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Regional Economic Development through Creative Industries:

Townsville as a Key Centre for the Northern Australia Vision

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20-22 July 2015
Regional Economic Development through Creative Industries: Townsville as a Key Centre for the Northern Australia Vision

ABSTRACT: Creative industries continue to be recognised as a key contributor to economic growth, given they can be developed without investment in major infrastructure projects that other industries require (e.g. agriculture, resources). In addition to recognizing the importance of creative industries, the current Australian government has recently renewed a focus on the vast northern tropical area of the country as key to future economic and population growth. Townsville, North Queensland, the most populated provincial city of northern Australia, will be key to the new vision.

A recent study of Townsville’s creative industries however reveals that key sub-sectors of this area of economic activity are in fact in decline (e.g. visual arts, photography, design, fashion, architecture). Therefore, the key aim of this current phase of research, involving a partnership between Townsville City Council and James Cook University, is to provide a detailed analysis of the current supply of creative industries in the city of Townsville. Using recently obtained survey data, this paper provides direct insights into the various employment, job creation and business development issues that creative industries practitioners currently face and which both enable and hamper growth of the sector. The findings reveal a number of insights of relevance to civic leaders in North Queensland, as well as those more broadly responsible for the development of regional economies in the north of the country, in terms of the potential for creative industries to play a distinctive and significant contribution to future population and economic growth.

Keywords: creative industries, economic development, northern Australia, innovation, regional development

Introduction

Creative industries and the creative economy continue to be seen as vital for the growth of developed and developing countries worldwide (Flew and Cunningham, 2010; Mould et al., 2013; British Council, 2014; Flew, 2014; Hartley, 2014). The creative industries sector typically includes core creative arts (visual arts and crafts, creative writing, performing arts),
wider cultural industries (film, television, radio) and related creative industries (design, software development, architecture) (Throsby, 2008). In Australia, the creative industries sector currently contributes approximately $90 billion to the broader economy (SGS Economics and Planning, 2013) and involves 5.3% of the national workforce (ARC-CCI, 2013). In addition to recognising the importance of creative industries through its Ministry for the Arts, the current federal government in Australia has renewed a focus on the vast area of northern Australia as key to the economic growth of the nation, regarding it as the next frontier of development (Liberal Party of Australia, 2013). While this renewed focus has been met with scepticism in some circles (Bell et al., 2014), given there have been numerous policy papers relevant to the development of this region in previous decades, the current government appears committed to this vision, with the impending release of a white paper as well as the recent announcement of a $5 billion loan facility “to promote infrastructure investment across northern Australia” (Saulwick, 2015).

While the early signs appear promising, the achievement of sustainable growth in northern Australia will require significant ongoing investment, given the vast geographical spread, population churn and climate challenges that this area of the country faces. This is particularly the case when comparing existing infrastructure in northern Australia to the southern part of the country, where the majority of the population and hence investment exists. While northern Australia does include one of the eight state/territory capitals in Australia, Darwin is by far the smallest of these with a population under 100,000 people (Australian Bureau of Statistics, 2015). In addition, the majority of the population in northern Australia resides on the east coast, with Cairns and Townsville the two major provincial cities in this location, with populations of approximately 150,000 and 190,000 respectively (Australian Bureau of Statistics, 2015). While each has a relatively small population, Darwin, Cairns and Townsville will be critical to the future of the region and to achieving the northern Australia vision. Townsville, the largest city in northern Australia, forms the focus of a current research project involving Townsville City Council and James Cook University, in terms of the potential for the creative industries sector in this city to play a major role in the broader development of the city and the region, through employment growth, business development and through innovation processes such as Design Thinking and Co-creation. Following a review of relevant literature and overview of the project methodology and design, this paper reports on early findings from this research project.
Literature Review

Regional economies and economic growth

Attention to drivers of regional economic growth remained subdued until Krugman (1991a) introduced the core-periphery model which explicated industry location. The model demonstrated how agglomeration effects may lead to industry concentration, further spatially drawing in other related industries that provide backward and forward linkages (Krugman, 1991b; Venables, 2006). As a result, economic activity and growth may become endogenously determined and spatially concentrated in – what become – metropolitan areas. The Australian economy shows clear signs of concentration of economic activity in its main metropolitan cities, while rural areas – especially regions that are mineral resource poor – struggle to keep up. The endogenous nature of economic growth suggests (1) the divide between high economic growth and low economic growth regions will increase and (2) policies aimed at addressing the divide (or stem the flow) are unlikely to be effective (Grattan Institute, 2011).

However, this self-fueling process of economic growth in spatially concentrated areas will come to a halt as soon as continued agglomeration stops to produce economies of scale. Duranton and Puga (2004) show that continued expansion of metropolitan areas may produce diseconomies of scale for example as a result of congestion, pollution or – particularly relevant in the Australian context – access to fresh water. The majority of economic activity in Australia is concentrated in Australia’s south, where pressure on river systems is mounting. Anticipating agglomeration economies to produce diseconomies of scale at some point, hence as cited earlier the Australian government is contemplating developing the North, where access to fresh water is relatively more secure and population density lower (Australian Government, 2014).

Various theoretical perspectives on how to grow less developed regions exist including cluster (Haak et al., 2014) and place based approaches (Tomaney, 2012). Cluster theory suggests the bringing together of specialised industries in a region enjoying agglomeration effects, while place based approaches stress the integration of interested parties (government, non-government and business) in the region to develop an inclusive framework. One industry sector that has the potential to be instrumental in building a region is the creative industries. Florida (2009) argues that the creative class provides the technology, talent and tolerance conducive to talent attraction and industry development.
That is, the presence of a creative class and creative industries may constitute a catalyst for regional economic growth.

**Creative industries as driver for economic sector innovation**

The understanding of the impact and interconnections between the creative industries and the innovation potential of the wider economy has been expanded in recent years. Globally, the creative industries have been recognised as an enabler of innovation and vital driver of productivity and performance (Bakhshi and McVitte, 2009; Reid, Albert and Hopkins, 2010; Australian Government, Minister for the Arts, 2011). More specifically, the creative industries is seen as having three roles in contributing to the innovation potential of an economy (Müller, Rammer and Trüby, 2009, p.149; Reid, Albert and Hopkins, 2010, p.27):

- producing ideas and the commercialisation of these ideas which contribute (directly or indirectly) to the generation of new services and products;
- offering creative services which can input to innovative activities of businesses and organisations within and outside the creative industries; and
- creative industries are intensive users of technology and often demand adaptations and new developments of technology, providing innovation impulses to technology producers.

Research has shown that the creative industries usually involve a high level of innovation themselves and are therefore instrumental in assisting businesses to innovate (Müller, Rammer and Trüby, 2009; Chapain et al., 2010). Input from the creative industries can lead to innovation in other industries (Bakhshi and McVitte, 2009; Müller, Rammer and Trüby, 2009) such as “new products and services offered to their customers (product innovation) as well as new technologies, procedures and routines within their business that raise efficiency or quality of their output (process innovation)” (Müller, Rammer and Trüby, 2009, p.149).

In recent years, the creative industries sector has been particularly successful in supporting innovation by ‘exporting’ creative methodologies into other industries and facilitating their implementation. The Australian government recognised this development: “Other industries are increasingly employing creative methodologies, talent and using the services of creative businesses to improve their own productivity” (Australian Government,
Minister for the Arts, 2011, p.5). For example, Design Thinking – a human-centered innovation process – is a creative methodology which has increasingly been introduced into areas beyond traditional design in order to accelerate the process of renewing products, services and processes that sets businesses and organisations apart and ultimately makes them more competitive (Brown, 2009).

Another such creative methodology is Co-creation, and which is seen as new way of value creation. Co-creation is about involving people or a community outside the business or organisation in new product or service development (Sanders and Stappers, 2008; Benson, 2013). It is seen as a “quiet revolution overtaking large organisations that is changing how they innovate” (Simoes-Brown and Guy White, 2014). Such a user-led innovation process, although not completely new, brings various benefits for companies that include “direct innovation outcomes such as increased speed to market, increased product quality, and a reduced risk of innovation efforts not meeting customer needs” (Dervojeda, et al., 2014, p.2). Hence, creative methodologies typical to the creative industries sector are now recognised as key enablers of innovation and contributors to the wider innovation eco-system.

**Extant research: creative industries in northern Australia**

While most research to date in relation to creative industries has focussed on large metropolitan centres through the use of clustering methodologies and reporting on statistical data sets, there has been a recent shift towards examining regions and locations beyond the metropolis (Drake, 2003; Jayne, 2005; Luckman, 2009). This has occurred in the United Kingdom (e.g. Jayne, 2005; Lloyd et al., 2006; Bell and Jayne, 2010; Chapain and Comunian, 2010), the United States (e.g. Schlichtman, 2006; Lees, 2006) and Europe (Eckardt, 2006; Fleming et al., 2006; Lazzeroni et al., 2013). In Australia, recent studies include those by Verdich (2010), Waitt and Gibson (2009), Felton and Collis (2012), Luckman (2012) and Gibson (2012). In general, these various studies across a range of global locations reveal the problems of attempting to apply large-city urban theories (e.g. Landry, 2012; Florida, 2012) to regional or smaller locations, as against the importance of taking into account the geographic, cultural and social idiosyncrasies of the relevant place in question.

In relation to creative industries in northern Australia specifically, there is an emerging body of work relevant to this region. Darwin was recently the focus of a major body of ARC-funded study, with this research project revealing the importance and impact of the local environment on creative practice (Luckman, 2009), strong themes of remoteness and
proximity for sector participants (Gibson et al, 2010), as well as particular hot spots for creativity in the city and surrounding areas (Gibson and Brennan-Horley, 2009). In terms of Cairns, extant research studies include those by Anderson (2001), who explored the aboriginal art industry and Daniel (2013, 2014) who investigated creative strengths and impediments of the region, as well as potential strategies for building creative industries and cultural tourism in the area. Similarly, there is an emerging body of work focussed specifically on creative industries in Townsville, including Daniel et al (2013) who analysed Australian Bureau of Statistics and yellow pages data to reveal a preliminary picture of the city’s creative industries workforce, revealing the fact that across the 2006-11 census periods there was a decline in certain sectors (visual arts, photography, design, fashion, architecture). In another study, Daniel (2013) identified a range of opportunities for and impediments to growth in the sector, with limited infrastructure seen as a key limitation but also opportunity for the city. Finally, Daniel (2014a, 2014b) also explored engagement with and the impact of cultural policy in north-eastern Australia, from the perspectives of both artists and key stakeholders responsible for policy and sector development.

Rationale for the study

Given the focus on developing northern Australia and the key role its largest city – Townsville – must play in achieving that goal, it is timely to study the city’s creative industries which can be both a source of economic growth themselves and an enabler of economic growth elsewhere in the city economy through its innovation capacity. Alongside recent findings demonstrating that certain areas of the city’s creative industries are in decline (Daniel et al, 2013), the first aim was to develop a stronger understanding of Townsville’s current supply of creative industries. Specifically, the following two research questions were raised:

1. What are the key issues of relevance to both the current supply and therefore potential growth of Townsville’s creative industries?
2. What is the current role of the Townsville creative industries as an enabler of innovation and hence the potential of the industry to play a significant role towards the northern Australia vision?
Methodology

The current study focuses on the city of Townsville, situated in North Queensland\(^1\). In the last ten years the city’s population grew at 2.4% per year to 192,000 in 2014 (Australian Bureau of Statistics, 2015). Population growth is projected to slow slightly to 2.2% per annum in the next 20 years, implying the city would reach a population of 315,000 residents by 2036 (Queensland Government, 2013). Gross Regional Product was projected to reach 13.4 billion dollars in 2014 growing at an annual rate of 4.7% – expected to top 17.6 billion dollars by 2020 (Deloitte Access Economics, 2011). In terms of economic structure, the public sector is about five percentage points larger in Townsville than the nationwide average – mainly because of a large Defence presence. Otherwise the economic structure of Townsville is comparable to the nationwide economic structure (Australian Bureau of Statistics, 2011).

To gain an understanding of the creative industries in Townsville, we developed and conducted an online survey in order to attempt to reach as many practitioners in the sector as possible. The online survey intended to depict the breadth of the industry in Townsville, current business activity, growth prospects and innovation in the industry. Given the diverse nature of the overall creative industries definition, this study focused on the commercially focused disciplines of design, photography, software development, architecture, advertising and marketing. Based on a scoping study of the creative industries in Townsville (Daniel et al., 2013), we identified 305 businesses in Townsville which we believed were active and operational in the creative industries. Ethics approval to conduct the research was sought and obtained from James Cook University (Ethics Approval Number H5893). A draft version of the online survey was piloted among four creative industries business owners to ensure the quality of the data generated by the survey. Recommendations were taken on board to finalise the survey. We then individually phoned the 305 identified businesses but found that 64 were no longer in operation and 55 were either not interested in participating or did not return phone calls. The remaining 186 businesses were subsequently invited by email to complete the survey in November 2014, which remained live until March 2015. Of these invitations, 29 emails were not deliverable hence the final sample who did receive the survey invitation was 157. In the end, 67 businesses fully completed the survey (response rate: 43%). This paper proceeds to describe the business profile of this sector of the creative industries in Townsville, their business prospects and their uptake of innovation.

\(^1\) In line with the Australian Bureau of Statistics’ geographical classifications, our analysis refers to the Local Government Area Townsville.
Data Analysis

Profiling the survey participants

In order to overview the participants who completed the survey, Table 1 below provides key profiling data.

Table 1: Key profile aspect

<table>
<thead>
<tr>
<th>Key profile aspect</th>
<th>N and/or %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender:</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>27 (40%)</td>
</tr>
<tr>
<td>Male</td>
<td>40 (60%)</td>
</tr>
<tr>
<td><strong>Age:</strong></td>
<td></td>
</tr>
<tr>
<td>22-29</td>
<td>10 (15%)</td>
</tr>
<tr>
<td>30-39</td>
<td>23 (34%)</td>
</tr>
<tr>
<td>40-49</td>
<td>12 (18%)</td>
</tr>
<tr>
<td>50+</td>
<td>22 (33%)</td>
</tr>
<tr>
<td><strong>Total experience in creative industries sector:</strong></td>
<td></td>
</tr>
<tr>
<td>1-3 years</td>
<td>3 (4%)</td>
</tr>
<tr>
<td>4-6 years</td>
<td>10 (15%)</td>
</tr>
<tr>
<td>1-10 years</td>
<td>8 (12%)</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>46 (69%)</td>
</tr>
<tr>
<td><strong>Length of current business ownership:</strong></td>
<td></td>
</tr>
<tr>
<td>Less than one year</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>1-3 years</td>
<td>10 (15%)</td>
</tr>
<tr>
<td>4-6 years</td>
<td>17 (25%)</td>
</tr>
<tr>
<td>7-10 years</td>
<td>13 (19%)</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>25 (38%)</td>
</tr>
<tr>
<td><strong>Location(s) of business workplace:</strong></td>
<td></td>
</tr>
<tr>
<td>Single workplace in Townsville</td>
<td>57 (85%)</td>
</tr>
<tr>
<td>Multiple workplaces in Townsville</td>
<td>3 (4%)</td>
</tr>
<tr>
<td>Workplace(s) beyond Townsville as well (e.g. Brisbane, Malaysia)</td>
<td>7 (10%)</td>
</tr>
<tr>
<td><strong>Types of services provided:</strong></td>
<td></td>
</tr>
<tr>
<td>Design (graphic, web, interactive, interior, landscape)</td>
<td>39%</td>
</tr>
<tr>
<td>Software and/or games development</td>
<td>4%</td>
</tr>
<tr>
<td>Accredited architecture and building design</td>
<td>14%</td>
</tr>
<tr>
<td>Photography (commercial, domestic)</td>
<td>13%</td>
</tr>
</tbody>
</table>
Table 1 reveals that most practitioners (69%) had at least 10 years industry experience, while over half of the surveyed businesses (57%) had been in operation for at least seven years or more. The majority of businesses were single workplaces in Townsville with design services the dominant area amongst this group. As is characteristic of the creative industries sector, Table 1 also reveals that over half of the surveyed businesses operated from a home studio or office.

Key issues of relevance to Townsville’s creative industries

In Figure 1 we show gross business income among survey respondents. We note that the majority of our respondents run businesses with a gross business income between 50,000 and 500,000 dollars per year. However, we also surveyed small enterprises and enterprises whose business income exceeds 1 million dollars annually. Further analysis shows that 83% of these businesses made a profit in the 13/14 financial year; the remainder operated in the red.

<table>
<thead>
<tr>
<th>Type of business premises:</th>
<th>40 (60%)</th>
<th>26 (39%)</th>
<th>1 (1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential/home office space(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial office space (s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: both residential and commercial space(s)</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Film and moving image</th>
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<tbody>
<tr>
<td>Advertising/marketing</td>
</tr>
<tr>
<td>Other: copy/print services, public relations, gallery, signage, business start-ups,</td>
</tr>
<tr>
<td>publishing, IT management, retail, planning</td>
</tr>
<tr>
<td>4%</td>
</tr>
<tr>
<td>14%</td>
</tr>
<tr>
<td>12%</td>
</tr>
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</table>
Figure 1: Gross business income Townsville creative industries in 13/14 financial year

Figure 2 shows the industry origin of clients to the respondents’ businesses. We note three industries that stand out: construction, retail and property and business services. All three sectors are known for their vulnerability to business cyclicality, which implies creative industries may import business cyclicality through their clientele. Three quarters of business income is generated through Townsville based clients, whilst a further 5% is generated through clients based elsewhere in North Queensland. The remaining 18% of business income is generated from clients based outside North Queensland.
Table 2 below describes the business outlook of survey respondents. That is, we asked them where their business in particular and the Townsville creative industry in general would be in three years’ time in terms of gross business income, profitability and employment compared to the current situation. Respondents had similar thoughts for business income and profitability, i.e. the majority think (1) their business income and profitability will improve and (2) business income and profitability more in general for the Townsville creative industries will improve, however there is less optimism about the industry in general than about their own business.

The optimism about business income and profitability does however not translate into optimism about employment growth. Survey respondents are more cautious about employment growth in their own business and less cautious about employment growth in the Townsville based creative industries in general. In case these prospects materialise, the Townsville based creative industries will observe jobless growth in the next three years.
Table 2: Income, profitability and employment outlook Townsville CI businesses for the 2014-2017 period (% of business owners)

<table>
<thead>
<tr>
<th></th>
<th>Business Income</th>
<th>Profitability</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Own business</td>
<td>CI Townsville</td>
<td>Own business</td>
</tr>
<tr>
<td>Decrease</td>
<td>19.0</td>
<td>27.1</td>
<td>17.5</td>
</tr>
<tr>
<td>Stay the same</td>
<td>22.4</td>
<td>30.5</td>
<td>22.8</td>
</tr>
<tr>
<td>Increase</td>
<td>58.6</td>
<td>42.4</td>
<td>59.6</td>
</tr>
</tbody>
</table>

We also asked survey respondents to rate the risk to business growth (0 no risk; 100 severe risk) of a list of 15 factors. Figure 3 shows the findings, reporting mean risk scores. The top five risks to business growth comprise of ‘non-qualified amateurs in the market’, ‘low profit margin’, ‘competition from outside Townsville’, ‘disregard of TSV based clients’ and ‘competition in Townsville’. Two themes emerge. Theme one is around strong competition from both within Townsville and outside Townsville, leading to low profit margins. Further analysis shows that large firms (gross business income in excess of 100,000 dollars) consider competition from outside Townsville a more important risk to their business than small firms, who are presumably less likely to compete for work that attracts non-Townsville based competitors. Theme two is around a lack of recognition of the quality of the work provided by local businesses, which potentially leads clients to neglect local CI businesses when tendering work.
Figure 3: Risk factors to creative industries business growth in Townsville

Innovation capacity of the Townsville creative industries

The impact and interconnections between the creative industries and the innovation potential of the North Queensland economy is difficult to measure. However, the survey sought insight into the innovation capacity of the Townsville creative industries through looking for indicators that suggest a capacity to support innovation activities within the industry itself and in other industries. We asked survey respondents to report on the character of the creative service provided to clients, e.g. Did the creative service contribute to outcomes that were new to the client’s business, new to the market or had innovation potential, etc.? Figure 4 shows survey respondents views on the kind of outcomes for clients the majority of their work contributed during the 13/14 financial year.
Figure 4: Creative services resulted in the following outcomes for clients during the 13/14 financial year

- **Improved current needs of end users**: 61%
- **Satisfied unmet needs of end users**: 56%
- **New to the clients’ business**: 47%
- **Had potential for significant innovation**: 26%
- **Produced novel insights**: 11%
- **New to the market**: 10%
- **New to the clients’ business**: 6%
- **New to the world**: 3%
- **New to the industry**: 2%

Figure 4 shows that the highest percentage (61%) of creative services provided resulted in outcomes for clients that ‘improved current needs of end user’, thus describing the traditional nature of the creative businesses and practitioners as service providers. The crucial criteria which can drive innovation, that is to contribute creative services to outcomes that ‘satisfy unmet needs of end user’, ranks second highest with 56%. Respondents also reported to have contributed to outcomes for clients that had ‘significant potential for innovation’ (26%), were ‘new to the client business’ (47%), ‘new to the market’ (10%), and even ‘new to the world’ (3%). Considering that within the creative industries are service providers who are less likely to support innovation activities in other industries, such as for example a portrait/wedding photographer, the findings suggest creative industries service providers consider themselves a source of significant innovation potential.

Another indicator that highlights the capacity for innovation within the creative industries itself and through their input into other industries is the level of familiarity and use of creative methodologies that help to accelerate the process of renewing products, services and processes such as Design Thinking and Co-creation. Definitions of what constitutes Design Thinking and Co-Creation were provided in the survey. Figure 5 and Figure 6 show the use of Design Thinking and Co-Creation of survey respondents when working on projects for clients.
Figure 5: Level of use of Design Thinking when working on projects for clients

- Always: 32%
- Yes, often: 21%
- Yes, from time to time: 11%
- Rarely: 5%
- I have heard of it but do not use it: 6%
- I have not heard of Design Thinking: 24%
- I have heard of Design Thinking but have not used it because it is not relevant for my business: 1%

Overall there seems to be high familiarity with creative methodologies that support innovation activities such as Design Thinking and Co-creation in the Townsville creative industries, with 76% of respondents being familiar with Design Thinking and 83% with Co-
Creation. According to survey respondents, Design Thinking is applied ‘always’ or ‘very often’ by 53% of the creative service providers when working on projects. Co-Creation is applied ‘always’ or ‘very often’ by 31% of the creative service providers. This is a high percentage in particular considering that both methodologies require the active involvement of end user in the creation process of products, services or processes that is usually time consuming. There is however also a group of respondents who have not heard of either approach (Design Thinking 24%, Co-Creation 17%).

**Discussion and Conclusions**

The survey provides some insights into the various employment, job creation and business development issues that creative industries practitioners currently face in Townsville. While participation in the survey was limited to 43% of the identified sector businesses, and there were various issues associated with attempting to definitively identify current businesses in the sector, the data provide an opportunity to present some tentative findings in response to the research questions. In relation to the first research question (What are the key issues of relevance to both the current supply and therefore potential growth of Townsville’s creative industries?), the survey revealed that providers of creative services in Townsville rely heavily on three industry sectors to generate their business income. This is problematic in that these sectors (construction, retail, property and business services) are vulnerable to business cyclicality hence making the creative industries similarly vulnerable. Although the health of the creative industries as a sub-economy is always closely linked to the broader economy, increasing the uptake of creative services in other industry sectors is crucial to making the creative industries more visible and viable as an economic contributor. Increasing the uptake of creative services involves three steps. One, the creative service providers need to be on the forefront of entrepreneurial and innovative developments and actively seek and create business opportunities in other industry sectors. Two, it needs to be explored whether these other industry sectors outsource their creative services and if so, why? Three, the capability of creative service providers to assist businesses and organisations in innovation processes needs to be more clearly communicated. Awareness and understanding of the current and potential contribution of the Townsville-based creative industries to the regional economy need to be increased, given that creativity is no longer an add-on but has become a strategic issue relevant to all businesses that want to stay competitive in the market and seek growth (e.g. Brown, 2009; Gardien and Gilsing, 2013).
Therefore, in relation to research question two (What is the current role of the Townsville creative industries as an enabler of innovation and hence the potential of the industry to play a significant role towards the northern Australia vision?), a significant issue in regards to the development of regional economies is the contribution of the creative industries to innovation processes of other industries. In the past financial year, a substantial amount of creative services provided led to products, services and/or processes that were new to clients business, had significant potential for innovation or were new to the market. While on the one hand these findings are based on the reported perceptions of survey respondents, hence not tested empirically, the data suggest that there is significant opportunity to further explore exactly how participants focus on innovation and how they in fact lead to new developments for clients and industry.

There is certainly potential to grow the innovation capacity in the creative industries itself. Knowing how to assist clients in innovation processes hence, knowing about approaches to innovation (e.g. Design Thinking, Co-Creation), is likely to be essential. It is not only necessary for other industries to continuously innovate to stay competitive in the market but also for creative service providers. Creative businesses also need to renew or reinvent themselves to adapt for example to new developments in technology, changing work processes and new business models in order to continue to offer services that are cutting edge. This is particularly important as competition within and from outside Townsville was identified as one of the five highest risk factors to business growth in the Townsville based creative industries.

Renewal or innovation within the creative industries can come in various ways, one of which can be in the form of collaboration across the sector leading to cross-fertilisation. The creative industries have a strong culture of interdisciplinary working. Bringing together specialised services in a region can lead to agglomeration effects and hence cluster building. 

Given the fact that 40 creative industries businesses (60%) involved in this survey research work from a home/residential office, hence are relatively isolated and reliant on reputation and/or e-profile for becoming visible, the potential for further agglomeration through clustering within a more focused geographical area of the Townsville city is worthy of consideration. This in return can lead to knowledge exchange, shared services and access to skilled staff (Chapain et al., 2010). As suggested by Haak et al. (2014) such clusters could grow the regional economy. Potential to join forces across various sectors of the Townsville
creative industries is certainly given in that over half of the surveyed creative businesses operate from a home studio or office, a potential opportunity for civic leaders to consider, in light of the success of such an initiative as the Renew Newcastle strategy where creative workers were given significantly reduced rental rates on empty inner city spaces and which led to a significant boost to the local economy, the tourism industry and the branding of Newcastle in Australia (Crommelin, 2013). As it is known to be difficult to build clusters from scratch (Chapain et al., 2010) further research is clearly necessary in order to develop a deeper understanding of this potential. These insights will also help to uncover potential ‘hidden’ clusters (Chapain et al., 2010) which may either exist or be potentially further strengthened.

Providing opportunities to form creative partnerships can also help to kick-start young creative careers and businesses. Survey data has shown that a large proportion of creative businesses had been in operation for 10 years or more. This is, at one level, a positive aspect and strong selling point when encouraging others to ‘set up shop’ in Townsville. However, in contrast, this might suggest a lack of younger creative professionals entering the market. A concern that emerged from the survey is optimism about business income and profitability of creative businesses in general but which does not translate into optimism about employment growth. Hence, the Townsville based creative industries will potentially observe jobless growth in the next three years. This can lead to young creative talent and graduates from regional institutions (e.g. James Cook University, TAFE) not finding employment in the region and therefore leaving the area to find employment elsewhere, most likely in metropolitan areas. However, young creative entrepreneurial risk-takers are an essential part of any economy that wishes to grow. They may lack experience but have the ‘creative edge’ that can spark fresh ideas and the development of new market niches often through the use of new technologies. Cluster and place-based approaches (Tomaney, 2012) can help creative graduates to find employment in the region (Chapain et al., 2010).

Overall, the survey gives one early set of insights into the views of a group of creative industries practitioners in the city of Townsville. There is clearly a need for further research, through such means as interviews with creative industries practitioners, as well as an exploration of other economic sectors in terms of their usage and value perceptions in terms of local creative industries services. That is, to what extent is creative industries work lost from Townsville to capital city or online (international) providers? What are the reasons for this potential leakage and what steps might be taken to retain more work within the city and
which then has the potential to provide employment growth and a more vibrant local economy? These questions provide the research team with a basis for moving into further research phases and which is necessary given the complexity of the issues and the need to provide a more nuanced assessment of the potential future contribution of creative industries to the Townsville economy. These ongoing findings will also provide an opportunity for the research team to present implications for key stakeholders in other parts of northern Australia who will also need to find a myriad of ways of contributing to the northern Australia vision.

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Exploring the Role of Cultural Sustainability in Tourism Development

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Exploring the Role of Cultural Sustainability in Tourism Development

**ABSTRACT:** New definitions of sustainability include Culture as a fourth pillar of wisdom for driving Sustainability. The paper and presentation provides a business case for including this pillar within the framework of sustainable development. Through a number of cases studies from Italy, Mexico and Sri Lanka a model for development can be presented. The argument put forward is largely about utilizing the knowledge industries such as Heritage Conservation to assist with this process. To do this we need to increase reliance on the tourism infrastructure that retains an understanding of the qualities of historic buildings and vernacular architecture. More over provides deep histories of the cultural, social and economic aspects of this infrastructure. The current work in this area is shallow and fails to really engage tourists at a deeper level. The paper presents a methodology for the improving knowledge base and improving the tourism experience.

Keywords: Sustainability; Culture; Development; Tourism; Sustainable Design.

**Introduction**

Tourism development has yet to full embrace sustainability although new standards for the Sustainable Development of tourism facilities have been created and there has been some progress for implementation although issues still remain. These issues are wide ranging some are about the leadership issues within the industry (Meijs 2009). Some see the importance of impacts on the quality of life local communities of tourism (Kim et al 2013); some argues these standards seek to embrace mainly environmental sustainability (Hyde et al 2007). This paper explores four main questions. First, what is Cultural Sustainability? Second, why is it important? Third, where can it be applied to tourism and forth how can it be implemented?
What is Cultural Sustainability?

Cultural Sustainability is seen as one of the four pillars of wisdom that provide the framework for sustainability for the 21st Century (Yencken and Wilkinson 2001). Yet the definition of Cultural Sustainability is still broadly based, covering a wide range of issues, including attitudes, values and customs of societies and communities.

The Sustainability Debates

The debate currently is how to achieve sustainability (Mawhinney 2002). This started from a concern for the environment and evolved around environmental protection (Hurst 1995). The debate now appears to have broadening suggesting that it necessary to integrated the current three key pillars of wisdom- environmental, economic and social sustainability- with cultural sustainability to achieve Sustainability However, many now see cultural sustainability as a new factor and see it moving more to the centre of the debate on how to achieve sustainability. There is a strong belief that cultural sustainability is the force that binds the pillars and promotes success in any intervention to achieve sustainability (Bolt 2004).

Why is cultural sustainability important?

The concept of Cultural Sustainability appears to have originated from the UN World Commission on Cultural Development in 1995, where an argument was presented for the long-term needs of future generations to have access to cultural resources (UNESCO, 1995). To this end Hawkes reports that there are three main questions concerning nature of cultural sustainability.

- What is the role served by ‘culture’ in progressing Sustainable Development?
- Where and why should the application of the ideas of Sustainability be applied to current cultural concerns?
- How can ‘cultural traditions’ be ‘stored and captured’ for future generations? (Hawkes, J. 2001)
Cultural Capitol and progress of Sustainable Development

The first question relates to placing this work in an economic context. There is tremendous opportunity for the work to fit within what is called emerging ‘cultural industries’ (Nurse 2006). That is the use of ‘cultural capital’ as a strategy for progressing Sustainable Development. It is seen as an alternative pathway for development, which is current entrenched in growth through modernisation or growth through Gross Domestic Product (GDP) using industrialisation and other forms of economic capital investments (Nurse 2006). These pathways incur heavy environmental impacts. Hence, it is argued that the development of cultural industries, through the use of cultural heritage can be an additional pathway for Sustainable Development, which may incur reduced environmental impacts. Cultural heritage can be defined as the history of a place and its people and can be expressed through the dress, customs, beliefs, architecture, art, music and books of those who came before us (Henderson 2013).

The current interest in this approach is growing. Hawkes (2003) places cultural sustainability as a central role in public planning and community change. He argues that cultural sustainability that focuses on the creation of values, meaning and purpose in life. He suggests this contrasts this with the alternate view of culture as simply ‘arts and heritage,’ and argues that hence avoids a current ‘duality of usage’ which ‘has created significant problems and confusions.’

The role of cultural sustainability relevance to and is a growth area of interest in the convergence of tourism, culture and sustainability. UNESCO argues that...

‘Cultural and natural heritage, that attracts so many tourists, and is a resource for development, is, fortunately, distributed throughout the world, thus providing an additional opportunity for many non-industrialized countries. Raising awareness, educating and training the staff concerned, is essential in involving communities in the process of conserving and enhancing their heritage. It is the involvement of all that will enable the heritage of humanity to be better preserved, living conditions to be improved and poverty reduced. Preserving cultural and natural heritage, to bring it within reach of all, making cultures and civilizations better known, improving daily living conditions and reducing poverty, is what gives meaning to the sustainability of tourism development’ (Robinson and Picard 2006).

Cultural Sustainability and City Planning

The second question the redefinition of cultural sustainability will contribute to the design and development of culturally sustainable cities. The work carried out in Canada has
developed principles for using the four-pillar model, Cultural Sustainability incorporates four interlinked dimensions: environmental responsibility, economic health, social equity, and cultural vitality. Hawkes addresses the need for a cultural perspective in public planning and policy by proposing practical measures for integration. In order for public planning to be more effective, Hawkes (2003) argues that…

‘government must develop a framework that evaluates the cultural impacts of environmental, economic, and social decisions and plans currently being implemented in cities and communities.’

Hence the four pillar model further demonstrates that the contribution of culture to building ‘lively cities and communities where people want to live, work, and visit plays a major role in supporting social and economic growth’ (Hawkes 2003).

_Cultural Traditions and Environmentalism_

The final question posed by Hawkes concerns looking at how ‘traditions’ can be ‘captured and stored.’ Currently there is concern that the definition of Cultural Heritage is too narrow. Throsby argues that definitions of sustainability focus on the preservation and maintenance of a range of environmental values, particularly those concerned with conservation of the environment (Throsby 2001). It is therefore important to investigate the embedded environmental values as part of cultural sustainability. So really the issues is to investigate the way past civilisations have accommodated or not accommodated environmentalism.

_Current progress on cultural sustainability_

Assessing the current state of cultural sustainability is underway.

At the theoretical level there is ongoing research into definition of, processes for and integration of the four pillars of wisdom into a more holist model for sustainability (Scammon 2015). A number of research approaches are emerging around cultural sustainability.

1) Classical approach examining the manifestations of a culture, particularly the high art, literature and architecture.
2) Everyday life approach, which examines the everyday practices of civilizations.
3) Context based approach, which starts from the place and time and describes the manifestations of civilisations that come from that context; it analyses relationships and looks at conditions (Hyde 2016).
The first approach is worldwide and led by UNESCO who has developed a number of World Heritage sites (UNESCO 2015). The second approach is emerging particularly in Australia. A study by Driscoll and Nicole for example has examined the cultural development of Australian country towns from the social perspective. The main issue is the way cultural values are sustained and evolved (Driscoll, C. D., K and Nichols, D. 2009). The third approach is particularly related to planning, architecture and its environmental setting. Studies by Hyde et al have been carried out through the Green Renaissance Project initially developed in 2008. The aim of the project is to *rediscovering ‘old knowledge’ pertaining to sustainability of past cultures and evaluating it for modern purposes such as education, new design strategies and techniques and use in cultural industries.* (Lazer et al 2011)

In this way the project can building the knowledge base of the cultural sustainability of particular buildings and sites. A number of case studies have been carried out in Italy, Mexico, and Sri Lanka (Hyde, R.A. and Rajapaksha, I., 2016, Hyde R.A. 2015a, Rajapashka, U., et al 2014, Lazer et al 2011). In the case of research in Mexico City on a World Heritage site, it was discovered that there are intersections between cultural sustainability and the additional factors of economic and environmental factors (. Hyde, R. A., Upadhyay, A., Treviño, A., 2015). These approaches all have relevance to the tourism since each articulates a particular tourism experience by providing knowledge and insight not previously known.

At the applied level the Australian Government set up an Action-plan to drive the cultural sustainability through education at a community level (Department of the Environment, Water, Heritage and the Arts, 2009). Hence, research is needed to build the knowledge base for education through projects such as those found in the Green Renaissance Project. In addition new intersecting theories such as Bioclimatics, Biomimetics and Biophilia can be used to provide insight into the cultural sustainability as it highlights particular relationships between man and nature (Hyde 2015b). Some common definitions of the theories and their application are as follows.

- Bioclimatics: climate responsiveness of sites and buildings (Hyde 2000).
- Biomimetics: buildings and sites which applies principles abstracted from natural systems for design and applications (Gamage, A. and Hyde, R.A., 2012)
A project carried out at Camooweal at the Dulgalunja Camp is an example of how biomimetics can be used to understand aboriginal technologies and lead to new approaches to buildings. This project looks at how old knowledge from indigenous cultures can be reconciled with western science. The project demonstrated how a more appropriate form of building could be developed (Memmott, P., Hyde, R.A., and O'Rourke, T., (2009).

Progress to utilise these theories is still a challenge however through the use of information from this research can help with working towards new Tourism Standards.

Where can cultural sustainability be applied to tourism?

Research over the last 20 years through the CRC for Sustainable Tourism, which has now completed its work has resulted in a number of eco-tourism, precinct and building standards to assist with moving the industry to a more sustainable future (Hyde, R.A., Moore, R., Kavanaghan, L., Watt, M., and Schiannetz, K, 2015).

New Tourism Standards

The research to date shows an increasing interest in the new Four pillar model of sustainability, in tourism. This is seen as a pathway for progressing Sustainable Development through tourism. However, there are still barriers concerning the provision of incentives for stakeholders to engage in this process (Moore 2010) and to provide frameworks for engagement (Meijs 2009). In addressing these barriers and as part of their ongoing standard review procedure EarthCheck has now incorporated some of these ideas into their latest Destination Standard. The Destination Standard Version 2.0 January 2015 states,

‘The Standard establishes a framework for environmental, cultural, social, and economic (ECSE) performance for communities wishing to achieve EarthCheck Destination Certification. EarthCheck Destinations generally include as part of their location and economic make-up a significant travel and tourism sector.’ (EarthCheck 2015)

Table 1. Destination Standard Key performance compared to Four Pillars of Sustainability Model

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Social</th>
<th>Economic</th>
<th>Cultural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy efficiency, conservation and management □</td>
<td>Cultural and Social Management □</td>
<td>Economic Management</td>
<td>Cultural and Social Management</td>
</tr>
<tr>
<td>Greenhouse gas emissions □</td>
<td>Cultural and Social Management □</td>
<td>Economic Management</td>
<td>Cultural and Social Management</td>
</tr>
<tr>
<td>Air quality protection, noise control, &amp; light pollution</td>
<td>Cultural and Social Management □</td>
<td>Economic Management</td>
<td>Cultural and Social Management</td>
</tr>
</tbody>
</table>
The Standard has a number of Key Performance Areas, which are shown in Table 1. This compares the KPA’s to the Four Pillar model. The majority of KPAs are concerned with environmental performance areas; however the inclusion of Economic Social and Cultural has been included. Little work has been done as yet in implementing this Standard. One of the main issues is how to measure cultural sustainability and how to implement the Standard?

Figure 1. Local Settings for the Destination Authorities

How can cultural sustainability be implemented?

A number of activities can be identified for implementing the standard.
Finding a Destination Authority and location

A series of site visits around Townsville identifies a number of areas, which could potentially be developed as Destination sites for enhancing the cultural heritage. This can include not only cultural events from the present as well as from the past. Some indicative local settings can be found in the new Destination Standard as shown in Figure 1. This is primarily orientated at finding an organisation that is willing and able to show leadership in managing the process of identifying and developing the site to meet the standard. The following locations were identified using the criteria in Figure 1.

Magnetic Island: It is a natural heritage site and sits within the World Heritage-listed Great Barrier Reef Marine Park. The unique features of the island come from its location in the dry tropics creating a diverse flora and fauna. It is geology created over 200 million years ago. It’s the landscape is very different. From early occupation by the traditional owners of Magnetic Island, the Wulgurukaba Aboriginal people through to European settlement to the present day tourism activities (Australian Tourism, 2015). The context provides an opportunity for applying the

Figure 2. Magnetic Island. The island has a number of themes concerning cultural sustainability. Top left: Unique flora and fauna. Top Right. Human settlement. Bottom Left. From the geology one could image that giants made the island. Bottom right. Dry tropical location.
Measuring cultural sustainability

Using the Destination Standard it is possible to measure cultural sustainability as found on Magnetic Island. A number of measures are used.

1) Involve community in the identification, documentation, and management of the Destination’s cultural heritage.
2) Conserve, value, restore and enhance natural and cultural built heritage sites, artifacts, and cultural expression.
3) Carefully manage the impact of tourism visitation on sites of cultural heritage significance. (EarthCheck 2015, p25)

So working around these four themes as seen in the preceding section, that of unique location in the dry tropic, its geological formations, flora and fauna and the evolution of human settlement, a captivating story of cultural developments that should be sustained emerges. A process of benchmarking is used; the main measures are as follows.

1) The Destination shall commit to the conservation of natural and built cultural heritage sites.
2) The Destination shall ensure a publicly available inventory of existing sites is to be maintained.
3) National and international laws and regulations relevant to the protection of cultural artifacts shall be applied.
4) The Destination will ensure that services related to cultural heritage tourism include provision for appropriate training (EarthCheck 2015, p39).

Further opportunities exist in the country towns such Aye and in the bioregion of Paluma built around ecotourism. The importance of these standards cannot be understated since they provide a framework for developing Northern Australia as well as other parts of the world.

Conclusions

The research to date shows an increasing interest in a new model of sustainability, which involves four pillars of wisdom- environmental, social, economic and cultural factors. Cultural sustainability is a new emerging area. Progress in this area is in its infancy. The role of cultural sustainability is to provide a conceptual framework around which a wide range of culture related issues are integrated. This framework has been established and a number of case studies are emerging which articulate the dimensions to this approach. Furthermore new theories such as
Bioclimatics, Biomimicary and Biophilia offer new perspectives concerning the human relationship with nature, which can be used to examine our cultural heritage and growth. This will necessitate new research to expand the knowledge base surrounds existing Heritage Sites to present a more comprehensive experience to visitors and improve their experience. This is seen as a pathway for progressing Sustainable Development through tourism. However, there are still barriers concerning the provision of incentives stakeholders to engage in this process (Moore 2012) and to provide frameworks for engagement (Meijs 2009).

New standards for measuring Sustainability are emerging from organisations such as EarthCheck, which has a system for assessing Sustainable Destinations (EarthCheck 2015). The standards are going through a process of continuous improvements, which will evolve into systems that address these barriers. They form a framework for implementation, which is necessary in this complex and emerging area of Sustainable Development.

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Now you see it; now you don’t. Looking for the ‘remote advantage’ in the development of Northern Australia

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Developing Northern Australia: recognising remote mixed-market economies

Keywords: remote, economic participation, market activity,

Abstract

One challenge for Northern Australian development is national sampling cannot adequately represent the drivers of economic participation in sparse populations across remote Australia. Over the last four years the Cooperative Research Centre for Remote Economic Participation’s (CRC-REP) programs have gathered data with remote Aboriginal communities, industries and service sector representatives in parts of remote Northern Territory, South Australia, Queensland and Western Australia. As a synthesis of findings from those projects and relevant literature, we ask what and how ‘mixed-market’ activities contribute to structures of economic participation in a sample of remote communities in Central Australia. Finally, we consider what this insight contributes to the discourse of sustainable development in Northern Australia.

‘Mixed-markets’ are those which combine the opportunity and investment of both market and non-markets, such as government or philanthropy. Clustering a sample of remote communities in Central Australia, we compare employment and industry participation data with the presence or lack of local mixed-market structures and activities. We determine that national data is not adequately representing the scope of mixed-market economic activities which are so essential to remote Australians. In light of unpacking this finding, we describe a number of key findings and address three of the key issues. The first is the scale required to interpret the values and variables asserted through customary, natural and linguistic characteristics that contribute to mixed-market activity. The second is the burgeoning and valuable remote capacity and advantage which is associated with mixed-markets and that underpin those activities; and the third examines how the benefits flowing from these can inform the agenda for the sustainable development of northern Australia (Australian Government 2013; Northern Territory Government 2013).
Introduction

This paper emerges from synthesis and integration of findings of the Cooperative Research Centre for Remote Economic Participation (CRC-REP, 2010-2017) research programs. Our focus is informed by a series of synthesis roundtable conversations which elicited themes about remote economic participation which ran across the Remote Education Systems, Aboriginal and Torres Strait Islander Arts Economies, Population Mobility and Labour Force, and Pathways to Employment projects of the CRC-REP. We use the opportunity of this discourse on developing northern Australia to conceptualise how some of the nuances of mixed market activities play out in the context of social, ecological and financial participation in remote and very remote Australia. We also contextualise how the drivers of Indigenous and remote ‘disadvantage’ so prevalent in government policy, impact wider understanding of the opportunity, advantage and capacity of mixed-market activity.

In order to conceptualise the drivers of disadvantage as a policy agenda, we refer you to the key indicators for Overcoming Indigenous Disadvantage Steering Committee for the Review of Government Service Provision (2014). The indicators for Education and Training (p. 1855) and Economic Participation (p. 2386) provide benchmarks at a national level, which impact on the mixed-market activities and opportunity structures in the sample of remote settlements we discuss.

In order to contextualise remote advantage, we acknowledge the significance of community ‘property rights’ as they operate within the Aboriginal Land Rights Act framework. It is likely that Aboriginal law and custom provides a source of ‘remote capacity and advantage’ (Guenther, Bat & Osborne, 2014) that contributes to the strengthening core of identity. Further, linguistic agency exists within the demography of our sample communities, in which the majority of constituents have a heritage associating them with their homelands, and predominantly within the region where they live. The correlating patterns of displacement and linguistic heritage with proximity to homelands differ throughout Australia, but that line of inquiry is outside the scope of this paper.

Terms

Throughout this paper we use the terms market and non-market in keeping with Wolf’s (1979) Theory of ‘Non-market’ Failure: Framework for Implementation Analysis. In Wolf’s terminology ‘non-market’(p. 3) includes government, philanthropy, charity and other
actors in the public sector positioned to implement services where a market economy cannot, or has failed. Wolf suggests that non-market failure is symptomatic of the lack of reconciliation of the real costs and benefits of providing a service with the real costs and benefits to society as a whole (p. 51).

In remote Australia, the ‘mixed-market’ industries we seek to investigate are typically subject to admixtures of ‘market’ and ‘non-market’ forces. ‘Customary economy’ is a term coined by Altman (Altman & Martin, 2009) referring to systems of law and custom by which Aboriginal people have inherited and provided custody and management of their homelands for thousands of years, which can be defined as the economic agencies. We accept the term ‘customary economy’ signifies breadth of activities including trade, exchange and obligation that underpin the everyday negotiations and trade-offs at play in the lives of constituents of remote communities (Lovell, Blake, Alice & Wallace, 2014).

![Figure 1. Non-markets, customary and other markets combine to support structures and opportunities of mixed-markets.](image)

The mixed-markets in this sample also rely on what we call ‘opportunity structures’ (Alsop & Heinsohn, 2005). These are the frameworks that inform and enable the economic agencies necessary for empowerment. In this instance they include non-market policy and programs, which benefit market capability through providing practical infrastructure and basic human capital.

**Themes**

Many sparsely populated areas lack large-scale labour market and industry activity and under-report small-scale activity (Blackwell et al., 2014; Carson, Carson, & Taylor, 2013). Literature supports the premise that the choice of mixed and customary market related activity does not receive the same level of non-market attention as those industries which provide employment in public service sectors, or resource extraction industries (Altman & Kerins, 2012; Zander et al., 2014). We suggest that the exponential nature of mixed-market
economies is not evident through lenses such as human capital theory; and does not show up in national data so the multiplier effects are omitted from evaluation and impact assessments.

Wolf’s (1979) theory opens to the convergence of complexity and critical success factors. We draw together data about occupations for mixed-market activity in arts, cultural natural resource management and community research and evaluation in which mixed-market opportunity structures are key to achieving what Wolf (1979) describes as equitable and efficient costs and benefits to society as a whole; and which we suggest are underpinned by the agency of remote advantage and capacity. We suggest there is theoretical and anecdotal evidence of undeniable advantages of remoteness, in market and mixed-market activities, for societies, economies and ecologies.

Assumptions

There are always a number of assumptions on the part of researchers. Here we note those of significance to the thinking behind this paper.

Axiological considerations

We assume the values and wisdom of Aboriginal culture which underpins education about the privileges of cultural heritage and homelands (Minutjukur & Osborne, 2014) is axiological. Many remote Australians, and Indigenous Knowledge theorists and experts (Nakata, Nakata, Keech, & Bolt, 2012; Saini, 2012) acknowledge that links between Human Capital Theory (HCT) and policy and planning affects sparsely populated settlements in remote Australia in ways unforeseen by the governments (Carson, Carson, & Lundmark, 2014; Dockery, 2014).

Tan (2014) cautions us that while it is relatively simple to find fault with the assumptions underpinning human capital theories it is difficult to proffer a suitable replacement theory. Evidence of the trade-offs between customary economic participation and non-market service economies in remote areas suggests public services have evolved (and devolved) in multiple directions and through various policy eras. However, remote aspirations are not always reflected in a interculturalization of industries (Lovell et al., 2014; F. McKenzie & Rowley, 2013), nor in the strategic policy of Indigenous Affairs (Australian Government, 2014a, 2014b; Steering Committee for the Review of Government Service Provision, 2014).
It is our assumption that characteristics of remoteness in central Australia provide advantage and capacity; these include language, custom and country, representing the agency of remote societies, economies and ecologies.

Remoteness

Some quantification of remoteness is required when considering the role of Australian markets and non-markets in remote regions. The Australian Statistical Geographic Classification (ASGC) Remoteness Structure (Australian Bureau of Statistics, 2012) defines remoteness in terms of road distance from settlements to the nearest service centres. Access then, is a key concept for understanding remoteness (Dockery, 2014; Stoeckl, 2010).

Central Australia is an informal but enduring concept that describes the region for which Alice Springs and Tenant Creek operate as service access hubs. The Australian continent includes a network of language groups (see Map of Aboriginal Languages, Australian Institute of Aboriginal and Torres Strait Islander Studies, 1994) which signify cultural orientation to kinship and relationship systems, and to customary trade, exchange and reciprocity. ‘Central Australia’ is a popular concept in tourism marketing, and exists within the psyche of urban and remote Australians alike (Woinsarski, Traill & Booth, 2014). For Aboriginal people of the region, customary, linguistic and cultural mapping does not yet play an essential or equitable part in developing Northern Australia (J. Morrissey, personal communication, 22 July 2015).

Disadvantage

Throughout this paper, we make reference to the concept of ‘disadvantage’. We acknowledge the term, but we do not necessarily accept its validity. The intent of the word is to convey a sense of ‘disparity’ (Bath, 2011) between Aboriginal and Torres Strait Islander and non-Indigenous people on a range of indicators (see for example Steering Committee for the Review of Government Service Provision, 2011a). The concept then extends to ‘closing the gap’ (Council of Australian Governments, 2009) in a general sense and in a more specific educational context (What Works: The Work Program, 2012).

While we accept that the data shows a gap - and in some cases a widening gap - the construct is defined from a non-remote position which fails to take into account local indicators of success or advantage (Guenther et al., 2014b, Guenther et al., 2013b). It also fails to take into account the agency and power of many people in remote communities who
refuse to comply with the supposed hegemonic control of systems (Guenther & McRae-Williams, 2015; Lovell et al., 2014).

Limitations

*Overcoming Indigenous Disadvantage* (Steering Committee for the Review of Government Service Provision, 2014) acknowledges that limitations relate to ABS data used in assessing health outcomes, as defined by the *Closing the Gap* strategy (Australian Government, 2012). However, there is no note on data limitation regarding economic development, which includes ‘land and business ownership, access to equitable education, employment, and income support’ (Steering Committee for the Review of Government Service Provision, p. 9.1).

The *Council of Australian Governments* (COAG) targets and headline indicators for Indigenous Health (Osborne, Baum & Brown, 2013) requires ‘collaborative relationships with local communities and businesses’ as essential to successful employment (2014, p. 6) and participation with family, community, culture and country in remote areas is vital to health (2014, p. 5). Many sources confirm ‘Indigenous Knowledge’ frameworks are a human right (UN General Assembly, 1948). However, the advantages of Indigenous Knowledges are lacking from non-market evaluations and across policy agendas.

Literature

*Human Capital Theory*

In writing, we acknowledge human capital theory (HCT) has driven such planning and policy agendas nationally, and internationally, for several decades (see for example Australian Council of Trade Unions & Trade Development Council, 1987; Banks, 2010; Quiggin, 1999), but lacks the language to deal with the complexities and critical success factors effecting sparse and remote populations (Carson et al., 2015).

We foreground Human Capital Theory as the most influential and prevalent theory informing national and international western economic policy. HCT assumes causality exists linking educational aspirations to employment outcomes, with those outcomes conforming to labour market needs and geographies. Tan (2014) addresses the question how Human Capital Theory developed by describing the philosophical, theoretical and ethical premises and branches of the Theory, which traces its roots back to neoclassical economic thinking.
Neoclassical economics depends upon choice and causality; people choose education because they will earn more. The assumption rests upon another: that it is a logical and fixed trait of human behaviour to obtain education and aspire to well-paid employment (2014, p. 424).

Teaching and learning

The strengthening core of identity is evident across the findings of our mixed-market sample, and has emerged in findings from CRC-REP projects in Red Dirt Research in Remote Australia (Guenther, 2014) and particularly Remote Education Systems (Guenther et al., 2013a). There is a role for intercultural learning and teaching that acknowledges the connectivity of identity and country that enables mixed-market activity. Lovell (2015), Boyle et al. (2009), and Abbott et al. (2008) found everyday teaching and learning is essential to successful mixed-market, whether product, activity or service based.

The United Nations Declaration of Human Rights provides for the expression of Indigenous Knowledge as a human right (United Nations, 1948). While the right to use first language is enshrined in the declaration, linguistic capacity is a significant local and regional advantage in remote Australia. In contrast, the trend against privileging children's capacity to learn in two languages in remote communities is tied to the international commitment Australia has to ensure every child attains the same educational benchmarks in English language. This is in order for Australia to meet its purported future demands for human capital. Yet bi-lingual and multi-lingual capacity is internationally regarded as one of the most important enabling functions for employment into the future and nowhere more so than throughout Asia and in remote Australia.

Markets and Non-markets

Wolf (1979) suggests the reasons for market failure can be modelled: ‘The most general explanation for these failures is markets don’t exist, and can’t be created’ (p. 49-51), but non-market failures remain inconclusive, and as we have observed, subject to policy drivers and political lenses. We consider the impact and context of non-market failure of the sort Wolf (1979) refers to as ‘distributional inequity’ (1979, p. 10) is reflected in the discourses of ‘remote’ and ‘Indigenous’ disadvantage.

The Australian Statistical Geography Standard (ASGS) Remoteness Areas Index (Australian Bureau of Statistics, 2011) and Socio-Economic Indexes for Areas (SEIFA) (Australian Bureau of Statistics, 2015) for remote and sparsely populated contexts are
criticised methodologically (Taylor, 2014), politically and economically (Gerritsen, 2010; Gerritsen, Stanley, & Stoeckl, 2010; Larson, 2010), but they are not at the core of this paper. Of equal relevance, the ABS qualifies characteristics of advantage and disadvantage using the SEIFA at settlement level (Australian Bureau of Statistics, 2015). However, smaller population clusters characteristic of many central Australian Aboriginal communities, are not included in the SEIFA calculations at all (Griffith, 2003). This is an example of non-market failure on the grounds of ‘inequitable distribution’ (Wold, 1979).

In presenting central Australia as a cartographic region, we acknowledge the reliability of ABS sampling in remote areas remains questionable (Taylor, 2014). The shortfalls of national sampling frameworks (built on geographies) limit interpretation of customary economic structures (built on languages), which are conduits for mixed-market participation, and which determine remote advantage.

Data trends and Economic participation

National policy frameworks to overcome remote Indigenous disadvantage (Steering Committee for the Review of Government Service Provision, 2014) can be challenged if we concentrate on what we learn from remote Indigenous capacity and advantage. Blackwell, Mcfarlane, and Blake (2014) find local employment trends in remote Northern Territory Local Government Areas runs contrary to state, territory and national employment figures, and in some remote settlements, rates of Aboriginal employment are higher than regional and urban settings. They find outside the centres of Alice Springs, Katherine and Darwin, local Aboriginal people make a significant contribution through employment.

Yet, as we discuss throughout this paper, there is a trend emerging which suggests the nuanced relationships between non-market and mixed-market activities is critical to understanding economic participation in remote communities; but with nuances omitted in national reporting, so often the available data has not been analysed for constructive use at settlement levels (Acker & Woodhead, 2015; Blackwell, Mcfarlane, et al., 2014).

Method

We know local staff in remote places provides advantage and capacity which are significant to non-market service delivery such as in health clinics, across local shire services, through family and children's work, for aged care programs and in schools. For the purpose
of finding out more about the customary and mixed-markets and industries that are active in an intercultural space, we have concentrated on:

- Occupational Categories (ABS, 2011) that represent mixed-market activities which includes Arts, and Cultural Natural Resource Management
- An industry activity record, where the activity is outside the ABS categories (Ninti One, 2011-12), which is Aboriginal Community research
- One non-market Occupational Category (ABS, 2011) that is representative across the clusters, which is Education

We choose to sample sparse and remote Aboriginal communities in a region of Central Australia included in the Northern Australian Development white paper (Australian Government, 2015). The sample was aggregated by the number (3 or less) of confirmed mixed-market activities in each community. Mixed-market industry activity was captured as Aboriginal art centers, Indigenous Ranger programs and Aboriginal Community researcher activity in 2011.

Constraining factors

The sample from ABS Census 2011 was compiled in ABS ‘Table Builder’. It is formulated for Occupation (OCCP - 4 Digit Level) by Indigenous Geography (ILOC) and Indigenous Status (INGP), for Census counts at Place of Usual Residence (POUR). We approach the ABS data with caution, aware that it is not a reliable representation of the complexity of occupations, and economic participation in sparsely populated settlements and that it does not represent economic activity which is (i) outside the definition of occupation in the census, or (ii) is a secondary occupation.

Occupational data for Educational categories provides a non-market activity (service) comparison that is consistent in its presence across the three clusters. There are no records of Aboriginal Tourism businesses active in the sample region in 2011. There are Tourism products that involve sites within the sample region but they are not aboriginal owned or run, do not utilise local governance or business structures, but may employ locals intermittently as guides.

The data for employment of Ninti One Aboriginal Community Researchers from unpublished project demographics, is a record for a twelve month period in 2011, and does not reflect the same collection method as the ABS ‘snapshot’ (Australian Bureau of Statistics,
Data for economic activity was calculated by the number of artists who sold at least one product in an Aboriginal Art Centre for the twelve month period in 2011, and was sourced by cluster from CRC-REP Aboriginal and Torres Strait Islander Arts Economies project (Tim Acker, Pers. Con., 2 June, 2015). In the case of Aboriginal Community Researchers, we use program data to indicate the number of people involved in casual employment during a year (2011-12).

**Data**

**Map 1:** showing the location of each of the communities sampled, identified as clusters.

To build a snapshot of mixed-market economic activity across clusters we identify the arts, resource management and commercial research industries, as they were active in the region in 2011. We have clustered remote settlements (see Table 1) as One - three mixed-market economic activities and opportunity structures; or Two - one or two activities; or Three - no opportunity structures in 2011. ‘Industry activity’ constitutes local access and infrastructure, and a regional support structure, resulting in a ‘score’ between 0 and 3 for ‘mixed-market activities’.

**Table 1.** Community clusters used for analysis*

<table>
<thead>
<tr>
<th>Cluster One – 3 activities</th>
<th>Cluster Two – 1 or 2 activities</th>
<th>Cluster Three – 0 activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ntaria; (Hermannsburg)</td>
<td>Atitjere (Harts Range)</td>
<td>Wirliyatarrayi (Wollowra)</td>
</tr>
<tr>
<td>Settlements</td>
<td>Communities</td>
<td>Ranger Programs</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Lajamanu</td>
<td>Daguragu Kakarindji</td>
<td>Alpurrulam</td>
</tr>
<tr>
<td>Ltyentye Apurte (Santa Teresa)</td>
<td>Canteen Creek</td>
<td>Nyirripi</td>
</tr>
<tr>
<td>Yuendumu</td>
<td>Ampilawatja</td>
<td>Laramba</td>
</tr>
<tr>
<td>Papunya</td>
<td>Ali Curung</td>
<td>Tara</td>
</tr>
</tbody>
</table>

*Cluster One settlements have an Aboriginal Art Centre, an Indigenous Ranger program and active Aboriginal Community Researchers. Cluster Two settlements have one or two of these only; and Cluster Three has none.

In Table 2, we group ABS data by occupations most likely conflate to each industry. The conflated figures are drawn from the Census data for occupations shown in Table 2 (Australian Bureau of Statistics, 2014) and the record of employment of researcher by settlement during 2011-12 (Ninti One Limited, 2014).

**Table 2.** Occupational categories from ABS census into mixed-market categories: Arts, Cultural Natural Resource Management (CNRM), and non-market Education activities

<table>
<thead>
<tr>
<th>Arts</th>
<th>CNRM</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts Professional (*nfd)</td>
<td>Garden and Nursery Labourers</td>
<td>Child Carers</td>
</tr>
<tr>
<td>Visual Arts and Crafts Professional</td>
<td>Environmental Scientists</td>
<td>Education Aides</td>
</tr>
<tr>
<td>Artistic Directors, Media Producers and Presenters</td>
<td>Livestock Farm Workers</td>
<td>Primary School Teachers</td>
</tr>
<tr>
<td>Welfare, Recreation and Community Arts Workers</td>
<td></td>
<td>School Teachers (*nfd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Private Tutors and Teachers</td>
</tr>
</tbody>
</table>

In Table 2 (*nfd) stands for ‘not further defined’ within the ABS census definitions

**Labour Force and Population**

The Population and Labour Force demographics for each cluster (Table1) include status as Indigenous or Non-Indigenous/Not Stated. We know most people who declare *Non Indigenous–Not Stated* status are ‘migratory’ staff, or the family of migratory staff; those who come to live in a community in order to work there for a period of time.

Figure 2 indicates that Cluster One has the largest population and the largest Labour Force, with Cluster Two diminishing and Cluster Three the least. This is only a very broad indication of economic participation in this region; the usefulness of this interpretation is qualified because occupational census data does not represent an accurate, complete profile of remote settlements (Taylor, 2014).
Figure 2. Indigenous and Non-Indigenous/Not Stated Labour Force and total population recorded at census for the three settlement clusters in the sample. The ratio of INDIG Labour Force to Population across the clusters is 1:5.6 in Cluster One; 1:6.7 in Cluster Two; and 1:6.9 in Cluster Three. The ratio of Non-Indigenous-Not Stated Labour Force to Population across the clusters is 1:1.4 in Cluster One; 1:1.5 in Cluster Two; and 1:1.5 in Cluster Three.

What is interesting is the comparison between clusters. Cluster One labour force to population ratio of 1:5.6 and the highest population. The ratio suggests that in Cluster One, where all the sample industries were active in 2011, more people were available to the labour force. The higher labour force sounds obvious and logical given the higher population - but the question remains: what admixture of market and non-market is required for such contributions to local economies?

We know from literature that mixed-market activities are conduits of remote advantage and capacity, which often align with successful and aspirational activities; and that these combinations contribute significantly to wellbeing as well as to economic participation. This data snapshot suggests the measure of costs and benefits to society as a whole (Wolf, 1979) could be best extrapolated through considering successful mixed-market characteristics and tensions more exponentially and in clusters that capture regional industry support structures.

Mixed-market sample

Figure 3 highlights the correlation by cluster, between the number of people engaged in our sample of mixed-market activity against the labour force statistics at Place of Usual Residence x Occupational status; with the addition of the Aboriginal Community Research activity data for 2011.
Figure 3. Note: Mixed-market as the sample group from within the potential labour force, for each cluster. The ratio of INDIG Mixed-market sample to potential labour force by cluster is 1:4.2 in Cluster One; 1:5.5 in Cluster Two; and 1:5.7 in Cluster Three. The ratio of NI-NS mixed-market sample to labour force by cluster is 1:4 in Cluster One; 1:27 in Cluster Two; and 1:17 in Cluster Three.

One in 4.2 members of the Indigenous labour force is represented in the mixed-market industry sample of arts, community research and natural resource management. To arrive at these figures we augmented the selected occupational categories most likely to represent artists and those involved in natural resource management, with the number of Aboriginal community researchers who worked in their place of usual residency in the role of a researcher in 2011, at one of the cluster communities.

Again, it is fairly obvious – where the option exists for people to contribute through mixed-markets activity that fosters local agency and contributes social, ecological and financial value, we see they represent a significant labour force contribution to the local economy.

Artist selling their work

ABS Occupational data provides information about primary occupation, and omits other activities. The problem with this lack of representation is it is likely to conceal secondary activities and obscure the multipliers of social, ecological and financial value locally, to the region and beyond.
Figure 4. Note: Cluster One – active art centre in each community and active peak body in the region. The ratio of INDIG artists (with a sale) to INDIG population in Cluster One is 1:4; in Cluster Two it is 1:18; and Cluster Three it is nil. The ratio of INDIG artists (with a sale) to Sample (OCCP) for Cluster One is 1:3.9; for Cluster Two it is 1:1.2; and nil for Cluster Three.

Figure 4 is interesting because it demonstrates that potentially, market and mixed-market participation occurs at a rate higher than that expected of the labour force. However, the data is constrained; for example in representing the number of artists who sold an art work, it represents only data available from art centre records (Acker & Woodhead, 2015). We know artists will sell work independently and without a record of transaction, and so we consider the under-representation of market and mixed-market opportunities is likely to be more significant than the data suggests.

As a note of caution, it would be irresponsible to suggest the data, which indicates some level of casual mixed-market activity, could be seen as a legitimate reason to further reduce non-market investment in remote areas. Put another way, the evidence of economic activity occurring should not lead to the assumption that investment is not required. More beneficial would be an analysis of which opportunity structures work, where, why and how this can inform mixed-market success.

Mixed-market sample and non-market activity

The market activity of artists is opportunistic. Occupation in the arts and occasional economic participation as a seller of art are significantly higher where local infrastructure is available; but we lack comparative records for non-art centre activity in these communities.
Figure 5. Each occupational category in the sample for mixed-market industries (arts, cultural natural resource management, community research) and one sample of non-market occupation (education) with the figure representing the number of artists who sold a work at an art centre in the reporting period 2011. The ratio of Artist Sale to Sample (OCCP) for Cluster One is 1:3.9; for Cluster Two it is 1:1.2; and nil for Cluster Three.

As the previous figure (Figure 4) highlights, the number of artists who sold a work during the 2011 FY is greater than the number of people who are recorded as Labour Force participants. This means artistry is an attainable occupation to some degree for a least some percentage of those otherwise unable to participate in the labour force. Without the data to show us, we do not know the demography of this indicator or if it has correlations across other industries.

Findings

We know from literature and research that wellbeing indicators include economic participation and empowerment. This data snapshot suggests mixed-markets provide primary and secondary occupations; and opportunities to engage in economic activity that meet aspirations, are attainable and rely on local capacity and advantage.

Non-market structures do not reflect these qualities of mixed-market activity, which alter the analysis of cost and benefits to society as a whole, and within which social, financial and ecological agency are significant indicators:

- the extent to which people in remote communities value and participate in secondary employment
- the impetus and motivation to invest time and effort in occupations with attainable benefits and outcomes
• customary economic activity as both essential undertakings and ones from which mixed-market activities may flow
• the centrality of wellbeing in everyday life and the impetus to avoid ill-being

Scarcity of information at the local level contributes to regional and national indicators that promote the language of ‘disadvantage’:

• overstated non-market reliance; under-stated market activity
• perceived lack of mixed-market opportunity
• missed opportunity to make and experience choices; eroded governance and self-determination
• eroded economic empowerment
• governance confused with implementation
• diminished consideration of advantages - living languages, laws and customs

In order to provide policy that can support locally nuanced structures, it is essential to understand the relationship of local activities and regional structures.

Regional structures are essential to support and facilitate wider market engagement, and to maintain the innovative edge necessary to recognise and promote the advantages remote communities offer for the future of Northern Australia.

Multi-lingual expression and research are essential to developing northern Australia, but in order to draw together what can be offered to industry, remote advantage and local nuance must be valued and considered.

Indigenous Cultural Natural Resource Management (CNRM) and the Aboriginal arts are known and understood as sources and maintenance of extensive records kept through time across Northern Australian environments. They represent the systems of management of resources, people and laws which are valued in everyday life and underpin many transactions in contemporary life. These are accepted ontological principals.

Discussion

This paper has addressed three of the key issues described in the academic literature. Data sampling and analysis issues for remote and sparsely populated regions are reasonably well-reported in the literature (Taylor, 2014). We have found the data available in the 2011 Census
provides basic information by occupation, but it is impossible to understand from it the extent to which people might participate in industries we describe through secondary employment or occupations, unpaid customary activity, or in other activities with monetary gain.

The Census data alone is of limited use in ascertaining the scope and nature of Aboriginal engagement and capacity for mixed-market economic activity. There is little evidence available of the non-market determinants regarding public contribution to mixed-market opportunity structures. This paucity of information contributes to overstated non-market reliance, perceived lack of mixed-market opportunity, and missing evidence from the local level about customary structures that enable financial, social and ecological empowerment (Alsop & Heinsohn, 2005). Each of these gaps lessens the likelihood that aspirational activity is considered attainable in remote and sparsely populated settlements, which are negative determinants of both sustainability and empowerment.

There is some progress in providing evidence of nuanced remote advantage through value chain analysis (Acker & Woodhead, 2015; Woodhead & Acker, 2014), industry network analysis (Jacobsen & Addinsall, 2013; Jacobsen & Tiyce, 2014), employment, attraction and retention reporting (Central Lands Council, 2014), industry and labour force participation analysis (Colquhoun & Dockery, 2012; Dockery, 2014; F. H. McKenzie, 2013), and educational system and employment pathway analysis (MacRae-Williams & Guenther, 2014), but not enough to construe the costs of non-market failure in remote Australia.

We agree with Carson et al. (2014) that a more nuanced approach is needed to gauge what admixture is useful to mixed-markets because creating advantage is not about theoretically overcoming disadvantage. We have demonstrated local advantage and capacity adds sustainable values to mixed markets, and we suggest this warrants further attention in the context of Developing Northern Australia.

**Conclusion**

Census data alone is of limited use in ascertaining the scope and nature of Aboriginal engagement and capacity for mixed-market economic activity in remote areas. The White Paper on Developing Northern Australia (Australian Government, 2015) expresses some general and high level priorities in relation to Indigenous economic participation, but there is no statement of efficacy beyond ‘known’ opportunities – as opposed to those which remain un or under-reported, or which ontologically privilege remote capacity and advantage.
Has the language of ‘deficit’ overcrowded the reality and begun to promote ‘disadvantage’? Indicators for *Overcoming Remote Disadvantage* (Steering Committee for the Review of Government Service Provision, 2014) stress advantages of non-market contribution in remote Australia through improving ‘land and business ownership’ (2014, p. 78); but the aspirations of the traditional land-owners in relation to mixed and customary market opportunities which accompany land and business activity are not evident. Again, health evaluation of non-market programs in relation to wellbeing emphasize ‘collaborative relationships with local communities and businesses’ are essential (Osborne et al., 2013, p. 6). Clearly, non-market failures do occur, where real costs and benefits of providing a service do not reconcile with the real costs and benefits to a society as a whole (Wolf, 1979).

It is time to recognise aspirational advantages of remote Australia exist beyond non-market scope and imagination, and are not simply characteristics or artefacts of public policy and program implementation. Northern Australia, including Asia, offers opportunities to remote Australians to engage through nuanced mixed-markets, and confidently consider economic empowerment pathways as defined by remote advantage, capacity and aspiration. Non-market enablers of mixed market activity remain essential to avoid the cost of failure.

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Bibliography


Eyes Wide Open: Planning a Resilient Future for North Australian Agriculture, Come Hell or High Water.

Paper: submitted for the Developing Northern Australia Conference 2015

In the Stream – “Policy and Research”


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KEYWORDS: Northern Australia, Agricultural policy, Resilience, Adaptive Capacity, Disaster

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Abstract

Agriculture is a risky business, and natural disasters are only one of the variables farmers have always had to plan for, yet producers “hang in there”. The Commonwealth Government’s White Paper on Developing Northern Australia indicates exciting challenges and possibilities for agriculture, but will these opportunities translate into tangible outcomes for existing industries, individuals and communities? Grand plans for Northern Australia based on the premise of underutilised land, abundant water, and proximity to Asia, are not new, so what lessons might history save us having to learn again, and how might better policy alignment deliver benefits to existing and future industry participants? Preliminary results suggest research focus needs to include resilience and transformability alongside productivity; and that governance networks should foster collaboration and adaptation to solve environmental problems rather than simply exclude activity.

Introduction

Northern Australia is vast, over 40% of mainland Australia. It is geographically diverse, alternatively (and at times simultaneously) very wet and very dry, with an enormous natural resource base yet remarkably small human population – less than 4.8% of Australia’s population choose to live in this well-resourced and democratically governed first world economy tropical region.

This is at odds with international trends, where almost half the world’s population live in the tropics and tropical economies are growing 20% faster than the rest of the world (JCU, 2014). World population is projected to exceed 9 billion by 2050 accompanied by an increase in the middle class demographic (DAFF 2013), and Kharas (2010) predicts that more than half the world's middle class will be Asian by 2020. This larger, wealthier population will require more food, and food of higher value. Linehan et al (2013) speculate that the real value of global food demand is expected to rise by around 70 per cent by 2050 from 2007 levels, with most demand coming from Asia, particularly for meat and processed foods rather than traditional staple grains. Cole and Ball (2010) believe it unlikely that Asia will achieve food self-sufficiency.

These projections have been widely interpreted to provide opportunities for northern agricultural expansion, but this is not the first time grand plans have been espoused for Northern Australia - founded on the premise of underutilised land and bountiful water resources providing the wherewithal to feed the world’s starving millions. But consider that
contemporary farm returns often fail to meet production costs; the social, environmental and climatic unknowns associated with increased agricultural scale; and the inherent risks in agriculture; and the future does not seem quite so clear.

This paper attempts, through a review of academic and grey literature filtered through personal industry experience and current research, to identify whether today’s aspirations differ from past attempts, and what might be the key elements for Australia’s planners and policy makers?

**A Brief History of North Australian Agriculture**

This Northern Australian landscape has had tens of thousands of years of human intervention (Gammage, 2011), and the notion that the ‘natural’ landscape can be maintained in its pre-European state simply by excluding or limiting contemporary land uses does not stand up to scrutiny. The number of Indigenous Australians living in the north is much higher (14.3% of the population) than the national average (2.3%), but the lifestyle and land use of Traditional Owners is now typified by relatively stable population centres and cessation of nomadic lifestyles. European settlement in the late nineteenth and early twentieth centuries was instrumental in this change, and it was the search for economic opportunity that drove the invasion of Aboriginal lands (Bottoms, 2013).

From the earliest beginnings of European settlement a bright future has been forecast for Northern Australia. John McDouall Stuart in his 1865 exploration (p.6) remarked:

> I have no hesitation in saying the country I have discovered on and around the banks of the Adelaide River (near present day Darwin) is more favourable than any other part of the continent … I feel confident that, in a few years, it will become one of the brightest gems in the British crown.

Australia’s non-indigenous development has been succinctly described by Aschmann (1977) as one of an initial investment of capital and introduction of people (sometimes involuntary), extensive pastoralism and limited subsistence farming, followed by mineral discoveries (often gold) that attracted enormous immigration. Extensive agriculture developed to feed these immigrants, often subsequently specialising in a commodity for export. Manufacturing and service industries developed to supply the established population, and the whole complex became economically self-sustaining. Aschmann thought that this sequence was interrupted in the north at the agricultural stage not because of climatic or soil limitations, but because, while
transport was expensive, it was cheaper than local production (a cost-benefit outcome repeated in today’s food-mile debates).

Australia was on the winning end of many late nineteenth / early twentieth century innovations. Mechanisation (the petrol engine, refrigeration) combined with labour shortages (driving the need to innovate) and large areas of land to allow Australia to supply cheap meat and butter to Europe and satisfy the demand for an improved working class diet. Advances in pesticides, herbicides and fertilisers continued to increase productivity. (European) farming systems based on labour-intensive methods could not compete in open markets against mechanised industrial agriculture (Barr, 2009).

The first Commonwealth Administrator of the Northern Territory, Dr Gilruth, placed great hope in the pastoral industry to develop the economy, and in 1914 the (British-owned) Vestey group of companies built the Darwin meatworks, which in turn facilitated control of vast pastoral leases. The meatworks doubled Darwin’s population but, plagued by industrial action and failure to complete the rail line to the Katherine River, proved a dismal failure. They did not open till 1917, and closed in 1920 (Carment, 1996).

The Second World War catalysed strategic concerns about the North’s “emptiness” and highlighted opportunities for development. The government, imbued with a newly-forged nationalism and readiness to engineer the future, established the North Australian Development Committee (NADC) in 1946, charged with investigating the region’s pastoral, agricultural, mining, forestry, marine, fuel and power, and processing and manufacturing industries; and to guide systematic development of these industries (Garnett et al., 2008: vi).

Twenty years later, Dr ‘Nugget’ Coombs, a NADC commissioner and long-time advocate for Northern Australia, said that:

> the optimism at the time and the prevailing views ... that growth was a good thing, that it could be achieved primarily by seeking to impose on the North a pattern of productive activity and a way of life essentially European in its origin and substantially European in its relevance. There was little attempt to envisage the gradual emergence of a more humanized environment capable of self-perpetuation, providing a context for a more rewarding life for those who already lived within it (Bauer, 1977: 8-9).
It is significant that this was at a conference themed *Cropping in Northern Australia: Anatomy of Success and Failure*. An analysis of six large-scale agricultural developments, undertaken by Fisher *et al.* (1977), showed all failed to achieve their stated objectives. A particularly pertinent comment was made by Mollah (1980) in his retrospective analysis of the cropping development at Tipperary Station. In 1967, encouraged by a world-wide beef shortage, tax concessions to encourage investment, and the first stages of the Ord River development, the Tipperary Land Corporation (registered in Texas, USA), announced the biggest agricultural project attempted in Australia, with “American know-how” and $20 million to establish a farming community of 15,000 people, producing 300,000 t of grain sorghum annually and high quality beef cattle. These great expectations were never realised, and farming was all but abandoned after three years and the station sold back to Australian interests. Mollah’s comment (p. 156) was that “Pioneering developments in the North had no room for those who doubted their own ability but, from the outcome at Tipperary, it is equally clear that confidence is no substitute for knowledge and experience”.

Cook (2009) has summarised five historic pushes for (Northern Territory) agricultural development in which government-led research efforts assumed that agricultural development would follow the science; but concluded the aspirational drivers for these initiatives related as much to addressing the perceived risks of Australia’s “empty North” as a genuine commitment to agricultural growth. Even in the more climatically hospitable and richer soils of the Atherton Tablelands (Queensland), Gilmore (2005) considered government-sponsored agriculture was more a means of closer settlement and strategic defence than a food producing venture, and that the maize, dairy and tobacco industries so established foundered when Australian governments realigned the economy according to neo-liberal principles. In 1985, Bauer gave three reasons for the failure of large-scale agriculture in Northern Australia: (1) distance; (2) ignorance of the physical environment; and (3) a reprehensible aversion to learning by experience.

The twenty-first century has seen a focus on contemporary Indigenous management of the North Australian natural landscapes for the provision of environmental services (Cook *et al.*, 2012), but neither previous policy failure nor emerging recognition of Indigenous environmental stewardship has stopped on-going speculation about Northern Australia’s agricultural development opportunities. The twenty-first century drought in Southern Australia (compounded by over-allocation of irrigation water) fed this debate to the extent that in 2007...
then Prime Minister John Howard established, as part of his plan for water security, a Northern Australian Land and Water (NALW) Taskforce to:

“examine the potential for further land and water development in Northern Australia, with particular emphasis on the identification of the capacity of the north to play a role in future agricultural development” (Garnett et al., 2008: vii).

Whilst some industry sectors consider the projections and assumptions in the NALW report conservative (Maher, 2011), the report clearly states that the future of the North should not be limited to pastoralism and/or irrigated agriculture, and that decision making should be based on a thorough and balanced assessment of the economic, social and environmental implications. A commitment to such a decision making context, assisted by ongoing technological developments, would address the first two of Bauer’s concerns, but what of the “reprehensible aversion to learning by experience”? McLean and Gray (2012) promote the “thinking use of history” as a mechanism for reinterpretation of the premises of major policy decisions. Without this, the potential for repeating past failure remains, particularly if the underlying policy paradigms are ill-conceived or flawed.

**Drivers for Change - Food Security**

International interest in food security was focused by the 2007 – 2008 spike in world food prices (Figure1) as a consequence of a shift from food to biofuel production (Fraser 2008). It has been retrospectively argued that the crisis was actually triggered by a combination of short-term factors and longer-term trends including: a series of extreme weather events; low global stock levels; the use of food crops for biofuels; rising energy prices; export bans; and increased financial speculation; along with structural problems rooted in global resource limits (see Maye and Kirwan, 2013). But politicians and policy-makers were left in no doubt as to the potential threat of food security, the increasing interdependence of agri-food systems, and the political and social importance of affordable food (Ambler-Edwards et al., 2009; Lagi et al., 2011).
The United Nations Food and Agriculture Organisation World Food Security summit in Rome, June 2008, helped establish a consensus that food security was a key ‘master frame’ of twenty-first century public policy (Mooney and Hunt, 2009) and that the risks to food security also included slower-onset, more diffuse perturbations such as global climate change (Erickson, 2009).

But as with most complex problems, the opportunity for a simple solution fades under scrutiny. Maye and Kirwan’s editorial in the 2013 special issue on Food Security warns of the risks to agriculture’s other outputs such as nature conservation and water management from pressures to produce food and energy. In the same issue Allen (p. 137) warns that solutions that move control farther from the ability of people in their everyday lives should be subjected to

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1 Red dashed vertical lines correspond to beginning dates of “food riots” and protests associated with the major recent unrest in North Africa and the Middle East. The overall death toll is reported in parentheses. Blue vertical line indicates the date, December 13, 2010, on which the authors submitted a report to the U.S. government, warning of the link between food prices, social unrest and political instability. Inset shows FAO Food Price Index from 1990 to 2011.
particular scrutiny, and that productivist goals of doubling food output could exacerbate – not solve – problems associated with food insecurity such as energy costs, climate change, and food of low nutritional quality, and suggests that food security is a collective problem requiring a social solution. Innovative outcomes are occurring from this debate, such as Project Catalyst - a Coca-Cola / WWF / Australian Government / NRM Regional Bodies / sugar industry partnership aimed at reducing the environmental impacts of sugar production on the Great Barrier Reef through innovative farming practices (WWF 2013), and along the way substantiating Coca-Cola’s social licence to source sugar from a politically stable but environmentally sensitive area (Cocco 2013).

The Australian International Food Security Centre was established in 2012 to consider Australia’s role in feeding an extra two or three billion people without irretrievably damaging the planet, and focuses on Australia’s role in research and extension (Blight 2012), as in a globalised world … success lies as much in our degree of internationalisation as in domestic factors (CEDA 2013). But Australia’s agricultural history differs from Europe and the USA, being export-orientated around demands for food and raw materials, more-often driven by foreign investment, resulting in a lack of (or unwillingness to) finance value-adding or processing capacity (Burch et al., 1999). This has locked production into low value, unprocessed, competitive commodities vulnerable to free market price fluctuations exacerbated by increasing application of neo-liberal policies (Lawrence et al., 2013). Australia’s agricultural sector is the second least protected (subsidised) in the OECD (O’Meagher 2005). So despite recognition of the need to value-add, most Australian food exports continue to be commodities processed to the minimum necessary for stability and transport, with supply chains fragmented and dominated by overseas interests (Ball 2012).

The interplay of issues related to northern agriculture expansion includes: water resource management, climate change, disaster management, environmental impacts (particularly on the Great Barrier Reef), native title and other tenure issues, the future of regional communities, foreign ownership of land and production units, the economics of developing new irrigation areas, and who will pay for the infrastructure. So Northern Australia’s role in future world food security needs political and social consideration in addition to the structural issues raised by Bauer in 1977.
Contemporary Opportunities and Challenges for Northern Australian Agriculture

A viable and diverse agricultural industry already exists in Northern Australia, with beef, dairy, corn, sorghum, peanuts, avocados, mangoes, nuts, sugar, and a myriad of fruits and vegetables as well as plantation timber. Agriculture is a major contributor to Northern Australia’s economy: in 2008/09 direct primary industry turnover for Far Northern Queensland was estimated at over $1.7bn, with direct employment of about 9,000 people (RDA, 2011). Australia is the world’s largest exporter of sheep and cattle, and eighty per cent of exported cattle are from the north, valued at $416 million in 2006-7 (Gray 2009). The Livingstone Beef facility (near Darwin) commenced operation in 2014, with eventual processing capacity of 220,000 head per annum (McGauchie, 2015). Whilst the total Australian agricultural output represents only one per cent of global production, Australia is the fourth largest net agricultural exporter in the world behind Brazil, Argentina and the Netherlands – well above nations like China and the USA that have enormous domestic agricultural sectors, but in net terms import just as much as they export (Keogh, 2009). When the outcomes of agricultural research are considered, Australia contributes to the diets of 400 million people worldwide (Prasad & Langridge, 2012).

The Australian Government’s 2012 White Paper *Australia in the Asian Century* describes opportunities for agriculture to be a beneficiary of forecast Asian growth, which Keogh (2012a) interprets as a signal that policy makers now see opportunities for agriculture rather than as a sunset industry, and argues that Australian superannuation funds should join overseas pension funds in investing in agriculture (2012b). The National Farmer’s Federation (2012) *Blueprint for Australian Agriculture 2013-2020* sets out a strong future for Australian agriculture and its supply chain.

Industry excitement about the potential for growth is understandable, but what are the aspirations of the northern-resident and broader Australian community? Not everyone wants to live in a city, but regional residents also desire a future for their children and access to services for an aging population. Neither should the continuing appeal of the frontier ethos as personified by Dame Mary Durack’s “Kings in Grass Castles” (1959) be dismissed, as the challenge continues to excite individuals and the nation alike (Bendle, 2013), even though *terra nullius* never existed.
The tyrannies of distance have been significantly addressed since Bauer’s time, particularly through the past decade’s mining boom, with improvements in road and rail links, port infrastructure, communications and employment opportunities (albeit many on a fly-in fly-out basis). Both agriculture and export-oriented mining have strong projected growth in Northern Australia’s short to medium term future, and the obvious synergies of shared infrastructure are recognised (Owens 2013). Historically though, the internal distribution of costs and benefits from mining within host regions transitioning from agricultural economies has been limited (Hoath & Pavez, 2013).

Indigenous Australian’s role in landscape management appears obvious to contemporary Australia, but has not been an easy transition, riven initially by uncertainty and community division over the implications of the 1992 Mabo High Court decision and subsequent Commonwealth Government's Native Title Act 1993 impacts on private and leasehold tenure. Today, a majority of the north is owned and managed by Indigenous Australians. These communities are actively addressing social issues and considering alternate futures and employment opportunities for their growing communities (annual population growth is 2.1% compared with 1.6% for the national average (BITRE, 2009)). This is not to say unanimity exists, as evidenced by the divided response to Queensland’s Wild Rivers legislation and contested development of the Kimberly natural gas resource. On the international stage Pieck and Moog (2009) describe schisms in the iconic Amazon eco-indigenous alliance due to indigenous people never becoming a central part of large conservation organisations agenda, and their subsequent failure to live up to the discursive (and promotional) assurances they made to indigenous people. Cruz (2010: 421) warns that publishing information on a webpage does not make it more accessible to members of a local community, but rather allows that knowledge to escape local control and be used by anyone.

The driver for many environmental campaigns has been concerns over resource exploitation. However, mining is increasingly providing opportunities for Aboriginal business and employment in Northern Australia. Fortescue Metals, an iron ore miner in the Pilbara area of Western Australia, have invested $1 billion with Aboriginal businesses since 2010, and employs 1,000 Aboriginal people (Power, 2013). This experience contrasts sharply with historical agricultural industry engagement with Aboriginal people, characterised initially by dispossession and persecution before moving through exploitation to widespread disengagement. Even today, the Far North Queensland banana industry is heavily dependent
on international backpacker labour, whilst aboriginal communities in the same region experience underemployment (personal experience and observation).

Planning for the Unexpected

In February 2011, tropical cyclone Yasi cut a swathe through Far North Queensland’s natural and production environments, compounding the impacts from cyclone Larry five years previous. Unlike cyclone Larry, Yasi occurred in the aftermath of the Global Financial Crisis and in the context of a high Australian dollar and a ‘summer of disasters’ throughout eastern Australia. Agricultural impact was widespread, but highly variable. The banana industry received extensive media coverage with 90% destruction of the Australian crop, but within 10 months was back in full production and facing chronic market oversupply and resultant low prices. The tropical fruit industry however was dealt a crippling blow that will take years to recover, if ever. Sugar cane, cattle, dairy, other tree and horticulture crops were also affected to varying degrees relative to their geographical relation to the cyclone’s path.

How can industry expansion be contemplated when the incidence of such disasters is predicted to increase as a consequence of climate change (King, 2010), with less climatic predictability and more disasters impacting upon an increasing and more vulnerable population (ISDR 2008, Barratt et al. 2009, Handmer et al., 2012, Prabhaker et al., 2009), and with regional and remote communities in tropical Queensland among Australia’s most vulnerable in the face of climate change (Dale et al., 2011)? Indeed Flint and Luloff (2005) argue that natural resource-based communities are generally viewed as being vulnerable to risks and disasters; and climate change will not only affect extreme weather events – higher temperatures and storm surge flooding could affect current crop and livestock performance, as well as the pest and disease spectrum and pressure.

A factor made clear by the two cyclones was the interdependence of industries across scale and commodities: without regular banana transport south, freight costs escalated to the point government subsidy was required to ensure affordable delivery of much-needed building materials, but farmers capable of sending product south also required freight assistance; the disappearance of back-packer employment opportunities impacted on local accommodation and tourism businesses; and dairy cows could not be milked without electricity. Additionally, whilst cyclones are stand alone and geographically defined events, their impact manifests in the convoluted environment of world markets. As an example, the greatest concern of the
Australian Banana Growers Council post-Yasi was that lack of supply to supermarkets would result in the importation of bananas from the Philippines (Australian Food News, 2011) - an event that would have more significant and persistent industry impact than one cyclone.

Disasters however are not limited to natural events. In June 2011 the Federal Government suspended live cattle exports from Australia to Indonesia following the ABC’s *Four Corners* programme of 30 May, 2011 showing brutal slaughtering methods and mistreatment of cattle inside an Indonesian abattoir. Whilst the ban lasted less than a month, its impacts continue to affect the beef industry through a combination of narrow market options compounded by drought conditions across much of Northern Australia. The unexpected market loss and resulting price plummet confused established drought management strategies of producers, and impact of the ban extended far beyond beef producers dependent on the live export trade.

**Anthropocene Implications**

Agriculture is a risky business. The endless variables that farmers must evaluate and plan for (often subconsciously) include weather, markets, supply chain, finance, labour availability, changing legislation, natural disasters, pests and disease. Lawrence *et al.* (2013) point out that over time neo-liberal policy has sought to foster self-reliance in the management of environmental risk by Australian agriculture rather than expecting it to be addressed through government funding as a national problem, and Gill (2011) makes the important point that whilst farmers have accepted their responsibility to manage risk, their capacity to do so is often sorely tested. There is an argument that as a consequence of constantly dealing with risk, farmers are conservative when it comes to issues such as politics and the projected impacts of human-induced climate change, and it is *understandable that farmers are cautious and contest the claims of those who would have them reorganise current production systems* (Lawrence *et al.*, 2004: 256).

Early settlers lacked the skills and knowledge of their new environment to realise that introduced European agricultural practices were often unsuited to Australia (Gray and Lawrence, 2001). Governments used pastoral lease conditions to facilitate land use intensification and closer settlement, an approach often incompatible with the unreliable climate and limited carrying capacity of the rangelands (Productivity Commission, 2002). The resulting negative impact of agriculture on Northern Australia’s natural environment and
biodiversity has been extensively documented, and climate change is predicted to bring new pressures to bear on both agriculture and biodiversity (Cocklin and Dibden, 2009).

The International Assessment of Agricultural Knowledge, Science and Technology for Development report (2009) describes agriculture as a multi-output activity producing not only commodities, but environmental services, landscape amenities and cultural heritage. Cocklin and Dibden (2009) postulate that it is possible to envisage mitigation and adaptation responses that would alleviate pressures on all three systems (climate, agriculture, biodiversity), and there has been a wave of interest in shifting emphasis away from productivity enhancement and towards sustainability and resilience (McNeely and Scherr, 2003; IAASTD, 2008, 2009; Nellemann et al., 2009) which has been assisted through improved regional participation in natural resource management. However, there continues to be a lack of clarity and certainty as to the property rights conferred by, for example, pastoral lease arrangements; and approaches to allow non-pastoral land uses vary across jurisdictions - generally treating them as special cases within the legislation. This lack of formal recognition reflects the narrow and prescriptive nature of pastoral lease arrangements (Productivity Commission, 2002).

There is also an emerging discussion around the need to explore alternate governance systems from global to local scales to address the contemporary social, economic and environmental challenges facing the world and improve multi-sector cooperation, particularly since ‘command-and-control’ regulation has been found wanting (see Taylor, 2010). Higgins et al. (2010) describe contemporary society’s broader global shift from public to private forms of governance, and how farmer-initiated Environmental Management Systems take a proactive approach to environmental issues to avert more onerous intervention by governments. Dale et al. (2013) describe how linear governance systems that are poorly integrated with the wider system can constrain thinking, have limited benefit, and even be counter-productive, and describe Governance Systems Analysis as a systemic/adaptive means to optimise collaborative effort. Sayer (2010: 20) extends this argument, warning (contentiously) that environmentalists should be cautious in resisting agricultural innovations that may have short-term or local negative impacts on nature but which might provide better long-term options by jump starting economic growth, and states that more efficient agriculture will in general be better for the environment, and that the ability of civil society to assert itself will be much greater when people are prosperous and well fed.
Much of the world’s current agricultural research is undertaken in and directed towards improving agriculture in developing countries. Pachauri (2011: 100) reminds us though that currently few plans for promoting sustainability have specifically built in means of either adapting to climate change or promoting adaptive capacity. Whilst the third world research focus is right, such research has only limited relevance to first world countries such as Australia. However, success in the latter is inexorably bridging the gap between the two situations, and Australian agriculture can demonstrate aspirational targets for sound agricultural practices in other tropical regions. To achieve this though, the skills loss and declining interest in agriculture as a career needs to be addressed - many Australian universities have either closed or merged their agricultural faculties to compensate for a shortfall in students, indicative of a broader negative community view towards commercial agriculture (Keogh 2009).

Now is a strategic time to consider how a growing Northern Australian agricultural sector can better prepare itself for the natural, social, and economic pitfalls it will encounter, whilst embracing the principles of sustainable agriculture and recognising and fostering explicit tropical expertise. With this in mind, Walker et al. (2010) propose featuring resilience and transformability alongside productivity as major objectives of research, as literature suggests that not only are resilient organisations about surviving, but thriving; and the dynamic relationships between vulnerability, resilience, hazard impact, hazard change, adaptive capacity and social change in the context of climate change and disasters can inform approaches to planning for and developing community-based approaches to adaptation (Cottrell et al., 2011).

In the same way that Cottrell and King (2008) emphasise the need to have an understanding of how people living in communities view risk to more effectively engage them in disaster planning and mitigation, both agricultural industry individuals and organisations will need to be engaged, understood, and empowered as part of expanded agriculture planning; along with adoption of the principles described by King (2010) to achieve climate change adaptation - flexible, local, stakeholder driven, and involve all levels of government and institutions.

Agriculture is an industry connected across scale, commodity, and community, and it is this innate capacity that has delivered many demonstrations of resilience. Small growers need larger growers to attract infrastructure and service provision, but often smaller growers are the innovators that precede wider adoption. Whilst Cottrell (2011) warns that a shared view of
what constitutes resilience in general and community/social resilience in particular is likely to remain elusive, she points out that it is essential approaches taken to planning are context specific and developed in conjunction with those people who are most affected.

Yes, farmers are generally resilient individuals capable of handling the uncertainty and adversity that life on the land brings, but they are also members of regional communities and broader society, from whom they derive and contribute support. Farmers interact with, and transition in and out of, all aspects of society, and it will be to the detriment of all if this ability or desire is compromised or curtailed either by design or by accident. Whilst this might never be a policy or societal intention, it can happen through socio-economic marginalisation, as seen now in the cattle industry with producers at a loss to understand the thinking and actions of extreme animal liberationists. Whilst the majority of Australians might not agree with these views, neither are they directly affected by them, so understandably stay silent. Farmers however, particularly those in remote locations, are directly impacted and struggle to understand what they have done wrong and, (preliminary results suggest) as a consequence feel further removed from society than geographically. Characteristic of the Anthropocene is increasing urbanisation and social connectedness. Whilst improved communication technology enables people in remote areas to connect to the rest of the world, the ability of regional populations to influence big-city-orientated political decision making continues to decline.

Conclusions

Northern Australia is well placed temporally and geographically to learn from and avoid the mistakes of others in its continuing development. Historic impediments are being addressed: improved roads and vehicles; building technology, remote area power supplies, and air-conditioning; regional infrastructure, particularly in mining areas; weather forecasting; and communications, which have the additional benefit of enabling social networks over extended distances. Confusion over land tenure and native title has reduced (though pastoral lease conditions are still capable of delivering perverse outcomes), while natural resource management understanding and governance are empowering regional communities and delivering cross-sectoral outcomes.

The growing Indigenous population is actively considering their future, and their legitimacy is without question. The international drivers for increased agricultural productivity have bipartisan recognition and support, and the perils of remaining in a bulk commodity export
paradigm are recognised and the subject of active discussion. Technological innovations continue to provide opportunities for addressing Australia’s higher labour costs and ability to compete in world markets. Financing options include foreign capital and the superannuation industry, though AACo’s Darwin abattoir shows Australian industry is willing and able to invest. With experience and persistence, past failures like the Ord irrigation scheme are showing success.

However, there can be no guarantee that today’s enthusiasm for northern development will be realised, or in time be just another step to a future realisation (though the concept of an ‘end point’ is itself misleading). Recognition by today’s planners and policy makers of the considerable and honest analysis undertaken by the agricultural sector in the mid-1980s (Bauer, Aschmann, Mollah, and their contemporaries) and Cook’s (2009) more recent work as an important learning record rather than “an anatomy of failure” shows there can be no one determinant of successful Northern agricultural expansion. It will require integration of markets; supply chains; people and industry skills; flexible infrastructure; stable government policy, particularly for international trade and environmental management; market-driven investment in research, development and extension for national and international arenas - delivered through an adaptive planning process capable of accepting and responding to input from all levels, including the historical and individual experience from current participants.

This does not imply a “recipe” for some clever person to develop, rather adoption of an approach that recognises and empowers resilient and informed individuals, industry, and community, who are able to respond and adapt to challenge and adversity, and to find collaborative solutions.

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Tropical Gardens and their Potential as Tourism Attractions in Northern Australia

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Tropical Gardens and their Potential as Tourism Attractions in Northern Australia

ABSTRACT: Globally, gardens are popular attractions with recent research finding that the botanical garden in Cairns is one of the city’s top attractions. Capitalising on the garden’s tourism appeal offers another opportunity to enhance the city’s attractiveness as a tourism destination, but also raises a number of questions about the recreation needs of local residents versus the needs of visitors as well as about future funding models. Using the Cairns Botanic Gardens as a case study, this research explores the underlying aspects and issues of the management of successful garden attractions in a tropical setting. Issues discussed include visitor management strategies, aesthetics, funding as well as safety with the aim to support other tropical regions in developing their destination through garden tourism.

Keywords: Botanical gardens, tropics, tourism attractions, visitor services, Cairns

Introduction
The establishment of botanic gardens as places for recreation, entertainment and in some cases scientific enquiry in many Australian cities and towns follows a much earlier pattern of gardens that emerged in the United Kingdom (UK) during the early Victorian era. For instance, many of Queensland’s botanic gardens were established during the colonial era and used designs adopted from the UK. Of the 20 botanic gardens located in Queensland, eight (Cooktown, Cairns, Townsville, Whitsundays, Mackay, Longreach, Emerald, Rockhampton) are located in the tropics and all feature collections of tropical plants. When these gardens were first established, generally in the 19th century, most users were local residents. The rapid growth in tourism in the second part of the 20th century has added a new user segment that includes both domestic and international visitors. The Cairns Botanic Gardens (CBG) in particular has emerged as a major tourism attraction offering considerable scope for further development directed towards the tourism market. From a management perspective, however, the ability to cope with increased visitor numbers poses a range of problems that need to be addressed if further tourism related development is to occur. This paper examines issues related to increasing the tourism potential of tropical botanic gardens in the tropics of Northern Australia with a specific focus on the Cairns Botanic Gardens.
The historical context

The tradition of establishing gardens reaches far back into the past with the Hanging Gardens of Babylon, one of the so-called seven wonders of the ancient world, being one of the best-known gardens of antiquity. As one of the seven wonders of the ancient world, the site was regarded as one of the must see’s for travelers in the pre Christian era. In Asia, the establishment of gardens in China predates Babylon’s Hanging gardens perhaps by millennia. Turner (2010), in a study of the history of Asian gardens between 3000 BC to 2000 AD, found that China has a garden design tradition reaching back 5,000 years with the oldest examples being vast Daoist inspired tracts of natural landscape. Today these areas would be classed as parks. Intricate gardens, now viewed as classical Chinese gardens, were established after Buddhism emerged as a major religion in China. In other areas of Asia there is a much shorter history of garden development. In Indonesia for example, one of the first botanical gardens to be found was the Bogor botanical garden, established by the Dutch in 1817 (Encyclopædia Britannica, 2014). More recently, tropical gardens have been established by hotels and resorts (Gardenvisit.com, 2015).

In Europe, the origins of today’s large-scale involvement in country house and garden visiting can be traced back to the Early Victorian period in the UK. Before that time, country house visiting was predominantly an activity enjoyed by the aristocracy (Hlavac, 2002) with Northern Europe being the likely origin of garden visiting starting in the 16th century (Connell, 2005). Over the course of the Victorian era, the working class population became increasingly interested in garden visiting as a leisure activity resulting in the opening of many private gardens for large scale visiting. The factors that stimulated demand included transport improvements and cheaper fares as well as an increase in leisure time and disposable income (Connell, 2005). Constantine (1981) remarked that the rational recreation movement of the late 19th century encouraged the working class to take up gardening as a leisure pursuit with the result that horticultural shows, as they are known today, became increasingly important in countries such as Germany (Europäisches Symposium, 2008).

Europe’s two World Wars in the 20th century lead to either the destruction or neglect of many garden in Europe although during the inter war years a new age of gardening commenced with new and different elements of style, design and planting (Connell, 2005). The increase in demand and supply of recreational opportunities in the post Second World War era rekindled growth in garden visiting in Europe, examples being the gardens of Versailles, the Renaissance gardens around Rome and Florence, the Wörlitzer Gardens in Germany as well as the noble gardens in the UK (Hlavac, 2002). By 1999, around 16 million
visits were being made annually to gardens in the UK indicating the expanded potential of garden visiting (Evans, 2001) at the end of the 20th century.

*The botanical garden*

Amongst the various types of gardens, the botanical garden is of specific interest in this study. Botanic Gardens Conversation International (n.d.) identified the physic gardens of Italy in the 16th and 17th centuries as the world’s first botanic gardens to be used for the academic study of medicinal plants. During the age of exploration and expansion of international trade, botanic gardens became sites for the trial and cultivation of new species discovered by expeditions sent on collecting missions to Europe’s colonies. Later, in the 19th and 20th century, municipal and civic gardens were established throughout Europe and the British Commonwealth. Nearly all of these municipal and civic gardens were built as pleasure gardens with very few having scientific programs. The last 30 years have seen a revival for botanic gardens as scientific institutions following the emergence of the conservation movement. Botanical gardens are regarded as very important due to their existing collections and the scientific knowledge possessed in the propagation of plant species (Botanic Gardens Conservation International, n.d.).

Botanical gardens arguably play an important role in reconnecting people with the world of plants, in educating them and in presenting models for sustainable living stimulated by recent increased awareness and concerns about the human impact upon the environment (Dodd & Jones, 2010). The future role of botanic gardens is seen as broadening audiences, enhancing their relevance to communities, educating and actively changing attitudes and behaviour. Dodd & Jones (2010) for example, emphasise that working with other gardens offers a chance to escape isolation and develop new ideas and approaches, as demonstrated by botanic gardens in Oxford and Eden.

Based on a series of case studies, Gough, Accordino, & Lindsey (2012) and Gough & Accordino (2013) summarised the future role of botanic gardens as: *Gardens as Educators* of youth and the general public about the importance of greening initiatives; *Gardens as Technical Experts* including demonstrations or techniques of conservation; *Gardens as Community Hosts* for meetings and events that promote accessibility to public garden space and *Gardens as Catalysts* for community change and promotion of sustainable community development. Powledge (2011) recognized that even though the role of botanical gardens has expanded, gardens in general face constant funding pressures. Consequently, many botanical gardens have become places of entertainment, requiring financial contributions from their
visitors. In addition to entrance fees as income, increasing numbers of botanical gardens have added gift shops and restaurants as well as marketing arms to entice the public. Today, botanical gardens are regarded as both sites for conservation and sites for recreation by locals as well as tourists (Ballantyne, Packer & Hughes, 2008; Crilley, 2008; Crilley, Hills, Cairncross, & Moskwa, 2010).

**Garden visitors’ motivation**

Connell (2004) attributes the increased interest in garden visiting to the growing attention paid to the natural environment and the fact that there is a rising proportion of garden owners who like to admire floral displays and the work of great landscape architects. Motivations to visit and attitudes towards nature therefore play a crucial role in the investigation of the potential of nature-based activities such as garden visiting. Ballantyne et al. (2008) investigated visitors’ motivation at a subtropical botanical garden and grouped them into seven categories with the categories ‘enjoyment’ and ‘learning and discovery’ identified as the main motivators. Interestingly, the authors found that compared with visitors to other informal learning sites, botanic gardens visitors rated restoration as relatively more important and learning and discovery as relatively less important, pointing to the challenge that botanical gardens face when creating visitor experiences. A more recent qualitative study by Wassenberg, Goldenberg, & Soule (2015) revealed that participants felt that ‘botanical garden’ and ‘plants’ were the most meaningful garden attributes, leading participants to experience the effects of ‘new experiences and learning’, and ‘stress relief and relaxation’, values ‘transference’ and ‘improved quality of life’.

In this respect, Crilley (2008) explored visitor service quality attributes at six Australian city botanic gardens and their importance in influencing behavioural intentions such as recommending the site to others or revisiting the site as the result of a previous visit to a botanic garden. Twenty-three attributes were identified and using factor analysis were grouped into four dimensions; ‘aesthetics’, ‘engagement & learning’, ‘hospitality services’ and ‘staffing’. A study by Crilley et al. (2010) of regional botanical gardens revealed similar results. The authors again found that ‘aesthetics’ is the critical contributor in explaining changes in visitor reported satisfaction, and intentions to revisit and advocate for the gardens in the future. Another critical factor in visitor service quality of gardens was safety with the feeling of being safe when visiting the gardens accorded the highest attributes of service quality. Crilley et al. (2010) argued that although this does not appear to be linked to previous research on motivations or satisfaction levels, it could be that despite the activity that a visitor
Tourism potential of garden visiting

The growth in domestic and international tourism has generated a resurgence in interest in visiting gardens. Former private gardens as well as public gardens have emerged as major tourist attractions for both independent travellers and tourism operators offering tailored garden tours. Examples of such garden attractions include the traditional National Gardens Scheme in the UK, the Floriade in the Netherlands generally regarded as the world’s leading horticultural exposition, and the biennial Singapore Garden Festival (Packe, 2012). Globally, the increased interest in tourism has resulted in the creation of an ‘International Garden Tourism Network’ which aims to be a platform for stimulating more visits and business for gardens (International Garden Tourism Network, 2015).

While the popularity of gardens is recognized, data on global visitor trends is not comprehensive and Botanic Gardens Conservation International, which states that approximately 250 million per year (Ballantyne et al., 2008) visit botanic gardens and arboreta, provides the only global estimate available. In Australia, a survey by the Australian Bureau of Statistics (ABS) on the total number of visits to Australian botanic gardens between 1999-2000 estimated that about 11.8 million visited botanic gardens (ABS, 2001). The highest attendance rate for botanical gardens was recorded in the Australian Capital Territory (ACT) followed by the Northern Territory and Victoria. With increasing visitor numbers to botanical gardens, an investigation on the potential of tropical botanical gardens and associated landscapes as tourism attractions is of particular interest in the context of developing tourism in Northern Australia.

Tropical gardens as tourism attractions

Following our initial investigation on garden visiting, we argue that tropical gardens have the potential to attract significant visitor numbers but their promotion as tourist attractions poses a range of issues that must be addressed by the host community if they are to be promoted as a tourist attraction rather than an amenity for local residents. Issues that need to be addressed
include: ensuring that visitor safety is given a high priority; the provision of adequate infrastructure to meet demand particularly where visitors may not speak English; funding visitor services such as interpretation and; balancing the needs of residents with tourists. As Crilley et al. (2010) observed, safety is a primary concern for visitors. In a tropical climate for the type experienced in Cairns, heat can be problem and unless adequate precautions are taken visitors may suffer sunburn or heat exhaustion. Moreover, there is some potential for visitors to encounter venomous snakes and other animals in the rainforest zone of the gardens. In relation to interpretation, Packer et al. (2008) emphasised that international tourists need assistance in understanding the significance and importance of the site they are visiting and we argue that this is of particular importance in tropical gardens. The funding of visitor services is also an issue of concern to park managers and the communities that host gardens. The two common approaches are to provide gardens as a free good with the local community bearing the cost or imposing some form of user pays principles. In the case of Cairns, the botanical garden has emerged as one of the city’s top 10 attractions and the issues raised previously need to be addressed particularly with expected increases in visitors to the city in the future.

Methods
Data for this study were collected using a mixed method approach. An exploration of the current body of knowledge on garden visitor management formed the underlying basis of the research on successful management strategies for tropical gardens. Drawing on the results of this literature review (Crilley, 2008; Crilley et al, 2010) five issues were identified for further investigation: aesthetics, visitor management including visitor engagement and learning, funding, community engagement and safety. The authors then used a qualitative case study approach to investigate the identified issues in relation to the management of gardens as visitor attractions.

Simons (2009, p. 21) describes the case study method as “an in-depth exploration from multiple perspectives of the complexity and the uniqueness of a particular object, policy, institution, programme or system in a real life context” with the primary purpose being to “generate in-depth understanding of a specific topic, programme, policy, institution or system to generate knowledge and/or inform policy development, professional practice and civil community action.” The case study approach was chosen on the basis that it enables insights to be gained from different perspectives and from different types of information (Thomas, 2011). The advantage of the case study method is that it can zoom in on real life situations
and test views directly in relation to phenomena as they unfold such as the application of
visitor management strategies (Flyvbjerg, 2011).

The main limitation of the study is the inability to generalise findings. However, as
Flyvbjerg (2011) notes, formal generalisation is only one of many ways by which people gain
and accumulate knowledge. The fact that knowledge cannot be formally generalized does not
mean that it cannot enter into the collective process of knowledge accumulation in a given
field or in a society. Knowledge therefore may be transferable even where it is not formally
generalizable. The next chapter describes the selected case study in more detail.

The Cairns Botanical Garden
The Cairns Botanical Garden was selected as a case study site based on its current position as
a major tourism attraction. In recent unpublished research by Anderson (2015) into visitor
attraction ranking on TripAdvisor the three years to 2015, the CBG was consistently ranked in
the top five free activities in Cairns. However, there is little information on the visitor profile
of garden visitors apart from an estimate that the Flecker Gardens receives about 300,000
visitors a year.

The CBG were established in 1876 when the then Council designated 71 acres for a
recreational reserve to the public. The gardens are located north-west of Cairns,
approximately five kilometers from the town centre. Over time the reserve has increased in
size and developed into a number of distinct botanic spaces that demonstrate the diverse plant
life that can be found in the tropics. The collection currently houses over 4,000 species of
plants. Apart from the botanic spaces visitors are able to visit the Tanks Art Centre also
funded by the Cairns Regional Council but administered as a separate entity to the botanic
gardens. Since it was first established a number of new spaces have been added to the original
reserve to create a series of distinct botanic spaces that are now promoted as the main
attractions of the gardens.

The gardens provide a range of amenities including public toilets, an information
centre, guided tours by volunteers, free BBQ stations and a children’s playground. The Visitor
Information Centre, which was completed in 2011, houses interactive and interpretive
displays showcasing Cairns’ tropical environment and the wet tropics region of Far North
Queensland. Although the Gardens are located on an area of high biodiversity, the collection
has not focused on this aspect of tropical North Queensland. The Visitor Centre also houses a
café and a gift shop.
Findings
Using the criteria suggested in the literature (aesthetics, visitor engagement, funding, community engagement and safety) the following assessment was undertaken on the CBG.

Aesthetics
As Crilley (2008) noted aesthetics are a key element in the appeal of gardens. Compared to many of the gardens in Europe, the CBG offer a different visual appeal based on the luxuriant nature of the tropical climate and the types of plants on display. The following section briefly describes the garden’s botanic spaces.

The Flecker Gardens houses a diverse range of tropical flora collected from tropical ecosystems in Asia, Africa, South and Central America and Australia. In their style of presentation, the Flecker Garden can be described as a tropical version of the gardens found in Europe. The Rainforest Boardwalk runs through a coastal, lowland, swamp rainforest connecting Flecker Garden with the lakes zone. The remnant forest in this zone is one of the few remaining examples of the coastal forest ecosystem that existed in the area before European settlement. This area also contains the endangered Layered Tassel Fern (*Huperzia phlegmarioiades*) which was once widespread in coastal areas.

The Lakes zone contains a salt water lake and a fresh water lake with both lakes containing a range of flora and well as local fauna including birds and amphibians. In the northern sector of the gardens the Mount Whitfeld Conservation Park, an area owned by the Queensland Parks and Wildlife Service but administered by the Cairns Regional Council, contains extensive areas of rainforest was well as smaller areas of Eucalypt forest and is a popular recreation area for walking and jogging.

Located between the Flecker Garden and the Visitors Information Centre, the Gondwanan Heritage Garden traces the evolution of photosynthetic bacteria to modern flowering plants. Other significant botanic spaces are the Aboriginal Plant Use Garden, which exhibits local flora used by the region’s Indigenous community, and the Mangrove Boardwalk established in a mangrove community a short distance from the Botanic Gardens.

Compared to the manicured, ordered and planned nature of traditional European and Chinese gardens, tropical gardens often appear chaotic and with no apparent sense of either order or border. For visitors who are unfamiliar with this lack of order, tropical gardens may appear daunting and even unsafe if there is an associated sense of danger of a botanic space that may harbour plant and animal species that can cause harm. This dichotomy in aesthetic appeal can be both an attractor and an inhibitor for potential visitors.
Visitor Management

The size and location of the gardens create several problems from a management perspective. A major public road transects the property making it difficult to erect security barriers and limiting options for charging an entrance fee except to specific areas such as the conservatorium currently under construction or to the orchard collection.

Previous research has identified three crucial aspects of visitor management that are important in nature based tourism experiences: orientation, interpretation and education. In addressing these issues, the CBG has been mindful of the needs of both residents and visitors. For example, the garden’s website acts as a first point of orientation for visitors and provides essential information on location, opening hours, a virtual tour online, descriptions of each element of the garden, a downloadable orientation map and for visitor with special needs, information detailing wheelchair access. The garden has adopted a range of strategies to provide visitor interpretation including themed walks and guide tours provided by volunteers from the *Friends of the Botanic Gardens*, a Visitor Centre that provides a range of brochures and a free downloadable audio tours. Educational guided walks for schools and other educational institutes are also provided on a no cost basis while special interest tours such as the ‘Bird Watching Walk’ are also offered.

Safety

Safety is an important issue and from the perspective of the tourist is assumed not to be a problem unless otherwise advised. While it may be argued that local residents are likely to be aware of safety issues such as heat stroke, sunburn and poisonous animals, these factors may not be apparent to domestic and international visitors from temperate zones or locations where the snakes and spiders are not a feature of the local ecosystem. If visitor numbers increase an overhaul of current safety strategies will be necessary.

Community Engagement

Given the popularity of gardens as a form of recreation in other countries and the status of the botanic gardens as a major attraction of the city (Anderson, 2015), there is significant scope to build the gardens into a major destination attraction. However, before this can occur there needs to be a public debate about the role of the gardens as a space for residents and as a tourist space. Expansion will assist in promoting the city's tourism industry with subsequent benefits but may also mean a loss of amenity to local residents as they compete with visitors.
for opportunities to use the gardens. The question of funding is also significant and may require a public debate.

**Funding**

The current funding model of the botanic gardens relies on a significant subsidy from city ratepayers offset by minor revenue from commercial activities. Expansion can be funded either through an increase in public funding or through charging of fees. Recent research (Wood, 2013) into a proposed botanic garden in Mossman, just north of Cairns found that 60% of a sample of 203 tourists indicated their willingness to pay an entry fee of at least $5. From a philosophical perspective issues of funding and who pays can be approached from two opposing perspectives, the neoliberal view that advocates a user pays approach (Giddens, 1998) and the social democracy view that facilities such as the CBG should be a free good and available to all members of society irrespective of their ability to pay (Giddens, 1998). From a ratepayer perspective while increased public funding may create an overall benefit to the city through increased visitation there is also an opportunity cost based on forgone opportunities not funded by the council. Ultimately, issues of this nature need to be considered by the public.

**Discussion and Conclusion**

Given the popularity of the CBG as a tourist attraction, it is apparent that scope exists to undertake additional development that would further increase the garden’s and ultimately the city’s tourism appeal. For example, the size and composition of the garden’s current range of botanic spaces offers unrealised opportunities for “soft” ecotourism experiences that will allow visitors to engage with nature in a safe, supported and non-threatening environment. However, development of such experiences will incur additional costs which is an issue that needs to be resolved at a community level. One approach might be to develop specific areas of the gardens as attractions for which a charge is incurred while other areas retain their current no-cost status.

One significant issue that also needs to be resolved is the absence of data on visitor use of the gardens. The failure to collect visitor data has created a knowledge gap in areas such as the use profile of facilities by local residents and tourists, demographic profiles of users and satisfaction. This knowledge gap must be considered a serious inhibitor to future planning and understanding of visitor needs and will need to be rectified before informed debate of the nature outlined above can occur.
The ‘feel’ of the gardens is another issue that needs further consideration. Given the importance of restoration as a motivation to visit gardens, areas that provide space for reflection should be designed to be consistent with the need for a peaceful, relaxing and reflective experience. First-time visitors, however, may appreciate interpretive activities that focus more on learning and discovery activities, e.g., plant discovery trails, more detailed information sheets, themed maps, guided walks and informal presentations.

Given the garden’s appeal as a tourism attraction further consideration needs to be given to marketing. Apart from budget issues, other issues that need constant attention by management include the maintenance of a clear brand vision and brand identity that utilizes existing botanic spaces to develop a product and segment portfolio matrix that is matched to experiences sought by visitors. Issues that need to addressed include ongoing evaluation of the usefulness and effectiveness of the garden’s website in facilitating visitor decision-making and constant re-evaluation of the objectives set regarding which visitor segments are to be targeted and which products are to be marketed.

The investigation of the case study provided a first insight into the potential of tropical gardens as tourism attraction in northern Australia, but also the inherent challenges. In the White Paper on Developing Northern Australia (Australian Government, 2015) tourism is discussed as one of the five industry pillars contributing to the growth of northern Australia. Specifically, the government’s aspiration for tourism and hospitality are to lift overseas tourists’ horizons beyond the wonders of the Great Barrier Reef and the Daintree Rainforest, to attractions such as the Kakadu National Park, the Kimberley and Broome (p.58). The tropical gardens located across the North of Australia have the potential to contribute to this aspiration, adding significant value to the portfolio of a tourism destination and its image.

REFERENCES
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Cape York Peninsula: Ecosystem Services and Economies of Scope

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Cape York Peninsula: Ecosystem Services and Economies of Scope

Abstract: Cape York Peninsula has an iconic status reinforced by its extraordinary landscapes and the continuity of Indigenous occupation. Cape York is also a battleground of ideas, values and visions characterised by complexity and intractability. Contests and trade-offs between economic, environmental and cultural interests and social advancement of Cape York futures have to date not included a valuation of ecosystem services.

Here we present the first valuation of Cape York Peninsula’s natural assets – its rivers, wetlands, forests, grasslands, coastal systems and reefs - as a fundamental component of its wealth, well-being and sustainability. We use a technique of basic benefit transfer from aggregated values of global case studies. We delineate twelve “ecosystem services biomes” across Cape York with a total ecosystem services value in monetary units in the order of $300 billion per year, equivalent to Queensland’s gross state product.

While the approach has limitations and restrictions, it nevertheless makes explicit the values associated with economic decisions that, based on other accounting methods, hide the value of ecosystems from view. Critical analyses of land uses such as mining and grazing show that these may sometimes not be viable when taking into account the costs of environmental degradation and its repair at public expense.

We suggest our valuation has a critical role in crafting a path toward a multifunctional future for Cape York, through diversification of land uses, particularly where extensive natural environments are becoming an increasingly precious commodity. Our initial valuation raises the importance of ecosystem services with a view to more balanced decisions regarding trade-offs with policies that currently enhance gross domestic product but damage the natural capital on which that depends.

Keywords: ecosystem services; ecosystem values; cultural values; carbon; land use

Introduction

Cape York Peninsula is a place of extraordinary landscapes distinguished by the continuity of Indigenous occupation. Here, a mosaic of Indigenous, agriculture, pastoralism, government, mining and conservation interests drives a battleground of ideas, values and visions. Complexity and intractability have meant governments have been largely ineffectual
in providing sustained leadership in shaping futures attuned to Cape York Peninsula’s complex challenges and potentials (Holmes 2011).

This is perhaps no better exemplified than in recent history where a Federal Labor government supported by the Queensland government argued for world heritage listing for much of Cape York Peninsula by 2013 in recognition of its world class natural and cultural values (Mackey et al. 2001). The subsequent overturning of governments at both federal (in 2013) and state levels (in 2012) has, in contrast, renewed interest in the development potential of Cape York Peninsula encapsulated in the 2014 Cape York Regional Plan (The State of Queensland 2014) which has no mention of World Heritage values. Instead the Plan is focused on the mining, grazing and agricultural industries, on the assumption that these are the basis for long-term economic resilience.

These on-going contests between economic, environmental, and cultural interests and social advancement have to date not included a valuation of the underlying ecosystem services of the region. Simply put, ecosystem services are the benefits people receive from ecosystems. They are a significant contributor to human well-being (Costanza et al. 2014). Providing estimates of ecosystem service values in monetary units is a way of accounting for the benefits to that wellbeing.

In northern Australia, and particularly in Cape York Peninsula, ecosystem services are central to the on-going environment and social trade-offs being made toward the goal of developing the north. However, their relative contribution to that goal, unlike built and human capital (the economy), are not often made transparent.

Cape York Peninsula has large, intact and healthy ecosystems including woodlands, forests, wetlands, and coastal systems. The services provided by these ecosystems include climate regulation, fresh water, waste treatment, erosion prevention and moderation of extreme events (by large barrier reef), lifecycle maintenance services for a large variety of species, wild foods and grazing lands, and opportunities for recreation (tourism, including fishing). In contrast to non-renewable mineral resources, ecosystem services are renewable and can produce benefits perpetually; though they can still be degraded, depleted, improved or enhanced.

Here we provide a preliminary valuation of the ecosystem services of Cape York Peninsula as a fundamental component of its wealth, well-being and sustainability, and we
scope the uses of such a valuation. These estimates are of aggregate accounting value for ecosystem services in monetary units, analogous to the approach taken in deriving GDP (Costanza et al. 2014). Most people understand value in monetary units and this valuation provides a convenient way of expressing the relative contributions of ecosystems which can be factored alongside other accounting methods as part of the economy.

Other values associated with ecosystems, in particular intrinsic values, are not easily evaluable. These values are nonetheless inherent in conservation of species and people’s values for nature.

These first ecosystem services values for Cape York Peninsula can, at the least, begin to raise awareness (Costanza et al. 2014) of the trade-offs being made in crafting a path toward a multifunctional future for Cape York Peninsula.

**Monetary valuation of Cape York’s ecosystem services**

We used recent global meta-analyses of studies quantifying ecosystem service monetary units (De Groot et al. 2012, Wratten et al. 2013, and Constanza et al. 2014) based on 10 biomes. We produced an approximation of these 10 biomes from Queensland vegetation, land use and topographic spatial data and used a benefit transfer approach to generate first-cut, order-of-magnitude ecosystem services value estimates.

*Mapping the Cape York biomes*

We built a spatial layer of the biomes on Cape York using the descriptions provided by de Groot et al. (2012) in their supplementary information. We used the Cape York boundary to limit the extent of the area. The Cape York boundary is defined by Cape York Natural Resource Management Ltd., which follows the *Cape York Heritage Act 2007* boundary to the west and east, and the Mitchell River to the south.

To define the biomes, we used a combination of spatial layers of remnant ecosystems (DSITIA 2012), land use mapping (DSITIA 2015) and reefs (Geoscience Australia 2006). The categorisation of each of the 10 biomes is presented in Table 1, including the remaining areas classed as ‘non-remnant’ by the remnant vegetation mapping (DSITIA 2012).

Biome descriptions for vegetation most closely matched the descriptions of broad vegetation groups (BVG), which groups vegetation communities at the national, state and
regional scales. We first used the state level descriptions (1:2 million resolution) of the broad vegetation groups to categorise each biome type. For some biomes the state level descriptions of BVGs were ambiguous, so we used the regional level descriptions (1:1 million resolution) to separate the BVGs.

The urban and cropland areas were classified using the land use mapping layer, updated in 2013 (DSITIA 2015). Urban areas are those of ‘intensive uses’ in an urban setting, for example ‘manufacturing and industrial’ or ‘utilities’. Cropland are areas classed as production lands, both dry and irrigated.

Coral reefs were extracted from the reef layer, for those areas classed as ‘reef’ only (Geoscience Australia 2006). The remainder of the marine areas were then classed as ‘coastal systems’ biome, as they were all in shallow seas of less than 200 metres depth.

Table 1 Categorisation of existing regional spatial data for Cape York into 10 biomes and a non-remnant category, with a description of the resulting Cape York biomes. BVG 2M – broad vegetation groups at the 1:2 million resolution (DSITIA 2012); BVG 1M – broad vegetation groups at the 1:1 million resolution (DSITIA 2012); ‘Reef layer’ from (Geoscience Australia 2006); QLUMP – Land use layer from the Queensland Land Use Mapping Project (DSITIA 2015).

<table>
<thead>
<tr>
<th>Biome</th>
<th>Spatial delineation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal wetlands</td>
<td>BVG 2M: 35</td>
<td>Mangroves and salt marshes</td>
</tr>
<tr>
<td>Inland Wetlands</td>
<td>BVG 1M: 34b to 34g</td>
<td>Permanent to ephemeral palustrine wetlands, including swamps, claypans, springs and billabongs.</td>
</tr>
<tr>
<td>Fresh Water</td>
<td>BVG 1M: ‘Water’, 34a and 34e</td>
<td>Water (rivers and creeks), lacustrine wetlands, lakes and palustrine wetlands of springs with water dependent herbs.</td>
</tr>
<tr>
<td>Tropical Forests</td>
<td>BVG 2M: 1 to 8</td>
<td>Dry to moist forests, including semi-deciduous, open forest and evergreen forests. Some BVGs where ‘woodland’ is mentioned, but where it more closely resembles ‘open forest’.</td>
</tr>
<tr>
<td></td>
<td>BVG 1M: 9a, 9c, 9d, 10a, 11a, 11b, 16a, 22b, 22c</td>
<td></td>
</tr>
<tr>
<td>Woodlands</td>
<td>BVG 2M: 12 to 15; 17 to 21; 23 to 29 BVG 1M: 9b, 9e, 9f, 9g, 9h, 10a, 11c, 16b, 16c, 22a</td>
<td>All woodlands, including moist to dry woodlands, shrublands and heath. Some BVGs where ‘open forest’ is mentioned, but where it more closely resembles ‘woodland’.</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Grasslands</td>
<td>BVG 2M: 30, 31, 32, 33</td>
<td>Tussock and hummock grasslands and forblands.</td>
</tr>
<tr>
<td>Coral Reefs</td>
<td>Reef layer: All areas classed as ‘reef’</td>
<td>Coral reefs, as part of the Great Barrier Reef and in the Gulf of Carpentaria.</td>
</tr>
<tr>
<td>Cropland</td>
<td>QLUMP: All ‘Production from irrigated agriculture and plantations’ and ‘Production from dryland agriculture and plantations’, but not ‘Land in transition’. Includes ‘Intensive horticulture’.</td>
<td>Lakeland and Cooktown have the largest amount of land for agriculture. Other areas include small areas near Weipa and the Northern Peninsula Area.</td>
</tr>
<tr>
<td>Urban</td>
<td>QLUMP: from the primary field ‘intensive uses’, where the secondary field is ‘waste treatment and disposal’, ‘utilities’, ‘services’, ‘manufacturing and industrial’. Also included ‘Urban residential’.</td>
<td>Residential, industrial and commercial areas of Cape York. Areas include the towns and roadhouses. The main centres are Cooktown, towns of the Northern Peninsula Area and Weipa.</td>
</tr>
<tr>
<td>Non-remnant</td>
<td>BVG 1M: Remaining ‘non-remnant’ areas after removing cropland and urban land uses. Also includes 16d (rock).</td>
<td>Mining areas, infrastructure and rock. Includes airstrips and other areas not classed as ‘urban’ or ‘cropland’ but possibly also some agricultural land or areas within towns.</td>
</tr>
</tbody>
</table>

**Valuation method**

We converted international dollars ($1 USD in 2007), to Australian dollars in 2014 using a USD inflation factor of 1.14 (World Bank 2015), and multiplying by the current purchasing power parity of the Australian dollar, which was 1.5 in 2014 (OECD 2015): $1 international dollar is equivalent to $1.71 Australian dollars in 2014.
A direct benefit transfer approach has several comparability issues, due to mismatch between study and policy site contexts, including issues of scale, substitutions of utility, different demographics and diminishing marginal utility (Richardson et al. 2015). To account for some of these issues, we calculated a range of monetary values, first using a direct transfer estimate for the upper end of the range to a more conservative estimate at the lower end. The direct value transfer estimate used mean monetary value estimates for eight biomes reported in de Groot et al. (2012) and urban and cropland estimates from Costanza et al. (2014).

For a more conservative estimate, we moderate our direct transfer values by two further steps. Firstly, by avoiding double counting (Stoeckl et al. 2014, Richardson et al. 2015). While the global estimates represent bundles of services that could be provided simultaneously (de Groot et al. 2012), we provided a more conservative estimate by choosing only one of the four categories of ecosystem service (provisioining, regulating, habitat or cultural) to represent the total ecosystem service value for each biome. We chose the category with the highest value estimate, which ensured that all other categories were at least counted once.

Secondly, not all values exist or are applicable in all locations, and ecosystem services are not spatially homogenous (de Groot et al. 2014). A direct transfer can be improved by adjusting values using expert opinion of local conditions (Batker et al. 2008, Costanza et al. 2014). We hence validated each service category for each biome by examining the ecosystem service that provides the highest value, to check whether it is applicable to the Cape York context versus the study sites that were used to calculate the global estimates in de Groot et al. (2012) or Wratten et al. (2013). If the individual ecosystem service that provides the maximum value is not appropriate to the Cape York context, the ecosystem service category with the next highest total dollar estimate was chosen to represent the conservative value for that biome.

The economic value of ecosystem services

Map 1 shows the 10 biomes and non-remnant areas of the Cape York Natural Resource Management region. The distribution of the biomes is dominated by woodlands, which account for 11.8 million hectares, whereas urban and cropland areas are less than 10 000 hectares each. Unsurprisingly, the coral reefs are mostly those of the Great Barrier Reef, and the forest biome is largely along the Great Dividing Range and along rivers and
around wetlands. The coastal systems biome represents large continental shelf areas, particularly to the east.

Table 2 shows our estimates of ecosystem services by direct transfer and by a more conservative estimate. The value of the direct transfer for each biome ranges from $0 per hectare per year in ‘non-remnant’ areas to $602,346 per hectare per year for coral reefs. Most of the value for Cape York is in the coastal and reef biomes. On land, while Cape York is overwhelmingly dominated by woodland, much of the ecosystem service values are from wetlands. Our more conservative estimate is in five cases one order of magnitude less valuable than the direct transfer. The total ecosystem services value for the entire Cape York NRM region is $467 billion per year if by direct transfer and $116 billion per year if by conservative estimate.
Figure 1 Map of Cape York Natural Resource Management Region, including the northern Mitchell catchment. Biomes relate to those in Table 1.
Table 2 Estimated range of values for ecosystem services for the categorised biomes of Cape York NRM region. Value is in 2014 Australian dollars.

<table>
<thead>
<tr>
<th>Biome</th>
<th>Value by direct transfer ($ per ha)</th>
<th>Area (x1000 ha)</th>
<th>Total value by direct transfer ($million per year)</th>
<th>Total value by conservative estimate ($million per year)</th>
<th>Ecosystem service category of conservative estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal System</td>
<td>49 448</td>
<td>2 512</td>
<td>124 229</td>
<td>10 242</td>
<td>Habitat</td>
</tr>
<tr>
<td>Coastal Wetlands</td>
<td>331 475</td>
<td>269</td>
<td>89 177</td>
<td>7 884</td>
<td>Regulating</td>
</tr>
<tr>
<td>Coral Reef</td>
<td>602 346</td>
<td>341</td>
<td>205 264</td>
<td>63 422</td>
<td>Provisioning</td>
</tr>
<tr>
<td>Fresh Water</td>
<td>7 297</td>
<td>33</td>
<td>238</td>
<td>107</td>
<td>Regulating</td>
</tr>
<tr>
<td>Grasslands</td>
<td>4 909</td>
<td>562</td>
<td>2 757</td>
<td>1 166</td>
<td>Habitat</td>
</tr>
<tr>
<td>Inland Wetlands</td>
<td>43 916</td>
<td>148</td>
<td>6 480</td>
<td>4 381</td>
<td>Habitat</td>
</tr>
<tr>
<td>Tropical Forests</td>
<td>9 001</td>
<td>695</td>
<td>6 255</td>
<td>3 005</td>
<td>Cultural</td>
</tr>
<tr>
<td>Woodland</td>
<td>2 715</td>
<td>11 820</td>
<td>32 097</td>
<td>25 811</td>
<td>Provisioning</td>
</tr>
<tr>
<td>Urban</td>
<td>11 390</td>
<td>9</td>
<td>66</td>
<td>57</td>
<td>Cultural</td>
</tr>
<tr>
<td>Cropland</td>
<td>9 519</td>
<td>6</td>
<td>90</td>
<td>64</td>
<td>Provisioning</td>
</tr>
<tr>
<td>Non-remnant</td>
<td>0</td>
<td>92</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total Cape York</strong></td>
<td><strong>16 486</strong></td>
<td><strong>466 654</strong></td>
<td><strong>116 018</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Uses of the Cape York Peninsula Ecosystem Services Valuation

There are several sources of uncertainty in our estimates, which could lead to undervaluing or overvaluing services and thus weakening the strength of land use and policy decisions. Costanza et al. (1997), de Groot et al. (2012) and Costanza et al. (2014) discuss in more detail some of the main sources of uncertainty, such as spatial heterogeneity of ecosystem services, diminishing utility of large areas and actual versus potential values. In addition to this, we realise that the methods we used to delineate biomes bring in some further uncertainty, due to the limited accuracy of the mapped broad vegetation groups and our ambiguity in categorisation of some BVGs to each biome. Nevertheless, the estimates provide a measure with which to raise awareness of the values of ecosystems and their services for policy and land use planning, which requires a relatively low precision compared to full cost accounting or payments for ecosystem services (Costanza et al. 2014).
If we focus on the order of magnitude of our estimates, as Costanza et al. (2014) and Richardson et al. (2015) suggest, the monetary value of ecosystem services in Cape York is comparable to the QLD gross state product of $295 billion per year (ABS 2014). At a regional level the conservative estimate is in the hundreds-of-billions of dollars, which, in a region where the gross product might be little more than one billion dollars\(^1\), is a substantial amount.

One of the key questions to be answered in policy and land use decisions for Cape York is ‘who is winning, and where?’. For instance, mining resources extracted from Cape York might have more benefit to shareholders in the cities further south (Brisbane) than benefits to the local community and to land managers. Below we focus on several examples in which our ecosystem services valuation may help make better decisions in the mining and pastoralism sectors, the dominant sectors of Cape York Peninsula, and in the cultural arena.

Importantly, these examples allow us to test the veracity of our ecosystem services valuation and compare it with other valuations such as those through economics. The examples also reveal gaps in using ecosystem services valuations. Our purpose is not to suggest an “either-or” outcome but to highlight and value trade-offs made, and the potential of additional opportunities based on ecosystems.

**Culture**

Ecosystem services to culture, particularly Indigenous culture (related to spiritual and heritage values), and health (including mental and physical health) are under-represented in the literature and policy arena, and poorly valued. One reason for this poor representation is that the productive economic realities of many Indigenous people in northern Australia occur in the intersecting spaces between the market and customary sectors (Altman 2005, 2009).

Hunting, gathering and fishing occur as customary activities as do a range of other activities such as land and habitat management, fire management and maintenance of biodiversity (Altman 2009). The fact that these activities are not monetised nor integrated into mainstream Australian policies (Zander and Garnett 2011) does not mean they have no value. A 1996 study (Asafu-Adjaye 1996) on Cape York Peninsula, one of the few studies to evaluate this aspect of customary activity, valued the subsistence food production based on market replacement valuation and calculated it to be worth at least $6 million per year.

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\(^1\) The Australian Bureau of Statistics (2014) reports that at 2014 figures, Queensland’s gross state product per capita was $63 000. Cape York has approximately 17 000 people. Multiplication of these two figures give an approximate estimate of just over $1 billion.
More recently, the environmental services provided by Indigenous-owned land has been found to be valued by the wider society in their willingness to pay between $878m and $2b each year for Indigenous people to provide environmental services (Zander and Garnett 2011).

In contrast, dependence on the state can have an opportunity cost of millions of dollars by maintaining the status quo rather than investing in economic activity across a broad front including land management and customary activities. One study (Taylor & Stanley 2005) estimated the productivity forgone of $43.4 M in a Northern Territory Indigenous community. Another study focused on potential primary health care savings associated with land management. This study (Campbell et al. 2011) showed a savings of $4.08 million dollars over 25 years for a community of 298 people from a remote Indigenous community in Arnhem Land.

The values estimated in these studies - for subsistence food, land management and health - are all grounded in ecosystem services and hint at the significant value of these services to Indigenous culture and the community at large.

Mining

In 1957 the Queensland government revoked Indigenous reserves at the Weipa mission to accommodate bauxite mining. In 1963 Mapoon mission was evicted and demolished to enable the extensive bauxite mining lease to Alcan (Holmes 2011b). The following year, 1964, was the first year of commercial production with 453 365 tonnes of bauxite mined and shipped (Klimenko, V. and R. Evans. 2009). Today the bauxite mining operation north of Weipa is one of the largest in the world producing 26 million tonnes of bauxite (Rio Tinto 2014).

Indigenous people do not have the power of veto over mining development projects. After the introduction of the Native Title Act in 1993, and in recognition of the continuing lack of control of the region’s Indigenous people in decisions related to mining, Comalco (now Rio Tinto) and the Queensland government sought to recognize Indigenous interest and rights in the land. A compensation package was offered and accepted by Traditional Owners and Indigenous communities as parties to The Western Cape Communities Co-existence Agreement (WCCCA) signed in 2001.
Due to the depletion of the north of Weipa bauxite reserves, the South of Embley Project anticipates extending the mining south of Weipa to sustain mining for about 40 years. The Project involves a staged increase to 50 million tonnes of bauxite per annum (Rio Tinto 2011) closer to the community of Aurukun and on Wik traditional lands.

We have provided a first attempt at valuing the ecosystem services of the South of Embley Project biomes to compare with local economic values associated with the proposed project. Following this, we have provided a specific ecosystem services value for the carbon of the South of Embley forests, and compared this to the value obtained from potential logging opportunities associated with the South of Embley Project.

**Social disadvantage**

The economic impact of mining is not evenly spread. The Rio Tinto mining operation based in Weipa has produced great benefits to the regional and national economy but local communities remain disadvantaged. According to the Environmental Impact Statement for South of Embley (RioTinto 2011) the neighbouring communities of Napranum, Aurukun and Mapoon rely to some degree for their prosperity on bauxite mining. The majority of the economic impacts, however, are localised in the Weipa area (RioTinto 2011), and account for 75% of Weipa’s total economic output.

The ABS (2006) socio-economic index of disadvantage (SEID) was used in the South of Embley EIS, which focused on Aurukun. Aurukun is shown to be one of the most disadvantage communities (100% within Quintile 1 of the SEID) in Australia with Weipa, in comparison, being less disadvantaged (in Quintile 3 & 4 of the SEID). Five years later, in 2011, the situation for Aurukun had not improved, despite ongoing mining activities which were expected to bring some degree of prosperity. New to the BRS Census (BRS 2011) was the ordering of all areas in Australia ranked from the lowest to highest (with the lowest given a score of 1); these national statistics show that Aurukun remains one of the most disadvantaged areas in Australia, falling not only in the lowest 10% (the quintile 1 of the SEID) but in the lowest one percent of disadvantage (Table 4). Only two local areas in Queensland, and three in Australia, are more disadvantaged (BRS 2011). Weipa in comparison is comparatively well-off being ranked 350 and in the top 25% of areas in the country.
Relative values

We have provided a valuation of the ecosystem services in the South of Embley Project biomes to provide a broad comparison with the modeled local economic impacts of the Project (Table 3), which are anticipated to benefit the four western Cape York communities and Cook Shire Local Government Area. To be conservative we have used the gross output values of the South of Embley mine (million dollars per annum) with which to compare total ecosystem services value per annum. The South of Embley Project involves a staged increase from 15 Mdptpa (million dry tonnes per annum) to 30 Mdptpa and then 50 Mdptpa (Rio Tinto 2011).

Table 3 Comparison of local economic impact using operational gross output values with ecosystem services value of the South of Embley Project area. Source: Rio Tinto 2011. *Value are in 2014 $AUD. **million dry tonnes per annum. ***range is from a conservative estimate to the direct transfer estimate, and does not take into account flow-on impacts to waterways or the marine environment.

<table>
<thead>
<tr>
<th></th>
<th>Local economic impacts (2014 $M*)</th>
<th>Ecosystem Services value (2014 $M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Regional Product Western</td>
<td>508</td>
<td></td>
</tr>
<tr>
<td>Cook Shire LGA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Economic Impacts 15</td>
<td>717</td>
<td>304-1144***</td>
</tr>
<tr>
<td>Mdptpa**</td>
<td></td>
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<tr>
<td>Operational Economic Impacts 30</td>
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<td>304-1144</td>
</tr>
<tr>
<td>Mdptpa</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Our figures show that the value of the ecosystem services provided by the South of Embley biomes are significant and of the same order of magnitude as the estimated local economic values of the staged South of Embley project. We are not suggesting that these values can be commodified and sold in private markets. We are suggesting that knowing the value of the ecosystem services is helpful in their management. In some cases this could include economic incentives. Below we have, for instance, provided a carbon value for those forests that may be cleared for the South of Embley project.
An ecosystem valuation of the South of Embley Forests

One ecosystem service that we can reasonably accurately value is that of carbon in the land planned for clearing for the South of Embley operation. The South of Embley anticipates the disturbance of 29,658 ha of remnant vegetation comprising 29,366 ha of RE 3.5.2 (Darwin Stringybark tall woodland).

Law and Garnett (2011) used the National Carbon Accounting Toolbox (DCC 2010) to estimate carbon stocks for the Northern Territory’s major vegetation groups. This dataset is appropriate for broad state-level analysis. Modelled carbon stocks were highest in eucalypt open forests (158 tC/ha), grading downwards through tropical eucalypt woodlands, eucalypt woodlands, eucalypt open woodlands, shrubland and grassland. The comparable vegetation group in the South of Embley region is woodland which, according to Law and Garnett’s scheme has values from 121-150 tC/ha for tropical eucalypt woodlands down to 11-20 tC/ha for acacia forest and woodlands (Law & Garnett 2011).

We selected the lower value for woodlands of 31-40 tC/ha, likely to be an underestimate since the South of Embley forests are tall woodlands and we have taken a more conservative open woodland estimate. We used the mid-point or average value (35 tC/ha) for this woodland type to get a total estimate of 3,809,570 t CO₂-e for the cleared forest.

To convert to dollars we used the average price at the last Emission Reduction Fund auction of $14/tCO₂. A significant proportion of the projects that won at auction were avoided deforestation projects. This results in a conservative carbon value of the tall stringybark forest of $53 M. Investing this in Australian shares at 8.9% (ASX 2013) would provide a return of $4.8 M per annum without touching the capital.

The figure is useful for four reasons:

1. The figure demonstrates that our ecosystem services values, based on the lowest estimate from Table 6 ($304 M), are a similar order of magnitude and hence plausible.

2. The figure suggests that with good governance arrangements and investment, and the right policy setting, the value of carbon in the South of Embley forests may provide potentially a higher level of prosperity for Aurukun people than mining to date (we are not privy to the arrangements made between Rio Tinto and the Aurukun community).

3. The figure allows us to compare the value of other forestry-based operations.
4. Finally the figure suggests that the value of on-country land management provided by Indigenous people is higher than currently invested.

We briefly examining the last two points below.

*Returns from a forestry operation in South of Embley area*

The South of Embley EIS social impact assessment (2011) states that, in terms of business opportunities, Traditional Owners and Indigenous communities emphasized the desire for opportunities in land and coastal management, timber harvesting, civil construction, contract mining, ecotourism, seed collection and rehabilitation and cultural heritage management. In particular they valued on-country employment opportunities.

Venn (2004) - the only study cited in the South of Embley EIS for forestry opportunities - modelled some general parameters for a Wik Forestry industry (Table 4). Venn (2004) assumed start-up funds of from $0.5 M - $10 M for a 30 year time horizon and calculated net present value using a 7% discount rate.

**Table 4 Modeled potential incomes and employment from logging on Wik lands adapted from Venn (2004). Reported estimates are in 2004 Australian dollars.**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>$0.5M</th>
<th>$1M</th>
<th>$2M</th>
<th>$5M</th>
<th>$10M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total employment</td>
<td>14</td>
<td>16</td>
<td>30</td>
<td>72</td>
<td>108</td>
</tr>
<tr>
<td>On country employment</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>22</td>
<td>37</td>
</tr>
<tr>
<td><strong>NPV</strong></td>
<td><strong>$2.1 M</strong></td>
<td><strong>$6.1 M</strong></td>
<td><strong>$7.4 M</strong></td>
<td><strong>$15.3 M</strong></td>
<td><strong>$42.8 M</strong></td>
</tr>
</tbody>
</table>

At best, and assuming a $10 M up-front investment were available (Venn 2004), the figures suggest a net present value of $1.4 M/annum, and employment of 37 people. At worst, the figures suggest net present value of $70,000/year and the employment of 12 people. The modeling done by Venn (2004) is based on a number of assumptions including a forestry operation of the larger Wik estate, not just the South of Embley operation, a ready market for timber, and that the initial investment was available, none of which were tested.
**Employment**

Rio Tinto probably employs over 100 western Cape York Indigenous people from the mine’s 1000 or so employees (RioTinto 2014; actual figures are not available). How many of the employees are from Aurukun is not available publicly. Anecdotal information suggests 40-50 western Cape people, mostly Land and Sea Rangers, are also currently employed in land management activities – approximately five of whom are from Aurukun. Assuming an annual wage of $40,000, this amounts to $1.6-2.0 M for the entire western Cape.

In Aurukun the figure for land management activities may be in the order of $200,000/annum which is a tiny fraction (0.2%) of the value of the most conservative value of ecosystem services of the South of Embley biomes, and 4% of the value of carbon in the forests to be cleared, suggestive of a significant investment mismatch.

A fairer policy framework might be one that included mining, compensatory stewardship payments for carbon, land management and forestry opportunities.

**Pastoralism**

*Declining terms of trade*

The north Australian beef industry is generally in poor health with most enterprises struggling to generate positive economic returns (Grice et al. 2013). Despite the major transformations of the beef industry it continues to have declining terms of trade of about 2% per annum. Over the past decade there has been nil net productivity growth, average debts are high and returns are low, with many enterprises facing threats of insolvency (Grice et al. 2013).

*Relative values*

The average unimproved rangeland value for Cape York is $14 997 per km² (calculated from Bastin et al. 2008). Livestock densities for Cape York Peninsula have remained steady at nine (Dry Sheep Equivalent km⁻²) - about 2 cattle, or one bull - for two decades (ACRIS 2015). Based on two 450kg beasts at a high $2.00 per kg, this totals $1800 per km². Based on our estimates, the ecosystem service value of the same lands on Cape York are between $33 000 and $61 000 per km². Two points can be drawn from this. First, land values are much more than can be accounted for by grazing productivity, a trend that is apparent across the rangelands of Australia (Bastin et al. 2008). Second, the most
conservative ecosystem services value is an order of magnitude higher than the highest land value.

**Strategies to offset poor terms of trade will trade-off the health of country**

The relative values suggest caution for strategies to offset the terms of trade decline which include expanding herd sizes and animal performance (Bastin et al. 2008). These strategies can threaten sustainable resource use because, while much of Cape York Peninsula has seen little purposeful environmental modification, pervasive and insidious factors such as feral animals, weeds and land degradation brought about by cattle challenge the apparent robustness of the environment (Garnett et al. 2010).

Land degradation is a cost to the public but there is not adequate knowledge of baseline conditions or monitoring data to assess the impact of recent grazing practices in the rangelands (Bastin et al. 2008). There are also few economic analyses of the costs of degradation, though those that do exist point to the significant cost of feral animals and weeds. The Australian Government in its Fifth National Report to the Convention on Biological Diversity (2014) cites the annual cost of control of 11 feral animals at around $720 million, and more than $1.57 billion on the management of weeds. The annual cost of weeds to the Australian livestock industry, through loss of production and control measures, has also been estimated at $315-345 million with a further $112 million cost to public authorities (Garnett et al. 2010). Figures for Cape York Peninsula are not readily available.

A rigorous analysis of how or even whether pastoralism could be an economic benefit has not been undertaken. From our preliminary ecosystem services valuation, it may be more economic to manage the values of the landscape under a stewardship program, or a combination of conservative grazing and stewardship payments.

The potential value of stewardship payments might be estimated from the first Emissions Reduction Fund auction, such as for Olkola Aboriginal Corporation and clan group (Olkola) in southern central Cape York. Olkola were contracted to deliver abatement of 455 000 t CO₂-e over seven years for an early season savanna burning project (Clean Energy Regulator 2015). While the amount paid for the tranche of CO₂-e is confidential, Olkola will possibly earn millions of dollars over seven years for approximately 870 000 hectares of land, not all of which may be included in the fire abatement project. This income, together with a conservative grazing regime, some funds to manage the national parks, philanthropic funds
and tourism opportunities, could provide more economically and environmentally sustainable livelihoods than cattle grazing alone.

While we are unable to provide more detail at this stage, exploring in-depth case studies such as the one sketched for Olkola will add significant value to exploring economies of scope for Cape York Peninsula landholders.

**Conclusion**

In Cape York Peninsula economic and political decisions are regularly made involving trade-offs of ecosystem services but these decisions are mostly hidden from view. Improved transparency will enable wiser decisions, and knowing the relative value of ecosystem services, even with its limitations and restrictions, will help make the sustainable management of Cape York Peninsula more effective. In particular this ecosystem service valuation is helpful in:

- valuing the ongoing land management activities of Cape York Peninsula landholders
- making explicit trade-offs made against other economic imperatives
- presenting new opportunities to achieve human well-being.

We have shown that cultural activities are likely to be grossly underestimated in value including the opportunity costs of not investing in Indigenous customary and land-based activities. Both mining and pastoral activities could be made more sustainable by adding economies of scope such as carbon and other stewardship payments based on the management of fire regimes, weeds and feral animals, and other opportunities based on ecosystem services.

Importantly, our research highlights the importance of ecosystem service valuation and reveals avenues of further research into alternative and diverse land management services and incomes.

**Acknowledgements**

We would like to thank Professor Natalie Stoeckl for her time and advice on economics and ecosystem services, and Amanda Hogbin for her input regarding the management of Olkola country.

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World Bank 2015 data.worldbank.org/indicator – usd inflation table


The Demography of Developing Northern Australia

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Paper Presented at the
Developing Northern Australia Conference
Townsville (QLD), 20-22 July 2015
The Demography of North Australian Development

ABSTRACT: In light of the current policy focus of developing northern Australia, numerous government reports, inquiries and papers have been tabled. The recent ‘Green Paper on Developing Northern Australia’ embeds three significant population themes: 1. Significantly grow the populations of urban zones in the north, 2. Improve net interstate migration flows between the north and remainder of Australia, and 3. Increase international migration to the region. The aim of this research is to analyse pre-existing demographic and socio-economic characteristics of the population of northern Australia, comparing and contrasting populations within the region and the region itself to the rest of Australia as a basis for commenting on opportunities and challenges associated with the demography of developing northern Australia.

Keywords: Northern Australia, demographic and socio-economic characteristics, Economic development

Background

The present-day focus on developing northern Australia emanates from a pre-2014 election commitment by the incumbent Abbott Government (a Liberal-Nationals Coalition). That policy was titled the 2030 Vision for Developing Northern Australia (Liberal Party of Australia, 2013). The policy’s central element is to deliver a white paper outlining the Australian Government’s strategies in relation to northern development under their Developing Northern Australia agenda. In the Australian political context, white papers are official and national level elucidations of policy platforms on specific macro-issues, which are considered of nationally strategically importance. In the past there have been white papers in such areas as national defence, education and engagement with Asia. The stated purpose of the White Paper for Developing Northern Australia is to:

...set out a clear, well-defined and timely policy platform for realising the full economic potential of the north, including a plan for implementing these policies over the next two, five, 10 and 20 years. (Australian Government, 2014a)

The white paper process in Australia signifies a policy position of the Australian Government, which is initially articulated, in the form of a green paper, against which public consultations and submissions are tabled before a white paper is produced. At the time of writing, the Green Paper on Developing Northern Australia had been circulated to the public (June to August 2014) with around 200 submissions received from individuals, associations, local and state governments, representative organisations, universities and others. A Joint
Select Committee on Developing Northern Australia, consisting of parliamentary representatives from across political parties, was established to provide a report on the consultation process and identify barriers and opportunities for development as a pre-cursor to the white paper. The Committee delivered its final report in late 2014 titled Pivot North – Inquiry into the Development of Northern Australia (Australian Government, 2014b).

While there have been numerous policies, reports and inquiries into developing the north of Australia within the context of the renewed policy focus, the ‘real’ agenda for this iteration has been questioned. There is, for example, uneasy silence in the key documents (the Green Paper, policy documents and Pivot North report) about lack of progress for improving the wellbeing of Indigenous residents in the north, who constitute around 16% of the population, but are far behind in terms of socio-economic and health status. Some question the current ‘northern development’ agenda as being potential subtext for reducing Indigenous land ownership and control over Indigenous affairs (for example, Rothwell, 2015).

What is overt in the discourse of policy makers, committee members and politicians is the perceived need for strong population growth as a catalyst for economic development in the region. While evident, the depth of discussion and analysis around this issue is limited to the predication of ‘big is best’, focusing in particular on the growing large urban zones in the north. Absent are questions about how the pre-existing population’s characteristics, in terms of demographic makeup, settlement distribution and socio-economic characteristics might compliment or create barriers for development.

**North Australian population aspirations**

Fundamental to the Developing Northern Australia policy are the issues of population characteristics and population growth for the region. The perceived significance of growth in particular to the debate and discussion on northern futures is evident in both the Green Paper and final report from the Joint Standing Committee. Indeed the latter has identified the small population of northern Australia as the ‘…key impediment to be overcome.’ (Australian Government, 2014b, p.109). In similarity to past reports and inquiries on developing northern Australia (for example, Coombs, 1947; Harris, 1992), a bigger population in the north is seen as vital, but supporting detail about what this might mean in terms of the relationship of population size and demographic change to development is scant. This might partly reflect the ‘misbehaviour’ of relationships between the economy and population change observed in some parts (Carson et al., 2011). The Northern Territory is a prime example where strong
economic performance (on paper at least) has coincided with (if not helped trigger) historically high levels of population losses to interstate (see Payer and Taylor, 2015).

While the current policy is relatively scant on demographic detail, the absence of this in northern policy and development contexts is not unusual (Carson, 2011a). What has been evident and implicit within several iterations of reviews, parliamentary enquiries and other investigations on northern Australian development is the macro-assumption that a bigger population in the north will drive development and foster sustained economic growth. This is certainly made explicit in the present day green paper and Joint Standing Committee report. Likewise, past reviews and policies have identified the population growth as imperative, along with a consistent messaging about retaining residents in the north, itself implicit recognition of the social and economic issues associated with the high rates of population turnover observed in most northern peripheries (Carson, 2011b).

Nevertheless, a number of important northern Australian demographic pre-conditions are identified in the green paper. These include a high concentration of the population in urban areas (particularly in Darwin, Cairns and Townsville), great diversity and polarity in the demographic and socio-economic characteristics of settlements and their residents (particularly between urban and other areas), disparate population growth rates between urban and other areas and the prevalence of a large number of small and very remote settlements away from coastal zones (Australian Government, 2014a).

It is also important to note, and possible to distil, that there are three key population-related ambitions in the Green Paper upon which economic development, diversification and sustainment in the region might be based:

1. A focus on substantially growing ‘urban zones’: “…the White Paper will consider options for building on existing key urban zones — such as Darwin, Cairns, Townsville and Karratha — with the aim of substantially increasing their population.” (p. 54)

2. Improve net internal migration flows: “Greater migration from elsewhere in Australia would help boost population... The White Paper will explore practical options to remove some of the impediments to internal migration to northern Australia — recognising governments have limited ability to directly affect people’s decisions as to where they live and work.” (p. 54)

3. Increase international migration: “…the Australian Government is consulting across governments, industry, business and communities on ways migration policy can help
increase the availability of skilled and unskilled labour, including in the north.” (p. 56) (Adapted by the authors from: Australian Government, 2014a)

These ambitions raise many questions, not least the spectre of what might constitute a sufficient population size for the development of the region, what might be sustainable environmentally, and realistic in terms of size and, importantly, what characteristics our northern population might contribute in difference to pre-existing resident characteristics? Analysis in these areas for northern Australia is to date disparate and relatively shallow. There is no research-based review available, for example, of the critical issue of who comes, who leaves and who stays. Such knowledge is vital in the context of opportunities and barriers for growing the population and achieving the ambitions embedded in the Green Paper. In addition, knowledge of these issues may be important for projecting what might eventuate in terms of population size, composition and distribution for the region in the short to medium future. Consequently, the aim in this paper is to examine key demographic and socio-economic characteristics of the pre-existing northern Australia population in order to comment on the influence these may have on population-related aspirations articulated in the present day developing northern Australia agenda.

**Methods**

The analysis in this paper is based on 2006 and 2011 Census data as well as drawing on other Australian Bureau of Statistics (ABS) and Department of Immigration and Border Protection materials. Here, northern Australia is broadly defined as the area to the north of the Tropic of Capricorn, however some areas to the south, such as Alice Springs are being included in the north due to their importance as regional centres for servicing surrounding communities and industry (Australian Government, 2014a).

The boundary of northern Australia extends across parts of the states of Queensland and Western Australia and encompasses the whole of the Northern Territory. Using this broad definition, a north-south split sees approximately 40.5% of the national land area in the north and 5.2% of the total Australian population in the north. In this study we replicated the definition in the Green Paper and developed a custom geographic area based on Statistical Areas Level 2 (see Figure 1) to specify and extract customised Census tables from the ABS software Table Builder. Areas which were on the border of northern and southern Australia were allocated on the basis of the location of the majority of the population.
The Green Paper identifies the cities of Townsville, Cairns, Darwin, Mackay, Rockhampton, Gladstone and Karratha as the key urban areas (or ‘zones’ as they are labelled) in northern Australia. Interestingly, while the geographic scope of the policy includes Alice Springs and that city is larger than Karratha, this city is not mentioned in the context of growth in the urban zones of northern Australia. Our analysis of urban versus other populations and socio-economic change in northern Australia incorporates those cities defined as ‘Significant Urban Areas’ by the Australian Bureau of Statistics in its publication Regional Population Growth (various editions). These are Townsville, Cairns, Darwin, Rockhampton, Mackay, Alice Springs, Mount Isa, Port Hedland, Yeppoon, Broome, Karratha and Emerald.

Results

In this results section we first provide fundamental demographic and socio-economic indicators for the region. This is followed by analysis which speaks to the three key population aspirations identified in the Green Paper. These are 1. Substantially increasing the population of urban zones in northern Australia, 2. Improving internal migration flows and 3. Increasing international migration and the retention of international (skilled) migrants.

Fundamental demographic indicators for northern Australia
Approximately five percent (just over 1.2 million) of Australian’s resided in northern Australia in 2011, and this was consistent with five years prior (Table 1). While overall the population grew by 12% during 2006 to 2011 (compared to 8% elsewhere), the overseas born population grew by 33%, such that the overseas born representation in the population rose from 13% in 2006 to 16% by 2011 (compared to 27% in the rest of Australia by 2011). Meanwhile, the proportion of Australian Indigenous people living in the north fell by 2% and the ratio of men per 100 women (known as the sex ratio) increased from 105 to 107, but remained the same (at 98 men per 100 women) in southern Australia.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2006</th>
<th>2011</th>
<th>Change</th>
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</thead>
<tbody>
<tr>
<td>Population of North Australia (NA)</td>
<td>1,080,682</td>
<td>1,206,090</td>
<td>12%</td>
</tr>
<tr>
<td>Population elsewhere</td>
<td>19,965,922</td>
<td>21,592,093</td>
<td>8%</td>
</tr>
<tr>
<td>Residents of NA born overseas (%)</td>
<td>13%</td>
<td>16%</td>
<td>33% growth</td>
</tr>
<tr>
<td>Australian's living in North Australia</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Indigenous Australians living in NA</td>
<td>30%</td>
<td>28%</td>
<td>-2%</td>
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<tr>
<td>Sex ratio North Australia (v rest)</td>
<td>105(97)</td>
<td>107(97)</td>
<td>+2 men(no change)</td>
</tr>
</tbody>
</table>

The resident population structure for northern Australia and the rest of the nation differ significantly with a much younger population evident in the north. In part this is due to the large and youthful Indigenous population who constituted 15% of the population (around 140,000 residents) in 2011. In northern Australia 22% of the population were aged less than 15 years in 2011 compared to 19% in the rest of Australia, while for the Indigenous population in northern Australia this was 35% compared to 20% for other residents. Conversely, seniors were under-represented in northern Australia where 9% of the population were aged 65 years and over compared to 14% in the rest of Australia. A ‘bubble’ in the age structure for northern Australia becomes apparent at 25-29 years with a higher proportion evident in subsequent working ages up to 55 years.

*Fundamental socio-economic indicators for northern Australia*
The top ten industries for employment in northern Australia are shown in Figure 2 (with all other industries combined into the category of ‘Other’). The top ten industries in the north account for 79% of employment compared to 73% for the rest of Australia. Mining, Public Administration and Safety (which includes the defence sector) and Accommodation and food services are proportionally more prominent employers in the north.

![Figure 2: Industry of employment, 2011](image)

Incomes in northern Australia are on average higher than elsewhere, with the exception of Indigenous residents. Despite their low incomes in comparison to others, in 2011 a third of Indigenous residents in the north earned on average $1,000 a week or more compared to 28% for the rest of Australia (Figure 3) and a lower proportion earned very low incomes of less than $200 per week.

While mining is prominent in the north, it is only the fifth largest employer of northern residents. Substantial discussion and debate on the practice of fly-in-fly out (non-resident) workers across the north has transpired, and in particular for large resource based projects. Nevertheless, non-resident workers are prominent in other industries in the north including Public Administration & Safety, and Health Care & Social Assistance. Numbers of non-resident workers in northern Australia grew by around 40% from 2006 to 2011 with 75% of these being males (Carson and Taylor, 2013). Incomes for non-resident workers were above the northern and rest of Australia averages with around double the proportion earning more than $1,500 per week.
Attracting and retaining skilled workers is a point of discussion in the present day Green Paper and in prior reports on developing northern Australia. Educational data on people’s highest post-school level of qualification are an indicator of the overall level of skills in the community. For those with a post-school qualification, a smaller proportion of non-Indigenous people hold a Bachelor’s level or above qualification (19% compared to 31%). However, for Indigenous people the proportion with a Bachelor level or above qualification is higher in northern Australia (Figure 4). A far higher proportion of Indigenous people in northern and southern Australia hold Certificate level qualifications.

Figure 4: Highest level of post-school qualifications by Indigenous status, 2011
As a measure of the capacity for northern Australia to develop the industrial and services sectors, interconnectivity, high and improving Internet rates can be considered important pre-cursors. Indeed a number of Green Paper response submissions identified a lack of information communications technology infrastructure. In 2011, 21% of households in northern Australia did not have any form of Internet connection, compared to 14% in the rest of Australia (Figure 5). Of those households in the north who had a connection in 2011, less had broadband connections compared to the rest of Australia (71% compared to 80%).

**Figure 5: Type of Internet connection for households, 2011**

<table>
<thead>
<tr>
<th>Type of Connection</th>
<th>Northern Australia</th>
<th>Rest of Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other connection</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Dial-up connection</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Broadband connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Internet connection</td>
<td>21%</td>
<td>14%</td>
</tr>
</tbody>
</table>

**Results for Green Paper population ambitions**

In this section we further analyse demographic and socio-economic characteristics of northern Australia, which are pertinent to assessing compatibility with Green Paper population related ambitions.

We commence by discussing the aspiration on increasing the population of urban zones in northern Australia. In 2011, the urban zones of northern Australia accounted for 69% of the population and had grown by 18% from 2006, compared to just 3% for the remainder of the region. Indigenous residents too increasingly gravitated towards the urban zones with their share of the region’s Indigenous population growing from 32% to 41% and the Indigenous population in urban zones growing by 21% over the five-year period (Table 2). However, the proportion of population in urban zones who were Indigenous in 2011 fell, while rising in the remainder of the region, indicating relatively large growth in the non-
Indigenous population in urban areas since 2006. The population of urban zones grew by 18.4% from 2006 to 2011 in comparison to just 2.6% for the remainder of northern Australia. There were 104 men for every 100 women in northern urban zones in 2011 compared to 113 for per 100 in the remainder of the region. This male bias in the population had increased for both areas during 2006 to 2011, especially outside of the urban zones. Meanwhile, urban zones featured a larger and increasing share of overseas born migrants in the population at 18% in 2011 compared to 11% elsewhere in the north. The proportion of the population under 15 years of age was at around 22% across the north and remained consistent during 2006 to 2011, but the proportion aged 65 years and over grew, causing the dependency ratio (the proportion aged less than 15 and 65 or over and an indicator of the economic potential in the population) to rise in 2011.

Table 2: Key demographic indicators for northern Australian urban zones, 2006 and 2011

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Population share of the region</td>
<td>57.1%</td>
<td>42.9%</td>
<td>60.6%</td>
<td>39.4%</td>
</tr>
<tr>
<td>Indigenous share of the region</td>
<td>34.6%</td>
<td>65.4%</td>
<td>37.5%</td>
<td>62.5%</td>
</tr>
<tr>
<td>Indigenous proportion in population</td>
<td>9.1%</td>
<td>22.7%</td>
<td>9.3%</td>
<td>23.8%</td>
</tr>
<tr>
<td>Proportion born overseas</td>
<td>15.2%</td>
<td>10.3%</td>
<td>17.7%</td>
<td>12.2%</td>
</tr>
<tr>
<td>Men per 100 women</td>
<td>102.6</td>
<td>107.5</td>
<td>102.5</td>
<td>113.6</td>
</tr>
<tr>
<td>Proportion under 15 years</td>
<td>22.1%</td>
<td>24.2%</td>
<td>21.5%</td>
<td>22.3%</td>
</tr>
<tr>
<td>Proportion over 65 years</td>
<td>8.7%</td>
<td>9.2%</td>
<td>9.2%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Dependency ratio</td>
<td>30.8%</td>
<td>32.2%</td>
<td>30.7%</td>
<td>32.1%</td>
</tr>
</tbody>
</table>

Analysing interstate migration to northern Australia, net interstate migration flows are most often negative, with more residents leaving than arriving. This is certainly the case for the Northern Territory which recently experienced record net interstate migration losses and has seen 20 successive quarters of negative Net Interstate Migration, totalling a net loss of just under 10,000 residents (ABS, 2015; Payer and Taylor, 2015). Nevertheless, parts of the north have experienced relatively large rates of population growth in recent years including Townsville, Cairns and in the Pilbara region. Overall, net interstate migration to northern Australia during 2006 to 2011 was 16,500 with 75% of this attributable to the non-urban areas of the north. Growth in urban areas meanwhile has been driven by international migration, natural increase and internal migration within the region (from remote areas to urban zones). Critical to improving net interstate flows for northern Australia is an understanding of who comes and who goes. Figure 6 demonstrates the compression of
interstate migration, in both directions, to those aged in their 20s and 30s, especially for into migration to northern Australia from outside the region.

Data also show a net positive contribution to population growth from interstate migration across all ages excepting those 55 years and older and those aged 10-19 years (Figure 7). The former highlights the loss of seniors while the latter suggests a significant brain drain to southern areas for further education, and particularly for females. The gender differences in net interstate migration also demonstrate the progression of the region towards a greater male bias with 10 extra men per 100 women moving into the region but 3 fewer men per 100 women moving out.
Next we investigate the characteristics of international migrants to northern Australia. These highlight significant structural and compositional differences between northern migrants and the rest of Australia, as well as between new arrivers and long-term overseas born residents of the north. In 2011, overseas-born residents comprised 16% of the population of northern Australia, which was lower than the rest of Australia (27%). Furthermore, Northern Australia differs from the rest of Australia in that more people from New Zealand (18% compared to 9%) and Maritime South-East Asia (10% compared to 8%) but less from Southern and East Africa live in the North. However, sources for overseas-born in northern Australia appear to be changing markedly with large differences between those who arrived to Australia before 2006 (long-term residents) compared to those who arrived to Australia after 2006 (the ‘new arrivals’). While less people from New Zealand and Europe migrate to northern Australia, more Asian immigrants choose to live in the North.

With the proportions of overseas born in the population being significantly below the rest of Australia, the figures suggest there is potential to increase numbers in the north. Nonetheless, increased shares of international migrants to the north will depend on policies which are targeted towards a complex range of issues aside from those associated with discussions on visas and the use of skilled workers from overseas. These include redressing existing internal distributions of international migrants within Australia which have long been heavily skewed towards the capital cities and their surrounding urban areas. In Queensland, for example, around 70% of recent arrivers settled in Brisbane or on the Gold Coast; in Western Australia around 90% of all new migrants settle in Perth, while in the Northern Territory 75% of recent migrants settled in Darwin or Palmerston. Northern jurisdictions, have attracted just zero to four percent of recent migrants to the individual States or Territory (Department of Immigration and Border Protection, 2014).

These figures highlight there are challenges inherent in encouraging new overseas migrants to settle in sparsely populated northern regions. While State and Territory specific migration programs for encouraging northern and regional settlement by international migrants (for example the Regional Skilled Migration Program) are in place, only a small portion choose to do so.

A further and major barrier to more substantial international (and indeed interstate) migration flows to northern districts is the inability to attract and retain women. This is indicated in the ratio of men to women for overseas born in the north, at 119 men per 100 women (much higher than for others at 107 per 100), and net migration flows to and from the region, which show males contributing at three times the rate on a net basis. The magnitude
of the female deficit in the north is revealed in Figure 8 which shows the ‘missing’ females in the north in comparison to the rest of Australia and broken down by overseas born females and others. There are large deficits of overseas born females aged 0-4 and in their late teens and 20s, as well as from 60 years onwards. For non-migrants, deficits are relatively large at all ages from 30 years onwards, peaking for ages 55 years and above.

Figure 8: The ‘missing’ women of northern Australia, 2011

Note: These calculations show the percentage difference in the number of women per 100 men between northern Australia and the rest of Australia.

A male biased population signifies demographic and social imbalance in communities and is a feature of most of the northern areas in developed nations (Taylor and Carson 2014). The predominance of male overseas born migrants settling in northern Australia is likely in part to be a function of noteworthy growth in the skilled stream migration classes (Figure 9). Skilled jobs are heavily male biased and this may explain a continuing male bias in the overall population. Nevertheless, peak ages for missing females suggest a large deficit of females aged above 55 years (Department of Immigration and Border Protection, 2014).
Discussion and Conclusions

Much of the analysis presented in this chapter involves comparisons and contrasts at a range of geographic and demographic scales: northern Australia compared to the rest of Australia; urban areas in the north compared to others; overseas born compared to others; and so on. These are just some of the levels at which the significant differences in the demographic and economic makeup across the region can be observed. There are also, of course, substantive intra-regional and cross-border differences warranting further research. For example, some areas, like the Pilbara, are in the midst of a significant downturn as the price of Iron Ore has plummeted, while the economy of the Northern Territory is purportedly booming from large resource projects but at the same time that jurisdiction has lost record numbers of residents through net negative interstate migration during 2013-2014 despite the strong economy (Payer and Taylor, 2015).

These sorts of intra-regional differences in population systems and in the interrelationships between population and economy are acknowledged to some extent in the current policy documents, but the apparent disparate and segregated nature of these are understated. Population systems are relatively discrete, having been built and maintained around specific economic functions which may well be temporary and certainly re-enforce the sorts of population imbalances common across northern jurisdictions. Discrete areas of economic activity, and population settlements themselves, by and large are poorly integrated when it comes to transport networks and the flows of labour and capital.

What is common across the region is an increasing dependence on externally sourced capital and labour. Such conditions make the challenge of ‘developing from within’ increasingly difficult and engender circumstances under which divergences in population and socio-economic conditions between sub-groups, for example between urban and non-urban
residents or Indigenous and non-Indigenous residents, can be expected to maintain and grow (Taylor et al., 2011). These sorts of challenges are long standing for northern peripheral areas.

Several indications of a growing divide in the north between employed, educated and affluent residents (and non-residents) whose mobility patterns align with continuing such lifestyles, and a relatively immobile, under-educated and low income cohort are evident in this paper. The latter includes, but certainly is not limited to, many Indigenous residents in the north. Current approaches and articulations for northern development may identify these issues, but provide very little in the way of direct suggestions on avoiding or rectifying the potential for a ‘stuck underclass’ to continue to emerge and grow. Conversely, population aspirations articulated in the Green paper may actually enhance the worrying trend towards a further male bias, a highly mobile high income class and discrete geographical areas where ‘boom and bust’ cycles attract and then repel increasing numbers of affluent men. The Pilbara in Western Australia and Nhulunbuy in the Northern Territory are prime examples where ‘who is left’ after those who have the means to leave have done so has become the really critical question. There is also collateral damage to investors involved in the boom related to property and businesses to consider, many of whom were pre-boom locals.

Collateral ‘demographic damage’ also occurs from the downstream social and financial consequences of economic discrete booming and busting. Socially, women are less likely to tolerate the sorts of effects from a strong male bias in populations noted in much of the research on ‘boomtowns’ (Taylor and Carson, 2014), including increasing crime, anti-social behaviour and health issues from risk taking. Financially, boom times increase the cost of living in discrete areas; particularly housing costs, a primary factor in motivating people of all ages to leave the region. The focus on urban growth, interstate migration and growing overseas migrant numbers says little about growing from within. Urban zones are already far outstripping ‘the rest’ in growth, international migrants are growing significantly (especially the skilled intake), and interstate migration flows are supporting the types of economic activities which might lead to further growth. This leaves the impression of an extemporaneous incorporation of the population ambitions embedded in the Green Paper, one which is timid in broaching the difficulties of encouraging ‘growth from within’ while adhering to growth which is externally sourced.

The solution is both readily apparent but also exceedingly difficult: Attract and retain more women. The difficulties in achieving this have been laconically laid out by Carson and Schmallegger in their 2009 article titled ‘Why don’t women like Darwin?’ In summary,
northern peripheries are subject to demographic lock-in as a result of legacy industries being highly male preferred (fishing, agriculture and mining, for example). Such industries ‘trap’ men into patterns of employment which, although changing in line with companies engaging more labour efficient processes, contribute a social amenity which women do not like or want. Conversely, large cities ‘down south’ offer better education and career prospects, a chance for more favourable community amenity and likely are closer and better connected to locations of family members for support with children and finance. This chapter confers the contrasting sex ratios between urban areas in the north and the remainder, as well as between the north and rest of Australia; and in the gender and age profiles of migration to and from the region.

These issues might also lead us to question whether and why a bigger population is seen to be inherently desirable. Throughout the history of inquiries and reports on the potential of the region, readers are left in no doubt that, not only is bigger best, but that (somehow) a complex population system featuring a great diversity of settlement types, settlement sizes, growth rates, migration rates, mortality rates and ethnic compositions (to name a few population characteristics) will ‘deliver’ the required demographic outcomes (age and gender balance, skills set and so on) for up-scaled development. Ironically, it is extreme population growth rates to the north of the north (of Australia) which have long been cited as the impetus for the underlying assumption that northern Australia must grow.

On the whole, the demography of northern development features a range of population and settlement characteristics which are highly related to past pathways for economic development as well as the role of the north in national agendas, for example, as strategically important militarily (Winther, 2010). These present a range of challenges including a growing male bias and a reduced focus on regions outside of urban zones. Nevertheless, opportunities do exist in relation to the Developing Northern Australia policy. An increasing focus on international migrants and non-resident workers may create opportunities around education and tourism related services. Numbers of intergenerational families are growing, helping to balance out losses of residents in pre and early retirement ages and providing social and financial capital to communities. Population ageing (see Zeng et al.) and the declining Indigenous share compared to southern Australia (see Taylor, 2013) both represent immediate and long term challenges for the finances of the region and in turn the capacity for addressing resident’s needs in terms of services and infrastructure. Both are sufficiently influential to warrant a region-wide research agenda.
References


Cape York Peninsula: the evolution of land use policy that delivers environmental, cultural, social and economic outcomes and the role of environmental NGOs.

Andrew Picone, Northern Australia Program Officer, Australian Conservation Foundation

Abstract

Since 1995, the Queensland Government has returned 3,225,000 hectares of land on Cape York Peninsula back to Aboriginal ownership. This includes 1,933,958 hectares of jointly managed national park (CYPAL) and over one million hectares of Aboriginal freehold. From its origins in 1996 with the signing of the Cape York Heads of Agreement the tenure resolution process was created to provide land use certainty through the identification, acquisition and protection of areas of high natural and cultural significance.

The process is backed by the conservation sector, Indigenous representative organisations and has enjoyed bi-partisan support from the Queensland Government. There remains approximately 600,000 hectares of state-owned land scheduled to be returned to Traditional Owners for which negotiations have already commenced. A further 250,000 hectares of existing national park remains to be transferred to national park (Cape York Peninsula Aboriginal land).

Despite the often vexed politics of conservation on Cape York Peninsula, the capacity of environmental NGOs to collaborate on shared objectives has been critical over the last 20 years of tenure outcomes and remains crucial for the process to continue.

Background

The Cape York tenure resolution program is one of the most successful and longest running land use and conservation planning processes in Australia. Since 1995, the Queensland Government has returned 3,225,000 hectares of land on Cape York Peninsula back to Aboriginal ownership including 1,933,958 hectares of jointly managed National Parks and over one million hectares of Aboriginal freehold.

The process was born out of the early campaigns to prevent the sale of the Starcke and Silver Plains pastoral stations to foreign developers (Picone 2015).
Out of these campaigns, the Cape York Land Council, Australian Conservation Foundation, The Wilderness Society and the Cattlemen’s Union reached settled on a way forward with the signing of the Cape York Heads of Agreement in 1996 (Stevenson 1998).

Signing on to the Agreement in 2001, the Queensland Government began acquiring the most important properties throughout Cape York to protect their natural and cultural values (Stevenson 1998). Additions were made to existing national parks during this period, including Cape Melville, but it was not until amendments were made to the Nature Conservation Act 1992 (Qld), Aboriginal Land Act 1991 (Qld) and the introduction of the Cape York Peninsula Heritage Act 2007 (Qld) that the Cape’s national park estate began its transformation.

These changes provided a unique balance between protection in perpetuity while still accommodating Traditional Owner rights and interests under Native Title legislation. This became the basis for allowing Australia’s first Aboriginal owned and managed national parks (Leverington 2012).

**How it works**

The Queensland Government, Indigenous organisations and the conservation movement established priority areas across Cape York Peninsula which included pastoral leases and various forms of state-owned land. Following three key principles based on conservation values, economic opportunity and representativeness for different Aboriginal groups, the Queensland Government sought to acquire key pastoral properties as they became available with the intent of divestment, along with other state-owned land, back to Aboriginal ownership (Leverington 2012, Queensland Government 2015).

Under the Bligh Government, setting priorities and endorsement of the acquisition list were the function of the Cape York Tenure Resolution Implementation Group (CYTRIG). CYTRIG consisted of representatives from the Queensland Government, Cape York Land Council, Balkanu, Australian Conservation Foundation and The Wilderness Society.

This group was chaired by a delegate of the Premier and operated under terms of reference that provided for the endorsement of land acquisition priorities and tenure resolution outcomes.

Once acquired, negotiation and the development of both Indigenous Land Use Agreements (ILUA) and Indigenous Management Agreements (IMA) proceed in partnership with the Traditional Owner group facilitated by Balkanu.
In most cases the State, supported by both Conservation and Indigenous interests have sought to secure a roughly 50/50 outcome of new national park and Aboriginal freehold ratio of land tenures.

With a legal entity identified or established to take ownership of the land, agreements are executed and deeds delivered which commits parties to the outcome, often at a handover event.

Post-handover support to the new title holders has been provided by the State to facilitate the identification of economic opportunities on inalienable freehold land (Leverington 2012).

**A new chapter in Australia’s National Parks**

Reflecting the changes to legislation, National Park CYPAL – Cape York Peninsula Aboriginal Land – provides a unique tenure allowing joint management of national parks between Traditional Owners and the Queensland Government. This also provides for associated economic opportunities for contractual services for park management and tourism partnerships.

The first national park under these new legislative arrangements was declared as Lama Lama National Park (CYPAL) in 2008 near Princess Charlotte Bay on Cape York’s east coast.

This was followed by the KULLA (McIwraith), Batavia, Alwal and Olkola National Park (CYPAL) declarations through the same process under the *Nature Conservation Act 1992* and the *Aboriginal land Act 1991*.

**New beginnings for old parks**

Across Cape York, the first national parks declared since the 1970s are also being returned to Aboriginal ownership and re-named by local Traditional Owner groups.

The first of the old parks to be returned was the 37,000 hectare Mitchell-Alice Rivers National Park declared in 1977. Back then little consideration was given to the Traditional Owners, the Kunjen and Oykangand, many of who reside in the nearby community of Kowanyama. In 2009 it was renamed Errk Oykangand National Park (CYPAL) and is now jointly managed.

Since then, the once familiar names of the old national parks across the region have followed suit. Over the last four years Lakefield became Rinyirru, Mungkan Kandju became Oyala-Thumotang and Iron Range became Kutini-Payamu National Parks. The re-naming is an
important aspect of the return of the parks and the recognition of their cultural significance. Jardine River is the final remaining park yet to be transferred across to the CYPAL tenure.

**Righting a wrong**

Importantly, steps were taken in 2011, before the transfer of Mungkan Kandju National Park back to Traditional Owners, to put right what then Premier Anna Bligh described as “a shameful chapter in Queensland’s history”.

When Queensland Premier Joh Bjelke-Petersen declared Archer Bend National Park in 1977, which later became park of Mungkan Kandju, his motivation was not conservation.

John Koowarta and a number of his fellow Wik Mungkan countrymen sought to purchase the Archer Bend pastoral holding in 1974. This land was part of the Wik Mungkan people’s traditional homelands. They had maintained a strong connection with their country by working and living on the Archer Bend property for many years.

Despite a legal right to purchase the land which the Wik Mungkan successfully took to the High Court, Bjelke- Petersen preventing sale by declaring the Archer Bend National Park.

For the last 30 years, many Aboriginal people saw this as an example of how protected areas can serve as another form of dispossession.

In 2011, 75,854 hectares of the former Archer Bend section of Mungkan Kandju was revoked from the park’s former 456,000 hectares. Of the revoked area, 32,000 hectares became a nature refuge to protect the extensive monsoon and riverine rainforests of the Archer River demonstrating the Traditional Owner’s goodwill and commitment to conservation.

**Charting new ground and re-making history**

In 2010, the Queensland Government returned the 42,510 hectare Mulkay pastoral lease to the Olkola people of south central Cape York. Knowing the significance of that country the Olkola decided that the area needed protection. Together with the Queensland Government the Olkola declared the Alwal National Park (CYPAL), named after the endangered golden-shouldered parrot which inhabits the area.

In December 2014 the historic hand-back of five pastoral properties totalling 633,630 hectares brought the Olkola people’s total land-holdings to 766,272 hectares, which is most of their ancestral homelands. It was also one of the largest single handovers in recent history.

The deal included one of the largest national park declarations since 2008. The new 269,630 hectare Olkola National Park (CYPAL) protects ancient bora-grounds, rock art and many
other cultural values important to Olkola people. Extensive wetlands, rare and unique tall open forests, remnant rainforest refugia and vast tracts of intact savannah woodlands are also protected. These habitats also support populations of the critically endangered golden-shouldered parrot and many other rare and threatened species of flora and fauna.

Since the return of much of their traditional homelands, the Olkola have gone from zero to fifteen paid employees. The Olkola Aboriginal Corporation’s holistic approach to country planning is paving the way diversified revenue streams that include carbon abatement, fee-for-service land management, pastoralism and tourism.

**Sticking with a good process**

The process was created to provide land use certainty through the identification, acquisition and protection of areas of high natural and cultural significance. It is one of the most successful land use planning initiatives on Cape York Peninsula. Despite changing governments and other policy agendas, the tenure resolution process has continued to deliver land use outcomes and economic opportunities for nearly three decades.

Since 1994 the Queensland and Federal Governments have spent around $48 million on the strategic acquisition of properties for cultural and natural conservation values. While there have been substantial outcomes over the last twenty years, a number of very significant properties remain subject to ongoing negotiation and await return to Traditional Owners.

This includes the iconic Shelburne Bay and former Bromley lease. Both have substantial conservation and cultural values and have come perilously close to destructive development from sand mining and the infamous Cape York spaceport.

The return of these lands back to their Traditional Owners under the terms of the Cape’s unique tenure resolution process provides multiple benefits across social, cultural, economic and environmental imperatives.

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Fitzroy Agricultural Corridor – Land of Opportunity

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Paper presented at the
Developing Northern Australia Conference
Townsville (QLD), 20-22 July 2015
Fitzroy Agricultural Corridor – Land of Opportunity

**ABSTRACT:** This paper outlines the infrastructure which needs to be built on the Fitzroy River to allow the Fitzroy Agricultural Corridor to be built. It examines the Queensland Governments water resource planning and regulation framework and the Federal Government’s development, water resource and agricultural agendas. This paper finally looks at the development of the Fitzroy Agricultural Corridor and the Lower Fitzroy River Infrastructure Project, both of which have grown out of the Fitzroy Industry and Infrastructure Study.

**Keywords:** Fitzroy Agricultural Corridor; Fitzroy Industry and Infrastructure Study, Lower Fitzroy River Infrastructure Project.

**Introduction**
Fitzroy Agricultural Corridor involves the construction of the Rookwood Weir which in 2012 was estimated to cost $238 million and the development of intensive agriculture in identified precincts along the lower Fitzroy River.

Development of the Fitzroy Agricultural Corridor has the potential to significantly increase agricultural production in the region and has been identified as a priority by Rockhampton Regional Council.

The proposed Lower Fitzroy River Infrastructure Project will provide water to support the development of intensive agriculture along the Fitzroy River as well as meeting future industrial and urban demands of Rockhampton, the Capricorn Coast and Gladstone.

**Queensland Government’s Water Resource Planning**
The proposed Lower Fitzroy River Infrastructure Project and Rookwood Weir are consistent with the Queensland Governments water resource planning and regulation framework.

The *Central Queensland Regional Water Supply Strategy* (2006) and preceding studies investigated and identified the preferred regional water supply planning and infrastructure options for the Fitzroy Basin. In particular, they identified that the short to medium-term urban and industrial water resource needs of the Lower Mackenzie-Fitzroy sub-region could not be met by water trading and/or efficiency measures alone.

In order to meet water resource requirements, it is expected that the proposed Lower Fitzroy River Infrastructure Project would allow for the capture and storage of all unallocated water resources that are available in the system (76,000 megalitres pa).

The allocation and management of water resources in the Fitzroy basin is regulated through the statutory *Water Resource (Fitzroy Basin) Plan 2011* and associated *Fitzroy Basin Resource Operations Plan 2014*. The *Fitzroy Basin Resource Operations Plan 2014* identifies 76,000 megalitres (ML) of unallocated water (high priority equivalent) in the Lower Fitzroy River. Of that 76,000 ML:
Up to 30,000 ML is reserved for the Gladstone Area Water Board for urban and industrial supplies

Up to 4,000 ML is reserved for a local authority for urban water supplies to the Capricorn Coast

42,000 ML remaining unallocated (potentially for agricultural and/or urban uses).

**Federal Government Agendas**

Development of the proposed Fitzroy Agricultural Corridor and Lower Fitzroy River Infrastructure Project is consistent with both State and Australian Government agendas.

The Australian Government is seeking to form clear and progressive policy on both the development of northern Australia and development Australia’s agricultural sector. A key point of consideration in both policy settings is the development of water infrastructure.

The Rookwood and Eden Bann weir projects feature prominently in the *Pivot North: Inquiry into Developing Northern Australia: Final Report* (Joint Select Committee on Developing Northern Australia, Sept 2014) which recommends that the Australian Government give priority to the development and funding of water resource proposals that have been scientifically identified as being sustainable and with the strongest cost-benefit case, and consistent with National Water Policy. Rookwood Weir and Eden Bann Weir are specifically identified as projects to be considered.

Australian Government’s *Water Infrastructure Options Paper* (2014) identifies the Fitzroy Agricultural Corridor and construction of Rookwood Weir and raising Eden Bann Weir as “Likely to be suitable for further consideration for possible assistance to accelerate feasibility studies, cost benefit analysis or design”(but this project is actually more advanced than this suggests). Rookwood Weir needs to be escalated to “likely to be sufficiently developed to allow consideration of possible capital investment within the next 12 months.” This paper indicates Commonwealth involvement in water infrastructure development should be directed to activities that are in the national interest, deliver net economic and social benefits and broader public benefits. It is also expected that given the primary state and territory responsibility for water resources there must be strong state or territory government support for projects.

The Australian Government’s *Agricultural Competitiveness Green Paper* (2014) identifies “Improving access to reliable water supplies and better managing existing water resources are essential for the continued growth of the agriculture sector… Water resources in the north of Australia are less developed than in the south. This may afford our nation opportunities to make strategic investments in water resources to support the development of water-dependent industries.” The Green Paper also incorporates the *Water Infrastructure Options Paper*’s list of potential water infrastructure projects that could warrant possible Commonwealth involvement. Again, constructing Rookwood Weir and raising Eden Bann Weir feature amongst a relatively small list of water infrastructure projects and are identified as suitable for further consideration.
Lower Fitzroy River Infrastructure Project
Planning for the Lower Fitzroy River Infrastructure Project is well advanced. The project is designated as a Significant Project under the State Development and Public Works Organisation Act and its regulatory approval is being assessed under the joint State-Commonwealth approval process. The projects draft Environmental Impact Statement (EIS) is expected to be released for public submissions in mid-2015. The regulatory approval for the project could potentially be obtained as early as December 2015.

The Lower Fitzroy River Infrastructure Project, and particularly Rookwood Weir, can be developed for relatively low capital cost per ML of yield making it more viable for intensive agricultural industries.

Fitzroy Agricultural Corridor
The proposed Fitzroy Agricultural Corridor also has a number of strategic and comparative advantages. The Corridor is in close proximity to Rockhampton, a large regional city with a population of approximately 85,000 people. This provides ready access to a large workforce and a range of services that are required to support agricultural industries and the people that work in those industries. In particular, Rockhampton has higher order health, education, retail and services sectors to support both industry and population growth.

The Fitzroy Agricultural Corridor is also in close proximity to key transport links including the Bruce, Capricorn and Burnett Highways at Rockhampton. Rockhampton is also located on the North Coast Rail Line that traverses the State from Brisbane to Cairns. Rockhampton has an international standard airport and the strategic Port of Gladstone is located approximately 110 km to the south.

A significant body of technical investigations have been completed to support planning and development of the Fitzroy Agricultural Corridor.

Fitzroy Industry & Infrastructure Study
The Fitzroy Industry & Infrastructure Study (FIIS) was undertaken between 2002 and 2007 by the Queensland Government, Rockhampton City and Fitzroy and Livingstone Shire Councils, Rockhampton Regional Development and Stanwell Corporation.

The FIIS identified nine potential agricultural development areas that could be supplied water from the proposed Rookwood Weir and enhanced Eden Bann Weir and used for intensive livestock and horticulture production.

Significant demand was identified in 2007 for producing grain-fed cattle for high-value export markets, and for increasing supply to the region’s meat processing plants. In 2007, some horticultural were also expected, however, in the intervening eight years horticultural opportunities appear to have increased following the successful large scale production of citrus and grapes at Emerald.

The following studies were undertaken as part of the FIIS project:
Global Market Review;
Land Suitability Study;
Environmental Assessment;
Health Risk Assessment;
Heat Stress Risk Assessment;
Infrastructure Requirements Assessment; and,
Economic Impact Assessment.

The FIIS focussed on the development of beef feedlots. It found 10 or more 15,000 head feedlots could be established in the nine development areas with room for large piggeries, if required by market demand. Areas for potential production of citrus, grapes, vegetables, cotton, sorghum, wheat, soya beans, navy beans, peanuts and macadamias were also identified.

In addition to significant increases in agricultural production, the FIIS envisaged many of these products being processed in the nearby Gracemere Industrial Area (GIA).

The GIA has now been established between Gracemere and Stanwell and has suitable road, water and sewerage infrastructure. Road access has been enhanced by construction of an overpass of the Blackwater Rail System and designation of Type 1 Road Train routes into the GIA.
Growing Central Queensland: Catching the next wave of agribusiness potential

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Growing Central Queensland: Catching the next wave of agribusiness potential

ABSTRACT: Four words capture the essence of Growing Central Queensland: Productivity, Profitability, Prosperity and Potential. The region has been delivering on the first three ‘Ps’ and is ready to answer the call by the Australian and Queensland Governments to double agricultural production through a new phase of growth and development building on existing strengths in natural resources, infrastructure and people and realising its untapped potential. Since 1853 when the first European settlers arrived in Central Queensland, the region has experienced several ‘waves’ of agricultural development. In recent history, the most notable developments have included the commencement of dryland cropping after World War II, the threefold increase in beef production from the Brigalow Development Scheme through the 1960s/70s and the growth of irrigated cropping in the 1980s as a result of the Emerald Irrigation Scheme. These waves of growth occurred on the back of significant government investment particularly via infrastructure to encourage and support agriculture. Growing Central Queensland is a regional initiative under the leadership of Regional Development Australia Fitzroy and Central West and involving Queensland Government agencies, local government authorities and a wide range of industry and community groups. It aims to promote the significant opportunities that are available in the region and to play an enabling role to attract public and private investment that turns the potential into reality. Growing Central Queensland has identified three key needs to unlock this potential: new infrastructure, especially irrigation water storages; improvements to existing infrastructure and logistics, particularly telecommunications and transport; and, reconsideration of industry structure to accommodate a wider range of farm investment models. This presentation will explore how Central Queensland through its unparalleled combination of location, natural resources, existing infrastructure, knowledge and experience is poised to play a significant role in emerging Asian demand for high quality agricultural produce.

Keywords: Growing Central Queensland; Agricultural Development; Opportunities; Investment; Irrigation

Introduction
In this paper, an initiative called “Growing Central Queensland” is discussed. This is the story of a region that has a long history of agricultural production and an enviable suite of agricultural enterprises and agribusinesses, but with the ambition for more. Whilst beef cattle production is far and away the dominant agricultural industry, there are pockets of more intensive production based on a combination of available land and water, and there is significant potential for more of this intensification. As distinct from some other parts of Northern Australia that will feature at this conference, Central Queensland is looking at ‘brownfield’ development or expansion of existing agriculture.
The Growing Central Queensland project team is thankful for the opportunity to address the Developing Northern Australia Conference and welcomes the current attention that is being given by Federal and State governments to Northern Australia. Central Queensland is positioned along the Tropic of Capricorn and like other areas to its north is strongly influenced by the tropical weather patterns. It is an export focused region and as such its orientation is to the north and the markets of Asia and the northern hemisphere. This paper describes some excellent opportunities that exist within Central Queensland to contribute to the agricultural development of Northern Australia.

However, before looking at the future prospects, it is worth taking a look in the rear view mirror to remind ourselves what any new ventures might be building upon.

**Historical Perspective**

Following European settlement, the thirst for land in Australia was insatiable. The Central Queensland region came under this spell in the 1850s with the early explorers quickly followed by squatters who occupied every possible area. Agriculture of many types became the foundation of the regional economy, and although occasionally pushed to the background by discoveries of gold and coal or the growth of cities and towns and the service sector, it still kept functioning in the background without fanfare. By a process of trial and error it became apparent that beef cattle production was the industry best suited to the vast areas of Central Queensland but over time other agricultural pursuits have also been successfully introduced.

What followed over the ensuing 160 years was a series of government interventions that provided both regulation and order on the one hand and the catalyst for regional development on the other. Thus the agricultural history of Central Queensland has been characterised by surges or waves of growth followed by periods of consolidation. Interestingly just about every surge has occurred through government initiatives, while the consolidation has been led by the private sector, particularly via the family farm.

The first major surge was the so called Village Settlement period of the late 19th and early 20th centuries. This period was highlighted by the Kidston Scheme where migrants from various parts of Europe were encouraged to settle in the region and establish new communities. This was a bustling 25 years of regional development where many animals and
crops became the subject for experimentation and lots of supporting infrastructure was constructed.

The next wave of development occurred after the First World War and saw the first of Central Queensland’s irrigation schemes established on the Dawson River at Theodore – a scheme that continues to this day. The scheme was a modest one but there were plans for something much bigger when the Nathan Dam was proposed; a dream that still exists but has yet to be realised. This period demonstrated that the large river systems of Central Queensland were a significant resource that offered great opportunity for irrigated agriculture.

After the Second World War, the expansion of the Central Queensland cattle industry was given a major boost when the Federal and State Governments agreed to the Fitzroy Basin Brigalow Land Development Scheme. Over a period of 15 years some 4.5 million hectares of brigalow scrublands were cleared, sown to introduced pastures and land parcels balloted and sold off. Not only was this development responsible for increasing cattle numbers by 250%, it also led to the development of new communities, roads, schools, electricity and telecommunications in what had previously been sparsely populated, isolated areas.

At about the same time, the Queensland British Food Corporation commenced broad-scale grain production in the Central Highlands District between Clermont and Springsure. Almost 200,000 hectares were acquired and cropping of grains and oilseeds was attempted. Although the 8-year venture failed due to poor management and drought, it demonstrated that cropping could be undertaken on the black, cracking clays. The land was returned to the Queensland Government and subsequently broken up into smaller properties and sold or balloted out. Further adjoining land was developed and dryland farming businesses that continue to this day, were established.

In 1968 the Queensland Government with backing from the Federal Government decided to construct the Fairbairn Dam on the Nogoa River near Emerald and develop land downstream into a channel-supplied irrigation area. Thus commenced the Emerald Irrigation Scheme with 14,000 hectares supplied by the Selma and Weemah Channels and 350 kilometres of regulated river system supplying water to an additional 11,500 hectares. The Scheme has been responsible for supporting successful enterprises such as cotton,
horticulture (citrus; grapes), oilseeds, peanuts and cereals and offers a strong degree of security to production. After 45 years the Scheme is still going strongly and the Dam is the lifeblood not only of agriculture, but also of the resources sector and the urban communities of the Central Highlands.

From the 1980s onwards development throughout the Basin has been incremental and largely privately funded. A number of small to medium sized feedlots were established to finish cattle and some private irrigation development has occurred along the Comet, Mackenzie and Dawson Rivers. Cattle numbers continued to increase as the brigalow lands reached full production and research and development into improved genetics and more productive pastures reaped rewards. This was essentially a consolidation phase maximising the production benefits from the previous years of development.

Further irrigation development looked likely in the mid-1990s when the Nathan Dam project was resurrected by the Queensland Government along with another large storage proposal on the Comet River. The latter was quickly ruled out and the former, which passed into private development hands (SUDAW), had an Environmental Impact Statement prepared but for the second time in its chequered history came to nought. A decade later a number of water infrastructure proposals were considered, but for mining, industrial and urban use rather than agriculture. These included Nathan Dam (for a 3rd time), Connors River Dam, Rookwood Weir and Eden Bann Weir raising. All these proposals remain possibilities and water supplies have been reserved for them but in the absence of further government involvement they are unlikely to proceed in the near future.

This quick examination of the agricultural growth in Central Queensland shows that it occurred in stages largely on the back of government investment. The government stimulus programs like the Brigalow Scheme or construction of Fairbairn Dam then provided the private sector opportunities to take up the land and water resources to establish a number of profitable and resilient forms of agriculture. Since the 1990s production levels have essentially levelled off (or in some instances gone backwards) and this situation will remain the same without some further stimulus. There are no further land areas available to be cleared and developed so additional development will be contingent on increased intensification. The Emerald Irrigation Scheme has been the standout case study of what can
be achieved through catalytic investment in infrastructure leading to intensified and diversified land use.

**The Current Imperative**

Over the last two years, some interesting developments have occurred that have triggered new interest in agriculture in Central Queensland.

Firstly, a range of international financial organisations have presented reports highlighting the major economic growth opportunities over the next 20 years. In a document called “Positioning for posterity? Catching the next wave” (Oct 2013), Deloitte Access Economics states that agribusiness is one of five sectors (the ‘fantastic five’) offering great prospects for growth during that 20 year period. Add to this Australia’s strong competitive advantage in agriculture and you have an opportunity that is largely unmatched by any of Australia’s competitors.

Secondly, the Australian Government released policy papers with a particular focus on improving agricultural competitiveness and on the development and growth of Northern Australia. These provided further signals that agriculture was high on the list of industry sectors that could offer great potential for growth and investment to benefit all Australians.

Thirdly, at a regional level, the downturn in the resources sector has renewed interest in other job and wealth creating industries, with agriculture, a tried and true mainstay of the Central Queensland economy, in the spotlight and the long planned irrigation projects dusted off once again and creating interest at political level.

In combination these factors presented a very strong case for a concerted effort to engender interest across Central Queensland in pushing for a new wave of agricultural growth. From the ensuing discussions across government and regional economic organisations, Growing Central Queensland was conceived.

**The Birth of the Growing Central Queensland Concept**

Central Queensland is a well-studied region and much is known about its land, water and vegetation resources. There is also a well-trodden path examining opportunities for agricultural development, including potential agricultural precincts in the Dawson Valley, Mackenzie River Big Bend District and Fitzroy Agricultural Corridor.
The Growing Central Queensland initiative developed on the back of efforts by the Rockhampton Regional Council to progress the Fitzroy Agricultural Corridor. Studied in detail in 2006 as part of the Department of State Development’s Fitzroy Industry and Infrastructure Study, the Fitzroy Agricultural Corridor was envisaged as an area where multiple cattle feedlots could be established along with some cereal and fodder cropping and annual and perennial horticulture. However without support infrastructure particularly weirs, roads and electricity to provide the platform for private investment, nothing proceeded and the project stalled.

The interest by both Australian and Queensland Governments that emerged in 2013 to develop new water infrastructure was the trigger to resurrect the Fitzroy Agricultural Corridor. However, various stakeholders across Central Queensland were conscious that the other opportunities noted above in this paper, were also worthy of consideration and should be in the mix of any concerted effort to develop the north.

Emerging from this discussion was the realisation that a whole-of-region approach was required if Central Queensland was to be seriously considered alongside proposals like the Ord River Expansion or the Flinders-Gilbert development. A further imperative was to find a regional organisation that was recognised as having the authority and reach to lead such an approach.

Regional Development Australia Fitzroy Central West was anointed as the lead organisation supported by the Queensland Departments of Agriculture and Fisheries, State Development and Natural Resources and Mines and the six local government authorities of the Fitzroy Statistical Division, and agreement was reached to pursue the initiative now known as Growing Central Queensland.

**Growing Central Queensland Phase One**

Growing Central Queensland set itself the goal of promoting the significant agribusiness opportunities that are available in the region and playing an enabling role to attract public and private investment that turns the potential into reality. Recognising its outstanding combination of location, natural resources, existing infrastructure, knowledge and experience, Central Queensland believed it was perfectly positioned to make a significant contribution to the emerging Asian demand for high quality agricultural produce.
A major task undertaken by the project was to review the agricultural sector of Central Queensland and through understanding its strengths and weaknesses, look for opportunities to build on those strengths and overcome the weaknesses. This was achieved through a combination of literature review and stakeholder engagement.

Three key areas of interest to unlock the region’s potential emerged:

- **New Infrastructure**
  
  Infrastructure proposals were suggested from across the region dominated by irrigation water storages, roads/bridges, telecommunications and processing facilities.

- **Improvements to Existing Infrastructure and Logistics**
  
  Examination of existing transport and logistics systems plus aging irrigation infrastructure revealed some significant inefficiencies resulting in high costs and foregone productivity. Of particular concern for such a large region were the lack of connectivity within and between various transport systems and the general lack of access to modern technologies such as containerisation and cold storage.

- **Structural Adjustment Needs of Farm Businesses**
  
  Central Queensland is dominated by family farms that have an aging demographic and high capital cost of entry into agriculture. Traditional methods of investment and ways of doing business need to be reconsidered so that a new generation of producers is fostered and a wider range of investment prospects is encouraged.

On the back of this review, promotional efforts commenced with prospectuses developed and a launch of the initiative held at the 2015 Beef Expo. An important activity also held at the Beef Expo was an investment seminar featuring a recent successful regional case study of a joint venture investment, a rundown on what external investors are looking for and the legal issues that landholders and investors need to address in the investment world.

**Central Queensland’s Opportunities**

The Fitzroy Region which makes up the majority of Central Queensland has six local government authorities and covers an area of 118,000 km² with a population of 230,000. Gross value of agricultural production in 2012/13 was $1,008M with 67% from livestock
products, 25% from broad hectare crops and 8% from horticulture. There are also well established forestry (native and plantation) and fisheries industries (wild catch and aquaculture).

The climate is sub-tropical and characterised by high variability along with droughts, floods and cyclones that are challenging to agricultural producers. The dominant geographic feature is the Fitzroy Basin consisting of five river systems which join to form the Fitzroy River. The River enters the Pacific Ocean just south of Rockhampton and is a key influence on the Great Barrier Reef which lies parallel to the coast.

Grazing of beef cattle is the dominant industry relying on both native and introduced pastures. It is carried out on 82% of the total area. Depending on available moisture, rainfed cropping is undertaken in both summer and winter with sorghum the traditional crop over the warmer months and wheat when it is cooler. Over 5% of the total area is arable but in most years cropping is restricted to about half this. Irrigated cropping is dominated by cotton, cereal, pea and bean crops and occurs on about 50,000 hectares (0.4%) located along river valleys such as the Nogoa/Mackenzie, Dawson and Callide. Included in this irrigated area is horticultural production consisting of perennial crops (citrus, grapes, nuts, fruits) and annuals (vegetables, melons).

Supporting these enterprises, a range of processing and storage facilities have been established including abattoirs (x3), saleyards, cotton gins (x3), silos and packing sheds. There is also a strong network of support services including contractors, consultants, finance institutions, stock and station agents and suppliers. Road, rail, airports and seaports are all present in the region, most of the time providing good access from farm to processing centres or export points. With some limitations, electricity and telecommunications are available throughout.

Against this background of well-established agribusinesses and support infrastructure and services, there are four standout districts for further development:

- **Fitzroy Agricultural Corridor (FAC)**

Located north-west of Rockhampton adjacent to the Fitzroy River, the FAC has over 30,000 hectares (ha) of land suitable for irrigation or development into intensive animal industries in nine separate parcels. Full development is dependent on the construction of the Rookwood Weir and the raising of Eden Bann Weir. A total of 112,500 megalitres
(ML) of unallocated water would then be available for use, along with some unused allocation of the Rockhampton Regional Council. Potentially up to 20,000 ha could be irrigated with this quantity of water.

- **Dawson Agricultural Corridor (DAC)**

  Reliant on the construction of Nathan Dam below Taroom, the DAC covers a 250 kilometre stretch of the Dawson River. Over 60,000 ha of land suitable for irrigation has been identified and theoretically up to 190,000 ML of medium security water could be available – sufficient to irrigate 30,000 ha. The DAC is also suitable for development of intensive animal industries. The DAC incorporates the existing Dawson Valley Irrigation Area and a number of private irrigation schemes adjacent to the River.

- **Mackenzie Agricultural Corridor (MAC)**

  There is extensive irrigation, as supplied by the Emerald Irrigation Scheme, already being undertaken along the Mackenzie River. The MAC refers to an additional area of land near the junction of the Isaac and Mackenzie Rivers north of Dingo and upstream of Tartrus Weir. Over 20,000 ha of land suitable for irrigation has been identified. Development is largely dependent on construction of Connors River Dam 100 kilometres to the north. If built and used for agriculture, up to 150,000 ML of medium security water would theoretically be available. In addition almost 30,000 ML of unallocated water is available via flood harvesting and off-stream storage. The MAC is also suitable for intensive animal industries.

- **Gladstone Agribusiness Corridor (GAC)**

  The GAC is proposed within the existing Gladstone State Development Area, a 22,000 ha area adjacent to Gladstone Harbour and the site of a number of large industrial developments. With ready access to major highways, rail links and the Port of Gladstone, the GAC would be the ideal location for an agricultural logistics hub enabling storage, handling and direct export of agricultural produce from across Central Queensland and back-loading of imported products including machinery, fuels, fertilizers and chemicals.

  In addition there are a number of other prospects under investigation that would boost agriculture in Central Queensland. These include: an inland port at Yamala to the east of
Emerald with major benefits for increasing use of rail and containerisation and improving connectivity to the Port of Gladstone; a new abattoir in the Central Highlands providing opportunity for individual service kills and product branding and reducing costs of transport; and an oilseed processing facility either in the Central Highlands or Dawson Valley allowing value adding to oilseed and cotton crops.

It is also important to stress the educational opportunities that are being developed within the region. For over 40 years, the Australian Agricultural College Corporation’s Emerald Agricultural College has delivered industry accredited and endorsed training with hands-on experience in beef production, crop production, horsemanship and business skills. CQUniversity has a long history of agricultural research and development to which it has recently added an agricultural degree and an industry mentoring program to match learning outcomes with industry needs. This will provide a welcome boost for the region’s students and agricultural industries. Also worthy of note is the training provided directly to landholders via collaborative arrangements between AgForce, Fitzroy Basin Association and Department of Agriculture and Fisheries. The region has been the leader in the development and delivery of best management practices for grains and grazing.

As a total package, these opportunities have the potential to double or even treble productivity, profitability and prosperity in Central Queensland.

The Way Forward

A second phase of Growing Central Queensland will commence in July 2015 with the intention of pursuing the three key areas of interest revealed in Phase One, in parallel with efforts to promote the opportunities that exist for further agricultural development.

Growing Central Queensland appreciates that accessing the Australian Government’s infrastructure funding is a highly competitive process and there are many worthy project ideas on the table. The advantage that Central Queensland possesses is that whilst it is looking to construct new infrastructure, particularly dams and weirs, it is not starting from scratch with most of these projects having been fully investigated (or nearly so) and close to shovel-ready. Furthermore, the production that is proposed from such new infrastructure builds upon existing animal and cropping industries and their supply chains, including export outlets. Thus government investment will generate almost immediate results and a swift impact on the economy.
The project is also mindful that considerable gains are to be made from improving the systems and processes that are already in place. For example, upgrades to two bridges between Biloela and Gladstone to enable the passage of road trains, have the potential to halve cartage costs of grain and cattle; significantly improving producer bottom lines. State and local government agencies have identified a suite of such improvements that could considerably improve productivity of existing agricultural industries. As with the proposed new investments, these infrastructure improvements could provide a major boost to profitability and prosperity in the region.

Complementing these efforts to attract ‘nation-building’ funds from the Federal and State governments, Growing Central Queensland will be concentrating its efforts on the issue of future business ownership and structure. The project has identified a gap in service delivery that it will try to fill. Whilst there are a number of successful examples of existing landholders and external investors coming together for the sale of properties or joint ventures, they are not commonplace and have only been achieved after considerable time and effort, usually on the part of the landholder.

It is recognised that many landholders have limited knowledge or understanding of the options that are available to them regarding the future ownership and management of their properties and may need assistance to examine these options and link with investors. Opportunities to be explored include management and lease contracts, joint ventures, farmer-owned cooperatives, supply chain opportunities and outright sale. The ultimate aim is to prepare businesses to be “investment ready” ie aware of what business investment model they wish to pursue and having prepared business plans that detail what their businesses have to offer potential investors. Thus Growing Central Queensland’s role is that of an enabler bringing government, landholders, investment houses and investors together to make investment happen.

Conclusion

The Growing Central Queensland project is a collaborative partnership between all three levels of government that seeks to increase the profitability, productivity and prosperity of agribusiness in Central Queensland by exploring and enabling the potential for further development.
At its foundation is 160 years of agricultural development and a community that understands and welcomes such growth. Added to this are: recognition of the further opportunities that are available within Central Queensland; substantial existing infrastructure and support services; clear messages from around the globe about the opportunities for expanding agribusiness; and strong interest by Federal and State Governments in new development in Northern Australia.

All these factors combine to provide a compelling case for Central Queensland to marshal its forces behind the Growing Central Queensland banner and pursue its next wave of agricultural development.