considered to be of primary importance for the future survival and health of families, the community and economic engagement for generations to come.

Case Study 2

In 2012, Ninti One conducted community and student surveys across three communities in the southern region of the Northern Territory where Nyangatjatjara College, an Independent Aboriginal School has secondary school campuses at Imanpa, Docker River and Mutitjulu (based at Yulara). The purpose of this work was to provide feedback to the College Board, but also to gauge community perceptions and understandings of mental health and wellbeing issues for young people, with a particular focus on the MindMatters program that was being established. The surveys were repeated 12 months later to evaluate the emerging impact of the MindMatters program and to ascertain to what degree community engagement with the College was progressing.

As with the previous case, Aboriginal Community Researchers were employed to undertake research development and to recontextualise and translate standard departmental parent opinion surveys. With the redesigned instruments they conducted interviews and participated in the analysis and report writing. In the first cycle of surveys (2012), most ACRs had not previously worked with schools, or within the field of mental health and wellbeing. The work drew heavily on previous language and conceptual development which had occurred in school-based health promotion initiatives in the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands in the north-west of South Australia (see Osborne, 2013). The lack of experience and confidence with the research process and the field of the research yielded limited information and participants tended towards the practice of 'gratuitous concurrence' (Lieberman, 1980), where Indigenous peoples tend to honour and manage relationships by seeking to mirror the assumptions and values of others in dialogue. Most noticeably, this is seen through the tendency to respond to all manner of questions with the answer, 'yes', or 'I don't know'. In regards to community understandings of the aspirations of young people and strategies for responding to young people experiencing mental health and wellbeing issues, the data could be interpreted to suggest in these communities, young people hold few aspirations and communities are largely unaware or unconcerned about issues relating specifically to the mental health and wellbeing of young people.

There are methodological issues Indigenous scholars have pointed to, as I have described above, where working from institutional language, assumptions and priorities is problematic. The surveys used were based on national online surveys and despite reducing the number of questions from more than 100 to around twelve and translating the questions, the methodological approach of contacting participants and sitting down with a 20-30 minute survey is a method that often confirms what was already in the mind of the researchers and the institutions. The lack of meaningful data to inform planning and future actions points to a couple of key areas. By presenting a statement and seeking to elicit a response, the epistemological context, language and implicit assumptions of the field are pre-determined. Secondly, the content, including the professional context (such as education, mental health and wellbeing) of the surveys and the work of being a researcher were relatively unfamiliar to the ACRs and they initially lacked the confidence to move away from the constraints of the survey format and find a more suitable method for participants to share stories from their experience in relation to the education and mental health and wellbeing questions.

In 2013, the surveys were repeated. For some of the ACRs, this was now their second time around and more experienced Pitjantjatjara language speaking researchers joined the team. A methodology that asked fewer questions and allowed for deeper discussion was adopted, rather than recording responses to a series of questions derived and adapted from government surveys as the source documents. Researchers dispersed to verandas, shady areas and community spaces in far less formal interview styles, working in groups as well as interviewing individuals. The data collected in this cycle of surveys showed young people held strong, largely place-based aspirations for the future and communities described personal experiences of dealing with young people experiencing trauma and mental health and wellbeing concerns from an Anangu perspective. They explained the process of identifying a young person who is experiencing these issues and how families, communities and others such as teachers can support young people to reengage and become strong again. The language, assumptions and epistemological context of these stories brought to light capacities and thinking that remained hidden within the first cycle of surveys. Stories that emerged from the second cycle informed teachers, Anangu educators and support staff in their approach to student wellbeing, mental health and wellbeing programs, and working with families and the wider community where there were concerns about a young person's wellbeing.

This shift in methodology required ACRs to engage in a strengthening 'cultural capacity' process, where freeing the research from the epistemological and institutional constructs of a mental health and wellbeing service delivery model required reflection on how the language of the community and the language of the field can be brought together in ways that can develop understanding and ultimately, inform change. A couple of short examples of community comments demonstrate the emergence of language and thinking that was obscured in more structured interviews. In these examples, family members explain that identity and belonging underpin a sense of confidence to engage wholeheartedly and to succeed in school:

Some kids have tried so many schools. My granddaughter has tried [a boarding school] and other schools but she runs away. I talk to her about how I am her grandmother and how I'm related to help her think about education. She is doing really well at the College.

This grandmother argued that instilling a sense of confidence and belonging was critical to the educational success of her granddaughter (see Osborne, 2015a; Tjitayi & Osborne, 2014). The following observation points to broader social and community concerns impacting young people. Particularly where families are under stress, or a mother is too young to raise a child, it is common for a child to be 'given away' to other relations to raise even if just for a short

period. These are the kinds of issues that are visible to families, but which nonlocal (piranpa) educators, for example, have limited capacity for identifying. The logic of intervention and closing the gap are inadequate in addressing core issues family members such as this mother identify as foundational to young people's wellbeing and concerns of poor engagement with schooling:

Young people are confused about their family relationships and their identity because everyone gives their kids away. It's a problem that's hurting them. Then they want to know and find out and it's very hard. Then they turn around and say 'you're not my mother'.

These observations highlight the need for holistic, inter-disciplinary approaches where family and community involvement, affirming students' identity and belonging as learners in a school community and the development of contextualised materials and activities build student confidence in school and strengthens the network of supports around young people. This is the concept of closing the gap that Anangu educator, Katrina Tjitayi advocates for:

This is the way we can close the gaps. The child is in the middle and his family are around him. When the family surrounds the child, they can help him. Only his family can help him to change to a positive way of thinking. When the family watches over him, the child feels secure. The mother and father can help the child to be brave and to learn new things.

Our children need to learn together with us as one spirit. Our spirits are like a solid rock for them to stand on. It is only when they are standing together with us that they can stand firm without falling. (Tjitayi, in Osborne et al., 2014, p.13)

Explicit questions asking families to describe student attendance patterns yielded limited data, but as stories about young people were shared, a clear relationship between school attendance and the emotional wellbeing of students in light of community trauma was described:

They lost their friend this year when he died and they have struggled with the loss. They stopped talking and couldn't go to school. Now their tjuni [lit. stomach – a reference used as a barometer for stress/extreme emotion] is evening out [feeling better] they are returning to school in recent times.

There's a bit of sadness at the moment. Sometimes kids are at home, not attending school, not feeling good about themselves. Anangu kids go to school when they have a good feeling about themselves.

A series of family descriptions of the emotional state of young people provided educators with new perspectives on how they might support young people to engage with school and support the wider community as they monitor their young people. Shifting the research methodology to a space where more open dialogue could occur in local language, in community spaces and on community terms aided the emergence of future-oriented thinking for affecting change. Issues of student attendance can immediately be seen as more complex than simplistic strategies such as targeted attendance programs can address (see Osborne, 2014b). Rather, the context of young people's lives requires schools to work across disciplines of health, education, community development, and an approach that privileges and strengthens local epistemologies, language and culture.

The following comment demonstrates an expectation and sense of optimism that young people will make good on the deeply held Anangu value of *walytjangku kulintjaku* (to think and act independently) and also indicates a sense of personal agency in the research process, where participants explain their thinking on their own terms:

I want the kids to learn to think for themselves and make a strong future. Our older generation can think for ourselves, good ideas and strong ideas but now it's our turn to sit down and watch the next generation stand up and think for themselves and build a strong future.

The logic of capacity to aspire seeks to strengthen the cultural capacities of aspiration and voice. The data that emerged from the second cycle of surveys reminded Piranpa educators of the importance of working across agencies and disciplines, but most importantly, the value of cultural capacity, families and the wider community in the education process.

Synthesis of case studies

A strengthening cultural capacity approach highlights the inadequacy of singular notions of Indigenous identity (Nakata, 2007f; Pearson, 2014) and simplistic, universal approaches to Indigenous policy. Dialogue between Anangu and the institutions of government tends to happen on location, in the community where Anangu voices and priorities are frequently positioned as subordinate. Anangu narratives demonstrated strong and clear notions of the essential attributes for young people to succeed into the future. The question, therefore, is not whether Anangu have aspirations, but whether there are available venues for the cultural capacities Appadurai (2004) describes as 'aspiration', and 'voice' to be strengthened and then to be 'heard' (Delpit, 1993; Osborne, 2014a) by others, such as Piranpa collaborators and the institutions they represent, within the externally driven national discourse of economy and development. This is where flexible, interdisciplinary research methods and institutional structures can play a significant role in strengthening cultural capacities towards social and economic justice in remote communities.

The need for power-sensitive and interdisciplinary research

Appadurai (2004) argues that future-oriented thinking integral to notions of development are held and generated from within the cultural context of communities. Nakata et al. (2012) argue for a reflective pedagogical approach to working in complex and nuanced spaces between Western and Indigenous knowledge systems, but Nakata (2007f) is critical of the academy's tendency to hegemonise, or 'discipline' Indigenous knowledge within a Western knowledge frame. This paper addresses two relevant considerations in arguing for a strengthening cultural capacity approach: Firstly, there are methodological implications for 'savaging the disciplines' (Nakata, 2007f) by challenging (Western) scientific research methods that seek to objectify and compartmentalise Indigenous peoples and knowledges; and secondly, there is the question of structuring research and research-related institutions towards a strengthening cultural capacity approach. Haraway's (2004) notion of 'power-sensitive' conversation (p. 589) can be useful in framing the grounds for collaboration between communities, academic institutions, government and non-government entities in research activity that informs policy and action. Contrary to institutional tendencies to dismiss culture and Indigenous knowledge(s) as impediments to development, cultural capacities, Aboriginal and Torres Strait Islander voices and knowledges should be central in shaping and conducting research that informs policy and action directed towards these communities.

Strengthening cultural capacity through research methodology

The case studies describe how methodological approaches developed towards a strengthening cultural capacity logic through working from questions of interest to local ACRs and participants, and then through privileging local voices in the research. In Case Study 1, local researchers explored the relationship between culture and local economic opportunities with a view to informing younger community members of the importance of traditional knowledge in social and economic enterprise opportunities (see Acker & Sullivan, 2014). In Case Study 2, the first cycle of parent opinion surveys featured modest alterations made to a government survey tool, a process that generated limited data, or evidence of the cultural capacities of aspiration and voice. In the second cycle, a methodological shift towards fewer and more open questions allowed ACRs to facilitate discussions and storying in local language. This encouraged communities to explain issues relating to young people, working from local language, epistemologies and ontologies. The data from this cycle of surveys highlighted the need for education to work in a more integrated manner across school, family and community spaces, but also to collaborate across knowledge and disciplinary spaces, such as with health services, mental health and wellbeing practitioners, senior family and community members, including the utilisation of homelands as spaces for learning, healing and social re-integration. This research also informed the development of resources and activities drawing on local language, knowledge and experience to (re)negotiate understandings of mental health and wellbeing from community experiences, rather than redistributing Western knowledge perspectives and a service provision paradigm.

Discussion

These case studies highlight methodological considerations for strengthening the cultural capacities of voice and aspiration in Indigenous research spaces, but is it possible to structure flexible and interdisciplinary research practice that adopts a logic of ‘capacity to aspire’ (Appadurai, 2004), rather than a logic of intervention in considering the question of futures and development in remote Aboriginal and Torres Strait Islander communities?

Structuring a cultural capacity approach: A regional knowledge hub concept

The following analysis conceptualises a regional knowledge hub as a model for strengthening the cultural capacities of voice, aspiration and future-oriented thinking through research. The focus is on the tristate region in which the case studies occurred.

A significant part of the RES project has been to engage directly with Anangu in research activities and to privilege Anangu voices in dialogue about Anangu education. In particular, this includes collaborating on a number of public presentations and publications (see, for example Burton & Osborne, 2014; Minutjukur & Osborne, 2014; Minutjukur et al., 2014; Osborne et al., 2014; Tjitayi & Osborne, 2014). That body of work supports Appadurai’s (2004) view that culture is a rich site for future-oriented thinking, aspiration and voice, and these capacities are a natural ally to development. This type of knowledge production should not only continue, but be matured to seek continuing venues for Anangu to pursue research-informed opportunities for social, cultural, knowledge and economic development.

In remote community policy making, deficit language positioning Aboriginal people as problematic, behind or lesser (such as described by critical theorists, see Comber & Kamler, 2004; Ladson-Billings, 1991; Milner, 2008) informs externally imagined, simplistic and universal ‘solutions’ that are taken up far too readily and far too often (see, for example Forrest, 2014; Hughes & Hughes, 2012; Wilson, 2014).

It is this deficit perspective of being behind, lesser and in need of intervention that leads to approaches that frequently exclude people who live in remote communities in all stages of the dialogue and actions. The logic of 'capacity to aspire' (Appadurai, 2004) assumes the best people to negotiate the complex process of what Nakata et al. (2012) term 'decolonial knowledge-making' (p. 124) are those who actually live the questions of negotiating notions of culture and development in their own community contexts. Along the same vein, Pearson argues Aboriginal people and communities are best placed to make economic, social and environmental decisions for the benefit of their communities, particularly where Native Title and other land-related agreements present development opportunities.

Nakata (2007a) argues a shift in language and in practice is required to address historically unequal power relations, where:

...in the academy and on the ground, the talk of Indigenous knowledge systems, rather than of cultures, does bring Indigenous knowledge, its systems, its expressions, and traditions of practice into a different relation with Western science than was possible through the discipline of anthropology. (p. 8)

The concept of a tristate knowledge hub offers potential to engage Anangu language and cultural expertise, but also offers a venue for 'decolonial knowledge-making' (Nakata et al., 2012) and strengthening cultural capacity (Appadurai, 2004). Some regions have access to specific economic opportunities such as Indigenous Protected Areas, tourism and ranger work, among others that aren't locally available elsewhere. In some cases, communities have had limited experience with Western education, whereas other communities have cohorts of qualified Anangu teachers and skilled local language educators through engagement with a longer, more consistent education history in the community. These Anangu sit within the 30% of the global population that Appadurai (2006) argues should be involved in claiming the right to research, and in gaining 'strategic knowledge', strengthening 'their claims for democratic citizenship' (p. 167).

A regional approach also draws on the dwindling capacity of Piranpa expertise. Historically, local people and language were prioritised in schooling and in running communities (see Osborne, 2015b). Piranpa were required to learn to negotiate complex knowledge interactions in local Aboriginal languages on a daily basis. Policy shifts, such as elevating the place of English language in remote education since the late 1990s (see Disbray, 2014; Graham, 1999; Nicholls, 2005) and privileging a public service paradigm in remote communities has generated fewer Piranpa with the skills, intellectual and intercultural capacity required to participate in the kind of knowledge negotiation process described. Across the tristate area, there are significant economic opportunities that can be strengthened and sustained through a cultural capacity model. At one level, drawing together senior community members from the region as language and culture experts has potential. For example, the Pitjantjatjara language Summer School, offered as an intensive two week course in January through the University of South Australia (see UniSA, 2015). This program employs and draws on the expertise of many Anangu. This intensive model could easily be offered as an autumn, winter or spring school to provide language and culture training for staff working in Anangu communities, tourism and ranger programs based at Uluru and Yulara (Ayers Rock Resort), and in Alice Springs where many services including health care are provided. Such a model increases opportunities for Anangu employment and development, and contributes to improved professional practice in Anangu contexts on a fee for service basis, making this an economically sustainable proposition. Strengthening cultural capacity in this way also contributed to the potential for research-informed actions towards social and economic justice.

A regional knowledge hub provides a venue for dialogue and shared learning where Anangu and Piranpa learn together. The cultural capacities of voice, aspiration and future-oriented thinking that can be strengthened through a continuing venue for flexible and interdisciplinary engagement can be returned to communities as knowledge assets (Moll et al., 1992; Zipin, 2013), but can also provide points of access and interaction for larger-scale collaborations with government programs and external organisations that can otherwise be too overwhelming to manage at a local level. Ninti One provides an organisational structure located within central Australia, offering ongoing opportunities for interdisciplinary engagement and a strengthening cultural capacity approach stretching beyond the current life of the CRC-REP.

Conclusion

Prioritising the voices and aspirations of Aboriginal and Torres Strait Islanders in remote community research requires flexible and interdisciplinary methodologies and institutional structures. Drawing on Appadurai's (2004) concept of aspiration and voice as cultural capacity, and the examples of two case studies, a research hub framework is argued for. Privileging Anangu voices in research dialogue through a Participatory Action Research method, prioritising the use of local language and exploring questions of interest to communities enabled the relationship between culture and development in the local context to be explored, and to remain core to the narrative and findings of each research project. The CRC-REP has provided opportunities for flexible, interdisciplinary research engagement and learning. A similar structure offers possibilities for remote Aboriginal communities such as in the tristate area to pursue continuing partnerships for 'decolonial knowledge-making' (Nakata et al., 2012, p. 124) as a means for pursuing research-informed social and economic justice, where community organisations, government and non-government institutions and universities can collaborate within a strengthening cultural capacity approach as outlined by Appadurai (2004).

Acknowledgement

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent the views of the CRC REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special Issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication.

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Enrichment plantings as a means of enhanced bush food and bush medicine plant production in remote arid regions – a review and status report

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Keywords: enrichment planting; savannah enrichment; bush food; bush medicine; *Terminalia ferdinandiana*; *Solanum centrale*

Abstract

Attempts to establish horticultural businesses in remote Aboriginal and Torres Strait Islander communities have seldom experienced sustained success. Various reasons have been proposed – inadequate technical and business expertise, insufficient planning and consultation, limited local demand for products and long distances to external markets, harsh seasonal conditions adverse to farming, limited irrigation water availability, competing community interests, and the laborious nature of the work under arduous conditions. This paper proposes a further reason and explores a new approach as an alternative to horticulture. Enrichment planting is a strategy involving the establishment of plants for food, medicine or other uses, in a landscape that is otherwise natural and largely undisturbed. The establishment of enrichment plantings of bush food and medicinal plants in bushland settings complements wild harvest, and yet as an alternative to the agricultural farming approach, it accommodates the important social and cultural interactions of value to Aboriginal people in collecting bush food and traditional medicines, while also generating a source of income. Through a review of the limited published information available and documentation of the current status in Australia, the use of enrichment planting is examined in the global context and its application to bush food and traditional medicine production for remote Aboriginal communities is explored.

Introduction

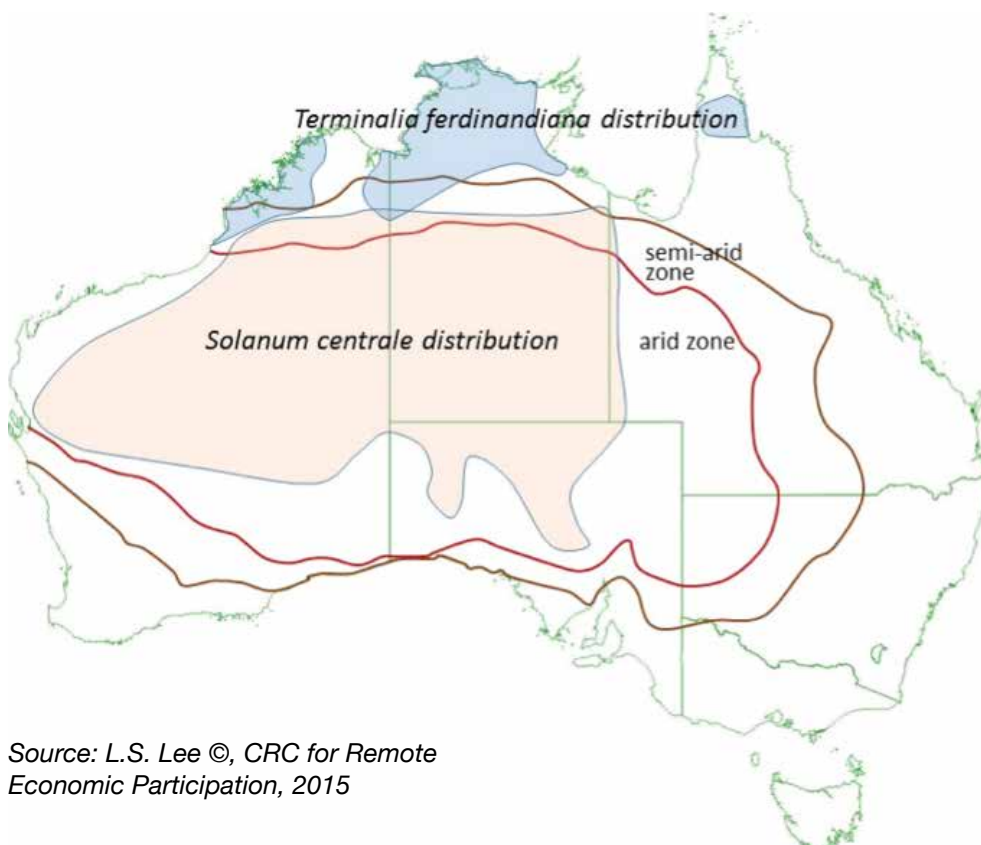
As will be detailed, the use of enrichment plantings as a means of bush food and traditional medicine production in remote Australian Aboriginal and Torres Strait Islander communities has limited application. Enrichment plantings involve establishment of relatively high densities of propagated plants in a largely undisturbed, seemingly wild situation to supplement the existing native plants. To the casual observer, the planting appears the same as any other bush-scape. But the benefit, from a plant product enterprise vantage, is the natural biodiversity of the planted area is maintained while plants can be minimally managed to ensure a satisfactory yield of crop. Harvesting may be conducted in a way akin to the traditional wild harvesting practice of Aboriginal people, but more efficiently and reliably because of the increased density of the desired plants. The enrichment planting business therefore mimics traditional wild harvesting practice of Aboriginal people and is thus culturally relevant, yet it is more consistent, more productive and more labour-efficient; less travel is required between sites and between plants, the site can be readily monitored and treated for weeds, pests and disease incursions, and plants may be tended to promote ideal growth. In addition to the business opportunity, the

harvest practice can encourage intergenerational transfer of Traditional Knowledge (alternatively termed Indigenous Ecological Knowledge) and play an important role in social and cultural interaction among community members. Enrichment planting also provides the opportunity for high value bush food to be grown in close proximity to Aboriginal communities, making management and harvesting more practicable. Aboriginal unemployment is a significant problem (Gray, Hunter & Lohar, 2012) and is not improving (Productivity Commission, 2015). The adoption of enrichment plantings could present a pathway to employment in culturally relevant pursuits and an opportunity for Aboriginal and Torres Strait Islander people to develop businesses, particularly in remote regions.

The prospect of Aboriginal people growing bush foods and traditional medicines for commercial gain in a culturally relevant manner by enrichment planting has been proposed for arid regions of Australia (Fawcett, 2011; Merne Altyerre-ipenhe Reference Group, Douglas & Walsh, 2011; Walsh & Douglas, 2011; RIRDC, 2014). The plant species involved are as diverse as Kakadu Plum (*Terminalia ferdinandiana*) (Cunningham, Garnett & Gorman, 2009a; Cunningham, Garnet, Gorman, Courtenay & Boehme 2009b) and bush tomato (*Solanum centrale*) (Ninti One Ltd, 2015). Enrichment planting has been conducted for some years with Kakadu Plum in the Kimberley (National Institute of Complementary Medicine, 2009; Rola-Rubzen, Gibbs, Gabunada, Altangerel, Fung, Rubzen & Carter, 2011) – refer to Figure 1. The practice has also been proposed for Aboriginal communities in the wet tropics (Bristow, Annandale & Bragg, 2003). However, the approach has not become widespread to date and the only known established application is with Kakadu Plum (Gubinge in *Nyul Nyul language*) near Broome in Western Australia (Torres, 2010; Pat Torres, Mayi Harvests, pers. comm.).

Published information on enrichment planting practices globally is limited and its application in the Australia context is only just beginning. This paper serves to review such relevant information as is available and to report on the current status of this approach to bush food and medicine production.

Figure 1: Distribution of *Terminalia ferdinandiana* and *Solanum centrale*



Enrichment planting

Enrichment planting has been practiced for thousands of years in agrarian traditional cultures as diverse as in Africa (Campbell, Clarke & Gumbo, 1991), Central and South America (Ladio & Lozada, 2009; Eyssartier, Ladio & Lozada, 2011; Suarez, Williams-Linera, Trejo, Valdez-Hernandez, Cetina-Alcala & Vibrans, 2012), Asia (Joshi, Wijaya, Sirait & Mulyoutami, 2004), the Pacific (Clarke & Thaman, 1997) and many other regions of the world (Bharucha & Pretty, 2010). The practice has also been traditionally applied to some extent in non-agrarian cultures of most continents (Berkes, Colding & Folke, 2000; Bharucha & Pretty, 2010; Barlow, Gardner, Lees, Parry & Peres, 2012). Moreover, enrichment planting has proven to be an effective approach to food security and supporting livelihoods in arid zones in various parts of the world (Harris & Hillman, 1989; Barrow & Mlengi, 2003; Ladio & Lozada, 2009; Reij, 2010; Suarez et al., 2012).

A White Paper is a major policy document prepared by the Australia Government and released publicly. It outlines the policy settings and approach in a particular area of interest. In a submission to the White Paper on the Competitiveness of the Agriculture Sector, the Rural Industries Research and Development Corporation (RIRDC) points out, in regard to bush food and medicinal enterprises in Australia:

Some of these industries have the potential to be developed in remote Indigenous communities, using enrichment planting methodologies consistent with important social and environmental co-benefits. (RIRDC, 2014, p. 8)

Undertaking activities of food and medicine production is primarily a utilitarian pursuit from the perspective of Western culture; but from an Australian Aboriginal outlook such activities carry much more complex and nuanced values, embracing spiritual, cultural, knowledge-transfer and social elements (Merne Altyerre-ipehe Reference Group et al., 2011; Walsh, Dobson & Douglas, 2013). On the other hand, having a predominantly traditional hunter-gatherer heritage, it may be appreciated that there is little if any relevance to the cultural interests of Aboriginal people in agrarian practices. It may be argued that a disconnect between horticultural practice and a hunter-gatherer lifestyle could be partly responsible for the limited sustained success in adoption of farming by Aboriginal people in remote regions where traditional culture plays a significant role in daily lives (ACIAR, 2007, p. 7; Denham, Donohue & Booth, 2009).

It is significant to note, however, there is evidence of rudimentary development of horticulture in far northern Australia in the distant past (Denham et al., 2009) and it seems possible that some type of 'pre-agricultural' enrichment planting may have been formerly practiced by Aboriginal people (Hynes & Chase, 1982; Chase, 1989). Moreover, Chase (1989) explains the complex societal relationships that necessarily underpin such practices, which were based on what Chase (1989) defined as:

...small-group localisation, long-term coastal occupation, and a complex Aboriginal science of speciation, plant behaviour, and extractive technologies. (p. 43)

The result was a series of what Hynes & Chase (1982) call "domuses", amongst which clan groups would circulate; and the tending of useful plants at these locations, that the authors refer to as "domiculture" (Hynes & Chase, 1982; Chase, 1989). According to those researchers, far from being a semi-random nomadic pursuit, this they claim, was a highly organised function governed by customary law and traditional knowledge that ensured 'spiritual safety of routine action' (Chase, 1989). Cosgrove (1996) suggests, however, that the practice may have been somewhat less structured.

This little-recognised isolated proto-agricultural circumstance notwithstanding, the fact pre-European Aboriginal societies lived a hunter-gather subsistence (Yen, 1989) and that nowhere did they develop a system of land-clearing for crop production (Chase, 1989), the tenet of agrarian practice lacking cultural relevance to Aboriginal traditional perspectives remains valid.

Whereas the predominant thrust of enrichment planting globally is for reforestation of disturbed landscapes, rather than food or medicine production (Ganz & Durst, 2003), numerous reports point also to the long-term carbon storage benefits of enrichment plantings of perennial plants (see Albrecht and Kandji (2003), Oelbermann, Voroney and Gordon (2004), Keefe, Alavalapati and Pinheiro (2012), and Hill, Pert, Davies, Robinson, Walsh and Falco-Mammone (2013)), and includes abatement applications in arid environments (Takimoto, Nair & Nair, 2008). Another significant interest in enrichment planting is for urban landscape enhancement, where there are benefits in food security, livelihood strategies, conservation of useful plants, redressing ecosystem degradation, and biodiversity conservation (Martini, Roshetko, van Noordwijk, Rahmanulloh, Mulyoutami, Joshi & Budidarsono, 2012; Cousins & Witkowski, 2015). Although similar benefits no doubt could accrue to Indigenous communities in remote regions of numerous countries, that application has gone largely undocumented. The majority of activity in research, development and assessment of enrichment planting in association with traditional cultures occurs in the field of agroforestry (Schulze, Leighton & Peart, 1994; Clarke & Thaman, 1997; Keefe et al. 2012; Suarez et al., 2012; Martini et al. 2012).

Participation in forest management activities, including the practice of enrichment planting, taps into a range of cultural interests and thereby presents an opportunity for Aboriginal and Torres Strait Islander communities (Commonwealth of Australia, 2004). Local traditional knowledge of plants has proven invaluable in guiding and managing enrichment plantings in various countries (Schulze et al., 1994; Clarke & Thaman, 1997; Berkes et al., 2000; Bharucha & Pretty, 2010; Suarez et al., 2012). The potential of traditional knowledge for development of similar initiatives in Australia is recognised (RIRDC, 2014). Loss of traditional knowledge about plants and their uses is therefore a concern in Australia (Walsh & Douglas, 2011) and in other cultures (Clarke & Thaman, 1997; Ladio & Lozada, 2009; Eyssartier et al., 2011).

With the exception of work in the Kimberley region (Courtenay, 2009) there has been very little systematic investigation of enrichment planting for bush food and traditional medicines in remote Australia. While limited developmental work has been conducted and valuable observations recorded, no methodical research has yet been conducted. The technical and environmental risks seem small, although Cunningham et al. (2009b) do indicate the concern for potential genetic contamination of local gene pools that could result through the introduction of genotypes from other locales. This, however, is arguably a lesser risk than the introduction of invasive foreign species via enrichment plantings in agroforestry projects as has occurred in other countries (Baguinon, Quimado & Francisco, 2005). The potential benefits seem apparent, in terms of micro-enterprise development as well as social and cultural interaction and traditional knowledge transfer, and the possibility that enrichment plantings may provide useful and culturally relevant options for financial independence to Aboriginal and Torres Strait Islander communities in remote Australia. The current and emerging status of this approach is discussed below.

Savannah enrichment in north-western Australia and the Top End

In investigating the enrichment planting concept for the cultivation of *Terminalia ferdinandiana* on Aboriginal communities in the Kimberley, the Kimberley Training Institute (KTI), formerly Kimberley College of TAFE, has developed an approach that combines traditional burning practices with modern horticultural techniques termed 'Savannah Enrichment'. KTI began

incorporating the cultivation of the prized local bush fruit *T. ferdinandiana* (Gubinge / Kakadu Plum) into horticultural training programs on local Aboriginal communities in the mid-1990s as part of the Institute's commitment to supporting appropriate strategies for remote community development.

In 2004, following widening recognition of the fruit's exceptional nutritional qualities, a "gubinge rush" hit Broome when Sydney based company, Coradji Pty Ltd, offered pickers up to \$20 per kilogram for wild harvested fruit. While the opportunity for a new industry with benefits for local Aboriginal people was largely welcomed, there was controversy and concerns about the sustainability of large scale wild harvesting when trees long sourced by local people for fruit for their personal use were stripped and damaged by commercial pickers.

Cultivation was viewed by many then, as it is now, as a logical way to support the emerging industry. KTI saw the opportunity to assist by refining cultivation techniques through their Aboriginal training programs and over the next few years established plantations on three local Aboriginal communities through practical delivery. The plantations were drip irrigated and became well established in their first years demonstrating *T. ferdinandiana* could be cultivated on a commercial scale.

Recognised for its work in engaging Aboriginal and Torres Strait Islander communities while pioneering the cultivation of *T. ferdinandiana*, KTI built collaborative partnerships with various other agencies and organisations in promoting the advancement of the industry. In 2006, KTI was invited by the School of Environmental Studies at Charles Darwin University (CDU) in the Northern Territory (NT) to be a partner in an Australian Research Council (ARC) grant application to fund several PhD students to engage in research projects supporting the development of the industry.

The application was built around a philosophy of promoting an "Across the North" strategy for the industry linking the Kimberley and Top End of the NT to maximise involvement with and benefits for Aboriginal and Torres Strait Islander people and communities. In discussions on proposed cultivation methods it was agreed that to satisfy the market advantage of *T. ferdinandiana* as a natural wild product, conventional cultivation techniques on cleared land would not be as appropriate as a model that preserved natural biodiversity and fitted in with existing ecosystems. That funding application was unsuccessful but the philosophies endured.

A novel concept was born and the following year (2007) KTI undertook to investigate the initiative by establishing a training and research facility on a 20 hectare site at the Broome "12 Mile" in a partnership with the WA Department of Conservation and Land Management.

In establishing the site, KTI sought and received endorsement from the local Yawuru Traditional Owners who suggested the name Balu Buru, a Yawuru term meaning "place of trees". Over the following years trials were established through practical training in nationally accredited horticulture and land management Certificate courses. Student enrolments in the programs attracted a high percentage of Aboriginal people from across the Kimberley, including minimum security inmates from Broome Regional Prison. This engaged local people as key players in the emerging industry and taught them skills to be part of similar initiatives on their own communities in what has become known as "Savannah Enrichment".

Annually for each of the first five years, approximately a hectare of *T. ferdinandiana* was planted with around 200 trees. To assist the establishment of the planted seedlings, the irrigation systems employed in the Savannah Enrichment methodology were based on tried and proven techniques developed in the Middle East and now applied globally across arid regions. Preparation of each area involved hand removal of dead wood and slashing between the existing trees and perennial shrubs. By far the most dominant species was *Acacia eriopoda* or pindan wattle, which typical of the surrounding native savannah, comprised up to 90% of

the woody vegetation and in some areas formed dense thickets. These dense acacia thickets, which can also include *A. tumida*, *A. monticola* and several other species, are a consequence of unmanaged fire regimes and consistent with large areas of the Kimberley and Top End of the NT since the end of Aboriginal “firestick farming” following European settlement.

The trials at Balu Buru provided valuable lessons in propagation techniques and in the effective establishment of *T. ferdinandiana* seedlings in the field but they also revealed a major challenge in controlling the prolific and resilient *A. eriopoda*. The area where the trials were planted contained a typically high percentage of the acacias. Because their life span is usually only about seven years, the strategy was to remove them when they died which would make way for the emerging *T. ferdinandiana*. However there was an enormous seed bank through the area and each Wet season (November - April) prolific numbers re-emerged. They were removed using hand tools but it was labour-intensive and not feasible on a large commercial scale. When the problem seemed insurmountable the solution came unexpectedly in 2012.

In conjunction with the establishment of the trials, prescribed burning was carried out early each Dry season (May – October) as part of Conservation and Land Management training to create fire breaks around the planted area. After several years, it was revealed the successive cool burns effectively eliminated the *A. eriopoda* from the firebreak areas and created an open parkland effect. This was the same landscape described by Gammage (2011), which Aboriginal people had maintained across the savannah regions of the north through firestick farming. It indicated areas planned for enrichment planting could effectively have these acacia thickets and their seed banks removed with prescribed burning over several years prior to planting.

On a large scale, Savannah Enrichment could effectively reverse the cycle of expanding wildfire-tolerant plant communities and the coinciding loss of biodiverse woodlands and forests that has occurred across large areas of northern Australia since the end of traditional firestick farming. In a carbon economy, it could take the opportunities around savannah burning through the Carbon Farming Initiative to another level. Creating productive forests and woodlands using high-value, traditionally important native species thus presents multiple benefits.

From a human point of view, it engages people on remote communities, making use of existing infrastructure and presenting appealing, culturally relevant and healthy options for their economic future. Environmentally, it breaks the cycle of successive wildfires and presents a productive natural resource management system that can be applied across large areas of mismanaged country in Northern Australia. The combination of fire control and modern innovative techniques in horticulture has the capacity to transform a region that currently releases globally significant quantities of greenhouse gases through wildfires into a vast carbon sink.

The Savannah Enrichment concept is built around an understanding of the natural history of the Australian vegetation and landscape. In 1788, Aboriginal people occupied all corners of the country and firestick farming was a precise form of land management and an integral part of traditional culture. Anthropologists believe it was developed in response to the extinction of the megafauna and the habitats that sustained them, over 40,000 years ago. Firestick farming maintained the natural order for millennia but ended following European settlement and the displacement of Aboriginal people from their traditional lands. In the Kimberley and Top End of the NT, the end of firestick farming saw a marked increase in late Dry season wildfires with a negative impact on plant communities and natural biodiversity. Savannah enrichment reverses the effect of wildfires and recreates stable ecosystems built around long-lived forest and woodland tree species.

The Savannah Enrichment innovation has evolved from KTI's commitment to supporting appropriate strategies for remote community development. Unlike training institutions in metropolitan areas, a significant percentage of KTI's clients are isolated and face limited employment opportunities. KTI's long term involvement with Traditional Aboriginal Elders and community leaders has built lasting relationships and fostered a 'walking together' philosophy. Savannah Enrichment has emerged from this commitment and these relationships as an innovative strategy that can contribute to the 'closing the gap' strategy of the Australian Government, which aims to reduce disadvantage in Indigenous communities. Far more than delivering training to service existing industries, KTI has demonstrated a commitment to recognising and implementing new initiatives with health, social, employment and environmental benefits and a capacity to preserve traditional culture.

Savannah Enrichment is a combination of individual elements recognised and authenticated by science and industry. Applied collectively as a methodology, it has been endorsed by a collaborative group of scientific and industry peers as appropriate and worthy of continued development. The potential to manipulate savannah plant communities through prescribed burning has been widely researched and documented (Whitehead, Purdon, Cooke, Russell-Smith & Sutton, 2009; Edwards & Allan, 2009), as has the effects of 'firestick farming' by Aboriginal people over millennia (Gammage, 2011).

As well as *Terminalia ferdinandiana*, KTI have investigated the cultivation of several other important bush foods as opportunities for remote communities. In the Savannah Enrichment model, these have included *Terminalia cunninghamii* (pindan walnut) and *Buchanania obovata* (wild mango).

At Bidyadanga community south of Broome, *Ipomoea costata*, a wild yam, and *Solanum chippendalei*, a bush tomato, have also been cultivated. In cultivating *S. chippendalei*, KTI worked closely with Yulparija Traditional Elder Merridoo Walbidi, and in 2007 assisted through a project at Kings Park Botanic Gardens and Parks Authority in Perth.

The Kings Park project investigated propagation techniques for solanums and discovered that soaking seeds in gibberellic acid resulted in germination rates allowing for the effective establishment of seedlings in a nursery environment (refer to Lee, 2012).

Through the Kings Park project, seedlings were provided to KTI and subsequently planted at Bidyadanga where several grew to maturity and produced fruit. The fruit, however, did not exhibit the same quality as wild fruit and Elders lost interest in the conventional cultivation approach. Subsequently there has been increasing interest in an approach where plants are established in a natural setting. Following discussions with Merridoo Walbidi there are plans to experiment with direct sowing of seed into sites prepared by burning, light working of the top soil, pre-treatment of seed (with gibberellic acid) and watering through the initial stages with in-line drip irrigation – i.e. enrichment planting.

Ntaria initiative in central Australia

Enrichment planting, by its very nature, is fundamentally suited to perennial plants – annual species require replanting each year, which necessitates agricultural practice. The Australian bush food plant *Solanum centrale* known as bush tomato and desert raisin (Lee, 2012) is a small herbaceous shrub yet is a perennial, like its close relative *S. chippendalei*. When damaged (e.g. by seasonal frost or fire) it regenerates vigorously from underground structures. The fruit of this plant is a food of traditional Aboriginal society of the Australian arid zone to which is it endemic occurring across a wide area (Lee, 2012).

To ascertain whether establishment of enrichment plantings of *S. centrale* may benefit remote Aboriginal communities, and to determine what pitfalls may be encountered, a pilot project has begun at Ntaria (Hermannsburg) in Western Arrente Country of central Australia. In addition to the planting procedure, community participants are receiving training in food safety and processing, business and marketing practices to assist them in developing local bush food micro-enterprises. These activities are designed to accommodate culturally relevant practices.

Two plots of undeveloped slightly undulating land of approximately one hectare were each planted with approximately 500 randomly distributed seedling plants – the sites were previously disturbed but had reverted to native plant growth. To aid establishment, plants were hand-watered initially but subsequently receive minimal maintenance.

The plots were established shortly prior to the date of publication and it is anticipated that observations will be published in the future after the plantings have grown for several annual cycles.

Conclusion

Variants of enrichment planting approaches to ensuring adequate production of plant material for food, medicines and other traditional uses have been applied since before recorded history in almost every continent. Since the second half of the twentieth century, the method has been developed scientifically and used for a broader range of purposes incorporating forestry and conservation management. It has, however, had limited application in Australia, except for its use in reforestation for the timber industry.

It has been recognised that participation by Aboriginal people from remote communities in enrichment planting projects may provide a beneficial source of food and plant-derived resources for local consumption, and to form the basis of Indigenous business enterprises. With an ancestral heritage of hunter-gatherer lifestyles, it may be argued that agricultural pursuits bear little relevance or interest to remote Aboriginal communities who are still significantly connected to their traditional customs and values. Enrichment planting approaches entail activities in a seemingly natural bush-scape setting, therefore they can provide opportunities for engagement in traditional practices and play a role in the transmission of traditional knowledge about gathering and processing food and medicine, ceremonies and lore involving particular plants, creation of traditional artefacts, and the like. Thus, proximity and density of desired plants in enrichment plantings offers a culturally relevant activity for Aboriginal people in remote places concurrently improving ease and efficiency of producing plant products and can underpin business initiatives. The encouraging instances of success in enrichment planting projects involving Aboriginal people, specifically those to date with *Terminalia ferdinandiana*, suggests this approach offers considerable promise of benefit for Aboriginal communities – financially, socially and environmentally.

Projects with *Terminalia ferdinandiana* in northern Australia and *Solanum centrale* in central Australia and the north-west are forecast to continue, as prototypes for enrichment planting and to improve methodology. The approach is in its early stage of development, yet a small group of researchers is exploring other prospective species and associated traditional interests to which it would be applicable. This represents a potential opportunity for culturally relevant employment and business development in remote regions.

Acknowledgement

The author Lee's research and development work with Australian bush tomato is undertaken with the financial support of the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (<http://crc-rep.com/>), and its parent organisation Ninti One Ltd (<http://www.nintione.com.au/>).

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent the views of the CRC REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special Issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication.

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Switching on the remote: a new perspective on accessibility in remote Australia

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Keywords: accessibility, remote Australia, remote telecommunication and transport, Aboriginal and Torres Strait Islander communities, social equity, sustainable service provision

Abstract

In remote Australia, access to people, goods, services, information and places is difficult because of extreme distances and climates, sparse population, remoteness from markets, and complex economic and socio-cultural dynamics. Most of remote Australia remains disconnected from both the digital revolution and the national transport network due to a lack of adequate infrastructure, affordable and reliable services, and, for most, poor digital literacy. This impedes service delivery including education and health services, economic development and wellbeing of remote residents; contributing to inequalities between remote and non-remote Australians. Whilst the concept of accessibility in transport and telecommunication goods and services is relatively well defined in an urban context and can be measured accordingly, the way accessibility is currently measured fails to capture the complexity of the remote Australian context. The article discusses some of the current knowledge gaps associated with studying accessibility levels in remote Australia with a particular focus on Central Australia. The article presents indicators and tools which could be used to evaluate access issues with practical applications for remote Australia. Developing an accessibility index for remote areas would enable the reconsideration of minimal requirements for sustainable livelihoods in remote areas and the development of effective and appropriate regional development policies and initiatives.

Background

Rodrigue, Comtois & Slack (2009) define accessibility as “the measure of the capacity of a location to be reached by or to reach different locations”. In this context remoteness could be understood almost as an antonym. Remote Australia is composed of different locations linked to each other and to non-remote areas domestically and internationally through a variety of complex economic and socio-cultural relationships. The ‘Desert Syndrome’ (Stafford Smith, 2008) is a concept that was developed under Ninti One co-funded research. The Desert Syndrome asserts remote Australia is characterised by a set of features that are not individually unique but which together cause it to function in ways that are fundamentally different to any other physical and social environments. Climate variability, scarce resources, sparse population, distance from markets and isolation from political power, social variability, limited research knowledge and cultural differences are the core common features of remote areas in Australia. Acting individually, these may not be significant but collectively they are. From an accessibility point of view, multiple layers of multicultural local connections, long-

distance links between people and places, including fly-in-fly-out practices, and dynamic international exchanges interact at different levels in the remote Australian context. Remote communities are privileged to be able to rely on a variety of spatial links but can also be particularly vulnerable when one of these links is disrupted. Indeed, Australia as a nation is no longer primarily defined by the “tyranny of distance” (Blainey, 1966) and is well positioned in terms of access to regional and global markets and population centres. However, for over 80% of landmass and 3% of population which constitute remote Australia, the ability of remote locations to sustain a reliable contact with the rest of the world is critical in order to reduce the impacts of the “desert syndrome” (Stafford Smith, 2008).

Demography reflects one reason remote Australia is still understood as a frontier space in contrast with urban settings. In fact, in urban Australia the very concept of accessibility refers to a wide range of specific fields. One common signification of accessibility in an urban setting is related to supplying those who have special mobility needs with appropriate goods and services. Another connotation refers to the ability to supply online information in a non-discriminatory and functional manner (Web Content Accessibility). These issues become increasingly topical in remote Australia, where access to reliable communication and appropriate transports is further impacted through those factors associated with the Desert Syndrome (Stafford Smith, Moran & Seeman, 2008).

However, there is a knowledge gap in terms of accurately measuring accessibility in a remote context. Currently the ARIA+ index “is based on road distance measurements from over 12,000 populated localities to the nearest Service Centres in five size categories based on population size” (Australian Bureau of Statistics 2011). This does not reflect the different levels of accessibility characterising people living in remote Australia. The concept of accessibility in a remote context is defined by complex elements which characterise different regional areas. For example, in some locations, there is access to excellent levels of air services, sealed roads, four wheel drive vehicles, high speed internet and 4G speed mobile internet, while in other places it is barely possible to have access to a public phone and the local unsealed road can be closed for a third of the year.

Inequalities affecting remote communities and enterprises are better understood when considering the cumulative effects of different forms of inaccessibility. For a large number of Aboriginal and Torres Strait Islander (ATSI) people living in remote communities, lack of or poor access to, essential infrastructures and services such as water, housing, education, health, transport and telecommunications have led to a situation of deep socio-economic exclusion and social injustice. Importantly, the inequality conferred by distance to other locations is mostly relative to the level of development of infrastructures and services, the availability of technological innovations, public versus private affordability and the local capacity building and overarching regulatory frameworks that drive regional policy. In order to measure how people can capitalise on an increased accessibility in a remote environment, we need to assess in a holistic way the impacts of improved physical or digital access, the associated benefits of human interactions, and the financial and socio-cultural dimensions allowing these interactions to be performed. Therefore, it is important to study new ways to more comprehensively evaluate accessibility.

This article discusses a variety of key attributes for assessing the level of accessibility of different locations in remote Australia. In this respect, it reviews referential attributes in a remote environment - including infrastructure, technologies, and policies - that offer transport and communication services which support local community and enterprise needs, and which have a scale of affordability. To evaluate accessibility in such a context, the article proposes a new index based on a range of indicators to measure the access to, and affordability of, effective

telecommunication and transport services. Finally, the article discusses how unwrapping the spatial relationships between remote locations through a new concept of accessibility leads to reconsidering the minimal requirements for sustainable livelihoods for people living in the bush, with positive outcomes in terms of economic and social opportunities as well as regional development projects.

Infrastructures

The prohibitive costs of providing conventional access-enabling infrastructure in remote Australia have contributed to innovative and low-cost solutions developed to overcome isolation risks. The Royal Flying Doctor Service radio system is an iconic example that relied on a pedal-operated wireless generator radio designed by Alfred Hermann Traeger in the 1920s (Behr, 1990). However, the development of technological innovation reaching remote communities is plateauing; new innovative transport and telecommunication infrastructures are needed to sustain remote Australian communities.

Transport infrastructures in remote Australia: the dilemma of supplying a vast land with a small population basis

There are world class transport infrastructures in remote Australia even though on a kilometric density basis, the density is amongst the lowest in the world. For example, in the Northern Territory the road density is around 1km of road for every 39km² as a comparison, in Russia it is around 1km/12.2km². Even though a series of key infrastructures are well positioned to support the main export industries in remote Australia, more targeted investments are required to increase economic development in remote and regional areas (Department of Infrastructure and Regional Development, 2014). Significant logistical improvements could be achieved in the area of intermodal platforms to better link existing networks. One of the biggest challenges in terms of infrastructures is related to supplying remote communities with appropriate transport options. Currently a vast majority of the 1,200 ATSI remote communities in Australia do not have access to sealed roads (Smoker, 2011). In a recent survey conducted in three very remote Aboriginal communities in Central Australia (Hermannsburg, Lajamanu and Santa Teresa), 42% of the respondents indicated they experience serious difficulties when travelling because of poor road conditions (Spandonide, 2015). In the Northern Territory, a large number of unsealed roads are typically closed for over a week, three to four times per year, due to extreme climatic events leaving very remote communities accessible only by air or maritime services. Road closure issues are even more problematic in such tropical regions of Northern Australian where road access for remote communities can be closed for several months during the wet season. This affects people's ability to travel to closest regional towns or neighbouring outstations, and impacts freight services which are only available by sea or air. Finally, sealed roads contribute to significant socio-economic benefits for remote communities: 15% more people commute for work in large very remote communities with sealed road access, than in communities which do not have access via sealed roads (Spandonide, 2015). However, providing sealed road access to sparse populations is not economically viable in most instances. While single lane roads could prove to be more cost effective in providing access to the largest very remote communities, the low population density is a structural issue in terms of capacity to sustain the costs of building and maintaining sealed roads through public revenue. In the Northern Territory, the road network includes 35,725 km of roads with 25% of these sealed. This represents a staggering ratio of 6.57 kilometres of road per person, which is more than any Organization for Economic Cooperation and Development (OECD) country (Organisation for Economic Co-operation and Development, 2013). Different investments might be more effective at improving transport access than costly sealed road infrastructures.

Meeting telecommunication infrastructure needs

The findings of the 2011-2012 Regional Telecommunications Independent Review Committee (2012) show mobile communications are the most important telecommunication issue for remote and rural Australians. Indeed, access to broadband through mobile devices has become the medium of choice for all Australians. Currently, there is a very low penetration of cellular mobile coverage in rural and remote areas of Australia. Despite high demand, market failure means service providers will not independently invest in further terrestrial coverage. A key inhibitor for remote areas is that mobile delivery is currently not part of the National Broadband Network (NBN) business plan, limiting the option of satellite backhaul for mobile services. Recent partnerships between the Western Australia and Northern Territory governments and Telstra have enabled expansion of mobile coverage to additional remote communities where existing fibre optic backhaul permits. However, more is needed. For example, in September 2015, the Northern Territory Government announced a joint \$30 million three year agreement with Telstra to expand and improve telecommunications in remote locations. About eight new remote communities will benefit from this initiative (Northern Territory Government Department of Corporate and Information Services, 2015). The 2015 \$100 million Mobile Black Spots initiative of the Australian Government aimed at improving mobile coverage and competition in regional Australia was welcomed. Outcomes of Round 1 of the programme announced in June 2015¹ will deliver 499 new and upgraded mobile base stations across regional and remote Australia (Department of Communications and the Arts, 2015). It is estimated the 499 base stations will deliver coverage to approximately 3,000 nominated black spot locations. However, an analysis of the funded locations reveals most of the funding will benefit regional and outer regional areas. For example, only five remote Northern Territory locations and five remote South Australian localities will receive coverage under this round of funding. Through Round 1 of the programme, a database of 6,221 locations around Australia was developed from locations identified as needing improved mobile coverage. This excludes many more locations yet to be nominated. The further \$60M earmarked for proposed Round 2 in 2016, demonstrates the Federal government has an appreciation of the severity of regional and remote area cellular mobile service shortfalls. However, the scale of existing regional and remote mobile coverage scarcity clearly demonstrates such Federal support will long continue to be required. Governments need to further invest in remote region black spot programs to address the provision of telecommunication infrastructure where commercial telecommunication companies have insufficient incentive and therefore low priority to invest in new infrastructure. Importantly, the rational use of existing infrastructure and micro-cell (or similar) technology to lower the capital and operational costs can be considered. Indeed, the remote landscape is littered with large Telstra towers constructed to deliver voice services (via High Capacity Radio Concentrators or HCRC) and microwave links. A collaborative approach and commitment to corporate responsibility to remote Australia would unlock these assets in order to realise better connectivity to remote towns and communities.

Developing a national broadband policy is a tangible achievement at a national level. However, while it addresses fixed broadband issues, societal needs have progressed way beyond this. Government has largely ignored policy and program advancements outside the national broadband infrastructure. The need for continued upgrade and to expand remote telecommunications infrastructure is evident. The NBN implementation fails to connect remote towns and communities with proximity to existing fibre-optic infrastructure to the terrestrial NBN network. The NBN technology choice policy offers communities (and individuals) the

1. See <https://www.communications.gov.au/what-we-do/phone/mobile-services-and-coverage/mobile-black-spot-programme>

opportunity to change the default policy choice for their premises. However, that places a financial burden on communities wishing to connect to NBN by way of terrestrial infrastructure. The Long Term Satellite Solution (LTSS) service has been marketed as the optimum solution for the 3% of Australians residing in remote areas who wish to access broadband services. Its success can only occur if end-user expectations match the reality of a fully loaded and utilised operational satellite service.

To date, implementation remains unknown despite the launch of Skye Muster on 1st of October 2015. Access to the new service will commence in 2016 but implementation plans have not been made public. Significant questions exist: Who will be covered first? How will the migration from the Interim Satellite Solution to the LTSS occur? Will the data restrictions impede on a families' ability to access online education, tele health services, or a movie on Netflix? The satellite life is fourteen years: What will happen next? Public Interest Premises (PIP), such as schools and health clinics, may have exemptions from this restriction but the price structure is unknown. Stakeholders need to be consulted in the design of services, and have forewarning of issues, such as the current uncertainty around future data allowances. Furthermore, consumers should be provided with information on these issues in a transparent way and remote communities would benefit from earlier engagement in the planning process.

Technology and innovations

Appropriate technology includes equipment and knowledge promoting the self-sufficiency and sustainable development of specific places. Most often providing appropriate technological responses to remote areas consists of adapting existing components, and enlisting future innovations which best suit the specific socio-cultural and economic conditions of the locations they are introduced in.

From the dealer's top of the range model to the wrecking yard

The Australian society is heavily dependent on motorised transportation. This is even more the case in mainland remote Australia. The most problematic issue is inequality of vehicle access for transport. In a recent survey, a third of the respondents indicated they could not access a vehicle to travel (Spandonide, 2015). The research suggests there is a critical shortage of appropriate vehicles in remote communities for local residents to use. There is a striking contrast between externally based service providers, who only use top-of-the-range four wheel drive vehicles to access very remote communities, and the fact that four-wheel drive vehicles represent less than 10% of community member's vehicles (Spandonide, 2014). Poor private transport access is predominantly a financial issue. This is confirmed in the survey's results where a third of the respondents indicated they experience serious difficulties when travelling because of not being able to register a vehicle (Spandonide, 2015). This triggers a negative transport poverty cycle: a large number of vehicles in very remote communities have a very short life span because they are not appropriate for being driven on unsealed roads (Holcombe, 2006). As a result, in a majority of remote communities, wrecking yard landscapes define the community's boundaries where unusable vehicles are left to be used for sourcing parts (Young & Doohan, 1989; Lawrence, 1991). A large number of unregistered vehicles are vehicles in need of repairs. The results of the transport survey in Central Australia indicate participants consider access to a community mechanic workshop (37%) would greatly help them to stay more often and for longer periods in their community. This would also reduce their travel demand. However, the scale of the transport equipment issue is not limited to transport access with very substantial flow-on effects in terms of adverse impacts on wellbeing. A very significant proportion of the average income of ATSI people living in remote communities

is allocated to transport expenses. This creates a situation of financial transport stress (NT Council of Social Service Inc, 2014) and highlights a need for ATSI people living in remote communities to purchase more affordable and appropriate four-wheel-drive vehicles.

In terms of innovations, the ability to integrate transport and household energy systems could effectively decrease living costs and provide long term benefits in terms of increased community resilience in off-the-grid environments. Automated and driverless vehicles will be another transformative innovation in the transport industry in the next 50 years. However, as a large majority of the private vehicles used in remote ATSI communities are in (and beyond) the last stages of their viable life (Young, 2001) vehicles equipped with updated technologies tend to be particularly rare (Holcombe, 2006). To reach a market where second-hand vehicles play a central role in household motorisation, strong future incentives for switching to electric or driverless vehicles would be required to accelerate the current slow rate of penetration of new technologies. In order to fast track the access to new technologies in the bush, specific strategies could be implemented to evaluate the feasibility and the effectiveness of such incentives. This includes applied research and pilot projects focusing on business and social enterprises (Raicu, Taylor et al., 2011).

The digital gap in Telecommunications

Today broadband is a powerful force for change. Worldwide, mass connectivity with broadband is improving lives in many ways. For example, it provides online clinical health delivery; enriches education through online delivery and access to learning resources; drives economic growth; improves social inclusion; and encourages active citizenship. At current growth rates, half of the world's population will be online by 2017 (The Broadband Commission, 2014). In Australia, access to reliable digital communication technology is the norm and mobile broadband subscriptions have now outnumbered fixed ones by a ratio of 3:1. Australians have enthusiastically embraced the use of broadband in their professional and personal lives. Indeed, more than three quarters (77%) of Australian households have access to the internet via a broadband connection (Australian Bureau of Statistics, 2014). However, this is not the case in remote Australia, which remains largely disconnected from the digital revolution. The lack of suitable and reliable telecommunications in most parts of remote Australia impacts on delivery of government and health services and access to educational resources that most Australians take for granted. It is a major barrier for economic development. At present, due to over subscription of the Interim Satellite Solution, remote residents are struggling to even do their internet banking. Given the evidence residents of rural and remote communities continue to show poorer health outcomes, have lower incomes, display lower employment rates and education attainment than residents in metropolitan centres, access to reliable telecommunication services has the potential to make a significant difference in economic, health and education outcomes (Australian Institute of Health and Welfare, 2011). Innovative and localised infrastructure and service delivery solutions need investment to allow remote residents to benefit from the digital revolution and utilise new applications such as 3D printing and tele-health services.

Services

Transport and telecommunication services are undeveloped in remote Australia. In some large remote communities the potential for growth is particularly strong and could lead to greater opportunities to increase economic participation and improve wellbeing outcomes.

Like a shag on a rock: regional public transport services as a way to avoid inaccessibility

Access to transport services is the root of transport inequalities in remote Australia. Beyond the issue of vehicle shortage, not being able to drive is another problematic challenge for sustainable livelihoods and a barrier to economic participation. Dockery and Hampton (2015) identified having a license has a direct impact on employment in remote communities. A fifth of offenses in the remote communities in the Northern Territory are driving related offenses (Australian Institute of Health and Welfare 2007; Australian Bureau of Statistics, 2013) and yet the provision of public transport services is inadequate in remote communities (Finlayson & Auld, 1999; Dodson, Gleeson & Sipe, 2004). In remote areas, about half of ATSI people are left without any access to public transport (Australian Bureau of Statistics, 2010); the existing services operate on very low frequencies (a maximum of twice weekly for long distances), and concession tickets are expensive (Spandonide 2014). For example, in Central Australia, public transport service providers do not have any connection routes, timetable integration, interchange facilities or integrated booking system.

The combination of these transport barriers directly impact on the livelihood of ATSI people living in remote Australia. In remote communities, transport disadvantage tends to affect people who are already financially and physically disadvantaged and result in long term socio-economic exclusion. Older people (National Aged Care Alliance, 2007), people with disabilities (Gething, 1997), females and younger children (NSW Aboriginal Transport Network, 2006; Rosier & McDonald, 2011) and low-income households (Posselt, 2000; Lucas, 2012) are over-represented in the categories of people who do not have regular access to public transports (Currie and Senbergs 2007). The proportion of people with a disability is two times higher in remote ATSI communities (Australian Bureau of Statistics 2010, 2010a). In Central Australian remote communities, an estimated 80% of people with disability/low mobility have no regular access to appropriate transport services (Spandonide, 2015).

These public transport shortages represent a very significant economic burden for service provision in remote communities (Battellino, 2009). Additionally, people living in remote communities have specific mobility needs: a very substantial part of that mobility is directed to maintaining family links and connection to country between places which are often thousands of kilometres apart (Memmott, Long & Thomson, 2006). In the transport survey in Central Australia, visiting friends and family appears to be particularly significant for small trips (34% and 48% respectively, 82% combined) and is still an important reason to travel for big trips (respectively 28% and 29%, or 57% combined). Another major reason for travelling is the need for shopping in service centres located hundreds of kilometres away. The transport survey confirmed these results with small trips (76%), and big trips (32%) essentially related to shopping. High living costs in remote communities (NT Council of Social Service Inc, 2014) further exacerbate these needs. Indeed, with similar shopping baskets, the cost of shopping in the nearest service centre remains lower than shopping locally despite additional travelling costs.

This exacerbates the inequity of options for intense regional mobility and represents an operational challenge across service delivery industries (Taylor, 2002; Prout, 2008; Battellino, 2009). A better integration between communication and transport services would enable better goods delivery services and decrease mobility needs in remote communities. The results of the transport survey in Central Australia indicate people consider access to more services within communities (54%) and access to a system of affordable goods delivery (41%) (Spandonide, 2015, p. 35), would help them to stay more often and for longer periods in their community. This would significantly reduce their travel needs.

Make Telecommunication affordable and flexible

Affordability is critical for the sustained take up of telecommunications services by vulnerable groups generally. Indeed, there are still a very significant number of households in Australia that do not have a home internet connection (17%) (Australian Bureau of Statistics, 2014). This level is much greater among certain consumer segments, for example, Indigenous Australians living in remote areas, people with a disability, seniors and single parent families. In remote Australia, 75% of Indigenous households do not have an internet connection, a lower penetration than a country like Sudan (The Broadband Commission, 2014). A research study among low income families across metropolitan and non-metropolitan Victoria showed 66% of mobile phone users had difficulty paying their account and 61.7% of clients with a pre-paid account ran out of credit sooner than expected (Wise, 2013). In remote Australia, pre-paid mobile and internet services are the preferred option for Indigenous and low-income people where coverage is available, as they enable people to manage usage costs. However, pre-paid mobile calls and data usage rates are significantly higher than for billed services. Mobile, data and pre-paid services are not covered under the Universal Service Obligation, which only provides cost equalisation for fixed line services and public phones. Indeed, the existing Extended Zones scheme assists by reducing the cost of fixed line voice calls within the caller's zone to the cost of a local call. There is potential to introduce a subsidised structure equivalent to the extended zones scheme for voice calls originating from mobile services registered at remote locations. The NBN satellite products now being designed currently have no pre-paid broadband options. Given, pre-paid services are the preferred option for the majority of remote Indigenous households, the Government and NBN should be encouraged to work with satellite Retail Service Providers to introduce pre-paid broadband tariff models within the NBN Long Term Satellite service. Content exempt investigations should also examine the potential for providing free data download for specified healthcare, education and government sites, and for some domestic services such as banking, in areas where no local service is provided. Zero-rating of data for these services will assist remote Australians. Content exemption models are already in operation with commercial carriers, covering both education and internet TV services.

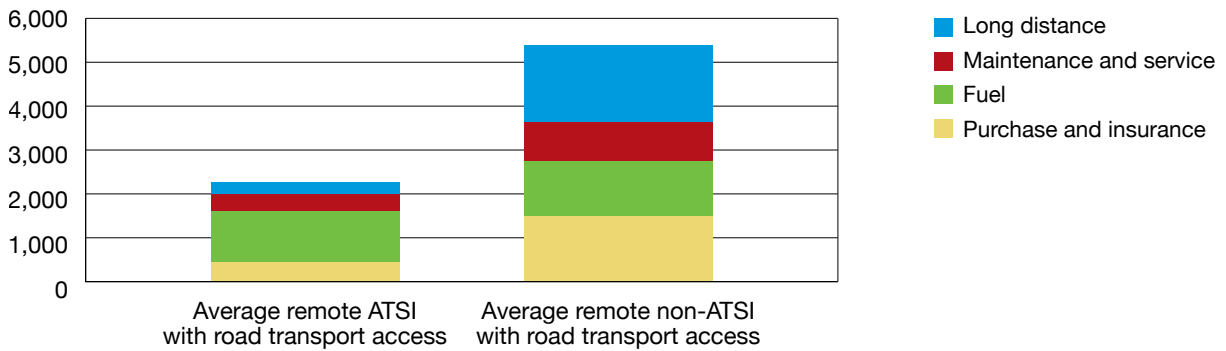
Financial accessibility

The ability to afford access to transport and telecommunication services in remote ATSI communities is problematic because of the associated expenses and the relative low level of average incomes.

Figure 1 describes transport cost allocation in Central Australia for remote ATSI people and non-ATSI people living in non-remote areas. On a per person basis, annual transport costs in Central Australia for remote ATSI people are half those for non-ATSI people living in non-remote areas. However this is predominantly caused by average vehicle occupancy rates being more than three times higher. On a vehicle basis, costs are greater for ATSI people living in remote areas.

Figure 1: Transport cost allocation in Central Australia for remote Aboriginal and Torres Strait Islander people and non-Aboriginal and Torres Strait Islander people living in non-remote areas

Average non-remote with road transport access

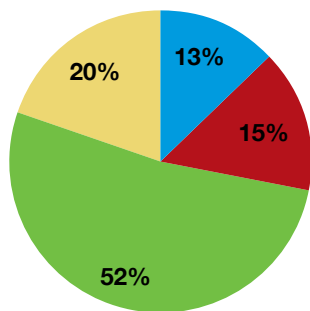


Figures 2a and 2b indicate the proportion of different types of transport costs in the annual transport expenditure for remote ATSI people and non-ATSI people living in non-remote areas.

Figure 2a: Proportion of different types of transport costs in the annual transport expenditure for remote Aboriginal and Torres Strait Islander people

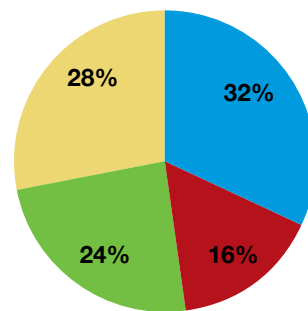
Figure 2b: Proportion of different types of transport costs in the annual transport expenditure for non-Aboriginal and Torres Strait Islander people living in non-remote areas

Average remote ATSI with road transport access



- Long distance
- Maintenance and service
- Fuel
- Purchase and insurance

Average remote non-ATSI with road transport access

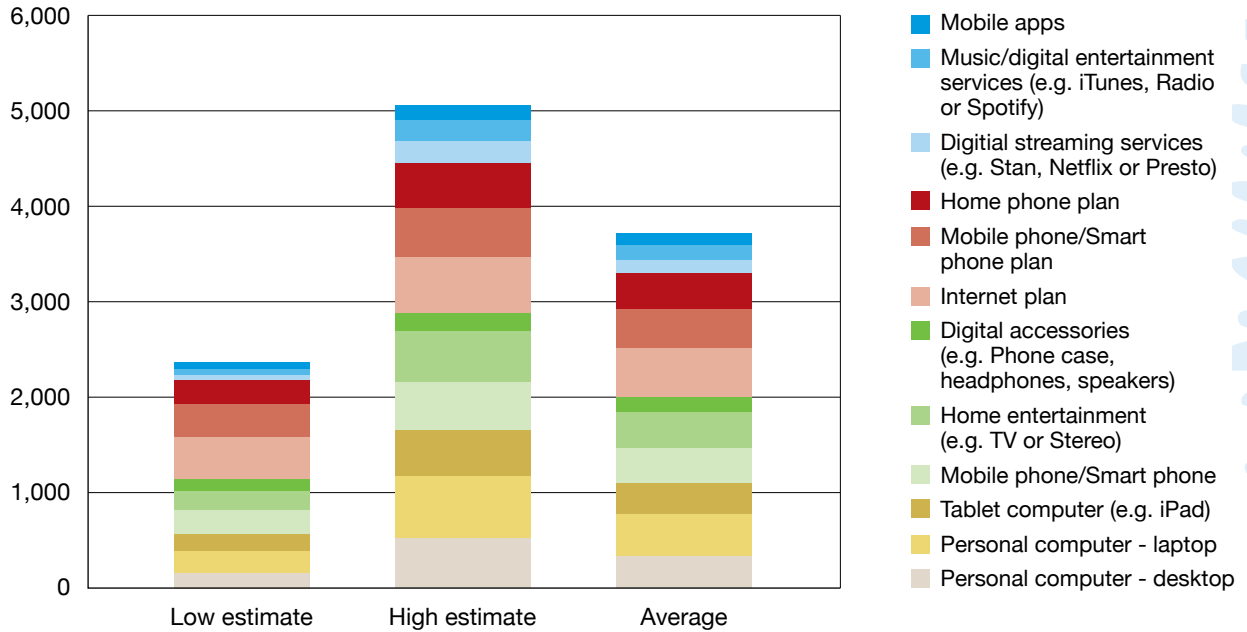


- Long distance
- Maintenance and service
- Fuel
- Purchase and insurance

There is a flagrant predominance of fuel costs in the annual transport cost expenditure for ATSI people living in remote areas. Furthermore, for people who do not have regular access to a motorised vehicle, public transport costs are much more significant. The fact that average incomes in remote ATSI communities are half to one-third the national average, means over 25% of the average household income is allocated to transport.

Figure 3 gives some indications of telecommunication costs in Australia. Remote ATSI people tend to correspond more to the low estimate profiles with most of the telecommunication expenditure allocated to mobile communication. Telecommunication costs can represent over 20% of the average household income in ATSI remote communities.

Figure 3: Telecommunication costs national averages



Source: Suncorp Bank, 2015

Integrated accessibility, a way to increase economic participation and decrease living costs

Integrated transport and communication systems are essential for local regional economies and could effectively reduce living costs. High costs of transport are challenging for the socio-economic development of very remote communities. Mobility is crucial in terms of livelihoods and wellbeing as a way to sustain communities in and between multiple homelands (Dockery, 2015). Local transport services will be increasingly important in a context of an aging population (Somenahalli & Shipton, 2013) as it will be critical to establish specific transport services for people in a situation of low mobility at a community level.

Developing basic transport access and services as low-cost alternatives to unaffordable infrastructures could increase community resilience. Additionally, the transport industry can be a reliable source of local employment in a remote context and contribute to closing the existing economic participation gap in remote ATSI communities (Deloitte Access Economics Pty Ltd, 2014).

While the provision of adequate broadband to regional and remote Australia is essential, the true social and economic benefit of that infrastructure will only be realised if its deployment is accompanied with appropriate education and training services. Many people in regional and remote Australia have effectively missed out on 20 years of learning that has taken place in areas where online services are readily available, including access to commercial services for participating in online markets for goods and services, and labour. The fact that many existing digital programs are targeted exclusively at NBN early release sites, explicitly

precluding towns and local governments not in these areas, is further impeding access to training for most remote Australians. There is a need to develop specific programs for remote Australians to ensure they have the opportunities to gain the skills to participate in the global digital economy. For example, 92% of Australians use the internet to look for product/service information, but only 64% of Small and Medium Enterprises (SMEs) have a website (Sweeney Research, 2014). There are over 40,000 SMEs in remote Australia and lack of website presence is impeding business growth. Only 54% of SMEs sell online and when asked what were the major concerns, a lack of expertise and knowledge with computers (25%) came second after security concerns relating to hacking (44%) (Sweeney Research, 2014).

There is also a need for targeted Indigenous programs as high levels of digital inequality still exist in many remote Indigenous communities around Australia. The Indigenous Remote Communications Association (IRCA) highlights this point saying, “most remote Indigenous people currently have limited access and usage of ICTs”, and further, “limited access to IT facilities, training, relevant on-line content and service delivery and affordable broadband services will increase the digital divide” (Indigenous Remote Communications Association, 2012, p. 12). There is an opportunity, through appropriate use of the NBN and targeted programs, to build digital literacy and engagement and significantly improve remote Indigenous communications and capacity.

New policies focusing on access to integrated transport and communication as a key to sustainable livelihoods in remote communities

An appropriate specific policy framework recognising the unique characteristics of remote communities is required in order to improve transport and telecommunication access from both technical and financial perspectives. Policies and strategies aimed at the majority of Australians who live in major cities are not necessarily appropriate for remote and rural Australia which is characterised by very different circumstances and greater risks of market failure. Deploying services and effectively reducing access costs would have significant impacts on economic participation and livelihoods.

For transport policy developments, this would include the following considerations: reviewing registration concessions, supporting driver licensing, establishing appropriate concession levels for public transport, capping or discounting fuel prices, offering priority procurement for remote community members to be able to purchase discounted second hand government fleet vehicles with appropriate financial tools, setting up mobile workshop units to provide regular mechanic services at reasonable cost levels, supporting the development of specialised transport services involving local employment opportunities, encouraging fleet sharing strategies for service delivery providers and social and business enterprises in remote areas, and accommodating tendering tools for decreasing freight costs of goods delivery in very remote communities.

In order to tackle the challenges and issues described in this article, there is a need for a dedicated strategy for unlocking the digital potential of the bush. The call for a bespoke Remote Telecommunications Strategy has been made by the Broadband for the Bush Alliance (Broadband for the Bush, 2015) and is supported by all its members. It is time to act and commit the resources necessary to develop and implement a Remote Telecommunications Strategy, which will ensure remote Australians are not left behind. Such a strategy requires a multi-pronged approach addressing mobile coverage, appropriate infrastructure, pricing and digital literacy issues. It will need to be developed through a partnership approach, which would involve active collaboration between the Australian Government, NBN, telecom companies, businesses and service providers, regulators, state and local governments, community stakeholders and the Broadband for the Bush Alliance.

Proposed Local and Regional Index of Accessibility

Remoteness can be defined by the level of access people have to information, services, infrastructures, goods, and other people and places. In this context, transport and communication enable access and ensure essential services for remote residents. As part of the chain linking people and essential services, access to transport and communication maintain the vital links between remote communities, enterprises and the rest of the world. They operate in conjunction rather than as substitutes: for instance there are no indications that an enhanced access to telecommunication technologies reduces mobility needs (Zander, Taylor & Carson, 2012).

Access to good transport and telecommunication infrastructure is a positive factor in economic participation. The availability of affordable and reliable transport and telecommunication equipment and services is essential in remote regions because it can decrease living costs and improve sustainable development options of local social and business enterprises.

To evaluate accessibility in a remote context, we suggest a move away from the current road distance based remoteness index and towards an accessibility index which would accurately reflect how local accessibility factors impact socio-economics. Such an index requires a range of measurable indicators that can be quantified and evaluated for access to, and affordability of, effective telecommunication and transport services. The index relies on a wide range of data and data sources, some of which are not publically available or uniform across remote areas at this time.

Table 1: provides a set of indicators, which could be used to measure accessibility levels in remote Australia for transport and telecommunication services.

Indicators	Principles	Unit
Access to appropriate vehicles	Percentage of registered and roadworthy four wheel drive vehicles for off- road environments and regular hatchback or sedans, people movers or vans for sealed roads	Percentages of vehicle types
Access to licence	Percentage of people with a license	Percentage of license per inhabitant
Cost of fuel	Average fuel cost and percentage of average income Average fuel consumption	AUD per litre Litre per kilometre
Cost of vehicles	Average purchase price cost per year over the life time of the vehicle and percentage of average income	AUD per vehicle Average number of passenger per vehicle
Public transport cost	Average cost of public transport and percentage of average income	AUD per year
Transport time/ integration	Average time and speed for travelling Average frequency of public transport Connectivity between transport routes	Hour per year Kilometre per hour Hours of wait per day
Mobile phone coverage	Availability of service Number of service providers (mobile carriers) Reliability of services	Existence of coverage Availability to choose service providers Connection failure
Access to the internet	Speed and reliability of services Number of service providers	Megabytes per second Connection failure Availability to choose service providers
Access to mobile internet coverage	Speed and reliability of services Number of service providers	Megabytes per second Connection failure Availability to choose service providers
Access to digital education	Number and added-value of programs available for digital education / level of digital use and awareness	Number of courses, students and degrees
Access to e-services	Access to e-government services Access to tele-health services	Connection failure Ability to access services
Cost of data	Average data cost and percentage of average income	AUD per megabyte
Cost of fixed phone communications	Average annual expenditure per person on fixed phone communications and percentage of average income	AUD per minute Average AUD per year
Cost of mobile phone communications	Average annual expenditure per person on mobile communications and percentage of average income	AUD per minute Average AUD per year
Money spent on internet	Average annual expenditure per person on internet and percentage of average income	AUD per year

Table 2 provides an example of several indicators for 2015 in Central Australian remote communities and some rankings. A simple weighting index is used to measure the gap between accessibility in remote Central Australian Aboriginal communities and national average levels.

Table 2: Example of indicators for evaluating accessibility in Central Australia and rankings

Indicators	Performance in Central Australia	Scoring (national average=1)
Access to appropriate vehicles	10% of registered and roadworthy four wheel drive for off road environments	National average over 90% Score of 0.125
Access to registered vehicles	1 registered vehicle (hatchback or sedans, people movers or vans) per 12 inhabitants for sealed roads	National average of 1.3 vehicle per inhabitant Score of 0.1
Access to licence		
Access to public transport	35% of people with a license	National average over 70% Score of 0.5
Integration of public transport routes	50% of people can regularly access public transports Average of one service per week Poor integration between transport service providers resulting in several hours of additional transport time	85% of people can access regularly public transport Average of one service per day Score of 0.55 Variable integration between transport service providers resulting in less than an hour of additional transport time Score of 0.3 Overall score 0.32
Cost of fuel	AUD1.8 per litre 14 litre per kilometre 7,000km per person Fuel cost of AUD1,600 per year per person 12% of per person income AUD3,500 per vehicle per year	National average of AUD1.3 per litre National average of 10 litres per kilometre 8,000km per person Fuel cost of AUD900 per year per person
Cost of registered vehicles	AUD800 per person per year 6% of per person income	2% of per person income Score of 0.16
Public transport cost	AUD1,500 per year 13% of per person income	Average of AUD2,000 per vehicle per year AUD1,300 per person per year 4% of per person income Score of 1.5 AUD1,500 per year 5% of per person income Score of 0.38 Overall score of 0.68
Transport time	2.5 hours per day	1.5 hours per day Score of 0.5 Overall score of 0.6

Indicators	Performance in Central Australia	Scoring (national average=1)
Mobile phone coverage	Low penetration of cellular mobile coverage in rural and remote areas of Australia	Mobile phone services currently reach 99 per cent of the Australian population 4G coverage is around 90% and 3G, is 99 per cent Score of 0.1
Number of service providers	One main service provider	Three main service providers Score of 0.3 Overall score of 0.2
Access to the internet	75% of remote Indigenous households have no internet connection - less than in Sudan 5% households with a computer, approx 40% of mobile device equipment	Less than 10% of Australians do not have access to internet Score of 0.13 90% households with a computer or mobile Score of 0.27
Number of providers	One main service provider	Lots of service providers Score of 0.1 Overall score of 0.16
Access to digital education	Number of courses, students and degrees <10/100,000 (1/10,000)	>20,000/22 million (1/1000) Score of 0.1
Access to e-services	Limited access to e-government services Limited access to tele-health services	Full access to e-government services Advanced access to tele-health services Score of 0.1 Overall score of 0.1
Cost of data Money spent on internet Mobile and fixed phone communications	AUD1,500 per person per year 13% of per person income	AUD2,000 per person per year 5% of per person income Score of 0.38 AUD2,000 per person per year 5% of per person income Score of 0.8
Cost of mobile and fixed phone and digital equipment	AUD500 per person per year 4% of per person income	Overall scoring of 0.6
Internet speed	Average less than 0.5 MB/s download Less than 100 kB/s upload Connection failure?	6 MB/s with 14% above 10 MB/s, 3.9 MB/S for mobile internet (South Korea has 81% above 10MB/s, 1 MB/s upload (Akamai, 2014)) Score of 0.1
Average total scoring		0.375

This scoring model is a preliminary compilation of some of the available data and gives an indication of how a scoring system could be set up to generate an accessibility index. However generating composite scores requires more research particularly into how to aggregate together with an equal weight. This could be undertaken through a factor analysis or principal components analysis to establish common factors and then assign weights to these.

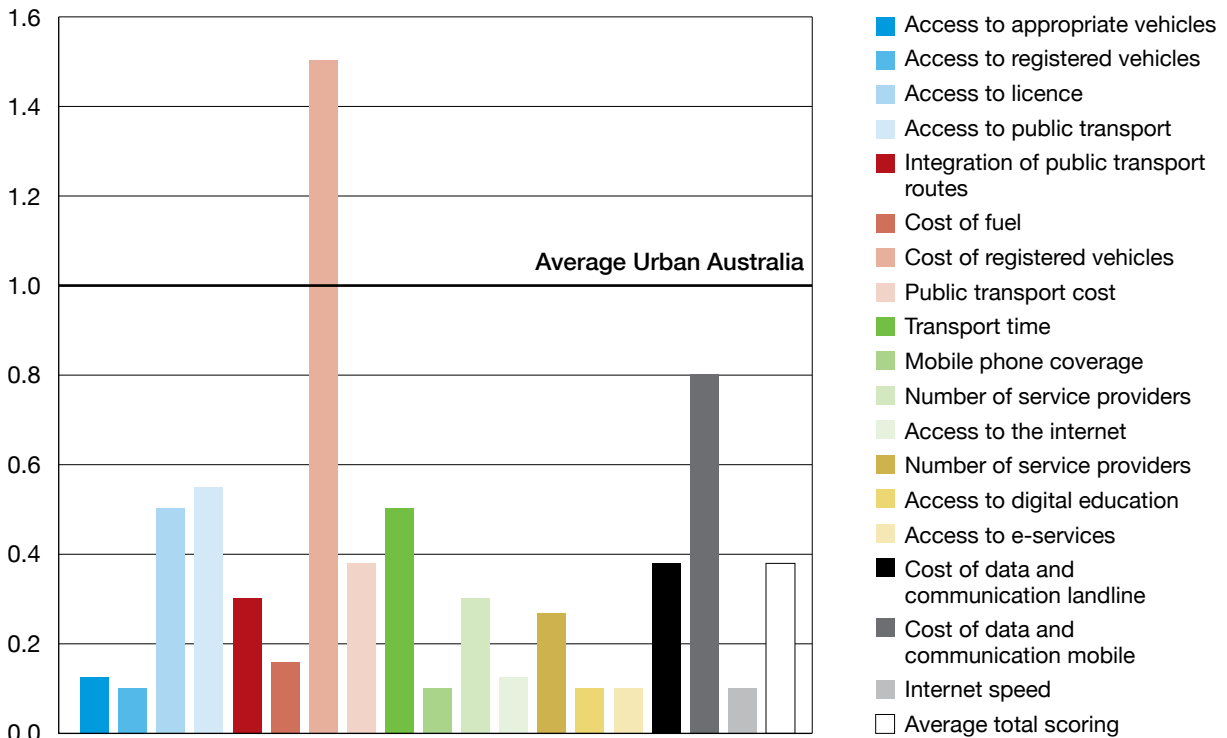
Using this preliminary model, the average accessibility level of Central Australian remote Aboriginal communities is 0.375 of the Australian average and less than 0.2 compared to well-connected urban areas in Australia.

Tables 1 and 2 provide an index of accessibility across a region defined as Central Australia. This index could be used in a systematic way across remote Australia at local and regional levels. At the local level this tool could assist in community development planning and prioritise current and future infrastructure and service delivery options. With additional data for more locations, and with the inclusion of regional, state, territory and national data an accessibility index for remote Australia would provide essential planning and development information on a scale useful to policy and public expenditure decision making.

Figure 4 provides a visual breakdown of the Accessibility Index for Central Australian remote communities.

Figure 4: Accessibility Index breakdown for Central Australian remote communities

Accessibility Index Breakdown



The Central Australian example is used in this article to showcase how a new index could evaluate accessibility in remote Australian communities, regional policy planning, and provide accurate information for local and locational decision making.

Priority areas to improve accessibility levels in remote Central Australian communities include internet access and speed, access to digital services and education programs, mobile phone coverage and access to appropriate and/or registered vehicles.

Evidence-based decision could support the development of scenario modelling integrating realistic objectives with measurable targets set accordingly. To achieve this, there is a clear need for more baseline research. This would require mapping existing telecommunications, transport infrastructures and services in remote Australia to maximise opportunities to leverage existing infrastructures and services, and improve transport and communication coverage. Incorporating in the index indicators of health, socio-cultural, economic and environmental externalities associated with different levels of accessibility would reinforce the rationality and the relevance of the model (Spandonide, 2014). Wider benefit indicators could include direct and indirect health outcomes, wellbeing perception, education outcomes, access to services, employment outcomes, and better use of public and private expenditure, as well as emissions.

Importantly, the impacts in increased participation in the local economy (in terms of poverty alleviation, increased household consumption, and direct and indirect employment creation) would be able to be more accurately quantified. The acquisition of suitable and appropriate data represents the main limitation, but could be overcome by undertaking additional research projects in remote communities on transport and telecommunication externalities. Market analyses of the different levels of economic participation in local industries could be then linked to the indicators discussed above.

Conclusion

New elements of accessibility define remoteness more accurately and give a fresh perspective on the regional development priorities for remote Australian communities. The development of a relevant accessibility index will contribute to better regional development planning and assist in developing effective policies and strategies aimed at improving health, education, wellbeing and economic participation outcomes in remote areas. As discussed earlier, more local data baselines and further research are needed to develop an accessibility index.

The index would identify key priorities for improving transport in specific Central Australian remote communities as well as providing more regional snapshots of accessibility. From the Central Australian case, priorities include providing more roadworthy and suitable vehicles, decreasing fuel costs, and increasing public transport frequency/integration. This would result in significant financial and time savings and an increase in access to transport. For telecommunications, key priorities are: improving internet access and mobile phone coverage, increasing internet speed, offering digital education services and decreasing data costs, including data exemptions on education and health services. It is critical that current dedicated programs such as the Australian Government Mobile Black Spot Program, to improve telecommunications in rural and remote areas, continue to exist. Furthermore, complementary programs should be considered to ensure that remote Australians are not left behind. Indeed, as more services move to digital delivery, communities and individuals that are not online risk further social and economic exclusion. Emerging broadband and telecommunications offer real opportunities to grow and strengthen remote economies and transform local businesses.

The logic is not to provide similar infrastructure or services to metropolitan Australia. This would imply entering in an asymptotic race towards infrastructures which would create unsustainable financial pressures on remote areas. The aim is to develop transport and telecommunication resources capable of fostering livelihoods in thriving remote communities. While pledges are made by the United Nations for universal internet access by 2020 (Broadband Commission for Digital Development, 2015) a majority of Indigenous Australians living in remote communities are still disengaged from and cannot effectively participate in political and social debates because of poor online access and a lack of appropriate transport options.

More appropriate regional management in transport and telecommunication could result not only in directly improving quality of life in remote communities, but also assist in finding a cost-effective way to address some of the desert syndrome issues. Besides, the issue is not about developing areas which are comparatively underperforming as much as promoting vibrant livelihoods and overcoming obstacles affecting the availability of essential resources to achieve a high level of wellbeing. A holistic approach is required for ensuring remote areas are not left behind. We must avoid a 'one size fits all' approach and develop local solutions, which recognise the unique social and environmental local circumstances of remote communities, and are aligned with residents' needs and aspirations. This would also have significant wider benefits for the Australian society and economy. Improving access to transport and telecommunications will help to positively transform Australia's future.

Acknowledgement

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent the views of the CRC REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special Issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication.

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Conceptualising climate change adaption for native bush food production in arid Australia

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Keywords: climate change adaptation; arid Australia; arid zone lifestyles; native bush food; farming enterprises

Abstract

Climate projections indicate an average rise in temperature in the range of 3-7°C for central Australia by 2100 and a decline in thermal comfort. There is uncertainty in the future spatial and temporal occurrences of extreme events such as floods and droughts, though heat stress is predicted to become more frequent in central Australia. To a large extent, sustainable development in this region aims to create self-sufficient and vibrant remote desert-based communities. In this paper, we examine the prospects for sustaining native bush food production in central Australia under a changing climate. Harvesting of native plants for bush food has strong relevance in a central Australian context, where many bush foods have cultural significance to Aboriginal peoples. The native bush food industry is also important in central Australia as it provides employment for local people and sustains the knowledge and practice associated with culturally significant plants. However, the projections of climate change in the region suggest an increasing risk – to plant production, workers' safety, and getting product to markets. A pathway of the potential steps needed for adaptation (i.e. adaptive pathway) is conceptualised in this paper as to how native bush food production can become a climate-ready and enduring industry in central Australia.

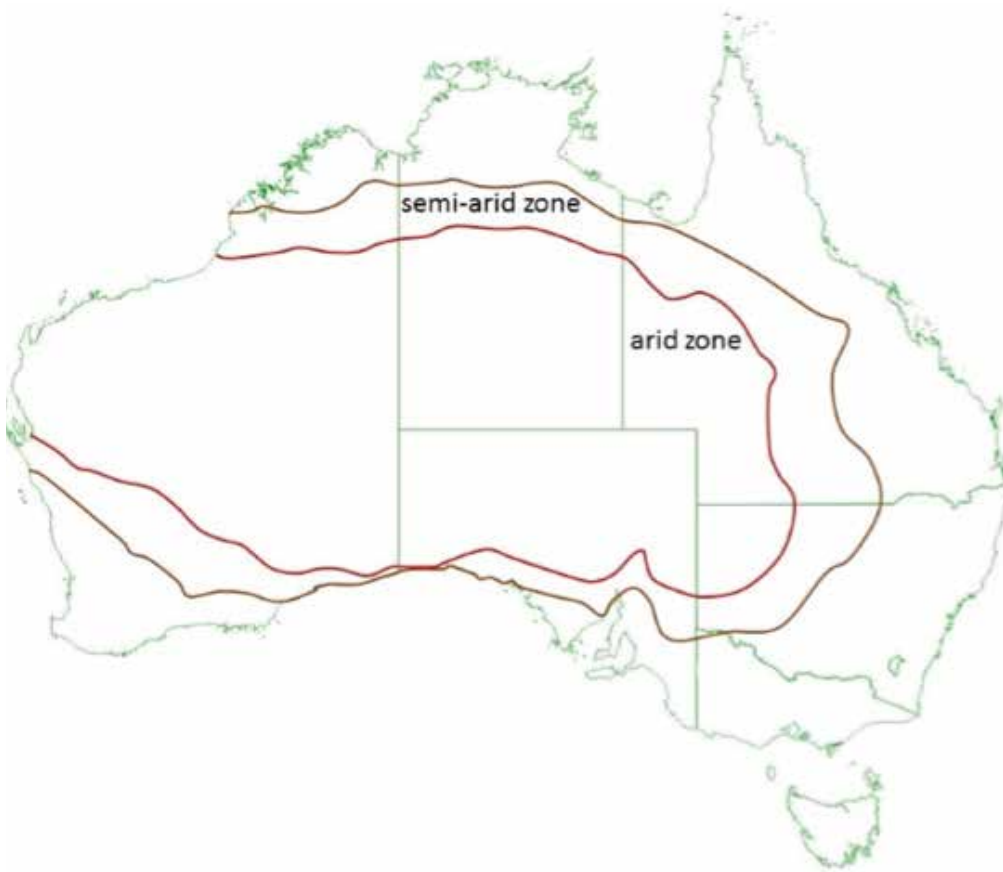
Introduction

More than 41,000 small to medium sized enterprises operate across Australia's arid or desert region, of which 500 are Aboriginal-owned and around 100 are community controlled art centres (Race, 2015). The bush food industry is also one such emerging business activity which also involves Aboriginal people. Arid Australia is also home to numerous Aboriginal communities involved in the customary harvest of bush food resources and who have extensive knowledge regarding the harvesting and use of bush foods. The Australian bush food market system thus includes harvesting by Aboriginal communities within a customary law system that negotiates specific rights and responsibilities, and also harvesting by non-Aboriginal bush food enterprises working within the framework of Western laws and aim to maximise financial returns (see Merne Altyerre-ipenhe Reference Group, Douglas & Walsh, 2011).

The Australian bush food industry is small compared to other agricultural pursuits, but it makes a valuable contribution, both financially and culturally, to people living in arid parts of Australia (see Figure 1 for arid and semi-arid regions in Australia). There are no reliable estimates for the total value of the bush food industry in this part of the continent; however it would represent a considerable part of the \$18.5M industry that employs 500-1,000 people. Moreover, this value is increased five-fold following processing, which most raw bush food products undergo (Clarke, 2012) before they reach their largely metropolitan markets. The bush food products derived primarily from remote arid regions include bush tomato (estimated annual farm gate value of \$540K), Kakadu plum (\$240K), desert lime (\$225K), quandong (\$180K) and wattle seed (\$150K) (Clarke, 2012).

The impact of climate change is no less an issue for the Australian native bush food industry than for other sectors of agricultural enterprise. However, as the industry is based on native plants that have evolved to suit the wide range of environments found throughout Australia, the native bush food industry presents some atypical situations and opportunities in regard to climate change adaptation. The aim of this paper is to conceptualise potential adaptation strategies for native bush food production under the changing climate of the arid region of central Australia. We refer to adaptation of the bush food industry with and without the involvement of Aboriginal communities here.

Figure 1: Australian arid zone



Source: L.S. Lee ©, CRC for Remote Economic Participation, 2015

Climate projections and bush food production in the Australian arid region

In the arid region of central Australia, climate model outputs show high confidence in the projection of meteorological parameters such as temperature and extreme heat events. (CSIRO & Bureau of Meteorology, 2015a). However, the magnitude and direction in which rainfall may vary for central Australia is uncertain (CSIRO & Bureau of Meteorology, 2015a). In particular, potential changes to future summer rainfall remain unclear, though projections indicate a decline in winter rainfall in the southern parts of central Australia. Whereas in far north-western Australia, there has been a trend of increasing rainfall in the past century, in the south of the continent there has been a slight average decrease (CSIRO & Bureau of Meteorology, 2014) and the projection is this will continue, which necessitates contingencies for water management planning (Qureshi et al., 2013). There is high confidence in increases in the intensity of extreme rainfall events and medium confidence in the increase in the duration of droughts for the arid parts (CSIRO & Bureau of Meteorology, 2015a).

Probably of greater impact on climatic conditions will be increasing temperatures. This has been significant over the last hundred years and is projected to continue, with the greatest increases being recorded in central Australia, central and western Queensland, and south-west of Western Australia (CSIRO & Bureau of Meteorology, 2014; Race, 2015). The climate projections provided by CSIRO and the Bureau of Meteorology (BoM) (2015a) for the remote regions of Australia indicate increasing average temperatures, more hot days, more warm spells and fewer frosts. The duration of warm spells and frequency of hot days will also increase. This also means locations such as Alice Springs, even for an intermediate emission scenario, daily temperatures above 35°C could occur for more than a third of the year by 2100.

Locations within remote Australia will continue to be susceptible to frequent extreme precipitation (high confidence), extended droughts (medium confidence), increased average and maximum temperatures (high confidence) and increased evapotranspiration (high confidence) (CSIRO & Bureau of Meteorology, 2015a). The uncertain rainfall determines fuel availability for bushfires and hence fire projections are also uncertain. The locations in this region are at risk to the uncertainty associated with periods of water surplus and water deficits. Thus, successful adaptive strategies for the bush food industry also requires successful managing of such uncertainties. The greatest concern in recent times, as results of more detailed analysis emerge, is the increased variability in climate events and the greater unpredictability in forecasting (Anwar et al., 2013; Thornton et al., 2014). Numerous principles and strategies are being used to manage uncertainty and inform adaptation decisions.

Managing climatic uncertainties: principles and strategies

The climate change adaptation literature discusses a number of ways to manage uncertainty. Responses to climatic changes can be broadly considered to be *incremental* (adjustments made to meet current objectives under a changed environment where the change is gradual and happens at a certain degree of certainty) and *transformational* (fundamental changes to the objectives made to meet new or unanticipated abrupt changes) (Stafford Smith et al., 2011). Hallegatte (2009) discusses five principles to managing risk, which includes:

- i. 'no-regret' strategies that deliver benefits even in the absence of the impacts of climate change (e.g. options with co-benefits such as local employment for vulnerable communities, see Mathew Trueck & Henderson-Sellers, 2012);
- ii. reversible and flexible options (e.g. options that can cater to new climatic information);

- iii. options with safety margins (e.g. high cost new constructions such as dams to be upgradable considering climatic projections);
- iv. soft adaptation options (e.g. community awareness programs; building social capital); and
- v. reducing decision time horizons (e.g. options with shorter lifetimes).

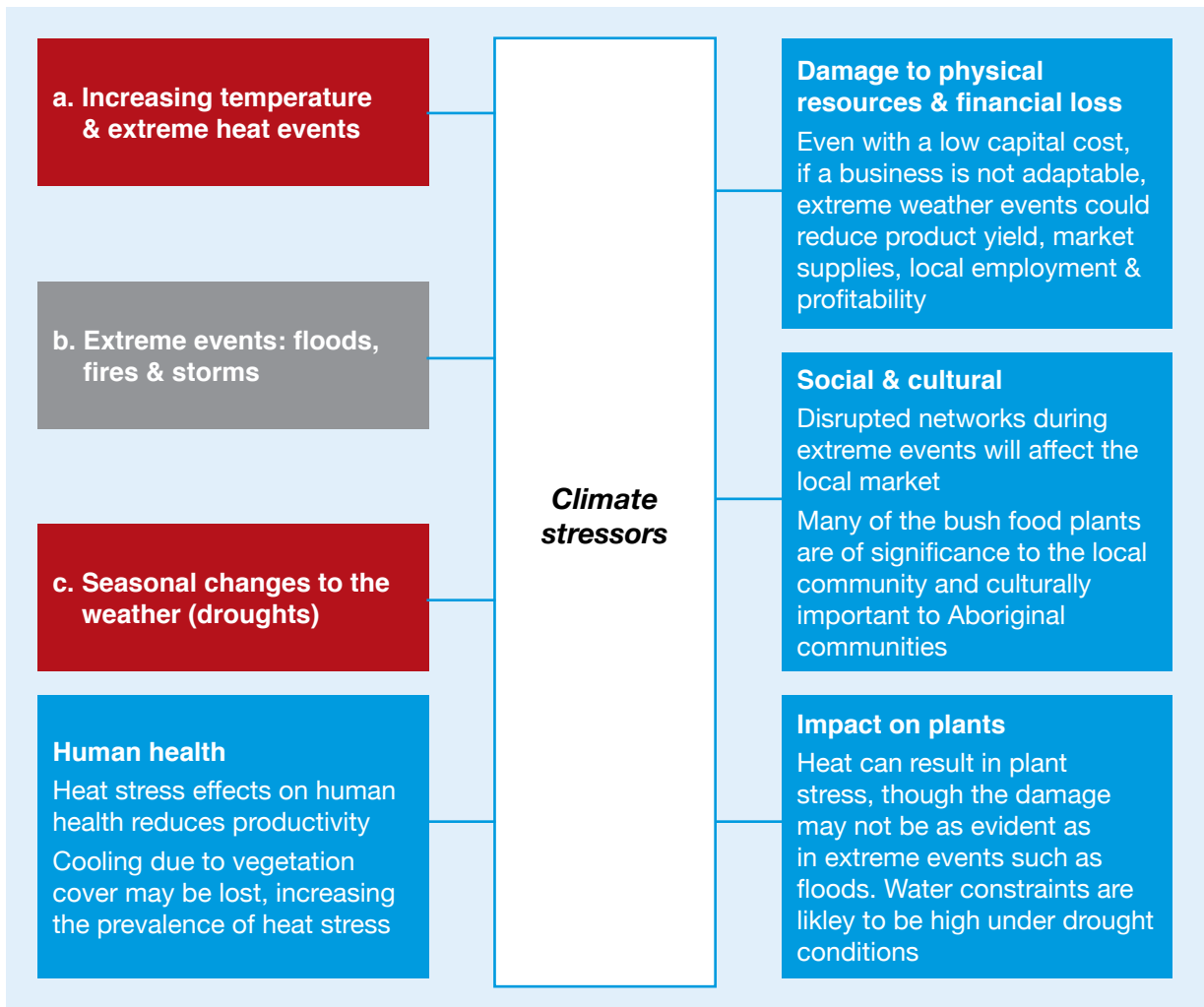
These five principles support the adaptive management approach, where monitoring is followed by actions and decisions reviewed in light of new information. Actions that aim to reduce the risks posed by climatic changes whilst also having other additional social (e.g. improved health and well-being), economic (e.g. increased employment opportunities) and environmental (e.g. greenhouse gas reduction) benefits can be chosen using combinations of the above five principles.

Adaptation plans must address contexts of change (e.g. change of societal values and requirements, technological advancements) and uncertainty (e.g. uncertainties in climate projections, uncertainty in local impacts) (see Bosomworth et al., 2015). Recent adaptation research broadly uses the adaptation pathways approach (and its alterations) to decision-making under uncertainty. The adaptation pathways approach presents a sequence of actions after a tipping point (usually defined based on different stakeholder/community values, world views, cultural perspectives) beyond which any of the current actions stop meeting the required objectives (see Moss & Martin, 2012; Haasnoot et al., 2012; Haasnoot et al., 2013; Wise et al., 2014). The adaptation pathways approach considers a diverse range of futures and examines the robustness (insensitivity to changing conditions) and flexibility (easily adaptable) of options across these futures (Bosomworth, 2015). Adaptation pathways assist in avoiding 'lock ins' (see Wilson, 2014) and support the adaptive management approach which includes an iterative decision-making process of acting, monitoring and revisiting decisions (Willows & Connell, 2003). Some analysts (Wise et al., 2014) adopt a broader approach highlighting societal change aspects of adaptation, which also implies the need for longer term strategies and transformational change. The adaptive pathways approach thus creates a pathway of flexible adaptation options evaluated against short and medium term objectives to ensure the long term adaptation objectives are achieved.

Climate change adaptation in native bush food industries in the arid zone

The bush food industry is at risk from annual cycles of weather changes, increasing atmospheric temperature and occurrences of low probability high impact events (see Figure 2), and will need various strategies to adapt to the potential risks. In this section, we first explore general adaptation strategies for crop production and wild harvest in arid Australia. Secondly, we use the adaptive pathways framework and the five principles of managing risk to conceptualise contextually relevant and potential adaptation strategies for the native bush food industry in the arid zone (also see Table 1).

Figure 2: The impact of climate change on a small scale bush plant business operated by Aboriginal communities.



Note: Red shapes indicate highly certain climate stressors and the grey indicates less certain climate stressors. The blue boxes represent potential risks posed on the bush food business.

Table 1: A conceptual list of short to medium term adaptation strategies for native plants/bush food production

	Strategies for seasonal changes	Adaptive measures for warmer climates	Adaptation to extreme heat	Uncertain trends (frequency and intensity of precipitation)	Abrupt events (extreme events such as flash flooding)	Non-climate-related external changes (e.g. changing values)
Bush food/ native plants	Seasonal planting adjustments Plant production should be informed by short & long-term BoM weather forecasts	Adaptive business management strategy to be adopted Use heat tolerant plants Creation of artificial environments (e.g. greenhouses or shade, shelter plantings) Change seasonal timing of production schedules	Research and use heat resilient native plants Tipping points need to be researched to understand the levels of heat plants can withstand Research should focus on the effects of short to long term climate projections	Alternate sources of irrigation Storage of surplus water Avoid flood prone/drought prone areas Flood mitigation	Reversible and flexible investments Flood mitigation structures Diversified business models that provide fall-back cash flow sources if parts of the enterprise are impacted	Community engagement to address loss of interest in preserving native bush food traditions
Financial losses	Financial losses could be managed through seasonal planting and diversifying incomes Consideration of hardship circumstances by lending institutions	Adopt diversified business models and different products	Consideration of hardship circumstances by lending institutions	Mechanisms to share the financial burdens (e.g. government assistance; insurance)	Damage due to flash flooding is usually of high cost, but the frequency of such damages is low. Cost effective planning will be required for uncertain low probability (e.g. 1 in 20 year events), high impact events. This may also mean that depending on the scale of business, it may not be worth investing in preparation for such events.	Business management training that accommodates contingency planning methods



Table 1: A conceptual list of short to medium term adaptation strategies for native plants/bush food production *continued*

	Strategies for seasonal changes	Adaptive measures for warmer climates	Adaptation to extreme heat	Uncertain trends (frequency and intensity of precipitation)	Abrupt events (extreme events such as flash flooding)	Non-climate-related external changes (e.g. changing values)
Human impacts	Working patterns will have to suit extreme weather in different seasons	Work times need to be scheduled to cooler periods Provide in-field shelters and mobile shade structures	Work times need to be scheduled to avoid extreme heat Protective clothing (research needs to be conducted on workplace suitability) Provide in-field shelters and mobile shade structures	Counselling services trained to recognise and respond to hardship caused by climate impacts	Services prepared for local employment that may be affected Planning to avert risk of personal injury during extreme events	Preparedness for migration of labour to coastal centres impacting business viability

Crop production

While at first it appears climate change can only be problematic for Australian agriculture in the arid zone, it is however, quite possible some positive outcomes could result. For instance, the prediction rainfall should not decrease, and indeed may slightly increase in some parts of arid Australia, indicates crop production opportunities may not necessarily decline due to a diminishing water supply. Thus, it seems, with appropriate adaptation strategies the maintenance of dryland agriculture, and even its possible expansion, could be a reality. Moreover, potential new opportunities are envisaged as part of the response to climate change.

The resilience of agricultural systems in the face of changing climate, at a global scale will call upon regional and local strategies of coordinated approaches involving the sustainable use of soil and water resources, agro-forestry, farming systems diversification, modified cultivation practices, the use of stress-tolerant crops and genetic improvement (Mijatovic et al., 2013). These authors argue effective adaptation strategies will be integrated with combined resilience-strengthening practices at different scales: (i) the landscape level, (ii) farming systems, and (iii) species/varieties. Central to this proposition, is the utilisation of agricultural biodiversity and the long experience of traditional agricultural communities in adapting their social and production systems to accommodate environmental challenges (Vigouroux et al., 2015). Through the natural response processes of adaptive genetic diversity, many crop species will be self-selective in the face of environmental change (Dudley, 1996), thus influencing the genetic resources to which researchers and plant breeders will have access in order to help agricultural communities adapt. These response mechanisms include phenotypic plasticity, genetic selection, gene flow and extinction (Mercer & Perales, 2010).

Plants have evolved a wide range of physiological and physical mechanisms to deal with drought and heat stress (Lipiec et al., 2013) including root growth responses, reduced transpiration and photosynthesis, greater water use efficiency, and production of defensive compounds and proteins. For astute plant breeders and researchers, opportunities will be presented as a result of environmental change. Some authors point to the opportunity for taking advantage of productivity gains from breeding crops responsive to elevated atmospheric CO₂ levels (Ziska et al., 2012). Phenotypic assessment of beneficial crop characteristics can be harnessed and the use of biotechnology for genetic improvement to adapt to changing climate, and even the identification of geographic relocation options, are all being investigated (Chapman et al., 2012) to tackle emerging challenges, including more frequent and longer droughts, waterlogging, salinity and changing pest and pathogen pressures. However, geographic relocation of bush plants may not be a viable option for wild harvest as this practice is often linked to dreaming, country and people (Merne Altyerre-ipenhe Reference Group et al., 2011).

Ultimately, production of conventional crops is limited by water requirements and their levels of heat tolerance. Provision of irrigation, planting of appropriate crop types and selection of suitable varieties help to achieve production in marginal areas, where these approaches fit the prevailing conditions. Nonetheless, crop production opportunities in the arid zone are largely constrained by environment. An opportunity exists, however, in cropping enterprises based on the very plants that have adapted and evolved in this environment. In their current state, such native plants exhibit particular resilience in coping with harsh conditions. The bush tomato or desert raisin (*Solanum centrale*) is a case in point where a lucrative, albeit small, farming industry is developing (Lee, 2012) in central Australia (Figure 3). Another example is Kakadu plum or gubinge (*Terminalia ferdinandiana*) which shows potential for developing into a major crop for northern Australia (Cunningham, Garnett, Gorman, Courtenay & Boehme, 2009) growing closer to the coast, marked by a prolonged dry season. Others that already show some level of market demand include Australian native lemongrass (*Cymbopogon ambiguus*), Old Man

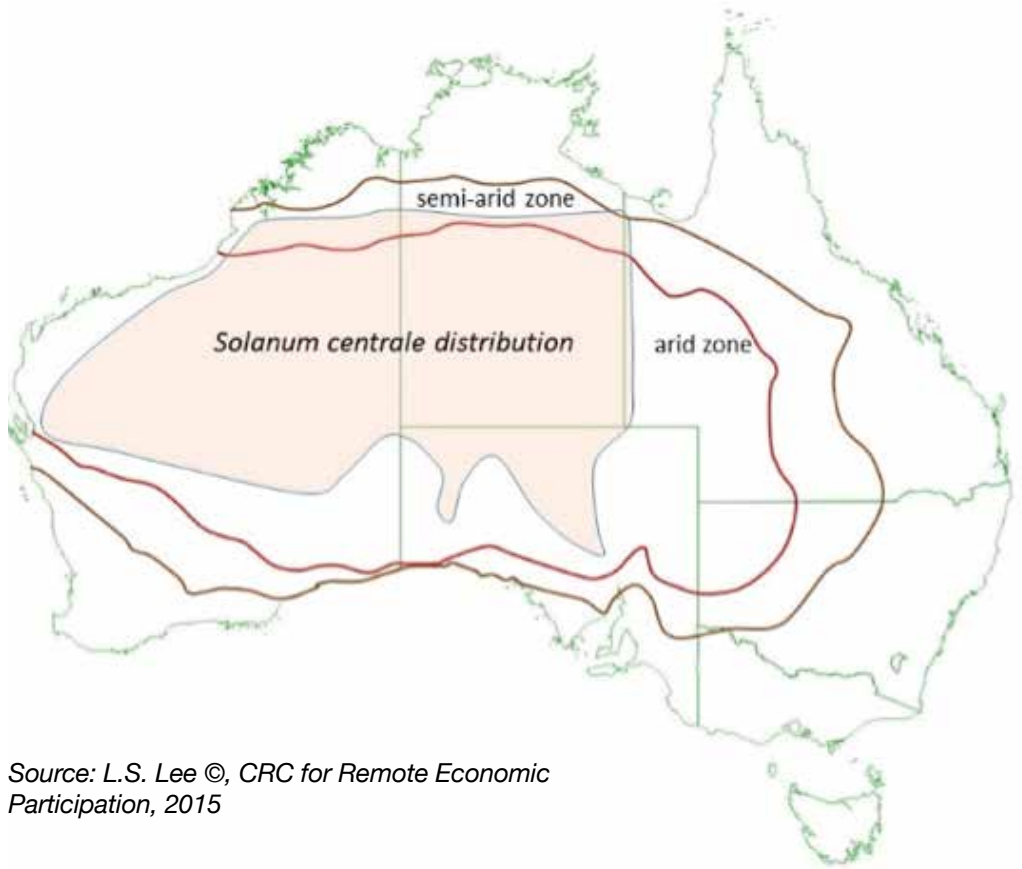
saltbush (*Atriplex nummularia*), desert lime (*Citrus glauca*), wattle seed (predominantly *Acacia victoriae*, but also other arid acacias (Figure 4) *A. aneura*, *A. coleii*, *A. coriacea*, *A. murrayana*, and *A. pycnantha*), quandong (*Santalum acuminatum*) and sandalwood (*Santalum spicatum*). All are highly adapted to arid environments and are expected to tolerate changing climatic conditions easily.

Naturally, genetic improvement for climate change adaptation is far more prevalent in conventional crop species (Chapman et al., 2012; Ziska et al., 2012). However, the very nature of the variable environment in which Australian species of the arid zone have evolved furnishes them with adaptive capacity to withstand occasional severe conditions. That characteristic presents two advantages – firstly, the resilience to accommodate the anticipated future thermal changes, and secondly, the genetic resources to facilitate selection and plant breeding for better adapted varieties. Such research has already occurred for saltbush (*Atriplex* spp.) (Joseph et al., 2013), native pasture grasses (Reed et al., 2008), and native legumes (Bennett et al., 2011).

In another approach, biotechnology is being harnessed in the form of ‘xenogenomics’ to discover genes in Australian native species that confer tolerance to drought and adverse soil conditions that may result from an increasingly hostile climate (John & Spangenberg, 2005). Such work offers the dual potential of advancing the understanding of abiotic stress tolerance physiology and identifying candidate genes for introgression into crops to confer climate change adaptation. In field situations, adaptive characteristics of native plants under adverse growing conditions are being investigated, initially with species for pasture management (Nie et al., 2008; Reed et al., 2008), aimed at facilitating genetic improvement. This is paving the way for greater understanding of the contribution that endemic plant species can make to climate change adaptation for crops in the arid regions.

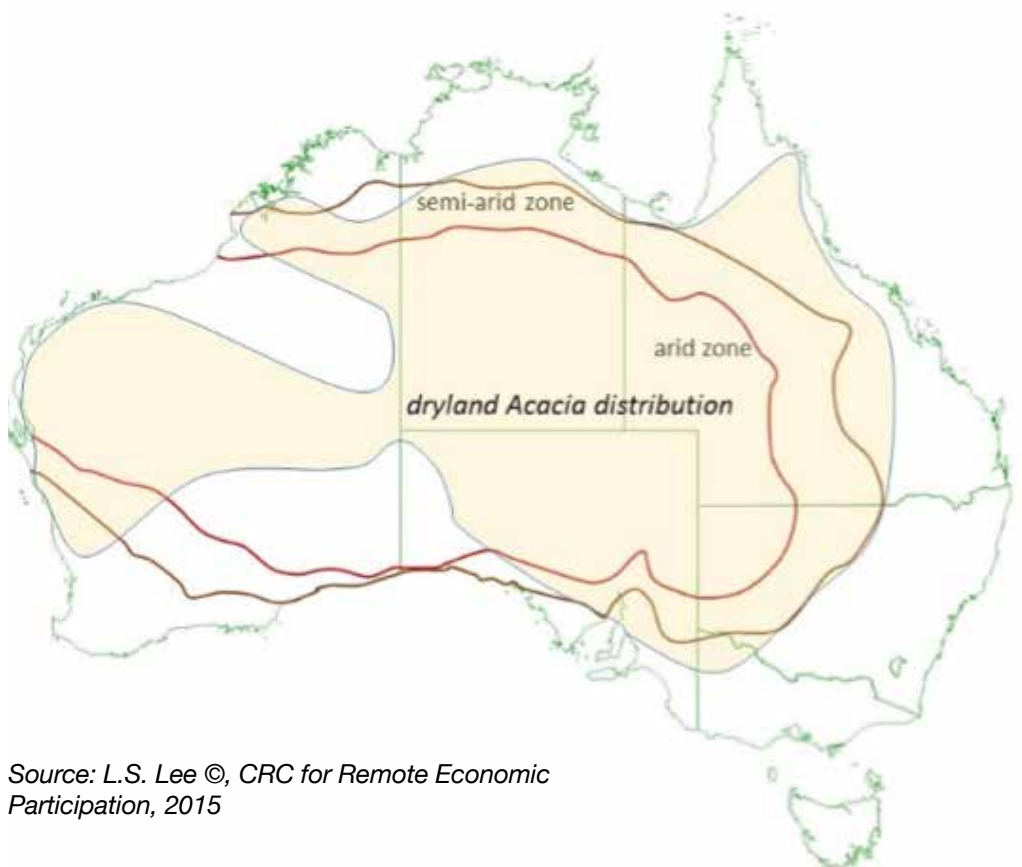
Further, while the adoption of new arid-adapted crops presents a novel approach to creating productive farming enterprises resilient to climate change in Australia’s arid region, complementary strategies involving novel production concepts are also being explored. Such techniques as ‘minimum till’ cultivation (Tang & Zhang, 1996; Bauer et al., 2010) or an even more radical approach of ‘enrichment planting’ (Lee & Courtenay, 2016) are examples of innovative thinking applied to arid zone crop production systems that, among other benefits, impart enhanced resilience against climate change in harsh environments.

Figure 3: *Solanum centrale* distribution



Source: L.S. Lee ©, CRC for Remote Economic Participation, 2015

Figure 4: Arid Acacia species distribution



Source: L.S. Lee ©, CRC for Remote Economic Participation, 2015

Wild harvest

A significant counterpart to bush food production in cropping systems of various kinds, is the complementary activity of wild harvesting. On average, approximately half of the annual production of bush tomato and wattle seed comes from wild harvesting, and a much higher proportion in good years (Clarke, 2012), and arguably (depending on whether enrichment plantings are considered crops or wild) almost the entirety of Kakadu plum is wild harvested (Lee & Courtenay, 2016). Moreover, wild harvesting practice plays an extremely important social and cultural role in Aboriginal and Torres Strait Island communities (Alyawarr speakers from Ampilatwatja, Walsh & Douglas, 2009; Merne Altyerre-ipenhe Reference Group et al., 2011; Lee, 2012; Walsh et al., 2013). This vital part of the bush food supply chain is almost exclusively undertaken by Aboriginal and Torres Strait Islander people, and as Race (2015) points out, climate change will present even more arduous conditions for such activities in future years. It is anticipated wild harvest will continue to play a significant role in the bush foods industry, and climate change will necessitate amendments to current practices. Fortunately, advancing technology such as improved communication services, reliable air conditioned vehicles, electricity and refrigeration in remote locations will help to alleviate the conditions for workers and assist in maintaining post-harvest bush food product quality.

Managing risks associated with climatic changes

In this sub-section, we conceptualise a pathway of flexible adaptation options that may be evaluated against short and medium term objectives to ensure the long term adaptation objective of developing a sustainable native bush food industry in arid Australia is achieved. Cost effective incremental options may be preferred over high cost transformational adaptation that specifically focus on the native bush food industry. This is mainly because climate change risks are not limited to the bush food or agriculture industry in central Australia. Adaptation is thus required by the community and various industries supporting these communities.

Many of the adaptive measures in other sectors as well as within the bush food industry will deliver benefits across sectors. For instance, a number of heat stress related adaptive measures (e.g. uptake of solar technology; energy efficient building designs) have already been piloted in central Australia. Reliable low cost supply of power can facilitate artificial moderation of climate for bush food production reducing stress to the plants and human health and more efficient post-harvest processing. Improved digital communication also provides the opportunity for better networking among remote producers and scientists creating a sharing and learning platform for best practice strategies.

Many of the strategic investments for the long term such as those for managing extreme events are likely to be high cost, and actions will depend on the scale and financial returns from such businesses. In such situations, the bush food industry itself may not be strong enough to trigger transformational changes, but adaptation transformations in other sectors may derive new pathways for the bush food industry. The adaptive capacity of the remote bush food industry is dynamic and also subject to interventions made by other dominant sectors (local and national). Thus in the short to medium term, the bush food industry may benefit by following an adaptive management approach, with decision points determining the nature and path of adaptation. Decision points could be determined by non-Aboriginal business owners (financial value), traditional owners (cultural value) and the community (urban markets and local value of the product). The thresholds (determining decision points) for preserving the cultural value of bush foods are likely to be entirely different from the threshold values that consider the financial or non-Aboriginal local value, unless a loss of interest in preserving native bush food traditions becomes prevalent among Aboriginal communities. Reduced planning times

could be used as a strategy to manage uncertainties associated with climatic and non-climatic changes and its impacts and benefit from transformative adaptations as more technological advancements happen elsewhere.

An adaptive plan that accommodates seasonal changes, gradually warming atmospheres, extreme heat, uncertain precipitation and floods/droughts is conceptualised for the bush food industry in Table 1. In the table, adaptation strategies are provided that target short/medium term objectives to ensure: i) adaptation of the native bush plants, ii) financial returns from the industry and iii) adaptation by the human capital required for the industry. In general, flexible options (e.g. use of cost effective shades; diversify incomes), 'soft' adaptation options (e.g. utilising adaptive strengths such as the strong social and traditional knowledge capital among Aboriginal communities to enhance networking and communication regarding best practice bush food production) and low regret options (e.g. avoiding flood prone areas) may be favoured in such short planning periods and will also provide opportunities to accommodate change over time (e.g. transformational change) triggered by the requirement of other industries, locations or technological advancements.

Conclusion

The native bush food industry makes an important cultural and economic contribution to central Australia, and adds to the culinary diversity of menus nationally and internationally. While the industry is expanding, it is still in a consolidation phase in central Australia. The risk of climate change, particularly given the projected rise in average temperatures across Australia's arid central region, has only recently been considered for this industry. The anticipated increase in heat stress will affect both the native plants and the people employed in the industry, with the combined impacts threatening the viability of businesses that adopt a 'business as usual' approach.

Effective climate change adaptation may afford some opportunities for the native bush food industry, such as changing production practices to become more efficient, focussing on species that are suited to hotter conditions, and being more conscious of ensuring employees have comfortable and safe working conditions. Adaptation actions for the central Australian bush food industry will thus be more incremental in nature, but will be subject to transformative adaptation efforts happening in other sectors and at large/urban scales. The threat of climate change may trigger strategic thinking and innovation of a 'learning community' that creates a robust and sustainable industry that becomes well adapted to the increasingly variable conditions of the future.

Acknowledgement

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent the views of the CRC REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special Issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication.

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Enduring value for remote communities from mining: Synthesising production, employment, populations, and reform opportunities

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Keywords: benefits, mining, labour, mobility, population, remote, community

Abstract

Enduring Community Value from Mining is an important outcome for mining in regional and remote locations around the world, an initiative lead by the national and global peak mining bodies. This article tracks the connections between mine production, employment and populations in very remote areas of the Northern Territory and South Australia. Mining is an important industry activity in these locations and the results suggest, in the main, these locations are highly dependent on mining for maintaining population levels through employment, not just in mining but in other industrial sectors that indirectly rely on mining. Leigh Creek has recently experienced declining coal production and so its population and workforce, while highly mobile, have been in decline. In contrast, until recently, production at Olympic Dam has been on the increase, with similarly highly mobile population and workforce that has experienced growth. While mining brings jobs during productive times, it can also bring dwindling populations through increased mobile work practices. These remote locations therefore face an uphill battle in ensuring enduring community value from mining. However, a range of policies can help ensure a better transfer of enduring value to remote mine dependent towns including being open to non-mine residents, unrestricted access in land and property markets, an ability of residents to have locally responsible and accountable local governments, and early and shared strategic planning by government, mining companies, and communities around how to manage the peaks and troughs of the various avenues for returns to community. Finally, while each case location is different in its own way, the most different is Yuendumu and it therefore requires careful consideration of how to deliver lasting benefit.

Introduction

Resource abundance is often proposed as the beacon of hope for improving the conditions of less well-off communities (Dietsche, Stevens, Emsley, & Östensson, 2009; Daniels, 2012; Otto et al., 2006), however the evidence that it reaps benefits is less than favourable. (Freudenburg & Wilson, 2002; Humphreys, Sachs, & Stiglitz, 2007; Sachs & Warner, 2001; van der Ploeg & Venables, 2012). For developing economies the general evidence is mining has not helped communities. However, there are counter arguments which show 'rich countries' such as Canada, Norway and Germany have benefited from natural resource wealth due to well-designed public policy and strong institutions and institutional frameworks (Brunnschweiler, 2008; Brunnschweiler & Bulte, 2008; Davis & Tilton, 2005; Larsen, 2005). Although public policy analysts and prominent economists (Deloitte, 2010; Edwards, 2011; Taylor, Bradley, Dobbs, Thompson, & Clifton, 2012) argue that Australia has not been a victim of Dutch Disease or the

resource curse, the Australian experience has, in some remote areas, been little different to those of developing economies (Haslam McKenzie & Rowley, 2013; Pick, Dayaram, & Butler, 2010). By examining the labour stocks and flows of mine-affected communities in remote areas of South Australia (SA) and the Northern Territory (NT) over the mine lifecycle, this article identifies trends between resource development, employment and population levels in these remote locations. The overall intent of such an analysis of scale and outcomes is to identify, if possible, any underlying 'enduring community value' from mining (Davies, Maru, & May, 2012, p. vii) and whether this is case specific.

The geographical areas considered in this article are drawn from four locations in Australia, covering South Australia and the Northern Territory, for a variety of minerals and communities. The communities and mining operations all have the common characteristic of being termed 'remote' as classified by the Accessibility Remoteness Index of Australia (ARIA) (Australian Government Publishing Service, 2001). Remoteness adds to the difficulties faced by these communities accessing infrastructure and services, attracting and retaining people and consequently undertaking mining in these locations (Blackwell, Dollery & Grant, 2015). It also adds to the difficulty of ensuring mining delivers much needed stimuli to the remote economies of these communities given a disconnect through, for example, fly-in fly-out (FIFO) and drive-in drive-out (DIDO) operations and centralised purchasing, contributing to the 'fly-over effect' (Storey, 2001).

The remainder of the article is divided into five main sections, providing an outline of the methods and data used, analysing the evolution of production and the nature of employment resulting from this production, and the level of populations in these remote communities. The article ends with a synthesis discussion and suggestions for policy reform along with some concluding remarks.

Methods and Data

The general approach taken in this article was to use secondary data to analyse the characteristics of the case study settlements and their associated mines. Three types of data were collected: 1) employment and population levels in these settlements, 2) mine production and employment, and 3) in some cases, indicators of mobility.

Employment

Employment data were collected from the Australian Bureau of Statistics census for the years of 1996 to 2011. These data were collated and presented by industry type in percentage graphs for each of the towns associated with the case study mines. With a number of periods offering comparison, the flow of labour between industries could be identified along with a comparison over the same period of the ebb and flow of total employment.

In a number of cases, data were not available based on local government area across the census years considered. For example, much of remote NT was unincorporated into local government areas prior to 2008 (Blackwell, 2012). A similar situation exists for the South Australian cases study sites with the Outback Communities Authority acting as a *de facto* local government service provider on behalf of the state. Furthermore, the ABS has multiple data collection area definitions and these boundaries have changed overtime, particularly in the NT. For these reasons there are inconsistencies between data sources across the case study locations and census periods, but wherever possible consistent datasets are used in order to reduce any inherent bias. More details of data sources are provided in the notes and sources of tables and figures.

Mine Production and Employment

The sources of data for mine production differ between mine locations and include State statistical collections or company reports. Employment data typically comes from company reports. These data have been collected, collated and are presented in time series graphs that provide a view of changes in production and employment over time for some locations. In some cases a breakdown of employment into Aboriginal and non-Aboriginal employment is undertaken to provide further distinction.

Mobility Indicators

Three indicators were used to selectively identify the extent of mobility in particular local populations or employment. These measures are especially relevant in measuring the impacts of changes in work practices on where people live, particularly where these practices encourage people to leave remote Australia.

The first key indicator for mobility in employment is through a comparison between people's place of usual residence and their place of enumeration. This gives a guide, though not perfectly precise because of the existence of tourism, of the extent of people who are at a given location on census night because of work but live elsewhere, i.e. FIFO or DIDO workers. However, it does not capture the extent of people who FIFO or DIDO out of the given remote community for work (see Blackwell, Fischer, McFarlane and Dollery (2015) for more discussion).

The second is turnover of the population, where arrivals and departures of people are added together and divided by the population. This is useful in establishing the degree to which people stay in a location once they arrive and a range of reasons can exist for high or low turnover as discussed further in this article. The final mobility measure is migration, where we measure in, out and net migration rates.

The Mines, Associated Communities, Production, and Labour Stocks and Flows

The mines and regions depicted in Figure 1, are:

1. the Granites gold and Ranger uranium mines in Central and Northern, Northern Territory. Granites is part of Central Desert shire and has aboriginal settlements to the south, Yuendumu, and north, Lajamanu and Kalkarindji, significant distances apart. In contrast, Jabiru supports the Ranger mine, is close by, and falls within the West Arnhem shire.
2. Leigh Creek and Roxby Downs in central South Australia support coal and copper, uranium, gold and silver at Olympic Dam respectively. These towns lie within a vast area of the state managed by the Outback Communities Authority, a defacto state government provider of local government services.

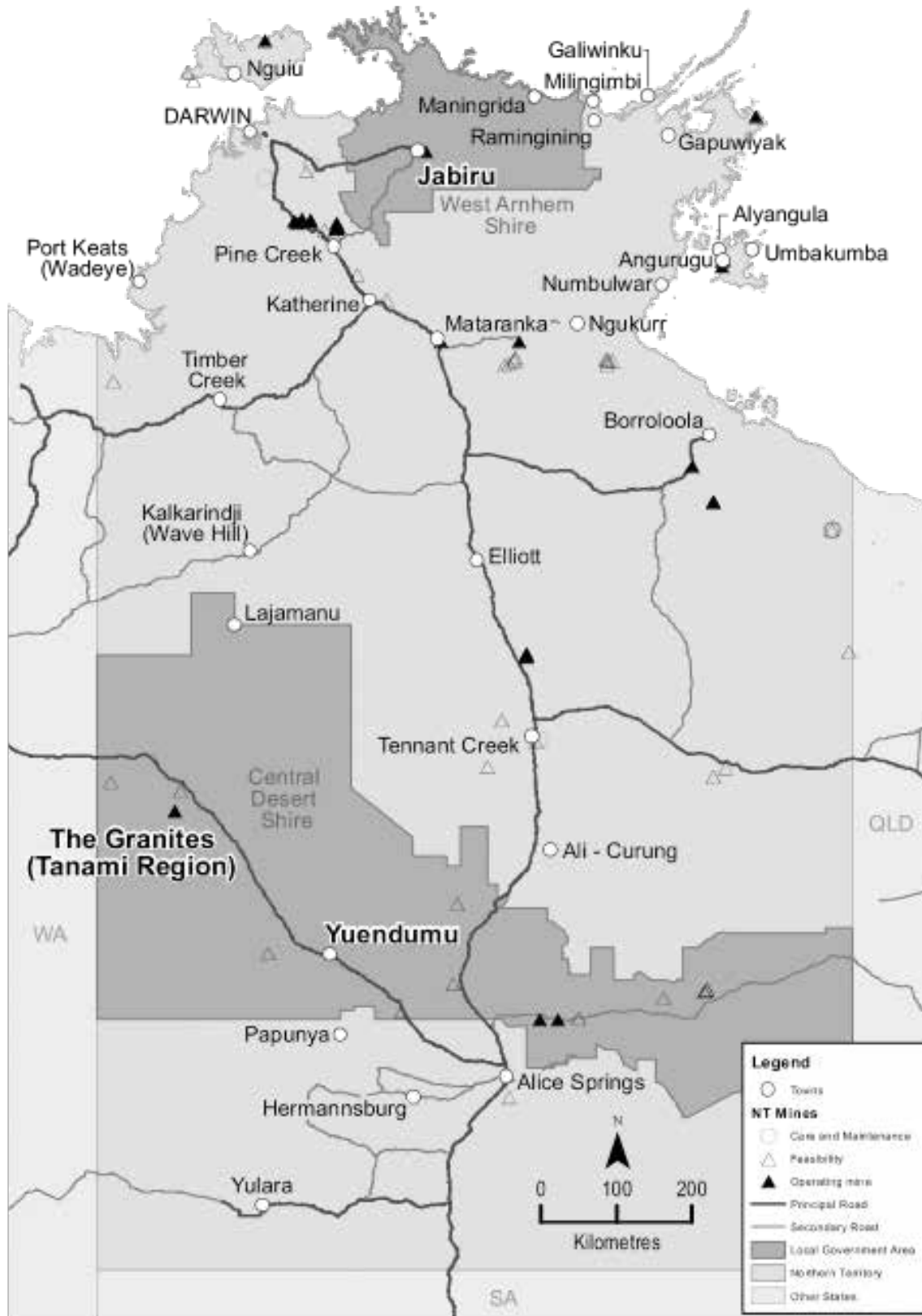
Figure 1: Case study locations

Source: Kate Rampellini ©, CRC for Remote Economic Participation, Curtin University, 2014

Yuendumu and Jabiru, Central and Northern, Northern Territory

The first case study from the Northern Territory includes the town of Yuendumu and associated Granites gold mine of Newmont based in the Tanami desert. The second case study is the town of Jabiru and associated Ranger uranium mine of Energy Resources Australia (ERA). These mines and towns are illustrated in Figure 2.

Figure 2: Location of Tanami and Ranger Mines and Associated Communities, Northern Territory



Source: Kate Rampellini ©, CRC for Remote Economic Participation, Curtin University, 2014

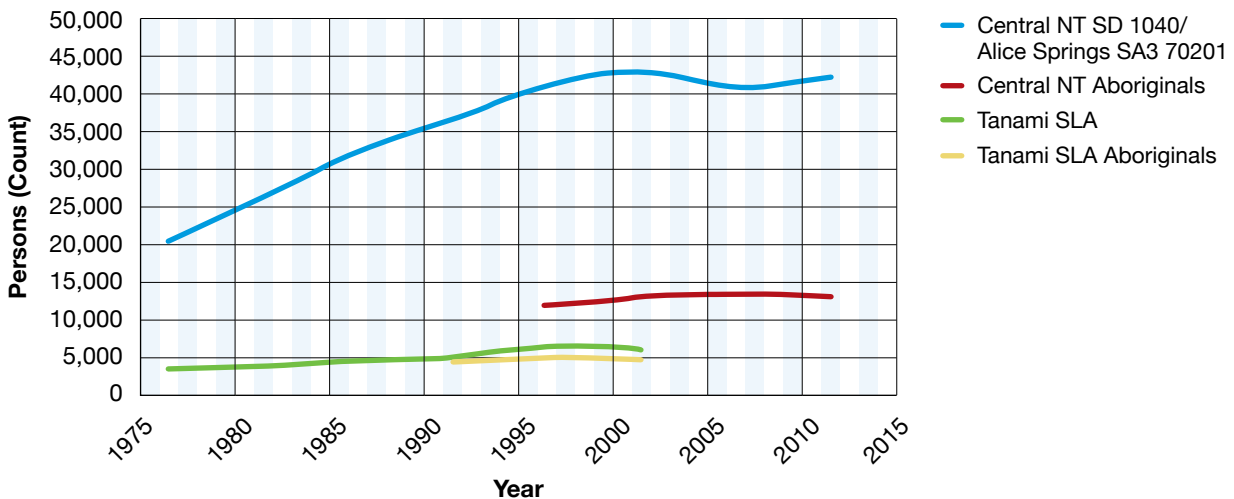
Yuendumu and the Tanami Mine

The Newmont Tanami gold mine includes the mining operations of the Granites treatment plant, located about 550 kilometres along the Tanami Highway northwest of Alice Springs, and the Dead Bullock Soak mining operations, about 40 kilometres west of the Granites (Newmont Mining Corporation, 2012a). In 2011, the mine operations produced 221,000 ounces from an estimated 2.5 million ounces of gold reserves at year end (Newmont Mining Corporation, 2012a, p. 29) with the life of the mine estimated to extend to 2023.

Mining for gold in the Tanami desert began in the early 1900s (Newmont Mining Corporation, 2012b), with one of Australia's greatest modern day discoveries of gold occurring at Callie-Dead Bullock Soak in 1992 (Elias, 2007). Since then, a number of companies have owned the mining operation, including Normandy Mining that was subsequently taken over by the US company Newmont Asia Pacific in 2002.

The town of Yuendumu lies around 260 kilometres south of the Newmont Granites mine. Yuendumu was established as a ration and welfare services station in 1946 by the Native Affairs Branch of the Australian Government (Musharbash, 2010), rather than a mining support town as the other case studies considered in this article. The Baptist Church established a mission there in 1949 and by 1955 most of the local Warlpiri people had settled in town (Jordan, 1999). Today, the Warlpiri are the traditional freehold owners of the land mined by Newmont, and Yuendumu has the largest population of Warlpiri nearest the mine with 86 per cent Yapa (local Aboriginal) and 14 per cent Kardiya (non-Aboriginal) of a total population of 686 (Australian Bureau of Statistics, 2012c).

Figure 3: *Populations of Central Northern Territory (NT) and Tanami Statistical Local Area (SLA)*



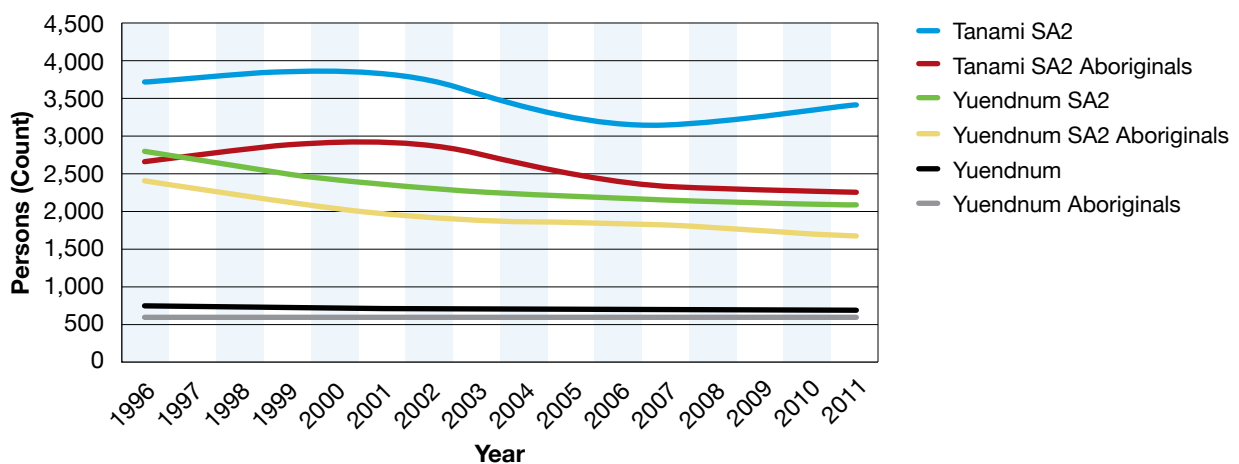
Source: Australian Bureau of Statistics, 1982a, 1987, 1993a, 2003, 2008d, 2013a.

Note: For 1976 and 1981, used sum of LGAs to give Central NT and Tanami SLA directly from source

Figure 3 shows the populations of Central Northern Territory (NT) while Figure 4 shows the populations of the Tanami and Yuendumu, with two different ABS statistical collections for the Tanami: 1) Statistical Local Area (SLA); and 2) Statistical Area 2 (SA2). Comparing both figures, as the focus of analysis moves from the regional to the local remote level (Figures 3 and 4), the proportion of Aboriginal people (Aboriginal and Torres Strait Islander people) in the population rises. Central NT has a lower proportion of Aboriginal people than the Tanami, and in turn the Tanami has a lower proportion than Yuendumu. Similarly while the populations of Central NT and the Tanami have increased, those of the Tanami SA2 and Yuendumu have generally been in decline.

Aboriginal people tend to have strong traditional ties to their local lands in contrast to people without such connections. People living remotely may also be isolated and disconnected from the broader economy, unable to move when local economic circumstances become less favourable. Combined, these factors suggest Aboriginal people may be more likely to live remotely, even when the general population is falling. Importantly, the falls in the local Yuendumu populations (SA2 and LGA) are likely to reflect a fall in economic activity and participation through employment as confirmed in Figure 5 by a fall in the total number of people employed).

Figure 4: Populations of Tanami and Yuendumu Statistical Area Level 2 (SA2)^a and Yuendumu ^b



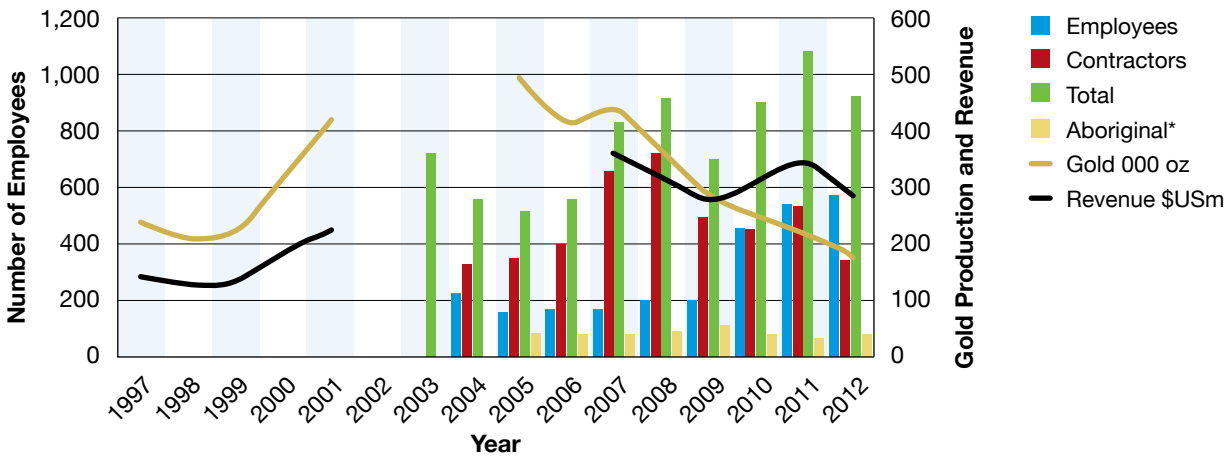
Source: Australian Bureau of Statistics, 2008h, 2008i, 2013g, 2013i.

Note:

- a. 1996 data not available for Tanami and Yuendumu SA2. 1996 Tanami SA2 data estimated by calibration with 1996-2006 Tanami SLA total population and 1996 Aboriginal proportion. 1996 Yuendumu SA2 estimated via power function (had highest $R^2=0.98$) of total population and census years 2001-2011. Yuendumu SA2 Aboriginal population estimated from 1996 total population estimate imputed in log function (has highest $R^2=0.97$) for total and aboriginal populations 2001-2011.
- b. 2011 data is not available for Yuendumu LGA (Local Government Area) because it was incorporated into Central Desert LGA in 2008, so data based on State Suburb Code (SSC) – the nearest measure to that of LGA – and is based on place of usual residence data which is higher and more conservative in this particular case than data based on place of enumeration.

Employment of local Yuendumu people has always been difficult for the mine, despite ongoing programs to boost employment of local Aboriginal people. Newmont (K. Eglinton, personal communication, 29 March 2012) points to at least five reasons: 1) the inhibitive distance that must be travelled to reach the mine (about 250kms of unsealed Tanami track); 2) the high turnover of Aboriginal staff and hence, the high cost of training and retention; 3) issues around ‘humberging’ (as an aboriginal person, anything one earns or owns belongs to one’s extended family and must be shared with them); 4) poor health, literacy and numeracy status of Aboriginal work candidates; and 5) the lack of interest by Aboriginal people to work at the mine. The interaction of these factors is complex. For example, item 5 maybe because types of jobs have limited up skilling, transfer to other industries, and opportunities to develop other jobs or small businesses due to clan politics and small-isolated place distrust. In 2011, employment from Yuendumu Aboriginal people was around 2 out of a total of 90 employees (K. Eglinton, personal communication, 29 March 2012). Figure 5 provides a summary of the more recent levels of production and general Aboriginal employment at the mine.

Figure 5: Newmont Tanami Revenue, Production and Employment



Source: Newmont Asia Pacific, 2009, 2011, 2012, 2013; Newmont Mining Corporation, 2006, 2007; Normandy Mining Ltd, 1998, 1999, 2000, 2001, 2002.

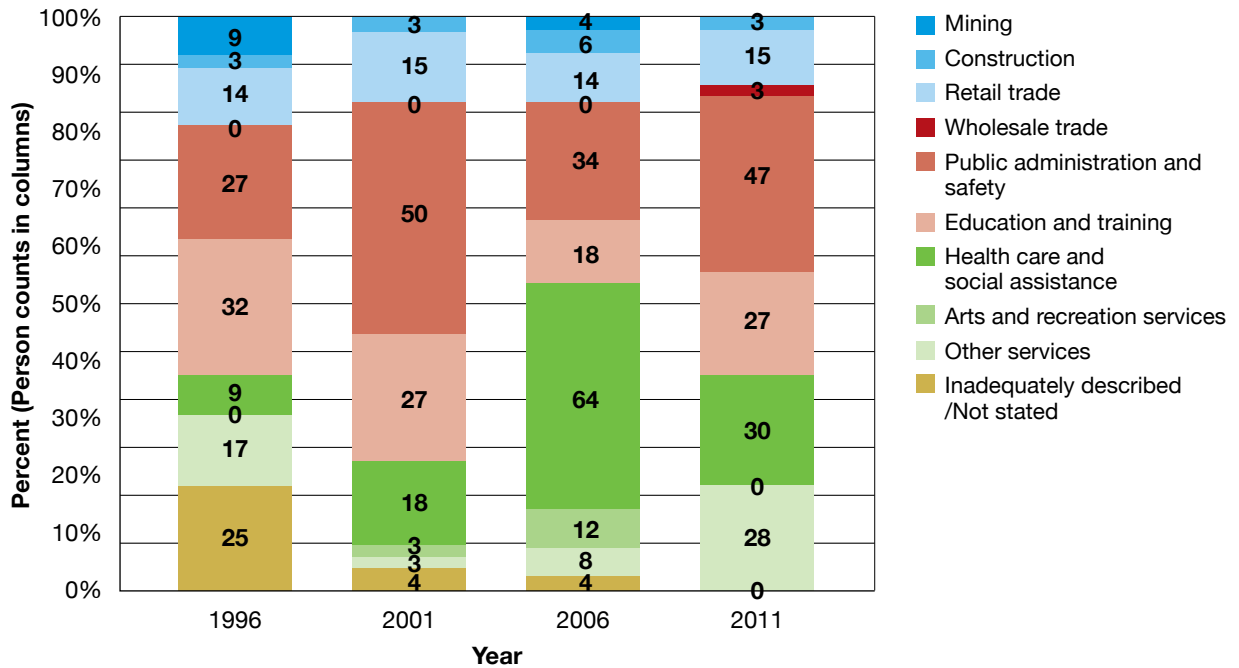
Note: * = employees and contractors.

Revenues appear to drive employment given the co-oscillation of these two parameters from 2007 to 2012 in Figure 5. In the earlier years from 1998 to 2001, revenues oscillated with gold production but in more recent years these have diverged and this may be explained by strong growth in the gold price during the years 2008 to 2011, reaching and exceeding \$USD1600 per ounce in 2011 and 2012 (InfoMine, 2013; Newmont Asia Pacific, 2012). Despite the general fall in gold production since 2005, overall, total employment generally rose across the recent period. Contractors markedly increased in 2007 to 2008 then plateaued in 2009 to 2011 and dropped considerably in 2012, being substituted somewhat by an increase in employees. Aboriginal employment rose from 2007 to 2009 but then dropped from 2009 to 2011 and rose again in 2012.

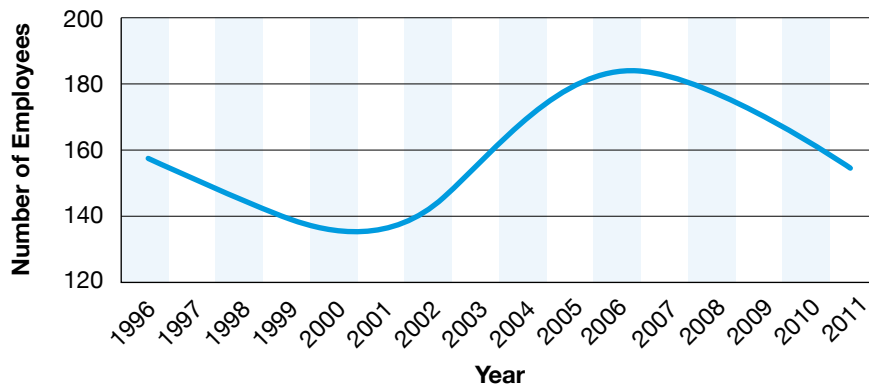
Figure 6 shows the percentage of persons employed by industry and in Yuendumu from 2006 to 2011. During periods of lower employment, 2001 and 2011, more people were employed in public administration and safety, while during higher levels of employment in 1996 and 2006, there is a more even spread of employment across industries. Mining’s direct contribution to employment was greatest in 1996 but in recent years contributed little. The reason for this cannot be determined definitively.

Figure 6: Yuendumu Employment by Industry and Yuendumu Total Employment

A) Yuendumu Employment by Industry



B) Yuendumu Total Employment



Source: Australian Bureau of Statistics, 2008i; 2012c.

Note: Yuendumu LGA was incorporated into Central Desert LGA in 2008 so there is no 2011 Yuendumu LGA data available. Instead we use Yuendumu SSC Based on Place of Enumeration data.

Jabiru and the Ranger Mine

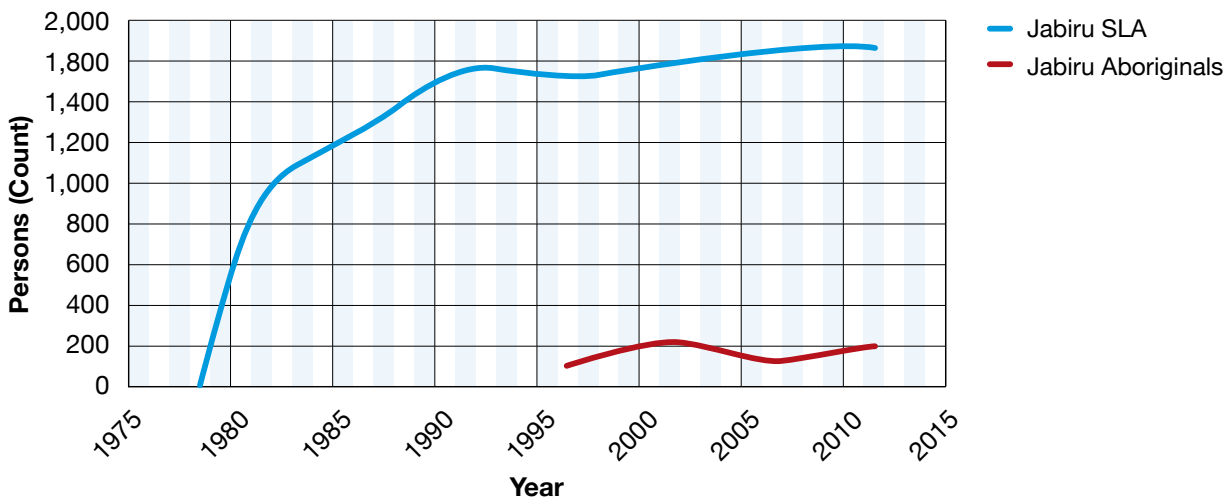
The Ranger uranium mine in the Northern Territory is owned by Energy Resources of Australia Limited and is 70 per cent owned by Rio Tinto (Energy Resources of Australia, 2013b). In 2011, it was reported that after three decades, the mine was one of three in the world to have produced in excess of 100,000 tonnes of uranium oxide (Energy Resources of Australia, 2012, p. 3).

Uranium was discovered at Ranger in 1969 and mining commenced in 1980, reaching full production by 1981. Due to a particularly wet season for tropical Australia in 2010/2011, mine production was lower than usual. Ranger 3 Deeps is one of the world’s most significant recent discoveries of uranium with estimated reserves of 34,000 tonnes of uranium oxide (Energy Resources of Australia, 2013c). Assuming recent environmental breaches can be overcome,

the life of the mine is expected to extend processing until 2021 with rehabilitation completed in 2026 (World Nuclear Association, 2013). However, the 2015 withdrawal of financial support by RioTinto for the 3 Deeps expansion will reduce future production from the mine.

The Ranger Project Area, Jabiluka lease, and the town of Jabiru are located on Aboriginal land of the Mirarr people. The Mirarr clan is small, consisting of 26 adult people who are explicitly opposed to uranium mining on their land (Gundjeihmi Aboriginal Corporation, 2012). As depicted in Figure 2, the town of Jabiru lies 260 kilometres east of Darwin with a State Statistical Suburb population of 1,128 in 2011, 19 per cent of whom were Aboriginal (Australian Bureau of Statistics, 2012a). The total and Aboriginal statistical local area populations of Jabiru are depicted in Figure 7. The population has steadily grown since the late 1970s, with a more recent plateau of the total population and oscillation of Aboriginal people. Relative to Yuendumu, the proportion of Aboriginal people is smaller.

Figure 7: Population of Jabiru Statistical Local Area (SLA)



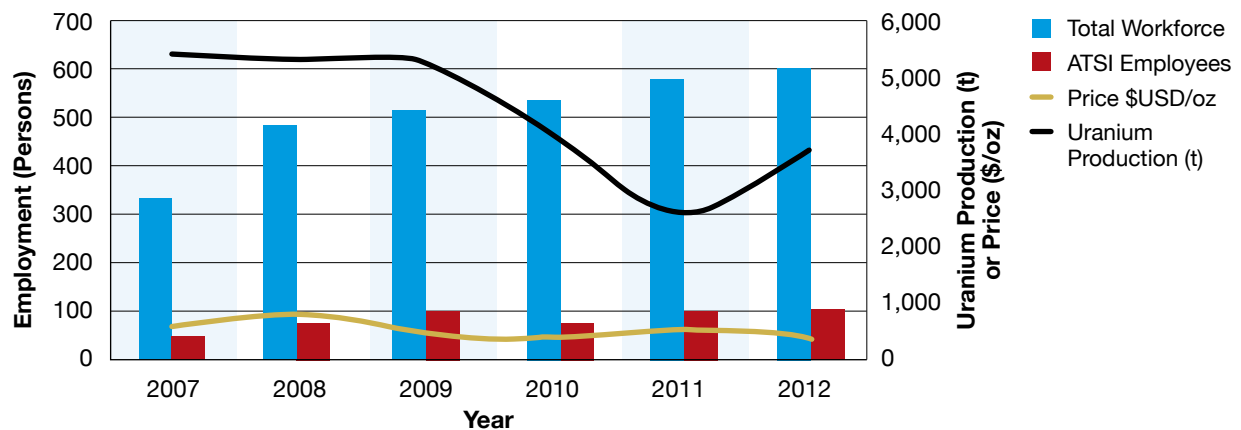
Source: Australian Bureau of Statistics, 1982a, 1993a, 2008e, 2012b

While Jabiru, and the Ranger mine and Jabiluka lease are surrounded by the Kakadu National Park, these mining areas had already been separated when the Park was established in 1981 (Lawrence, 2000). The town of Jabiru also lies within the Park, having been established in 1978 as the settlement for Jabiru East, eight kilometres from the mine (Spiers, 2000). ERA and the Commonwealth and Territory Governments committed funds to build the town (Knight, 2008) through the Jabiru Town Development Authority (JTDA) under Northern Territory legislation.

Jabiru is owned by the Commonwealth Director of National Parks (2007), who draws a head lease held by the JTDA which subleases it to private businesses, government agencies and ERA. Jabiru houses the head offices of the West Arnhem Shire, being formed as part of the local government amalgamations undertaken in 2008 (West Arnhem Shire, 2013). In addition to mining, other industries important to the town are tourism as well as Aboriginal arts and crafts, with the Kakadu National Park being a centrepiece for both (Director of National Parks, 2007).

Total employment at ERA has continued to grow over the period since 2007 as depicted in Figure 8. In contrast, Aboriginal employment has oscillated with an upward trend from 2007 to 2009 and 2010 to 2012, dipping in 2010. The percentage of Aboriginal employment at Ranger has been greater in recent years than that of Newmont's Tanami operation. One reason is Ranger is close to the well serviced town of Jabiru. This makes attracting Aboriginal employees locally and further afield easier compared to the very remote Tanami operation of Newmont.

Figure 8: ERA (Ranger) Price, Production and Employment



Source: *Energy Resources of Australia, 2012, 2013a.*

In addition, ERA point to a number of initiatives that highlight their good performance in Aboriginal employment (Energy Resources of Australia, 2013a). The first is having an Indigenous Employment Strategy (Energy Resources of Australia, 2013a) which includes a mentoring program, ‘flexible work arrangements, continued involvement in the Northern Territory Mine Training Programme, workplace literacy and numeracy training, and supporting students from local communities in work experience and school based apprenticeships’ (Energy Resources of Australia, 2013a, p. 38). Other initiatives include a cultural awareness program for all employees and an education partnership with the West Arnhem College involving the targeted recruitment of teachers and miners from Queensland, New South Wales, Victoria and South Australia (Energy Resources of Australia, 2013a).

Determining the number of people who work in mining in Jabiru and who also reside in Jabiru or the number of Jabiru workers in mining who do not reside in Jabiru cannot be definitely determined from the census data. What is known is the number of people working in mining in West Arnhem LGA in 2011 was 428 (Australian Bureau of Statistics, 2013h, based on place of work data). The number of people who worked in mining anywhere who resided in the LGA were 256 (Australian Bureau of Statistics, 2013h, based on place of usual residence data). There were 366 people who were surveyed in West Arnhem on census night (includes Australian visitors) and worked in mining (Australian Bureau of Statistics, 2013h, based on place of enumeration data). While there are expected to be residents who fly out of the region for mining work, given the relative magnitude of place of work data (428) to the usual place of residence data there are expected to be a considerable amount of people who FIFO into the region for mining work. The origin of these people is identified from the place of enumeration data on census night. Most people from outside the LGA were from outside the same statistical area level 2 (SA2) but residing in NT, followed by the same SA2 then NSW, Victoria and South Australia. A relatively small proportion was from Queensland.

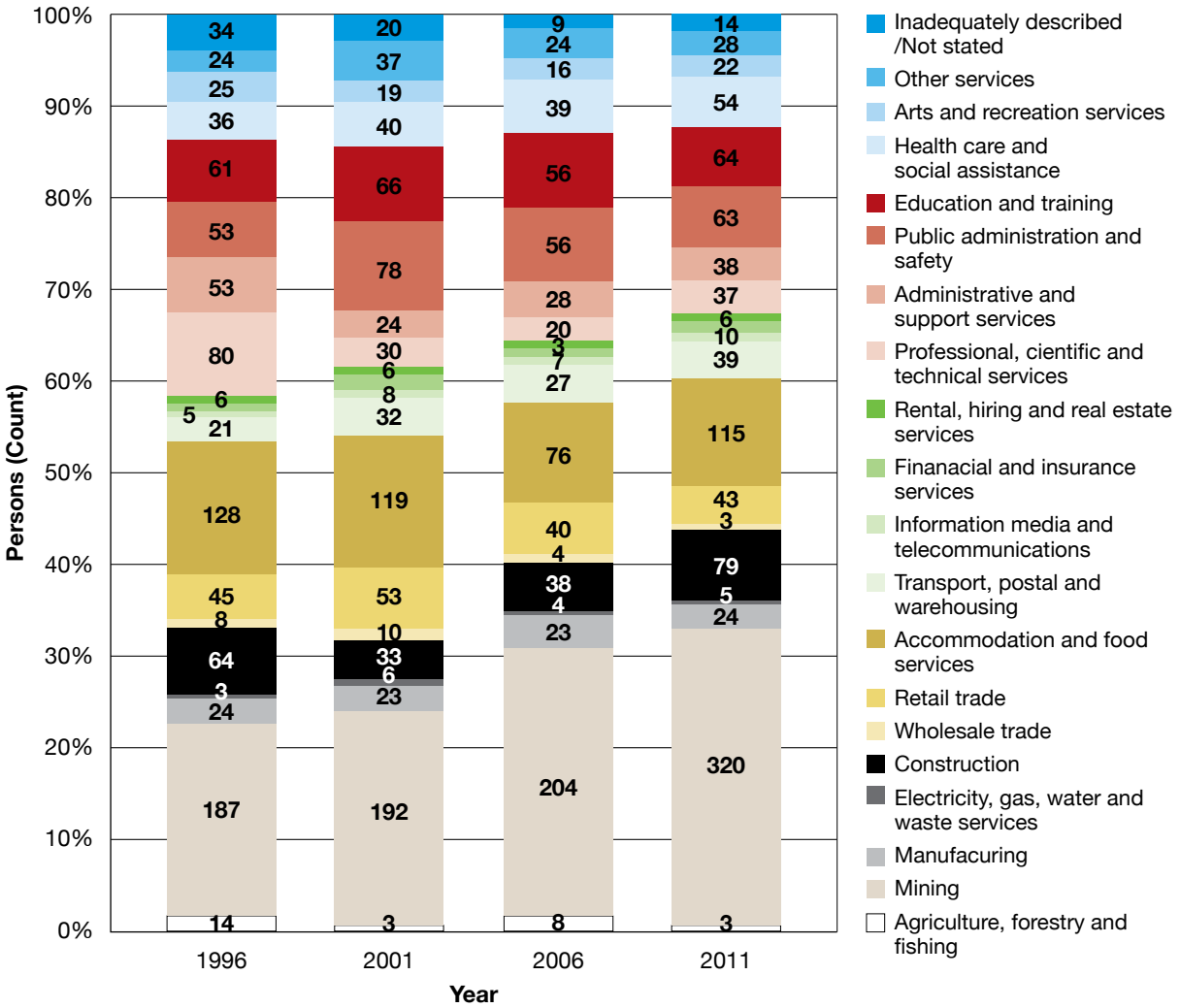
ERA’s financial management supports employment as shown through Figure 8. For example, there is a negative correlation between the ERA’s realised uranium price and production that helps to sustain revenues (prices are up while production is down or prices fall while production is up). Sustaining revenues, by altering production and use of stockpiles can also provide the ability to sustain employment during price fluctuations. Note that production was affected by an unusually wet 2010/2011 season, but with ERA drawing on stockpiles (Energy Resources of Australia, 2012) and with some price growth, total employment continued to rise as depicted in Figure 8.

Figure 9 provides the percentage and counts of persons employed by industry type and in total from 2006 to 2011 in Jabiru. Mining has taken an increasing share of employment across

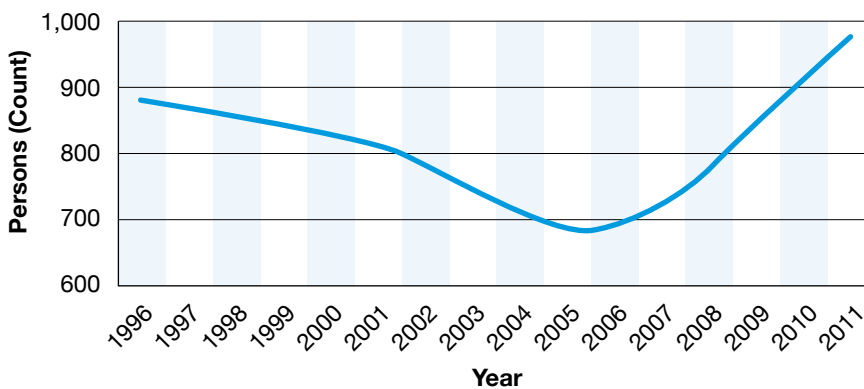
the period in contrast to Yuendumu. Furthermore, there are more types of industry supporting employment, reflecting a more diversified economy. An additional contrast is ‘public sector and support services’ appear to be a smaller percentage of total employment in Jabiru than in Yuendumu. This latter contrast again reflects a more diversified economy and greater opportunity for employment and economic participation through less relative, economic reliance on government expenditure, given its relative closeness to Darwin.

Figure 9: Jabiru Employment by Industry and Jabiru Total Employment

A) Jabiru Employment by Industry



B) Jabiru Total Employment

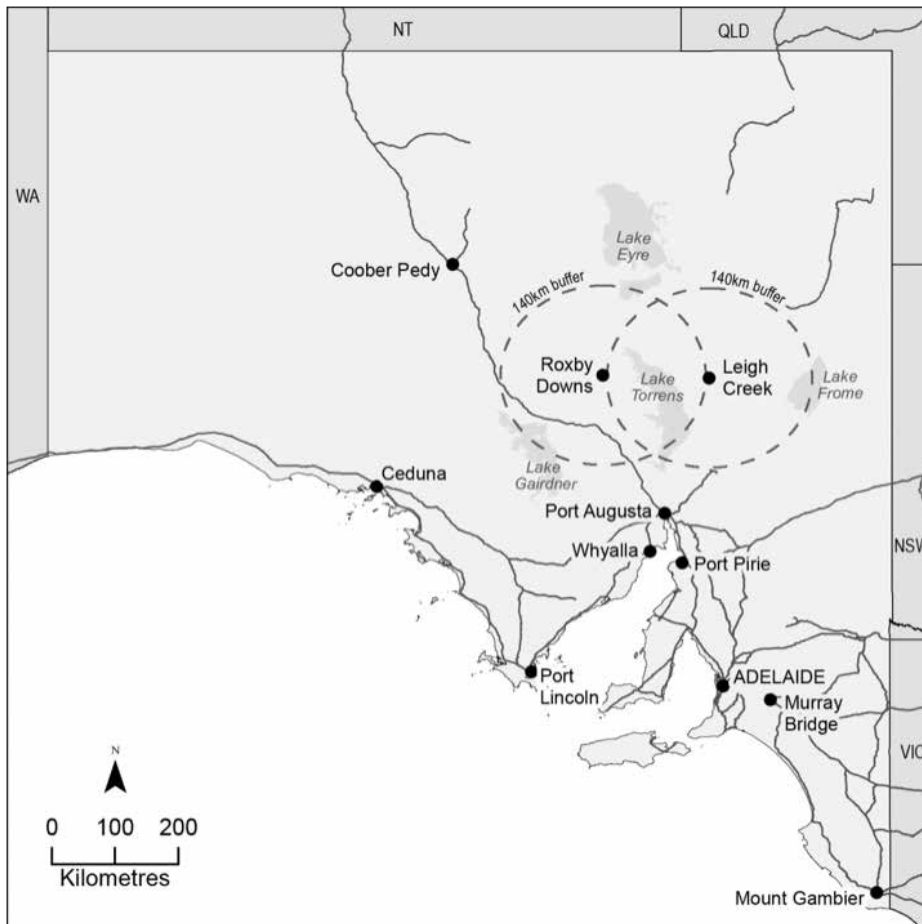


Source: Australian Bureau of Statistics, 2008e, 2012b.

Leigh Creek and Roxby Downs, South Australia

Leigh Creek and Roxby Downs are located in the mid North and East of central South Australia. Leigh Creek is located on the western edge of the Northern Flinders Ranges and Roxby Downs is approximately 144 kilometres due west of Leigh Creek. As shown in Figure 10, the Lake Torrens basin is between the two communities and prevents direct access between the two locations. Both communities are remote, located approximately 560 kilometres north of Adelaide, the capital city of South Australia.

Figure 10: Location of Roxby Downs and Leigh Creek, South Australia



Source: Kate Rampellini ©, CRC for Remote Economic Participation, Curtin University, 2015

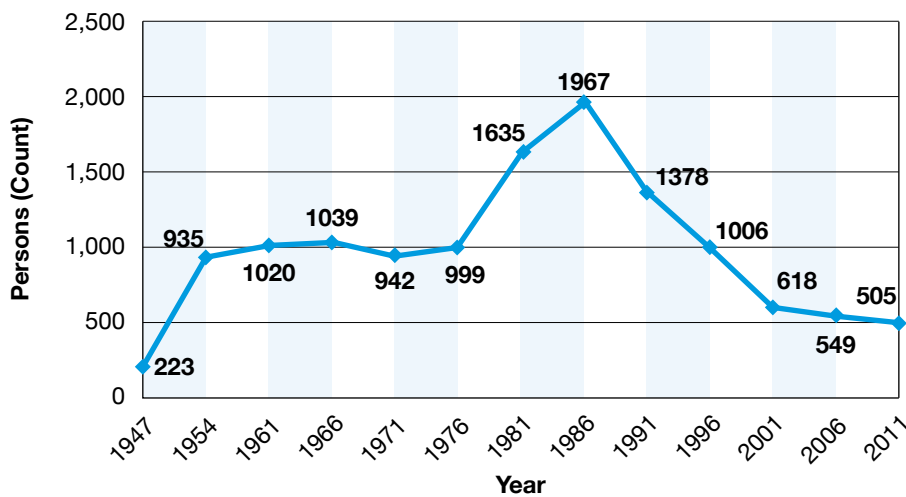
Leigh Creek

In 1942 the South Australian Government developed the Leigh Creek coal field to supply coal for power generation, with the township established in the same year. Leigh Creek was designed as a model mining community for miners and their families, and also a service centre for the other communities within the remote region (Klaassen, 1997). The township is a 'closed community' to those who work a minimum of 20 hours per week in the mine and associated town services or private business (Matulick, 2011). The South Australian Government owns the town and associated infrastructure while private businesses lease premises in the town to provide services to the community. Currently, the mine and the town are leased to Alinta Energy with expiry in June 2018 but the mine is due to close on 17 November 2016 (Australian Broadcasting Corporation, 2015a).

In 1976, the Electricity Trust of South Australia (ETSA) decided the community needed to be relocated south of the original town site to allow for the expansion of the coalfield. This site was selected due to topography and it having no identified mineral deposits. Following relocation, the South Australian Government wished to develop the new town as an open community to act as a service centre for the Northern Flinders Ranges; the proposal was within the then preferred principles for planning a mine related community (State Records of South Australia, 1978c). Despite the significant benefits of an open town¹ policy, there was strong resistance from the existing community members and unions wishing to preserve the extant composition of Leigh Creek, objecting to the provision of Aboriginal and welfare housing in town (State Records of South Australia, 1977, 1978b). With Leigh Creek responsible for generating around a third of the State's electricity during the late 1970s, the government preferred to abandon its proposal to avoid industrial unrest and associated power 'blackouts' (State Records of South Australia, 1977, 1978a, 1978c). Despite opportunities to remove residency restrictions and make housing available for general lease or purchase during ETSA's privatisation in 1999, the town remained closed.

Figure 11 shows the population of Leigh Creek peaked at 1,967 residents in 1986 (Australian Bureau of Statistics, 1988) with a subsequent continued decline due to diminishing coal reserves (Figure 12), increased technological efficiencies, and long distance commuting by employees (Figure 13). As evidence of the latter, the percentage of residents remaining at the same address as five years ago across the census periods between 1996, 2001, 2006 and 2011 increased but at a higher rate to, and remained significantly lower than, that of South Australia (Calculated from Australian Bureau of Statistics, 2002b, 2008f; Australian Bureau of Statistics, 2013e).

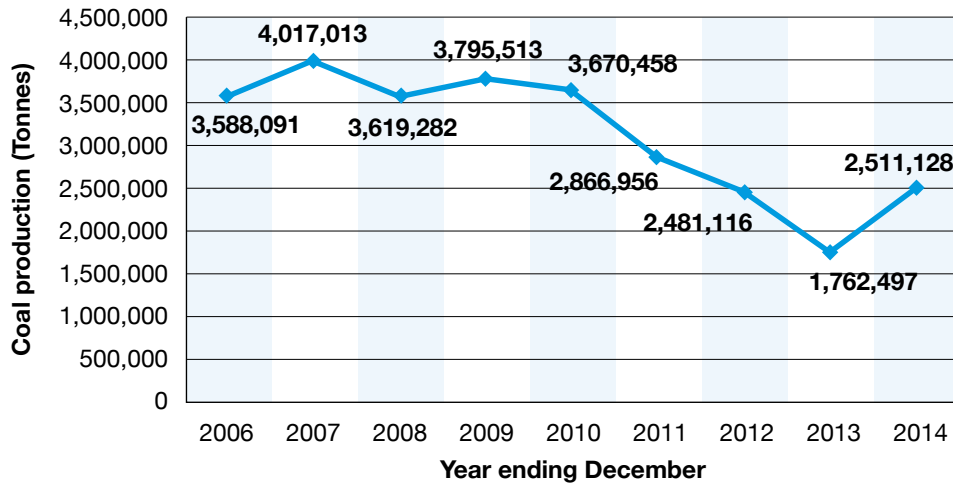
Figure 11: Leigh Creek Population



Source: Australian Bureau of Statistics, 1982b, 1988, 1993b, 1998, 2002b, 2008f, 2013e; Commonwealth Bureau of Census and Statistics, 1949, 1955, 1963, 1970, 1973.

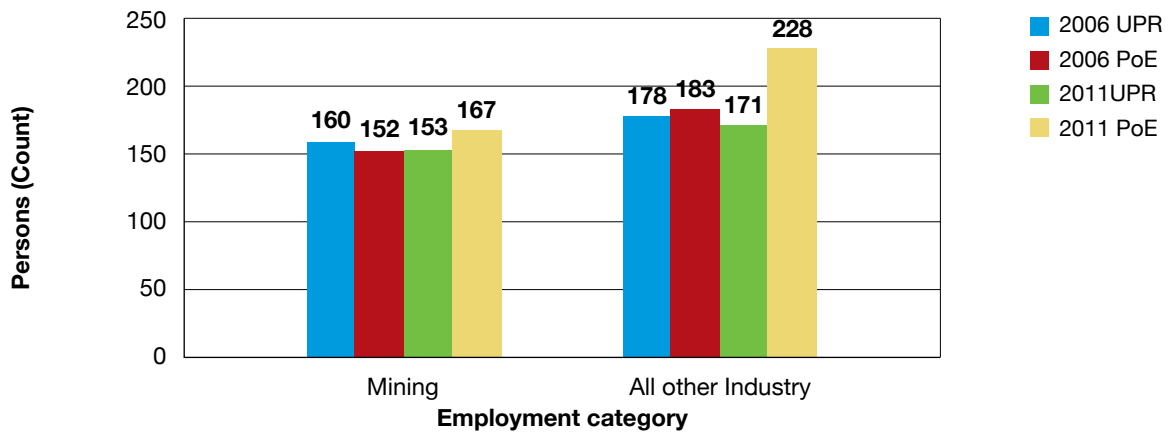
1. Benefits include the potential for tourism and other private development with diversification of job opportunities, a possible reduction in duplication of services, a more efficient use of housing and town facilities, and the importance of developing a service centre in the region.

Figure 12: Leigh Creek Coal Production



Source: Brice, 2011; Lavingdale, 2007, 2008, 2009, 2010, 2012, 2013, 2014, 2015.

Figure 13: Leigh Creek Employment by Usual Place of Residence and Place of Enumeration

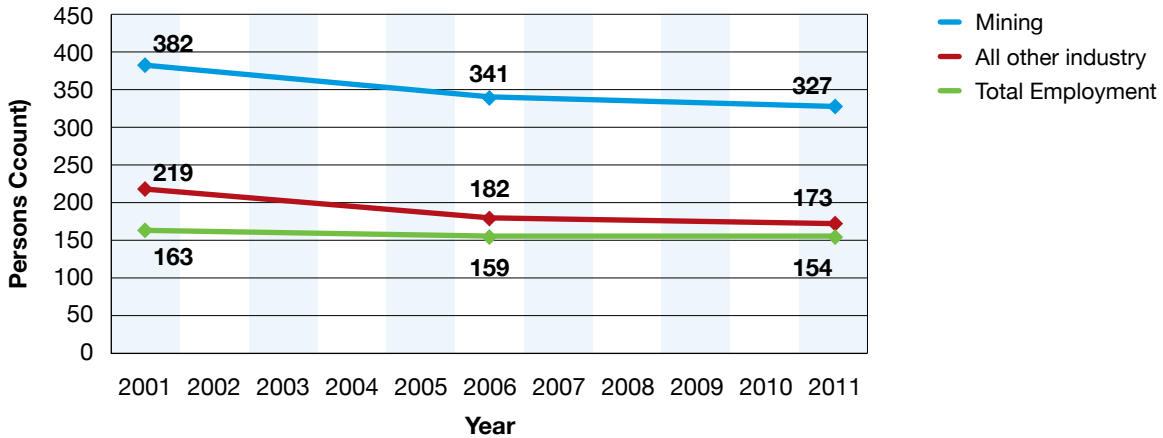


Source: Australian Bureau of Statistics, 2008a, 2013b.

Figure 14 presents employment in Leigh Creek from 2001 to 2011 using 2006 census data corrected for the anomaly of mine workers being recorded as working in the electricity industry. Following ETSA's privatisation in 1999, the figure shows the decrease in employed persons outside of mining in Leigh Creek since 2001, highlighting the importance of mining to employment in other sectors.

Figure 15 highlights the changes in employment by industry since 2001, with an overall decline in total employment across the period. There was a decrease in employment in mining and utilities' combined. Also, there is a decrease in retail trade and education employment, coinciding with the decrease in Leigh Creek's population. Behind these decreases is a contraction of coal production (see Figure 12). The further falls in coal production in recent years can be explained by the curtailment of the operation of Leigh Creek supplied power stations to the peak summer period, October to March (Alinta Energy, 2012) resulting in increased productivity and profitability at the mine (P. Kelly, personal communication, 18 September 2013).

Figure 14: Leigh Creek Mining, Other and Total Employment by Usual Place of Residence

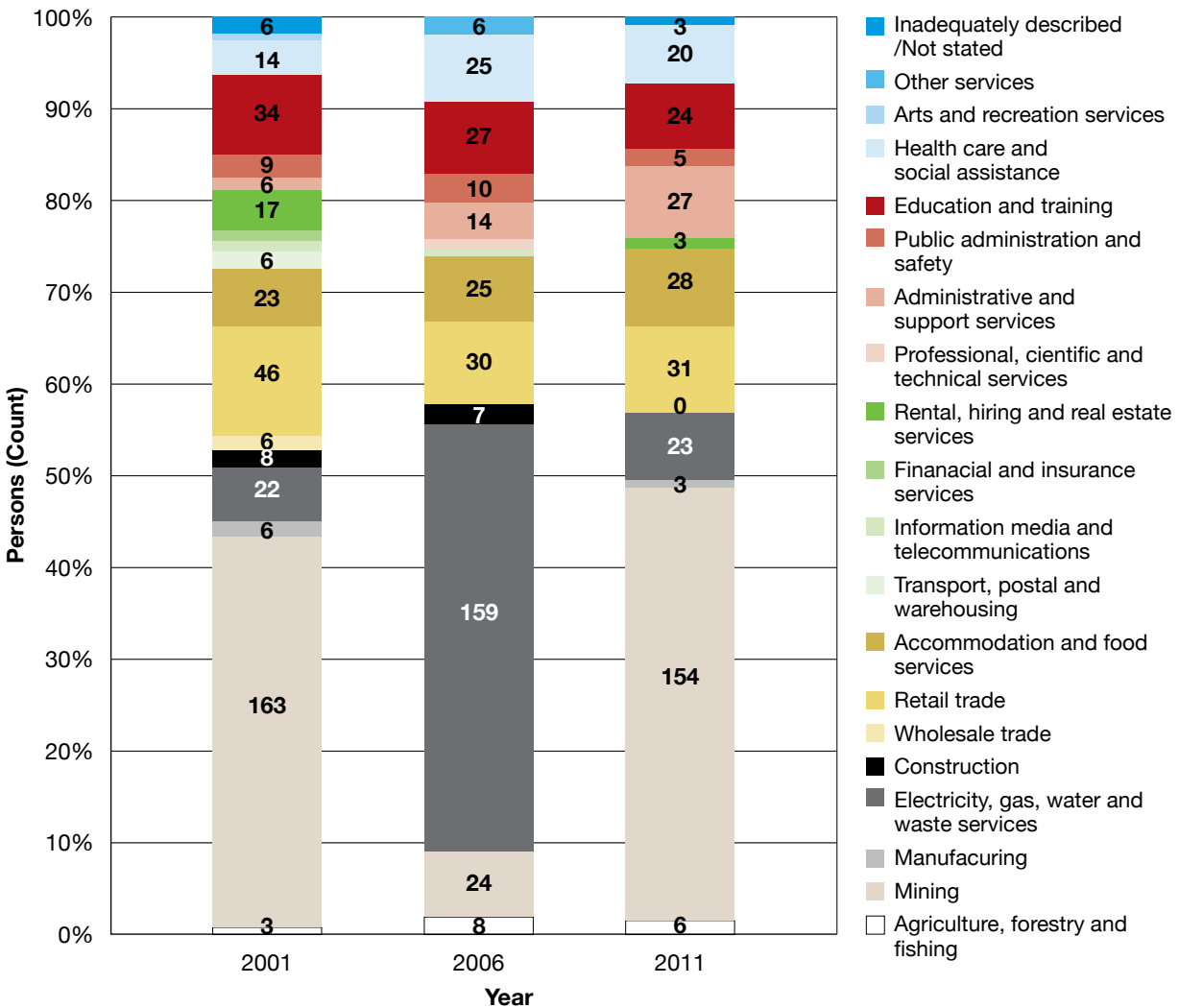


Sources: Australian Bureau of Statistics, 2002b, 2008f, 2013e.

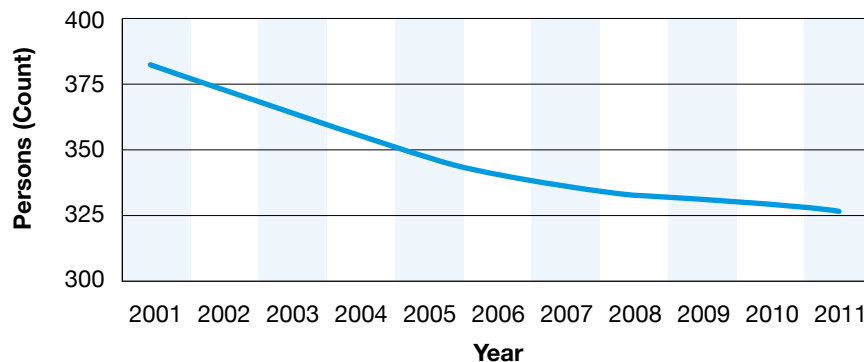
Note: The 2006 data are estimated to correct for mining employees recorded as electricity industry employees.

Figure 15: Leigh Creek Industry Employment and Leigh Creek Total Employment

A) Leigh Creek Industry Employment



B) Leigh Creek Total Employment



Source: Australian Bureau of Statistics, 2002b, 2008f, 2013e.

Note: Place of Enumeration used for 2001 Industry of Employment data, Place of Usual Residence used in 2006 & 2011. No data are available for 1996.

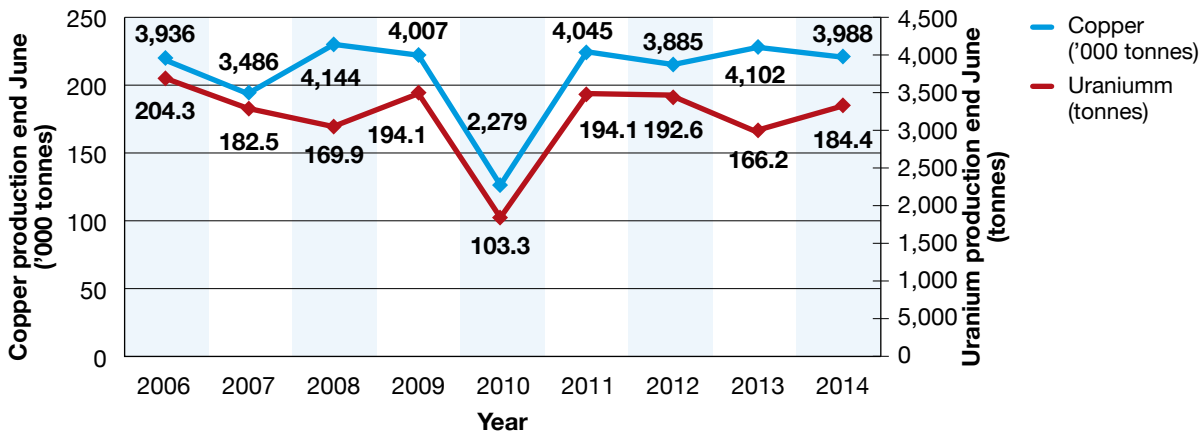
However, this improved efficiency has not been achieved without a social cost. As part of the efficiency initiatives, Alinta Energy changed work cycles in 2012 from four days on four days off, to seven days on seven days off. By 2015, 30 per cent of the Leigh Creek labour force utilised DIDO and almost five per cent utilised FIFO (R. Stack, personal communication, 20 April 2015), no doubt contributing to further declines in the local population. Analysis of the 2001, 2006, 2011 census data showed a decrease in school attendance (calculated from Australian Bureau of Statistics, 2002b, 2008f; 2013e), corroborating evidence of losses in population and social fabric.

Figure 13 lends further evidence in support of greater DIDO and FIFO utilisation in Leigh Creek, given a declining local population (counts for usual place of residence=UPR) but increasing Place of Enumeration counts (PoE) on census night. The Light Copper mine located between Leigh Creek and Copley operated on a DIDO basis in 2011 which potentially explains the increase (Phoenix Copper Limited, 2014). However, the relatively larger increase in the 'All other industry' category for enumeration counts in 2011 may be explained by the rare flooding of Lake Eyre, which increased the number of visitors to the area. This may also explain part of mining's enumeration increase.

Roxby Downs

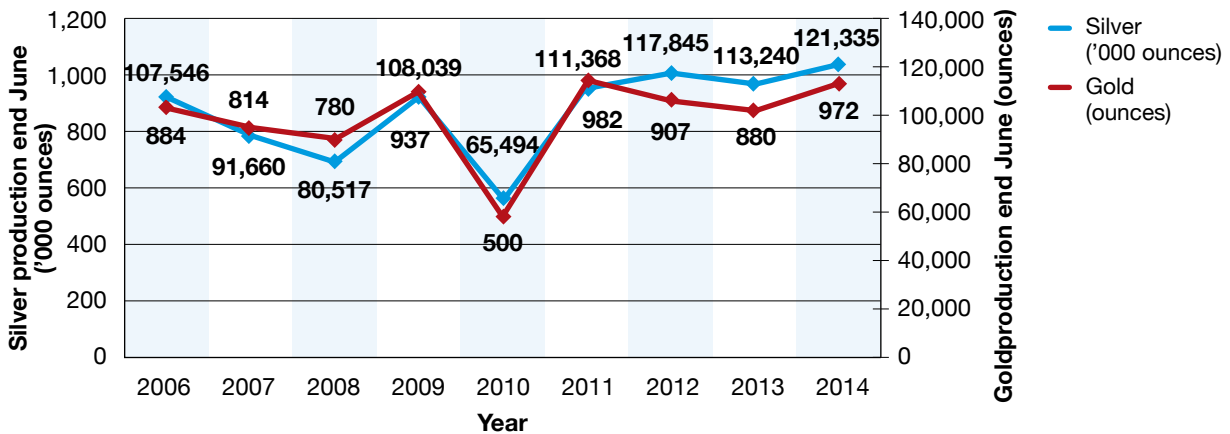
Western Mining Corporation was granted an exploration license over part of Roxby Downs Pastoral Station in May 1975 and the first exploration hole was drilled in June 1975 in the area of a stock watering point called Olympic Dam (Johns, 2010). In May 1986, Western Mining Corporation and their partners notified the South Australian Government of their intent to proceed with the Olympic Dam project (Johns, 2010). BHP Billiton acquired the Olympic Dam mine in June 2005 from Western Mining Corporation (Department for Manufacturing, 2012) and continues to produce copper, uranium, gold and silver as depicted in Figures 16 and 17. The main ore haulage shaft was damaged in October 2009 (BHP Billiton, 2009b, 2010a) resulting in the sharp decline in production for all minerals in 2010.

Figure 16: Olympic Dam Copper and Uranium Production



Source: BHP Billiton, 2006, 2007, 2008, 2009a, 2010b, 2011, 2012, 2013, 2014.

Figure 17: Olympic Dam Silver and Gold Production

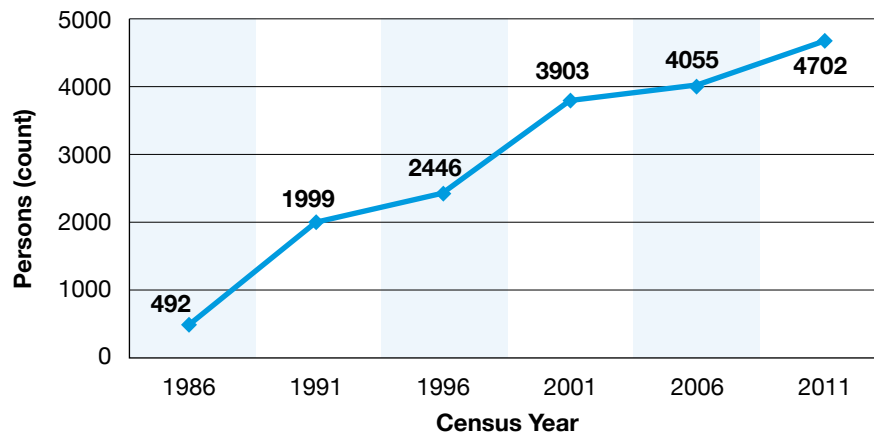


Source: BHP Billiton, 2006, 2007, 2008, 2009a, 2010b, 2011, 2012, 2013, 2014.

Roxby Downs was established in 1987 to provide accommodation and support services to the Olympic Dam mine workforce (*Roxby Downs (Indenture Ratification) Act 1982*). Unlike Leigh Creek, Roxby Downs was established as an ‘open community’ and is designated as a Local Government Area, though similar to Leigh Creek does have representation from state government. Also, unlike Leigh Creek, the population of Roxby Downs as depicted in Figure 18 did not recoil because of the reduced production in 2010 or other periods. This is because production of at least one mineral has continued to increase year on year (Figures 16 and 17), presenting a growing portfolio of mineral development to support population growth.

The connection of course between mining production and town population is through employment as depicted in Figure 19 that highlights mining as the major industry for all employees in Roxby Downs. Figure 20 highlights the changes in employment by industry since 1996 with a steady incline in mining’s employment (Figure 20.A) and total employment (Figure 20.B). Other larger employer industries include administration and support, accommodation and food services, and construction, industries that help service the mining sector.

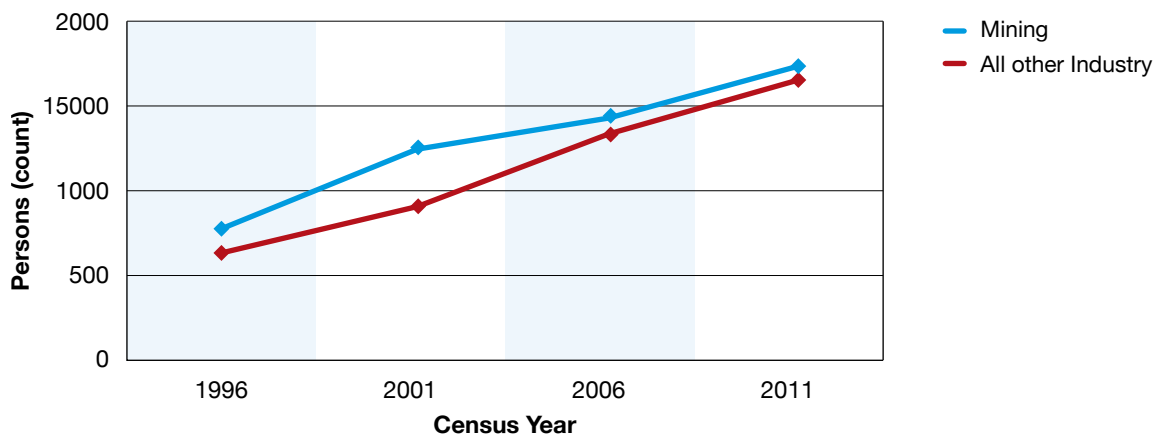
Figure 18: Roxby Downs' Population



Source: Australian Bureau of Statistics, 1988, 2002c, 2008g, 2013f.

Note: The locality was called Olympic Dam in the 1986 census.

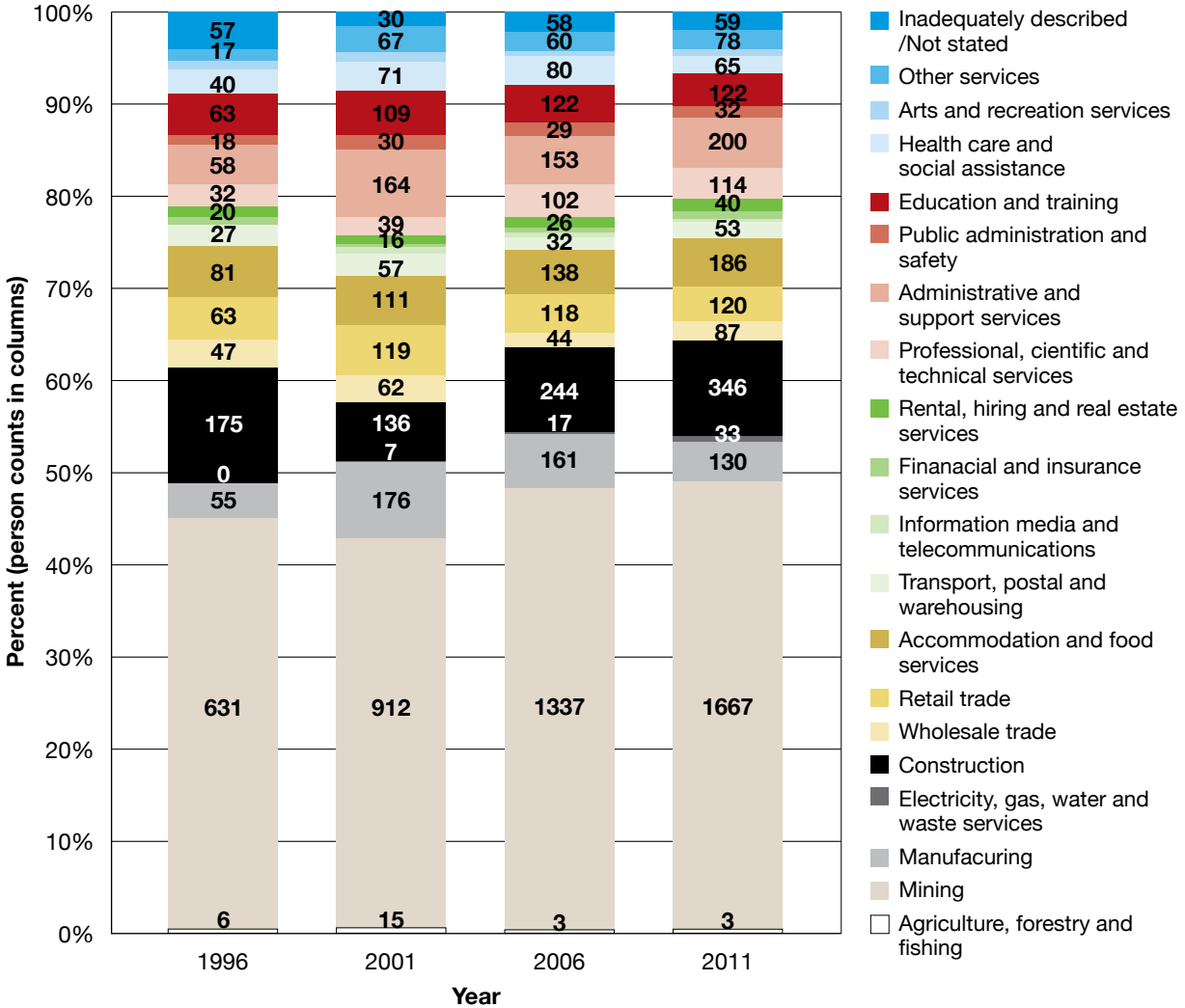
Figure 19: Roxby Downs Mining and Other Employment



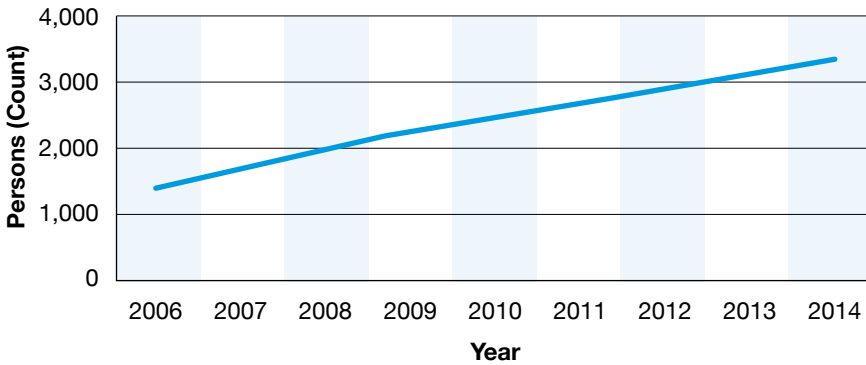
Source: Australian Bureau of Statistics, 2008b, 2013c.

Figure 20: Roxby Downs Employment by Industry by Place of Enumeration and Roxby Downs Total Employment

A) Roxby Downs Employment by Industry by Place of Enumeration



B) Roxby Downs Total Employment

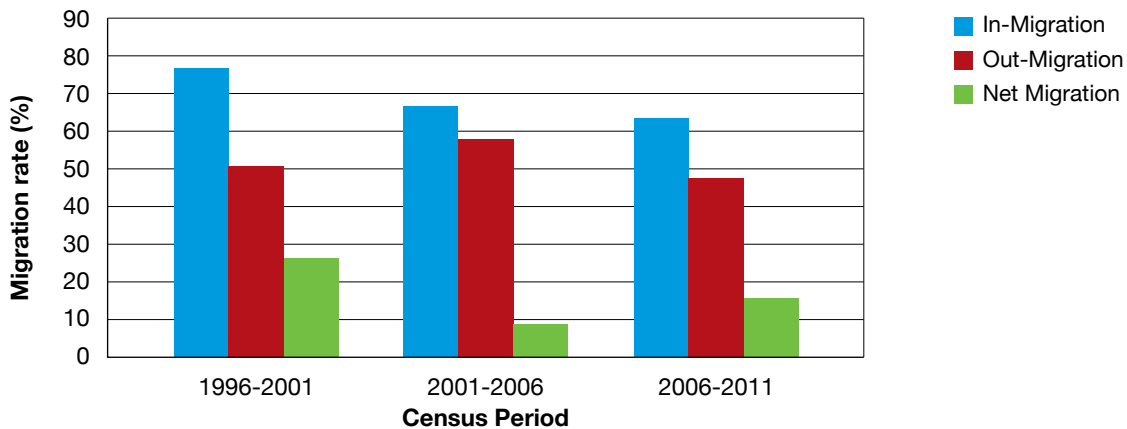


Source: Australian Bureau of Statistics, 2008g, 2013f.

Roxby Downs has a highly mobile labour force and population. Population turnover, migration rates, and place of residence and enumeration provide insights to this mobile labour force and impermanent population. Between 2001 and 2006 Roxby Downs had the seventh largest turnover of population in Australia, with 122 per cent of the population arriving or leaving across the period (Australian Bureau of Statistics, 2013j) with an increase to 124 per cent between 2006 and 2011 (Australian Bureau of Statistics, 2013k).

Figure 21 reveals Roxby Downs has experienced relatively high in- and out- migration rates since the mid-1990s, indicating equally high levels of population turnover. The net migration rates were also highly varied. For comparison, rates of in-migration for high amenity areas of the State (e.g. Victor Harbor) partially exceeded 40, while out-migration rates above 30 are rare (Argent, Tonts, Jones, & Holmes, 2010). Interviews conducted with Roxby Downs residents found that (i) many people move to Roxby Downs with five year career plans; (ii) mining company career development plans involve staff moving residence in Australia and overseas; (iii) and people reside in Roxby Downs whilst their children are young then change to a FIFO basis when the children are of high school age.

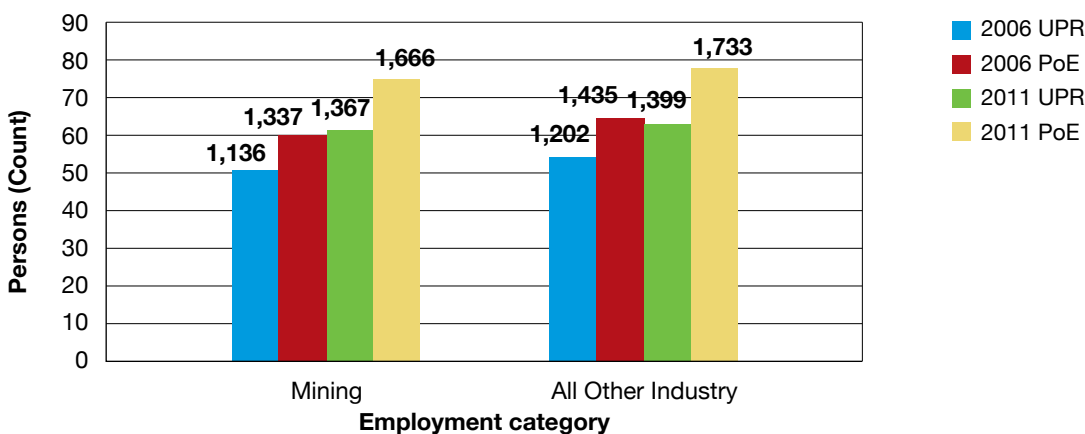
Figure 21: Roxby Downs Migration Rates



Source: Australian Bureau of Statistics, 1993b, 1998, 2002a, 2008c, 2013d.

Figure 22 highlights the difference between usual place of residence and place of enumeration for mining and all other industry combined. The high number of people in Roxby on the night of the census compared to the number of residents suggests FIFO/DIDO is utilised by mining and other industries supporting Roxby Downs and the Olympic Dam mine.

Figure 22. Roxby Downs Employment by Usual Place Residence (UPR) and Place of Enumeration (PoE)



Source: Australian Bureau of Statistics, 2008c, 2013d.

BHP Billiton recently announced it will not proceed with a planned open cut expansion of Olympic Dam resulting in expected staffing cuts (Australian Broadcasting Corporation, 2015b). This coincides with an increase in the number of vacant properties for sale and rent, and the closing of retail outlets (McGuire, 2014a, 2014b; RPData, 2014). Again, while mine production and town population has been on an upward trend since 2005, post 2011 the population is expected to decline given the curtailment of resource development.

Synthesis Discussion, Policy Implications, and Conclusion

It has been well documented that the benefits from the recent decade-long resources boom have been broadly distributed across the nation (Minifie, 2013; Sheehan & Gregory, 2013). However, importantly for remote Australia, the wealth generated from mining is not distributed evenly back to or within the regions where mining occurs (Haslam-McKenzie, Rolfe, Hoath, Buckley & Greer, 2013; Hoath & Pavez, 2013; Johnson, 2009). This fact is corroborated by the variation in demographic and employment characteristics of the remote mining case study locations considered in this article as synthesised in Table 1.

Table 1: Demographic and employment characteristics of case study locations, 2011

Location	Roxby Downs	Jabiru	Yuendumu	Leigh Creek
Population	4702	1851	687	505
Aboriginal peoples	87	219	587	15
Aboriginal percentage	2%	12%	85%	3%
Total employment	3398	978	150	200
Employment percentage	72%	53%	22%	40%
Mining employment	1667	320	0	136
Mining/total employment percentage	49%	33%	0%	68%
Mining town service centre	Yes	Yes	No	Yes

While Roxby Downs has the largest population, the percentage of Aboriginal people in the population is small, like in Leigh Creek, mining is the predominant employer and more so in Leigh Creek, while overall employment of the population is high and even higher in Leigh Creek. In contrast, Jabiru has just under half the population of Roxby Downs, a higher Aboriginal percentage than Roxby Downs and Leigh Creek, but is able to maintain total employment at a reasonable percentage, with mining contributing moderately to that employment. Jabiru, therefore may provide some inklings for success. While Yuendumu and Leigh Creek have the smallest populations of the case study locations, they offer contrasts in Aboriginal representation (Yuendumu 85%; Leigh Creek 3%) and employment, with Leigh Creek having around twice as many people employed compared to Yuendumu and with mining employing almost 70 per cent of the population in contrast to Yuendumu's zero per cent. These contrasting comparisons, suggest a strong negative correlation between Aboriginal representation and employment, and moderate correlation between Aboriginal representation, and the dependency a town has on mining to support jobs. Jabiru appears to be the outlier, having a reasonable Aboriginal representation in the population and moderate levels of employment, particularly Aboriginal employment through mining.

From the employment data, we found similar results for Leigh Creek to that of the Northern Territory case locations where employment is more diversified with higher population levels in 2001 versus 2006 and 2011. In 2006, there was a significant fall in mining employment, with education and training taking up considerable slack within the employment market, but other sectors suffered also with many no longer employing anyone. In 2011, mining employment increased again, but it appears Leigh Creek was less resilient to the shock of 2006, with fewer industries employing and lower levels of employment across all sectors in 2011 compared to 2001, with the exception of 'administration and support' sector.

Furthermore, unlike Yuendumu but like Jabiru and Leigh Creek, a large proportion of Roxby Downs' employment results from mining activity. In contrast, while Leigh Creek is dominated by mining employment, without this employment its population was found to be highly susceptible to shocks. The recent announcement by Alinta Energy which closed the mine in late 2015, provides an excellent example of such a shock. Again, Yuendumu contrasts all three other locations, by having a small proportion of mining employment and a highly undiversified economy with reduced capacity for economic participation through employment.

There were some important distinguishing features found for Yuendumu relative to the other case study locations. Mining employment is minimal in Yuendumu and therefore the population of Yuendumu has not necessarily oscillated with mine production or employment through the mine. Yuendumu however does benefit through royalty streams from the mine indirectly helping provide much needed funds to provide essential social and community services. This points to the need to consider the array of streams through which benefits from mining can be delivered and delivered in a sustaining way. Also, Jabiru and Roxby Downs have more diversified employment opportunities than experienced in Leigh Creek and especially in Yuendumu. *Ceteris paribus*, these latter two towns are therefore more dependent on oscillations in the returns provided by mining to the local economy.

This article has provided evidence that the scale and pace of mining developments and long distance commuting to remote mine sites has changed the nature of benefits between the mines and their associated remote communities, none more so than through long distance commuting and mine shift work practices. There is, therefore, a pressing need for more strategic approaches by governments and companies to generate benefits both short and longer term for local remote communities. A range of possible strategies are available to decision makers.

Firstly, a shared engagement approach could be used to ensure community buy-in to expected long-term benefits. Secondly, timely and coordinated planning is an essential precursor to providing local job opportunities or otherwise at various phases of the mine's lifecycle. No such planning took place in Leigh Creek and there is no future vision of Roxby Downs without mining as examples. A comprehensive management plan cognisant of the potential environmental, social and economic impacts and benefits of the mining workforce could be developed at the outset of mine planning with key community and government leaders. Only relatively new mines are implementing such practices, whereas the mines in these case locations are well established in their lifecycles. Management plans should therefore be required retrospectively and be iterative.

Mining is also not the only responsible partner in delivering enduring community value from mining. Governments, communities and remote people are also responsible, governments even more so where institutions commonly available in the city are not available in the bush. The contrasting case studies above, particularly through Leigh Creek's closed town approach and unincorporated local government nature, and lack of free access to land and property title, are examples of where even the best intended remote economic development efforts can prove futile in the face of poorly designed institutions (Blackwell, Dollery & Grant, 2015;

Blackwell, 2012). Therefore, sometimes the avenues for delivering lasting benefits lie within community will to have free and open representation, garner support from outside regions and people, and gain access to the standard institutions that the rest of society enjoys (Blackwell, Dollery & Grant, 2015). Being open to non-mine residents, unrestricted access in local land and property markets, an ability of residents to have locally responsible and accountable local government, and early strategic planning by government, mining companies, and communities around how to manage the peaks and troughs of returns to community, offer key institutional reforms for such cases.

Not many things are certain for remote mining and associated communities, however, mine production, employment opportunities and resultant population are inevitably connected. Long distance commuting and modern mine work practices have the capacity to disconnect communities from remote economic development opportunities, which during boom times can be detrimental but during contractions can offer a cloaked benefit (Blackwell, Fischer, McFarlane & Dollery, 2015). Furthermore, as we have seen in the evidence from Yuendumu, mine employment is not necessarily an attractive occupation for all Aboriginal people and other avenues for delivering benefits are necessary in such cases. Similarly, whether communities wish to engage and are able to engage is an important consideration in delivering lasting benefits. While we have not been able to determine definitely whether specific factors deliver enduring value, we have outlined some of the contrasting characteristics of the case locations and how this has manifested in terms of employment.

Finally, non-employment avenues are particularly relevant for remote communities, where economies tend to be less diversified, communities are more significantly distant from associated mines, and communities are less resilient to shocks such as falls in commodity prices or the closure of a mine. In such cases, royalty payments, infrastructure provision, local economic contracting and spending, and regional partnerships are critical to the ongoing development of remote communities (see Blackwell, Dollery & Grant, 2015 for further discussion) and these also must be considered early in the planning process.

Acknowledgements

The work reported in this publication was supported by funding from the Australian Government Cooperative Research Centres Program through the Cooperative Research Centre for Remote Economic Participation (CRC-REP). The views expressed herein do not necessarily represent the views of the CRC REP or Ninti One Limited or its participants. Errors or omissions remain with the author. We also wish to acknowledge Ninti One for providing the resources to fund this Special Issue as well as the Northern Institute, at Charles Darwin University for providing the opportunity for publication. The authors are grateful to Kate Rampellini for the preparation of the maps.

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