‘A Circular Conundrum’
150 Years of Cropping and Complexity in North-West Australia

by

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Submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy
of the Australian National University
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Candidate's Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of the author's knowledge, it contains no material previously published or written by another person, except where due reference is made in the text.

Kate E. Andrews  
Date: 15th December 2014
Acknowledgements

First I recognise and pay respects to all Traditional Owners of northern Australia past and present. I would like to thank those who have shared their knowledge and time with me, and hope a little of my learning is reflected in the following thesis.

My thanks for all the conversations people have shared with me, for peoples’ stories and generosity across the Kimberley and the Top End. It is a privilege and a pleasure to have such opportunities. People trusted me with stories of personal hardship and commitment and I wish I had the space and time to do them all more justice in the following pages.

This work is a result of those unrecognised treasures of Australia, our libraries; particularly Kununurra community library, the Northern Territory Department of Primary Industries Berrimah Farm library, the Northern Territory Library Parliament House, the ANU libraries and the National Library of Australia. They all house hidden but valuable gems, and not just on the shelves. Likewise Kununurra Historical Society who were so helpful.

Thanks to my supervisors Libby Robin, Steve Dovers and Val Brown for taking on the difficult task of a student working ‘remotely’; Darwin can feel a long way from ANU, Canberra. Thanks to the organisations which provided me with a desk and PhD home in Darwin - TRaCK/NERP Northern Hub and Entity1 and, of course, Central Café.

And the bookend that held me up throughout - thanks to my many families from Darwin to Canberra to south coast NSW for emotional, physical and intellectual sustenance, support and patience. Bravery medals for reading, commenting or proofing at different stages go in particular to Graeme, Vera, Lynne, Andrea, Penny and Merridy.

Acknowledgements are a reminder of the serendipitous and collective nature of knowledge creation and hence the fundamental importance yet inevitable inadequacy of any crediting.
Abstract

Cropping plays an extremely minor role in north-west Australia, barely contributing to economic production. Since colonisation however, broad-acre cropping regularly appears in the political and public discourse about northern development, often in an optimistic light. I label this the ‘circular conundrum’ - a cycle of publically expressed expectation for northern Australia to produce food and fibre through broad-acre cropping, and the failure of this to occur at the scale envisaged despite many attempts, significant investment and much research. This circular conundrum begins with high expectations, moves to cropping attempts, then usually to failure, and back around to high expectations. This thesis is a response to my curiosity about this phenomenon. What is this cycle? Why does it continue when many cropping attempts fail? What does this tell us about Australia’s relationship with northern Australia?

It is through reawakening the stories of cropping attempts and collecting them in one place in some detail that a broader and deeper picture can emerge, revealing both shared and unique features of the attempts, and patterns through time and across locations. The drivers become visible as do the variables that lead to failure, impacting at a range of scales from the individual farm to national policy. Additionally the narratives reveal emerging and persistent themes, including race, learning and relationship with place.

The three parts of the thesis address portions of the circular conundrum: Part I ‘Ideas of North’ (Chapters 2-5) explores changing perceptions of northern Australia, the high expectations of cropping, and the drivers of the circular conundrum; Part II ‘Stories of Northern Cropping’ (Chapters 6-10) describes a suite of cropping attempts over the last 150 years; while Part III ‘Caught in a conundrum’ (Chapters 11-12) explores the variables that contribute to these failures, and the relationship between failure and continuing high expectations - the mystery of the continuing circular conundrum.

This final step reveals how the cycle is perpetuated through hindered learning. This is expressed through our slow and intermittent journey in developing landscape literacy, reliant upon acknowledging the north as a cultural landscape; and our even slower journey to developing complex systems literacy, including a capacity to deal with variability and complexity. Place does have power, and remains the fundamental agent in these narratives. The concept of ‘A Circular Conundrum’ provides useful insights more generally on what hinders learning and how barriers to learning can be seeded in the situation itself.
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Ignorance of a new region or environment is excusable—indeed, it cannot be avoided. However, gross ignorance of a region which has been under occupation for more than a century is not, and it is on this count that Australian efforts in the North can be condemned. Initial lack of knowledge was bolstered by unfounded optimism, gross exaggeration, simple poor judgement, unfortunate coincidences, and a reprehensible refusal (especially on the part of government) to learn by experience. (Bauer 1963:46)
Chapter 1: Introducing a ‘Circular Conundrum’

A Beginning

The story of this thesis begins with an original copy of economist Bruce Davidson’s 1965 book “The Northern Myth” in which he “examines the case for subsidized development of agriculture in northern Australia, and concludes that the case is bad.”

Open up the copy and you discover that it has been annotated in an almost indecipherable pencilled hand with an almost palpable frustration, and clear disagreement. Under the heading on the Frontispiece “The Myth of the North” is pencilled in “or The dead hand of The economist”. Whereas Davidson denies the potential for agriculture in the north and decries the wasted investment and expectations to date, the pencilled comments are countering with a critique of the critique, and retain an emphatic sense of the potential and the future. Davidson’s preface contains the colourful and pithy point that any crop can be grown anywhere at a cost, even pineapples in Antarctica. (Davidson 1965) The body of the book goes on to explicate at what cost (economic only) agriculture in the north. Davidson concludes that all cropping commodities, excepting sugar and peanuts (but which would still require subsidies), could be produced at a lower cost in temperate Australia; why then, he questions, is there government investment and ongoing cropping attempts in northern Australia.

And whose is the pencilled hand? Dr C.S. (Chris) Christian, then CSIRO agricultural scientist and member of the Executive, developer of the land systems assessment for land capability, land use surveyor of the north, humanitarian - and my grandfather.

This annotated copy of the book is a microcosm, one example in the ongoing cycle of believers and naysayers battling over the future of northern Australia, each buttressing their case with a mix and manipulation of information, discourse and belief.
It represents a circular conundrum that has been occurring for 150 years and appears impossible to resolve. How can this be the case? How can these two intelligent researchers1 (and countless others before and since), maintain such polarised positions in the light of experience, observation, and research? In 2014 the Australian media and politicians are again heralding a northern food bowl.

The circular conundrum, epitomised in my grandfather’s annotated copy of Davidson’s book and played out again and again to this day, sparks my curiosity and provides a starting point for exploring further. I describe the ‘circular conundrum’ as a regular

1 Davidson became senior lecturer in Agriculture at the University of Sydney until retirement, publishing the definitive history of agriculture in Australia and continued as a well-known figure in agriculture challenging some Australian agricultural orthodoxies (Batterham et al 1994). Christian, then head of the Division of Land Research in Australia’s premier scientific organisation, CSIRO, established research stations across the north and later worked internationally with the land systems approach.
cycle of publically expressed expectation, in fact push, for northern Australia to produce food and fibre through broad-acre cropping, and the consistent failure of this to occur at the scale envisaged. Yet despite failures the cycle continues, replaying similar language and carrying similar expectations. This thesis is a response to my curiosity about this phenomenon. What is this cycle? Why does the cycle continue when many cropping attempts fail? And what does this tell us about Australia’s relationship with northern Australia and its environment?

Davidson’s book, with my grandfather’s contesting annotations, provides an entry point for this thesis, though not the path that it followed. That path has involved an iterative process of exploring, describing, understanding, and revisiting the circular conundrum through text and narrative, conversation and reflection.

This thesis is an open inquiry. It is not an attempt to prove or disprove an hypothesis, nor does it seek to answer an applied question such as the potential area for cropping in northern Australia. Rather it seeks to contextualise and better understand this perceived phenomenon, the ‘circular conundrum’. Given the current context of a revived push for northern development it could be tempting to tackle the concrete elements of this debate. Instead I step back from specific applied questions to look at the longer and broader view, a story which requires addressing multiple interests, multiple scales, and multiple outcomes, while speaking to the present. If we could understand this apparently endless ‘circular conundrum’ then could we do better, could we change it?

Davidson’s book title and catchcry The Northern Myth is now well-established in the discourse of agricultural development in the north (1965). Those who speak against the potential for agriculture use the term as short-hand for failure and delusion, or as a starting point to re-iterate or re-examine the case (Greiner and Johnson 2000, Woinarski and Dawson 2002). Those who work to develop agriculture raise it defensively as an example of dismissiveness and negativity towards inevitable and necessary progress (Conversations 9, 12, 14), as did my grandfather Chris Christian.

Snapshot

The history of crop production in the Northern Territory is not one of large scale or even continuous production. (Lapidge 1979b)
Thirty years ago geographers Holmes and Mollah explained that "By any comparative assessment, North Australia remains an anomalous settlement zone..." (1987:54). This remains the case. Northern Australia belies patterns across the world, and local expectations of agricultural development, with little intensification of land-use or cropping. A brief overview of cropping in the context of overall production capacity of northern Australia helps to explain the nature of the debate, and the circular conundrum. Northern Australian land-use remains dominated by pastoralism though economic production is led by mining and petroleum. Fifty % is now Aboriginal lands, only 4.8% of the Australian population (BITRE 2011) lives across the top third of Australia, and about 0.97% in the North-West portion (Western Australia and Northern Territory) which is the focus of my research.

There are some success stories; these are small scale taking advantage of niche markets or market windows. Chia in the Ord River Irrigation Area is a wonderful example of farmer-led innovation and vertical integration with a crop that is high-value with a long shelf-life. Hay producers in the Northern Territory who supply the live cattle exporters are another example, with a close market. Horticulture, distinct from broad-acre cropping, is also growing, often taking advantage of windows in the market and the price advantage when produce is not yet ripe elsewhere, such as melons and mangoes.

Table 1. Statistics of northern agricultural production

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<th>Northern Australia</th>
<th>2009 value of irrigated agriculture production about $160 million, or 0.8% of region’s total with tourism $2.8 billion, and beef cattle production about $1 billion annually in northern Australia. Irrigated agriculture employed around 1.3% of the regions labour force. Total irrigated area is 34,000 hectares or less than 0.03% of northern Australia however broad-acre cropping is only a small proportion of these figures. Horticulture was the highest value (mangoes $40 million and melons $32 million) while sandalwood was $60 million (and increasing). Sugar and cattle fodder (what I’m defining as broad-acre cropping) were worth $15 million each (Webster et al 2009).</th>
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<td>Northern Territory</td>
<td>2010-11 Agriculture, fishing and forestry worth $545 million, 3.3% of NT’s gross domestic product (GDP); of that, cropping (mixed farming) was $19 million (Northern Territory Department of Resources 2012) or about 0.5% of</td>
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GDP. In contrast horticulture valued at $138.7 million and the pastoral industry at $285.3 million. Even the crocodile industry was snapping at the heels of cropping reaching a value of $10.1 million (Northern Territory Department of Resources 2012). The ratio remains remarkably similar to 70 years previously. In 1939-40 agriculture (not including pastoralism) was worth £1,500, pastoralism £587,821 and other production (buffalo hide, trepang, dried fish, salt...) £29,376 (Administrator 1941). The area of cropping in the NT has remained low relative to other jurisdictions. A study of land clearing in the Territory shows that in 6,000 hectares of perennial crops and 1,000 hectares of annual crops in 2000 located mostly in the Daly Basin and Top End Coastal regions (Sturtz 2000:320).

Western Australia - 2008-09 total value of production of the Ord River Irrigation Area estimated to be more than $101 million. Indian sandalwood (a forestry crop) - $65.3 million. Melons $2.6 million, pumpkins $2.4 million, mangoes $6.7 million, citrus $2.0 million, chickpea $1.0 million, chia $2.6 million, hybrid seed $ 3.8 million and other $15.1 million. By 2009/10 production was worth about $120 million with majority Sandalwood. Field crops only about 1/12th of the total amount or $10 million. The remarkable diversity of crops in the Ord is tracking backwards as forestry increases. Despite being the largest irrigated area in northern Australia as of early 2014 the ORIA was only 14,000 ha, the size it has been for about 40 years, and despite countless rhetoric about developing further stages. In 2014 Ord Stage II is underway with a joint contribution of about $415 million from the Western Australian and Australian Governments. It will add approximately 8,000 hectares.

Agriculture’s contribution to Australia’s GDP contracted tenfold, from 30 to 3% during the 20th century (Webster et al 2009). The agricultural sector at farm-gate contributes 3% to Australia’s total GDP and the gross value of Australian farm production in 2010-11 was $48.7 billion (NFF 2012). The gross value of Australian crops in 2011-12 was

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2 This substantial increase from the previous year which did not last as the ban on live-cattle exports negatively impacted upon hay producers of the region.


4 To provide some relative scale Cubbie Station in south west Queensland, the largest irrigated property in Australia, totals 96,000 hectares - 22,000 of which is developed and 11,000 under development for irrigation. (http://en.wikipedia.org/wiki/Cubbie_Station Accessed 26 February 2014)
$25.6 billion (ABS 2012) and in 2007 Australia’s contribution to total world food exports was 2%, or US$17.5 billion of a total of US$836 billion (PMSEIC 2010).

As shown above, cropping plays an extremely minor role in northern Australia, barely contributing to economic production, yet still appearing regularly in the political and public discourse about northern development often in an optimistic light; the ‘circular conundrum’ - a cycle of publically expressed expectation for northern Australia to produce food and fibre through broad-acre cropping, and the failure of this to occur at the scale envisaged.

The Dichotomy: Believers and Naysayers

The first intimation that a ‘circular conundrum’ exists is the dichotomy of attitude expressed about northern Australia and its potential for development. Given the backlash Davidson’s work produced, as expressed by Christian’s pencilled comments and described in Chapter 3, it is tempting to assume that he was a rare naysayer. This is not the case. Blunt naysayers make a regular appearance over the last 150 years interspersed with the believers. "It is important to remember that alongside the history of 'develop the north' rhetoric, there has also been a long history of critique." (Head 2000:181) When Davidson entered the fray of public and political debate he was not the first academic to voice doubts and to undergo sometimes acidic exposure. Many years before in the 1920s, geographer Griffith Taylor wrote about the limits to Australia’s potential for development and was likewise subjected to backlash to the extent that he moved to North America. And there have been others since.

Introducing her ode to the tropical north Ernestine Hill, adventure journalist and author quotes various and early sources of contradictory yet co-existing responses to the north, contrasting the sense of potential with the sense of hopelessness: from the explorer John Stuart who in 1862 claimed that “anything and everything” could be grown there to the first Administrator of the Territory, Boyle Travers Finniss, who in 1864 stated it was “Rich to rottenness” (Hill 1951:3).

In reviewing the literature on the potential for agricultural development in the north, the contradictory views in my grandfather’s annotated copy of “The Northern Myth” are replayed again and again.
Table 2. Contradictory quotes of northern Australia's agricultural potential

1623 “...most arid and barren region that can be found anywhere on earth...” the Dutch charting Gulf of Carpentaria (Jan Carstenszoon, Commander of the Pera. Quoted in Heeres 1899)

1839 Sees the "..plains of promise" and dreams that "...far away I could perceive the green and glistening villages through which it wandered" (Captain Stokes quoted in Asche 2007) of the Gulf country and Victoria River.

1848 "It deserves all the abuse that has ever been heaped on it. It is fit for neither man nor beast...” (Thomas Huxley quoted in Flynn 1963:55) visiting Port Essington.

1862 “…certainly the finest country I have seen in Australia” and "suitable for the growth of any and everything – what a splendid country for producing cotton!". (John McDouall Stuart quoted in Donovan 1981:28) writing of the north coast of the Northern Territory.

1884 "...the alluvial banks of the Daly and Adelaide Rivers will soon be the scenes of busy activity...There can be no doubt either that coffee, cinchona, India-rubber, ground nut, tobacco, rice, indigo, and spices, will be successfully and profitably grown..." (Parsons 1884:7)

1892 “It is to be regretted that the area of really good land with a good rainfall is so limited in the Territory, but regret will not alter the fact that, with the exception of the land on the Daly River, the area of which is small...there appears to be little ...sufficient for tropical agriculture without irrigation.” (Playford quoted in South Australian Register 27 May 1892, then Premier of South Australia).

1923 “the North-West is a land of untold wealth, of boundless possibilities, needing only the "sinews of war"- money and people- to win its treasures, and ensure prosperity for the present owners of the great Australian continent.” (Stuart 1923:141)

1934 “…any scheme of settlement for Northern Australia—an area of nearly a million square miles— would have to overcome very great difficulties as regards climate, soil, and isolation”. (Grenfell Price quoted in The Advertiser 13 January 1934)

1937 “Nature has not been lavish in bestowing resources upon the Territory...It is difficult to visualise much development in the way of closer settlement, mixed farming, or agriculture on the lands of the Northern Territory." (Payne and Fletcher 1937:77) Report for the Inquiry into Land and Land Industries in the NT.

1961 “There should be no room for further scepticism about possibilities of substantial production in Northern Australia.” (Christian 1961:17)

1961 "Whatever the pessimists may say about the immediate prospects of large water development projects in the North, the author has no doubt that in 10 or 20 years’ time major developments must occur.”(Munro 1961:27)

1965 “... the agricultural techniques which have been developed in tropical Australia are uneconomic and that development there could only proceed at tremendous cost to the nation." (Davidson 1965:x)
"the problems involved in any development of north-west Australia are very great...a premature plan to direct financial assistance to the development of this region would serve no useful purpose" (Young 1979:16) Ord River Irrigation Area Review.

"Poor soils and harsh climate made agriculture of any kind difficult and commercial agriculture in the absence of Asian labour, impossible" (Powell 1982:56)

"The Ord region was a unique agricultural resource, unmatched by any other growing region in Australia" (Western Australian Government)

"it's one of the last undeveloped agricultural frontiers of the planet" and "the north could become a food bowl for Australia and Asia". Senator Heffernan

"Capitalising on Northern Australia’s strengths - Develop a food bowl...Double Australia’s agricultural output through developing Northern Australia" (Liberal Party 2030 Vision for developing Northern Australia 2013)

"a new grain and oilseeds industry in Northern Australia is not currently supported by global commodity prices...the high investment required for large scale irrigation schemes could be better directed medium term into R&D for established crops in the south.” (ANZ 2014)

There are many more such quotes showing the consistency and regularity of the contradictory views over time. Ernestine Hill flourishingly asks the question that remains surprisingly relevant:

What is the truth of this changeling child of ours? Is it paradise or hell, milk or honey or Dead Sea fruit? Has it a transcendent future or only a pitiful past? (1951:3).

Several authors positioned this dichotomy of opinion on northern potential within a larger context and debate. Australian geographer Griffith Taylor characterised the two poles as the two schools of geographical thought “Possibilism and Determinism”. Describing himself as an environmental determinist, “Nature has largely decided the future of a country before man occupies it" (1955:479), Taylor entered the public fray cataloguing Australia’s environmental limitations, including of the north (Taylor 1955, Marshall 1966).

Similarly Laurence Teakle (later the Soil Conservation Commissioner of Western Australia) described two contrasting schools of thought in Australian Agriculture, one

5 quoted on ABC radio (http://www.abc.net.au/rural/content/2010/s2814154.htm)
of illimitable potentialities, and the other pessimists (1944). Prognosticating on their virtues he explains that both are necessary however require moderation, in the case of the optimists “they need to be harnessed to the investigators and practical men who can translate vision into practice”, and the pessimists “to serve like a good opposition, but Heaven help us if they ever get into power” (Teakle 1944:2). Christian also described the dichotomous positions; this time as “the unseeing realist” and “the visionary” detailing their attitudes of all or nothing and concluding that “Somewhere between these two lies a policy which assumes equal responsibility for both the present and the future” (1961:18).

Teakle links the debate of Australia’s agricultural potential with people’s vision for its future, through the continent’s capacity to support a larger population. One reason the public discussion was so intense was that participants had the perceived future of their nation state at stake (Teakle 1944).

This thesis captures these contrasting views over time, and the schemes that are the result of the school of “illimitable potentialities”, and places the struggle into the broader national and international context.

Agriculture and Frontiers

Someone is always discovering the Territory, its songs and its beauty, infinite resources, boundless wealth, ‘forever piping songs forever new’.

(Hill 1951:3)

No longer will Northern Australia be seen as the last frontier: it is in fact, the next frontier.

(Liberal Party of Australia, 2013)

Many lyrical and despairing lines have been written of attempts to establish agriculture in northern Australia over the last 100 and more years; lines that capture the friction between dreams and reality, and where dreams come off the worst:

...these hopes have been dashed, and many dreams turned to dust, even yet the North denies the largesse so long promised and so earnestly sought...This depressing result has not come about through lack of trying... (Bauer 1977:vii).
Several attempts at cropping have passed into northern folklore. They are relatively well-documented and in some cases renowned in the north: rice at Humpty Doo; cropping at Tipperary Station; and cotton on the Ord. In some instances mythology has built up around the causes for their failure, such as the infamous magpie geese on the Humpty Doo rice crops, mythology which has perhaps also hindered learning from these examples.

What is more searing to read or hear is the frustration of the visionaries acknowledging the self-serving attempts or blunders of others that push fulfilment, and vindication of their optimism, even further away (Parsons 1884, Hill 1951, Bauer 1984, Hillock 2000).

Other stories, however, are barely remembered or written of. These either go back to earlier periods in the history of the north, are smaller endeavours that created fewer ripples, or did not capture the imagination of the Australian media or public. These attempts include the Northern Territory sugar-cane plantations of the 1880s; the WWI soldier settlement scheme near Derby in the early 1920s; the Camballin irrigation scheme on the Fitzroy River in the Kimberley, Western Australia; peanuts near Katherine in the Northern Territory in the 2000s; and the rice and sugar industries that followed cotton on the Ord River Irrigation Area.

There is an ongoing contradiction and tension in the discourse between a belief that northern agricultural development has lagged due to a lack of attempts, or lagged due to all attempts being inadequate. Australia had been accused of a “dog in the manger” approach to developing the north (McGregor 2012); an accusation Grenfell Price in his geography of Australia stridently denied stating the States and Commonwealth have:

...made vigorous attempts to develop tropical areas...while in Queensland the Australian people are conducting one of the most successful agricultural penetrations by whites in the tropical world (Price 1972:163).

The lack of acknowledgement of previous and ongoing attempts reflects the frontier mentality which allows for a sense of tabula rasa, a blank slate, and therefore ongoing and constant colonising (explored in Chapter 2). Dovers encapsulates this in his line “Not settlement-as-event...but settlement-as-process” (2000:12).

Evidence and learning about northern cropping can also be drawn from the research stations, demonstration farms and experimental sites run across the north and sometimes
operating alongside commercial and government farming schemes. Their role, influence, challenges and learning are an integral part of the agricultural story; one informative example is the rice trials around Humpty Doo in the 1950s and 60s considered in Chapter 7. Other examples are found in the other cropping narratives in Part II.

Modern farming is perceived to have advanced its frontiers and intensified production (Pretty 2007), a trend that feeds into our expectation that intensive agriculture will, and should, occur across northern Australia. The success of Australia’s agriculture through adaptation and innovation (Henzell 2007), also contributes to expectations of the North’s productivity; if Australia can farm some of the driest and poorest country in the world than why not the Wet-Dry Tropics? Yet northern Australia defies this trend. It is tempting to believe that this is through lack of trying however this is not the case, as the many stories of cropping attempts in this thesis reveal.

Geography models the core and periphery, and with this, expected dynamics of the movement of resources and distribution of decision-making and power. The process of occupying new worlds and new land raises questions about frontiers and peripheries (Lowenthal 1997) and of frontiers themselves:

How frontiers are viewed shapes how people view themselves and how they treat their environment (Lowenthal 1997:231).

Cultural geographer Lesley Head in writing of northern Australia acknowledges the shifting “lines between culture and nature, science and humanities, people and their environment, north and south” (2000:xxii). This list is even more extensive, aligned to south/north I would also add: developed/undeveloped, settled/unsettled, use/non-use, productive/unproductive, civilised/uncivilised, and central/remote. Head warns that our challenge “is not to ink in the lines but to use the tensions creatively in order to see more clearly where we stand in space and time” (2000:xxii). This is a constructive way to identify and engage with the complex and changing north, what is still considered to be Australia’s frontier. Head’s challenge helps us to deepen our understanding rather than falling back onto clichéd, though indicative, dichotomies.

There is one more distinction, that between expectation and experience. As Powell says geographical transformation “cannot be understood without examining the gap between
rhetoric and reality…” (Powell 1977:83). This thesis explores the tensions above in the context of attempted broad-acre cropping in north-west Australia.

**Scope**

In the course of the thesis I will be discussing and critiquing the general literature and history of Australia’s ‘North’, and then, for a more detailed understanding of the circular conundrum, focus on several areas within the north-west, the Northern Territory’s Top End and Western Australia’s Kimberley, all within the Timor Sea Drainage Division and the Wet-Dry Tropics of northern Australia.

The three overlying ‘Norths’ of the thesis scale down from the largest and most commonly used, everything above the Tropic of Capricorn; down to the Wet-Dry Tropics or tropical savannas of Northern Australia. Although this excludes the very different Wet Tropics of north-east Qld (the only region in the north with significant cropping) it still leaves an area larger than 1.5 million km². The third and smallest is the Timor Sea Drainage Division, approximately 564,600 km². Within this Division the four largest river systems, the Fitzroy, Ord, Victoria, and Daly (moving from west to east), are the locations of the largest failed cropping attempts in the north. The narratives of cropping in Chapters 6 to 10 address five crops - sugar, rice, cotton, peanuts and grain sorghum, all located within the Timor Sea Drainage Division.

In defining cropping I am excluding pastoralism, horticulture and forestry, each of which has characteristics distinct from broad-acre cropping. Pastoralism is a very different agricultural system which more closely mirrors the existing natural system, requiring large land areas and low inputs, and is more able to handle natural variability; horticulture is a more intensive system requiring less land, more intensive management and inputs, and often a higher value crop (having said that horticulture faces many of the same impacting variables as cropping); and finally forestry, a land-use that is growing in dominance in the small amount of irrigated land available in the north-west, perhaps partly due to financial policy benefits to the plantation industry.

How we define failure or success in the context of cropping in the north depends on many factors, revealing the continuing complexity of the debate; for some success cannot be determined by economic factors alone or the time-frames for success may be long-term, as discussed throughout the thesis. Scale is another crucial factor. The ORIA
is a useful illustration of this point. Locally farming enterprises are now successful, at a regional level socio-economic reports show the scheme negatively impacted upon the Indigenous population, and at a national level the scheme does not provide a perceivable blip in the economy of the country, despite what has been significant ongoing public investment.

**A ‘Circular Conundrum’**

_That’s why I’m quite surprised because the old people would say that you see the land being buggered up over and over again. You can sit and watch it. One will come and bugger it up then go away, another will come and do the same thing over again. And the old people say that there are no lessons learned and they can’t understand why they keep doing this cause it’s a failed crop._

(Mona Liddy, Wagiman elder Daly River Northern Territory, pers. comm.)

Over the course of the thesis I have developed and refined a conceptual tool to guide my inquiry and with which to shape the large amount of rich material. The visual expression of the circular conundrum grew iteratively, informed by a number of theoretical approaches and the growing material; a process congruent with grounded theory (Denscombe 2005, Gibson and Brown 2009) and adaptive theory (Layder 1993, 1998). The diagram is not an attempted model of reality. Exploring the cycle, its parts and their relationships with the conceptual tool, leads to a new and nuanced understanding of the narratives of cropping in northern Australia and of the ongoing conundrum, one that cannot be achieved with a conventional bounded focus. In his global history of the environment Joachim Radkau identifies “vicious circles”. He explains that in order to write about the relationship between humanity and the environment we need “ideal typical models about the mutual interaction” (Radkau 2008:7), although he immediately acknowledges that perfect examples of such models don’t exist.

High expectations of the potential for northern cropping regularly dominate the public and political discourse (though contested as shown above and in Chapter 3), resulting in regular attempts over the last 150 years to establish broad-acre cropping. These constitute the first two elements of the circular conundrum ‘high expectations’ and
‘cropping attempts’. What makes the situation in northern Australia so interesting is the third overt element – ‘cropping failure’. The vast majority of attempts have failed and as a whole northern Australia remains with less than 1% of intensive agricultural land-use, bucking global trends in land-use. With this consistent failure one could assume that the expectation for cropping potential in northern Australia would change over time - yet high expectation continues to appear as does a push for attempts and some attempts themselves. In other words the circular conundrum rolls on.

These three parts, as drawn below (Fig. 1), constitute the first level of the circular conundrum. The conundrum is hand-drawn to capture that this is not a formal generic model, rather a tool to help describe and understanding what I see occurring.

![Figure 1. The Circular Conundrum – first level.](image)

There is more to the conundrum, however. Firstly, why does it keep turning, what drives the cycle? The momentum is provided by what I label ‘drivers’ (Fig. 2).
Next is the relationship between these elements, the three arrows. The first is what takes us from high expectation to cropping attempts. I have called these ‘enablers’. Second are the variables that cause the failure of cropping attempts which I have identified as ‘impacting variables’. The term, ‘variables’, can contain the range of factors that come into play without pre-judging their role or impact. It captures the innate variability in the factors themselves and in their impact over time and place. It recognises the variability created by their relationships, and the complexity created. Often they are identified as problems, impediments, or obstacles. These terms suggest difficulties which can be overcome, or at least managed with a linear and dogged approach, and one by one. Impacting variables cannot, hence the wicked nature of the problem.

The third arrow is the relationship between cropping failures and high expectations. This is where we would expect the cycle to stop, yet it keeps turning; this is where the conundrum sits. Do the failed attempts influence expectations? If so how, and if not what does? The circular conundrum is illustrated below with the relationships between the elements.
Thesis Structure

The diagram above also provides a map for the thesis. The three parts of the thesis, each containing several chapters, address portions of the circular conundrum: Part I ‘Ideas of North’ (Chapters 2-5) explores the expectation and drivers; Part II ‘Stories of Cropping’ describes many of the documented attempts and their failure; while Part III ‘Caught in a conundrum unpacks the variables that contributed to these failures and the relationship between failure and expectations. This third section also asks whether this simple model of the circular conundrum contributes to our understanding of northern Australia and of the nature of our relationship with place over time.

Part I - Ideas of North

Chapter 2 ‘The Idea of North’ introduces northern Australia and the changing and multiple maps of the north, both cultural and physical. It shows how significant colonialism and post-colonialism is to perceptions and understanding of the north (the disjunctions it has created), and that the process of colonising is still underway. It reveals the strong threads from the Old World that still bind non-Indigenous Australians’ beliefs, and the unacknowledged push of a single dominant ‘idea’ of north.

In Chapter 3, ‘Davidson’s Idea of North’, I go back to agricultural economist Bruce Davidson’s 1965 book which became a lightning rod for debate on northern agriculture in the 1960s and which coined the term “The Northern Myth” which is still used today. In exploring the context of his book, and my grandfather’s annotations, we see the
virulent and public debate crystallised in the Commonwealth Government decision-making process for funding the Ord River dam. This chapter also presents motives for agricultural development according to Davidson, showing that they are poorly supported and addressed in his text, and Davidson’s belief in the pre-eminence of the economic approach.

‘The Power of Ideas’, Chapter 4, considers the drivers for northern agricultural development. Analysing material since Australia’s colonisation it posits that there have been ten different drivers over time. It reveals the irrational power of the development imperative, and the role northern Australia plays as a signifier, an idea or vessel, on which national perceptions and drivers are projected.

Chapter 5 ‘Forever frontier?’ draws together material from the 1820s through to the present to provide an overview of agricultural attempts, government inquiries and reviews, commissions and committees.

**Part II - Stories of cropping**

Scattered across northern Australia and through time are many fascinating and diverse stories of cropping, from stoicism and hardship to greed and profligacy, from individual endeavours to companies and governments. Each chapter describes the story of a different crop over time, focusing on periods of significant endeavour in different locations. These narratives illustrate the attempts and the failures of the circular conundrum, two parts of the cycle.

The thesis draws upon the narratives of people in the north, and looking to the north; of the North’s first peoples, and of the newer mob – pastoralists, farmers, researchers, politicians, government workers and the like. It traces the stories from the 1800s to the first decade of the twenty-first century, dipping in and out at key points in time and place to provide some detail in the broader picture.

It is through reawakening these stories and collecting them in one place in some detail that a broader and deeper picture can emerge, revealing both shared and unique features of the attempts, and patterns through time and across locations. The drivers (discussed in Chapter 3) are visible in context as are the variables that lead to failure, across scales from the individual to national policy. Additionally the narratives reveal emerging and persistent themes, including race, learning and relationship with place.
Sugar is the first crop to be considered, a crop of colonialists. Chapter 6, ‘Sweet Savannah’, begins with the fiasco of sugar plantations attempted in the Northern Territory in the 1880s and then describes the sugar industry in the Ord River region in Western Australia from 1994 to 2007.

Chapter 7 tells narratives of rice in both the Northern Territory and the Kimberley; from the Chinese growers of the late 1880s to government researchers and Hollywood millionaires in the mid-1900s.

Cotton is the crop for which the Ord River Irrigation Area is most renowned. Chapter 8 portrays a little known attempt of cotton in the Kimberley in the early 1900s and a controversial proposal in the late 1900s, along with cotton in the Ord through the 1960s to 1970s.

Peanuts are the stoic but less sexy cropping cousin of the others with a long history in the Northern Territory. Chapter 9 describes peanut growing along the Daly River of the Northern Territory in the 1930s and 1940s, in the Douglas-Daly region in the late 1990s and in Katherine in the early 2000s.

Finally there are the large-scale grain-growing attempts such as sorghum, often with the apparently sensible intention of integrating cropping into larger pastoral enterprises (Chapter 10). Through the late 1960s and 1970s we see three of the largest and most dramatic visions come to grief; Tipperary Land Corporation at Tipperary Station and Northern Agricultural Development Corporation on Willeroo Station in the Northern Territory; and in the Kimberley of Western Australia, Camballin Irrigation Area. Following that period is the Northern Territory Government Agricultural Marketing and Development Authority in the 1980s.

**Part III - Caught in a conundrum**

The cropping stories reveal an interwoven multiplicity of characteristics and relationships of the circular conundrum (sometimes self-contradictory, sometimes reinforcing). What becomes visible as the stories coalesce is that the overarching narrative is not actually of agriculture and cropping, it is of people’s relationships with place, and knowing place.
Chapter 11 interprets the variables influencing failure, framing them within the five categories of capital and exploring how together, with the relationships between them, they create a complex system and vulnerable cropping systems.

Chapter 12 explores the final arrow of the conundrum, the relationship between failure and high expectation, identifying the influence of the many parts of the cycle on this particular relationship, and revealing how they hinder learning; the gap between “rhetoric and reality” (Powell 1977:83) and “a reprehensible aversion to learning by experience” (Bauer 1985:27). This is expressed through our slow and intermittent journey to learn landscape literacy, reliant upon acknowledgement of the north as a cultural landscape, and our even slower journey to complex systems literacy. The latter including a capacity to deal with variability, uncertainty and complexity. The place does have power, and remains the fundamental agent in these narratives. The reinvigoration of Indigenous land management and the growth of new environmental markets including carbon and environmental services challenge traditional western ideas of agriculture and challenges how we know place and build a literacy of place, and our relationships with people and place in post-colonial Australia.

**Theoretical Perspectives and Method**

This PhD seeks to improve understanding of a phenomenon that straddles many fields, social, cultural, environmental, economic and political. The value of this study is achieved by exploring the relationships and dynamics within the entire system, and by using multiple lenses, rather than by undertaking a detailed analysis of just one part of the system or through one lens. Hence this thesis is informed by a range of theories and methods and uses them selectively as appropriate for different chapters. It is guided by what emerges from the research material.

I distinguish between drawing upon the content of texts from other disciplines, and drawing upon the concepts, theories and methodologies of these disciplines; a spectrum rather than a clear delineation. The disciplinary scope of academic material I use is wide-ranging, more so than with theory and method, and includes agricultural science, economics, ecology, post-colonialism, anthropology, history and geography.

The scope of theory and methods I draw upon are more bounded yet still range across disciplines. An initial investigation of social science theory was useful for informing the
research methods rather than in providing an overarching theoretical framework. A risk of this supermarket approach to theory and method is a potential incoherence or inconsistency in the work; cherry picking from a discipline may reduce the integrity of the work. I addressed this concern by identifying and drawing upon theoretical approaches that tackled three areas fundamental to this inquiry – scale, time and relationship between people and place. This led me to geography (historical, cultural, economic and physical – in and of itself a wide-ranging and encompassing field), environmental history, adaptive theory, and discourse analysis, then arriving at social-ecological systems theory, a contemporary approach to understanding human relationships with the environment (people/place). These theoretical lenses assisted me to bring together narratives and material to address scale and to connect past and present, ensuring contemporary relevance. Each of the three parts of the thesis has a different emphasis in the theory and method it acknowledges: Part I particularly uses geography in its approach with some social theory and history, Part II is predominantly environmental history and Part III geography, social theory, and social-ecological theory.

Just as this thesis relies upon the work of this range of disciplines and fields so too I hope it contributes back to them. Geographer Lesley Head identifies that “environmental change and the agency of nature has generally been neglected in social theory” (2000:54) explaining that environmental history addresses this neglect through “recognising nature in human affairs, and, more fundamentally, the reciprocity between nature and society” (2000:54). Preferred definition for environmental historian John McNeill is “the history of the relationship between human societies and the rest of nature on which they depended” (2010:346) whereas environmental historian Libby Robin explains that she explores “the idea that non-human actors like mountains and deserts have agency in history and have had some part in developing a distinctive national identity in Australia” (2007:2). Honouring nature’s agency and exploring the reciprocity of our relationship with country, as expressed by Head, McNeill and Robin, is one goal of this thesis. In-depth and specific histories are necessary to achieve this, to unmask stereotypes and assumptions, and to uncover the role of ‘New World’ settlers in an old cultural landscape (Lowenthal 1997:229). Just as Head identifies that social theory neglects nature, Sörlin and Warde claim that environmental history would
benefit from greater engagement with social theory (2007). It is a beneficial conversation both ways.

The emerging Australian 'Literature of Place' also uses narratives to extend our understanding of place and of people's relationship with place. As Robin describes above, stories may reveal the agency of place itself. The most powerful literature of place gives voice to place and how place itself creates people:

At its best, this literature listens to the land and to those people intimate with its places...Perhaps the work of literature attuned to place is, finally, a listening (Tredinnick 2003:32).

More powerful than this new Australian field is Indigenous cultural practice and oral tradition which has played the most significant role in regards to people/country relationship in Australia over many tens of thousands of years. The work of anthropologists contributed significantly to this thesis through their deep understanding of Indigenous relationship with land and the impact of white settlement/invasion. My good fortune to learn from Indigenous friends and colleagues across the north has also contributed substantially.

Narrative is the primary way that humans understand and share their experience of the world around them. As Polkinghorne writes:

I envision the primary organizing principles in human experience as more akin to those that construct poetic meaning than to those that construct the proofs of formal logic (1988:16).

Hearing the stories and understanding relationships can help us to understand how societies learn from their environments and what that means about our capacity to adapt successfully to a variable and changing natural world. The dance this requires, with which historians are familiar, is to move between multiple detailed stories and the overarching view, while remaining open to emerging themes. It is a valuable approach in that it can tease out patterns and present alternative narratives thereby deepening understanding. Environmental history also has a commitment to narrative form, telling stories of the relationship between humans and the environment. Although sometimes imposing an order that does not actually exist:

We do so because narrative is the chief literary form that tries to find meaning in an overwhelmingly crowded and disordered chronological reality (Cronon 1992:1349).
Initially canvassing an even broader range of theoretical perspectives I came back to some iteratively throughout the research. Layder’s “Adaptive theory” captures this approach; an ongoing responsiveness between theory and the research, and between externally imposed and internally generated theory: “...a continuous process which accompanies the research at all “stages”” (1998:3). The adaptive approach is especially relevant to this research as it addresses the particular along with the system-wide phenomena and the relationships between them, enabling exploration of people’s stories and ‘lived experience’ along with the broader system within which this occurs, and the influence of each upon the other. This is integral to my research.

Implicit recognition of scale in the adaptive approach is useful in bringing insights to the relationship between the individual and the societal levels that are at play in this thesis. Discussing the significance of scale environmental historian Tom Griffiths explains how:

> environmental forces that have shaped Australia, for example, come into focus on analytical levels other than that of the nation – by seeing Australia as a settler society, as part of the New World frontier, or as a continental cluster of bioregions. (1997:12)

Griffiths urges that environmental histories need to change scales, enlarge or focus.

Scale, time and people/place are all fundamental to geography, as is the relationship between them. As historical geographer J.M. Powell describes, every type of farming frontier involves the interpretation and transformation of landscapes (1988). Landscape can be defined as physical, social and symbolic (Lowenthal 1997) and cultural geography sees landscapes as social and political, recognising therefore, the need for an interdisciplinary and historic approach in order to understand today’s environmental issues (Head 2000).

The significance of discourse analysis to my thesis is the fundamental understanding that the discourse about agriculture in northern Australia affects and is affected by related politics, policies, institutions, and culture, carrying its own assumptions and judgements that determine what, and who, is considered legitimate in the arena (Dryzek 2005). Although I do not undertake formal discourse analysis here it does inform my work, both from the understanding it brings of the role and power of discourse, and in regard to my reading and interpretation of material. I draw upon discourse analysis to help understand the assumptions and values behind the circular conundrum, and how it
is perpetuated. What does the public discourse about northern Australia show us about our “systems of knowledge and belief” (Fairclough 1992:36) and “the mechanisms through which societies sustain their social structures and social relations over time”? (1992:5)

The adaptive approach and discourse analysis present behavioural and systemic phenomena in the social context. To address my inquiry I need to take this a step further. The social must also be considered within the context of the ecological, and have its relationship to the ecological acknowledged (Head’s critique above). Building on Layder, this would include understanding both the behavioural and systemic relationships with the ecological.

A contemporary theoretical framework which attempts to understand these relationships is Social-Ecological Systems Theory (SES) such as Stafford-Smith’s work on the desert syndrome (Stafford-Smith and Cribb 2009). SES is exploring the social and the relationship between the two (Gunderson and Holling 2002, Cash et al 2006, Lebel et al 2006, Bunch et al 2011, Veldkamp et al 2011). Perhaps still neglected is how learning occurs in the relationship between social and ecological. SES relies upon modelling, thus focusing on the mechanistic and material elements of the biophysical. Crane (2010) argues that this obscures the social and cultural. Given the biophysical system can be culturally constructed in a multiplicity of ways, and there are also many cultures of the north, including ‘The North’ as perceived from the south, I draw from a broader understanding of SES without applying it.

**Method**

I used three methods to inform the thesis; research of written material; ‘guided conversations’; and participant observation. The methods were informed by Polkinghorne 1988, Kellehear 1993, Denscombe 2005, and Gibson and Brown 2009.

Throughout the history of non-Indigenous agriculture in northern Australia a range of roles have been played including the usual; the politician, the bureaucrat, the researcher, the farmer, the private company, the peak or industry bodies, and the conservation groups. Others are less visible - the traditional owner and local Aboriginal people, and the organisations that emerged to represent or support them, or the migrant farmers. Additionally there are geographic distinctions. Across the north, as well as between the
north and the south, there are different jurisdictions, environments and histories and also different drivers. The federal politician based in southern Australia is likely to play a different role and have a different perspective to the local politician in the north; likewise for researchers and bureaucrats. An incoming farmer or agricultural company from elsewhere in Australia or the world may have different expectations, tools and methods to someone who has been living or farming locally for a long period of time.

To identify appropriate people to talk with I created a table capturing the geographic distinctions – the north, the south and my focus areas - and a relatively standard categorisation of people and organisations related to ‘country’ and agriculture. Through participant observation and research I identified about 40 possible people and managed to meet with 32 of them in a range of locations including Kununurra and surrounds, Darwin and surrounds, Broome and Brisbane (see Appendix 1). These discussions were recorded (with consent\(^6\)) and parts of them were later transcribed. Although I tag the conversations numerically I do not link this to the individual descriptions in the appendix; given the small population in each of the locations people would be too easily identified.

Due to the nature of the topic and diversity of people I did not want to constrain participants or impose too many of my preconceptions upon them, talking with an agricultural scientist is a different conversation from a discussion with a Traditional Owner. As such it was not appropriate to hold structured interviews which could miss or skew rich narratives and stories. Additionally a structured interview is not a comfortable process for many people, whether in cross-cultural situations or outside of professional roles. Rather I developed a method of ‘Guided conversations’ appropriate to the situations. A list of topics helped guide the discussion and was adapted after my first few conversations when I realised that I was missing some fruitful areas of discussion, particularly in relation to learning. The topics were not framed as direct questions rather created room for people to tell their story and encourage them to express more than the most immediate response. The conversation topics are in Appendix 2.

\(^6\) ANU Ethics approvals - Protocol numbers: 2011/230 and 2011/359
I accessed material from 1870 to the present through archives, libraries and related databases such as the Trove newspapers online, and my grandfather’s personal collection. Sources include research literature, scientific reports, personal journals, maps, political documents, newspapers, letters, parliamentary records, government documents, research publications, workshop documents, maps, pamphlets, novels, and poetry.

Through my roles in natural resource management in northern Australia I have gained inside understandings of the context of my study and built networks across the north which provided context for the ‘guided conversations’. To manage concerns of vested interest and unacknowledged subjectivity (Denscombe 2005) I regularly questioned my own assumptions, or had them challenged by others, and ensured I drew upon a wide range of material. My involvement shaped my understanding of the range of institutions; government agencies and programs, research and development organisations, investments, non-government organisations, taskforces, and policies. Working in the north and living in Darwin I was also attuned to public debate, most graphically informed by the high quality journalism of my local newspaper, the Northern Territory News. I attended public forums and participated in, even initiated, workshops, alliances and such like. I am a small part of the human landscape that I am writing about, and I am writing from and in the north.
PART I – IDEAS OF NORTH

How do ideas change? This question is specially urgent in these times of rapid change, because patterns of thought that are really useful in one age can make serious trouble in the next one. They don’t necessarily have to be dropped. But they do often have to be reshaped or balanced by other thought patterns in order to correct their faults...Prominent ideas cannot die until the problems that arise within them have been resolved...We do better to talk organically of our thought as an ecosystem trying painfully to adapt itself to changes in the world around it (Midgley 2004:4)

The following four chapters explore the diverse and changing ideas of northern Australia. Chapter 2 ‘The Idea of North’ introduces northern Australia and the multiple maps and perceptions of the north, both cultural and physical. It shows how significant colonialism and post-colonialism is to perceptions and understanding of the north, and that the process of colonising is still underway. ‘Davidson’s Idea of North’, Chapter 3, discusses agricultural economist Bruce Davidson’s 1965 book The Northern Myth and its context, the decision-making process by the Commonwealth Government on funding the second, and larger, dam for the Ord River, a very public economic debate. This chapter also presents motives for agricultural development according to Davidson. These drivers provide the starting point for the next chapter ‘The Power of Ideas’ which considers the drivers for northern agricultural development. Analysing material since Australia’s colonisation it establishes that there have been ten different drivers over time and reveals how national perceptions and drivers are projected upon the north. Chapter 5 ‘Forever frontier’ draws together material from the 1820s through to the present to provide an overview of agricultural attempts, government reports and inquiries, research efforts, and changing institutions.
Chapter 2: The Idea of ‘North’

To most Australians the term ‘Northern Australia’ is a nebulous unreality; it has real meaning only for those who live and work there. Yet few days do not bring some mention of ‘our undeveloped north’ in the nation’s major press, and indeed, this adjective is the north’s best known trademark. A term of the imagination rather than the sensibilities, Northern Australia implies that country variously known as ‘the outback’, ‘the back of beyond’, ‘the nevernever’; those regions the nation still likes to think of as the real Australia... (Bauer 1963:39)

Where is the North?

Bear in mind all maps even when they appear to contradict each other

(Midgley 2004:27)

The first chapter introduced the ‘circular conundrum’, a concept to describe the cycle of the expectations, attempts and failure of broad-scale cropping in northern Australia. In order to explore this circular conundrum of the north we need to understand what and where ‘the North’ is, or, more accurately, perceptions of what and where it is.

Sometimes it is a capitalised ‘the North’, a definite place and identity in that one big N. At other times it is just ‘the north’, more a direction than a definitive place. Both expressions, though, convey a sense of a single identity with a singular ‘the’ erroneously indicating homogeneity – a misperception we will revisit. And north of what? Sometimes ‘Northern Australia’ is used, at least pinning the place to a continent and relating it to the rest, the south of Australia. The tendency to aggregate anything that is ‘other’ into the one category is common: if something or someone doesn’t belong with us than it or they belong elsewhere (and usually together). This dualism of difference may also lead to whatever is other being defined by lack (Plumwood 1993), as it often has been for northern Australia when written about, researched and ruled from the south of Australia.

Once you are in northern Australia though, and it is no longer north of you, what happens to the way we define and understand this place? Does it cease to be a single entity defined solely by what it is not, the south? It may become plural rather than...
singular as we begin identifying the complexity and difference within. Do we learn from it?

The changing maps of northern Australia show that the boundary of northern Australia has shifted over time as colonisers’ knowledge has increased, and as those of the north contribute to the definition. Perhaps, more cynically, it changes as the nation state more effectively claims the place (Whitehead et al 2007).

**Aboriginal nations and maps**

Before British colonisation there was no self-identified north but many nations, as shown in the now recognisable map of Indigenous languages across Australia. For example in the Kimberley region across northern Western Australia about 42 language groups plus additional dialects were spoken (Griffiths and Kinnane 2011). Diversity of language and culture stretched across northern Australia from saltwater people to stone country people to desert people, yet with intersecting stories that joined and overlaid each other, weaving distant places and people together. Important stories travel geographically and are handed on from one clan to another in a direction (Merlan 1998, Ian Morris pers. comm. 17/11/137).

![Figure 4. Australian nations as shown in the Aboriginal Australia Map (Horton, AIATSIS, 1996).](image-url)

Ian Morris is a renowned naturalist and cultural expert of Arnhem Land and Kakadu.
Maps were not printed on fibre but in minds and culture, through art, song, and stories. Travelling through landscape reaffirms the mapping of generations and traces it in the minds and hearts of the young: “the sacred geography of country, sites and tracks...” (Rose 2002:320). Singing maps is a way to share knowledge (Magowan 2005, Ian Morris pers. comm. 17/11/13). There are many stories of Traditional Owners who visit their country after many years and surprise non-Indigenous colleagues by still knowing places and routes in intimate detail, whether from air or ground.

Another characteristic of Indigenous ‘mapping’ of northern Australia (and a point of distinction from the maps of British colonisers) is that the coastline is not such a key demarcation. Northern country was as much sea country as land – stories and songs pass across both and carry detailed knowledge of saltwater (Magowan 2005). This is now being made visible through mechanisms such as sea country ranger programs and Indigenous Protected Areas (KLC 2013, Hill et al 2013, Dhimurru 2013). Indigenous knowledge of the topography below the sea dates back to previous sea levels when the coastline was in fact much farther north (Ian Morris pers. comm. 17/11/13) reflecting the remarkable long-term continuity, adaptability and detail of this knowledge.

Before the British arrived the First Australians were also in relationship to what was north of northern Australia. For up to at least two centuries the Macassans from southern Sulawesi were seasonally harvesting trepang across northern Australia and trading with the First Australians (Austin 1964, Mulvaney 1969, Macknight 1976, Donovan 1989, Reynolds 2003, Ganter 2005, Moriarty 2011). On his voyage on the Investigator, 1801-03, Matthew Flinders describes meeting a fleet of Malay trepangers off the coast of Arnhem Land who advised him there were 60 prows and a thousand men moored along the Arnhem coastline (Austin 1964). A map found at the tomb of Sultan Hassanuddin in Gowa depicted the Gowan or Macassan empire until 1660, and, with Sulawesi at its centre, included the top end of the Northern Territory.
Up to 50 thousand years of habitation brings a deep and detailed knowledge of country. It brings a different relationship with country; a relationship embedded in an understanding of one’s own place and role in the whole – family, community and environment. This cosmology is one that non-Indigenous Australians may be lucky enough to fleetingly taste, from the breeze, the fresh caught fish, the stormy horizon, or the words of an Aboriginal friend, but it is rare for anyone not born into it to truly comprehend. Standing next to a dirt road on a stinking hot Kununurra day an Aboriginal friend, while finishing his cigarette, asks me where my home is, where did I come from? I explain that I had lived in many places of Australia, though in the north as a child; my home was Australia. This didn’t wash. We spend a little time trying to understand each other, me the question and him my response. Finally he says “This country speaks to me when I come home. It welcomes me back. I am a part of it.” He was shocked that I did not have such a relationship, anywhere, and I was saddened by it.

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8 (http://riel.cdu.edu.au/blog/2012/01/re-discovering--our-unique-makassan-maritime-legacy/ Accessed 5th April 2013)
Two hundred and thirty years of colonisation has, however, scarred this knowledge of country at best, and at worst, in some places wounded it fatally. The occupation of northern Australia was unrelenting and in many places brutal (Rose 2004). "It was notorious," reported the Government Resident of the Northern Territory in 1900, "that the blackfellows were shot down like crows, and that no notice was taken" (Quoted in Farwell 1951:150). As with the rest of Australia there was and is “an inherent conflict between the goal of colonising a new country and the rights of indigenous people” (Attwood and Foster 2003:6). The British did not recognise Indigenous Australians as having any ownership of the country - the infamous Terra Nullius or, translated, “land without owners”9 leading to policies and laws based upon blindness or a lie, and built upon ongoing denial of rights. Australian anthropologist W.E.H. Stanner identified “The great Australian silence”, arguing it was “a structural matter” not just “absentmindedness” (Stanner 1968). Non-Indigenous Australia has been in denial ever since regarding the realities of the mechanisms of invasion:

At the turn of the nineteenth and twentieth centuries, historical narratives coalesced into a myth about Australia that celebrated British colonisation of the continent as a peaceful act of discovery and settlement. (Attwood and Foster 2003:11)

Our frontier stories for ongoing public consumption were of the outback hardship faced by brave settlers opening up the country, both the tough environment and dangerous natives. Research in 'Aboriginal history' since the 1970s has challenged this depiction, writing a new Australian history (Attwood and Foster 2003) and pulling our comforting carpet of self-definition and nationhood out from under us. Griffiths named this shift, stating that “the Great Australian Silence” as identified by Stanner was “broken, and stories of the violence and dispossession done to Aborigines has been allowed to be heard” (Griffiths 1997:6). It is little wonder that there has been such a backlash and a series of new wars – the “history wars” (Macintyre and Clark 2003, Haebich 2005, Rose and Davis 2005).

The proud cloak of British racial superiority, woven with self-interest, blinded most of the newcomers to the humanity of the existing inhabitants, and to their knowledge and stewardship of the country. People were taken from their country or denied access to

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continue cultural and land management practices, thereby undermining knowledge, law, culture and language and, more obviously now, also undermining the health of the country (Latz 2007, Woinarski et al 2007, Gammage 2012). The blindness of the colonisers to Australia’s first peoples’ intimate relationship with and expertise of country can be regarded as the first fundamental knowledge disjunction that occurs in the story of attempted intensive agricultural development. The story of pastoralism takes a different path, benefiting from Indigenous skills, knowledge of country and free labour. Such blindness could be defined as a form of wilful ignorance (further discussed in Chapter 12).

The second knowledge disjunction is the imposition of knowledge from an entirely different environmental context in the Northern hemisphere onto the unique continent of Australia; documented extensively in the Australian literature on environment, agriculture and land degradation (Powell 1988, Seddon 1997, Rolls 2005). Since then Australian agriculture has become innovative in many ways; developing and/or adopting new, more appropriate, practices and technologies such as minimum and no tillage cropping systems, precision agriculture, low-input systems (Keogh 2009) and peer and social learning processes such as Landcare. Both these disjunctions are integral to the ‘Frontier’ mentality, not unique to Australia but reflecting the process of colonisation as it has occurred across the ‘New World’. Deborah Bird Rose explores these disjunctions with her concept of the Year Zero, discussed later in this chapter. As environmental historian David Lowenthal explains, “settler societies” in general did not acknowledge Indigenous impact (or surely therefore management) of the environment as "it suited colonial incomers to overlook signs of native alteration; the apparent absence of indigenous 'improvements' helped to justify the removal of indigenes from tribal lands" (Lowenthal 1997:234). Specific to Australia though, is the extent of this disjunction through Terra Nullius. (The North Americans celebrate the gift of corn from their First Peoples with ‘Thanksgiving Day, the Maori have the Treaty of Waitangi’).10

Denial of Indigenous rights remained until the Mabo decision in 1992 when the Australian High Court determined that Indigenous people had Native Title rights that

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10 Northern Australia as ‘Frontier’ is discussed more fully in the section ‘Constant Colonising’ later in this chapter.
predated the British and survived settlement. The Native Title Act of 1993 provided a process for Indigenous Australians to claim Native Title. Although a revolutionary change for Australia Native Title was not an unadulterated win and criticism of its limitations continues (Attwood and Foster 2003). The impact of Terra Nullius continues beyond 1993, seeping through the dominant culture of Australia to maintain the colonisers’ lack of understanding, or even recognition, of any form of Indigenous management of country (Giblett 2011). This is revealed in surprisingly recent and significant writing such as Geoffrey Bolton’s *Spoils and Spoilers* "... the Aborigines in all their centuries of occupation contented themselves with the lives of nomadic hunters, merely scratching the surface of the continent" (Bolton 1981:4). Anthropologist Rhys Jones famously challenged this paradigm as early as 1969 in coining the term *Fire-stick Farming* (Jones 1969). Jones challenged the belief that “Aborigines were passive slaves of the environment” and showed how land management, mainly through the use of fire, shaped Australia (Jones 1969, Petty 2012). Much research and practice has since cemented the role and significance of Indigenous fire management in the north (Yibarbuk et al 2001, Russell-Smith et al 2009).

Acknowledging Australia as a cultural landscape, however, is an ongoing battle that Australian historian Bill Gammage wages still, collecting and presenting evidence of Australia prior to European invasion while others still push back (Gammage 2012). Not recognising that Australia is a cultural landscape is the third knowledge disjunction stemming from colonisation. Awareness that the Australian environment is a product of many tens of thousands of years of relationship with humans, and that loss of Indigenous culture brings change to that landscape is a fundamental step to understanding and living with the environment of this continent (Rose 1997). Indigenous land management did continue post the disruption of colonisation to varying degrees, particularly in areas of northern Australia where people remained on country, or at least working on country on pastoral properties. It has also been reinvigorated in the last 30 years (Hill et al 2013, Dhimirru 2013), growing with, adapting to, and perhaps also potentially challenging the circular conundrum of European broad-acre cropping.

**Boundaries for the ‘Empty North’**

With the colonisation of Australia internal boundaries changed. The multiplicity of nations is ignored, and the Continent, whose places, landscapes, ecologies and seasons were understood in such detail by the First Australians is perceived by the conquerors as
empty, a large blank space requiring filling up (discussed in detail in Chapter 5). The
south of Australia is the first area to be populated successfully by the colonisers (despite
a number of attempts in the north) and it is from this vantage point that the north of
Australia is perceived (Reynolds 2003). As the south of Australia is filled in the north
becomes the frontier, unknown and unconquered, and, despite those many pre-existing
nations, it was considered unpopulated.

The almost arbitrary, certainly simplistic, probably convenient, boundary for northern
Australia, the Tropic of Capricorn, becomes that most frequently used to bound and
define the North until the end of the 20th century; as the Commonwealth Council for
Rural Research and Extension describe it in 1981: “a line often used to separate the
north from the south of the Continent” (CCRRE 1981:10). Examples through this period
Northern Myth* Davidson also chose this simple definition “that portion of the continent
lying north of the Tropic of Capricorn” (Davidson 1965:29), which constitutes a mere
three million square kilometres or 45% of Australia, or if its own country would be the
eighth largest in the world (Gray 2009). The Tropic of Capricorn passes from
Rockhampton in the east, cuts the town of Longreach in half, passes just above Alice
Springs, bisects the Gibson Desert and then passes through to the WA coast above
Carnarvon. It divides Qld in half, chops off a southern portion of arid southern Northern
Territory and in a neat straight line distinguishes the northern third of WA from the rest.
Above this line lie desert, savannahs, wet tropics, and wet dry tropics. It contains
Australia’s wettest rainforest areas and some of its driest desert.

![Map of Australia showing the Tropic of Capricorn](image)

*Figure 6. Inside cover of The Northern Myth 1965.*
One blunt use of this boundary is in the brochure published by the North Australian White Settlement Association in 1922 calling upon patriotic white Australians to fill the ‘empty north’, that mysterious and threatening blank above that decisive line. Hostility and fear by predominantly white southern Australia towards the multi-racial north influences the history of the north until at least the end of the 20th century (Reynolds 2003, Day 2005).

![Figure 7. From the 1922 pamphlet of the North Australian White Settlement Association.](image-url)

It is not until the 1990s that there is a move away from the use of the Tropic of Capricorn; instead the boundary becomes more complex than the straight line on a map, perhaps reflecting a growing understanding of the north as much as better mapping software. With the establishment of the Cooperative Research Centre (CRC) for Tropical Savannas in 1995 a more complex boundary emerged based upon bioregions and leaving out the wet tropics of north eastern Queensland. The CRC’s area did drop south to encompass the Barkley Tablelands and some of the Brigalow country of central Queensland through a combination of using a bio-geographic approach, an understanding of shared biophysical processes such as fire, and the pragmatics of drawing in a range of stakeholders whose interests focus on different regions (Peter Jacklyn11 pers. comm. 2012). Despite this the Tropical Savannas CRC was the first northern-wide entity for which the geographic scope was defined by those in the north, with most of the CRCs researchers and participants based in the north.

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11previously Communications Coordinator for the CRC.

Chapter Two - The Idea of North
A key achievement from the Tropical Savannas Cooperative Research Centre (CRC) in 2001 was the first northern-wide Indigenous organisation, the Northern Australian Indigenous Land and Sea Management Alliance (NAILSMA) which began as an alliance between the Kimberley Land Council (Western Australia), the Northern Land Council (Northern Territory) and Balkanu Cape York Development Corporation (Queensland) and in 2012 became a not-for-profit company. NAILSMA was established “to assist Indigenous people to manage their country sustainably.” It is defined from the ‘inside’, a voice from the North.

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Being neither a jurisdiction nor a readily defined environmental unit, any boundary defining the North would be "partly artificial"; moving inland from the coast there is a transition from the high-rainfall coastal zone to the semi-arid and arid interior all the way across the north (Woinarski et al 2007:3).

When the next major northern research collaboration began in 2007, the region was defined even more specifically, this time by northern flowing river catchments which are most influenced by the monsoonal climate. In other words the Wet-Dry Tropics, a 3000 kilometre stretch of the tropical savannas excluding the wet tropics around Cairns of north east Queensland. Working across these catchments (55 in total), Tropical Rivers and Coastal Knowledge had its ‘head office’ in Darwin (at Charles Darwin University) and the Research Director was a local. Of course the focus of the research on the northern rivers predicates the use of the northern catchments.

In 2009 an Australian Government initiative, the Northern Australia Land and Water Taskforce, was “to consider the broad range of sustainable development opportunities for northern Australia that are based on water resource availability” using the "surface and groundwater systems in the Timor Sea and Gulf of Carpentaria drainage divisions, and that part of the North East Coast drainage division north of Cairns” (Northern Australia Land and Water Taskforce [NALWT] 2009) reflecting the actual landscape of
northern Australia more than the Tropic of Capricorn and capturing the wet dry tropics and tropical savanna of the north.

Supporting the Taskforce’s work was the Commonwealth Scientific and Industrial Research Organisation’s (CSIRO) substantial Northern Australia Land and Water Science Review, commissioned by the Office of Northern Australia. This smaller area is far less populated than the area north of the Tropic; with a population of about 200,000 it is only about 20% of the ‘north of Capricorn’ total.\textsuperscript{14}

![Figure 10. North flowing catchment boundaries used by the Northern Australia Land and Water Science Review (CSIRO 2009a).](image)

These examples and maps show a trend away from defining the North with a straight line along the top third of the continent to the use of a more complex and relevant boundary, using catchments (as above) or biogeographic regions, as in the case of the Tropical Savannas CRC. Although this change may only reflect the increasing specificity of purpose for which the boundary is used, defined by the research topics at hand, it may also reflect the strengthening voice of northerners in the public, policy and research discourse of the north. No longer is it only southern Australia, the economic

\textsuperscript{14} [http://www.csiro.au/Organisation-Structure/Flagships/Sustainable-Agriculture-Flagship/Northern-Australia-Sustainable-Development/Science-review-key-findings.aspx Accessed 1 June 2014).]
and political 'centre', looking to this alien other at its periphery to 'solve' it, settle it, and profit from it (for northern Australia is a text book example of an ongoing internal colonisation of periphery).

Strengthening of the northern voice, particularly over the last 40 years, is also partly a result of the increase in Indigenous land ownership or rights, and the establishment of Indigenous organisations. For example the cross-government Northern Australia Ministerial Forum established in December 2010 created two expert support groups, one being the Northern Australia Indigenous Experts Forum on Sustainable Economic Development. Although these changes are reflected less generally in the stories of intensive agriculture in the Northern Territory, they are a significant part of the Ord River Irrigation Area history and future. The strengthening northern voice is due also to factors such as the growth in population of northern Australia, and the establishment of self-government in the Northern Territory.

This recent shift to more detailed and relevant boundaries reflects a growing biophysical understanding of the area and an increased capacity to map it. As Whitehead et al (2007) describe, the process of mapping can be a process of claiming and colonisation – literally in the sense of mapping resources for exploitation, and symbolically in the sense of establishing proprietorship of land. This process was common across the New World, names were “expressions of authority and power...they paved the way to transformation” (Wynn 2007:101). Claiming of places with often irrelevant English names to fill intimidating blanks on the map is a visual representation of the response to the intimidating ‘silence’ felt by the unsettled colonisers (Cathcart 2009).

From white explorers trekking into the unknown on behalf of the British (then on behalf of southern Colonisers), to satellite imagery, digital elevation models and geological exploration through magnetic imaging from planes – the filling in of physical information of the ‘empty north’ has been increasing. Yet the amount and resolution of data and information across northern Australia still remains far behind what is available in the south:

The resources, natural systems, landscape processes and interactions of the north are relatively poorly studied and not well documented. Historic data and information is often in non-digital formats and not readily accessible. (Wilson et al 2009:3)

Chapter Two - The Idea of North
A challenge to defining any northern boundary was the questioning of the north as a single homogeneous entity. Geographer Griffith Taylor in 1955 bluntly stated “No student of climatology” could justify closer settlement of 1,600 miles of country from Cooktown west to Geraldton by the close settlement of east Queensland (Taylor 1955:444). Christian equally understood that within this vast area there is great difference - of land types, potential for development, and stage of development, and that it cannot be usefully discussed without this understanding:

Thus in relation to development one cannot satisfactorily speak of land and production of Northern Australia as a whole. (Christian 1961:9)

Despite this change in the boundary of the north over the last 100 years the conservative Federal Government of 2013 presented a vision for the development of Northern Australia in which northern Australia is once again defined as everything above the Tropic of Capricorn (Coalition 2013). A slew of recent reports targeting the policy audience mirror this (Regional Australia Institute [RAI] 2013, CSIRO 2013b, Dale 2013).

**Which ‘North’?**

As Taylor and Christian articulated, ‘Northern Australia’ is many places, not just in the contrasting perceptions but across the environment of its enormous expanse. Homogenising it into one undifferentiated space and entity contributes to the difficulty in sorting this ‘problem’ of northern development and settlement. Identification of environment or nature is defined through the describer’s own historic and socio-political lens/context, whether consciously or not, (Whitehead et al 2007). Inevitably, discussions of the north are referencing many different versions and even descriptions of the biophysical nature of northern Australia are circumscribed in this way.

In this thesis I am dealing with multiple ‘Norths’. The first and largest is the most commonly used through time, all that lies above the Tropic of Capricorn, and, as shown above, this is the default boundary used by much of the literature and public commentary I draw upon.

The next North is the Wet-Dry Tropics or Tropical Savannas of Northern Australia, a more internally consistent and recent definition as shown and described above, yet still an area of more than 1.5million square kilometres (Woinarski et al 2007). This version
excludes the only area of northern Australia where broad-acre cropping has been successful, north-eastern Queensland, which in contrast to the Wet-Dry tropics has a rainfall relatively evenly distributed through the year (Jones and Bowler 1980). This distinction has been identified for many years. According to Christian:

...the cropping areas of northern Australia can be divided into two main regions: the east coast of Queensland and its accessible hinterland, and the more isolated far north and north-western part of the continent. (1977:15)

Third is the Timor Sea Drainage Division, a region within the Wet-Dry Tropics of approximately 564,600 square kilometres (CSIRO 2009b), which is itself still a huge and diverse area. The four largest river systems within this Division - the Fitzroy, Ord, Victoria, and Daly (moving from west to east) - are the locations of the largest failed cropping attempts in the north and the stories and histories of cropping attempts in the following chapters are all located within this Division.

![Timor Sea Drainage Basin Northern Australia](image)

*Figure 11. The Timor Sea Drainage Basin.*

The Timor Sea Drainage Division is biophysically distinct from the Gulf of Carpentaria and includes two jurisdictions, Western Australia and the Northern Territory. Christian bluntly states that success has mainly occurred in north east Queensland which has advantages that the rest lacks, including transport systems and access to a home market.

The dry monsoonal climate of northern Australia is very different from any other part of Australia and poses distinctive problems (1977:22).

In an Agro-ecological analysis of Australia this area approximately correlates with what was identified as the “Wet/dry North West Tropics” (Williams et al 2002), also catching
the north east section of the “Semi-arid Tropical and sub-tropical plains”. The report identifies extensive beef cattle grazing as the dominant use with limited dryland cropping in the Douglas Daly area and intensive irrigated cropping and horticulture “of growing importance on the Ord, Katherine and Daly Rivers” (Williams et al 2002:14).

What is the North?

The tension between history, culture and identity on the one hand, and geography on the other, was always most apparent in North Australia. It was there that geography threatened to engulf history...The Arafura Sea and Torres Strait were bridges for, rather than barriers to, the dissemination of flora and fauna and the movement of people. (Reynolds 2003:viii)

The Wet-Dry Tropics was sculpted by fire and water, culture and law; all else was shaped by them - soil, flora and fauna. Indigenous Australians wielded the fire, and the water ruled itself. Indigenous fire management produced diverse habitats and abundant foods while also fulfilling social and religious needs (Yibarbuk 2001). Fire in the north is less intense while far more frequent and extensive than in southern Australia. It has occurred for at least 180,000 years excepting through unusually wet climatic times, and was probably lightning lit (Kershaw 1985). With the arrival of Aborigines at least 50,000 years ago (Smith 2013) frequency increased dramatically, altering vegetation, and thereby the fauna that relies upon it (Ridpath and Corbett 1985) though the extent of this change is still contested. Aboriginal burning practices varied greatly according to the vegetation association – from protecting areas with firebreaks or light early dry season burns through to regular burning throughout the year (Ridpath and Corbett 1985, Standley 2014). Fire management has, in the main, been lost through colonisation – fire now rules itself – although over the last twenty years the use of fire management as a tool to look after country has been increasingly applied again.

Much of the north is old, very old. It is flat and infertile (Wilson et al 2009). With a relatively uneventful geological history there has been little in the way of soil and mountain creation (i.e. volcanic and glacial activity) so the landscape is very flat and complex patterns of weathered infertile soils have developed over these long geological timeframes (Story et al 2008b). In this flat landscape three sandstone escarpments create
dramatic contrast. The Kimberley, Arnhem Land plateau and the ranges of Cape York Peninsula are separated by Cretaceous sea floors such as the clay pans of the Gulf region (Bowman et al 2010).

Soils of the semi-arid tropics are not generally suited to agricultural development due to several characteristics. They possess low water holding capacities and poor structural stability (Motha and Dilshad 1997); they have poor infiltration and a very poor capacity to store water (Ridpath 1985); and they have problems with surface sealing under conventional cultivation (Williams et al 1985). As a scientist working in the north for many decades expressed the situation, “It’s an old continent and the soils are not that flash” (Conversation 13). Strongly seasonal, high energy rainfall can cause extreme soil and nutrient losses (Motha and Dilshad 1997). As a result the risk of soil erosion is considered to be considerably higher in the north of Australia than the south, increasing as protective groundcover decreases (Lynch and Hill 2007). Even where suitable pockets of soil occur land degradation is a hurdle (Motha and Dilshad 1997). Land management practices are therefore critical.

As rates of soil formation are well below rates of soil loss in many environments of the north the landscape is “inherently fragile” (Wilson et al 2009:4). Small soil disturbances can be aggravated by extreme and variable climatic events such as cyclones or long dry seasons thereby triggering major erosion on relatively low slopes, or large areas of scalded land with low permeability soils (Wilson et al 2009). The parlous state of the Ord River catchment with extensive soil erosion from inappropriate grazing management was documented well before the development of Lake Argyle (The West Australian 18 September 1945) and then more recently due to concerns of siltation of the dam (Aldrick et al 1978, Payne et al 2004). In fact a catchment stabilisation program was undertaken upstream (Aldrick et al 1978). Soil erosion in the Douglas-Daly, Northern Territory is also discussed as a factor impacting upon farming productivity in later chapters.

Although the first formal land resource survey was undertaken about 70 years ago CSIRO’s General Report on Survey of the Katherine-Darwin Region, 1946 (of which my grandfather, C.S. Christian was a part) little new land resource data collection or mapping has been undertaken across the north except for site or project specific investigations such as the ORIA (Wilson et al 2009). From CSIRO’s 2009 Northern
Australia Land and Water Science Review, it is clear that much of what has been done is at a very broad-scale covering large areas with little detailed investigation (Wilson et al 2009).

The climate is distinctly different from the rest of Australia. Its bipolar seasonality, a ‘wet’ and a ‘dry’, literally take the country from flood to drought every year (though some years miss the much needed flood). As an old-hand described it is not just a wet/dry but a “dry dry and wet wet” (Conversation 13).

Yet it is no simple monsoon, not as straightforward as swinging between the two poles of wet and dry, as variability of rainfall within seasons is also extreme. In the language of climate science the “prevalence of cyclonic depressions” creates high inter-annual variability in rainfall (Story et al 2008:2) with dry or wet spells occurring in the core of the season (Mollah et al 1991). Climate analysis this century has shown that the beginning, end and strength of the monsoon are influenced by five modes - the El Nino-Southern Oscillation (ENSO) mode, the seasonal cycle, the ENSO transition mode, and the two Madden-Julian oscillation (MJO) modes (Kim et al 2006). The contribution of each of these is “geographically complex and varies significantly throughout the monsoon period” (Kim et al 2006:1). About thirteen cyclones form each cyclone season, predominantly in north-east Queensland and north-west Western Australia (BITRE 2009). Finally, it is a hot climate, from a southerner’s perspective always hot (many pers. comm.), and from a scientist’s perspective “permanently high temperatures” (Ridpath 1985).

While settler Australia identifies a dichotomous wet/dry season Indigenous northerners identify a detailed range of seasons which differ across the north and by language groups. Indigenous calendars are far more complex and are determined by biological indicators, thereby responding to what is happening in the environment, not an externally imposed date. For example in Bininj country in Kakadu National Park, east of Darwin, there are 6 seasons, one of them being Kunumeleng when the first storms of the monsoon arrive (Russell-Smith et al 2009:95).

Although on average the Timor Sea Drainage Basin receives 504,000GL of rain annually, about 1000 Syd Harbs (Sydney Harbours), variability is high and in the driest year on record it received only half the mean while in the wettest year it received double (CSIRO 2009b). When the rain comes 95% falls between November and April.
Although northern tropical climatological research has focused on the monsoon itself the rainfall periods at the beginning and end of the monsoon "extra-monsoon rainfall events" are also critical both to the environment and to cropping. In fact the pattern of timing of rain may be more important to the nature of the ecology of the region than the amount (Cook and Heerdegen 2001).

This pendulum of seasonality also drives the rivers, the majority of which are ephemeral. Those that are perennial rely upon groundwater systems with unique natural ecosystems dependent upon these groundwater fed systems. And despite some of the highest rainfall intensities in the world the potential evaporation is also extremely high (Story et al 2008b). On average potential evapotranspiration is greater than rainfall for ten months of the year (CSIRO 2009b).

This dramatic annual swing in water availability defines the fauna of the tropical north which develop different mechanisms to survive and reproduce such as moving to moist refuges and/or opportunistic breeding cycles (Ridpath and Corbett 1985). Flora and fauna have adapted to the annual drought in a multitude of ways (Ridpath 1985). Although dominated by savanna woodlands northern Australia supports a significant diversity of habitats and vegetation types, including rainforest, heath and shrublands, mangrove, salt-marsh flats and freshwater (Woinarski et al 2007).

As described by Ridpath et al tropical semi-arid ecosystems are "dynamic, rich in species, and much less predictable and patchier than temperate equivalents...Herbivorous insects play a major role" (Ridpath et al 1985:419). Although the broad vegetation structure resembles that of climatically similar regions in Africa, India and South America some plant species are very restricted and rare, found only in small areas of the north. For example the Kimberley has 2000 native plant species, 300 of which are endemic (Woinarski et al 2007).

Despite being the largest contiguous area of tropical savanna left in the world, and relatively intact, northern Australia's environment is not in a healthy status quo. There has been an influx of a wide variety of weeds and feral animals: from the high fuel load gamba grass to the wetland colonising Mimosa pigra, from the poisonous cane toad to the destructive buffalos and donkeys (West 2008, State of the Environment Committee [SOE] 2011, Territory Natural Resource Management [TNRM] 2011). Some of these were introduced for agriculture. Mammal decline in particular has been well-
documented by scientists (Woinarski et al 2007, Fitzsimons et al 2010, SOE 2011) and by Traditional Owners, and is still occurring, as is the decline in the abundance and distribution of grass-seed eating birds (Franklin et al 2005). Decline of other fauna such as large reptiles has also been documented (Letnic et al 2008, Doody et al 2009). Why this is happening is debated (and a thesis in itself). With colonisation the broad-scale change in land management from traditional Indigenous methods, particularly changed fire management, must be a fundamental part of the complex answer. The influx of feral animals is another, with feral cats often highlighted, however this is not a consensus view. Extensive pastoralism is another potential factor and disease may also play a role, however little is known (SOE 2011). Understanding the complexity of the environmental systems of the north is a major challenge for our existing research paradigms and methods; let alone the factors that threaten these systems and the relationships between these factors.

What of climate change? Simplistically described annual rainfall is likely to increase in some parts of the Kimberley, Mackay, far nth Qld and Darwin regions whereas decrease elsewhere. There will be an increase in average temperatures throughout the year, more so inland (BITRE 2009).

The growing body of ‘Western’ information and knowledge regarding the characteristics of northern Australia and how it influences human activities has been slowly acquired and there is still much not understood. Some information has been available and has been promoted by certain public figures, but not acknowledged by others; Griffith Taylor is the most infamous example. Chapter 11 explores the role of learning, forgetting and ignorance in the Circular Conundrum.

**Whose North?**

*Instead of a shift from a White Australia to a multicultural one, we find in the northern half shifts from a predominantly Indigenous to a predominantly poly-ethnic society in the 1890s, and from poly-ethnic to predominantly white townships resulting from World War II, with a later reclaiming of Indigenous spaces beginning in the 1980s. (Ganter 2005:60)*

The multi-cultural north has always been a mystery, and sometimes a threat, to the southern portion of the continent (see Chapter 4 ‘Making it white’ for more on this). As
Ganter elucidates early economic growth in the north was driven by “pearling and trepanging, pastoralism, and gold mining” all of which relied upon non-white workers (2005:55).

Land use in northern Australia is still dominated by pastoralism, at 57.4% (BITRE 2009); "an anomalous settlement zone where the dominant land use of extensive livestock grazing yields gross outputs well below comparable climatic zones in other continents.” (Holmes and Mollah 1987:54) It has a sparse population given the enormity of the area. With a population of about 1.2 million people (Regional Australia Institute 2013) this area of three million square kilometres, or about 45% of Australia’s land mass, contains only 4.8% of Australia’s total population (BITRE 2011). The majority of these live in northern Queensland and the wet tropics so the Wet-Dry Tropics and particularly the Timor Sea Drainage Basin, the focus of my study, contain a much smaller proportion. The Northern Territory holds the 2nd largest population of northern Australia, 1% of Australia’s total, while the Pilbara and Kimberley combined only have 0.4%. (BITRE 2011) Due to the boundaries used to collect these statistics, determining the exact number for the North West is impossible. An approximate aggregation (of the Kimberley, Darwin-East Arnhem, and Katherine-Lower Top End regions) shows that in these combined regions, approximating the Timor Sea Drainage Basin, only 0.97% of Australia’s population reside. The vast majority of northern Australia is classified “very remote” (BITRE 2009).

In comparison to the rest of Australia the north is also not highly urbanised; about half live in cities and towns (BITRE 2011); of the four cities in northern Australia with populations over 50,000, three are in Queensland (Townsville, Cairns and Mackay) and only Darwin is in the North West (with 124 760 residents) (BITRE 2011). Of the population above the Tropic 14.3% are Indigenous as compared to 2.3% nationally (BITRE 2009).

Governments of northern Australia are centralised in Darwin, Perth, Brisbane and Canberra (and 100 years ago in Adelaide), creating fragmented governance across the north (Dale 2013) and also a removed approach as all bar Darwin are thousands of kilometres away from the far north of their jurisdictions. Regular attempts have been made to establish a cooperative structure across the north, even to create a northern jurisdiction; most have been forgotten, many are regularly reinvented as listed in
Chapter 5. Dale identifies several different and distinct “domains of Indigenous governance” in northern Australia such as Indigenous local governments in the Northern Territory, Indigenous not-for-profits delivering services such as health and housing, and traditional owner governance systems expressed through “the cultural institutions (families, clans and tribal groups)” (Dale 2013:13).

Looking above the Tropic of Capricorn the proportions of Indigenous and leasehold land are much higher than southern Australia. Of the 75.4% of Crown-owned land two thirds are pastoral leasehold. 18.5% is Indigenous land and only 6.1% is privately owned (CSIRO 2013b). Of the Northern Territory about 50% is Aboriginal owned through the Aboriginal Land Rights (Northern Territory) Act 1976 while 30% of Western Australia’s Kimberley region has been successfully claimed through the Native Title Act (Armstrong et al n.d.). Tenure systems of Northern Australian are “complex and unique in the national context” with “multiple and often overlapping tenure types for the same area of land”. There is variation in arrangements between the three jurisdictions of Northern Australia with each under review. New types of tenure are emerging in relation to water, carbon and biodiversity (CSIRO 2013b).

Regions of northern Australia remain some of the most socio-economically disadvantaged in Australia, and therefore their Indigenous inhabitants with them (BITRE 2009). Characteristics of the north such as the sparse population, poor infrastructure, huge distances, and extreme and variable climate create challenges for service delivery for those outside the few urban centres, and impact particularly upon Indigenous inhabitants (TNRM 2011). In an analysis of Indigenous socio-economic outcomes by Indigenous regions the Northern Territory and the Kimberley (excepting the centres of Darwin, Alice Springs and Broome) remained in the lowest of Australia in 2006, with no shift from 1991. A remote/non-remote disparity exists – and remains (Biddle 2009). This global trend of ‘bifurcated societies’ with development focused on urban centres is played out in northern Australia and reflected in stark “haves and have-nots” between the north and the rest of Australia, and within the north itself (Taylor et al 2011). According to Gary Gray, Parliamentary Secretary for Regional Development and Northern Australia from 2007 to 2013, this means that bridging the gap in living conditions and opportunities between Indigenous and non-Indigenous Australians is “of greater importance to northern Australia” (2009:2).
Yet the north still represents “Opportunity, freedom, still clean, not set in ways”. An Ord farmer describes that “No-one blinks when you do things out of the ordinary”. For others, particularly those who had moved to northern Australia or based their careers there, it seems to be a “proving ground” for themselves or for others (Conversations 25, 13, 2).

**Constant Colonising**

Contrary to popular opinion...northern Australia is not some region to which the first wave of the European colonial sea has only just reached to exploit it. Concerted settlements in and near Arnhem Land ever since the early 1820s, earlier in fact than any settlement in Victoria, South Australia or Western Australia... (Jones and Bowler 1980:25)

Understanding the role of colonisation, and the transformation of landscape through colonisation, is fundamental to understanding northern Australia. It continues to affect postcolonial land use through “conceptual landscape transformations (Ideological, discursive, symbolic, and so on)” (Sluyter 2002:4) despite the decrease of European sovereign power. The scope of this thesis restricts a deep analysis of the colonial and post-colonial literature however it does require some understanding of the context that impacts so significantly upon the topic at hand and which informs characteristics and perceptions of the northern ‘Frontier’. To explore the concept of frontier in Australia it is necessary to refer to the more famous but different American frontier, and particularly American frontier historian, Frederick Jackson Turner (Turner 1893, Alexander 1947, Taylor 1949, Thompson and Lamar 1981). Rose explains that despite critiques of Turner’s work the 'landmark essay' on the American frontier is a useful starting point "because it focusses on the myths which give life to modern settler society." (1997:20)

In Australia and America both, in the nineteenth century, settlement was made meaningful against a grand narrative that is the foundational story of civilisation. The story is grounded in a sense of destiny that is fundamental to its power. (Rose 1997:23)

Pretty, also referring to Turner’s work despite it being now shown to be wrong and racist, “rightly indicated that the frontier repeated itself” (Pretty 2002:22). “No longer will Northern Australia be seen as the last frontier: it is in fact, the next frontier”
(Liberal Party of Australia 2013). Unlike in the US the frontier in Australia is still not closed (Griffiths 1997).

The ‘circular conundrum’, expressed in ongoing and unsuccessful attempts to establish cropping in north-western Australia is accompanied by, even reliant upon, a set of beliefs that together create the ‘Frontier’. These are also illustrated clearly in Chapter 4 on the drivers of the ‘Circular Conundrum’: the ‘empty’ north (Blaut 1993), the frontier as historical tabula rasa or Year Zero (Rose 2004, Robin 2007), the inevitability of a ‘westernised’ development trajectory (Sluyter 2002), and the ignoring of Indigenous knowledge with the imposition of ideas from elsewhere (Sluyter 2002, Pretty 2002, Cronon 1987). These beliefs are not an Australian anomaly rather they are an expression of colonisation.1

The first of these beliefs is the ‘empty’ north, a persistent characterisation (NAWSA 1922, Upton 1938, The Sydney Morning Herald 20 June 1950, Government of Western Australia 1964, Day 2005). In challenging uncritical belief in “Eurocentric diffusionism” geographer J.M. Blaut presents the "myth of emptiness" which he explains "has particular connection to settler colonialism" (1993:15). According to Blaut this myth is based upon a number of claims used to justify colonisation, each one certainly echoed in Australia: the region is nearly empty of people, it is empty of a settled population and nomadic peoples have no sovereign claim, and the culture of the region has no private property. Australia’s ‘Terra Nullius’ is of course the ultimate expression of this “myth of emptiness”, the British legal principle allowing ‘unowned’ land to be claimed. The justifications are those articulated by Blaut writ large. Day explores these same justifications in his 2005 book Claiming a Continent.16 As articulated by Deborah Bird Rose "Frontier mythology depends upon the creation of a vast emptiness in which the new nation forms itself" (1997:22) and "...cities and hamlets will fill in what is currently 'empty' space, commerce will fill in what is currently 'unused' wealth" (1997:29).

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1 For further discussion on commonalities and differences between New World frontiers see Griffiths and Robin 1997.
16 The “Empty” North is explored as it relates to drivers for northern development in Chapter 4.
The second belief of the ‘Frontier’ that sits alongside the denial of a local Indigenous population is the denial of history. The frontier is a blank slate – over and over again. Based upon her learning with the Yarralin people of the Victoria River District (in the north-west of the Northern Territory) Deborah Bird Rose labels this phenomenon “The Year Zero” (Rose 2004). It is a belief that disregards anyone who has come before and which disconnects us from time and place (Plumwood 2007). Referring to a famous quote of Stokes navigating the Victoria River, NT, in 1839 and envisioning Christian hamlets thriving along the shore, Rose explains that through positioning the country as “newly found” Stokes (and others) present the country and people as without history. The Year Zero is for Rose a “disjunctive moment” when history is about to begin (1997:29). It is stretched across space and through time “it has been held constant through 100 years of conquest, waiting, so to speak, for the rest of the story to happen” (Rose 1997:29). In northern Australia perhaps this ‘Frontier’ repetition is illustrated through the ‘circular conundrum’ of this thesis.

Third in the set of beliefs is the inevitability of westernised development. According to Sluyter this assumption is of the inevitable progress of Westernization through a
sequence of stages that lead to “naturally dominant, western landscapes” and see “colonisation as natural progression” (Sluyter 2002:6). This continuing assumption of the West’s advancement in contrast to the non-West results in a response to the challenges of poverty and environmental degradation which is the “continued diffusion of institutional, technological, and intellectual innovations” from the west to the rest (Sluyter 2002:5). In his analysis of Turner’s frontier writings environmental historian William Cronon explains the appeal of Turner’s work (no matter how much it is now critiqued) was that it organised American history geographically and temporally, giving it a plot that was one with direction and progression “the grand sequence of civilized ascent” (Cronon 1987: 167). Turner established a story. Cronon explains that the attraction and success of Turner’s frontier thesis was that it “set American space in motion and gave it a plot” (Cronon 1987:166). Rose explains that this sense of destiny provides the frontier’s power, both in America and Australia:

...emptiness and inevitability are closely related, so that the emptiness or openness beckons the settler, and the land itself can be thought to call out for civilised peoples (Rose 1997:23).

Our desire for a story arc and the order and resolution it brings is strong, so the frontier story is a familiar progression that we long to apply to Northern Australia. Yet it denies us. The north has confounded this belief and denied us the symmetry and resolution of the frontier story; it has not been westernised, nor developed or populated in the western sense. This undermines a deep and unspoken belief of Australia’s dominant culture: the inevitability of development and progress: “For the whole point of the frontier is to vanish” (Cronon 1987:167).

The contradictory response criticising this push for development can also fall into the colonisers’ trap, romanticising the pre-colonial landscape as an “unspoiled wilderness” (Sluyter 2002:6), the American brother of the concept of wasted unexploited resources. It is a view epitomised by the founder of the American Wilderness Society, Bob Marshall, who originally defined wilderness as having no permanent inhabitants (Giblett 2011). As Sluyter explains, both views “reaffirm the western myth of emptiness” which wrongly generalises landscapes prior to colonisation as having low populations and unproductive land-uses (Sluyter 2002:6). This second perspective, of pre-colonial landscape as wilderness, was vehemently critiqued in Australia in the 1990s by Indigenous academic Marcia Langton, particularly as it applied to Australia
(Langton 1996). Others have shown how Indigenous Australians have shaped the continent over the last 50 thousand years (Rose 2004, Gammage 2012). As a result since the 1990s there has been a shift away from the wilderness belief in Australia with Environment organisations engaging with Indigenous Australia and moving towards an understanding of Australia as a cultural landscape. Understanding has improved, “We know now that the wildernesses are not pristine and untouched by humans.” (Pretty 2007:140)

Constant colonising is not a thing of the past (Head 2000b). In 1971 the main Ord dam was built, creating Lake Argyle and flooding 3,000 square kilometres of country - Bilbigi country, grasshopper dreaming. No thought was given to the impact upon local Aboriginal people nor was any attempt at consultation made.

A Traditional Owner born on Old Argyle Station, her father’s country, describes coming home from school in Perth for Christmas holidays. “When I came back the country was gone! I couldn’t believe it. We grew up there – it was our birthright place. And all the old people had gone.” (Conversation 26) Her younger sister recalls checking the river crossing almost every day with the station manager’s daughter looking at the water gleaming on the black soil plains as the water slowly backed up towards them. With her mother they were the last two Aboriginals to leave, stopping at the crossing to look back: “It was so sad for me to leave Argyle Station”. “It’s underwater now”. No attempt was made to record let alone preserve Indigenous cultural heritage, “The old people are buried out there”, yet the Durack homestead was relocated. A government employee describes a boat trip out on the enormous lake with the women and how they could pinpoint locations deep under the water. He had goose bumps. (Conversation 5)

Yet in the case of north-western Australia the battle is not won. Although the law may now recognise Aboriginal land rights, the public and political discourse still does not. For example although Patrick Dodson and Peter Yu refer to a specific piece of government writing (not quite policy) in their ‘Report from the Chairs’ contained in a

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17 Internationally similar efforts have been underway with work in the Americas demonstrating that precolonial landscapes were “profoundly modified rather than pristine wilderness/untrammelled resources” (Sluyter 2002:7).
recent North Australia Indigenous forum report, the concern is a more general one and
regularly raised by northern Indigenous leaders.

Governments’ approaches to development in northern Australia outlined in the
Australian Government’s Australia in the Asian Century White Paper (2012) raise
serious concerns. Indigenous Research and development agendas must underpin
shaping issues of such government policy agendas. It is crucial for governments to
meaningfully appreciate that north Australian Indigenous people are significant
investors in regional development. With recognised responsibilities for managing
over 40% of the land in the north and further vested interests in well over 80%.
(NAILSMA 2013a)

The fourth belief defining ‘Frontier’ behaviour is the imposition of knowledge from
elsewhere “... people test out existing ideas on a new environment... They also, of
course, imposed a new landscape on the old...One set of ideas about a landscape were
replaced with another.” (Pretty 2002:21) One set of values about land are imposed upon
another. Rose describes this as “a narrative structure of disjunctive change” (Rose
1997:23). Interestingly in northern Australia the trajectory of change of the frontier
stalled with pastoralism. The values and intent for intensive agriculture is occasionally
imposed but not large-scale cropping.

One of the fascinating aspects of the discourse around the unlimited potential for
agriculture in the north is how it appears to ignore history and all that history shows us.
In his work ‘Mythologies’ Barthes discusses the “The Privation of History” explaining
how myth “deprives the object of which it speaks all History. In it, history evaporates. It
is a kind of ideal servant...” (Barthes 2000:151). This has an interesting bearing on my
exploration of how the northern myth and related frontier myth persist regardless of the
experience and history unfolding around them. As if, at each moment, we are above and
beyond history and the constraints it may indicate. The myth is perpetuated by
proponents turning their backs to history.
Chapter 3: Davidson’s Idea of North - Economic and Political Perspectives on “The Northern Myth”

Myths are not lies. Nor are they detached stories. They are imaginative patterns, networks of powerful symbols that suggest particular ways of interpreting the world. They shape its meaning.” (Midgley 2004:1)

In 1965 a book challenged the prevailing and enduring idea of the potential for agricultural development in northern Australia: Bruce Davidson’s *The Northern Myth - A Study of the Physical and Economic Limits to Agricultural and Pastoral Development in Tropical Australia*. It came after over one hundred years of western agriculture, research and investment in the north and has been followed by another forty five years. My grandfather’s annotated copy of this book epitomises to me the ‘circular conundrum’ of northern Australia, the regular cycle of publically expressed expectation for broad-acre cropping in northern Australia and the consistent failure for this to occur at the scale envisaged.

Davidson’s catchcry “The Northern Myth” is now well-established in the discourse of agricultural development in the north\(^{18}\). Those who speak against agricultural potential use the term as short-hand for failure and delusion, or as a starting point to re-iterate the case (Greiner and Johnson 2000, Woinarski and Dawson 2002); those who work to develop agriculture raise it defensively as an example of dismissiveness and negativity. Several of my participants viewed me suspiciously when they suspected that I was simplistically applying Davidson’s perspective in my PhD (Conversations 12 and 22).

What is this northern myth that Bruce Davidson claims to expose? Is agricultural potential in northern Australia as unsubstantiated as he suggests?

In spite of the published evidence available the Australian public have been left with the impression that agriculture would be profitable in the Australian tropics. ... This book shows that most forms of agricultural development north of the tropic would be uneconomic. ... What is in fact a myth has become the truth to a large section of the Australian people... Any agricultural product which can be produced north of the tropic can be produced far more cheaply south of it. (Davidson 1965 Preface)

So Davidson was a spoiler. He took southern dreams of the north and named them as myth, not myth as heroic aspiration, but myth as error and mistake: myth as self-delusion. It must have taken courage (or perversity) or perhaps economic ‘evidence’ to stand up to the persistent claims of unlimited agricultural potential of northern Australia, claims that had been appearing regularly for over one hundred years. At the time of writing Davidson was at the Institute of Agriculture of the University of Western Australia after working with CSIRO from 1960 to 1963, in fact as a member of Christian’s team in CSIRO’s Division of Land Research working on northern Australia (Batterham et al 1994). Batterham et al claim that Davidson resigned from CSIRO feeling he was being discouraged from publishing his research results.

The bulk of Davidson’s book comprises his economic unpicking of the stitches of the case for agricultural development. The title alone throws down the gauntlet, calculated to challenge the prevailing mood, culture and policy norm with a logical, economic approach to the question of northern development. While those who quote Davidson tend to use his preface or first chapter “Motives and objectives in Northern Australia”, a complete reading of the book presents a more complex picture of Davidson’s argument, motivation and character. It follows an arc from the big picture, the motives he identifies for agricultural development in the north, through to his detailed economic analysis of the prospects of agricultural production, through to his critique of research, particularly CSIRO’s approach. Towards the end he is revealing far more of his own grievances, losing some of his purported objectivity and acquiring an almost petulant tone.

**Motives for Agricultural Development According to Davidson**

In the first two pages of his first chapter *Motives and Objectives in Northern Australia*, Davidson identifies six motives he believes dominate “thoughts on northern Australia” listing them in descending order of importance. He then, almost condescendingly, goes on to counter them. How he arrives at these six is left to our imagination as he makes
no attempt to justify or reference the “motives”, perhaps seeing them as an accepted and public given.

1. Unless the north is occupied by Australians it will be occupied by our neighbours in southern and eastern Asia who have insufficient agricultural land.

2. It is essential to have a large population in the north to defend the area.

3. Valuable resources in the form of land, water and minerals which are close to large markets in Asia are being wasted.

4. Agricultural development is essential in northern Australia to supply the undernourished regions of the world, particularly Asia, with food.

5. Tropical crops could be produced in northern Australia as part of an import-saving campaign to preserve our balance of payments.

6. The north must be developed to raise the standard of living of the Aboriginal. (Davidson 1965:2)

Crudely summarised, the motives Davidson believes are used to justify agricultural development are population as deterrent and as defence (1&2), wasted resources, feeding the world, import-saving, and Indigenous development. Once his ‘straw men’ are presented Davidson addresses them, not systematically or individually, rather launching into a general eight-page discussion dominated by the issue of defence and security. He wanders between his arguments, revisiting those he feels strongly about while only touching upon others.

Davidson claims motive one, defence, to be the oldest, driving the first northern settlements by the British in the 1830s. This is not strictly the case, given the East India Company lobbied the British Government to establish those first settlements seeking access to markets and market routes; as discussed in Chapter 4. Davidson points out that nations now use means other than invasion to gain access to raw materials and to markets. Today in Australia these means are themselves the topic of some debate, though foreign ownership of land and companies are certainly not a new stick for the nationalist drum.

In response to the claim that unused agricultural land and opportunities provide enticement, Davidson makes several arguments. Given Asia has been aware of northern
Australia for many centuries and didn’t make an attempt to establish settlements why
would they now. In fact when the Japanese were offered the Northern Territory in 1876
to settle, they refused, and with regard to the 20th century Davidson claims “there is
even less evidence that it was unpopulated and undeveloped land in northern Australia
that the Japanese wished to acquire” (Davidson 1965:4). Further illustrating his point
Davidson says that there are plenty of other sparsely settled areas in Asia with
potentially arable land, comparing them in a table. He launches in to his own analysis of
national security and defence with only a single reference, and that on the Kokoda.
Davidson concludes this discussion reiterating that “a developed north might attract an
aggressor, while an undeveloped north would not” and, on the positive note, that in a
nuclear war or a conventional war development of northern Australia would have “no
effect on the outcome of the struggle” (Davidson 1965:7).

Venturing on to the motive of raising the standard of living for the Aboriginal
population of the north, and saying that this is the least discussed motive of them all,
Davidson proceeds to dismiss it within two paragraphs. He claims that part-time
employment in the pastoral industry has “probably retarded integration and raising of
living standards” (Davidson 1965:8) and that part-time labour in agriculture is unlikely
to improve matters. The basis on which he makes the former claims is unstated.
Highlighting that other existing opportunities such as the meat works and the Ord River
dam construction provided no Aboriginal employment, Davidson questions why
agriculture would be different, and would part-time labouring help anyway? He
suggests that encouragement to move south to the city might be a faster way to improve
people’s standard of living and opportunities for employment and education: an
agricultural economist venturing far from his field and into social policy.

What Davidson identifies as “motives” ebbed and flowed in the century prior to his
book, and continue into the next in some form. I take up Davidson’s “motives” again in

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19 There are alternative views to Davidson as to the Japanese intent at the time, some more alarmist
particularly given the amount of information the Japanese were collecting about Australia, though no
conclusive agreement (Oliver 2002).
20 Once again there are varying views as to the significance of any possible military threat to the north,
and the most appropriate method to counter it if it exists. It is still a live issue; even more so than the
general public may be aware, as discussed further in Chapter 4.
the next chapter as ‘drivers’. They are the starting point to identify ten drivers of the circular conundrum over time through a review of literature and public discourse.

Davidson grinds his (personal) economist’s axe

Davidson’s final chapter ‘Research and Development in Tropical Australia’ takes an unexpected turn when, writing at the time of peak investment in the Ord River Irrigation scheme, he sheets the blame home to agricultural research. Concluding that irrigated production of most crops in northern Australia would require large subsidies and “only radical changes in techniques or prices” would change this (1965:261), while only dry-land peanuts might possibly be grown at a large scale in the Northern Territory with a small subsidy. He challenges why such large investments are being made on irrigation in northern Australia and has received more attention than other forms of development. “Why, after twenty years of research in the tropics, is the worst form of development being chosen?” (1965:261). Davidson believes the blame lies with those in charge of research and development and their lack of awareness that “development is an economic process”. His last chapter presents this blow by blow. Davidson poses a series of questions that he believes research should answer.

1. Where are the markets for Australian tropical products and what price will they receive? (Decide on products first? Assumed prices.)

2. What yields of crops or livestock are likely to be obtained? (Part of procedure)

3. Which commodities could be produced at relatively low cost? (Given high labour costs) Why have sugar and rice been researched when they require large subsidies? (At what yields? Research first?)

4. Could any of the suggested products be produced more cheaply in some other region? Simple enquiries, as outlined above, would have limited research to an investigation of the possibilities of producing beef, peanuts and sugar on a large scale under dry-land conditions. [Possibly but not part of LRRS job]

5. Where could the selected commodities be produced? This could have been established by physical surveys, and experimental work would have indicated the yields which might be expected and cultural practices necessary to produce them. Where several areas were available, those where costs were likely to be lowest should have been selected. Such a choice involves not only an assessment of yields but also of the costs of the resources used.
6. Having established the yields, prices and methods of production, estimated profits could be easily calculated and the economics of any proposed development scheme clearly stated. [Propose research changes??]"

Figure 13. From my grandfather’s copy of Davidson’s book; his pencilled marginalia reproduced in italics alongside Davidson’s words.

Davidson then criticises the 20 years of northern survey and research work undertaken by CSIRO’s Division of Land Research and Regional Survey not undertaken according to his outline above, claiming that the first four steps have “virtually been ignored” and decrying that instead, “expensive surveys were carried out to establish the topography, soil type, vegetation and climate of large areas of tropical Australia”. Christian questions in pencil “How do we decide where to grow them?” Davidson then states that “no attempt was made to compare these with similar areas in other tropical countries, and thus the possibility of assessing probable yields was ignored.” And the pencilled response? “It was...” CSIRO had made comparisons with other Tropical areas and went on to do a lot more work in equivalent regions in Africa (Conversation 2) Davidson believes that CSIRO asked the wrong questions in the wrong order.

Christian’s annotations note Davidson’s denial of temporal change highlighting Davidson’s assumption that things will remain static whether consumption, prices, population, capacity, technology or availability of resources. It is interesting that an economist appears to not be taking trends into account. Acknowledging change and variability in factors relating to cropping, even just one area such as economics, is a crucial step to moving on to a more sophisticated understanding of the complex system within which cropping sits.

This apparent failure of R&D to take an economic approach creates stalemate, or chicken and egg. What is the point of determining prices when you don’t even know what the land capability is or what it is possible to grow? Davidson’s argument in his final chapter sounds like a tussle between disciplines, each questioning the other’s validity and right to advise on these matters: a disciplinary fight for primacy. Davidson hits statistical pay-dirt when he highlights the erroneous assumption made that farms would deliver the same yields as experiments (an ongoing issue for agricultural research); this work having begun in 1961 when he was employed by Land Research to
explore the relationship between experimental and farm yields. At this point Christian writes in the margin [Thanks to LRRS].

With his final chapter Davidson is sounding less like a courageous academic speaking out against the predominant view and more like an aggrieved, even blinkered economist and ex-employee with his own personal and professional axe to grind. Davidson asserts that the Division of Land Research considered economic aspects unimportant or the remit of another group once the land surveys and experiments were done. Christian’s handwritten response? [Why D & B were appointed]. Davidson’s initial work on the north was done as an employee of the Land Research group that he claims has marginalised economics and which has approached research of cropping in the north in entirely the wrong way. It is perplexing that Davidson blames R&D for what he sees as inappropriate development in the Ord region. Many factors are at play in such decisions, particularly political imperatives, as shown in the work of Graham-Taylor (1975) and discussed in detail in the next section of the chapter. Was CSIRO’s power in the decision making greater than it seems from documentation, or was it used as post hoc justification for essentially political decisions?

Despite Davidson’s criticism that there was no consideration of economic factors, as early as 1946 there was clear acknowledgement. Christian and Stewart explain that although “climatic and soil conditions are the main factors in determining type and limitations of agricultural and pastoral production” and can be modified to an extent, any modification to the environment “represents financial expenditure” and therefore “must be considered in the light of economics” (Christian and Stewart 1953:24). Five years before Davidson’s book the Forster Committees report of 1960 into Agricultural Prospects for the NT recommended that “The economic aspects of production of these crops should also receive attention before the crops could provide a basis for land settlement” (1960:6).

The most obvious dissonance in Davidson’s own critique of CSIRO’s research is that he, an economist, was in fact employed by them to contribute to the work of the Land Research Division. This complaint of a lack of economic approach raises a fundamental issue, although perhaps unintentionally, of the nature of research and the need for a multi-disciplinary approach to complex and applied questions or challenges.
Even accepting Davidson’s criticism of underdone economics, land use system surveys were ahead of their time in bringing together a number of disciplines in the survey and analysis process, though all from the biophysical sciences. By bringing in Davidson and a fellow economist Land Research had been reaching even further. It is a significant milestone in the move towards multi-disciplinary, systems, and then complex systems approaches to research – still a challenge we have not fully embraced.

Davidson and Economics in Battle – the Ord River Dam Decision

_The Ord' is an irrigation scheme on paper but on the spot it amounts to a religion. You believe in it or you do not. If you are of the faith, you believe with passion and proselytise with fervour. If you are an infidel, you had best keep away. This is of course widely adopted by a man regarded more or less as anti-Christ, the economist Dr. Bruce Davidson... With a passion almost equal to that of the believers, Dr Davidson disbelieves in the potentialities of the Ord, and has written a book full of statistics to support his views._ (Huxley 1967:239)

_The Northern Myth_ was not Davidson’s first foray into the northern Australia cropping debate. It was the culmination of a period of work, including a 1963 paper on the Ord, and a calculated follow-up fuelling an ongoing public and backroom debate about the development of the Ord River Irrigation Area. In spite of the impression he gives in _The Northern Myth_ his was not a lone economic voice in a wilderness of agronomists; others were also engaged on this topic. In fact the debate was intensely alive before its publication, which we can now see in context rather than as a stand-alone anomaly. This period illustrates the intensity and politicisation of the broader Northern Australia development discourse, and the pressure on and within governments to invest public funds in infrastructure for agricultural development.

Investing in the damming of the Ord River was an exceedingly charged topic well before Davidson’s book. Throughout the 1960s the Western Australian Government was making a case for and seeking funding from the Commonwealth Government to fund the main Ord dam, a tumultuous debate both in public and behind the doors of power, however the Federal Government did not make a decision until November 1967.
One prominent voice questioning the wisdom of irrigation investment was then Professor of Agricultural Economics at the University of Sydney, Keith Campbell, who saw “too much romanticism” and “too few objective facts” in the discussion on irrigation development (Campbell 1964:9). Incongruously this blunt speech was given at a symposium in Leeton, the heart of irrigation country. Campbell provides a view typical of an academic who believes in the pre-eminence of their own disciplinary expertise, certainly consistent with Davidson’s, stating that development decisions need to be made mainly on the grounds of economic and social factors “rather than technical, agronomic or engineering considerations.”

In a speech given a year before publication of Davidson’s book Campbell expounded that these decisions are not about whether crops grow well in particular areas or the location of dam sites:

> It is rather a question of whether there are markets to absorb the crops to be produced, and the costs which must be incurred to produce these crops. It also involves broader questions such as whether in the interests of national welfare money should be invested in irrigation development rather than in other forms of national development. (Campbell 1964:9)

It is an emphatic claim for the dominance of economic considerations in governments’ development decisions. It reveals that the believers/naysayers debate around northern agricultural development contained other tensions; about the role of different professions and disciplines in informing the debate (a struggle for agency and access) and about the types of information and forms of knowledge that should be used.

Davidson was not always in agreement with other economists. Several studies were being undertaken to inform the Commonwealth Government’s decision whether to fund construction of the Ord River dam: one by the Commonwealth’s Bureau of Agricultural Economics, a cost-benefit analysis; a second by the University of Western Australia’s Economics and Commerce faculty – an analysis of the secondary benefits of the scheme; and a third by the Northern Division of the Department of National Development – an economic justification for the project. Indeed reading the responses and counter-responses of those for and against government investment is like watching a fast and vicious game of tennis, except the match continues over years. Journal articles were published, critiquing articles then written, rejoinders published, and so on.
The origins of the public match seemed to start in 1962 when the Commonwealth’s Bureau of Agricultural Economics (BAE) was approached by the WA Government to undertake some work related to the proposed Ord development. With negotiations this work grew into a cost-benefit analysis of the Ord development and included in WA’s 1964 submission to the Commonwealth for financial assistance to complete the Ord irrigation Project. The report was provided to WA agencies without being made publically available and was the subject itself of a WA Public Works Department report. (Graham-Taylor 1978) Caveats in the report included a lack of data and the calculations were based on cotton monoculture; it should be seen as preliminary.

The backroom negotiations on the projected cotton yields to be used in the study show the multiplicity of variables, high uncertainty, and therefore many assumptions of any such work. For example the projected cotton yields by the WA department of Agriculture were more optimistic than those of CSIRO (which BAE had called upon) and CSIRO’s were more optimistic than Davidson’s. The study’s calculations were for a 100 year life of the project. Even moderate differences compound over such a time span; uncertainty of the figures surely does too.

This difference between experimental yields and commercial farm yields is an example of the importance of just one assumption in projecting future production, and therefore the conclusion as to whether agricultural development is economically viable. Davidson’s work published in 1962 while working for CSIRO’s Division of Land Research and Regional Survey, concluded “it would seem unwise to assume that commercial crops will produce more than two-thirds of the mean yield of experiments...” (Davidson 1962:459) Davidson posited that this was due to the scaling up in farms reducing the opportunity to optimise management and timing, and variability in managerial skill. In 1965 he published again in Nature on the differences between variety yields under experimental and farm conditions (Davidson 1965b).

In 1963, while a lecturer in Agricultural Economics at the Institute of Agriculture, University of Western Australia, Davidson spoke out publically against sugar as a crop for the Ord with fellow Institute member Roger Gregory Mauldron, publishing their view in the West Australian (25 December 1963). They believed that the price was artificially high due to a temporary world shortage bringing into question whether it would be profitable in the long term (Graham-Taylor 1978). The Institute’s comments
contrasted with their own university's Faculty of Economics and Commerce who were working on the WA Government's case to the Commonwealth for funding. Charles Court, then Western Australian Minister for the North West, responded in the newspaper only three days later claiming that "there was a group conducting a crusade against the development of the north" (quoted in Graham-Taylor 1978:248). Despite this public posturing Court himself was privately doubtful about the potential for sugar and the Ord's capacity to compete with the industry elsewhere (Graham-Taylor 1978). There was also tension with Queensland, Australia's sugar producing State, which was not keen on a competitor. (This example of inter-State competition is discussed in Chapter 6 'Sweet Savannah'.)

Davidson's next public swipe at the Ord was over cotton. Late in 1964 he published in _The Australian_ figures stating that taxpayers had subsidised the first cotton crop on the Ord21 to the tune of 55 thousand pounds, or £2,600 for every farmer and farm worker employed. The response to Davidson became more personal. At the inaugural meeting of the North West Planning Authority in January 1965, Patterson, then Director of the Northern Division of the Commonwealth Department of National Development, claimed that Davidson "had an axe to grind" (quoted in Graham-Taylor 1978:258).

With the publication of _The Northern Myth_ later that year, Davidson extended his critique from the Ord scheme to northern Australia. The gauntlet was again thrown down. The politics intensified. Supporters of the scheme could see no reason for Menzies not to approve financial assistance, and, after all, there was a new division of the Department of National Development, the Northern Development Division. Yet Menzies delayed.

Patterson then presented _The economic justification for the Ord Irrigation Project_ (one of the three studies listed earlier) at the 38th Congress for ANZAAS. He estimates that by that time approximately £1 million had been spent on "agricultural and engineering research and investigation" (Patterson 1965:1). Patterson concludes that the Ord Irrigation project is "a sound financial proposition" and that the additional investment required of £20-24 million to build the second dam and finalise the project "is justified

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21 Irrigated at that stage from the small diversion dam.
on financial grounds based on cotton production only, or on sorghum grown supplementary to cotton” (Patterson 1965:60).

It is an unusual paper in that, rather than simply describing the methodology and results of the analysis, Patterson commits some time and intellectual effort on broader yet topical philosophical and policy issues. Articulating in particular the basis upon which decisions should be made for public investment, the purpose of which he describes as being to “provide the greatest possible net benefit to society” (1965:3). Patterson distinguishes a financial analysis from an economic one, referencing a number of international economists to establish this, and explaining that government considerations must be much wider than those of private enterprise and intangibles should be considered in project evaluation:

The responsibility for evaluating such intangibles rests with Government. It is a political judgement and no economist has the right to make this judgement on behalf of society. (1965:5)

Patterson justifies labouring the point to clarify that, although some benefits cannot be measured by economists, it does not mean they are irrelevant.

There are some who make the charge that many of the qualitative issues regarding the development of the Ord and the north in general are merely emotionalism. Emotional or not, these issues are not ignored by Government policy makers when making decisions regarding the investment of large sums of public funds and the national welfare of the Australian people. In fact, such issues have every right to be included in the benefit-cost analysis, but the latter is incapable of accommodating them. (1965:5)

He goes on to state (and restate) the conceptual limitations of benefit-cost analysis; that although indirect benefits and intangibles should be included they are impossible to quantify. Nevertheless he explains the analysis he has undertaken, stressing that it is not the role of the economist to make the final decision but to provide as much data as possible.

Patterson is not only challenging Campbell and Davidson’s charge of the emotionalism of justifications to develop the north, but his presumption of the role of the economist. He shows the complexity of factors involved in decision-making in the policy environment – a tension not just between academic disciplines (the economists and agricultural scientists) but between knowledge and value domains.
Regardless of Patterson’s paper, later in 1965 Menzies stalled on a decision announcing that more detailed information was required including on cotton production profitability, pests and soils. Some attributed this delay to Davidson. Graham-Taylor quotes then Senator M.F. Scott who asked the Minister for National Development to ignore Davidson’s attacks, which he considered to be unrealistic, and to rely upon the expertise of the Kimberley Research Station. This was pitching Davidson against the organisation he had once worked with\textsuperscript{22}, and which he rails against in the last chapter of \textit{The Northern Myth}. The response to Senator Scott from Senator Paltridge the Minister in question was that all options with a scientific basis would be taken into account and will “not necessarily exclude the opinion of Dr Davidson” (quoted in Graham-Taylor 1978:260).

By now the political environment was fraught. The Opposition moved an emergency motion in the House of Representatives; Fred Collard (Labor) who submitted the motion asserted that the Prime Minister’s statement reflected Davidson’s views. Some saw the Federal Government’s approach as business-like, others saw it as lamentable. In 1966 the debate continued in public with Davidson publishing “The Economics of Irrigated Agriculture on the Ord River” in \textit{The Bulletin}.

There was also the controversial matter of calculating secondary benefits of the Ord River development. This was a thorny theoretical wrangling point. Should secondary benefits be included? What does one value? How does one price the intangible? Graham-Taylor reveals through detailed searches of government minutes and university correspondence the negotiations between UWA’s Faculty of Economics and Commerce and the WA Government for funding a long-term study of the development of the North-West. Eventually an agreement was reached and the WA Government provided a grant that funded a research fellowship for Dr Cannegieter from the Netherlands. Cannegieter, employed by UWA to undertake the secondary benefits analysis and arriving in late 1962, disagreed with Davidson’s calculations on yields, believing that agricultural practice and science would improve them over time. The resulting work

\textsuperscript{22} Before lecturing at the University of Western Australia Davidson had been working for CSIRO and was claimed to have been “stopped from publishing findings unfavourable to the Ord Scheme” (Graham-Taylor 1978:218) an accusation it would be fascinating to follow up but for which there is now no readily accessible credible source.
addressing employment, additional income generated and political benefits, estimated the present value of total secondary benefits as £67 million and opened him to disagreement from all directions. The then WA Minister for North West, Charles Court (Senior), felt it was overcautious while other economists criticised his valuing of the “dubious intangible or political benefit” of the Ord scheme (Graham-Taylor 1978:234).

Contested assumptions in the economic studies of the Ord were numerous: the projected price of farm outputs, the estimates of production costs, the requirement for subsidies, and, as in any cost-benefit analysis, the discounting rate (to be used for discounting future benefits and costs to present values). They were all points of detailed debate between Davidson, Patterson and Cannegieter; the final point of contention illustrating the limitation of cost-benefit analysis. Patterson acknowledged the limitation and that results of such economic analysis must be treated with caution, the rate of interest being “more of a policy judgement to be made by the government rather than by an economist” (Quoted in Graham-Taylor 1978:225).

In her book of 1967 *Their Shining Eldorado*, Elspeth Huxley comments that the Ord is a ‘religion’ not just an irrigation scheme:

If you are of the faith, you believe with passion and proselytise with fervour. If you are an infidel, you had best keep away. This is of course widely adopted by a man regarded more or less as anti-Christ, the economist Dr. Bruce Davidson...’He won't come to Kunanurra,' said a believer, practically grinding his teeth. ‘We've invited him to a public debate but he ducks it. He'd be pulped if he came. (Huxley 1967:239)

When in 1967 the Federal Government finally agreed to the financial request to support the Ord scheme the public duel had been continuing for a number of what must have been stressful, conflict ridden years for Davidson. Was it down to politics in the end? According to many, yes (Graham-Taylor 1978, Smith 1998, Ghassemi and White 2007); the result of an imminent election and the need for the Liberal-Country Party to make a political gain. Smith analyses 1966 Federal Cabinet papers and confirms that all technical and economic advice were adverse:

Initially Cabinet withheld its approval. However, by late 1966 they had changed their decision and there is little doubt that this was influenced by forthcoming elections in Western Australia...It is clear that political expediency overrode agricultural and economic wisdom. (Smith 1998:171)
In fact Patterson himself, a key Federal bureaucrat involved in the decision-making process, is damning in his analysis. He sums up the decision as:

...grandstanding in the worst sense of the word for the Senate election...consistent with every decision that this government has made in respect to northern development. Each decision has been announced either as a matter of political necessity or as a result of an election promise. (Quoted in Graham-Taylor 1978:295)

A confidential Report by the Commonwealth Government’s Standing Inter-departmental committee on Northern Development Projects, to which the matter was referred by the Minister for National Development, acknowledged the uncertainties in predicting factors such as cotton prices (though with a predicted fall) and yields, noting that at the present yield level cotton would indeed be uneconomic and that farmers would likely incur losses for some years. In conclusion “the economics of Stage 2 of the Project were unproven” (Commonwealth ca 1967:19).

The committee looks at the consequences of a favourable decision and of a rejection or deferment. They note the possible benefits to the cattle industry in the Kimberley, the likely cost of water subsidy to the farmers, and the possible greater social and financial problems if the farmers don’t succeed. Likely pressure for financial assistance for farmers was recognised, although it was also articulated that the scheme itself could be uneconomic while farmers earned profits through subsidised water.

Another key point in this document that has not been raised in other literature is that the Western Australian application presents the scheme in its entirety including the Northern Territory portion or one third. They do not distinguish. This, of course, provides considerable advantage to the scheme, its costing, and the case. Yet there was at that stage no “uniformity on many important matters” and no joint consultation or administrative arrangements in place (Commonwealth ca 1967:18)

Davidson was caught up in the momentum of the very motives he describes. The strength of these beliefs, and the differing opinions between the scientists (including between economists) ensured that his pivotal role in the debate, in the end, did not sway the outcome. Even more than 10 years later pot shots were still being fired at Davidson, with ongoing bitterness. In a 1977 workshop Dr John Millington echoes Christian’s pencilled annotations of “The dead hand of the economist” stating:
Although the Ord began as a national scheme to ‘populate the north’ it became involved in the great debate which an agricultural economist initiated...The whole project was reduced to an ‘economic assessment basis’ which no agricultural land scheme can tolerate...Because of the pressure of ‘economic’ dogma and control, the need to include the essential principles for success, as established in the War Service Scheme, was overlooked. (Millington 1977:156)

The affront sparked by Davidson’s work seems to spring from something deeper than its possible hindrance to the Ord Irrigation Project or other potential schemes that were being imagined for the North. The debate is a continuation of a longer, ongoing contesting of Australia’s potential for agricultural production and perhaps its potential to fulfil the dreams of the old country.

**Not Why, But How**

In *The Northern Myth* Davidson posed a question few had in Australia at that time by stepping back from the perceived ‘task at hand’, from the prevailing view which assumed agricultural development in northern Australia, to ask “Why” rather than “How”. Such a simple question, “Why should we develop agriculture in the north?” yet what makes it so inflammatory? In researching 150 years of northern history it is striking how infrequently this question is asked. Even when reading example after example of failure, or the myriad of variables that mitigate against ‘success’, there often comes a turning point in the workshop or report or book when the authors say in effect ‘now back to making agriculture happen’. People would seem spurred on to even greater efforts despite, as Slim Bauer noted, “the taint of failure became nearly as great an obstacle to further development as were the formidable environmental factors” (1977:vii). Sometimes this is expressed as a sense of having reached a ‘crossroads’, that this time it will be different because there is greater agronomic knowledge or better infrastructure or new technology. It can read as a belief that a positive tipping point has been reached, or as an arrogance of any ‘contemporary’ view – we know better than they did in the past and this time it will be different. This attitude can itself become a hindrance to learning as discussed in Chapter 12.

Exceptions jump out, such as Payne and Fletcher. Their *Report for the Inquiry into Land and Land Industries in the NT* in 1937 reads with blunt lucidity. The unusual contents list, four and a half pages long, reads like a dot-point explication of their findings and argument, pulling no punches. In the section called “Facing the Facts” the
sub-headings provide a clear articulation of their view of what 'The facts' are: “A
delusive yet romantic place; The difficulty of accepting limitations; Hugging delusions;
Let us face the facts”. Under the heading “Solving the Territory's Problems” they
comment that “Nature has not been lavish in bestowing resources upon the Territory”
but that “Notwithstanding these serious limitations, many of the Territory's problems
are capable of solution but too great expectations must not be entertained.” Perhaps this
had something to do with the pair both being Queenslanders? Payne and Fletcher did
not buy into an all-or-nothing scenario.

Over time the ‘believers’ voices have been consistent. The assumption of the
inevitability of, and push for, certain types of development is epitomised by the 1954
Australian Institute of Political Science’s (AIPS) conference, *Northern Australia: Task
for a Nation*. In the opening address Norman Cowper states that the title was “‘How
should we develop Northern Australia?’ not, it will be observed, ‘Why should we
develop it?’”. He explains that:

It was, perhaps, natural that the latter question should have been raised
occasionally, but the general opinion was that the discoveries of
uranium and oil made it more than ever necessary to have a population
to defend the North, and that Australia could not justify her retention
of it unless she exploited to the full its mineral resources and its
capacity for food production. Our failure in this part of our continent
seemed a national reproach which we should do our utmost to remove.
(Cowper 1954:xiii)

Cowper’s second sentence damns with faint praise, stating that it is only “perhaps”
“natural” that the question of why the north should be developed has been raised
occasionally. He is actually fobbing it off as unnecessary and perhaps even unnatural
(perhaps even un-Australian). The next key phrase is “more than ever necessary”,
implying it was always necessary. The discovery of uranium and oil resources, which
when exploited do not themselves achieve a population in the north, further makes the
case for food production with its assumed concomitant population growth. A sense of
moral duty is also raised with his emotive words “failure”, and, “national reproach”.
Cowper’s motives are not an anomaly, rather an expression of mainstream opinions.23
He does go on to temper his own call to arms, acknowledging that it will be “no easy

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23 The following chapter, ‘The Power of Ideas’, explores these motives in detail, reframing them as
drivers for intensive agricultural development and cropping in particular.
task” with a large population unlikely in their lifetimes and mining and pastoralism still likely to dominate (1954:xiii).

Although featuring a diversity of speakers, it is significant that this conference was hosted by the Institute of Political Science, not agricultural science. Northern development was seen as a political imperative with agriculture embedded as an inevitable part of this process.

Another significant multi-disciplinary, multi-sectoral conference *The development of Northern Australia* held at UNSW a decade later in 1961, the question was again how, not why. Once again despite speakers noting the challenges confronting agricultural development none acknowledged they may be insurmountable. Presenting on water supply, C.H. Munro, then Professor of Civil engineering at UNSW and honorary director of research of the Water Research Foundation of Australia, exemplifies this determinedly positive approach and trust in technology:

> ...the problem of development is not so much a question of available water as one of soils, transport, and markets. Admittedly the water is not always available at the right place and the right time, but large areas can be provided with a regular supply by expenditures comparable to those completed and contemplated in California, South Australia, and elsewhere. (Munro 1961:21)

In the following discussion a Professor Baxter mentions experimental work being done by the US Atomic Energy Commission to address water storage problems using nuclear explosions:

> I mention this because this is the kind of area where the ideas they are developing might be applied. One is the possibility of opening up large storages, in ground that doesn't lend itself naturally to the building of dams, by underground explosion and making a very large crater or series of craters (and may I hasten to add that there is no release of radioactivity in this operation!) The other is the possibility of building dams themselves by blowing the earth into place where you want it, by the same agency. Both of these ideas, I think, should go on our list for further examination. (Baxter in Munro 1961:41)

It is tempting to dismiss Baxter as a crank however the professor was at the time Vice-Chancellor of UNSW with a CMG and OBE, and was later knighted. Perhaps for a Sydney resident the northern frontier is far enough away that unsatisfactory results of nuclear experimentation are of little concern.
The how not why imperative is expressed again by the then Emeritus Professor of Geography, J M Holmes, in the subtitle of his 1963 book *Australia’s Open North – A study of Northern Australia bearing on the urgency of the times*. Holmes identifies the “great dilemma of the Australian northland” as being the “incontrovertible geographic fact” that it is in the monsoonal tropics. He challenges modern Australia to overcome the North’s dilemmas by applying some of the “accumulated wealth of the south and some that has been acquired in the north... to overcome that which time has not allowed” due to his identified “urgency of the times and the propinquity of the north land to a resurgent east and South-east Asia and a turbulent Africa.” (1963:429) Holmes’s ultimatum brings to the fore this issue of whose responsibility it is to pay for and kick-start northern development, the ball passed between government and the private sector, levels of government, and between generations.

Expressing frustration with the conflation of ‘why’ and ‘how’ agricultural researcher M.J. Fisher distinguishes between the nature of the two questions; ‘why’ being political and social, with ‘how’ being technical. He even substantially attributes the failure of many of the large schemes, including the Ord River rice and cotton projects, and Tipperary and Willeroo in the NT, to this confusion of thinking by high-level management in government and business (Fisher 1980).

How much and what type of government investment should be undertaken is a question one of Australia’s most influential bureaucrats and economists, Nugget Coombs, puzzled over at that time with northern development not yet self-perpetuating. "It is certainly not self-inducing, and all discussions of the development of the north are in terms of governmental action of some sort to stimulate or to create development which would not take place naturally. This, I think, reflects the fundamental problem that faces Australia with conventional development of the north and is discussed further in Chapter 11.
Chapter 4: The Power of Ideas - Drivers of the Imperative for Agricultural Development

Despite what some portray as the 'strong taint of failure' over cropping developments in northern Australia the impetus recurs with erratic momentum over 150 years. Periods of more intensive push, effort and investment are interspersed with lulls in effort where the north is left to its own devices. What drives this momentum? Have drivers changed over time? Are they similar across different places in the north, or at different scales? What is the relationship between them?

From the very first European attempts at settlement in the north we see the emergence of varied drivers for development, and for agriculture in particular. Davidson calls them 'motives' and identifies a number in The Northern Myth. Revisiting Davidson's list of motives I undertake my own analysis of northern agricultural development since the 1820s using primary and secondary material, including contemporary 'conversations', and identify ten drivers for agricultural development: ‘Securing the Nation’; ‘Legitimating the Nation’; ‘Markets and trade routes’; ‘Land of Opportunity’; ‘Making it White’; ‘Feeding the world’; ‘Plugging the money sink’; ‘Indigenous opportunity’; ‘Climate change and the water crisis’; and finally, ‘Managing risk and diversifying’. These drivers are not bio-physical or strictly socio-economic but represent ideas that reflect the dominant culture and values of Australia over time; the power of ideas.

Two fundamental themes emerge that flow through the ten identified drivers across time - nation-building and the assumption of progress. What results is a clear picture of the ongoing strength of the imperative to develop, regardless of previous experience of failure, or current acknowledged hurdles.

What does the public discourse about northern Australia show us about our “systems of knowledge and belief” (Fairclough 1992:36) and “the mechanisms through which societies sustain their social structures and social relations over time”? (1992:5) Dryzek reinforces this understanding of discourse as “a shared way of apprehending the world...Discourses construct meaning and relationships, helping to define common sense and legitimate knowledge” (2005:9).
What is a Driver?

The term driver is used in a number of ways in the literature but is most relevant to this thesis in the literature on land use change. According to Hersperger et al (2010) there are now three elements generally agreed as fundamental to land use change research; driving forces, actors and land change.

A distinction is made between proximate cause or direct actions, and indirect or underlying driving forces. Referring to the work of Burgi et al (2004) the study of underlying driving forces “has a long tradition in geography and landscape research”. Driving forces are simply defined by Hersperger et al as the forces that together with actors shape land change. In their explanation Hersperger et al (2010) stipulate that driving forces don’t necessarily have to cause change as they may be too weak, counteract each other, or have a stabilizing effect. In general it is through the actors that driving forces may create change.

Briassoulis (2000) summarises the literature on drivers and identifies two sets of distinctions – the first between bio-physical and socio-economic drivers, and the second between human driving forces, described as fundamental societal forces, and proximate driving forces. Applying resilience thinking to natural resource management Allison and Hobbs use two categories of drivers, proximate and ultimate – the first “draw attention to the direct levers of change”(2006:208) while the second refers to “the shape of the fundamental structure of values, knowledge and empowerment”. The ultimate drivers are considered to be more stable and therefore more relevant to the concern of long-term policy making, and “tend to influence trends indirectly by acting upon proximate drivers” (2006:211). They acknowledge that the distinction between them can be blurred though believe it is useful for policy discussion.

Similar to this dual categorisation is that used by the Millennium Ecosystem Assessment which discusses indirect and direct drivers of change in ecosystems. Working from the assumption that ecosystem change is brought about by a “complex web of interactions between humans and their surroundings as humans seek to satisfy their basic needs and improve their well-being” (Nelson et al 2006:2) this relationship is described in terms of drivers of ecosystem change. Of course drivers work over time and space and scales, and they interact in a synergistic way. Direct drivers are considered to be physical and biological – and indirect drivers are categorised as
demographic, economic, socio-political, cultural and religious, and scientific and technological (Nelson et al 2006:2). This aligns with the work of Geist and Lambin (2002) on causes and forces of tropical deforestation. They similarly distinguish between proximate and underlying forces, and present the categories of underlying forces as demographic, economic, technological, policy and institutional, and cultural factors. Geist and Lambin use the terms causes and drivers interchangeably. Cultural factors include public attitudes, values and beliefs. Burgi et al (2004) similarly present five groups of driving forces – political, economic, cultural, technological, and natural, with the only significant difference being the inclusion of natural as a category of drivers.

In asking the question, why does the impetus for agricultural development of northern Australia continue in the face of apparent failure and obstacles? I am seeking the indirect or ultimate drivers, the human portion of this interaction. Rather than quantifying to what extent these drivers have contributed to actual agricultural attempts (whether successful or not), this thesis identifies, documents and describes them. Each provides its own story and journey through the history of the north and together they create an ongoing sense of potential and impetus for agricultural development in the north. It is unusual to explore drivers that have not necessarily resulted in persistent land change through agriculture. The ones I focus on have perpetuated belief in and discussion of the potential for agriculture, rather than changed land use or successful agricultural practice. They drive successive attempts at cropping development (whether actual farming enterprises, government policy and investment, or research and development).24

Each of the ten drivers is, or was, relatively overt, as evidenced by appearances in the literature and media. In the main they are the articulated and socially-acceptable motivations for agricultural development. A couple may even be considered justificatory and aspirational, rather than essential or direct motivations. A justificatory driver is a publically acceptable justification that girds those less publically acceptable. ‘Feeding the world’ is an obvious example of a justificatory driver. Not only is it unrealistic to ascribe altruistic moral motives to political calls or national policy, it is

24 The variables that hinder the realisation of these expectations and drivers are explored in Chapter 11.
also clearly at odds with the reality of how agricultural land in the north is being increasingly used – for forestry. We are in a market-driven economy and with current tax arrangements forestry appears to be more profitable than food crops.

This broad brush approach to the drivers reveals that they are removed from the environment itself, needing only cues or general representations to be primed and running rather than the ‘real’ thing, cues such as space, apparent emptiness, and water. As the drivers are not actions themselves, but the expression of motive, (they are the intent, not the action) they therefore stand separate from place. The drivers themselves do not necessarily interact with the north, and thereby don’t necessarily have relationship with the environment. Nor do they necessarily emanate from the north itself. Often they are aspirations coming from elsewhere in Australia. The environment, or representation of the north, is a vehicle that carries these motives. In the language of Barthes (2000), these representations or cues of the frontier – space, emptiness and water are the ‘signifiers’ that carry the concepts. It is their generality and hollowness that allow so much to be packed and carried in them, some of them working over more than a century and a half. Together the signifiers and concepts create what Barthes calls ‘signification’, or the myth itself (Barthes 2000), in this instance this is the vision of agricultural development in northern Australia.

Of course for those who are living and working in the north this is different. They are in relationship with place, directly influencing and influenced by it. And their relationship with the drivers can be tangible – a desire to make a go of their farm for their family, or a drive to create employment opportunities for their people.

**The Drivers for Northern Agricultural Development**

Development of northern Australia historically has focused on three elements – pastoralism, mining and agriculture (Parsons 1901, Bauer 1984). In later years, tourism joined them. Unlike agriculture, however, none of these others provide closer settlement or a substantially larger population; these are benefits of agriculture alone. Hence the push for cropping development can be a proxy for the push for a more densely populated north.

As detailed in the previous chapter Davidson identifies five key motives: (1) the perceived need to settle the north to provide both deterrent from attack and defence
from Asian neighbours; (2) the ‘waste’ of leaving resources near large markets undeveloped; (3) Australia’s international responsibility to feed the growing world population; (4) production of tropical crops to save on imports; and (5) improving the standard of living of Aboriginals in the north. In the 1960s context he dismisses each one, and the assumptions underlying them, as unfounded.

Despite his own criticism of inadequately justified reasons for attempting development, Davidson himself does not present evidence to show where they came from. Perhaps such motives were so prevalent in the media and contemporary debate in 1965 that he thought they did not require historical referencing, or perhaps he was using them as rhetorical devices to back up his economic analysis. In canvassing the literature all of Davidson’s proposed motives appear regularly and publically except the fourth, concerning import-saving to protect the national balance of payments, though it is common in Hansard during this period. The first two of Davidson’s motives, deterrence and defence, are intertwined to such an extent in other material that I combine them and name them ‘Securing the nation’ (Abbott 1942, Coombs 1977, Crawford 1985, Day 2005, FDI 2011, McQuire 1939, Mawby 1954, Patterson 1965, Robin 2007, Territory Rice Ltd 1956, The Mercury 19 August 1953, The Sydney Morning Herald 20 June 1950, Upton 1938). His third point I address as ‘Land of Opportunity’ (Gettler 1993, Hill 1937, Millington 1977, Munro 1961, Powell 1977, Rose 2004, Conversations 4, 10, 14, 20), the fourth under ‘Feeding the World’ (ABC News May 2010, Boelee et al 2011, The Australian 19 September 2011, The Courier Mail October 6 2011, Conversations 4 and 19), and his final motive becomes ‘Indigenous opportunity’ (Coombs 1977, Kearney 1991, Kelly 1966, Kinnane 2008, KLC 2004, Patterson 1965, Pedersen and Woorunmurrea 1995, Young 1979, Conversations).

My research identified six additional drivers which I will briefly introduce here before outlining them in more detail. The ‘moral’ imperative to use land productively is woven through several of Davidson’s motives and is often wrapped in the flag of nation-building. I call this driver, ‘Legitimating the Nation (and the government)’ (Coombs 1961, Day 2005, Graham-Taylor 1978, McNeill 2000, Powell 1977, Rose 2004).

In the era of the White Australia policy (1901-1973), questions of race drove development, particularly in the 1920s and 30s. The driver ‘Making it White’ has now all but disappeared, at least in its explicit form, but it undoubtedly drove Australians to
claim the tropics for the White race (Bauer 1985, Conigrave 1936, McGuire 1939, *NT Times and Gazette* 4 March 1927, Reynolds 2003, Upton 1938). The drivers of security and opportunity were also linked with and influenced by this driver – we were securing against the non-whites and creating opportunity for whites.

Contrasting the Land of Opportunity is another motivation raised by Curtin when Prime Minister, ‘The money sink’. Frontiers may beckon with opportunity but, for central governments, they sometimes only generate bills, and hence, ironically, financing development is seen as a way to cut the purse-string dependency – eventually (Coombs 1977, Holmes 1963, Robin 2007). Members of the Government of South Australia were relieved to relinquish the bills of the Northern Territory when they handed it to the Commonwealth Government in 1911. The debt transferred was in the order of ten million pounds (Robin 2007).

From the early 1800s, ‘Markets and trade routes’ have provided incentive for northern development (ADMA 1981, Bauer 1985, Calley 1998, Conigrave 1936, Curteis 1965, Everingham 1982, Hill 1995, Holmes 1963, Parsons 1884, Robin 2007). This may be seen to be more about development as a whole rather than agriculture in particular; however, agriculture is particularly sensitive to the proximity of its markets and the North’s position close to trade routes or markets was seen as an opportunity for agriculture.

During the recent ten year drought that ushered in the new millennium in which the Murray-Darling Basin suffered severely, northern Australia was held up for its prospect of plentiful, cheap and reliable water for southern farmers in the media and by some politicians. The media coverage suggesting that Australia’s southern farming areas may dry up permanently added to the impetus (ABC news April 2008, ABC Rural Sept 2009, ABC rural report Feb 2010, Conversations). ‘Climate change and the water crisis’ became the latest driver, though intermingled with the beating of the old frontier drum in the driver ‘Land of Opportunity’.

Allied with managing climate change another driver, ‘Managing risk and diversification’, arose in a number of the discussions and occasionally in recent media (Steele 1982, Conversations, Future Directions website). The risk society is a growing theme of the 21st century. Agricultural enterprises based elsewhere have been interested in extending their activities to the north to spread their risk of impact from extreme
weather events, rather as Kidman spread his operations across different climatic zones in the early days of pastoralism in the mid to late 19th century. Agriculture offers jurisdictions a way to diversify income and employment base and to lessen their reliance upon a single industry.

Through archival research and contemporary interview material, I have identified these ten drivers that perpetuate the impetus for agricultural development: ‘Securing the Nation’; ‘Legitimating the Nation’; ‘Markets and trade routes’; ‘Land of Opportunity’; ‘Feeding the world’; ‘The money sink’; ‘Indigenous opportunity’; ‘Making it White’; ‘Climate change, and the water crisis’; and finally, ‘Managing risk and diversifying’. These I discuss below.

1) Securing the nation.

On 12th December, 1941, the War Cabinet decided that women and children should be evacuated from Darwin and adjacent areas and forwarded the necessary instructions to me...

As an attack upon Darwin appeared to be distinctly possible after the conquest of Malaya and subsequently, the fall of the Netherland East Indies, various branches of the Administration were moved from Darwin quietly and without confusion...

My office sustained a direct hit and was completely destroyed. This explosion caused the death of a member of the domestic staff attached to Government House, who, with Mrs Abbott and others, were sheltering under the office.

From The Report on the Administration of The Northern Territory for year ended C.L.A. Abbott, Administrator, 30th June 1942.

Reading Abbott’s stoic, understated account of the bombing of Darwin in his Yearly Report, reveals the personal impact and depth of feeling. It is riveting. It is also shocking. The war and the Japanese were inside Australia’s northern border.

Northern Australia is closer to the countries of its north than to the southern cities of its own continent, the ruling south. Its climatic conditions are also more like tropical Asia than temperate Australia. The level of insecurity that Australia feels with regard to its northern borders fluctuates according to the politics of neighbouring nations, the politics
of allies, its relationship with both neighbours and allies, and Australia’s sense of its place in Asia. This then plays out in the attitude towards northern Australia and the associated strength of security as a driver for northern development. Right back to the first attempted settlements by the British in the north we see the push to establish a military presence. These first three attempts in 1824, 1827 and 1838 were all military stations established by the British Colonial Office, and were staffed and managed by the British military. There has been a military base of the Australian Defence Force in Darwin since 1934 (Stone 2009). An agreement with the American Government in 2011 for American marines to be posted in the Top End of the Northern Territory establishes the largest ongoing foreign allied presence in the Territory’s history.

Despite the intensity of the bombing of the North not being commonly known to the Australian public (60 bombing raids) it was an obvious spur to post war politicians and resulted in increased Federal Government activities to encourage northern agricultural development for the following few decades (Coombs 1977, Crawford 1985).

The apprehension caused by the ‘empty’ north was not new though. United States President Roosevelt showed interest in the settlement of Australia’s north in 1904 warning then PM Alfred Deakin "beware of keeping the far north empty" (Quoted in Walker 1999:114). This brought more attention from the international stage. In 1909 a London journalist wrote a story conveying an Australia of the future that had become Asian – “It was a generalised threat made to enforce an unmistakeable command: develop the continent or surrender it.” (Walker 1999) In the 1920s C. Price Conigrave stated in regard to the Northern Territory, “Its close proximity to the teeming millions of the east makes it at once on the score of Australian self-defence, a vulnerable part of the continent” (Quoted in Robin 2007:125). The establishment of the North Australia Commission by the Federal Government in 1927, in response to the Buchanan report recommendations of 1925, was seen as a response to the pressure to fill the north for fear others would (Powell 1982). Then Prime Minister Bruce cautions Parliament “In its present empty and undeveloped state it is the Achilles heel of Australia” (Powell 1982:169).

As the world drew closer to the Second World War Australians and the British continued to see the ‘empty north’ as a calling card to others “In the present condition of
world affairs it is a dangerous thing to have habitable territory available for occupation” with the view that:

Japan casts covetous eyes on tropical northern Australia, and that there is a strong feeling in Australia that Japan may be tempted to seize some of those empty spaces if they are left undeveloped much longer?” (Upton 1938:21)

![Figure 14. Frontispiece of Land of Opportunities showing eyes of Asia upon the north (Stuart 1923)](image)

One way to defend the ‘empty’ north was to fill it with people; and a significant enough density of population could only be generated by agricultural development. Prime Minister John Curtin’s stated ‘narrow escape’ from foreign invasion in WWII (Coombs 1977:5) prompted a strategic and quick response from the Federal Government and the Post War Reconstruction Committee, the establishment of the Northern Australian Development Committee (NADC) immediately after WWII with the Commonwealth,
Queensland and Western Australian Governments agreeing to work together to address northern development for the first time. The NADC, chaired by H.C. (Nugget) Coombs, was to make recommendations to a Policy committee which included the heads of each of the three governments and the Commonwealth Minister for the Interior. Overarching all of the objectives of the committee was the edict “In all its investigations the committee shall give special consideration to the aspect of defence”. The objectives of the committee were to increase the population in the north; the welfare and development of native inhabitants; increase in the value of production; best utilization of land.” (Coombs 1977:5) An example of the post war concern is expressed in Darwin’s local paper which compares the populations of Java and the NT and concludes that “An immediate and rapid development of its resources is imperative if we are not to be swamped by a united, resurgent Asia” (Quoted in Reynolds 2003:147).

This disquiet and the concomitant attitude regarding defence continued well past the Second World War and into the period of the cold war. For example the war and ‘communist infiltration’ were seen to have disrupted rice production in South-East Asia creating a perceived increased pressure for more rice-growing land. In a 1950 article “Rice Will Secure Our North-west Frontier Area”, Douglas Taylor, Secretary of the Rice Association, claims:

> Thoughtful Australians have always been concerned about our great empty spaces in the north-west. This vulnerable, uninhabited land is a national danger area. ... What can be done to protect the so-called ‘back door of Australia?’ There is only one effective method of protecting it: Fast development. (Taylor quoted in *The Sydney Morning Herald* 20 June 1950)

Taylor presents the Queensland sugar industry as a valuable precedent providing the ports from which General MacArthur's ships launched their attacks on the Japanese, the levelled airstrips, roads, railways, and so on. Taylor calls on governments to clear away “minor obstacles” so that rice can do for the Northern Territory and the Kimberley what sugar did in Queensland and to have “their eyes fixed on the twin goals of defence and development” (*The Sydney Morning Herald* 20 June 1950:18). This role of the sugar industry in the defence of the north was ‘foreseen’ and promoted many decades earlier.

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25 Some would say for the second time however the attempt in the 1920s was so under-resourced that there was considered to be no real political commitment and it was wound up within three years.
when the 1912 Federal Commission for sugar highlighted the crop for defence through establishing settlement and cultivation of the north: "Sugar is a line of defence" (McGuire 1939:191).

Defence motives continued to influence Federal Government interest and investment. The 1956 Territory Rice Ltd proposal to develop a rice industry in the Northern Territory states "the whole-hearted support of the Australian Government" came from their understanding that "it was vital to the security of Australia that its empty north be developed" (Territory Rice Ltd 1956:4) The 1955 agreement between the Commonwealth Government and the American-Australian company, gave the company an option on 750,000 acres of sub-coastal plain for rice-growing.26

An Australian Government report on the Ord Irrigation Project states that "major impetus for development occurred during and after the Second World War" (Department of National Resources 1976:1) as the war had emphasised the North's vulnerability to invasion – thereby emphasising the need to develop the area (the very leap of 'logic' that Davidson decries in *The Northern Myth*). This is clear in the WA Parliamentary debate on the 1958 Act for Commonwealth funding assistance for Stage One of the Ord scheme "if we are going to hold the north-west, we must do something about it", "our northern defences have never been worse", and, "all patriotic Australians would acclaim any proposal to develop our sparsely populated areas." (Young 1979:20)

After the Second World War and during the Cold War an additional element emerged, feeding those to the north of Australia. Captured in the objectives of Territory Rice Ltd and as agreed with the Commonwealth Government an outcome was to be:

> The provision of possibly a million tons of rice a year, which would help to feed the rice eating peoples of Australia’s near North, whose present deficiency causes them to be susceptible to Communist agitators. (Territory Rice Ltd 1957:2)

So in the 1950s with the threat of communism in south East Asia the yellow peril also became red. This concern was confirmed with the release of classified Cabinet papers showing that in 1953 the communist threat in south-east Asia was used by the British...

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26 As described in Chapter 7 the scheme soon became an embarrassment and an unmitigated failure.
Government to convince the Australian Government to help maintain rice supplies to British colonies (Basinski et al 1985:95).

The discovery of uranium in the Territory added further to the unease. A newspaper article of 1953 quoted then Deputy Leader of the Opposition Mr. Calwell: “We have entered the atomic age and the Northern Territory has become one of the most vital parts of the Continent.” After a visit to the Humpty Doo rice project Calwell explained that the prospects for agriculture were good if engineering problems could be overcome, adding:

> The Federal Government would have to provide millions of pounds for water control, but this would be a small premium on an insurance policy guaranteeing national survival. (The Mercury 19 August 1953)

This concern to protect the relatively newly discovered and now precious mineral deposits of the north continued.

> The strategic importance of Northern Australia need not be stressed – we all realize the narrow margin of strength which prevented its invasion in the last war. Population is the best security against similar happenings in the future ... The recent discoveries of oil and uranium were made in isolated localities, and the vulnerability of our northern mineral resources must be a great concern to our Defence Departments. (Mawby 1954:41)

Holmes introduces *Australia’s Open North - A study of Northern Australia bearing on the urgency of the times* with “our recent war travail has generated urgency into our northern affairs” (1963:xvi).

Indonesia’s takeover of West New Guinea, and the fear, as expressed by then Labor leader Calwell, that it might keep going through Timor, Papua-New Guinea and northern Australia exacerbated feelings of vulnerability (Day 2005:347). According to Day in the 1960s it was easy for Conservative governments to convince Australians of the threat:

> They looked upon Asia as an overcrowded continent and feared that the people of Asia looked avariciously upon Australia as an empty and undeveloped continent. (Day 2005:347)

Again this is reflected in the debate for Commonwealth financial assistance for the Ord Irrigation Scheme – this time for the main dam. In the Western Australian case to the Commonwealth it is explained that due to economic problems “most Asian countries
are frustrated in reaching their social ideals” and that “aggression originates ultimately in response to some frustration” peculiarly providing a single reference *Aggression – A Social Psychological Analysis* by Berkowitz. According to the WA Government’s case the only conclusion is we must do whatever it takes to “prevent those countries from having the obvious argument: ‘If you Australians do not use those natural resources, why can’t we use them for our increasing and hungry population?’” (Government of Western Australia 1964:29) A map in the document titled “The Ord River Project Geographic Relationship to Nations of S.E. Asia”, with miles marked, hammers home the proximity argument (also for the distance from markets case I’m sure).

In 1982 the Northern Australian Development Council titled its annual development seminar *Australia’s Northern Resources – How do we keep them secure?* with the two themes development and defence (NADC 1982). In a presentation by P.V. Jones, then a Minister in the Western Australian Government, titled “Development through defence” he refers to the WA Government’s “determination to see a sugar industry established there, regardless of our opponents...such projects are people” (Jones 1982:103).

Concern of what is north of our north is now only occasionally articulated in relation to agriculture and settlement (though is certainly raised outside this context). The indefatigable Senator Heffernan claimed as recently as 2010 that “If we don’t develop northern Australia someone else will do it for us” (ABC 7.30 Report 16 February 2010). The CSIRO review for the Northern Australian Land and Water Taskforce identified the vulnerability of northern Australia with Darwin “still considered the most vulnerable location to hostile attack” (Stone 2009). A more subtle example comes from the organisation Future Directions International which describes itself as providing ‘independent strategic analysis of Australia’s global interests’. Chaired by ex- Governor General, Major General Michael Jeffery, it has northern Australia as one of its four research areas explaining that “This region is also strategically important for the vital role it plays in border protection and as an interface for broader engagement with neighbouring states and the wider region.”

More recently an article by this ‘think-tank’ proclaimed a “Northern food bowl ‘critical’ for security. Australia needs to produce food in its northern regions to avoid creating a national security problem” and

quoted a former head of the Defence Intelligence Organisation, John Hartley, explaining that the potential for significant food shortages in the region could cause conflict.  

Colin Barnett, then an MLA and later Premier of Western Australia, warned in 2008:

> In a world that is bursting at the seams with people, natural disasters, a shortage of potable water, emerging economies and all sorts of political, racial and ethnic tensions... do members really think that we can sit here through this century on 2.5 million square kilometres of land, leave it empty and keep it? (Hon Colin Barnett MLA Western Australian Government Hansard 15 May 2008)

The military are a significant and growing presence in northern Australia – economically, land tenure, and contribution to population. President Obama’s 2011 announcement of an increased US military presence was hailed by the Australian Government and commentators. Despite the connections made by the likes of FDI above, however, security of the north is nowadays rarely publically tied to agricultural development.

This slight history of the defence context goes some way to building an understanding of just how significant the concern of Australia’s ‘empty’ north as a ‘calling card’ has been, becoming the motive for developing and populating the north. What we don’t find is an analysis of whether establishing a greater population and industries would in fact deter or defend this vast area, exactly what Davidson took issue with, or even if the region could support “teeming millions”. This work is not a strategic defence analysis; rather what is relevant is that security has been a significant ongoing driver for promoting agricultural development, particularly since WWII.

> The first motive for pursuing closer settlement was basic. There were concerns that a sparsely populated 'empty north' represented a risk to the defence of the nation. (Ling 2012)

**2) Legitimating the nation (and the government).**

Closely linked to the perceived ongoing need to secure Australia’s north is the drive to legitimate Australia’s right to this large tract of the continent. How do you mark your territory in a way that is recognised and lasting?
There are several nuances in this motivation. Most obvious is the sense of truly legitimating our claim to the north, and our right to keep it. More subtle is the sense of moral obligation; if we have claimed this land and in fact dispossessed others then we have a responsibility to use it productively. This responsibility is not only to our own people but to others who may otherwise have a need - and therefore a claim?

A wonderful example of the public sensibility of the late 1800s is expressed in a ballad ‘Hurrah for Australia’ of 1864 quoted by Day (2005: 150):

...Our dearest and greatest ambition  
Is to settle and cultivate land:  
Australia’s thousands are crying  
For a home in the vast wilderness,  
Whilst millions of acres are lying  
In their primitive wild uselessness. ...

Throughout the modern histories of conquering Australia, both the original inhabitants and the alien environment, we see an abhorrence of presumed emptiness and waste. Or if not abhorrence at waste, at least an assumption that empty space requires filling. Blainey describes of the early 1900s "Most Australians were still strangers in a new land. The land was only half won." (1980:361).

In his book *Claiming a Continent*, David Day frames the history of modern Australia as an ongoing “struggle by European Australians to claim the continent of Australia as their own” (2005:2). He presents three ways in which European Australians claim proprietorship – legal, physical occupation and moral. Fundamental to any claim by the newcomers was the defining of the original inhabitants as ‘uncivilised’. The perpetuation of the assumption of *terra nullius* discussed earlier underlies how European Australians sought to make the north legitimately their own.

Day claims it was only with populating and use of the empty north that white Australians would be able to “claim the moral right to retain possession of it”

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29 This is expressed frequently by map makers who fill areas of central and northern Australia with names that look to be the size of towns but are often simply cattle stations, or may now not even exist.
This was what was required to establish moral proprietorship and legitimacy. (2005:225)

The belief that the plough established legitimacy pre-dates the British invasion of Australia. The yeoman ideal, established in Europe and exported to the new world, is resilient and linked to religious and moral concepts. Powell describes the Victorian Government in 1869 for whom "The hallowed tenet of intensive cultivation was for them the ultimate test of the bona fides of the settler." (Powell 1977:77) Courtenay also describes this "long established instinct" stemming from the north-west European origin of the newcomer Australians that:

...only when the country has been submitted to the plough and closely settled by agriculturists will its potential have been realised...to be truly occupied and settled a territory must be agriculturally tamed (1982:121).

He quotes the famous lines from British surveyor Stokes in 1866 envisaging "a succession of tapering spires rising from the many Christian hamlets that must ultimately stud this country". One of the most significant Federal figures involved in the north, Coombs also posited this motive:

It can be argued that we should develop the north for other reasons, for defence reasons, or because we have occupied this territory and we should therefore make use of it, and no doubt there can be reason in this line of argument. (Coombs 1961:7)

The building of the Ord dam and creation of the enormous Lake Argyle, completed in 1971, signify a major point in marking and claiming the north for agriculture. Over 40 years later the scale of the lake, about 1,000 square kilometres, inspires wonderment in the many tourists who pass through and dreams of opportunity for others, such as WA Premier Colin Barnett and his push for a pipeline south. The Commonwealth decision to fund the dam was complex and contested (as shown in Chapters 3) and followed the Snowy Mountain Scheme in the post-war pattern of massive dams. "Little credence was given to economic and agricultural assessment and little concern was expressed for environmental impacts." (Smith 1998:172) Yet there is nothing like a big dam to create a sense of tangible) nation building. How can a politician resist? During the period of decision making and building of the Ord dam there was an international trend for building large dams, particularly from about 1930 to1970. According to the environmental historian John McNeill these dams served larger political purposes:
Governments liked the image they suggested: an energetic, determined state capable of taming rivers for the social good. Dams helped to legitimate governments and popularize leaders... Ambitious, modernizing states, especially colonial and newly independent ones with legitimacy problems, showed great fondness for dam building...Their political utility helps explain why so many uneconomic and ecologically dubious dams exist. (McNeill 2000:157)

3) Markets and trade routes.

The first attempts at British settlements of the early 1800s in the north were initiated as much with the economic rationale to establish or protect trade routes of the time, and their associated markets (Powell 1982; Curteis 1965). Donovan goes as far as stating that although strategic considerations were important in establishing these military outposts they were mainly motivated by economic rather than military reasons (1989).

International trade was not new to the north. For many centuries prior to European invasion the Macassans were seasonally harvesting trepang in northern Australia and trading with the First Australians. They established temporary camping spots where today you can still find enormous, shady old tamarind trees and stands of bamboo for use in drying racks (Author, Curteis 1965, Mulvaney 1969, Macknight 1976, Reynolds 2003).30

The British Empire had an eye for protecting and exploiting trade routes and suitably located ports. In 1803 Flinders wrote in a letter to Banks that the good harbours of Cape Arnhem, the wild nutmegs and the trepang might induce the east India Company to settle New Holland. (Austin 1964:169) When surveying the northern coastline from his Cutter in 1818 Lieutenant Phillip Parker King wrote glowingly about the potential of Port Essington to become a place of great trade and importance. His reports, along with pressure from a speculative shipping trader William Barns and from the East India Trade Committee led to the decision for the Port to “be chosen for the first British outpost on the tropical northern coastline.” (Curteis 1965:2, Conigrave 1936, Holmes 1963) The British Colonial Office wished to protect British commerce, particularly from the Dutch, and to establish commerce with the East through the Malay fishermen and traders.

30 Near Yirrkala in north east Arnhem Land is a site where the locals marked the visits of Macassan with stone art portraying their boats and methods for curing the sea slugs (pers. obs. 6/2012).
The original motivation for settlement is clear in a letter by Sir George Murray of the London Colonial Office in 1828:

The first settlement on the North West Coast was undertaken upon representations from the East India Committee, who hoped that the possession of establishments in that quarter would lead to an intercourse with the Malays, and thence to Trade with the Islands of the Eastern Archipelago. (Quoted in Curteis 1965:8)

As Alan Powell describes, it was believed the Macassan trepangers would provide trade access first to the eastern islands and then China (1982). The potential for broader trade with Asia was well-recognised, with the size of Asia’s proximate population enough to whet the lips of companies, governments and colonisers (Walker 1999). A third settlement attempt only nine years after the failure of the first two, was again partly prompted by trade, with British merchants this time wishing to attract trade with the Dutch rather than protect British trade routes from them (Curteis 1965). The location Port Essington was considered to have the potential of Singapore\(^\text{31}\) (Hillock 2000).

Being a part of the Empire was also handy half a century later when ships would bring to Darwin tropical plants collected across the seas. Reading through the range of unusual plants trialled counters the modern populist belief that what was grown tended to be, unimaginatively, only of European origin (and therefore inappropriate). Access to other tropical colonies provided plants as diverse as sago, indigo, and arrowroot, and the usual suspects - coffee, tobacco and sugarcane. Right back with the attempted settlement at Port Essington in 1838 they were growing nutmeg, breadfruit and bananas.

Later that century potential trade possibilities were still being touted. In his Government Resident’s report of 1884 Langdon Parsons refers to His Grace the Duke of Manchester on a seven week tour of the Northern Territory who commented that Darwin would ultimately become an important port. (Parsons 1884) Nearly one hundred years later in the 1970s Paul Everingham, then Chief Minister of the Northern Territory, comments on the rapid expansion and economic growth of the South-East Asian-Western Pacific region “That means our immediate region is potentially a huge market for Territory products” (Everingham 1982:xii). Everingham’s government had established the Agricultural Development and Marketing Authority of the Northern Territory only a

\(^{31}\) These first settlement attempts are described in detail in Chapter 5.
year before in this context: “As a result of trade missions, it is apparent that the
opportunity to export agricultural commodities to South-East Asia is particularly
attractive” (ADMA 1981:4).

What had been framed a threat, the near neighbour with “teeming millions”,
simultaneously became a lure. As the economies of Asia grew northern proximity
became an opportunity, and trade once again became an exciting potential for the north.
In the last 30 years this expectation has borne fruit for the live cattle export trade to
Asia, particularly to Indonesia, which the northern cattle industry has come to rely
upon; and hence also a range of industries that are associated with the cattle industry
such as fodder cropping.

Early in the Ord Irrigation scheme the Western Australian Government states in a
glossy brochure that that one aim of the scheme is to “establish trade with countries of
south-east Asia” (Government of Western Australia 1963).

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Figure 15. Ord River Project: Geographic relationship to S.E. Asia
(Government of Western Australia, 1960, Courtesy of Kununurra
Historical Society.)
By 1994 the Western Australian Government was claiming that “The Ord’s reputation for high quality produce and proximity to South East Asia will ensure that markets for grain, horticultural crops and live cattle continue to expand.” (Joint Ministerial Statement WA and Commonwealth Governments 1994) In 2008 the Northern Australia Economic Development Forum Online declares (again) that “North Australia is now Australia’s front door, occupying a critical strategic position”: the ongoing frontier always beginning anew. In 2013, Andrew Robb, then a senior figure in the Coalition and soon after to be the Australian Minister for Trade and Investment, announced the development of a northern food bowl:

In previous debates about the potential for a food bowl the key missing ingredient was the presence of a huge developing market on our doorstep. The percentage of the world’s middle class in our Asia-Pacific region is expected to explode.... (The Australian 21 June 2013)

In 2014 the Northern Territory Government has held numerous trade missions to Asia. Yet despite expectations for over 150 years the north still does not play a significant role as a trade route for agricultural products except for the live cattle trade from northern Australia. There are a number of reasons; one being that northern Australia finds it hard to compete with the low cost of production of agriculture (cropping and horticulture) in the very Asian countries it is conveniently located near. Another is that north-west Australian ports are expensive to ship through with less handling capacity and sometimes less access (such as Wyndham). There appears to be an ongoing naivety of assuming a lesser distance on a map equals a benefit for transportation. Purpose built northern ports are playing an increasing role in the shipment of resources sourced in the north such as minerals and gas. Their value far outstrips anything else and this discrepancy will continue to grow.

4) Land of opportunity.

Some believe that it is simply an historical accident that northern Australia has not been developed; if it was the initial focus for white settlement than it would be the well-populated power centre for the rest of Australia. At a 1961 conference on the Development of Northern Australia, then Professor of Civil Engineering UNSW and Honorary director of research of the Water Research Foundation of Australia, Crawford Hugh Munro claimed the north is “far better endowed by nature in respect to water” than the south:
Hence if our engineers and scientists were confronted with an empty continent, and asked to recommend a plan of development, they would almost certainly give highest priority to settlement of the Northern Areas and Central eastern Areas. (Munro 1961:28)

It is this blindness to attempts at settlement and agricultural going right back to the 1820s that help create the sense of an eternal frontier. Either there is a belief that no-one has thought to tap the endless opportunities out there, or that those who have tried haven’t tried in the right way.

Soldier settlement attempts in the north are expression of the ‘Land of opportunity’ by governments as well as individuals. In 1922 a selection of returned soldiers sailed to Derby in the Kimberley to establish the Knowsley Agricultural Area. All of the soldiers left (Millington 1977).

The ‘Land of opportunity’ also beckoned further afield. In the late 1930s Isaac Steinberg promoted a scheme to establish a Jewish settlement in the Kimberley. The Freeland League for Jewish Territorial Colonisation, formed in London, was seeking areas to establish Jewish settlement. Steinberg, secretary of the League, sought help from Chomley, an Australian journalist working in London who in 1936. Chomley had published a pamphlet “The Rich North-West of Australia - An Appeal to youth and the spirit of adventure” to convince Britons to come to north Australia and was a member of a committee to examine large settlement prospects in the Kimberley, producing a 1934 proposal for Empire Settlement within the Kimberley by a national Colonisation Company. Getting nowhere with the British Chomley transferred support to Steinberg, “Jews or Japs?” he wrote in one letter to Australian officialdom (Gettler 1993:52-53).

Steinberg came to Australia, and the Kimberley. He lobbied well and despite encountering Australia’s racism gathered high profile supporters such as Bradfield, renowned engineer of the Sydney Harbour Bridge and dreamer of the Bradfield scheme: "Steinberg's vision of turning the wilderness into a Garden of Eden had rekindled the west's peculiar obsession with northern development" (Gettler 1993:105). Steinberg formed pro-Kimberley scheme committees which included the likes of Clunies-Ross then head of CSIR. Steinberg approached Canberra in the early-1940s but the war

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32 As discussed in Chapter 2.
33 Described in Chapter 8.
worsened, Australia was threatened by invasion, and he was advised to hold off. In 1944 Curtin wrote to Steinberg saying he couldn't support the scheme (Gettler 1993).

One of the most infamous, and expensive, attempts at large-scale cropping was Territory Rice Ltd in the late 1950s. Despite its name the company was owned by Americans, one of them a Californian media star Art Linkletter. Linkletter writes how the whole idea was seeded when Harold Holt, then Federal Treasurer, proclaimed to the guests at a stag party that Australia was as the western United States a hundred years ago with millions of acres of “untouched virgin land...abundant natural resources... and on the verge of a rich expansion. Nowhere else in the world is there a place where money invested today will pay such high dividends” (Linkletter 1968:1) Ten years later millions of dollars were lost.

The more time passes, however, the more of a paradox this idea of frontier becomes. The more attempts are made, the more money is invested, then the more history must be wiped clean and the frontier recreated afresh in order to remain a place of opportunity. The nature of the north itself contributes to this sense of frontier. Its size, low population, distance from government centres (except more recently Darwin), and climate. So people see space and water. ‘Open’ or ‘empty’ land equals opportunity; and in Ernestine Hill’s parlance “Water into gold” through agriculture, the legacy of the southern irrigation areas (Hill 1937).

When this idea of the Land of Opportunity is challenged there is still a backlash. The need for a frontier dies hard. The report of the Northern Australia Land and Water Taskforce, although drafted by members representing a cross-section of interests and drawing upon substantial work by CSIRO, received an emotional and negative response from some quarters. Liberal Senator Ian Macdonald claimed the taskforce was compromised by conservationists and produced an anti-development report. (ABC Rural 6 May 2010) While the National Farmers Federation claimed “there's huge potential for agriculture in northern Australia, despite a Federal Government report finding that the north can't be the nation's food bowl” (ABC Rural 8 February 2010).

This sense of opportunity is felt in a number of quite different ways. One is the supposedly factual element of economic opportunity through available land and water. Another is more esoteric but seems to be just as important to those who come to the north - the culture of opportunity. Freedom, space and opportunity are how some who
came to the north and stayed expressed it (Conversations 4, 20, 14, 10). One Ord farmer explained “The Ord attracted people who liked new ideas – pioneers” and “No-one blinks when you do something out of the ordinary” (Conversation 10).

5) Making it white.

*Australia set herself a gigantic problem when she proposed to hold a continent solely for the white man. The magnitude of the problem impresses one more and more as one penetrates farther and farther into the north.* (McGuire 1939:195)

As a foundation stone of the Australian nation the White Australia policy is confronting. And it was still clinging on, and clung to, even by the 1970s. Barton’s speech on the Immigration restriction Bill in September 1901 sets the tone. It is blunt, stating that “There is no racial equality...These races are, in comparison with white races...unequal and inferior” (Reynolds 2003:173). Racism in Australia’s history is not a by-product but a by-line or brand.

This discussion explores how the push to make the tropics white also motivated agricultural development; how agricultural development was seen as a means of settling the north with a white population, and protecting it for a white nation.

In 1894 the potential for northern Australia to become internationally contested living space was presented in the publication of the Australian book *National Life and Character*. The author Pearson explains that it was the last part of the world where the “higher races” could “live and increase freely for the higher civilisation”. Historian Henry Reynolds shows the ongoing influence and significant role this book played in later public debate and thinking (Quoted in Reynolds 2003:176). Australia’s “failure” to colonise the north was more than an Imperial embarrassment; it was a concern for others too. Australia’s then Prime Minister Alfred Deakin publically agrees in Parliament with US President Roosevelt’s warning in 1906 to populate the far north (Walker 1999). In 1909 the British Immigration League was formed to stave off suggestions that non Anglo-Saxons should be encouraged to help settle the north. This was to be the role of “a stout community of yeoman farmers”, British and rural (Walker 1999:117), harking back to the “Golden Age” idealised in the previous century and discussed in the previous chapter.
Of course the north has never been white; a fact that seems to have horrified the south of Australia. In his book ‘North of Capricorn’ Reynolds illustrates the public opinion of the south in the first half of the last century and the perceived scandal of the ‘piebald’ north. Quoting extensively from material of the day, including from Sydney’s *Bulletin* and *The Worker*, Reynolds shows the South’s distaste and suspicion of the multi-racial north. He details how salt was rubbed into southern sensitivities with the local economic success of non-Europeans, particularly galling when Australia was intended to be for the Whites. As Reynolds notes it is a surprise that there was little comparable expression of this ideology in the north (Reynolds 2003).

In 1911 at the time the Commonwealth gained responsibility for the Northern Territory from South Australia “only” 1,698 Europeans were living there. The North Australia White Settlement Association urged patriotic white Australians to ‘go north’; peopling this great area is “the greatest and most urgent of Australia’s problems” as “the menace of the empty north continues” (c1920:2).

At one stage it was proposed using Italians to help keep Australia white. Under the heading “Italy to keep Australia white” a 1927 newspaper article quotes from a prospectus document sent from the Melbourne based Austral-European Share Settlement Company, “Help to populate the Empty North of your own Continent with industrious agriculturalists from Europe. Help to keep Australia White. Help yourself.” It goes on to propose introducing Italian families to the Territory “to engage in the cultivation of tropical agricultural products on a share basis” (*Northern Territory Times and Gazette* 4 March 1927:1).

In documenting his boys’ own adventure across the north in 1927, *Through a Land of Promise: with gun, car and camera in the heart of Northern Australia*, Michael Terry writes that white men will not continue long without healthy women by their side:

> For the species must be propagated of pure white blood. Any provision, any legislation, any inducement to increase the white folk in the North is too likely to be jeopardised, unless the case of the women is made an equal or better, a greater factor in the determination for this welcome change. (Terry 1927:165)

This inducement comes in the form of “thermantidotes” such as cool houses, fans, ice as so that they are "impelled not alone by love of their menfolk." These devices must also be accompanied by "intelligent and applied tropical hygiene" as promoted by the
medical profession. (Terry 1927:165) Terry's book reflects the accepted views of the time as expressed in populist literature. The necessity of encouraging white women to northern Australia to establish a white population is mentioned, sometimes forcibly, over the next several decades.

Terry's thermantidotes and emphasis on tropical hygiene also mirror a broader debate on white people's capacity to live and work in tropical climes; a fundamental one in relation to the potential development of Northern Australia and means to achieve it (Walker 1999). The North Australian White Settlement Association used explorer (and member) David Lindsay to reassure that the country can be “occupied by the white race” who quoted “Dr Breinl, tropical expert” who “sees no reason to anticipate race deterioration” (North Australian White Settlement Association c1920:4).

Renowned Queensland medical scientist Raphael Cilento contributed volubly to this debate providing 'evidence' from north Queensland to support the potential for white success in the tropics (Price 1939). In The Cultivation of Whiteness Anderson forensically investigates the history of medicine and 'white Australia' including the shift in attitude from the Tropics being “No place for the White Man” to “The Making of the Tropical White Man” (Anderson 2002). Where medicine was originally an obstacle to white settlement it later came to sanction and enable a White Australia (Anderson 1997).

In his 1937 book Conigrave has a whole chapter on the white Australia policy stating that “There is no argument as to the wisdom of a White Australia”. His passionate support for the White Australia policy is tempered by his warning that Australia sits in Asia, so while we proudly declare we are 98% white we must be “prepared to pay the price for it” (Conigrave 1937:251). Conigrave chastises Australia for its complacency.

Summing up factors limiting Northern Territory's agricultural development in their inquiry Payne and Fletcher did not shirk from identifying any factor they believed relevant, one being the low ratio of women to men, which does not appear in commentary nowadays. They explain that it is "difficult to establish a progressive and virile community unless these conditions can be overcome" (1937:8). Those who feared the worst saw this as a strong inhibitor to white settlement and intensive agriculture in northern Australia.
Soon after, in the 1938 book “Australia’s Empty Spaces”, British writer, Fellow of the Royal Geographical Society and the Royal Empire Society, Sydney Upton quotes, on the opening page, German writer Otto Corbach, commenting on the empty strip of northern Australia – “A thousand million coloured people are bursting to deposit their vast surplus population on the opposite shore, to break into the domain, so rich in promise, of the White Man.” (Upton 1938:19) An apparently surprising and incongruous choice when reading it in the 21st century and knowing it was written just before war with the Germans; however a reminder that the British still harboured views of the superiority of the white empire, sharing them with the Germans and, of course, the Australians who were still strongly upholding their White Australia policy. Although Upton tempers the public assumptions of the actual potential for the development of those ‘empty’ spaces later in the book he does go on to warn of the threat of the Japanese (Upton 1938:21).

This ongoing sense of urgency to settle the north with a white population was equalled by the sense of primacy of this goal. The nature of the public debate shows that it was more than just the ‘manhood’ of British Imperialism at stake (acted out through Australia); the future of the white race in the tropics, and therefore its place in the world, was the main game (Walker 1999). Two hundred and ninety nine pages are dedicated to this cause in a special publication of the American Geographical Society White Settlers in the Tropics by the Australian academic A. Grenfell Price who addresses the “problem of white settlement in the tropics” across the world with case studies in Australia. Price blamed in part this lack of success with the coloured races, “The third obstacle is the coloured people” (Price 1939:38), supposedly illustrated by the improvement of life expectation of white males in tropical Queensland after the expulsion of the Kanakas (Price 1939:36). Price’s tome brings ‘science’ to the cause of settling the north for the white race.

And it was not just those on nearby shores that had to be excluded. The Chief Protector (for Aboriginals) in the Northern Territory, Dr Cecil Cook, states in 1938 that:

…the native actually has become an intruder in a white man’s country. Politically, the Northern Territory must always be governed as a white man’s country, by the white man for the white man. (Quoted in Day 2005:244)
The Chief Protector’s views are now confronting to read. Ernestine Hill in her classic ‘The Great Australian Loneliness’ writes about the “Half-caste – A Living Tragedy”: interviewing Cecil Cook who she describes as “anthropologist, biologist, bacteriologist, Chief Medical Officer and Chief Protector of Aborigines in North Australia” who explains that after ten years of research in the north:

The problem of these half-castes can quickly be eliminated by the complete disappearance of the black race, and the swift submergence of its progeny in the white. (Hill 1940:225)

Deservingly this driver had the makings of its own undoing’s, an inherent contradiction, for without immigration what was the north to do for a labour force? Yet it seems that the consensus became that a White Australia and racial purity came first, even before agricultural development; hence the importance of the debate around white Australians’ capacity to live, work, and breed, in the tropics.

There were those who identified the inherent contradiction and lack of realism of this driver:

But cotton, sugar and tobacco are not going to fill the north with people: not in the present Australian economy and against the world-competition of cheap labour. Australia set herself a gigantic problem when she proposed to hold a continent solely for the white man. (McGuire 1939:195)

‘Making it white’ was still running strong in the second half of the 1900s. As the Northern Australian Development Committee was being formed by the Commonwealth with a flurry of assertive letters and telegrams between coastlines of the country, a draft Terms of Reference by the Premier of Western Australia was circulated. The first objective was “1 - An increase in the white population” (NAA: A431, 1947/1255). This objective did not remain in the final published list.

In a national conference held in 1961 on the development of Northern Australia participants were not shy of this:

Above all, the tropical Australian does not have to contend with the pressures stemming from an indigenous population bent on advancing themselves at his expense...The absence of such tensions is one of the clearest advantages that Australia possesses in her attempts to people the north with white communities. (Brown 1961:100)
In the first half of last century ‘Making it white’ was closely linked to the first two drivers of security and legitimacy. In the literature of the time we see the triumvirate discussed together regularly by white writers, policy makers and figures of the time. The debate over the development of the Ord River, and for Commonwealth assistance for the Ord scheme epitomises this. In making the case for further financial assistance by the Commonwealth in 1964 (essentially to build the main dam) the Western Australian Government states in the second sentence of the Foreword that “Excluding the eastern coastal strip of Queensland, the northern part of the continent supports less than 100,000 white people” (Government of Western Australia 1964:1). This sentence is left hanging.

There is no recent public record of this driver. Anyone wandering the markets of Darwin or Broome would see just how unlikely a white north would ever be, and most tourists delight in the multiculturalism of the north, now a drawcard. Nowadays it is overseas labour that enables the mango industry of the Territory to survive. In Katherine in 2011 while trying to check in to a motel/caravan park I was informed “You want a quiet room love? Last night I had to tell 30 Fijians sitting in the middle of the road to keep their singing down. And the backpackers might be partying tonight. Picking season!”

6) Feeding the world.

“The world is growing and we need more food” (Conversation 4)

"We know that one of the main factors limiting future food production will be water.” (Boelee et al 2011)

We have moved on from the need to produce rice to quell the communist rebellion. Now there is a strong articulated current of opinion about Australia’s responsibility to help feed the world clear in many discussions and related to a concern about the growing global population and the threat of climate change to food production. “With climate change people will become more reliant upon it [the Ord Irrigation Area] for food and water and it will become a food bowl over time” (Conversation 19).

In the 1950s rice production was being urged upon the north to feed the hungry of south-east Asia, and hamper Communist efforts (Norman 1953; Chapman and Basinski 1985). The Minister for Territories Paul Hasluck was quoted “the Federal Government
was making a vigorous drive to establish large-scale commercial rice growing in the NT" (*The Advertiser* SA April 30 1953). He explained that the intention was to “guard against a world shortage”.

This intertwining of the drivers of ‘Feeding the World’, ‘Making it White’ and ‘Securing the Nation’ is replayed through time. The 1960 Forster Committee report on the “Prospects for Agriculture in the Northern Territory” explains the need for development has become stronger:

> Population pressure in regions to the near north of Australia and the need for food supplies for the projected world population increase in the next 25 years make it essential that Australia should define its development policy relating to this area. (1960:9)

In 1965 Patterson, then director of the Northern Development Division of the Department of National Development in Canberra listed what may be considered the intangible benefits of northern agriculture including “to satisfy Australia’s moral international obligations with respect to the millions of Asians living at subsistence levels on Australia’s northern doorstep” (Patterson 1965:4).

In late 2011 the Federal Coalition was promoting agricultural development in the north in the context of Australia’s role in global food supply. When Opposition finance spokesman Andrew Robb, heading a policy development taskforce stated "..we can materially develop the north and get to a point where we can feed not 60 million people but 120 million people." (*The Australian* 17 September 2011) there proceeded a run in the media. Two days later Liberal Senator Bill Heffernan, long an advocate for increased agricultural development in northern Australia, backed the call also highlighting the issue of population growth and the need to feed nation’s such as China who could not feed their own (*The Australian* 19 September 2011). Nationals Senator Barnaby Joyce strengthened the sense of Australia’s obligation saying “Environmentalists’ opposition to more dams ignored a moral responsibility to use good agricultural land to produce food... Putting environmental restrictions on dam development did not override the need to do something practical about millions of starving people” (*The Courier Mail* October 6 2011) while the altruistic Liberal Senator Ian Macdonald during Senate Estimates challenged the Government for not doing enough to develop agriculture in northern Australia saying that the north could be producing food for a hungry world (ABC news 28 May 2010).
Paradoxically, by 2011 Indian Sandalwood overtook all other crops combined occupying over 50% arable land of the Ord Irrigation Area (figures from the regional economist of the WA Dept of Agriculture). The sandalwood produces aromatic oil. There is some tension around this, both in the region and outside. Although farmers were offered good deals to lease their land to the forestry company those that had felt mixed emotions. Despite acknowledged that they made more this way than farming for a couple it seemed to almost feel like an admission of failure. One even went on to lease land from elsewhere to enable him to keep farming (Conversation 10).

Correspondingly in the Daly Basin of the Northern Territory by 2012 forestry plantations (African Mahogany - *Khaya senegalensis*) occupied 10,000 hectares of the arable land available (Raison et al 2012). In the following year Tropical Forestry Services (TFS) who operate in the Ord region acquired two cattle stations in the Daly region to establish further plantations of Indian Sandalwood.

Conservative politician Andrew Robb, as Chairman of the Policy Development Committee of the Coalition, declared that through the “bold step of putting the development of northern Australia high on the agenda” they were, amongst other goals, “aiming to: Develop a food bowl that could double Australia's agricultural output.” According to Robb “an emphasis on premium quality can help us double the number of people we feed globally from 60 million to 120 million” and to manage the high cost of production we need to “focus at the quality end, rather than the fiercely competitive mass market end” (*The Australian* 21 June 2013). We need to feed the world – but the growing middle-class world who can afford to pay.

The discourse is consistent, if not internally logical. Australia has a moral responsibility not to leave potentially productive land idle when others are in need of food. This publically presented driver for agricultural development in the north is expressed more strongly today than at any other time in its emergence over the last 90 years. Given the growing dominance of forestry on available agricultural land in the north it seems that this is probably the most justificatory of the drivers – that most likely to be a Trojan horse for other motives – or a way to make development more palatable through moral suasion.
7) Plugging the money sink.

"North Australia has for too long been a "sink hole" for public money spent on the wrong projects." (Holmes 1963:38)

In a reversal to the perceived benefits of the land of opportunity this driver is the land of the financial black hole. Prime Minister Curtin in 1944 graphically described parts of the north as "vampires sucking away the nation's strength" (Quoted in Coombs 1977:5).

Perversely this concern becomes a driver to develop the north in order to ensure that it can stand on its own two feet and cease to be a drain on the public purse. Payne and Fletcher in their 1937 report sum this position up. They articulate how the Territory has been losing money; firstly while administered by the South Australians for 48 years, who incurred expenditure of over £6 million, and then by the Commonwealth for 26 years, whose expenditure was over £15 million “without material success”. In 1911 the revenue was £47,000 against and expenditure of £123,000. They recommend that to turn this around “investment of capital in the Territory...be encouraged to an extent greater than any encouragement given anywhere else in Australia” (1937:4,11).

Grenfell Price complains of the ongoing cost of northern Australia in a newspaper article just prior to this:

In 1928-29 we lost £576,000 on the Territory and its railways. We could have pensioned every white person there, and still made a large saving. Things have been slightly better in the Kimberleys and in Queensland, but it is difficult in those areas, which are integral parts of States, to obtain figures of loss. (The Advertiser 13 January 1934)

Christian and Stewart present this motivation in the very first line of their survey report of the Katherine-Darwin region; the comparatively slow development of northern Australia “has been a considerable financial burden to the remainder of the continent” (1953). They recommend a plan for the development of agriculture.

This concern that northern and remote Australia would remain a needy financial millstone around the neck of the nation still figures in some quarters today and the relationship between the Northern Territory Government and the Australian Government still reflects that tension. The Australian Government pours a disproportionate level of national resources into the Territory.
While Queensland pragmatically declined to take on the Northern Territory when offered the opportunity South Australia, however, was lured by the Land of Opportunity and when they ceded control to the Commonwealth the debt transferred was £ten million. Even the boosters admitted that the north was a tax burden (Robin 2007:128); another good motivation for development, particularly for the Federal Government who could not sidestep the ongoing commitment as Queensland had done.

When it attempted to kick-start plantation agriculture in the 1880s the South Australian Government had believed that this would help establish necessary infrastructure and allow further development. Agriculture would be a catalyst for development to redeem their investment in the Northern Territory. (Hillock 2000:31&33) The South Australian Government conscious of the “immediate reality of the balance sheet” were loath to pour in further investment “Yet any real development of the Territory called for greater expenditure not less” (Asche 2007:9).

In the context of this driver all and any development, including agriculture, was seen to be an essential means to disengage the toddler from the teat. In a summary for the National Archives Ling writes that there was a belief that “a populated north could make a greater contribution to the national purse and the Commonwealth could ultimately recoup some of its development costs.” (Ling 2012)

8) Indigenous opportunity.

If cynical one could suggest that this driver only emerged when it became apparent that Indigenous Australians were not going to disappear through assimilation. Until then it was not necessary to think about the role of the First Australians, except perhaps to bemoan their lack of suitability for agricultural labour (excluding pastoralism, of course, which would not be in existence of it wasn’t for the skilled unpaid labour and knowledge of country of Indigenous Australians).

So when did Indigenous opportunity and economic development become seen as a driver for northern agricultural development? A distinction here needs to be made. When it first arises this driver is more about Aboriginal welfare than opportunity and nuanced changes over time reflect the dominant policy attitudes at play at each time. This thesis cannot do this complex area justice, however it is worth noting how changing philosophies over time impact upon this driver and its expression through
agricultural development in the north. From when First Australians were literally a threat to the lives of the white usurpers, to the days of assimilation and the assumption that Aboriginal Australians would be bred out, through to the rhetoric of self-determination, the days of welfare, and now a growing policy of economic and business opportunity. A pivotal point in this history is Aboriginal Land Rights. Suddenly the marginalised had some power to negotiate land use.

The sense of potential opportunity for Indigenous northerners rarely arose in relation to agricultural development prior to the 1970s; in fact it is a surprise when referenced immediately post WWII for the Northern Australia Development Committee. Although Curtin established of the Committee primarily for concerns of defence the second objective reads “the welfare and development of native inhabitants of the area”. As it happens there appears to have been little change for Aboriginal northerners from this work (Coombs 1977). Another exception was the 1966 book Struggle for the North written by J.H. Kelly who actually worked with the NADC on the potential for the pastoral industry in the north. His book contains a chapter “Human Rights for Aborigines: Prerequisite for Northern Development”. In his paper on the economic justification of the Ord scheme Patterson wrote that an intangible benefit may be “to provide a solid base for the employment, assimilation and settlement of aborigines” (Patterson 1965:4) Patterson’s line also introduces the fraught complexity and contention in the term and definition of Indigenous ‘opportunity’.

A little known chapter is that of CSIRO’s Katherine Research Station (Phillips 2004). Described as a post-war employment opportunity for Aboriginal people that led to the first major and “licit camp within close reach of the town” (Merlan 1998:37), CSIRO developed a residential area for Aboriginal workers and their families in the late 1940s lasting for over two decades. The key Aboriginal and CSIRO figures who together made the “camp” a success and challenged the race orthodoxies of the town deserve more historical attention.

In the 1960s Terra Nullius still prevailed regarding the north, despite the history of strong resistance to white invasion of the Kimberley, as captured in the history of Jandamarra (Pedersen and Woorunmurra 1995, Kinnane 2008). It was empty country; perpetuated also by the belief that legitimate ownership is marked by certain types of use, cropping being one of them. Peoples perceived to be without agriculture were not
truly in possession of law and rights and land\textsuperscript{34}. So when the Ord River Irrigation scheme was first mooted there was no discussion about, let alone with local Aboriginals and Traditional Owners.

When the diversion dam was built creating Lake Kununurra in the 1960s, and then the main dam in 1971, creating Lake Argyle and flooding over 1,000 square kilometres of country, no thought was given to the impact upon local Aboriginal people nor was any attempt at consultation made. It appears that the traditional owners weren’t even advised of the potential flooding. Yet the Durack pastoral family homestead was relocated. One traditional Owner informed me that she came back from school for Christmas holidays to discover everyone gone and Old Argyle Station, her home and country, flooded (Conversation 28). The flooding extinguished native title on 3000 square km of land. The area of irrigated agriculture and the building of the new township of Kununurra were causes of further impact. (KLC 2004)

Yet less than ten years later a joint Commonwealth and Western Australian Government review of ORIA in 1978 identified the negative impact of the Ord scheme upon the local Indigenous population:

\textit{The review committee accepts the view that, in some measure, the development of the ORIA has contributed to the dislocation of the life and religion of Aboriginal people living in the area by destroying land of sacred and traditional value (Young 1979:5).}

Later the East Kimberley Impact Assessment Project (1985) also made this case. By the time the WA Government got around to extending the Ord scheme (to fulfil the potential cropping area originally intended) Native Title had changed the game. Who sat at the table and who had power at the table had changed. Before embarking on negotiating this next stage of the Ord scheme the Traditional Owners of the area, the Miriuwung and Gajerrong peoples, wanted to talk about the first stage, 40 years after it had occurred:

\textit{...they had no interest in negotiating on any development of the Ord Irrigation Project Stage 2 until such time that the impacts of Ord}

\textsuperscript{34} As articulated in Chapter 2.
Irrigation Project Stage 1, caused by the building of Lake Kununurra and Lake Argyle dams, were addressed.\textsuperscript{35}

As a result the Kimberley Land Council was funded by the Western Australian Government to undertake an impact assessment and to determine how such impacts could be addressed (KLC 2004).

The Ord Final Agreement (an Indigenous Land Use Agreement) was negotiated over a period of about 5 years providing requisite native title consents and heritage clearances for the second stage and envisaging the creation of job opportunities in the agricultural, industrial and residential development industries. The Agreement provides resources to, among other things, establish and operate the Miriuwung Gajerrong Corporation (MG), \textsuperscript{36} allocated up to 800 hectares of freehold land to Traditional Owners, and obliged the developer to negotiate an Aboriginal Development Package for the provision of employment. According to the current chair of MG, the mob is happy with what’s going on, and they have a handle on what’s going on (Conversation 18). This is a dramatic change. Yet not as large as one would hope, or expect, after all this time. At the time of this discussion in 2011 the Kimberley Chamber of Commerce was organising an economic development forum, to which the Miriuwung Gajerrong Corporation had not been invited.

Now there are not only no Indigenous farmers in the Ord there appear to be no Indigenous people employed in agriculture. According to a number of accounts this wasn’t always the case. One local involved in agriculture (Conversation 14) believed there was greater engagement in the 1970’s in cotton. Another, a farmer, tells a similar story of his enterprise (Conversation 23). In a photo from the 1980s of the farm workers 40\% of them are Indigenous. Now none of this farmer’s employees are Indigenous.

The current situation does not deter everyone. In discussion with a senior government figure committed to Indigenous opportunity through development “Agriculture is a tool


\textsuperscript{36} The Agreement provides community benefits of $24 million over 10 years to establish and operate the Miriuwung Gajerrong Corporation (MG), including a special economic development unit; $11 million for the Ord Enhancement Scheme, to address the recommendations of the Aboriginal Social and Economic Impact Assessment of Ord Stage One; and $6 million to the Department of Conservation and Land Management (CALM) to fund the joint management arrangements with the Miriuwung Gajerrong of six new conservation areas.
for solving the socio-economic issues of the north” (Conversation 12). We had been talking about the example of Aboriginal employment targets for local industry such as Argyle Diamonds through the Argyle participation agreement. I was advised by a local that people wondered why when the agriculture department have ignored us for 30 years do they want to talk now?

Even more inhibiting was the unresolved business of chemical poisoning of locals. One long-term local explained:

Indigenous people didn’t actually work in cotton but DDT aerial spraying was liberal, to say the least, and the community was right on the edge of the agricultural land. (Conversation 19)

In a later interview the regional manager for the Department of Agriculture commented that they need to get Indigenous people involved in agriculture however there are still “hang-ups” with cotton because of the DDT in the 1970s and the use of 245T for weed eradication generally in the 1970s and 1980s. (In fact a compensation claim had recently been undertaken.) Recognised as a barrier by the department an educational trip was organised taking locals down to NSW to learn about the cotton industry there and how much practices had changed with chemical use.37

A previous executive of MG also believed that agriculture could contribute to Indigenous economic development but “only if agriculture manages to happen!” (Conversation 15) “It’s been 6 years since the Agreement and we’ve seen nothing yet. There’s always a problem come up that people didn’t expect”. Ironically enough this interview occurred at the same time that an outbreak of the fungus rice blast in the latest, much feted, Ord rice crop was made public.

In 2009 the Ord East Kimberley Development Plan was released announcing the further development of 8000 ha of irrigated land with $415 million of joint investment by the Commonwealth and WA Governments.38 The Commonwealth Government acknowledged it was trying to move away from the usual approach of single big infrastructure and attempting to innovate with a wide-ranging package across portfolios including investments in education, health, housing and community infrastructure (Gray

37 There is not the space in this thesis to cover this story in the detail it deserves.
38 Further detail is in Chapter 8.
Gary Gray, then Commonwealth Parliamentary Secretary for Northern Australia explained while revealing several key drivers:

...no serious government could ignore the social disadvantage in East Kimberley...The Australian Government therefore saw an opportunity to simultaneously contribute to nation building, to address Indigenous disadvantage, to stimulate the economy and to give East Kimberley an ongoing growth momentum. (Gray 2009:7)

In the Northern Territory there was no equivalent of this public push for Indigenous opportunities through cropping, though some support for Indigenous pastoralism continues. In fact when the Wagiman were making a Land Claim on the Upper Daly the NT Government submitted that “The loss of this land could significantly effect (sic) the possible Stage II agricultural development of the Daly Basin and A.D.M.A. intends to challenge the claim on this basis”. Justice Kearney’s response was damning and named the implicit assumptions of the government:

I see no reason to believe that the lands recommended for grant would not be farmed...there is no reason why the traditional owners would not seek to participate in it [agricultural development], when it becomes practically and commercially feasible... The Land Rights Act now has more flexibility than in the past....There is not the slightest reason why Aboriginals should not be good farmers... (Kearney 1991:131)

A Traditional Owner from the Daly River was emphatic in our discussion as to the lack of Indigenous involvement in agriculture:

None whatsoever. Only when they wanted our land for it. They’ve never been consulted in anyway... That was part of the agreement when we gave them the land that Wagiman people always have to be notified of any developments in our region. Government hasn’t really... haven’t gone through with the agreements. (Conversation 30)

Changes are occurring if at least in the rhetoric. The Northern Territory Department of Primary Industry and Fisheries Industry Development Plan 2013-2017 contains an objective “Indigenous Participation - both supporting Aboriginal employment and encouraging business development” (Northern Territory Department of Primary Industry and Fisheries [NTDPIF] 2013:10) to support engagement in primary production in general (not just cropping).

It is not straightforward. A recent empirical study raises further doubt on the capacity for conventional development to assist Indigenous standard of living. Research in
northern Queensland shows that money flows from the Indigenous to the white economy but not back the other way; what the authors label “a profound and asymmetric ‘disconnect’ between these economies”. They suggest that assuming benefits will ‘trickle down’ from expansion of the non-indigenous sector is wrong, rather structural change is required (Stoeckl et al 2013a:1). Undermining this driver a further paper shows that:

Indigenous people not only have more to lose from ‘development’ which erodes natural capital than do non-Indigenous people, but they also have significantly less to gain (Stoeckl et al 2013b:1).

An earlier paper argues that “factors other than raw incomes and economic production should be reconsidered and re-prioritised by governments as redress to the ongoing ‘problem’ of the North” (Taylor et al 2011:13).

9) Climate change and the water crisis.

The ten year drought that heralded the beginning of this millennium changed everything; until it rained again. One sideshow of Australia’s inexcusably bewildered response to water scarcity was eyes turning again to the north. Radio shock jocks, politicians, southern farmers and investors – a diverse range of individuals turned their expectations to the apparently abundant, and wasted, water of the north:

The National Farmers Federation says there’s huge potential for agriculture in northern Australia, despite a Federal Government report finding that the north can’t be the nation’s food bowl. Years of drought have crippled production in the Murray Darling Basin, leading governments and researchers to look to northern Australia where there’s an abundance of rain. (ABC Rural Report 8 February 2010)

During this period the apparent availability of northern water was referenced in context to the drying south, and became more regular in the media. Comments by high profile Coalition politicians, key figures and farmer bodies came in response to several key events: Australia’s 2020Summit, the expansion of the Ord Irrigation scheme and the release of the Northern Land and Water Taskforce report. Even Don Blackmore, Chairman of CSIRO’s Water for a Healthy Country Program, commenting that with scientists agreeing that there would be a drier southern Australia there were “very positive opportunities in northern Australia” (ABC News 22 April 2008). Although researchers used the context of climate change for their comments the conservative side of politics avoided this correlation referring only to the water crisis of the south. Earlier
in this push and quoted in a 2006 ABC Landline report Stuart Blanch of the World Wildlife Fund countered the view that the north was to get uniformly wetter and better for farming, and was therefore a substitute for the south.

The Peanut Company of Australia’s acquisition of northern properties was a response to climate change. Worried about changing peanut growing conditions in south Queensland and the resulting decline in productivity in the 1980s the company established trials in the Katherine region of the NT. The Northern Territory was seen as an area that would have the right climate and access to water. In 2001/2 they bought their first small irrigation farm and in 2006/7 acquired a lot more. Then CEO explained the motivation was to manage the company’s interests in the face of climate change (Conversation 1). By 2010 their three irrigation farms near Katherine were up for sale.39

Then Regional Manager of the Rangelands Region for the Department of Agriculture and Food Western Australia, writes identified climate change as a driver for developing agriculture in the north in 2009. Declining productivity in traditional farming areas in the south will “heighten enthusiasm to expand agriculture in the northern region” (Chilcott 2009:13) while acknowledging, on the other hand, that climate change could also create a future threat for that very expansion.

This driver came up in only a minority of conversations, predominantly those working for government agencies: “people will become more reliant upon the north for food and water – it will become the food bowl over time” (Conversation 19) and “the south is getting drier and we have water ‘by the bucket load’” (Conversation 4), both referring to the Ord Irrigation Area.

10) Managing risk and diversification.

This driver emerges relatively recently in comparison to the others, and seems integrally linked to managing both climate variability and climate change. It relates to several levels - individual enterprises, industries and regions or jurisdictions. In the case of individual enterprises and industries, families and companies are seeking to spread their activities across geographic and climatic zones. In the case of regions or jurisdictions

39 This story is told in more detail in Chapter 9
they are seeking to diversify their income and employment base across a range of industries.

The increased frequency of extreme events seems to have provided further impetus to growers to mitigate risks, leading to increased interest in investing in the North West. One example is Queensland banana growers investing in the Northern Territory (Conversation 16) and showing interest in the Ord region (Conversation 19). If a cyclone again hits the eastern coast the north western crops will be particularly profitable, and this may be enough to cover for the North West’s fluctuations in productivity and profitability. The Peanut Company of Australia, discussed above, also shows a company spreading risk of production across different and presumably more suitable locations.

Reliance upon a particular industry or market is also seen to create risk, and agriculture is seen to provide a means for diversification. A local government member commented that one driver for agriculture was to diversify away from a dependence upon mining, for some, agriculture and pastoralism are the long game, not mining.

This sense of the vulnerability in the north from over reliance upon a single industry or market came to a head with the temporary ban on live cattle export. Not only were the cattle producers left reeling but a previously unconsidered collection of supporting industries was stung, from helicopter mustering firms to fodder crop growers. The fodder growers of the north were left with cattle feed that others couldn’t afford to buy, and with no means of recouping their investment of dollars and effort. According to the ex-CEO of the Peanut Company of Australia this would have been a killer blow for them if they had not already put their properties up for sale. Fodder cropping is still the only profitable rotation crop for peanuts, making the difference between viability or not.

Governments are also keen for the benefits of diversification across industries, a stated incentive for establishing the Agricultural Development and Marketing Authority (ADMA) in the Territory which had bipartisan support.

This Government strongly believes in a multi-sector economy to ensure economic stability in the Territory. We believe our proposal to foster the development of agriculture... is an important dimension in the pursuit of a sound and diversified Territory economy (Hansard, 20 February 1980:2758).

Chapter Four - The Power of Ideas
The Chief Minister of the Northern Territory in 1982 stated that economic diversification was essential “and agriculture will almost certainly be a major contributor to the Territory's future economic well-being” (Steele 1982:1).

Today in the Territory? According to one government employee one person with a sticker on their car constitutes an industry, thereby warranting government support – the result of a small population base and government desperate for development. An old hand in the north explains how important diversification of industry, and of agricultural industries, are for the Territory (Conversation 13).

Clusters and Scale

Although drivers emerge at different times, the last few most recently, most continue throughout the coloniser’s history of the north. Clustering of motives reflects the relationships between the drivers with those more closely related often appearing together. For example in the post WWII period three motives are often packaged together – ‘Securing the Nation’, ‘Legitimating the Nation’ and ‘Making it White’. All three have at their core the desire to claim and hold land for a white Australia, and a strong strain of nationalism. Sometimes, however, there was a fundamental tension between these drivers and what they sought, as was the case with those who believed agriculture could not thrive in the tropics without imported, i.e. non-white, labour. A quandary if you believed in the White Australia policy, yet sought success in the tropics.

A current expression of clustering is in the Federal Opposition’s 2011 push for northern agricultural development. Here ‘Land of opportunity’, and ‘Feeding the world’ come together regularly in their explanations. For some these are also inescapably tied with ‘climate change’.

Another distinction between the drivers is the scale at which they are most strongly at play; the motivations for a national government will be different to those of an agricultural company or farmer. Hersperger et al (2010) identify that “driving forces form a complex system of dependencies and interactions and affect a whole range of temporal and spatial levels”. For example security is most clearly a national concern. It has consistently been a driver for the Federal Government, particularly post WWII, and less so an issue for individual enterprises or farmers. On the other hand the ‘Land of
opportunity' is clearly a driver for the level of private enterprises and individual farmers; whether the Los Angeles industrialist Allen Chase in the 1950s, who formed Territory Rice Ltd, or Ord and Daly farmers who also saw potential to establish a family farm.

There is also the push pull between levels of government in this regard. Large 'nation building' projects are also seen more to be the province of the Australian Government, at least to fund. An additional complexity is that competition within the Federation meant that there was sometimes pressure from other jurisdictions against development such as Qld pushing against a sugar industry in the North-West.

The heterogeneity of northern Australia in environment would suggest that the drivers may have different trajectories and prominence in different locations however there seems to be only minor geographical differences in the drivers other than 'Indigenous opportunity'. Perhaps this reflects the predominantly national nature of the drivers or the dominance of the south where there is little distinguishing between the many 'Norths'; characteristic of the Frontier mentality.

**The Development Imperative**

*Both fear of Asians and hope of fortunes were, and are, factors in the story, but in part they are rationalisations. The fact is that any large, unused, unpeopled stretch of country presents a challenge to men of Anglo-Saxon origin. Most people of other traditions do not appear to feel the same urges, and some are inclined to shun empty spaces; but to the men of north-western Europe, empty spaces represent some kind of defeat that must be avenged. Does a basic lack of confidence lie at the heart of it - a need to prove manhood, to assert mastery? At any rate the emotions aroused by the idea of northern development are sub-rational, or para-rational perhaps; and an anti-Christ who writes a book called* The Northern Myth to prove that there is no crop grown in the north that can't be grown more cheaply, efficiently, and economically grown south of the Tropic of Capricorn, *must expect to be stoned...* (Huxley 1967:240)

Emerging most strongly from this description of drivers is the underlying and continuing imperative to develop; an imperative that is so implicit it is rarely challenged. Perhaps this is one explanation for the intense backlash to Davidson's work, shown in the previous chapter, such as from Charles Court, then WA Minister for the
North West, claiming "there was a group conducting a crusade against the development of the north" (*West Australian* 28 December 1963).

At their core the drivers share this imperative that is carried along by the belief that development is unquestionably a positive thing, that brings solutions not problems, with all conquerable in its stead (whether the environment or the locals) and that all can benefit (whether the locals or the global hungry). These are epitomised by the political rhetoric used regarding the north. Seeking to double agriculture in the north Andrew Robb, leader of the Coalition taskforce developing the policy called for "... a culture of development ..." (*The Australian* 17 September 2011). Several years before it was the Labor Government’s turn when in a press release it announced “Taskforce to drive the North’s economic development” (*Australian Government Joint Media Statement* 21 April 2008). As Lesley Head describes “there are consistent attempts to naturalize the inevitability of the development process itself” (2000b:166).

The spread of the ‘growth fetish’ has been likened to the invasion of the European rabbit by historian John McNeill who illustrates the rise of economic rationality after the Depression (McNeill 2000). Geographer J.M. Blaut explains that the powerful idea that “progress is natural and calls for no explanation" (Blaut 1993:18) is linked to beliefs in Europe’s inevitable progress and an element of “Eurocentric diffusionism…the colonizer’s model of the world". In *Settler capitalism* Donald Denoon emphasises Robert Nisbet’s belief that “growth, progress, and development are to be considered as pervasive metaphors and he pleads that the metaphor should not be confused with the social reality which it illuminates..." (Denoon 1983:7) Hand in hand with development comes technological determinism, an assumption that all problems are conquerable through human technology – wit and will – or as Jules Pretty describes "science and technology are understood as having control over nature, with the solutions to nature's problems lying in cleverer and more sophisticated technologies." (Pretty 2002:151) In his Massey lectures Ronald Wright identified the genesis of the belief as the “Victorian ideal of progress” which has “become ‘myth’ in the anthropological sense” (Wright 2004:3-4) and philosopher Midgley similarly describes “The myth of inevitable progress” (Midgley 2004:14). Significantly they describe how myth becomes a way that we order and understand our past, but, even more importantly “They are the maps by which cultures navigate through time” (Wright 2004:4).
Progress is considered a given, it always occurs, and one taken for granted step is the intensification of land use through cropping. It has happened everywhere else; how can it not happen in northern Australia? Determinism is at play with this myth and comes with the assumption of human capacity to ‘conquer’ the environment, any environment, regardless of its characteristics. Human will and technology have led to increasing production across the world, what could possibly stop progress?

This myth is inherent in the drivers for agricultural development in the north, and therefore feeds Davidson’s own “Myth of the North”:

> Myths are not lies. Nor are they detached stories. They are imaginative patterns, networks of powerful symbols that suggest particular ways of interpreting the world. They shape its meaning. (Midgley 2004:1)

This belief system of the inevitability and benefits of progress, expressed so tangibly through intensive agriculture, sustain the drivers discussed above, buoying them along regardless of the actual environment and experience, and perhaps sloughing off major learning or adaptation at the level of the notational (grand) discourse. At a societal level the ‘signification’ (discussed earlier) distorts our understanding of the environments of the north, and our relationship with them.

It is rare that it is questioned by any in the mainstream. Reflecting back upon the work of the Northern Australia Development Committee he chaired in the 1940s, Coombs acknowledged that the committee mirrored the optimism and prevailing views of the time:

> 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...” (1977:8)

Forty years later it is salutary to ask whether this situation has changed. In general the public expression of the drivers does not seem to become more nuanced over time with increased knowledge although we do see a difference in the implementation of these through research, policy, planning and the private sector.

The philosopher Midgley asks “How do ideas change?” explaining how urgent this question is given that “patterns of thought that are really useful in one age can make serious trouble in the next one” (Midgley 2004:4). I will come back to learning and forgetting in Chapter 12.
Chapter 5: Forever Frontier?

Conjuring Australian Arcady

Next to the Government Garden the Delissa Company's estate is the only sight in the Northern Territory to which a visitor can be taken to observe anything like a systematic cultivation of the soil... No one who has ever visited the spot can have left without being deeply impressed with the mighty vigour and pluck which has in the brief space of eighteen months converted a silent wilderness into a vast flourishing garden. (Northern Territory Times and Gazette April 1882)

The drive to create “a vast flourishing garden”, an idealised farming landscape of families and churches, is nothing new in Australia, or elsewhere in the New World. This script is replayed again and again, across time and place, and the north of Australia is no exception.

The draw to create Arcadia in northern Australia has been playing out up here for much longer than most people realise, and still emerges today. White Australia has been dreaming about a northern Arcadia since the British settlers arrived. This desire, and its attendant attempts to create Arcady through the 1800s and early 1900s, is explored by J.M. Powell in his book Mirrors of the New World. He describes how this sense of "abundance" was projected across the New World, indicating a pervasive belief which he describes as “a powerful rationalistic faith originating in the Old World” (1977:78).

The practical expression of this belief was supported by communication of:

...a usefully blurred picture of the physical and social environments of the new territories, an image of attractive and bountiful rural landscapes inhabited already or in some future time by an independent, virtuous, patriotic and industrious population... (Powell 1977:49)

Powell shows how this hopeful, often deluded, and rarely fulfilled expectation is played out in countries across the New World. These young societies were trying to transform their Territories and themselves as peoples. Open, ‘unused’, ‘undeveloped’ land, all that
Australia appeared to be, was seen to provide this opportunity whether in the Americas, Canada or Australia. Three elements in his quote are significant: the “blurred” picture and communication that was necessary to create a sense of bounty and opportunity; the moral nature of this enterprise and type of society it would create; and finally that it was small-scale farming that would populate the landscape. Wynn’s environmental history of Canada furnishes examples, politely labelling boosterism assessments of the British North American colonies in the 1850s and 1860s as “Positive, optimistic, even euphoric” (2007:153).

A wonderful example of how communication “blurred” the reality of the new territories and fed expectations for an Arcady is provided by Carol Lansbury in her work on Australia in 19th Century British literature. Lansbury catalogues how Samuel Sydney, who, though never travelling to Australia, became England’s “acknowledged authority” on the continent and thereby influenced populist opinion with his works *A voice from the far interior of Australia* in 1847 and *Sydney’s Australian handbook* in 1848. Additionally, perhaps more significantly, Sydney influenced the work of other popular writers, including Charles Dickens. Together their work encouraged settlement of the Australian colonies and peddled “a belief in a Golden Age which could be regained by a return to the plough and a furrowed field beneath a clear sky” (Lansbury 1970:44). Why is this important? Lansbury’s words express it best - this interpretation of “Australian life, Arcady and Australia became reality for Australian as well as for English readers, and this myth has the power to shape history” (1970:3), echoing Midgley’s writing on myth.

Powell also describes the role of British literature in fabricating an Australia by “discounting real and sobering experience for that conjured from secondary snippets and fireside imaginings...and the colonization business prospered in the new imagery.” (1977:132)

Epitomising this desire to create a “Golden Age” in Australia through farming, and revealing its early origins in British work, is the 1846 quote of John Stokes from his publication *Discoveries in Australia* which describes his survey of Australian waters while in command of the HMS Beagle. His vision for the Gulf Country of northern Australia, his “plains of promise” (Bolton 1967, Rolls 2002:163) is with its horizon “broken by a succession of tapering spires rising from the many Christian hamlets that
must ultimately stud this country” (quoted in Courtenay 1982:121). In 2012 a project to trial farming in the Gulf of Carpentaria, Queensland is without irony labelled “Plains of Promise” in Queensland newspapers.

Imaginative rendering of the Arcadian potential of northern Australia did not finish with the British. It continued through South Australia’s time of tenure of the Northern Territory, even to the point of would be beneficiaries resisting the transfer of the Territory to the Commonwealth from the time of Federation until 1911. Due to the prevalent belief that the Territory would inevitably become an economic success through agriculture optimism was once again enabled through the glossing over of inconvenient characteristics and pioneer experiences. The belief came from definite sources: the success of plantation agriculture by the British in India; apparent success of sugar plantations in north-east Queensland; and the agricultural colonisation of their own State (Atherton 1991). However it was, once again, “blurring” of information that supported these expectations over time, despite lack of success. Positive accounts of northern agricultural potential were “extracted from generally more balanced accounts” of early explorers Leichhardt, Gregory and Stuart, and then widely publicised (Powell 1977).

Dominant Territory characters and self-appointed boosters, cloaked with the credibility of their apparent first-hand knowledge, also played a significant role in perpetuating South Australia’s belief in the future success of Territory farming. They included figures such as M.W. Holtze, Director of the Darwin Botanic Garden, and Langdon Parsons (who played various roles including Government Resident of the Northern Territory). Indeed Atherton labels Holtze’s 1901 paper for the South Australian Branch of the Royal Geographical Society as “the misleading propaganda possible from an ‘expert’ with misperceived beliefs” (1991:8). “Mistaken notions” could become, and stay, entrenched due to a lack of transport and communication technology at the turn of the 19th century which limited first-hand experience (Atherton 1991:7).

In 1955 geographer and academic Griffith Taylor decries what he terms “propaganda” by government, more harsh than Powell’s term “blurring”, for “proclaiming the remarkable attractions of the empty lands of Australia, including the huge tropical areas, without adequate knowledge of the lands involved.” (1955:6) This tangle of communication (whether misinformation, lack of information, vested interest or
nationalism), and how it influences the ‘Circular Conundrum’, is explored in Chapter 11.

Reliance upon unjustified rosy information is not something left in the past. In 2006 a journalist enthuses about the Ord Irrigation Area:

...a vibrant patchwork of broad-acre and horticultural crops. Up here, they say, you could stick a nail in the ground and grow a crowbar. From sugar to seed, mangoes to melons and citrus to sorghum, the Ord scheme is home to about two dozen different types of crops. (ABC Landline 12/11/2006)

This otherwise seasoned reporter, Mark Willacy, was clearly overwhelmed with optimism. Senator Barnaby Joyce in late 2011 showed the ongoing appeal of the ‘vast, flourishing garden’ by proclaiming that “much of Australia could be transformed into a market garden if only it had water and people who could dream outside the confines of suburbia...We dream about developing in the places we already inhabit...We need to look further to the places we don't and have a vision that there are better things ahead of us." (Courier Mail 6 Oct 2011).

This transformative dream becomes bound up with Australia’s irrigation schemes, best epitomised by the Australian writer Ernestine Hill with the expression “Water into Gold”. Hill hailed the transformation of unproductive Australian country to a cornucopia in her 1937 book where she trumpets the beginning of “the transfiguration of a continent by irrigational science” (1937:vii), listing the Snowy River scheme in the south, the Burdekin Dam in North Queensland, and the potential of the Ord River in the Kimberley “the invisible and illimitable waters of Australia are now being revealed and redeemed, in affinity with our fertile soils to be a habitation for mankind...unveiling a New Australia to our eyes” (Hill 1937:viii).

Hill’s writing reveals the moral nature and religious fervour associated with conjuring Arcady in Australia. In describing the Murray Darling Irrigation scheme she opines "...they built an immortal heritage by faith and courage, and by the work of their hands in the tilling of the fruitful earth, the labour designed by God, as we believe, for man" (Hill 1937:viii). Bearing a striking resemblance to the British writers of the previous century (Lansbury 1970:77) and emphasising Powell’s proposition of the moral nature of efforts to transform the New World (Powell 1977), Hill’s evangelical tone continues when describing the soldier settlements “the splendid regiments of soldiers who fought for
theirs in the Old World, and came home to find peace and happiness in the virgin lands of the New” (Hill 1937:290). It echoes the myth Powell describes, the New World as a grail to hold and fulfil these pervasive expectations that originate in the Old. Interestingly, in Hill’s later work, after travelling and living in northern Australia, her optimism for development in the north becomes more circumscribed and hesitant (Hill 1951).

What Powell calls “the agrarian myth”, the British desire for intensive cultivation and settlement by small freeholders, retained an influence across Australia. Best epitomised by the soldier settlement schemes following each World War these efforts have continued, "farmers' political organizations still exert extraordinary influence" (Powell 1977:81)40.

This recurring re-imagination of the Australian landscape and its opportunities as a potential cornucopia has fed Australia’s Frontier mentality and hence Davidson’s the “northern myth” even as internal colonisation from southern Australia replaced the British in efforts to transform the north into an agrarian Arcady.

**Early Colonial History**

Aspirations and hard work are nothing new to the agricultural history of the north. Northern attempts at food producing gardens and cropping are among the earliest in Australia’s colonised history and help us understand perceptions about the north, and the variables influencing failure.

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40 Although the Australian agrarian ideal remains embedded in the way Australia defines itself (in image if not actuality), and the power of the agricultural and farming lobby remains relatively strong, farming is changing. Farmer numbers have been declining for many decades. In the thirty years to 2011 the number of farmers reduced by 40% or 294 farmers every month for that entire time. From 2006 to 2011 there was a reduction of 11% or 19,700 fewer farmers in Australia (Productivity Commission 2005).
Figure 16. Map of first British settlement attempts.
Faltering start at settlement - 1820s to 1940s

In 1824 on Melville Island where Captain Bremer established Fort Dundas, the first white settlement in the Northern Territory, there was optimism regarding the potential for food production. In a letter to the Admiralty Secretary in London, dated 11th November 1824, Bremer writes:

The soil of this island appears to be excellent...all the plants brought from Sydney flourish luxuriantly. ... and the maize was above ground on the fourth day after it was sown. (Quoted in Curteis 1965:3)

Bremer is described by historian of the north, Alan Powell, as “the first in a long line of optimists who have graced the Northern Territory with their temporary presence” (1982:49). The optimism continued the following year with Captain Barlow who replaced Captain Bremer as Commandant. Reports of the positive potential for food production were relayed to Sydney in 1825, Barlow having harvested millet and planted cotton. Additionally a collection of plants was brought to Fort Dundas from Timor including cocoa, mango, tamarind and yams. Even the soldiers and prisoners’ huts had gardens attached. The settlement’s Doctor was less optimistic however, reporting scurvy as the main disease of the settlement and claiming the vegetable gardens were unproductive. Captain Barlow responded that the doctor was being “more gloomy than there is necessity for” (Quoted in Curteis 1965:4).

In Nov 1825 the colonial botanist in Sydney sent Captain Barlow a remarkably diverse range of seeds and plants, including “Plants of Pyne Apples, bananas, coffee, sugar, cochineal cactus, lemons, oranges, loquats, prickly pear, thyme, sago...hyssop and cactus for pickling, Capeea and guinea grass” (Quoted in Curteis 1965:4). This illustrates the diversity of species trialled and available early on as a result of the reach of the British Empire. It wasn’t just the case of European plants imposed upon an Australian context (as has been the critique of Australian agriculture). Perhaps there was an even greater awareness then of tropical plants, and certainly fewer restrictions to.

Yet the newcomers did not look to the country around them which harboured locally adapted species, or to the locals who were harvesting them. What is stark is the assumption, yet again in Australian agricultural history, that the only productive plants were those that were introduced from elsewhere. There seems to have been no attempt to learn about local plants from the locals, no attempt to experiment with eating and
harvesting bush tucker, let alone trying to establish production from local species. Next to command the Fort was Captain Campbell, arriving in September 1826. He likewise had hopes of vegetable growing, plus some rice production in the swampy ground, and, as with his predecessors, believed the soil and climate were good. The extreme events of wet season, however, proved to be a problem, and in April 1827 he writes "I am sorry to state that our exertions have been nearly all rendered vain by a very severe gale or tempest" (Curteis 1965:5). Fences, fruit trees, vegetables, huts – all were destroyed; yams were the sole surviving edibles. Personal relations and the health of the occupants sounded appalling. Six men had already died, five of fever. Campbell acknowledged that anyone and everyone would leave the place if they were allowed and able (Powell 1982).

Although trade was a key driver for establishing Fort Dundas the trepang fishermen were not visiting, perhaps due to the dangers of the Apsley Strait and their usual route being well to the north (Curteis 1965, Powell 1982). This, coupled with factors such as isolation and barrenness, led to the Colonial Office that year founding a second British settlement at Raffles Bay. According to Powell, London merchants pushed the government for a relocation of site, naval protection (two supply ships had also been attacked by pirates), and dropped their plans to establish an agricultural company (1982:50). A garden was begun and livestock delivered from Sydney. The long list of plants was as diverse as on Fort Dundas with some additional tropical items such as custard apple, ginger and arrowroot. The following commander wrote optimistically of the potential productivity of the garden however the tenor of reports changed under a new Commander (the third in two years), who believed that the soil was not suitable for cultivation and complained about the buffaloes regularly escaping.41 Orders to abandon both settlements came through from the Colonial Office in 1829. By then however, the next Commander of Raffles Bay, Captain Barker, felt that “The chief difficulties had been surmounted and the place has decidedly proved to be exceedingly healthy” (Curteis 1965:8). It seems that the courage, kindness and capacity of Barker turned the settlement around; an early example of the extreme importance of the individuals in leadership roles. Barker reported that Macassan proas were visiting, 34 between late

41 Buffaloes are now a feral animal in the Top End creating major environmental damage and requiring significant investment to cull them.
March and mid-May, and that the Malays were happy with British settlement (Curteis 1965, Powell 1982). Perhaps the slow nature of communication contributed to a decision being made without knowledge of this turn around, and scuttling a potentially successful colony. Melville Island, however, the site of the first settlement, was considered by its series of Commanders to be unhealthy and with impoverished soil. Its demise was inevitable.

The third and final attempt by the British only nine years later in October 1838 was Victoria at Port Essington (Powell 1982). Once again the settlement begins with glowing reports of successfully establishing cocoa trees, harvesting yams and potatoes, and growing coffee, nutmeg, cotton, sugarcane, breadfruit and bananas. Indeed the first Australian cotton sold overseas came from Port Essington, sent by the Assistant Surgeon and sold in the Manchester Market (Curteis 1965). Later however Captain McArthur also reported that Europeans weren’t suited to undertaking agriculture in those conditions and wished to import Malays. It was the first time tensions arose about whether and how this should be done in northern Australia, a debate that continues to the present day.

In a newspaper article published only a year after the Port Essington was established it was reported that:

The soil is excellent; plantains, bananas, orange, lemon, and tamarind trees flourishing, the growth of the sugar cane being quite astonishing...there is no doubt that every kind of spice, together with sugar, rice, and excellent cotton could be produce there. (South Australian Register 31 August 1839)

Bremer attempted to attract free settlers with the lure of 8 acres with flourishing gardens of fruit trees (Hill 1951, Curteis 1965). Yet an inspection arranged by the Land and Emigration Commissioners soon after culminated in a report baldly stating that the author Mr Crawford “could not conceive of a tropical region more unsuited for agriculture” and too remote from the Torres Strait for commerce (Curteis 1965:12). Another often used and damning quote comes from the famous T.H. Huxley who declared that the climate of Port Essington is “fit for neither man nor beast” (Quoted in Hill 1951). Sure enough Port Essington was abandoned in 1849. The South Australian Register calls the abandonment “a blot upon our national character”. The paper asks
why the tropical north is not being settled from British India, which they believe would “augur most happy and prosperous results” (21 November 1849).

In his substantial book on the history of the Northern Territory Alan Powell dismisses the agricultural and horticultural attempts of the colony in one line “Poor soils and harsh climate made agriculture of any kind difficult and commercial agriculture in the absence of Asian labour, impossible” (Powell 1982:56) and then proceeds to describe the shipwrecks in the area in some detail.

Did these settlements have an impact upon future expectations of the North’s productivity? J.M. Holmes believed they did not settle the question of agricultural potential, instead leading to ongoing debate regarding its viability stating that rather “they seem likely to have encouraged the conception of north Australia as a granary for the East” (1963:27).

According to Holmes this view was still held when South Australia began encouraging agricultural settlement by small landholders in the Top End years later in the 1860s (1963). Another pattern was set in motion; the role of the speculator and the wealth-seeking but unprepared government. Bauer describes South Australia gaining control of the Northern Territory in 1863 as the "biggest land grab in Australian history" (Bauer1984:6). Soon after a South Australian Act of Parliament opened half a million acres in 160 acre blocks near Palmerston (Darwin) for purchase to attract 'yeoman farmers' however most of the land was bought up by speculators from London and Adelaide, or by Adelaide politicians (Hillock 2000). One purchaser was the Northern Australian Company, financed in London with capital of £200,000. The South Australian Government could not produce the surveyed land and the company went into liquidation in 1869. Five years later one London based shareholder successfully sued for £73,000 compensation from the government (Davidson 1965, Hillock 2000). Blocks were finally surveyed in 1869 by the renowned South Australian George Goyder, surveying a second and more suitable site for Palmerston (now Darwin), three country towns and 267 lots of 100 acres for agriculture.42 None of the agricultural lots were taken up and nothing was grown.

Western Australia was having its own doomed attempts at this time. In 1863 a syndicate was formed to establish a settlement at Camden Harbour north-east of Derby in the north-west and in 1864 one hundred settlers, mostly Victorians, travelled there with several thousand sheep. The appointed Government Resident for Camden Harbour settlement, Robert Sholl, arrived in February 1865 to find "chaos and confusion" and the settlement was abandoned by October (Birman 1976). Administration problems, some pilfering by local Aboriginals, fear of the visiting Macassan poas, lost and dying sheep, and very dry weather were some of the reasons the settlement failed so quickly (Bauer 1985). According to Sholl himself the failure was due to the nature of country and social structure of settlers “All were masters- there were no servants” (Quoted in Bauer 1985:13).

The constraint on establishing intensive agriculture due to a lack of existing local labour force or peasantry was acknowledged very early on by the colonists. In 1876 The Reverend Wilton Hack who was engaged in mission and literary work in Japan initiated an attempt to bring in Japanese workers as peasant cultivators or as workers on plantations owned and operated by Japanese capitalists:

“Emigration, he admits, is a new thing with the Japanese, so that he may encounter more difficulties than he with his sanguine temperament contemplates just now.” (Northern Territory Times and Gazette 30 December 1876)

An insurrection in Japan put back The Reverend Hack’s cause however he was insistent and was informed that emigration of Japanese outside Japanese territory would be denied by the Japanese Government (South Australian Register 6 September 1877, Davidson 1965).

**Chinese feed the north**

The Chinese were the earliest and most successful of the growers, producing maize, rice and peanuts using small scale, traditional methods. Chinese market gardeners proved it was possible to produce small quantities for local consumption (Scholefield and Blackburn 1985). Sugar-cane was sold and consumed daily and ginger, arrowroot and cassava were also grown (Parsons 1884, Holtze 1884, See-Kee 1987). The Chinese had been in Darwin virtually from its foundation in 1867. By 1877 the Chinese outnumbered the Europeans, in fact did so until 1909, being 70% of the non-Aboriginal population by 1890, attracted by the goldmines to the south of Darwin (Reynolds 2003).
In 1888 there were 32 Chinese fruit and vegetable gardens and on a visit to Darwin in 1891 Lord Kintore noted that without the Chinese the locals would be left without fish, fruit and vegetables, and most of the meat supplies (Reynolds 2003).

In 1884 tobacco was successfully harvested and grown by local Chinese. A few cakes of manufactured tobacco were given to the Government Resident, Langdon Parsons who explains that although done incorrectly it was good enough to show the Minister of Justice and Education, with the caveat that it had been prepared by unskilled hands and no equipment. He regrets that an Adelaide newspaper had written unfavourably about the tobacco:

A cake of tobacco made by Chinamen without any of the machinery of a tobacco factory was not meant to be compared with William's 'Victory' ... nor to be smoked at all by a fastidious palate accustomed to these choice brands. It is however worth mentioning, from the commercial point of view, that the Chinese merchant, John Allen, informs me that it is considered 'velly good' by his countrymen, and that he will be able to sell all he can get to the islanders of the Eastern Archipelago...It is, I think, a pity in the early experiments which must be attempted in a new country to make the 'absolute best' the enemy of the 'possible good'. (1884:8)

Parsons' patronising representation of the local Chinese provides an insight to the colonial attitude that may have contributed to a lack of willingness to engage with and learn from the Chinese farmers and producers. In fact as Reynolds explains perhaps the very success of the Chinese producers was an implicit insult or threat to the British and Australian colonialists (Reynolds 2003); if those in power had worked with the Chinese to develop agriculture what may have resulted? Chinese agriculture came to an end as the number of Chinese fell and immigration became restricted through discriminatory South Australian legislation (Bauer 1964, See-Kee 1987, Reynolds 2003).

Slim Bauer's 1985 analysis of northern agriculture states "Indeed, the Chinese conducted the first – and for nearly half a century, the only – successful cultivated agriculture in the whole of the North-West." Of course these were closed down with the enforcing of the White Australia policy and a move against the use of 'nightsoil'
leaving Darwin bereft of locally grown fruit and vegetables for many decades (1985:15,21).43

**Late 1800s-early 1900s – Western Australia**

Alexander Forrest, renowned explorer of north-west Australia with text-book status in Western Australia, surveyed the North-West in 1875 then undertook a six-month exploration in 1879 ‘discovering’ and naming the Kimberley district, the Margaret and Ord rivers, the King Leopold ranges, and the vast pastoral country on the Fitzroy and Ord (named after the Governor of Western Australia) rivers (Bolton 2008). Forrest then set up as a land agent specializing in the Kimberley; by 1883 leaseholds totalling over 51 million acres (21 million hectares) had been granted in the district (Graham-Taylor 1978, Bolton 2008).

In 1906 Western Australia’s Surveyor General wrote to the Under Secretary for Lands suggesting an inspection of the Fitzroy and the Ord to determine where in the Kimberley tropical products could be grown. Two sites were chosen for experimental stations including 2,000 acres 24 miles from Wyndham for possible cotton, tobacco, maize, sorghum, bananas, rice, species of hemp, pineapples, sugar cane etc and rubber trees although nothing eventuated (Graham-Taylor 1978).

Just a few years later Adrian Despeissis became Commissioner of tropical agriculture for the North-West of Western Australia in 1910-12, also investigating tropical agriculture in Queensland, Malaya, Singapore and Java (Maskell 1981). He is cited as being "an expert in tropical agriculture" (Graham-Taylor 1978:25) however his background and primary expertise was actually in viticulture, originally in NSW (Maskell 1981). Despeissis believed damming the rivers of the Kimberley would make millions of acres of alluvial country available for agriculture with cotton becoming a

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43 An interesting side-story relates to the much lauded father and son team, the Holtzes. During the period of the late 1800s they were renowned for their success with the botanic gardens and in establishing a wide range of flourishing crop and food plants. In a letter to the NT newspaper Alfred Gore, Secretary Northern Territory Progress Association claims that the government had seized the land of local Chinese gardeners for the government (later botanic) gardens after the first attempt elsewhere by Holtze senior failed. Seeing the flourishing Chinese market gardens near Fanny Bay the area was usurped with no consultation, and no compensation, despite the Chinese gardeners’ having invested substantial, money, time and labour. *(South Australian Register 16 May 1889)* If true it would be a bitter distilled representation of the history of the north.
leading industry of the region. The story of the Kimberley and the Ord River region is covered in detail in Chapter 8.

**Push for plantations – South Australia’s Northern Territory in the 1880s.**

In the 1880s came the first endeavours at establishing sugar cane in the Northern Territory. The South Australian Government encouraged the birth of the industry with the Northern Territory Sugar Cultivation Act of 1880, and in 1881 the Executive Council of South Australia approved the apportionment of 100,000 acres of land. Over its brief life the Delissaville sugar-cane plantation was hailed in the press as a role model and won significant investment.\(^4^4\)

In a surprisingly realistic and insightful account of a visit to the Territory in 1892, the Premier of South Australia, Thomas Playford, summarises the failed plantations of the 1880s. Perhaps it is his background as an orchardist (Playford 1988). His itinerary by boat and land takes him to the ghosts of plantations past, a litany of failure and abandonment. As he travels between failed plantations he decries either the poor choice of site and soil, or the lack of real effort. From the “unfortunate sugar plantation” of Delissa, where shareholder money was “thrown away” on such poor land, to Owston’s “so-called sugar plantation” on the Daly River which Playford considered abandoned without a fair trial despite having some good soil. At the ruins of both Poett’s and Beatrice Hill coffee plantations, where the 5 foot high trees have been harmed or killed by bushfires, the soil is “decidedly unsuited for coffee” and at Sergison’s sugar plantation there is little sign of soil having ever been turned. Supposedly an imported disc plough would not work and the few canes that were planted were eaten by rats. Sergison’s funders withdrew and he had to leave. Brandt’s sugar plantation at Shoal Bay was being worked by someone else employing “Chinamen and blacks” and paying Mr Brandt a percentage. That season they expected to crush 30 tons of sugar from about 50 acres. Yet again, however, Playford is dismayed at the choice of location, the small amount of good soil, its proximity to sea level and flooding, and its distance from a navigable route. He believed if Brandt had chosen the good land on the Daly River he would have succeeded “and we should have had a number of other plantations working,

\(^{4^4}\) This story is told in detail in Chapter 6 ‘Sweet savannah’.
much to the benefit of the Territory” (Playford in *South Australian Register* 27 May 1892:6).

Of the above failed plantations Poett’s coffee plantation was an interesting case; it managed to grow four hundred thousand coffee plants in the nursery with 10,000 successfully transplanted to Beatrice Hill. However according to Langdon Parsons, the Government Resident at the time, there had been no preparation of land for such an extensive plantation. “Here again the Northern Territory has to bear the odium of an apparent failure, when the want of success may be clearly traced to preventable causes.” According to Parsons the land was “unquestionably good and well selected” and the plants themselves were “smothering each other in the nursery” (1884:6). Holtze who was the government gardener at the time, comments that the failure of Delissaville influenced the closure (Holtze 1884).

All Territory plantations had failed or been abandoned by the 1880s, both those encouraged under the Sugar Act and those attempting other crops (Payne and Fletcher 1937, Christian and Stewart 1953, Bauer 1985, Hillock 2000). In his summation of the potential for agriculture in the Territory, Playford is pragmatic. He regrets that there are limited areas of good land with good rainfall in the Territory, with the exception of a small area on the Daly, while some good areas on the Victoria and Katherine rivers would require supplementary irrigation. His analysis holds true today. Blame later falls on government incompetence (Hillock 2000) and speculators (Asche 2007).

**The true cost**

While the South Australians were trying to make their frontier pay, through pastoralism, mining and agriculture, a tragic story was playing out in the Northern Territory and the Kimberley; a battle for land and life. Official reports understated what was occurring, if mentioning it at all, and it took some time for the general public to become aware of what was happening in their name though in the interests of those who sought wealth in the frontier. While Langdon Parsons was bemoaning the unnecessary stumbling and delays in developing the agriculture industry he mentions at the back of his 1884 report the “Outrages by Aboriginals”, referring to the killing of four white men at the Copper mine on the Daly, and the “measured” response of the Europeans (1884:13). Later information indicates otherwise. Yet senior figures seemed to turn a blind eye. Reporting on a parliamentary trip to the Northern Territory in 1882 reporter William J.
Sowden is appalled at the situation explaining that white bushmen steal Aboriginal women, when male relatives retaliate white residents lead “revenge” groups to “shoot down a score of blacks or so, and call it English justice...These black live and die like sheep, only that there lot is more degraded. *And the whites degrade it*" (Sowden 1882:42).

**Commonwealth and the Northern Territory**

With the assumption of responsibility for the Northern Territory by the Commonwealth Government in 1911 there was a rejuvenation of efforts at development. The final years of South Australian rule had seen that government worn down by failed attempts so much so that at the time of the handover there were only half-a-dozen people engaged in agriculture according to the acting Administrator Samuel Mitchell (Ling 2012).

A number of experts visited the Northern Territory to report on development opportunities for the Commonwealth Government. They included an expert in Tropical Medicine to report on the healthiness of the region for Europeans, and concluding the climate was suitable; a geologist who saw good mineral potential; a Professor of Biology at the University of Melbourne, who studied Aboriginal people; John Gilruth, a veterinarian from the University of Melbourne, reporting on stock carrying capacity (and appointed the first Commonwealth Administrator in February 191246); and Walter Campbell, a retired New South Wales agricultural administrator, who advised on testing the Territory's agricultural possibilities and selected sites for three experimental farms (Ling 2012).

Two of Campbell’s three recommended experimental farms were established, at Batchelor and Daly River. Begun in 1912 by the first Commonwealth Administrator John Gilruth, by 1920 both had ceased (Ling 2012).

**Batchelor experimental farm**

The story of Batchelor experimental farm is another illustration of the hurdles to establishing cropping in the region, and the travails of those who try. One of these

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45 Refer to Chapter 2 for further explanation.
46 Becoming infamous as the Administrator under whom the 1918 ‘Darwin Rebellion’ occurred.
hurdles is managing the now contradictory nature of the simultaneous expectations for the failure of such an enterprise, and yet the success of agriculture. The Commonwealth and those appointed by it, and the southern press, were keen and optimistic regarding cropping potential, whereas the ‘seen it all’ locals expected failure, and almost seemed to welcome it, perhaps as much due to the growing sense of tough pioneer identity as for grist for the rather cynical local humour mill, as represented in the local press.

Already in 1915, the almost contradictory attitude of the media and public is apparent. On the one hand the scepticism from past failures is kept alive, partly through disparaging humour, and yet there is an expectation that widespread cropping is inevitable. This situation was epitomised by the £4,000 pound pumpkin, famed (not entirely unfairly) for being the sole produce of Batchelor farm and a story that captured the apparent waste, failure and farce immortalised in many Northern Territory histories (Hill 1951, Flynn 1963, Lockwood 1968, de La Rue 2011). A sceptical and self-parodying local newspaper article of 1915 captures the latter, describing a trip to the Batchelor experimental farm:

The opportunity of paying a visit to the demonstration farm at Batchelor, the historic home of the alleged £4000 pumpkin was one that particularly appealed to the writer, and he naturally seized it with both hands! It was not because he professes to be an agriculturist. As a matter of fact he does not do so. His knowledge of agriculture would not get him a job as director of that branch for the Territory even with political pull. He went out to Batchelor, fully prejudiced against the place, and came back pleasingly surprised, and yet a good deal perplexed at the futility of what he had seen. Without practical knowledge of farming it would be vain for him to speak, but he certainly did not regard the site chosen as an ideal one for agriculture.

(Northern Territory Times and Gazette Feb 11, 1915)

This extensive quote not only epitomises the attitudes I described above but raises one still current for the Northern Territory, the appointment of people to roles that they have no capacity to fill but have the political connections. About 100 acres were under cultivation, including maize, rice and Lucerne, and the cotton was thriving. The pumpkin tale captures what must have been the claustrophobic nature of a small frontier town and population, the unforgiving gossip and unremittingly relished memories that refuse to die.

Looking back 40 years later Ernestine Hill is even blunter about the initial outlay and naivety “Scores of farmhands came from south by steamer, fares paid, high wages.
Mowing a meadow that bobbed up again behind them overnight, they managed to get 20 acres ploughed in six months, a Territory record" (Hill 1951:275). Hill also tells the story of the Batchelor “pumpkin splendiferous as Cinderella’s coach”, now costed at £65,000 and “worshipped” by Gilruth (1951:275). Waiting to be shipped and shown-off in Darwin the pumpkin was stolen; another nail put in the coffin of Gilruth’s agricultural credibility.

It is a story that has thrived, and upon the like of which the North thrives. Despite the many who have written of it (Hill 1951, Flynn 1963, Lockwood 1968, de La Rue 2011) however, the author of a thorough history of Batchelor states, after recounting the story himself, was not able to find even one official mention of the pumpkin, and certainly not a photo of Gilruth and the pumpkin (Barrie 1982). Yet each time it is told the credibility of the story is enhanced.

Another article illustrates the “great difficulties” of establishing cropping, such as distance from markets, transient unskilled labour and pests. The author suggests the answer is a railway connection. He comments that the experiment farms have not been established long enough to show results particularly as they were started from scratch in virgin bush. Expectations were as difficult to manage as the farms. Although it will take some years large areas will become “abundantly productive” (Sydney Morning Herald 2 January 1915).

‘Success’ is as much reliant upon the competence of the administration of the day as on climate or markets. In the case of Gilruth his small local administration was reliant upon the decisions of the Commonwealth Public Service in Melbourne who controlled the purse strings (Powell 1982, Robin 2007). For example in just the first year an urgent telegram from External Affairs requested a short statement of progress as discussion in the House of Representatives on Estimates “may come on any time”. Gilruth understandably responded with what appears to be an overly rosy picture saying the farms were going concerns and work was well-advanced. Despite being labelled as profligate in his expenditure in the media, Gilruth was constantly under pressure from the Commonwealth to economise, the advent of the World War exacerbating this situation (Powell 1982) and in 1914 Gilruth advised the Minister that Batchelor farm would cover its working expenses despite this restricting the farm’s capacity to undertake the experimental work it was established for (Lockwood 1968). After four
years only 74 acres of the farm’s 2,500 acres were under cultivation, yet there was enough plant (farm equipment) to crop 3,000 acres (Lockwood 1968).

Even as early as 1914 there were reports of the farms being closed down, perhaps in response to incidents such as the 1913 court case against the farm manager for attempts to indecently assault the wife and daughter of one of the Russian workers. By 1920 the two experimental farms of Batchelor and Daly River had become Aboriginal reserves (Powell 1982, Ling 2012). Ling (2012) cites reasons involving the climate, insect pests and the overall environment, a short-hand that does not do justice to the complexity of the administrative and human context.

Did the Commonwealth learn from these previous experiences of the South Australians? According to Powell - no. The ‘expertise’ that was called upon all came from those with southern experience, from Campbell who first recommended the experimental farm sites, to the farm managers. Powell notes that very similar crops were trialled to those the South Australians had tried. In an echo of Davidson, though with a more realistic caveat, he notes that “almost anything can be grown with enough effort-if flood, drought or disease did not intervene—but high costs, labour shortages and lack of markets made the effort worthless” (Powell 1982:147).

In a post script to this story Christian’s 1946 journal of the CSIRO land survey describes meeting Dave Cameron who was farming the old Experimental Farm site. "He did not have much to say of the prospects of farming. Same old story - markets and in his case also limited supplies of water for irrigation.” (Christian unpublished 1946:26)

From the “taint of failure” to Army vegetables

There were other primary industry failures in the Northern Territory, together building the sense of risk and failure. One better known instance is the Vestey’s meat works in Darwin (1914 to 1920), what Griffith Taylor labels "The most tragic example of failure in the tropics" (1955:456). Citing Grenfell Price’s 1930 Problems of Northern Territory which explained that, although railway mileage and cattle exports rose, “railways

47 Although the manager was found not guilty of the charge, the NT Times editor was found guilty of contempt of court for criticising the behaviour of the judge. Fined one hundred pounds the Darwin townspeople paid on his behalf. Again in 1916 there were moves to close the farms down but the priorities of the War intervened (de la Rue 2011).
showed enormous losses, agriculture made no real headway, and the populations only rose from 3,301 to 3,982". Vestey's, with holdings up to 30,000 square miles and 200,000 cattle, spent about £1,000,000 on the meatworks. According to Price and reinforced by Taylor, "this promising industry was ruined, in the opinion of many competent judges, by the suicidal policy of the trade unions" (1955:456), a summation others may contradict. It was a dramatic time in the history of Darwin and of Australian unionism which ended in the Darwin rebellion and the popular ousting of Gilruth, the Administrator. Each of these moments in the North's history added to a sense of risk regarding investing in the frontier.

Christian describes this sense of living with the ghost of failure in his unpublished journal of the CSIRO land survey work:

> Visited the Lucy tin mine - no longer worked. This sort of thing seems to typify the Territory. Old mines no longer worth working. Old decayed homesteads no longer inhabited, tracks which must have led someone sometime with high hopes but which now end in nothing and other tracks marked on the map but which merely represent the general direction along which someone once passed, but apparently to nowhere of any importance...Stumbled upon a high swamp land area which had once been cultivated. (Unpub 1946:30)

Between the wars there was more activity in farming than since the 1870s. The most successful area was at Adelaide River Township where Verburg established a weir and successfully irrigated, growing substantial amounts of vegetables and some fruits. According to geographer Slim Bauer Verburg was 40 years ahead of his time with irrigation (Bauer 1985). But Verburg had no market and then discovered citrus canker obliging the destruction of every one of his 446 trees.

Needing to provide fresh fruit and vegetables to the 40,000 troops (Australian and U.S.) stationed in the Territory during World War II the Australian Army established farming at various places - Adelaide River, Hayes Creek, Katherine and Mataranka in the north along with several locations in central Australia, totalling several hundred hectares. The Army even established a 16 acre experimental farm at Katherine to determine what could best be grown with recommendations from the Council for Scientific and Industrial Research (CSIR) after a visit late 1944 (Cronk 2011). One report states that in 1944 the army farms around Adelaide River Township produced nearly 1,500 tons of vegetables and 54,000 dozen eggs (Mailath 1982:35).
For some the success of the Army farms is a rationale for the promise of northern farming. The most salutary and deflating explanation for this anomaly comes from Bauer: "Relieved of the necessity to turn a profit, and with ample labour and fertilisers, the farms proved to be the most successful agricultural venture the Territory had known, but they did not persist into peacetime" (Bauer 1984:12). And another “One fact emerged during the post war years: if manpower was available and costs were not a problem, the Top End could produce crops” (Mailath 1982:35). It is interesting though that he doesn’t distinguish here between horticulture and cropping, different systems though facing many of the same challenges.

**Forever Frontier?**

Meanwhile, tourists flying into Kununurra airport are welcomed to 'Australia's last frontier', a conceptualization that jars with both occupied Aboriginal space and intensive agriculture. (Head 2000a:xxi)

In Australia the broader agricultural story is seen overall as one of successes, and the northern cropping story needs to be understood in this context. Despite beginning with British farming practices and crop varieties much of Australian agriculture has adapted and innovated to increase productivity and compete successfully internationally. The last 150 years has seen dramatic change in farming practices, available inputs, genetics, mechanisation, and technology (Henzell 2007). This context of successful conventional agricultural development (though contested48) contributes to expectations of the north; if Australia can farm some of the driest and poorest country in the world than why not the Wet-Dry Tropics? Yet trends in modern agriculture such as increasing reliance upon "purchased industrial inputs" and "greater integration of production, processing, transport, storage and marketing" favour more intensive systems located near markets, revealing further the challenges for northern agriculture (Holmes and Mollah 1987:53). Australian agriculture suffers a perpetual cost-price squeeze. They add that “former

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48 There is not the scope in this these to take up this significant debate about the sustainability of Australian agriculture and its much documented impact upon the Australian environment. It would be useful research to undertake in regards to agricultural opportunities for the north.
expectations of widespread agricultural development have now dissipated” (Holmes and Mollah 1987:53), a conclusion this thesis challenges.

Modern industrialized farming is considered to have advanced its frontiers and intensified modes of production (Pretty 2007:140), a trend that feeds into our expectation that intensive agriculture should, and will, occur across northern Australia. And yet northern Australia defies this trend.

Overview of Cropping - 1824 to 2013

Elsewhere in the vast region of the long-dry-season savanna of the north, despite great effort, capital investment, expertise and in some cases dedicated personal commitment and heroism, attempts to establish wide-scale agriculture have proved to be colossal and expensive failures. The names Humpty Doo, Tipperary, Willeroo, and the Ord River stand like the shot-scarred battle banners of a gallant but defeated army in some cathedral alcove. Even today most of the lettuces come from Adelaide. (Jones and Bowler 1980:25)

It is salutary to realise that information as obvious as a current list of northern cropping schemes, a comprehensive historical overview and context, is not readily available and is therefore not being used in the public discourse about agriculture in northern Australia. There is no recent aggregation of cropping attempts across the north (Western Australia and Northern Territory) in any published literature. Christian and Stewart in their Survey report (1953) present a surprising amount of historical material on cropping in the context of determining cropping potential. In his *The Northern Myth* Davidson presents a very brief history of agricultural and pastoral development of the north including Queensland (1965). A still useful analysis was undertaken by Fisher et al in 1977 where they addressed six large-scale agricultural developments across the north, detailing the factors leading to their failure. In 1985 the substantial book *Agro-research for the semi-arid tropics: north west Australia* edited by agricultural researcher Muchow was published. A chapter by geographer of the north, Slim Bauer, was a comprehensive sweep across northern cropping (Bauer 1985); what he himself calls a 'brief history'. Most recently the CSIRO Northern Australia Land and Water Science Review glances over previous agricultural attempts in Chapters 6 (Cook 2009) and 9 (Webster et al 2009): the first addressing the broader historical context of agricultural
development rather than identifying the schemes or information about them, and the second by necessity only touching upon attempts.

Northern cropping is haunted by the ‘chicken and egg’ problem. The Forster report described the cycle of “poor prices because there was no market, no market because there were few people, few people because there was no industry, no industry because of the poor prices” (1961:2). What needs to come first? The chicken and egg metaphor mirrors the tussle between Davidson and Christian detailed in Chapter 3, where Davidson places markets as the starting point whereas Christian identifies land capability. This situation results from what Christian describes as “undevelopedness” (1961:18), the green-field nature of cropping in north-west Australia.

Several large-scale attempts at cropping in the north are renowned for unfortunate reasons: rice at Humpty Doo; cropping at Tipperary Station and Willeroo; and cotton on the Ord, the “colossal and expensive failures” of Jones and Bowler (1980). There were others less well-known, from earlier periods in the history of the north or smaller endeavours, such as the Northern Territory sugar-cane plantations of the 1880s; the World War I soldier settlement scheme near Derby in the early 1920s; the Camballin irrigation on the Fitzroy River in the Kimberley, Western Australia; peanuts near Katherine in the Northern Territory in the 2000s; and the rice and sugar industries that followed cotton on the Ord River Irrigation Area.

It is not possible to present detailed statistics across the area over time, even as simple as area cropped and amount produced. Even today data collection is poor, as acknowledged by government officers and producer peak bodies, and due to a range of reasons from producers not wanting to share such information to there being no standard collection method. (Conversations 16, 24) The cumulative area that has been cleared for cropping over time is larger than expected. Writing in 1984 on the impact of agriculture on northern Australia Bauer estimates that the area cleared for agriculture at some stage across the north must total over 1,000,000 ha. (Bauer 1984:14)

The table below captures the often unacknowledged number and extent of attempts. The narratives of Part II go on to explore them in detail, including the drivers and the impacting variables.
Table 3 – Abridged timeline of North-west Australian cropping schemes (discussed in Part II).

<table>
<thead>
<tr>
<th>Years</th>
<th>Location, scheme and company</th>
<th>Description and Crops</th>
<th>Comments &amp; References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1824-49</td>
<td>Fort Dundas, Melville Island; Fort Wellington, Raffles Bay; Port Essington, Coburg Peninsula (See Chapter 5)</td>
<td>Developed gardens and crops. One offered 8 acre lots with “flourishing gardens”. No uptake.</td>
<td>Problems due to climate, scurvy, tropical diseases, lack of supplies etc. (Hill 1951, Curteis 1965, Powell 1982)</td>
</tr>
<tr>
<td>1860s</td>
<td>(NT) Nr Palmerston (Darwin)</td>
<td>Half a million acres opened for purchase in 160 acre blocks. None developed and nothing grown.</td>
<td>Most blocks bought by speculators or Adelaide politicians. SA Government sued for 73 000 pounds as blocks not surveyed (Hillock 2000, Davidson 1965)</td>
</tr>
<tr>
<td>1863-65</td>
<td>Camden Harbour (NE of Derby, WA) (See Chapter 5)</td>
<td>One hundred settlers, mostly Victorians, travelled there with several thousand sheep. Nothing grown.</td>
<td>Syndicate formed to establish settlement. Abandoned in October 1865 due to range of problems. (Bauer 1985, Birman 1976)</td>
</tr>
<tr>
<td>1879-1913</td>
<td>(NT) Holtzes’ in Botanic Garden and experimental nursery - Darwin</td>
<td>Huge variety of plants grown successfully at very small-scale including sugar, cotton, rice, maize, jute, peanuts, tobacco, sesame, indigo, and arrowroot (Forster 1961)</td>
<td>Successful on garden trial scale. Holtze’s son took over from him. For first 3 years virgin soil was rich enough but with no manure supplied soil was exhausted by 1884, advocates for second garden upcountry and away from coastal influence. (Parsons 1884, Holtze in Parsons 1884, Christian</td>
</tr>
<tr>
<td>Year(s)</td>
<td>Location</td>
<td>Event Description</td>
<td>Details</td>
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<tr>
<td>---------</td>
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</tr>
<tr>
<td>1922</td>
<td>(WA) Knowsley Agricultural Area, near Derby</td>
<td>Returned soldiers sailed there Nov 1922. Four of the 100 acre blocks allocated for cotton.</td>
<td>Cotton failed within a year and soldiers returned south. (Millington 1977, Bauer 1985)</td>
</tr>
<tr>
<td>1947-current</td>
<td>Kimberley Research Station/ Frank Wise Institute</td>
<td>Trialled many crops including rice, cotton, sugarcane, oilseeds.</td>
<td>Established by WA Government and CSIR with joint funding from WA and C’tlth Governments. Later CSIRO withdrew and became Frank Wise Institute of WA Government.</td>
</tr>
<tr>
<td>1940-1945 (WWII)</td>
<td>(NT) Army farms – Adelaide River, Hayes Creek, Katherine and further south</td>
<td>Thousands of tonnes of vegetables, fruits and eggs produced.</td>
<td>Cheap labour force, adequate fertiliser, irrigation, no marketing problems and no necessity to show a profit - could not stand up to cost-benefit analysis. Agronomically successful but underscores economic realities (Bauer 1985)</td>
</tr>
<tr>
<td>Period</td>
<td>Description</td>
<td>Details</td>
<td>Notes</td>
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<tr>
<td>1953-1960</td>
<td>(NT) Government trials at Tortilla flats, Humpty Doo, 60-mile, Chinese gardens, Beatrice Hill</td>
<td>Predominantly rice (though also cowpeas, sorghum, guar, clitoria, oats, wheat, cotton, millet, Sudan grass, Townsville lucerne)</td>
<td>Annual Reports by NT Administration</td>
</tr>
<tr>
<td></td>
<td><em>(See Chapter 7)</em></td>
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<tr>
<td>1954-1959</td>
<td>(NT) Territory Rice Ltd, sub-coastal plains of the Adelaide River (60Kms SE of Darwin)</td>
<td>Aimed to develop 200,000 hectares and produce more than 400,000 tonnes of rice annually. At peak sowed 2,000 hectares.</td>
<td>Failed and went into receivership after just a few years.</td>
</tr>
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<td></td>
<td><em>(See Chapter 7)</em></td>
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</tr>
<tr>
<td>1960-1963</td>
<td>(NT) Four farmers, mainly rice, location as above</td>
<td>About 800 hectares farmed in total.</td>
<td>Financed by Commonwealth Development Bank and the creditors of Territory Rice All operations ceased after 1963. <em>(Fisher et al 1977:44)</em></td>
</tr>
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<td></td>
<td><em>(See Chapter 7)</em></td>
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<tr>
<td>1964-1972</td>
<td>(NT) Three pilot farms established Adelaide River</td>
<td>Two combed rice cultivation with cattle grazing, one just cattle. Rice uneconomic so two continued with cattle breeding/fattening.</td>
<td>In 1972 scheme terminated and the remaining debts of the pilot farmers written off. One original pilot farmer grew rice and developed horticulture. <em>(Martin 1983, Chapman et al 1985)</em></td>
</tr>
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<td></td>
<td><em>(See Chapter 7)</em></td>
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</tr>
<tr>
<td>1960-current</td>
<td><strong>WA Ord River Irrigation Area</strong> <em>(See Chapters 6, 7 &amp; 8)</em></td>
<td>1960 Diversion dam started</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1962 WA Government decided cotton to be principle crop</td>
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<tr>
<td></td>
<td></td>
<td>1963 Diversion dam completed (Lake Kununurra)</td>
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<tr>
<td></td>
<td></td>
<td>1966 Thirty farms and water fully committed.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1967 Australian Government agree to finance Main Dam</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1971 Main Dam complete</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1960-66</td>
<td>970 ha run by Northern Developments Pty Ltd. Trials rice, linseed, safflower, cotton - emphasis rice.</td>
<td>Results disappointing. <em>(Department of National Resources 1976, Fisher et al 1977)</em></td>
</tr>
<tr>
<td></td>
<td><strong>Ord pilot farm</strong> <em>(See Chapter 8)</em></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td><strong>Cotton</strong> <em>(See Chapter 8)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960s-present</td>
<td><strong>Rice</strong></td>
<td>Ongoing regular attempts at rice production. First commercial harvest on Ord</td>
<td>Most recent attempts in 2011 including by a major NSW grower. Yields affected badly</td>
</tr>
<tr>
<td>(See Chapter 7)</td>
<td>River pilot farm in 1961.</td>
<td>by rice blast outbreak.</td>
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<tr>
<td>(See Chapter 6)</td>
<td>2000 mill sold to Cheil Jedang</td>
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<td></td>
<td>2007 Industry closes</td>
<td></td>
<td></td>
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<tr>
<td>(See Chapter 5)</td>
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<tr>
<td>1971-1974 (NT) Willeroo Station, SW of Katherine - Northern Agriculture Development Corporation</td>
<td>Proposed commercial sorghum production and pasture improvement. Planned to clear 120,000 hectares in first five years, 80,000 hectares to be sown to Townsville stylo and 25,000 hectares to sorghum.</td>
<td>NADC formed to develop Willeroo 1970/71 - 800 hectares sorghum sown 1971/72 - 5,000 hectares 1972/73 - 10,000 hectares, feedlot started. 1973/74 - 4,500 hectares sown 1974 corporation went into receivership. (Fisher et al 1977)</td>
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<td>(See Chapter 5)</td>
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<td>(See Chapter 5)</td>
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<td>(See Chapter 9)</td>
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</tbody>
</table>
More Inquiries and Reviews, Commissions and Committees

Those who have personal knowledge of the north consider that it is a problem the solution of which can be demonstrated in a few years if the right way is adopted. The North Australian White Settlement Association (NAWSA 1922:2)

As Ernestine Hill says “Someone is always discovering the Territory… ‘forever piping songs forever new’” (Hill 1951:3) and the sentiment is appropriate for the north as a whole. Since just before the 20th century, when the South Australians were bemused by the failure of their northern acquisition to bear fruit, to the beginning of the twenty-first century, northern Australia has been subject to many inquiries, committees and the like.

As already established in the thesis northern Australia is anomalous in Australia and the globe in not following an expected land-use trajectory of intensifying agriculture – from extensive pastoral land-use to broad-acre and intensive cropping. There have been a plethora of processes over time asking why and what should be done. Opinions have been free and forthcoming as to how to manage the ‘problem’ of the slow developing north. One example is that published by the North Australian White Settlement Association c1922. Encouraging white people to move north, and government to enable this goal, the recommendations in their brochure are eminently sensible and all-encompassing: from close co-ordination between all interests; improved transport and communication; determining suitable industries through previous experience in Northern Australia and similar regions internationally; and providing residential, medical, educational, recreational, and labour-saving facilities. (NAWSA 1922) Early recognition, (from a surprising source), of the fundamental need to address the broader social context, a need often lost in later pushes for agricultural development.

Inquiries, reviews and reports.

Stuck on a continuous loop for nearly 150 years, inquiries and reviews and reports have been a regular response to the “problem” of developing the north. Inquiries range in the geographical scope and issues they address; from across the north, to one jurisdiction, to a particular scheme, and from specific queries of cropping through to ‘settling the north’. It is rare that any refers to those previous and likewise rare that recommendations are acted upon. The inquiry treadmill begins in 1895 when the South Australian Government created a Parliamentary Commission to investigate the lack of
development in the NT, the Northern Territory Commission. Hillock (2000) is scathing of the Commission explaining that they did not confront the issues and were not willing to acknowledge the limitations of the South Australian Government. These measures by bemused and ham-strung governments have been undertaken at a State/Territory level or by the Commonwealth, regularly since this first instance.

The 1911 W.S. Campbell report (Northern Territory) regarding the suitability of lands for agriculture was the first of very few to catalyse actual outcomes. Campbell recommended the establishment of experimental farms, quickly instituted by the first Commonwealth Administrator of the Territory, and almost as quickly to fail, as illustrated earlier this chapter (Campbell 1911).

Cook claims that these countless reviews produced further agricultural visions and recommended the research needed to achieve them (Cook 2009), capturing the essence of the ‘how not why’ discussion in Chapter 3. Cook does not do the inquirers justice however, many of who were cautionary in expectations. The 1925 Buchanan report for the Bruce-Page Government reinforced that “pastoralism and mining were the only industries of promise” (Powell 1982:168). Payne and Fletcher reporting to the Commonwealth in 1937 on land development policy in the Northern Territory titled one section “Facing the facts” with the report blunt and realistic in its assessment of the limitations for agricultural development (1937:7).

The 1960 Forster Committee Report Prospects of Agriculture in the Northern Territory for the Commonwealth Minister for Territories was a remarkably comprehensive report that has yet to be bested for background material, maps and detail; perhaps to be expected given the committee was led by Professor H.C. Forster, then Dean of the Faculty of Agriculture at the University of Melbourne. Outcomes of this report concluded that rice growing on the sub-coastal plains and the use of improved pasture was ‘economic’, but for any worthwhile progress, government assistance would be required. Recommendations went into extraordinary detail and informed detail spanning government policies, Pilot farms, Research and Experiment programs, and government scientific services. 49 They are dominated by matters related to agricultural knowledge.

49 To illustrate the detail the one section “Government Policies for Rural Industries in the NT” includes establishing an advisory council and a farmers’ organisation, introducing freehold for land suitable for
though, particularly for rice and peanuts. The report reflects a centralised concept of expertise, as do other reviews, recommending strict control of farm practices by a single government appointee, in this case a “Land Development Commissioner”. Forster preempted Davidson's concerns of financial viability, asserting that although experimental farms and research stations could help determine agricultural practices only pilot farms could determine the actual cost of production and the "best economic farm system" (1961:8). Despite this markets did not figure in the recommendations.

A flurry of reviews followed the failure of the cotton industry in the Ord River Irrigation Area, undertaken by both the Western Australian and Commonwealth Governments (Young 1979). At this time also, with the beginning of self-government, the Northern Territory established a review into factors affecting agriculture and seeking recommendations to increase production. The 1979 Lapidge reports were the first of regular reviews and feasibility studies (Lapidge 1979a&b, Thomas 1983, Cowley et al 1987, Northern Territory Government [NTG] 1991, NTDPIF 1994, Cameron Agriculture 2000, Wylie 2002, NTG 2011) along with work from relevant departments and research stations. Meanwhile studies into the Ord’s prospects continued, with some jointly commissioned by the Western Australian and Northern Territory Governments (Hassall and Associates 1993, Government of Western Australia 1994, Kinhill Pty Ltd 2000). The Northern Territory adopted many of the Lapidge recommendations in implementation of ADMA50; one of few such examples, and unfortunately one that exposed the optimism of the review.

In 2014 there are again a number of Commonwealth processes in play, following close on the heels of the Northern Australia Land and Water Taskforce report and sister CSIRO publication: an inquiry by the Australian Parliament’s Northern Australia Committee “to define the future of Australia’s North—a region vital to the economic future of the nation” and a process to develop a Government White Paper on developing Northern Australia which will “set out a clear, well-defined and timely policy platform

agricultural development, reforming farm credit, subsidising transport and fertiliser, and even incentives for public service recruitment.

50 See Chapter 10 ‘Going Grain’ for further detail of Lapidge’s recommendations and how they were implemented.
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” (Commonwealth 2014)

Committees, commissions and departments.

“Someone is always discovering” (Hill 1951:3) a government agency or even ‘new’ cross-jurisdictional mechanisms for working across the north, whether a northern Ministerial forum, a whole-of-government committee, a cross-jurisdictional meeting, or an office or agency for the north; there have been many versions over time. Even the most dramatic option, a northern State, has been posited since before Federation. One example, a 1934 private British report Proposal for Empire Settlement within the Kimberley Division (Western Australia) by a national Colonisation Company suggests building roads, railways and international ports, establishing experimental and training farms, improving stock-raising and exploiting opportunities for agriculture. This blueprint was similar to one produced by the Freeland League 5 years later proposing a Jewish settlement scheme for the region (Gettler 1993).

Government processes have been numerous, flying in the face of views that the north has been neglected, at least in meetings, minutes and intentions. Western Australia began with the North West Department in 1920 (Graham-Taylor 1978, Bolton 1986), while the Northern Australia Development Committee formed by the Commonwealth in 1944 was the first attempt to consider the north as a whole.

Table 4 – Chronology of Commissions and Committees, not definitive.

<table>
<thead>
<tr>
<th>Year</th>
<th>Commission/Committee</th>
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<tbody>
<tr>
<td>1895</td>
<td>South Australian Parliamentary Commission to investigate lack of development in the NT</td>
</tr>
<tr>
<td>1920</td>
<td>North West Department Government of Western Australia</td>
</tr>
<tr>
<td>1926-1930</td>
<td>The North Australia Commission formed under the North Australia Act 1926 of the Commonwealth in cooperation with Qld and WA;</td>
</tr>
<tr>
<td>1939</td>
<td>Fyfe Royal Commission to inquire into the pastoral Industry Western Australia but recommending also on irrigated agriculture;</td>
</tr>
<tr>
<td>1944-1948</td>
<td>The Northern Australia Development Committee formed by then Prime Minister John Curtin with members from Commonwealth, Western Australia and Queensland;</td>
</tr>
<tr>
<td>1951</td>
<td>Kimberley Development Committee with Commonwealth and WA Government membership;</td>
</tr>
</tbody>
</table>

Chapter Five - Forever Frontier
Many of these processes achieved little for a variety of familiar reasons. The 1926 North Australia Commission was directed to prepare a plan for Northern development with cooperation with Queensland and Western Australia. A very general report on a development scheme was produced and no recommendations were adopted. The Commission was under-resourced and a new government abolished it in 1931 (Payne and Fletcher 1937, Kelly 1966, Powell 1982, Ling 2012). This story is repeated to the present, the most recent example being the 2010 Northern Australia Land and Water Taskforce established by Commonwealth Government;
Taskforce. Their huge sweep of recommendations included: increasing government investment in data collection, surveys and analysis in natural, social, cultural and economic to aid planning and local decision making; reviewing land tenure, water entitlements, and lease-hold arrangements for diversification; recognising Indigenous needs and rights for water; and establishing a Council of Northern Australia chaired by the Prime Minister. The diverse membership of the Taskforce achieved a consensus report that recognised Indigenous Australians and the diversity and complexity of northern Australia’s social-ecological system. Backlash from boosters and conservatives was immediate and emotional. As with the Commission 85 years earlier the taskforce was under-resourced and rushed, and a new government discounted their report with apparently nothing followed-up. And the cycle turns again with the next round of reports from the Joint Select Committee Inquiry (2014) and the White paper process for developing the north (Commonwealth 2014). One of the Inquiry’s seven priority recommendations is the creation of a Department of Northern Australian Development based in Northern Australia (Joint Select Committee 2014).

Settlement on very poor land cannot be forced without wasting money and wrecking lives. Many of our 'vast empty spaces' are as fully occupied as they will ever be. (Payne and Fletcher 1937:7)
PART II – STORIES OF CROPPING

Cropping is not a new thing in northern Australia, either in thought or action. The stories of cropping in Tropical Australia, specifically the Wet-Dry Tropics, flow together to begin as the story of White Australia’s inexperience with an alien place in an unfamiliar continent. The relationship between the Continent’s recent colonisers and the place has been explored by geographers, environmental scientists and environmental historians. Often this work concludes that the colonisers have brought inappropriate and therefore destructive land management practices, knowledge and institutions from Britain and Europe: imported views of the world and nature that we have imposed upon this very old ‘New World’ (Seddon 1997, Dovers 2000, Robin 2007). One would assume that over time this would change, through experience, learning and the growth of relationship with place. In some instances this is so, in others there is still an imposition of inappropriate ideas, this time not from the Old World but from the south of the Continent, a complaint that northerners, both Indigenous and non-Indigenous, now make.

The narratives in the following five chapters illustrate a broad sweep of cropping attempts over time and location. They show how the drivers of Chapter four have led to many, and varied, attempts at cropping when the enabling conditions have been present; from a fear of creeping communism in South East Asia in the rice story of the Fifties to a response to climate change by the Peanut Company of Australia at the turn of this century. They also reveal the many variables at play that impact upon cropping in north-west Australia, discussed in detail in Chapter 11.

Davidson concludes in The Northern Myth that it might be possible to grow dryland peanuts at a large scale in the Northern Territory with only a small subsidy but that “Irrigated production of sugar, rice, cotton, linseed, safflower and tobacco” would require large subsidies for “Only radical changes in techniques or prices would decrease the amount of subsidy required” (Davidson 1965:261). Once again he points out that only sugar yields are higher in the tropics, all the other crops produce higher yields in the south and at a lower cost.

How we define failure or success in the context of cropping in the north depends on many factors, revealing the continuing complexity of the debate. Scale is one key, and the Ord River Irrigation Area is a fine example to illustrate this point. With the ‘third’
wave of farmers we now see success on a farm enterprise scale. At a community level we see a successful farming community that has generated local social capital through sharing information and support. At a regional level it gets trickier. Socio-economic impact statements show that the consequences of the scheme for the Indigenous population have been negative in many different ways, although substantial efforts are being made to turn this around as discussed in Chapter 4. For the thriving tourism industry the establishment of the dam and the township of Kununurra have been foundational. At a State level one would need to weigh up benefits and costs (many hidden); at a national level the scheme does not provide a perceivable blip in the economy of the country despite what has been significant ongoing public investment.

As the narrative structure is based around crops information about specific places has been distributed between chapters. Where a crop has been particularly important to the history of a place, such as cotton and the Ord River Irrigation Area, than the majority of detail and history of that place can be found in that chapter.

In the following stories we see the shifting and sometimes invisible line between the visionary and the delusional, occasionally the charlatan, each projecting their dream and beliefs upon northern Australia.
Chapter 6: Sweet Savannah

1860
South Australian Government offer 250,000 acres of 160 acre blocks around Darwin. Fails and government pays compensation of £173,000 (1860s)

1870
South Australian Northern Territory Lands Act passed (1872)

1880
Sugar bonus offered by Government of £5,000 (1875) and N.T. Sugar cultivation Act passed

1890
100,000 acres of land apportioned by SA Govt for plantations (1881)
Delissaville Plantation established (1882)
Manager 'forced out' (1883)
Small amount of sugar produced (1884)
Delissaville Company wound up - Daly River Company created (1885)
Plantation Manager arrested for murder (1886)
Company assets sold off (1889)
All plantations failed or abandoned (late 1880s)

1900
Annual sugar production on Ord stage II (1900-2010)

1910

1920

1930

1940

1950
Royal Commission on sugar industry (1950)

1960
Research at Kimberley Research Station (KRS) (1951-57)

1970
Research at KRS (1964-68)

1980
Research at KRS and pilot farm (1975-82)

1990
Sugar planted commercially and sugar mill constructed at Ord River Irrigation Area, owned by CSR (1994-95)
Mill sold to Korean company Cheil Jedang (CJ)
Concerns at lack of scale and progress of Ord stage II (mid-2000s)
CJ/ grower stand off
CJ leaves, WA Government package to growers (2007)
Mill dismantled bits sold off
2013 - Chinese company wins lease to grow sugar on Ord stage II
Sugar cane is a crop of the tropics. As Courtenay said in 1982 “sugar remains supreme” (Courtenay 1982:125), as it does today when comparing its area and output values with other cropping in tropical Australia. This success, however, is only in small coastal/eastern pockets of the wet tropics of northern Queensland, the “physically better-endowed” (Courtenay 1982:132), not in the vast tracts of the Northern Territory and Western Australia, the ‘north-west’ of this study. Sugar’s success in Queensland was due not only to the use of the best areas available, small as they are compared with the total, but to the institutional arrangements that were established - controls and subsidies - that protected the industry and perhaps hindered its establishment elsewhere in Australia (Courtenay 1982). In talking of the success and importance of sugar to Queensland in the first half of the 20th century the British writer Paul McGuire expounds:

Sugar is Australia's great tropical crop, deliberately subsidized and protected for its contribution to the development and the defence of the north. Without sugar, the north would still be a province of the cattlemen and the miner (1939:189).

One could say that the latter is still the case for all that is west of that narrow coastal strip of Queensland.
Figure 17. Sites of sugar schemes
Two stories of very different attempts are contrasted in this chapter. The first is the South Australian Government’s push to achieve financial returns from its acquisition of the Northern Territory through the encouragement of plantations in the 1880s. The second, one hundred years later, is the establishment of a sugar industry in the Ord Irrigation Area in the East Kimberley of Western Australia in the 1990s; an effort that also eventually failed. There may, however, be another chapter for the sugar story in the north, with the acquisition in 2013 of the lease of a large new area of the Ord Stage II – by a Chinese company who are intending to establish sugar again.

**Act I: Plantations of the Deep North – The Northern Territory 1880s**

In the second half of the 1800s sugar was a wealth-generating prize for colonial powers (such as in the Caribbean) while in Australia the Queensland sugar industry was taking off. The first sugar-cane planting occurred in 1836 (Courtenay 1982) and impetus to expand production came in the first half of the 1860s with the interruption of supplies to Australia due to the American Civil War (Christian 1977); by the 1870s “its rapid expansion and evident prosperity were legendary” (Hillock 2000:30).

Given the lack of return South Australia was making from its investment in its northern acquisition the development of sugar plantations seemed not just achievable, but advisable. So in the 1870s the South Australian Government moved to encourage plantation agriculture in its Northern Territory with the South Australian Northern Territory Lands Act 1872 and a revision in 1875 allowing people to request 10,000 acre blocks. This was a move away from the smaller farm/yeoman ideal of their 1860s attempt when 250,000 acres in 160 acre blocks were offered at a low price (Payne and Fletcher 1937, Powell 1982, Hillock 2000); a failed scheme which encouraged speculators not settlers and cost the South Australian Government £173,000, a large portion of which was compensation to a London company for failure to actually survey the land (Payne and Fletcher 1937, Powell 1982).

In 1872 the Native Industries Encouragement Act also enabled a bonus to be offered by the government for local production and in 1875 a bonus of five thousand pounds was offered for the first 500 tons of sugar grown and manufactured in the Territory (South Australian Government 1872, Curteis 1965, Hillock 2000).
Empowered under the Northern Territory Sugar Cultivation Act of 1880 the Executive Council of South Australia in 1881 approved the apportionment of 100,000 acres of land. Of the thirty applicants Cabinet gave preference to those who lived in the colony and specified which area they wanted; one imagines these were a measure against speculators who had ruined the government's earlier attempt. Three applicants were successful, one a Mr. B.C. De Lissa of Queensland, Messrs. Spence and Owston of Melbourne, and Mr. Petersen of Melbourne, with each being provided the full 10,000 acres (Northern Territory Times and Gazette Saturday 23 April 1881, Donovan 1981, Hillock 2000). The ensuing story of the former, through the Delissa Pioneer Sugar Company, captures much of the frontier nature of agricultural attempts in northern Australia. Already by 1882, with his land allocation only approved in 1881, De Lissa, backed by an Adelaide syndicate, was considered to have established an estate and was being hailed a hero by a gushing local press:

As general manager of the Pioneer Company he (De Lissa) has exhibited devotion to its interests energy and self-denial enough to entitle him to be called a hero! (NT Times and Gazette Saturday 1 April 1882)

There is much to this lyrical piece, reflecting two drivers discussed in Chapter 4, 'Land of Opportunity', and 'Legitimating the Nation', and the celebration of the transformation of wilderness to garden explored in Chapter 5 'Conjuring Australian Arcady'. There is an implicit moral nature to this statement which places De Lissa, the man of vigour, pluck and self-denial, on a pedestal.

The Delissa Pioneer Company seemed to have spared little cost in establishing the estate, located on Cox Peninsula and reached by creek from the western side of Darwin harbour. An extensive jetty had been erected with a road a mile and a half long to the sugar factory, requiring the clearing of extensive tracts of mangrove. Taking into account the working conditions, the location, and the wet season, it was a significant amount to have achieved in just a couple of years. With two "Baker's patent rotary pressure blowers" and a pair of "Weston's top driven self-balancing centrifugals", the loving detail used to describe the machinery in the article reveals the novel nature of such technology in the Northern Territory in the late 1800s, and the powerful symbol of technology as progress. The article notes that particular care was devoted to the foundations for the machinery; concrete and masonry about seven feet thick and carrying massive bed plates of paper bark timber to ensure no vibration of machinery.

Chapter 6 Sweet Savanna
Accommodation included a house for the manager (De Lissa) and officers, a row of detached cottages for European workmen, mess room and kitchen, quarters for the Chinese workers, and “there is a comfortable camp provided for the Port Essington natives, who work most industriously” (*NT Times and Gazette Saturday* 1 April 1882). In this description we see the strict racial hierarchy of the time. By that time, of the 10,000 acres allocated, a total of 199 acres had been cleared and planted in four locations; Mr De Lissa selecting the sites himself.

Sugar success in Queensland fuelled political enthusiasm. In 1882 the South Australian Minister responsible for the Territory, the Hon. Langdon Parsons, travelled to Queensland writing of his excitement at their successful sugar plantations and convinced of the potential for a sugar industry in the Territory (Kwan 1988, Hillock 2000:30).

As early as July 1882, however, something is going awry and the company’s Board of directors appoint a Mr George Bean full management power. Mr De Lissa resigns in response. The Northern Territory Times and Gazette writes that it is speaking for the community in deploring the Board’s action, at the moment of the estate’s success, and that the only dignified course is indeed for De Lissa to resign, leaving behind the living quarters he furnished at his own cost. The martyred hero, in a published letter to the Board of directors, proclaims Mr Bean’s ignorance with regards both sugar cultivation and manufacture, and says he will not risk his reputation by working under someone so unqualified. He proceeds to Adelaide by the first steamer (*Northern Territory Times and Gazette* 22nd July 1882) and later Singapore, having taken up 20,000 acres granted from the British North Borneo Company (Hillock 2000).

In September 1882 the local newspaper is decrying that, despite the sum of £5000 being offered as a bonus for the first 500 tons of sugar produced and the ‘gift’ of 100,000 acres, not only was the bonus unclaimed “but the total quantity of sugar produced would be insufficient to sweeten tea for our Sunday School children's annual picnic” (*The Northern Territory Times and Gazette* 16 September 1882). According to the editor the problem lay with speculative companies, as opposed to the Delissa Pioneer Company, which had made an “honest attempt”.

Despite Mr De Lissa’s resignation both the estate and the Delissa Pioneer Company continue, even making their first shipment of sugar to Adelaide. In 1884 315 bags of
sugar grown on the estate are auctioned; buyer attendance, and the prices received, are low however. It seems that the sugar quality might also have been low given that the sugar is described as 'dark' (*The Northern Territory Times and Gazette* 23 August 1884). Realising that the plantation will not succeed at Cox Peninsula the company applies to transfer its concession area to the Daly River, now considered more suitable for sugar growing. Showing how publically the industry and company were supported, a Darwin Reform Association meeting held at the Town Hall of Port Darwin voted in support of the application (*South Australian Register* 17 September 1884).

It was too late. By December of that year, after only a few years in operation, and with free land, the company had failed. Even at its inception some critics claimed that the site was inappropriate including the Government resident and Holtze the Government gardener.

> We know now that a more unsuitable locality for the cultivation of the sugarcane could scarcely have been selected, but at the time when operations were commenced the shareholders were convinced no better could possibly be found in the Northern Territory... (*The South Australian Advertiser* 31 December 1884).

There was also criticism that capital investment in machinery was too low, a surprise given the impressive description from the local newspaper above. Additionally there was delay in getting a supply of cane for planting, and it was subsequently attacked by white ants.

> Excuses were always forthcoming, and all warnings were regarded by the trusting shareholders as mere inventions of the enemy. A change was made at last in the management, and Mr De Lissa left for 'fresh woods and pastures new;' but no change in the management could make the land produce a profitable crop. About five hundredweight of sugar was obtained, and no sugar probably ever cost the growers so much. (*The South Australian Advertiser* 31 December 1884)

There was, however, no loss in belief that sugar could become a productive crop for the region - it just had to be done on the right soils, with the right management, and, hopefully, the right price would follow.

Despite the company winning agreement from the government for the transfer of the estate’s location to the Daly River, an extraordinary general meeting held in January 1885 moved to voluntarily wind up the company. It seems that, as De Lissa had a claim on profits of the company, the shareholders considered it would be better go into
liquidation thereby burying his claim. In just a few years Mr De Lissa had gone from hero and trailblazer for the northern sugar industry to an absent pariah. Even as they wound up the De Lissa Pioneer Sugar Company, however, its shareholders were organising to establish a new company; preparing to buy the assets of the old to begin again in a new, more suitable location. Comment was made that there was no doubt that the machinery would be sold at a price favourable to the purchaser. *(The South Australian Advertiser* 16 January 1885) On 31st January 1885 an advertisement appeared in the Northern Territory Times and Gazette classifieds “For sale by Tender – Valuable Sugar Crushing Machinery and Plant, Iron Houses and Drays etc...*The highest or any tender not necessarily accepted*” (Italics added).

The Daly River Plantation Company is created and buys the machinery, plant and housing of the De Lissa attempt (for only 600 pounds). Meanwhile Delissa Pioneer company creditors are expected to only receive 5 shillings in the pound and the outgoing manager, Mr Biddles, is expected to lose a large portion of his overdue salary *(Northern Territory Times and Gazette* 28 March 1885).

The newly appointed manager, Mr W Heath, visits the Daly to examine the area and finds “the worst of it far superior to any at Delissaville” with large areas of black soil clear of vegetation making it easy to cultivate. Fish and game on the property meant that provisioning would be cheap and “So far the blacks had not been troublesome” *(South Australian Register* 21 September 1985); topping off the good prospects of the ‘phoenix’ company, a deputation to the appropriate Minister results in agreement that the bonus on the production of sugar may continue. The Daly River Plantation begins a new optimistic chapter, leaving behind the fallen hero, and unpaid workers and creditors.

Only a year later, on 8 October 1986, however, an article appears in the South Australian Advertiser, reporting from the Port Darwin Criminal Court on the conviction of a man for manslaughter on the banks of the Daly River. Heath, the manager of the Daly River Plantation Company was charged with shooting an employee, McKinnon, who had “deprived Heath’s wife of her honour”. He is found guilty of manslaughter and
sentenced to 10 years imprisonment\textsuperscript{51}. The plantation languishes without a manager, and Heath's family languish without a breadwinner.

The next year a deputation of over 80 men, including the Chairman of the Daly River Plantation Company, plead with His Excellency the Governor of South Australia at) for mitigation for Heath, presenting a petition with 3,821 signatures. With the support of esteemed citizens and the press Heath is released after serving one year of his ten year sentence.

Still eyeing off the potential sugar bonus the Daly River Plantation Company enter into negotiations with a South Australian merchant Way Lee in to employ 200 Chinese on the plantation and grow "All kinds of tropical products ... Chinese and European plants, including sugar-cane, rice, tea, yams, papia, peanut, and coffee...If the crops are successful manufactories will be started, including sugar and rice mills, tobacco and preserve factories" (\textit{Sydney Morning Herald} 31 January 1888). One wonders how different this story might be if Way Lee's proposal had been accepted.

Yet Heath's rescue was in vain, a notice appears in the \textit{South Australian Register} 26 January 1889, by telegraph from Port Darwin, announcing the purchase of "the machinery and effects of the Daly River Sugar Plantation Company at Daly River and Delissaville" by a Mr D Daniels who has not yet decided whether he will continue the sugar plantation. The story of Delissaville and its spinoff company thus ends.

Some worried that such failures were contagious. Holtze in his 1884 report from the Fannie Bay Experimental Nursery, claims that the failure of the Delissaville plantation deterred development of other plantations begun on the Daly and Adelaide Rivers, and caused the suspension of operations at Poett's plantation. A clear difference of opinion to then Administrator of the Territory, Langdon Parsons, who is disparaging regarding Poett's failure\textsuperscript{52} and brutal in his Quarterly Report to government:

\begin{quote}
...the Northern Territory has, I hope, seen the last of costly and absurd experiments, in which failure and loss are certain. I write with regret
\end{quote}

\textsuperscript{51} In an illustration of the diversity of the region, at the same court session the others sentenced include "Harry, an aboriginal, for escaping from gaol, received one month's extra imprisonment, and Ah Sam, for housebreaking, one year."

\textsuperscript{52} These plantations are considered in Chapter 5 'Forever Frontier'.
of the unfortunate issue that had been forced upon the shareholders of the Delissaville Company. When the alternative presented was a continuance of useless expenditure on land, which it is a mockery to call a sugar plantation, or abandonment, they wisely determined not to waste any more money in trying to grow sugarcane where it ought never to have been planted, simply because a mill has been erected. (Parsons 1884:6)

From the limited material available it is difficult to quantify how much land was actually cropped and how much produced throughout the 1880s plantation attempts. From any account it is minimal.

Sugar, tobacco and coffee were all tropical plantation crops embedded in the British Empire and colonies; a part of their well organised machinery to benefit from the resources of their peripheries. Northern Australia was already a passive resistor.

Looking back to the plantation period over 50 years later Christian and Stewart comment that large sums were spent trying to grow sugar on the Cox Peninsula (Delissaville) and they also attribute failure to the unsuitable soils on which the attempts were made (1953). The northern geographer Slim Bauer writes of the fiasco, suggesting several reasons for failure: low soil fertility; a lack of labour and machinery; and the annual dry season, a risk for non-irrigated crops (1964).

Political and institutional factors must also take blame according to Hillock, in the only major study of this period. For example over the two decades of South Australia’s plantation push there were 17 separate governments and 29 Ministers in charge.

The complete failure in the 1880s to enable the establishment of viable agricultural enterprises in the Territory may be sheeted home directly to the ineptitude of successive South Australian Government in coming to grips with the problem (2000:109).

Successive Ministers were unable to understand the basic requirements of agricultural development and therefore did not establish the necessary departments, or appoint appropriate people. In his book on this period Hillock also documents what he considers to be chauvinism favouring South Australians and prejudice against those from other colonies, though this is less apparent in the Delissaville story. Hillock’s own lance seems tilted at the government windmill. Surely some of the responsibility, certainly for the Delissaville and Daly Plantation experience, lies with the self-interest and ignorance of the absent city investors. This is most apparent when they sell themselves the plant

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and equipment cheaply in order to establish a new company, thereby disadvantaging their creditors and employees.

In hindsight one could easily be persuaded that the question should not be so much why they failed but how anything at all was achieved. (2000:33)

This period of Territory history, the 1880s, is seen by some as a make or break time that broke, or a window of opportunity for initiating development that was negligently misused (Christian and Stewart 1953, Curteis 1965, Hillock 2000). Perhaps the history of cropping in the north could have been very different? Inappropriate choice of sites with inadequate soils is, as shown above, the most cited variable impacting upon these attempts. Yet even if appropriate soils were chosen, as may have been the case at Owston’s plantation on the Daly, one of the many next hurdles is likely to have still defeated the attempted plantations, such as flooding of the Daly (which finally defeated the Catholic mission there) or lack of transport (which is later the case for peanuts).

The story of the Delissa Pioneer Sugar Company captures much of the frontier nature of agricultural attempts in northern Australia: an individual man who was considered a pioneer and hero, but was perhaps an incompetent and ignorant egoist, or even a charlatan; a populace and media ready to believe in an agricultural el dorado; a government doing whatever it takes with taxpayers’ money and land to promote development, and perhaps their own interests; and a failure that unfolds in just a few years, losing many thousands of pounds. Rising from the fire sale of this company is another attempt (supposedly this time better advised) which produced rather more soap than sugar; this time complete with a murder, a destitute family, and a call for clemency.

Race and labour are inextricably bound up in this narrative, and continue to play both an explicit and implicit role throughout all that follows.

**Intermission: Sugar - Always a Bridesmaid? The 1890s to 1980s**

With the arrival of the 20th century ‘white’ sugar takes on a double meaning in Australia. The industry’s history is caught up in the march of the White Australia policy, and the policy’s particular effect upon the development of tropical cropping which relied upon non-white labour. The *Pacific Islander Labourers Act* of 1901, one of the first of the new Commonwealth, epitomises this (Day 2005).
With the passage of the Commonwealth Government’s Immigration Restriction Act of 1901, most of the people who were actually succeeding at growing crops in northern Australia were deported. This was seen by many European advocates of agricultural development as being the death of any hope (Cook 2009:7).

Sugar promised more than a crop. An early British writer in describing the success and importance of sugar to Queensland in the first half of the 20th century expounds that:

Australia’s great tropical crop... has brought the agriculturalist, the settled townships, the first generations of the race which Australia must breed to people her tropics. Sugar is the basis of that great and exciting experiment on which the destiny of a white Australia depends, which will prove whether it is possible or not for white men to love and work and breed and develop their communities in the tropical world. (McGuire 1939:189)

Yet despite its success in other tropical countries and in Queensland, sugarcane spent the 20th century as the next ‘most likely’, at the wedding but never the bride: price and markets, including Queensland’s grip on the market, stop governments, researchers and investors from committing to sugar. In their land survey report Christian and Stewart conclude that with a subsidised Queensland industry, a fully supplied Australian market, and problems with labour supply, “there appears no justification for further attention to this crop at this stage” (1953:131). Sugar is dismissed in one paragraph.

It was certainly considered to have obvious potential, yet research was not undertaken until the 1950s, and the industry itself was not established until the 1990s in the Ord River Irrigation Area. There are two distinct explanations as to why. One view is that interstate politics prevented attempts – Queensland was worried about the threat to its industry (Graham-Taylor 1978, Bauer 1985, Couacaud and Paul 2006), and another that declining world sugar prices discouraged them (Young 1979, Basinski et al 1985). At this time sugar was certainly a highly regulated industry in Australia with production controlled by the Central Sugar Cane Prices Board (Skerman 1954) until the mid-1980s (Griggs 2011). It seems most likely that both these factors, price and State politics, were at play, with the first reinforcing the second.

When research finally began in the 1950s it was justified by predictions of a shortfall in sugar production forecast by the 1950 Royal Commission on the Sugar Industry (Basinski et al 1985). Yet the Royal Commission report states that new land for sugar was not difficult to find, and that new areas of high fertility rather than inferior marginal

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lands should be used. An agricultural scientist addressing the ambitious conference Task for a Nation in 1954 acknowledges that although sugar is undoubtedly the most suitable ‘pioneer crop’ for developing new areas of the tropics, why establish new infrastructure when Queensland already had them. “The question as to whether other States should undertake sugar production is one for discussion at high government levels” (Skerman 1954:77). He concludes that developments in other sugar-producing countries meant Australia’s sugar industry should not expand for a number of years.

Nevertheless trials begin in 1951 at the Kimberley Research Station (KRS), undertaken by CSIRO and the Western Australian Department of Agriculture and determined that sugarcane could be grown (Young 1979, Basinski et al 1985, Couacaud and Paul 2006), in fact was the best adapted of all crops to the local conditions (Basinski et al 1985). The Research Station’s Report of 1957 stated “Sugarcane appears to be at present the most promising crop, giving uniform stands and uniformly high yields” (CSIRO 1957:18). These findings are even used to bolster the WA Government’s case in its submission to the Federal Government for assistance to fund the Ord dam (Young 1979, Graham-Taylor 1977).

Despite these promising findings research halted in 1957, once again ostensibly due to poor market prospects. Commenting on this period almost 30 years hence Cox and Chapman (1985) note that sugar-cane research actually only accounted for 7% of the total 164 experiments and that the researchers had no previous experience with the crop.

Revived again at KRS in 1964 when “the market looked promising following the Cuban crisis in 1963” it was discontinued after only four years when the market outlook again deteriorated (Department of National Resources 1976). Commissioned by the WA Government in 1963 the Colonial Sugar Refining Company Ltd (CSR) investigated the potential for a sugar-cane industry in the Ord. The company determined that a price above the existing world price would be required for viability. Given the nature of estimates they also recommended establishing two pilot farms to test the estimates. This did not happen. The Western Australian Government was exploring commercial cotton by then so research was again picked up at KRS. This time two experienced sugar researchers were seconded from Queensland. Research halted in 1968 (Cox and Chapman 1985).
In *The Northern Myth* in 1965, Davidson challenged the potential of irrigation in the Ord analysing sugarcane as a potential crop. He concluded that sugar production in the Ord would require a subsidy higher than Queensland, and meanwhile Queensland was able to supply the existing market while also having room to expand. CSIRO and the Western Australian Department of Agriculture had abandoned experimental work understanding the lack of commercial prospects. At the time, however, the Western Australian Government was suggesting that 120,000 tonnes of sugar might be produced there (Davidson 1965).

By the mid-1970s the world price had improved markedly. It was at this time that the ORIA saw the damaging end of its cotton industry, and a failed revival of rice. The Western Australian Government was desperately looking for an alternative crop, leading them to commission CSR to undertake a feasibility study for the sugar industry in the Ord, and, in 1976, to fund a pilot farm to trial sugar-cane on a farm scale, with a departmental research program on the land next door to work on the agronomic aspects (Department of National Resources 1976, Young 1979). An experienced farmer was contracted to run the pilot farm for five years, and the Bureau of Sugar Experiment Stations to supervise joint research with the WA Agriculture Department. They evaluated varieties, fertiliser needs, and crop management (Cox and Chapman 1985).

CSR’s feasibility study concluded that, given the international market and arrangements such as the International Sugar Agreement and quotas, the outlook for a sugar industry in the Ord was not favourable (Young 1979). The Ord Review concurred there was still no immediate prospect for a sugar industry though agronomic research should continue (Young 1979). Perhaps unhappy with the outcome yet another report on sugar’s potential was done by the Department of Agriculture soon after (WADA 1981). Research carried on until 1982.

In their evaluation of the research Cox and Chapman explain that the first two periods of research were simply “exercises in technology transfer and validation of research completed elsewhere” and although they confirmed the agronomic potential of the crop they did not provide any basis on which to assess its commercial prospects (1985:187). Some production factors were improved in the third round of research along with an explanation for the ratoon yield decline. This cycle is repeated three times with three discontinuous and distinct periods of sugar-cane research; the 1950s, mid-1960s and
mid-1970s (Basinski et al 1985; SRDC undated). Over these three periods spread across thirty years, the research effort amounts to 31 research officer/technician years and 45 experiments and over that period mean annual sugar yields almost doubled. This is in stark contrast to the rice research which by that time equated to 344 research officer/technician years and 875 experiments had been undertaken in the region (Chapman et al 1985). Since then there has been another significant cycle of research with the Sugar Research and Development Corporation (SRDC) and CSR working in the Ord with producers in the 1990s and 2000s (SRDC n.d.).

Each of the first three periods of research was undertaken in isolation from any commercial industry, the third working alongside a pilot farm. It was only the latter that managed to solve practical problems of cultivation and irrigation and although the usual discrepancy in yields between research plots and farms was not revealed (the pilot farm had a high level of management and input) it did provide information on the cost of production. Cox and Chapman conclude that “No major problems in commercial cane-sugar production on the Ord are foreseen at this stage” (1985:189). Pilot farms are seen as an essential step in determining the viability of an industry and they have been recommended throughout the 20th century for northern cropping in various reviews (Payne and Fletcher 1937; Christian and Stewart 1953; Forster et al 1960).

After the failures of the 1970s, the 1980s is a time of dogged regrouping for the Ord Irrigation Area; the range of crops expand and include horticultural crops (from maize to cucurbits, and chickpeas to bananas), marketing improves, and farms turn a corner to become financially profitable (Webster et al 2009; Ghassemi and White 2007). By the year 1990/91, though, the total area cropped was only 4,400 ha (the size of one large wheat or cotton farm in central New South Wales), with the agricultural potential of the area unrealised. This figure is considered to be “6.3% of the potentially irrigable area” (Webster et al 2009:9). There is a question mark around what the potentially irrigable area actually is, both then and now, with very different estimates. Webster’s figure does not represent land actually ready and available for irrigation, rather what was perceived to be the full amount with potential – a striking difference.
The Ord
A new era...

Figure 18. Brochure early 1990s: "The Ord - A new era...the slumbering 'white elephant' has awakened".

Still struggling to turn around the situation in the Ord, and to earn back some of the substantial government investment, the Western Australia Government appoints the Kimberley Water Resources Development Advisory Board in 1992 to “recommend actions to maximise the value to the community from the development of the Kimberley water resources” (Ghassemi and White 2007:386). A study commissioned by the Advisory Board and undertaken by Hassall and Associates shows that despite the failure of the cotton industry in the 1970s the scheme had performed better in the 1980s and by the early 1990s benefits were exceeding annual agricultural production costs (this does not seem to take into account the cost of water borne by government, nor account for previous investment – just direct farm production cost). Hassall and Associates attribute this improvement to a number of factors: “the development of specialised field crops and horticultural industries, the strengthening market in Asia, and the tenacity of the farmers.” (Ghassemi and White 2007:387). Developments in biological control of insect pests also contributed. Yet despite this improved performance of the Ord scheme a cost-
benefit analysis done by Hassalls of the period between 1958-59 and 1990-91 reveals an overall loss by the scheme of $497,000,000 in 1990-91 values, which they attribute to under-utilisation of the water resources and a failure of crop production until the 1980s (Ghassemi and White 2007).

**Act II: Farming an Industry - The Ord 1994 - 2007**

It was not until one hundred years after the Territory’s plantations that sugar again became the crop of the north and this time it was in the Ord River Irrigation Area of the East Kimberley. Although only spanning 13 years, the Ord sugar story is not quite as short-lived or unproductive as that of the Northern Territory plantations in the 1880s. It also reveals very different reasons for its eventual collapse.

The context of this story is also poles apart from that of the Territory plantations. This was irrigated land so water could be managed – flooding controlled and crops irrigated in the dry season; government funded research was providing improved agronomic understanding and crop varieties; and the land was not being acquired or managed by profiteering speculators or absentee landlords in Adelaide or London. A sugar mill had been built, and not at the cost of the local growers. Transportation was not reliant upon tired old steamships and the whims of the weather. These farmers were the ‘third wave’ to the Ord; they were not the uninitiated first to an unknown place.

Sugar was seen as a potential base crop for the Ord, important in that it would provide farmers and the region with a consistent, stable industry and income. However sugar requires a substantial investment in infrastructure as the crop needs immediate processing, so a mill must be built in the vicinity of the crop. And for a mill to be a worthwhile investment there needs to be a guaranteed minimum amount of sugar-cane grown over a minimum number of years (Hildebrand 2002, Conversations 19 and 22). In fact not only is the mill fundamental but a constructive relationship between the mill and cane growers is of paramount importance to the industry's success in a region, as discussed at length in the 2002 Independent Assessment of the Sugar Industry, and as is shown in the eventual fate of the Ord’s fledgling sugar industry.

In 1994 a joint Western Australian Ministerial Statement proclaimed “an exciting future for the Ord sugar industry with the recent signing of a joint venture between CSR Ltd and the Ord River District Co-operative” (Joint Ministerial Statement Western
Australian Government 2 December 1994). The decision by CSR to build a sugar mill was followed by a joint announcement from the Western Australian and Northern Territory Governments supporting expansion of the Ord River Irrigation Area from its 13,000 hectares to 77,000 hectares (Chapman et al. 1996). It was one of the many announced Ord expansions that were never to eventuate, thereby also playing a role in the fate of an industry relying upon economies of scale.

The mill was to be a low cost, small capacity factory with low labour requirements (SRDC undated). Construction began late 1994 and commercial sugar production began with 7,000 hectares planted. After many decades of beckoning possibilities and reviews the 1990s finally saw the ushering in of sugar on the Ord. The Premier Richard Court described it as “the birth of a new industry” (Ministerial Media Statement 8/7/95). The mill was completed in late 1995 (Couacaud and Paul 2006, Conversation 22) and 2,000 more hectares were planted. The first full season’s crush was undertaken in 1996. It was considered a breakthrough for the Ord, a base industry that could provide farmers with a secure income. One current Ord farmer described how his father came from Germany specifically to grow sugar “that was his vision”. They started in 1995, first growing plant material for planting in 1996 (Conversation 10).

Once again the research start button was pushed. As the burgeoning industry was dependent upon sugarcane varieties introduced in the 1970s and not tailored for the Ord another cycle of research was initiated – this time by CSR Sugar (Ord Sugar Pty. Ltd.) and the Sugar Research and Development Corporation. A second project aiming to keep the sugar industry disease and pest free brought in an expert pathologist as the Western Australian department had no-one with the relevant expertise (SRDC n.d.). A significant point is made in the project background, the concern for biosecurity, a flip side of close Asian markets and another consequence of what lays north of Australia’s north. It acknowledges the vulnerability of the Ord sugar industry being so close to Papua New Guinea and Indonesia, “centres of domestication of sugarcane and areas known to have many of the pests and diseases of sugarcane” (SRDC n.d. 15). The project concluded that the ORIA had been found to have “almost certainly the worst incidence” of Red Stripe or Top Rot disease with the “greatest yield losses anywhere in the world” (SRDC n.d. 16). Yet while the final report concluded that pathologists in the Western Australian Department of Agriculture need to recognise and understand sugarcane pests and diseases, rapid turnover of staff undermines this.
The sugar industry was initiated in the context of work the Western Australian Government was undertaking on Ord stage II. Throughout 1995 and 1996, the Government commissioned studies on the proposed development of Ord Stage 2 leading to a call for private sector Registrations of Interest (1996) and Expressions of Interests (1997) with several submitted from local and overseas players.

In 1998, a joint venture between Wesfarmers Sugar Company Pty Ltd and Marubeni Corporation was awarded an “exclusive mandate” to investigate the feasibility of development of broad-acre irrigation. Meanwhile during that season there was an outbreak of sugarcane smut and only 3,800 hectares of sugar were harvested in 1998, far down from the figures of 1995 (Western Australia Department of Agriculture 1999:33). Wesfarmers–Marubeni undertook a three and a half year feasibility study into the development of a sugar industry on Ord Stage II costing $3.8million: “The heart of the... proposal is the development of a world scale sugar industry”, an export-based raw-sugar industry which would involve the development of about 32,000 hectares of irrigable land for sugarcane plantation – 29,000 for the project proponents and 3,000 for independent farmers. The projected cost, including all infrastructure was $500 million. Related studies for Ord Stage II at this time included investigations into hydrology, groundwater, an interim water allocation plan, and Environmental Review and Management Program/Draft Environmental Impact Statement (Ghassemi and White 2007). Additionally in the 1990s and 2000s research and extension was again being undertaken, the fourth wave, by the SRDC and CSR including projects on new varieties and pathology services (SRDC n.d.).

Yet in December 2001 a press release announced that the two companies would not proceed. The stated reasons? Volatility of world sugar prices, uncertainty around irrigation water supply, unresolved land access issues, and approval of environmental issues (Ghassemi and White 2007).

While work was underway assessing Ord Stage II the existing sugar industry was continuing. In March 2000 CSR sold the mill to a Korean company Cheil Jedang. A media release by CSR states that the company has decided to concentrate its raw sugar milling operations in the lowest cost regions of Australia and, ultimately, overseas – “in
the face of the current low world sugar prices we are keen to focus on our lowest cost, most efficient operations.”

The new mill owners, Cheil Jedang, shipped all of the raw sugar to Surabaya, Indonesia (Couacaud and Paul 2006, Conversation 27). “We had a lovely little deal with the Koreans” explains Kim Chance, the then Western Australian Agriculture Minister. The sugar produced in the Ord was not used for human consumption, it all went into a chemical mill in Surabaya, “our neighbour and only 2 days shipping away, which provided a ‘blue water cost advantage’ despite the fact that our port costs were high” (pers. comm.). According to a government employee working in regional development the Koreans bought the mill from CSR expecting expansion to happen (Conversation 22).

By late 2004, however, the expected announcement by the Western Australian Government on Ord Stage II had not eventuated. ABC Landline reports that sugar had become the “broad-acre mainstay for agriculture” for the Ord Irrigation area. Yet its long-term future was not certain. Interviews with local growers once again raise the issues of sugar price (impacted by world commodity price and the value of the Australian dollar) and the lack of progress with Stage II or associated release of land. Gabi Bloecker of the Kununurra Primary Industry Association comments on the difficult issues Stage II faces with “Aboriginal heritage clearance as well as environmental issues” saying that there is “no urgency and not enough push” (ABC Landline 21 November 2004).

In the same report a local grower explains that the sugar content was not what they wanted it to be explaining that they were still using older varieties, with newer ones under trial (ABC Landline 21 November 2004). This view accords with the Sugar Research and Development Corporation’s final report of three research projects undertaken in the second half of the 1990s which states that at that stage the Ord sugar industry had not achieved the yield or CCS (recoverable sugar content) targets initially set. Cane yield was highly variable but it was the “low sugar content and purity of Ord cane…which has been the most surprising and disappointing aspect of commercial cane

production” (SRDC n.d:5). Other problems also affected the industry. The mill was small and suffered breakdowns, sometimes failing to crush all the harvested cane. In 2005 it was announced that there was to be a $5 million upgrade to the mill (ABC WA Country Hour 6 September 2005).

Extension of the Ord River Irrigation Area now required agreement with the local Traditional Owners. After five years of negotiation the Ord Final Indigenous Land Use Agreement (ILUA\(^5\)) between the Western Australian Government and the Miriuwung Gajerrong Traditional Owners was finalised in September 2005 and registered 16 August 2006. Covering about 1,450 km\(^2\) of land it paved the way for Ord Stage 2; the extension of cropping land that Cheil Jedang had been waiting for.

By 2006 Ord Stage II had still not progressed. Growers and others publically alerted that this was a problem to the sugar industry. In an ABC interview one of the most successful farmers of the district, and at that time one of the largest sugar growers, comments that a shortage of farmland was a bigger threat to the industry than the fluctuating sugar price “We just haven’t got enough sugar cane at the moment” (ABC Landline 12/11/2006). This concern about achieving the required economies of scale for industry viability is consistently expressed. “For non-boutique crops such as rice, cotton and sugar, size matters. You need critical mass to make industries work, so for sugar, you probably need 30,000 hectares at least.” (Conversation 22) and “For sugarcane to come back you need a certain minimum acreage, and need a mill. So someone has to invest in that” (Conversation 19). This chicken and egg conundrum has plagued attempts at northern cropping. Yet sugar was not being cropped to full capacity. People were looking for alternative crops and sandalwood was already starting to replace sugar.

By this time the world sugar price was averaging less than 10 US cents per pound,\(^5\) reportedly less than Ord sugar production costs. The company said they couldn’t pay more until production was increased to half a million tonnes yet given the price squeeze production in the region was already dropping. For about a decade before 2007 the world price had averaged 8 US cents per pound, according to Kim Chance not a viable

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\(^5\) The National Native Title Tribunal describes an Indigenous Land Use Agreement as “a voluntary agreement between a native title group and others about the use of land and waters.”
\(^5\) (www.trading economics.com)
proposition in a western economy (pers. comm.). He explained that two big markets for sugar, the US and Europe paid their growers (of corn and sugar-beet) large subsidies and that Australia is the only non-third world producer of cane-sugar and bananas.

A 2002 Assessment of the Australian Sugar Industry supports these figures. The world price had not increased significantly since 1981 reflecting an oversupply on the world market and the export dominance of the cheaper producer Brazil. Modelling showed it was likely to remain at about 7 US cents and profitability would come under “severe pressure” (Hildebrand 2002:10).

According to figures from the Western Australian Agriculture Department’s regional economist 4,180 hectares were grown by 2002/03. This remained relatively consistent until 2005/06 when it dropped to 3,489, and remained about that in the industry’s last year, 2006/07. For the year 2002/03 the value of the crop was almost $17.5million and in the 2006/07 dropped to just below $11.5million (Bright unpublished).

Kim Chance, then Western Australian Agriculture Minister, describes the tension of the situation – “Sugar was going backwards...the Koreans were leaning on me, saying ‘tell the growers to grow it’. The farmers couldn’t make any money and the Koreans thought I could actually tell the guys to grow sugar!” (pers. comm.). The company was still trying to get a set area consistently under sugar-cane, “Industry that needs infrastructure...
needs farmers to lock in however with a fluctuating price they don’t want to do that” (Conversation 19). This account is confirmed in parliamentary records outlined below. Meanwhile the relationship between the growers and the company continued to deteriorate (Conversation 22).

It is worthwhile stepping up to the national context as between 2004 and 2008 the national Sugar Industry Reform Program was implemented by the Australian Government to: “alleviate the immediate financial hardship of millers and growers”; and “reform the industry structure through rationalisation and diversification, to make it competitive and sustainable” (Thompson et al 2010:ii). Of the total allocation of $444.4 million, $334 million was spent. Components included welfare, restructuring, reform, and diversification. Although production levels in Australia were stable the trend was toward fewer producers and larger farms; in 2007–08 only three per cent of growers accounted for 20 per cent of sugar cane production (Hooper 2008).

Ord sugar came to a head in 2007. One farmer described going through the closing of the sugar industry: “it was hard” and “a traumatic decision”. He explained how difficult it was to negotiate with the sugar mill in the end, and explained that with the returns they were getting, “they (the farmers) might as well not do anything; there was too much risk and no returns” (Conversation 10). The farmers explained to the sugar mill what price, or split of the dividends, they needed, to be able to continue. The response from the mill was that they would shut down, “now, before harvest - so it was not good”. Another local who had been involved from the beginning in a support industry describes the situation: “It got really political – price of sugar went through the floor, farmers got greedy and destroyed their own sugar industry – they’ll deny it” (Conversation 29). Both these participants explained that the mill was also just too small to be profitable (Conversation 10 and 29). Additionally there were problems with the mill “stuff they put in at the start didn’t work...they had trouble with the boiler, they didn’t put in a mud filter the first year...” (Conversation 29) Another participant claimed “The mill was a load of shit” (Conversation 27). Then Agriculture Minister said the mill had only one good thing to it – the power generator (pers. comm.). These views accord with informal discussions with a senior independent sugar researcher who believed that CSR had cut corners when building the government funded mill (pers. comm.).
It was an awkward time for the Western Australian Government which was trying to avoid embarrassing a foreign investor, and being marked as anti-agriculture, industry and development. The following Parliamentary Questions reveal how the possible failure of even the comparatively small Ord sugar industry was placed firmly on the political stage, with the discourse becoming more and more emotional and drawing upon traditional and consistent tropes. Pressure on the government to inject funds was ramped up.

On 29 May 2007 a Parliamentary Question to then WA Agriculture Minister Kim Chance reveals how political discourse assumed that the Ord sugar industry should be saved. In responding Minister Chance confirms that Cheil Jedang’s managing director had asked for both a guarantee of 500,000 tonnes of cane a year for four to five years (at the Ord Valley pricing index) and that government provide “certain undertakings” with regard to Ord Stage 2. “I told Mr Cheong very clearly that we could not accommodate any of those three requests, and I told him why” (Parliamentary Questions, Government of Western Australia, 29/5/2007). Chance goes on to say that the effect on the growers will be “severe” as $25million worth of cane will just be left to rot in the fields, which would also cause environmental problems. He decries the fact that “we have been put in a position where we must negotiate under such leverage” and that is a concern that “people would actually put the growers’ future at risk in that way”. A locally diplomatic response if not internationally, given it seems it was the growers who initiated the situation by approaching Cheil Jedang with an ultimatum prior to harvest. The Minister’s contingency plan is to “get the mill operating”.

On 19 June 2007 a question was this time put to the then Minister for State Development in Parliament. The tone has been ratcheted up. “Why is the government turning its back on the State’s sugarcane industry and putting the growers’ futures at risk with the loss of at least 80 jobs and untold pain for the families involved?” The Minister, Mr Ripper, is accused of mismanaging and dragging his feet on the expansion of the Ord scheme, stating that the “State’s only sugar mill was unlikely to ever be profitable without the expansion…”

Mr Ripper’s response is informed and measured. He explains that “Growers in the Ord have chosen to grow more profitable crops… have made their own private decisions, for reasons of their own incomes and responding to market forces, as they should, to grow
crops other than sugarcane.” The Premier explains that when the Korean company was asked what conditions they would require to process the year’s harvest they responded that no amount of financial assistance would persuade them. Ripper goes on to outline the assistance package that was offered to the growers (Hansard WA Government 19 June 2007 p3270b-3271a).

On 28th June 2007 the Western Australian Government announces an agreement and a package of up to $4 million to assist the Ord sugar growers, Ord River Cane Growers Pty Ltd, purchase the Ord sugar mill and process the year’s crop, allowing the sugarcane industry “to move forward with some confidence”. The Minister for Agriculture states “that this agreement is good for the Ord River canegrowers, the region and the State’s economy” (Hansard WA Government 28 June 2007 p3761b-3761b). The Ord River Cane Growers Pty Ltd “would be investigating options to continue operating the mill beyond the 2007 harvest”. One of the directors, Paul Mock, comments “Growers now have the security that the mill will stay” and options for continuing operations would be investigated (Ministerial Media Statement 28 June 2007). From less public accounts and my later interviews this appears to have been agreed rhetoric only, with no intention to continue in sugar, and with a government well aware of dropping world sugar prices, the inadequacies of the existing mill and the consistent lack of production levels sufficient to keep even a small mill operating. By this stage there are only a handful of sugar growers in the Ord and about 3,491 hectares under sugarcane. By 2007/08 commercial sugar production is zero.

Less than a year later the mill had been dismantled. In 2008 the smokestack was sent to a sugar mill in NSW. Interviewed for radio Paul Mock said “...if there’s people out there that could make good use of it at least it can be productive instead of being turned to scrap” (ABC Rural 22 July 2008). He comments that producing only sugar no longer makes sense. Rising fuel prices made ethanol an option however this would require new technology.

Was there a viable alternative to the growers closing the mill? Could growers have sustained the industry? The Australian Sugarcane Annual for 2009 reported that high input costs and low prices on offer at planting along with alternative crop opportunities saw the Australian sugarcane area fall to a level not seen since 1995. On top of that the
Ord mill was in need of major upgrading, according to one in the industry about $25 million (Conversation 22).

The bailout for the sugar growers was not a bailout for the industry. It did not ensure, and could not ensure, the continuation of a sugar industry in the Ord as it did not address any of the underlying factors that were plaguing the industry. It was a sweetener for the growers and the Ord region, and spared the government from further political criticism or pressure for not doing what it was assumed government should do, that is support agricultural industry no matter what the facts, because, of course, it must be “good for the economy”.

Christian writes thirty years before the Ord sugar industry collapsed that “we need to differentiate between the fate of the crop itself in a region and the success or failure of the particular development scheme or project” (1977:14). He explains that sugar is an example where the crop itself can be grown however the costs of infrastructure could probably not be financed by industry alone. He believed that if developing the Ord was a ‘national objective’ than the cost could partly be borne nationally, and if this had been done, a sustainable sugar industry would have existed in the Ord by then.

In stark comparison to the sugar plantations of the Territory one hundred years earlier it was not inappropriate site selection and poor soils that hampered the sugar industry of the Ord. Several variables are consistently voiced. The first was the inability to achieve the economies of scale and guaranteed consistent supply required for the mill to function profitably - and for the industry to sustain itself. This seems to have been exacerbated by the growth of the sandalwood industry in the Ord Area which, through offering beneficial leasing arrangements to farmers, was competing for available land (Conversation 19, Conversation 27). Secondly the low, and fluctuating, global price for sugar squeezed the farmers and the company, and pushed the area under sugarcane down. Ord farmers of the 21st century had adapted to the circumstances of their region by becoming price responsive and adaptable. They were willing and able to grow a variety of crops as necessary in order to benefit from fluctuating market price and minimise the impact of large input and transport costs; they were not self-identified with a particular crop as you find in other regions of Australia where you find regions of ‘cotton farmers’ or ‘sugar growers’.

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Less overt factors, probably not deal breakers of themselves, also contributed to the industry’s demise. The relationship between the growers and the mill owners, highlighted as being of fundamental importance in the sugar industry review quoted earlier, deteriorated to a parlous situation. A farmer involved expressed regret for the way the farmers had dealt with the company (Conversation 10) while the Korean company also seemed to struggle with understanding its Australian context, as shown by requests to the Agricultural Minister to insist farmers grow sugar rather than other crops. Additionally problems with the mill itself, not well made by all accounts, hindered production; and the sugar itself was not achieving industry quality targets.

Standing alone perhaps these factors may be manageable; how one buffers against the global sugar price in an industry dominated by the developing world is in doubt. Add to this the relationships between these factors, and the picture is far more complicated.

**Act III? Ord Expansion**

The expansion of the Ord (Stage II) is finally underway. Talking with Peter Stubbs, director of the Ord East Kimberley Expansion Project for the WA Government, in late 2011 he foresaw a future for sugar: “It’s the best crop for this environment and there’s a huge global demand for it”. He explains that as the standard of living rises in China so does sugar demand, and they’re looking to secure their supply lines. Three Chinese companies had visited in two months. However according to the regional manager for the Western Australian Agriculture Department in 2011 no research on sugar was currently being undertaken.

Since then it has been announced that the offer by a Chinese conglomerate for all of Stage II has been accepted by the Western Australian Government, and in addition they are negotiating for the development of an additional area on the Northern Territory side, Stage III. Kimberley Agricultural Investment (KAI) will lease and establish 13,400 hectares of irrigated farmland, an initial investment of $200million. Over time KAI proposes to invest more than $700million in the Ord region: spending $450million to construct a sugar mill; $50million for Wyndham Port improvements; and $200million for farm infrastructure developments. “This deal between the Government and KAI is
set to deliver the biggest agricultural development in Australia’s north in more than 40 years,” the Premier said (Joint media statement May 2013). The company that owns KAI, Shanghai Zhongfu, has interests in petrochemicals and hotels56.

The company also canvassed the possibility of biofuel production, particularly as a transition or stop-gap as cropping land of the Ord is increased and the economies of scale for sugar production are realised. Ethanol production as a possible saviour of the sugar industry has been explored previously. In 2007, when the Korean company and mill owner sold up and left northern Australia, a report commissioned by the Western Australian and Northern Territory Governments on the commercial potential for a sugar and ethanol industry in the area concluded that the Ord was well positioned to supply growing markets as there is plenty of land, water and good growing conditions. While acknowledging the Ord is a high cost location and that there is ongoing competition from low production cost countries such as Brazil, they state that the Ord has the potential to be a substantial ethanol producer (Economics Consulting Services 2007). As of 2012 there had been no progress with an ethanol industry.

Even with increasing sugar prices from 2003 to 2010 volatility in price will remain. High sugar prices created a surge in global production likely to ease the tight sugar demand-supply situation and therefore prices (Thompson et al 2010:13). A commodities analyst explained "I think it will remain a cyclical commodity and I think Australian producers will continue to live in that sort of environment and have to make hedging decisions and planting decisions in light of a fairly volatile world market" (ABC Radio Rural News 26 December 2012). There is the additional issue of the Australian dollar and its fluctuating strength internationally as a strong Australian dollar has a negative impact upon exports and profitability.

Economies of scale are yet to be achieved in the ORIA for a commodity such as sugar. The Northern Territory Government is keen to benefit from the momentum and infrastructure of Ord Stage II and to proceed with Ord Stage III on the Knox Plain and Keep River plains, an area of 14,500 hectares. In November 2012 Ord Development Project was designated as having “Major Project status” and an Ord Development Unit


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was established within the Department of Primary Industry and Fisheries whose Industry Development Plan 2013-2017 says “Open up new area for production including expansion of the Ord irrigation scheme in the NT”. A Memorandum of Understanding was signed between the Northern Territory, Western Australian and Federal Governments in November 2012.

It has unquestionably been shown that sugar can be grown in north-west Australia. But, as Davidson asked, at what cost? And he wasn’t even considering externalities.

The story of the 1880s Delissa sugar plantation exposes many variables, and the interplay between them which impacted upon the attempt: optimistic ignorance or wilful misleading; land speculation and vested interests of the Adelaide establishment; inappropriate siting of agricultural attempts; unquestioning cheerleading by the local newspaper; bureaucratic unwillingness to assist on-ground with realistic surveying; the uncertain role of government leadership and assistance; the tension for government between assisting larger companies and the smaller yeoman farmer; the lack of knowledge and capacity of investors, plantation managers and bureaucracy; and a fundamental lack of understanding about the local environment, its soils in particular, and ignorance of the requirements of the sugarcane plant.

By the time of sugar on the Ord over 100 years later, and about 800kms away (by road), many of these matters are in history alone. Adelaide’s esteemed citizens are no longer holding northern agriculture to ransom and murderers are no longer set free for the sake of a sugar company. Our knowledge has undoubtedly improved. Yet other variables, some beyond our control, remain steadfastly similar; the volatile and often low price of sugar is a key one, required economies of scale another.

Native Title is a more recent factor in northern cropping. Native Title negotiations will be pivotal to the expansion of the Ord across the Northern Territory border. According to the Northern Territory Department’s website of June 2014 negotiations had begun however several months later this was challenged by the Northern Land Council. The text on the website changed “Northern Territory poised to engage in Native Title

57 (http://www.nt.gov.au/d/Primary_Industry/ Accessed 23/06/2014)
negotiations ...”58 Perhaps we learn more slowly than hoped, or perhaps, as expressed by an anthropologist of the area in conversation, the old people have other dreams of, and for, their country. And these dreams may come head on with those of large-scale cropping, at least for the time that these elders have with us.

\[58\text{ (Same as above. Accessed 1/10/2014)}\]
Chapter 7: Rice Trials and Tribulations

1880-2015

- Small scale Chinese Rice growers, Northern Territory (1808 - 1910)
- Territory Administration Experimental farms - rice experiments (1910 - 1915)
- Territory petition for rice seed for trials. Denied due to a "Gentleman's Agreement" with Murrumbidgee Irrigation Area (1937)
- CSIRO Katherine -Darwin survey recommends rice trials (1946)
- Territory Administration begins rice trials (1952)
- Territory Rice Ltd. Fails in 3 years (1956-1961)
- Four small scale farms, N.T. (1960-64)
- Small and variable amount grown in N.T. never exceeding 400ha or 526 tonnes (1983 - 1997)
- N.T. govt starts rice trials, Katherine (2009)
- Single producer in the N.T.

Kim Durack begins growing rice at Liveringa, Camballin, Fitzroy River, WA (1950)
Ord Pilot farm grows rice (1960)
Small rice mill installed (1964)
Camballin rice growing abandoned (1968)
Some rice grown in the Ord River irrigation Area
23,000 ha planned for Camballin, W.A. Did not eventuate
Ord Rice trials
N.S.W. rice producer plants largest area in Ord for 20 years (2010)
Rice and northern Australia were first linked in the imagination in 1818 by Lieutenant Phillip Parker King R.N., who in April 1818 surveyed parts of the northern coastline in the cutter *Mermaid*. He named Port Essington on Coburg Peninsula and, impressed with the harbour, proclaimed it would be a place of great trade and importance “at no very distant date” and that near the Alligator River there “is a land apparently adapted to the cultivation of rice” (Quoted in Curteis 1965:2).

In 1826 Major Campbell, the Commander at Fort Dundas, aware rice grew in Timor, attempted growing rice on swampy land near the settlement (Curteis 1965:5). A severe gale in April 1827 destroyed his crops, along with his fruit trees and vegetables, and the settlement was abandoned soon after.

Since that time rice has been coming and going in northern Australia as regularly, if not quite as consistently, as the wet season. The company that attempted the largest commercial rice enterprise in the north in the 1950s stated that “Of all the various crops that have been tried over the past 70 years, rice has been the most promising” (Territory Rice Ltd 1956:6). The rice narratives move from the small-scale, ‘getting on with the job’ successes of Chinese northerners at the turn of the 19th century to the overblown and unfulfilled expectations of the 1950s. This was a time of trigger and dollar happy Americans, backroom British diplomacy of the Cold War, and the doggedness of government employees desperately trying to produce successful trials against all odds, both logistical and climatic.
Figure 20. Sites of Rice schemes.
Research and commercial attempts have been undertaken at three areas across the North-West since the mid-1900s - the Ord and Fitzroy Rivers in Western Australia, and the Adelaide River in the Northern Territory. Despite all being in the Wet-Dry tropics the climatic conditions of these areas vary significantly in rainfall and temperature. Rice research on the Ord began in the late 1940s with Kim Durack’s experimental farm at Carlton Reach. Kim, of the famous pastoral family, was an advocate, even an evangelist, for cropping in north Western Australia and spent decades of his life working to prove it, after Carlton Reach working to grow rice commercially on the Lower Fitzroy River in Western Kimberley in the 1950s. In the Ord rice was grown commercially for the first time in 1960 at the Ord pilot farm and a small rice mill was installed in 1964. Shipments were even made to Perth, Singapore and Papua New Guinea. Low yields, cracked grain and high freight costs were said to have discouraged commercial expansion. In 1966 a “rice disorder” also appeared and it took until 1972 for it to be identified as a zinc deficiency (Department of National Resources 1976). In contradiction to this time frame identified by the government the researcher Basinski writes that the “rice disorder” had been present from the first trials (Basinski et al 1985). Writing in 1985 about rice research in the north Chapman et al (1985) calculated that by that time 344 research officer/technician years and 875 experiments had been undertaken in the Adelaide, Ord and Fitzroy River Valleys, with three quarters of these in the Territory’s Adelaide River area. In the 2010s rice research is again being undertaken by the Northern Territory Government.

Two major commercial rice-cropping attempts have been made, one infamous and well-documented, the other less so. The first was Territory Rice Ltd, an American enterprise, in the late 50s in the Adelaide River area of the Northern Territory; and the second Northern Development Ltd at Camballin in the Fitzroy River Valley in Western Australia, which began around the same time in the 50s. A coda to these stories are more recent attempts: in the Ord by NSW rice farmer Lawrie Arthur; and in the Territory by farmer Bruce White, who began growing rice south east of Darwin at Mt Kepler Station in 2009.
From the early 1880s through to about 1910 the local Chinese were successfully growing rice in the Northern Territory cultivating small blocks of lowland rain-fed rice using labour intensive, traditional methods (Christian and Stewart 1953; Territory Rice Ltd 1956; Forster et al 1960; Bauer 1964; Basinski 1981, Courtenay 1982, Chapman and Basinski 1985). Reportedly there was only one failed crop throughout that time, in 1905-06, which was considered a result of particularly low rainfall (Bauer 1964). The local rice was considered to be of high quality and received a better price locally than imports. In 1904 the South Australian Governor visited a very successful Chinese market garden of 13 acres near the Pine Creek goldfield. Three acres were under rice and the grower had established a traditional Chinese rice mill (Reynolds 2003). Until racist policy overcame northern Australia around the turn of the 20th century Chinese market gardeners and farmers kept towns and cattle stations in the north provisioned with fresh food; there was no other source for fruit and vegetables.

The well-known plant pioneer of the north, Maurice Holtze of the Palmerston Botanical Gardens, saw potential for rice growing on the alluvial flats of the Adelaide and Alligator Rivers. While touring botanical gardens in Asia in 1887 he commented that with cheap labour the Northern Territory could become “the great rice field for the Australian colonies” (Kraehenbuehl 1983). There was no need for clearing and water supplies were plentiful, although he acknowledged irrigation would be required. Chinese syndicates were seeking leases and Holtze urged they be granted. (Curteis 1965) Nothing eventuated of these larger aspirations; import duty on rice was removed in 1890 which, according to Courtenay, killed the industry in the north until the Second World War when a shortage “revived interest in the crop” (Courtenay 1982:156).

Chinese rice growing came to an end as the number of Chinese fell and immigration became restricted through discriminatory South Australian legislation (Bauer 1964, Reynolds 2003). Political attacks on the Chinese increased. Reynolds suggests that “The very success of the Chinese appeared to confirm the failure of the European colonising
venture” (Reynolds 2003:117). Upland rice was trialled in the Darwin Botanical Gardens in 1907. Less labour intensive than the traditional Chinese lowland method it showed promising results. A suggested farm-scale trial in 1910 was deferred however, perhaps due to the upcoming transfer of the Northern Territory to the Commonwealth (Bauer 1964).

When the Commonwealth Government assumed responsibility for the Northern Territory in 1911 there was a rejuvenation of development efforts. A number of experts visited the Northern Territory to report on development opportunities on behalf of the Commonwealth Government. Amongst them was Walter Campbell, a retired New South Wales agricultural administrator, who advised on sites for testing the Territory's agricultural possibilities selecting sites for three experimental farms, two of which were established in 1912 at Batchelor and Daly River by the new Administrator (Powell 1982, Robin 2007, de la Rue 2011, Ling 2012).

Correspondence from the Administrator John Gilruth and local newspaper reports show that rice was trialled at the Batchelor experimental farm through 1914 and 1915. It was not successful. In correspondence to the Minister for External Affairs Gilruth’s positive spin is that they have produced good hay for the horses. His explanation, one which becomes familiar in the rice trials 40 years later, is that the wet season was unusual and rain extremely irregular (NAA: A431, 1948/834). Despite this Gilruth believes that Batchelor is well-suited for rice. (Lockwood 1968). The farms were starved of funds and wound up by 1920. Cropping and rice were off the agenda again; and it seems that there was little realistic or detailed documentation from the farms that could carry lessons forward. It wasn’t until 1937 that farmers, still without a commercial crop, petitioned the Commonwealth Government for seed for experimental rice growing in the Northern Territory. This was refused due to a ‘gentleman’s agreement’ between governments not to compete with the Murrumbidgee Irrigation Area and hence the NSW rice industry (Mollah 1982).

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59 For more on the Chinese and agriculture at this time see Chapter 5.
60 It was as well that the farms were at least producing hay as one of Gilruth’s documented foibles was the purchase of extremely expensive, and unnecessary, horses.
61 The fiasco and failure of the experimental farms is detailed in Chapter 5.
After World War II, the sense of vulnerability and threat created by the War, Communism to the north, and food shortages increased the Commonwealth’s urgency to develop and populate the north. Then Prime Minister Curtin initiated steps in 1944, calling on the Premiers of Queensland and Western Australia to cooperate and they responded with “the keen desire of their governments to co-operate in the vigorous development of the northern portions of Australia” (Kelly 1966:8). It was Curtin’s successor, Prime Minister Chifley, who established the Commonwealth –State machinery to progress this. The Northern Australian Development Committee (NADC) was formed and chaired by Nugget Coombs with objectives to increase the population, the value of production, utilise the lands and the development of native inhabitants (Kelly 1966).

One outcome of the NADC was to commission CSIRO to undertake land research and regional surveys and in 1946 CSIRO’s Katherine-Darwin Survey was undertaken on behalf of the Committee. This is where C.S. Christian enters the frame. Working for CSIRO he was assigned the task of surveying the north with a multi-disciplinary team and army jeeps; work that was later to help lead to the establishment of CSIRO research stations and agricultural trials in northern Australia.

**Rice Trials and Tribulations - the Territory and the Kimberley 1950s & 60s**

*Over the years, there have been a number of false starts in the Northern Territory grain industry. No one will forget the Humpty Doo experience. I am just old enough to remember the hype that occurred when Sir William Gunn and others came to the Territory to turn us into the world's great rice bowl. T.E. Smith, NT Opposition Leader, 29 October 1987*

The CSIRO survey again raised awareness of the large tracts of floodplains along the Adelaide River (Basinksi et al 1985). One of the recommendations from the survey was to consider a plan for the development of land industries in the region based on a range of crops including rice. This recommendation sat alongside others for the investigation of tobacco, peanuts, pigs and improved pastures. In order to implement the plan for development additional recommendations were proposed including the investigation of
rice growing on the Marrakai or "bull-dust" plains with initial experiments to be established near Adelaide River township (Christian and Stewart 1953:7).

The CSIRO team concluded that the sub-coastal plains, although superficially similar to rice growing areas of south-east Asia and carrying a perennial species of native rice (*Oryza fatua*), weren’t suitable for the Australian method of rice growing which was developed in the south and required dry seed bed preparation and precise water management. They predicted a number of difficulties for mechanised farming including the deep, seasonal flooding and the heavy clays, problematic to work when dry and move across when wet; leading to them recommending trials be run on the Marrakai soils not the sub-coastal plains (Christian and Stewart 1953, Basinski et al 1985). There were other moves afoot however, and vested interests, and in 1949 the NSW Rice Equalization Association (REA) asked Walter Poggendorff, then chief of the Division of Plant Industry NSW Agriculture Department, to visit the Territory, at their cost (Basinski et al 1985).

Writing later Basinski and colleagues explain some of the political intricacies and dealings that were happening at the time. REA’s shareholders were the rice mills of New South Wales, not the growers, and had an arrangement with the New South Wales Rice Marketing Board to handle the entirety of the New South Wales (and therefore Australia’s) crop. Effectively they had a monopoly; and growers were critical of them. They also had good connections with the Federal Government through their Secretary M.E. Farley, who was also Chair of Australia Rice Ltd. In late 1949 Farley travelled with the Federal Minister for the Interior from Derby to Darwin. The Minister’s trip wasn’t covered in the newspapers yet after the trip media attention turns to rice and the north; there is a revival of great rice expectations. Poggendorff is also later driven from Derby to Fitzroy Crossing, taking two weeks to investigate the Western Australian region’s capacity for rice growing.

‘Expert’ reports were taken up by politicians who publically urged support for establishing rice production and the potentially vast rice-fields of northern Australia (*The Sydney Morning Herald* Friday 16 June 1950, *Northern Standard*, Darwin, Friday 23 June 1950). The report referred to is Poggendorff’s.

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Chapter 7 Rice trials and tribulations
Enthusiastic coverage continues in 1951 with reports of a “Promising Rice Crop” being grown by a local farmer, Mr J McDonald, at Adelaide River, 70 miles south of Darwin. The one acre crop was a “flourishing” two feet six inches high after only two months and “Agricultural experts are enthusiastic”. It is difficult not to be a little sceptical about such large hopes being pinned on such a small field, really the size of what was then a large Australian backyard:

A big future in rice growing is predicted for the Northern Territory as the climate and rainfall are similar to that of Indonesia, one of the world's largest rice producers. It is estimated there are millions of acres in the Northern Territory suitable for rice. This country is untouched and could be resumed for agricultural projects. It has been suggested that the country could be thrown open to migrants. *(The Canberra Times* Saturday 17 March 1951:6)

There is ongoing pressure for the development of a rice industry in the Northern Territory.

Meanwhile CSIRO’s Kimberley Research Station, established in 1946, sows its first experimental rice crops in 1947/48. No trials were harvested in the first four years due to bird damage in the dry season crops and poor performance of cultivars in the wet season, imported from the Murrumbidgee Irrigation Area (Chapman and Basinski 1985, Chapman et al 1985). Stem borer and weed control were the major problems through the 1950s, solved by chemical application in the experiments. Although management deficiencies were considered to have contributed to low yields and high costs it was later determined that the rice disorders attributed to disease were in fact a result of herbicide residue associated with the high soil pH (Basinski 1981).

In 1950 Kim Durack of the famous Durack pastoralist family began growing rice in the West Kimberley at Liveringa Station on the lower Fitzroy River (Forster et al 1960, Kerr 1962). A year later a company formed with expectations to grow 8,000 ha; Northern Developments Pty Ltd, with several of its directors associated with REA the New South Wales millers (Chapman and Basinski 1985). In fact it is Northern Developments who provide the seed for the first Northern Territory Administration trials though sourced from the Murrumbidgee Irrigation Area (Department Of Territories 1953). Liveringa Station, later referred to as the Camballin Irrigation Area, did not receive the national coverage, nor, it seems, the political pressure that the Ord
River Irrigation Area, and the Northern Territory trials in particular were subjected to, perhaps due to it being a private venture (Bauer 1982).

Durack, convinced for many years of the potential for cropping in the Kimberley, managed to mill the first bag of rice in 1953 (Millett 2011) after several drought years produced nothing (Bauer 1982). A visit by representatives from the Australian Rice Industry advised a barrage dam be constructed plus some actual living quarters. Like a true evangelist, Durack had been living in a caravan.

The Western Australian Government cleared away legislative hurdles for a change in land-use in the area. A 1957 Agreement with the Northern Developments outlined that 20,000 acres would be cultivated for rice (and rotational crops) in a process to gradually convert leasehold to freehold as it is cultivated, at a minimal cost to the Northern Developments. The State would provide the irrigation infrastructure, roads and bridges, even a small township at Camballin with 5 houses available to be rented to company employees (Bauer 1982). A year after completion the dam on Uralla Creek is damaged by flood. A small crop is planted that dry season but once again the January following there is further flood damage (Yuhun 1985).

Camballin became popular for visiting politicians and press with a cropping cause to push. Unfortunately the flooding created problems for Durack in achieving planting goals. One account, based upon Durack’s letters, described a disagreement between Durack and the company’s Chairman with Durack refusing the Chairman’s demand to announce that the planting goal for the next season would be met. A meeting is called and Kim is ousted, despite having slowly bought up shares in the company in order to protect his vision and position. One of the most dogged and hands-on of the North’s cropping visionaries leaves the Kimberley for good (Millett 2011).

Northern Developments continued rice growing with floods damaging crops and irrigation works, droughts leaving insufficient water to irrigate, poor yields, bird damage, weeds and mould (Bauer 1982). To avoid flood damage in the wet season rice was planted in March and April but low winter temperatures then affected the crop (Basinski 1981). Publicity was still optimistic. Northern Developments began experimenting with other crops. Western Australian academic and economist at the time Alex Kerr published the tome *Northwestern Australia* in 1962 and announced with
regard to the Fitzroy River at Camballin that “Undoubtedly the water resources of this river system will be harnessed in the future to bring closer settlement to this tract of country” (Kerr 1962:254) then adding that “certain basic problems have emerged” including an “urgent need to control floodwaters on the plain” along with the need for more effective vermin control (1962:256). Kerr believed that the future was encouraging particularly given the success of fodder crops the year before leading to the frequent comment that combining irrigated fodder production with cattle production may provide a breakthrough.6

The 1966 rice trials were abandoned as the seed had come from ORIA where an outbreak of bacterial blight was found. By 1968 rice growing was abandoned by the company except for small experiments and the focus moved to fodder crops. Even these experiments stopped in 1970 with the Department of Agriculture staff withdrawn from Camballin (Yuhun 1985). In the following two years flooding again destroyed crops and irrigation works.

According to Bauer over 2 million pounds was invested into the scheme by the company, and less widely known, by the Western Australian Government (Bauer 1982), who invested considerably in constructing water control and in research (Yuhun 1985). Yields remained low and never more than 1,000 acres of rice was grown in any year (Basinski 1981). In fact according to Bauer the crop never exceeded 100 acres (1982).

Close to bankruptcy in 1968 Northern Developments was bought as part of a much larger enterprise across the west Kimberley to produce grain sorghum and beef by an American company, the Australian Land and Cattle Company Ltd63. Nothing comes of the many further years of investment and efforts at Camballin (Masters 1998, Bauer 1985).

Back in the Northern Territory Poggendorff’s report of his 1949 Northern Territory trip, published by REA, differed somewhat in expectation and recommendation to the 1946 CSIRO Katherine-Darwin survey. Unlike Christian and Stewart he did see potential for

62 This stage of the Camballin enterprise follows the rice attempts and is discussed in chapter 10.
63 This becomes the story of the larger than life Texan Jack Fletcher, taken up in Chapter 10 ‘Going Grain’.

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rice on the sub-coastal plains, with the use of deep water rice varieties a possible solution, and suggested establishing an experimental site where both the Marrakai and sub-coastal soils could be trialled. The Northern Territory Administration proceeded on this basis. They created an Agricultural Branch in 1952 which then established the Beatrice Hill site on the sub-coastal plains with estuarine clays in that year, and the site near Adelaide River Township on the Marrakai plains with the solodic soils the following year (Department of Territories 1953, Powell 1982, Chapman and Basinski 1985).

It was acknowledged that there were different problems on each system: on the sub-coastal plains rice would be dependent upon the natural flooding by the river as well as rainfall; on the Marrakai soils natural rainfall would need to be supplemented by “small scale conservations”. In each case “the adequacy of water” and “suitability of the soils” for economic production needed to be determined (Department of Territories 1953:2). The Forster report on Northern Territory’s agricultural prospects believed that the Marrakai, recommended by Christian and Stewart, was the less favourable (1960).

Under the headline “N.T. Rice For World?” the Administrator of the Northern Territory Frank Wise is reported saying that if trials being carried out in the Northern Territory are successful there is a strong possibility of Australia becoming one of the world's largest rice producers. He announced that two areas will be developed as rice projects and works were already underway. Wise believed the project was “an engineering rather than an agricultural one”. The paper goes on to say that there may be one and a half million acres suitable for rice (Northern Standard, Darwin, Friday 30 May 1952).

Across in Western Australia the Kimberley Research Station (KRS) expanded rice research in the 1950s; 350 accessions from Asia, Africa and South America were imported to trial. This work showed which cultivars worked best for the wet or dry season (indica and japonica respectively) and that phosphorous and nitrogen application was essential (Basinski et al 1985). The KRS were also responsible for supplying the Northern Territory rice experiments with cultivars.

In November 1952 Poggendorff undertook another two day tour of the Northern Territory rice trials on behalf of the Administration and was reported as saying “he believed that rice growing could become the Northern Territory's chief industry”
The Minister for Territories Hasluck trumpeted that "the Federal Government was making a vigorous drive to establish large-scale commercial rice growing in the NT" (The Advertiser April 30 1953) with the intention to "guard against a world shortage", the driver 'Feeding the world'.

The development imperative had worked up to a feverish pitch, with rice to be the crop that carried the north. Yet in 1953 the then Director of Irrigation and Drainage, Federation of Malaya, Peter McNee (Esquire) inspected the rice trials at the request of the Department of Territories to advise on water control. By this time, as reported in the Administration's 1952/53 Annual Report, the project on the sub-coastal plains is floundering, and water management (as predicted by Christian and Stewart) is a major problem. McNee is not a booster. He warned against the:

super-optimistic and confident statements which had appeared in the Australian press following Poggendorff's visit...He emphasized that there was 'very little topographical and practically no hydrological data available on which to design drainage and irrigation projects and any attempts to develop the area on a major scale prematurely with inadequate technical knowledge and insufficient investigation would be to court economic disaster'. (Basinski et al 1985:95)

McNee also comments that relying upon the monsoon rain alone is uncertain given the insufficiency and unpredictability of the rainfall.

More is going on behind the scenes, driving this impetus and 'optimism'. The release of formerly classified Cabinet papers shows that in 1953 the communist threat was used by the British Government to persuade Australia to help supply rice to British colonies in south-east Asia. (Chapman and Basinski 1985:95)

It was believed that rice shortage and hunger would allow the Communists to gain a foothold in south-east Asia. An article in the New Commonwealth in May 1953 promoted this opinion with emphatic and blood stirring gusto:

In frustrating Communism's scheme of 'planned starvation' in Asia, the monsoonal areas of northern Australia constitute highly strategic territory. It is no exaggeration to say that the efforts now being made to turn these Australian tropical plains into great rice paddies comprise a vital part of the long-term Commonwealth and Western battle plan. (Norman 1953:491)

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Norman refers to the optimism of the Australian Rice Association and claims that 3 million acres are available for "rice-growing under monsoon natural flooding conditions" and that the amount that could be produced on this area exceeds the current export shortfall of the three main Asian rice producing countries.64

Also in 1953 American Allen Chase visited Darwin, "another dreamer of great dreams backed by little research" (Bolton 2008:153). Harold Holt while Federal Treasurer had enthused to Chase and others at a stag party in California of Australia’s “untouched virgin land...Nowhere else in the world is there a place where money invested today will pay such high dividends (Linkletter 1968:1). Hearing about the potential for rice growing in the Territory, Chase “conceived the idea of a big development company to open up these lands for commercial production” (Territory Rice Ltd 1956:1). There begins a large-scale corporate rice development, the now famous Territory Rice Limited, to which the scapegoated Magpie Goose will always be linked, self-proclaimed as “one of the boldest experiments in large-scale land development schemes in Australia” (Territory Ltd 1956:1).

In this way the national political climate provided impetus for the establishment and maintenance of rice trials in the NT. Begun in 1952 these trials provide a detailed record of attempts at rice growing for a period of a decade and highlight some of the variables at play in the success or failure of cropping.

In the first annual report for the Agricultural Branch of the Northern Territory Administration, 1953/54, the year is described in graphic detail. It is notable that in the list of staff they had a “Rice project officer (Resignation in hand)” and “Technical Officer (Rice) Not appointed”. Recruitment remains an issue to this day. A range of varieties are sown, sourced from the CSIRO Kimberley Research Station. Although the year begins well with good germination some plants are lost due to dry conditions early on. Signs of nutrient deficiency are addressed with fertiliser. Weeds give severe competition to the shorter rice varieties. Geese are little trouble during the early stages of plant growth, but come in large numbers in early march when grain begins to harden.

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64 Clear examples of the drivers of Chapter 4 ‘Securing the nation’ and ‘Making it white’.

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"...it soon became evident that a good deal of damage was being done to the grain. A patrol with rifles made little difference and, in any case, the geese carried on all night." Stem borers in early April cause damage; rats cause damage in dried out areas where grain is edible; and grasshoppers infest the entire area, though lightly. Despite these early problems there is excellent grain on two varieties.

It is not to be so straightforward (if early dry, nutrient deficiency, geese, rats, stem borer, and grasshoppers can be considered such). On April 10th a cyclone completely destroys the crop. The report states that "a cyclone of such force cannot be recalled by local residents". One thousand trees blocked the access road for about a ten mile stretch and vehicles were constantly bogged for the following six weeks. Work stopped to clear the road and attend to weather reports.

This setback makes the press. Illustrating the very public nature of the projects and the heightened national expectations for northern cropping the Minister for Territories, Hasluck, surmises "Our problem, like many other problems of development in the north, is fundamentally one of agricultural engineering. When Australia can train and use the agricultural engineer as well as the agricultural scientist and cultivator, we will change the face of the north" (The Advertiser Adelaide 30 April 1953). The problem was seen not as one of cultivation but of water control, distribution and drainage, and one that could be conquered. There was an assumption that the vagaries of the climate could be managed. This attitude emerges regularly over time - the belief that technology can win the day.

Despite Hasluck's engineering certainty, other factors do still inhibit cropping at this time, and labour is one of these. As it had been since the first dreams and schemes of the 1880s, labour availability is still a major issue, and possible immigration solutions are regularly forthcoming. One newspaper reports the Indian High Commissioner General's suggestion on a visit to the rice trials that Indian ex-Servicemen could help grow rice in the Northern Territory. Although he "did not wish to run up against the White Australia policy" he saw thousands of acres suitable for rice growing and believed that:

Thousands of Indian ex-Servicemen now growing rice would welcome an opportunity to apply their knowledge in Australia...We
fought two wars together and there is no reason why we should not fight 'The war to grow more food. (The Sydney Morning Herald 16 November 1953)

Expectations continue to grow (unlike the rice) with announcements such as those by the chairman of the Commonwealth Rice Control Committee Mr Charles E Dalton, talking of plans to step up Australian rice production in a “big way”, and of “vital experiments being carried out in the Northern Territory and Western Australia, where 1 million acres of ground were available for growing rice”. He also referred to the strategic value of this work to Australia (The Mercury Hobart 15 January 1954). In their history of crop research in northern Australia Basinski et al state that by the mid-1950s rice was “regarded as one of the most promising crops” and deserving of more intensive investigation (Basinski et al 1985:43).

So the Northern Territory rice experiments remain caught up in a very public and politically charged push. Another article headed “Development of north urged in House of Representatives” reports a speech by Queensland Liberal MP Mr Swartz to the House urging “full development” of Northern Australia with the potential for two million acres of rice in the Northern Territory (Cairns Post Thursday 26 August 1954:10).

The annual reports of the Northern Territory Administration’s Agricultural Branch describe the barriers and pitfalls for cropping in general, and rice in particular. They capture one of the many stoic efforts that have been made to introduce cropping in the north. The trials and tribulations of their rice trials, is the stuff of a tragicomedy script. The reports of the, predominantly acting, Rice Project Officer, are simultaneously impressive for their catalogue of sheer hard work and tenacity, while frustrating for the pitfalls, obvious in hindsight.

When it wasn’t too dry, it was too wet. When seed germination was successful the geese thrived on the green pick. When the geese weren’t eating or nesting in the rice it was cockatoos, pigs or buffaloes damaging the crop. When rain finally came levees broke, roads washed away and vehicles bogged for weeks. After this came stem borers, weeds, and eventually Fusillaria; and if all of that wasn’t enough then a late season cyclone might arrive. Every year the reports would comment that the year was ‘unusual’ or ‘exceptional’ or ‘record breaking’.

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Reading these detailed, articulate reports is all the more like an unfolding Greek tragedy given we know the outcome. The initial optimism, hard slog, explanations of supposedly one-off mitigating factors or soon to be controllable variables, and the ongoing assumption that efforts would inevitably bear grain, are alternately amusing, frustrating and sad. Over time the reports became less detailed, less warts-and-all. At the time the conditions were tough. Infrastructure was basic, whether the staff housing, the roads or communications. In a letter of 1956 a visiting researcher Harry Frith describes:

The wet season is hell as the Humpty Doo quarters are in the middle of a pandanus swamp, and so every day or so a few inches of water goes through the hut and the frogs leer in the doorway all night, and the flies, mosquitoes and general filth has to be seen to be believed. (Quoted in Tyndale-Biscoe et al n.d.)

Recruiting staff was constantly difficult. Even when requests for increased staff numbers were successful filling the positions was a higher hurdle, highlighting what has been an ongoing difficulty for the Northern Territory, one that still exists and is a barrier to improving the capacity available in the north. Davidson also discussed the vexed subject of attracting capable farmers to the north (1965).

The obvious dedication of the team, who are not working for themselves and their own farms but for the government, seems to reflect a belief in the fundamental importance of their work; to establish cropping agriculture in the Territory.

The 1954/55 Annual report reveals further the multiplicity and diversity of aggravations the government rice pioneers were facing, and their determination to overcome them. Acting Rice Project Officer R.J. Kentish details what confronted them on a daily basis with a disarming honesty. Ground inside the water controlling levee banks was hard to plough, being more dried out, but also became harder in subsequent ploughing. “Record breaking” heavy rains in October then meant no land preparation was possible and with light rains continuing to the end of December work could only continue “spasmodically”. “Emergency methods of planting” were employed meaning seed was distributed by hand and with the rotary fertiliser spreader. Geese took to the planted seed immediately. Kentish had to wait for the arrival of Zon guns, another delay, and sowing was undertaken again mid-January “under cover of a Zon gun barrage”. After

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only two weeks the geese “took little notice” of the Zon guns\textsuperscript{65} and planting ceased at the end of January with only ten acres sown.

In February 26 inches falls over 2 days in the headwaters and tributaries of the Adelaide River and the River rises to 40 feet at township. Rice levees are breached at the Humpty Doo site with the water so deep (5 ½ feet) that the area was inspected by dinghy. Flooding might not have been due to rainfall alone as the tides were extra high and a gale was blowing up the river mouth. Given that the plain with the cultivation was only 18 inches above high tide in the river it is surprising that there was no documented trace of salt water on the rice fields. Kentish writes that the inundation renders areas unsuitable for commercial purposes. At the other location, 60 Mile, the earthworks were proclaimed useless.

“Late rains” interfered with harvesting operations and a D4 caterpillar, with 20 inch tracks, had to be used. Borrowing the header from Katherine experimental farm was “not very satisfactory”. This lack of timely and easy availability of appropriate machinery was a constant struggle for the staff. Although crops suffered damage from both birds and pigs that year the report states that pigs were “easily the worst enemy” with about one third of the best stand of rice lost. Despite all of the above the report states “Considering the very limited staff, the Annual Report reflects good progress in most fields of agricultural activity in the Territory.” New seed varieties for trialling were anticipated from CSIRO’s Kimberley Research Station. However we also learn that “The extension activities with farmers in the Darwin, Adelaide River, Katherine and Daly River areas have been somewhat neglected...” (Northern Territory Administration 1954/55).

The next annual report, 1955/56, begins with a call to arms: “These past unsuccessful efforts of agricultural development issue a challenge to the Agricultural branch to direct development along sound lines in an endeavour to obviate further failures.” This year is

\textsuperscript{65} Zon bird scare guns are still sold. An advertisement states “ZON bird scare guns have been the leader in the automatic scarecrow industry for over 50 years. Over the years, ZON has incorporated the latest technology into their design. Time proven and field-tested, ZON products have been accepted world wide for their durability and reliability. Over one million units have been sold!” (http://www.daken.com.au/scare_guns.html 19 October 2012)
significant with the beginning of the private company, Territory Rice Ltd.'s substantial venture. Despite advice from McNee, sought by the Department of Territories itself, that there is insufficient data available and large-scale development would be courting financial disaster, an agreement is signed in 1955 between the Commonwealth Government and Territory Rice Ltd giving the company an option on 750,000 acres of sub-coastal plain for rice-growing; encompassing the entirety of the coastal plains east of Darwin to the Arnhem Land border and across all the major river systems, the Adelaide, Mary, Wildman and west, south and east Alligator rivers. According to scientist J.J. Basinski the decision to proceed on the coastal plains, the area not favoured by Christian and Stewart in the CSIRO Land Use report, was made as there were no clearing costs in farming the treeless plain and major water storages were not considered to be necessary (Basinski 1981).

Unanimously approved in 1956 by the NT Legislative Council the Minister for Territories, Paul Hasluck, announced in Canberra that the venture would “change the face” of the Territory if successful and emphasised: “The Government sees nothing but advantage in encouraging the enterprise” (Territory Rice Ltd 1956:3). Initially the company were to develop 5,000 acres annually until the 8th year when it would increase to 45,000 acres per year (Basinski 1981).

The overt motivation of those in the company might be financial (though not well-considered) however the drivers for the Federal Government are much more than this, as articulated in the Territory Rice Ltd report “the idea which brought the parties together and which caused the whole-hearted support of the Australian Government” was how vital it was to the “security of Australia that its empty north be developed”.

(a) The development and population of the Northern Territory, particularly in the coastal belt east of Darwin, by the creation and development of farms producing agricultural crops for which there are markets both in Australia and overseas.

(b) The provision of possibly a million tons of rice a year, which would help to feed the rice eating peoples of Australia’s near North, whose present deficiency causes them to be susceptible to Communist agitators.

(c) To provide Australia with an additional volume of exports.

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(d) To provide the cattle industry of the Northern Territory with fattening areas and a local market for their products.

(e) To provide a basis for many local industries, in particular, primary processing works, such as rice mills, utilising the crops to be grown.

(f) To make a profit for the shareholders of the company. (Territory Rice Ltd 1956:3)

**Figure 21. Objectives of the Territory Rice Ltd Scheme**

Later, in a book describing his adventures in Australia, Art Linkletter, one of the original investors and group of friends who established the scheme, explains that their motivation is as much about the romance and the adventure as it is the potential investment earnings and he equates the friends’ scheme to the romantic vision that prompted their forefathers to sell up and wagon their way west. They had a lot less to lose than their forebears, all now being wealthy Californians in the Hollywood business or banking.

The Northern Territory Administration’s rice experiments became even more important in the context of this commercial development. The company itself wrote that “The Commonwealth Government, both by the Agreement and as a normal, good administration, is providing considerable assistance in such ways as investigation by its technical experts (Territory Rice Ltd 1956:3). The agreement included that government would provide research support, carrying out experimental work on varieties and growing techniques, and significantly, hydrological work to understand the best water control methods for rice growing areas of the Territory (Territory Rice Ltd 1956, Forster et al 1960, Chapman and Basinski 1985). This last the issue highlighted by McNee and already the major problem for the Administration’s trials.

Meanwhile the Department is already aware that the current site at Humpty Doo is too low lying for trialling the coastal plains and is surveying new areas. (Northern Territory Administration 1957) In that year Territory Rice sow 600 acres, some of it aerially to overcome the “excessively wet conditions” (Forster et al 1960:203). Plane surveys reveal that the land available for rice growing on the sub-coastal plains either side of the Adelaide River is not as extensive as had been thought; some areas are deeply inundated and others too high for cultivation without major water control works. Significantly the

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Annual report acknowledges that “Territory Rice Limited may have difficulty in selecting 500,000 acres of land suitable for rice-growing in the sub-coastal plains east of the Stuart Highway” (Northern Territory Administration 1957:6). They also acknowledge the difficulty of finding suitable varieties as capacity for a plant to withstand flooding “isn’t just a varietal characteristic as the level of maturity of the variety has a vital effect on its ability to recover” (Northern Territory Administration 1957:7).

Additionally the issue of trace elements arises for the first time. Something is affecting the growth of the rice however it is unknown whether it is deficiencies or excesses, and of what trace elements. Iron and manganese are the two most important for rice growing so they are considered likely.

The other notable difference in this Annual Report is the first mention of markets, “the question of market outlet has also been receiving the attention of the Branch; and also the Bureau of Agricultural Economics have made a special investigation on the marketing of fresh fruit and vegetables, both for consumption in Darwin and possible export of produce grown in the Territory” (Northern Territory Administration 1957:2).

The magpie geese continued to disrupt the cropping: “The main trouble from geese was when the crops were ripening, and night patrol by natives had to be instituted to prevent losses in the crop. Cockatoos and galahs were plentiful, but were effectively kept under control” (Northern Territory Administration 1957:8). The Humpty Doo site chosen for the rice trials was in fact a breeding ground of Magpie Geese, *Anseranas semipalmata*. Crop losses caused by the geese led to a request in 1955 to the Wildlife Survey Section of CSIRO to investigate Magpie Geese and the extent of their impact. Scientist Harry Frith was sent and although the study was requested by the Northern Territory Administration, support was not wholehearted. Frith writes in a letter that “The Humpty Doo circus continues with mud, slush, mosquitoes and bastardry on all sides. ... a lot of buck passing” (Quoted in Tyndale-Biscoe et al n.d.). The study is not mentioned in the Northern Territory Administration Agricultural Branch Annual Reports; an indication that the bastardry is not just the dramatic touch of the letter’s author and his colourful writing.

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Art Linkletter of Territory Rice Ltd doesn’t hold back in his opinion and description of the geese suggesting they should be called gobblers, even taking grain mid-air when it was being seeded experimentally from planes. “Humpty Doo became known as the Hollywood Pioneer Australian Restaurant and Buffet Service” (Linkletter 1968:26). There was a darker side to this humour, one that created a cause for Frith, and that was the control of the birds. According to Linkletter:

We must have killed a million of the birds. Hunters were invited and they came in droves. There was no limit...One hunter claimed he killed twenty-nine with one shot (Linkletter 1968:28).

How literally one can take Linkletter is doubtful given the tall story tone of his book, and there are no overt additional accounts that reveal such drastic carnage. The potential impact of broad-scale cropping upon the breeding grounds of the geese was certainly something that motivated Frith, and then others, to begin work towards creating a conservation area that later became Kakadu National Park.

Figure 22. Magpie geese in the Elizabeth Valley in 2014 (G. Sawyer)

Linkletter’s background includes major contributions to aviation, broadcasting, TV, and oil and gas exploration. He was U.S. Ambassador to Australia.
Territory Rice Ltd tried many techniques to scare the birds, noisemakers including carbon guns, scarecrows, strings of tin cans catching the sun; nothing helped. However despite Linkletter’s rice-stuffed goose drama they are not the killer blow to the scheme.

A very large experimental programme undertaken in the wet season of 1957 is destroyed by flooding. In March the report announces that “This area has been handed over to Territory Rice Ltd.” (Northern Territory Administration 1957:12) Soon after what is described as “the abrupt end of the Wet in early April” causes a temporary drought until a supply channel to the Adelaide River built; an incident occurs which leads the report to conclude that supplementary irrigation is essential for rice growing. The realisation is reached that the variability of the rainfall, even in the Wet, limits rice cropping: “Dry spells, which could destroy the whole crop or affect the yield greatly, can occur throughout the whole growing season.” It is the beginning of an understanding of the climatic conditions, the characteristics of the monsoon – and the loss of belief in the average. Problems continue with machinery inadequate for preparation and difficulties ploughing dried ground. Cockatoos are now a bigger problem than geese, “less deterred by shotguns and, also, they scratch up sown seed.” Cattle and buffalo also caused extensive damage, being particularly attracted to the rice after flooding when the native vegetation soured off.

The 1957 Northern Territory Annual Report bluntly attributed failures to “lack of careful investigation of soils and climatic conditions for the growing of crops, bad management, insufficient agricultural experience, and lack of sufficient capital to properly develop the projects and to meet high fertilizer and labour requirements.” The report’s description of rainfall is honest but quixotic “Agricultural development has been limited by the lack of rainfall in many parts of the Territory and its unsuitable incidence in others.” (Commonwealth 1957b:23)

Despite this litany of ongoing problems the annual report concludes that enough results are now available on everything from land preparation to harvesting techniques, and fertiliser requirements to water control, to justify the commercial rice growing on the Marrakai land system where there is sufficient water storage; even anticipating that “at least two farmers will be growing approx 100 acres of rice on this soil type in the 1957/58 season.”
Views are tempered somewhat the following year:

"it can never be hoped to develop intensive agriculture on a large percentage of the half million square miles of land in the Territory. However, this does not mean that agriculture could not play a major role in the wealth of the Territory, for substantial areas are suitable for some kind of agricultural or pastoral development, which could provide some thriving primary enterprises and, also, be the backbone to an export cattle market. (Northern Territory Administration 1958:3)

Yet, in the equivalent of the same breath, a page later:

On account of the extensive area of suitable soils, and sufficient water supply being available for supplementary irrigation, the sub-coastal plains offer very good potentialities for large-scale mechanised growing, and it is on the soils of Humpty Doo that Territory Rice Limited is developing land for extensive rice growing. (Northern Territory Administration 1958:4)

The report argues for more staff for the Agricultural branch, unsurprisingly. 1957-58 was the most successful rice growing yet for the Administration on the sub-coastal plains. Seventy-seven acres of rice were grown and harvested at Beatrice Hill with yields of up to two tons per acre attributed to better machinery, fences and farm labour, no flood, and irrigation. Although magpie geese were as severe from November to January there was no damage to combine sown rice only to broadcast rice. On the 24th March the geese left. The conclusion is to use later maturing varieties, sown by combine. Cockatoos were another difficulty and were also controlled by shooting. The disease Fusarium did occur and the report acknowledges that given Fusarium isolated from wild rice appears to be pathogenic the disease is probably widespread throughout rice growing areas of the Territory.

Although the Agricultural Branch reports that good liaison has been maintained with Territory Rice Ltd they go on to say that Territory Rice Ltd reduced the area sown to 250 acres despite having ploughed 3,500 acres as a result of trouble with water pumping and therefore insufficient water on the bays (Commonwealth 1958). The two farmers and 100 acres predicted in the last Annual Report have not come to fruition either.

By the 1958/59 Annual report of the Administration’s Agricultural Branch it is claimed that sufficient preliminary experimental work has been done on the sub-coastal plains to make “firm recommendations” on areas such as “cultivation practices, rates of seeding,
fertiliser requirements, most suitable varieties at present tested, irrigation requirements and need for harvesting at correct time for the prevention of sun-checking of grain” (1959:2). Shortage of technical and scientific staff due to difficulty recruiting is still a problem and caused considerable extra work.

The Territory Administration’s Agricultural Branch announce this will be the last year for rice trials at Beatrice Hill Research Station and that the station will be used for experiments on crops other than rice, specifically for large scale cattle feeding experiments. After all its rice experiments the Administration has come back full circle to working to improve pastoral productivity, a pattern we see recurring in northern agricultural Research and Development.

The Northern Territory Administration was having difficulties fulfilling the stipulations of the Agreement with Territory Rice Ltd, so CSIRO was invited to “assume responsibility” for rice experimentation. CSIRO’s Coastal Plains Research Station was established as a result, beginning operations in 1960 (Chapman and Basinski 1985:96). No mention is made of this transfer of responsibility in the Administration’s Annual Report.

Territory Rice Ltd’s large-scale attempt was already well underway, and already floundering. The company’s finances were stretched after three years and in 1957/58 could only afford to plant a token trial of 80 ha. Accumulated losses in 1958 were estimated at $1,053,034 (Mollah 1982). Allen Chase, the lead American investor, decided they “hadn’t thought big enough” so went looking for a new partner and a lot more money (Linkletter 1968:43). He found Californian Bob McCullough. In response there was an overhaul of the company’s ownership and management with 2 million dollars injected in the following few years (Mollah 1982). Of 5,000 acres sown in 1958/59 only 2,780 were harvested; 1,000 acres failed to germinate in new land and another 1,200 acres failed due to lack of water (Forster et al 1960, Mollah 1982). Then an April cyclone produced 380 mm rain in 24 hours (Mollah 1982). The following year 5,000 acres were sown however late rains, unsuitable machinery and inadequate transport resulted in a low yield (Forster et al 1960). Forster explains that large-scale extensive cropping using hired plant under contract resulted in “avoidably faulty agricultural practice” and “yields suffered accordingly” (1961:5).
Linkletter describes the Wet season as “The Deluge” or “The Nightmare” and describes how they were caught out by engineering averages: the drainage channels and levees were designed to handle 65 inches of water for the three months of the wet season however 15 inches fell in two days: “the entire alluvial delta was one gigantic, devastating, all-encompassing lake” (1968:28). To protect expended capital they “engaged one of the top engineering firms of Australia” and invested even more in pumps, roads on levees to ensure access, and large tractors. Yet the next wet season “The water came. And came. And came, and it kept coming. It came down in torrents, overflowing its channels and washing away or drowning everything in its course” (1968:33). They tried flying in new pumps but there was nowhere to put them down. Only a few hundred acres survived, one twentieth of what had been planted.

By 1961 Territory Rice Ltd was finished with heavy debts incurred (Forster et al 1960:204). More than US $2 million “had gone down the drain” (Linkletter 1968). After aiming to develop 200,000 hectares in 15 years and to produce more than 400,000 tonnes of rice annually for export at its peak only 2,000 ha were sown (Fisher et al 1977).

Despite the failure of Territory Rice Ltd an inquiry into agricultural prospects in the Northern Territory in 1959 stated in reference to the sub-coastal plains that government policy “should be one of confident but cautious optimism about the future for rice in this region...” (1960:5). The report believed that failure was due to poor internal company management, “It would be wrong to condemn the future of rice on this experience alone” (1960:204). Christian comments at this time that:

the lack of adequate technological information to guide a European type mechanized form of production and the failure to recognise this lack, have been largely responsible, together with other factors, for the poor progress of rice production ventures to date (1961:14).

He believed that success would eventually be possible with the Northern Territory Administration and CSIRO working to provide this information.

The area was transferred to four farmers who had been working for Territory Rice Ltd and who themselves then formed Rice Development Pty Ltd. (Pederson 2010). They were financed by the Commonwealth Development Bank and the creditors of Territory

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Rice and between 1960 and 1963 farmed approximately 800 hectares. Annual leasing arrangements restricted their capacity to plan and to contract to sell rice. Then yields were low with insufficient early rain in the first year and moisture stress from a late monsoon in the second. The annual Sesbania was also a problem, with seeds of similar size to rice which hindered harvest and milling. Their operations ceased in 1964 (Fisher et al 1977, Pedersen 2010).

A government sponsored Pilot Farm scheme at Tortilla Flats followed in the mid-1960s. Some believe that “had we persevered with rice production despite the early failures, we would today be much further down the road towards the establishment of a rice industry in the NT” (Chapman et al 1985 quoting Mailath 1982). Others are less positive. Of three pilot farms two were combining rice growing with cattle production, the other just cattle. In 1966 it was decided that rice was uneconomic and the farms focused on cattle instead. This did not save the farms and in 1972 the scheme was wound up and the debts of the remaining farmers were written off (Martin 1983).

Almost half a century later Hollywood all-rounder Linkletter referred to his rice-growing experiences in a humorous keynote in Las Vegas: advised that the area received 85 inches of rain per year, enough for rice, he comments "The question I didn't know to ask was 'How does the rain come down?' And I found out it comes down in a week. Which took care of the rice. It went to sea" (Lombardo 2000).  

From the mid-1960s the remaining rice research at KRS focused on finding the causes of the rice disorder present since the beginning and becoming more severe. It stymied researchers. Investigations were made to prove causes whether viral or bacterial, residual herbicide, zinc deficiency, or manganese toxicity. New introductions of rice cultivars from the International Rice Research Institute made little headway due to the disorder. Finally in 1972 the disorder was shown to be caused by the low availability of micro-nutrients zinc and iron due to the nature of the local soils (Basinski et al 1985).

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67 Linkletter went on to purchase 600,000 hectares of Crown land near Esperance (Linkletter 1968). In only two years the project “was clearly floundering from want of preparation.” Illustratively, the people that took over in 1962 “were more prepared to listen to the agricultural scientists.” (Bolton 2008:153) By 1965 the region had farms totalling 700,000 hectares and millions of sheep.

Chapter 7 Rice trials and tribulations
Coming to understand the characteristics of the Wet-Dry Tropics, or failing to, is a consistent theme in these accounts. Although presented as an issue of water management (whether too much or too little) reading the language that is used we see a constant, and constantly surprised, expectation that the climate will behave in averages. In the earlier Annual reports descriptions highlight the expectation that there would one day be a ‘normal’ year. In 54/55 rains are “record breaking”, sub-soils carried an “unusual amount of water”, “late rains interfered considerably with harvesting”, and “tides were extra high”, and in 55/56 “abnormal conditions caused by flooding” yet “a dry spell in December”. How many years can be abnormal before one questions what normal really is? By the 1958/59 Annual report there is acknowledgement that even during wet season supplementary irrigation is required as dry spells are possible. This growing understanding of the wet dry tropics, a climate entirely different to elsewhere in Australia, is a key element of the ‘circular conundrum’.

Although water management is the most obvious, and recurring, of the variables that contributed to the failure of Territory Rice Ltd there is a long list, as catalogued by Fisher et al in 1977, who appear disdainful of the company’s internal management and long distance decision-making. Decision-making functions were distributed between Humpty Doo, Brisbane, Sydney and Los Angeles with only the most insignificant of decisions allowed on site (Mollah 1982). The Americans arranged for an Australian to supervise the operation – from Sydney two thousand miles away. Paul Cullen was an investor and businessman, and former member of the Australian Defence Forces. He had no apparent agricultural experience but became involved through the merchant bank he founded, Mainguard. Initially investing one quarter of Mainguard’s capital the scheme became a major drain on the bank and it lost the entire investment. Cullen was to later say that “This was a great mistake by me”. (Baker 2005:193)

The investors themselves had very little knowledge of agriculture, let alone the tropics; the closest any of them had come to growing anything was Allen Chase, “whose beautiful garden was tended by two full-time gardeners and three helpers.” (Linkletter 1968:5) Should this have mattered? In his exuberant way Linkletter mentions that the company “hire agronomists, agriculturists, engineers, scientists and accountants and send them to Darwin in our crusade for rice.” (Linkletter 1968:5) Yet only two years before the scheme began the advice from tropical rice expert Peter McNee, at the
request of the Department of Territories was that, given insufficient data, large-scale development would be financial disaster. There seemed to be little learning, whether from the previous research or from their current experience. Linkletter discreetly refers to this with his comment about one of the big men in Australian agriculture employed by American Allan Chase “He retained Bill Gunn and Bill faithfully repeated for his new client many of our original mistakes. “(Linkletter 1968:43)

Despite a dramatic soliloquy “Today the rusted hulks of ploughs, abandoned tractors, and milling machinery stand as mute testimony to the failure of Project Marco Polo and to the primordial, erosive power of the monsoon rains, the devastating heat, and the untamed ferocity of the Top End” Linkletter goes on to say that “Everything is there; the conducive climate, the water, the soil, and the Asian marketplace. And, one day, you mark my words, Humpty Doo will come into its own” (Linkletter 1968:43) This encapsulates the turn on a dime attitude towards the north, from failure to expectation, the circular conundrum.

More Rice Tribulations - the Ord in the 1960s

One of the first farmers in the Ord discussed the difficulties of that early period. Despite government support, such as a rice mill built and run by the government68, according to the farmer the problem was their dependence upon government. He outlined several incidents including major chemical damage to crops through mismanagement by Government contractors. Another problem is that in the severe climate long grain rice can bend as it gets hotter, making grains prone to fracturing and the possibility of breaking when being husked, making it almost worthless. At one point the mill’s administration made a mistake and milled the cracked rice as white rice (husking and breaking it) and the milled the uncracked rice as brown rice. “It was financially catastrophic” (Conversation 6).

68 It’s still there in 2011 but with all the milling machinery stripped out of it and sold. The same thing happened years later with the cotton gin
A CSIRO scientist at KRS writes in an unpublished report to a government committee in 1973 that there are four problems with rice growing - stem-borer damage, weed competition, varietal limitations, and the "Kimberley Rice disorder". "All these problems, as well as poor farming standards, contributed to the failure of the attempt to grow rice commercially in the early 1960s" (Basinski 1973:24 Unpublished). A later summary by a researcher states that rice research conducted before commercial attempts in the Ord in the 1960s was:

...of little use in establishing a rice industry on the Ord... insufficient thought was given to the ways in which the economics of rice production might be influenced by the geography, soils and climate of the region... the conclusion is inescapable that the researchers suffered from the lack of stimulus and interaction normally provided by an existing local industry (Chapman et al 1985:224).

The 1976 State Government review of the Ord River Irrigation Area concluded “that a great deal of work needs to be done before a rice industry can be established in the Ord” (quoted in Young 1979:35). Hard on the heels of the State Government review came another, this time a joint Commonwealth and Western Australian Government review in 1978, they considered “a number of agro industrial crops” (Young 1979:4), sugar cane, kenaf and cotton – but not rice.

Agricultural scientists from CSIRO later wrote of the difficulties of finding suitable rice varieties for the Ord region, a problem "far more intractable than anyone imagined". They explain that although the issue of water availability is an obvious one the impact of temperature is not so; yet low mid-year temperatures can cause some sterility and high temperatures when the grains are filling out can create chalkiness. An ideal variety would therefore be tolerant to low temps early on and high temps at grain filling – “a combination difficult to find” (Chapman et al 1985:217). Temperature difficulties were compounded by the limitations of the soil and nutrient deficiencies. There had originally been an assumption that given climatic similarities to Southeast Asian rice-growing areas, tropical varieties of rice would be suitable however it was later shown that water temperature in flooded fields exceeded 40 degrees in October and November killing rice seedlings (Fisher et al 1977).
Rice resurrections? – The Ord and the Northern Territory since the 1980s

In the 1980s the establishment of the Agricultural Development and Marketing Authority (ADMA) by the new Territory Government re-invigorated the investigation of potential land and crops for development. Plans included two stages of development over 15 years with stage 1 the establishment of commercial rice production in the Upper Adelaide River area and stage 2 aiming for 45 farms in full production (Mollah 1982). A working party of the Northern Territory Government evaluated them and prepared advice to Cabinet in 1980 including outlining steps to develop a rice industry on the Adelaide River (NTG 1980).

By March 1981 commercial rice plans were on hold. Presenting at a forum in 1982 the Chairman of ADMA was ambivalent about the role that rice could play “this crop now seems to have less to offer than other field crops” (Cameron 1982:45). Acknowledging that good yields were possible Cameron presents the constraints as scale and cost efficiency, with a long listing of difficulties including: the need for a mill yet the amount of production required to justify investment in a mill; a hydrological study by the Water Resources Division concluding the area required was not available in the upper Adelaide River unless major water storages were provided and a site which did exist would cost at least $40 million; risk to farmers was too high without such a storage due to low rain years or flooding; and budgeting showed that farms of 120 hectares of rice would incur a substantial loss (Cameron 1982:45).

All of this flew in the face of a protocol for a rice research and demonstration program by the Northern Territory Department of Primary Production which proclaimed that existing work should be expanded to provide “biological and economic information” necessary to establish a “full-scale rice industry on the Adelaide River” for which up to 45,000 hectares of suitable land is available in the Adelaide River plains (Airey et al 1981:1). Davidson would be pleased that economics is flagged in the title however the proposed research program does not reflect this in its content, and the concomitant allocation of resources reveals only 20% of an economist’s time is required. Once again researchers are seeing the challenge as efficient use of inputs such as fertilisers and insecticides or varietal improvement.
Despite Cameron’s public doubts as Chairman of ADMA rice was resurrected in the Northern Territory in 1983 as a commercial crop (Cann et al 1989), and it appears again at Camballin where 23,000 hectares of cropping were planned though didn’t eventuate (Yuhun 1985).

In 1983/84 five growers with an area of 63 hectares produced 195 tonnes in the Territory. By 85/86 there were nine growers who produced 526 tonnes from 315 hectares (Cann et al 1989). With this growth there was concern that production might exceed the local market demands creating oversupply. Meanwhile over the duration of these five years the yield had steadily dropped from 3.1 tonnes per hectare to 0.5 tonnes per hectare. According to Cann’s study the declining yield is apparently due to ‘late sowing and inadequate water control structures’ (Cann et al 1989:4). The study determined that a local mill would not be economically viable. Since then according to the Australian Natural Resource Atlas (using ABS data) the production of rice in the Territory has jumped around with no discernible trend between 1984 and 1997 with 58 tonnes in 1984 (substantially lower than the NT departments reported figure), a low of 55 tonnes in 1995 and a high of 554 in 1996 dropping right back to 85 tonnes in 1997.

Reviewing the history of rice research Chapman et al (1985) estimate that over the 35 year period to that point the equivalent of 344 human years have been applied and 875 experiments have been conducted across the north west of Australia - the Adelaide, Ord and Fitzroy River Valleys. About three quarters of the years and half of the experiments were undertaken in the Adelaide River valley, Northern Territory and up to 70% were related to the introduction or evaluation of genotypes and plant nutrition or fertilisers. Interestingly they note that there was little change in these research priorities over time. At the time of their writing in 1985 the authors say that these topics remain a problem for industry development.

In 2009, at the height of the drought in southern Australia, it was reported that the Katherine Research Station of the Northern Territory Government had begun rice trials. Thirty three rice varieties were being trialled. The trial began in the wet season of 2008

and has been hampered by birds. The research station’s agronomist Malcolm Bennett said that birds have been trampling the rice seedlings and that one approach to controlling them would be to use scare guns with exploding shells.\textsuperscript{70}

At the same time, just prior to the much feted and long awaited Ord Stage 2 expansion, the potential for Ord rice was also being promoted, “Rice on top in the battle for the Ord’s new supercrop”, with a report that rice was outperforming GM cotton in the district as the “Ord Irrigation Scheme's new broad acre crop”. Since the end of the sugar industry in 2007\textsuperscript{71} the Ord had been without a consistent broad-acre crop. Two trials of rice were carried out, one by a local grower and the other by the Department of Agriculture and Food. The department trialled for varieties and the researcher John Moulden commenting that preliminary yields for one of them has been "outstanding". Both a grower and researcher agreed in the article that rice had more potential than cotton as it did not require the critical mass, or ongoing consistent production that cotton did to support investment in a cotton gin. Rice was considered more flexible and fitting to the Ord farmers technique of moving in and out of crops. John Moulden explained "Even if we had 1,000 hectares of rice next year, with these sort of yields; if we can get a small bulk freighter, SunRice operates a rice mill in Papua New Guinea, we could just ship the whole year's crop out of Wyndham and to New Guinea" (Brann ABC Rural 05/10/2009).

Another boost comes from the former president of the Australian Rice Growers Association, Laurie Arthur from New South Wales, in 2010 preparing to plant 600 hectares of rice in the Ord, the largest commercial planting in over 20 years. In a media report “A big day for rice in the Ord Valley” (Hyman ABC Rural 25/03/2010) Nick Lowing, Arthur’s business partner, is aware of the Ord’s history but believes things are different with new technology and varieties, and rice can now be successful. Planting was also undertaken at the Department for Agriculture’s research station trialling about a dozen varieties of rice. According to the departmental researcher this work was receiving interest from rice growers in other areas.

\textsuperscript{70} (http://www.abc.net.au/rural/content/2008/s2541491.htm Accessed 23.7.2011)

\textsuperscript{71} Covered in detail in Chapter 6
One year later, while I am in the Ord interviewing farmers and the department, they
discover rice blast in the crops. Initially it is kept quiet. I hear that something is up, and
then learn about it confidentially. The Department of Agriculture and growers are
cought on the back foot and trying to decide what to do with the crops, whether they
must be destroyed or not. Yields are badly affected. The media reports that one grower
bales over a third of his crop for hay. Another farmer who harvested his rice commented
that the cooler weather that year meant ‘cold shock’ also impacted upon the crop.
Despite this, he still believed that rice had a future in the Ord (ABC Rural 17 November
2011).

Across in the Territory in 2014 Bruce White is farming rice on Mt Keppler Station near
the Adelaide River. Bruce White built a dam on his cattle property to experiment with
flood irrigated fodder crops for his stock, diversify his enterprise and reduce reliance
upon live cattle export. Water supply is not guaranteed however with levels too low due
to a poor monsoon in 2013 to bother sowing. The year before he had difficulty keeping
the birds of his crop, particularly ducks and geese; as I drove past the paddocks one
evening there was the constant sound of the gas guns working futilely attempting to
scare off the birds, and a small mountain of spent cartridges on the dirt dam wall. Bruce
also employed backpackers to guard the crops at night.
Figure 23. Mt Keppler’s healthy 60 hectare rice crop in June 2014 (top) and ready to harvest in September 2014.

The Northern Territory Government assists the White’s operation and SunRice’s R&D arm, Rice Research Australia, are also involved. In echoes of Christian’s comments many years earlier Bruce Sawyer who manages the research farms of the Northern Territory Government explains that the capacity to grow a crop is a long way from it being profitable, even just economically viable (ABC Radio PM 2 October 2012). Once again there is interest from rice-growers in New South Wales, and although he has buyers interested in the rice he acknowledges that they are yet to achieve economies of scale (ABC Radio 23 May 2014). Although he is extending his planting area White is still growing rice for stockfeed not human consumption.
Soaking it up: farmers eye new dam as key to northern boom

Figure 24. Cropping booms and the media cycle - Mt Keppler’s rice crop (The Australian September 2014).
Chapter 8: Cottoning On

First ever Australian cotton grown in Port Essington, N.T. and sold in Manchester market, U.K.

Despeissis, Department of Agriculture, W.A. travelled to the Kimberley to Advise on agricultural development of the tropics - saw cotton becoming a leading industry. (1909)

Derby - dryland cotton grown. Samples tested in London had boll worm larvae. British pressure for Australian cotton supply. WA Government establish initiatives to encourage cotton growing. (1920s)

Cotton expert tours Kimberley. Knowsley Agricultural Area near Derby marked up. 100 small lots. Returned soldiers sail to Derby to grow cotton. Return within a year. (1922)

Government entomologist reports pink boll worm at Broome (1923)

Experiments in irrigated cotton commence at Kimberley Research Station

Ord diversion dam built. First farms released. W.A. government decides cotton to be principle enterprise on the Ord. Cotton gin built by WA Gov

Commonwealth agree to fund main Ord dam.

Ord farmers in serious difficulty (1971)
Prime minister opens main Ord dam (1972)
Farmers spraying crops for pest control 30 to 50 times each season (1973)
Cotton growing on the Ord ceases (1974)


Trials of genetically modified cotton

GM crop ban in Northern Australia reversed

800 ha planted on the Ord.
The history of cotton in northern Australia goes back much further than most would realise, more than 100 years before the Ord scheme. It was in the early 1840s that the first ever Australian cotton was sold, in the Manchester market, sent by the Assistant Surgeon, Dr A.R. Tilston from Port Essington, the third attempted British settlement in the north located on the mainland of what is now the Northern Territory (Curteis 1965). However in 1846 G.W. Earl identified the major issue that hindered the development of a cotton industry in northern Australia; the high cost of labour for what was a labour intensive crop at that time, and for the next century, so it was cheaper to grow in India and the Caribbean (Henzell 2007).

The most significant early chapter though, is a little known story of cotton in the west in the early 1920s. This was the beginning of the west’s earnest endeavours to establish cotton, which eventually culminated in the Ord cotton industry, and its failure, in the 1970s; yet with the possibility of re-establishment still regularly mooted.
Figure 25. Sites of cotton schemes.
**Cotton in the Kimberley - early 1900s**

When in 1879 Alexander Forrest 'discovered' and named the Kimberley region along with the Ord River (named after the Governor of Western Australia) he wrote in his journal "it will, I believe, be found that an extent of country equal to about 25 millions of acres has been opened up for pastoral and agricultural experiments" (Quoted in Graham-Taylor 1978:22). Within 4 years, by the end of 1883, already 51,289,080 acres of leases had been granted in the Kimberley and pastoralists began their fierce battle with Aboriginal people of the region to conquer the Kimberley (Pederson and Woorunmurra 1995, Bolton 2008, Kinnane 2008), a region with nearly 50 different language groups.72

It wasn't until the following century in 1906, that cropping was followed up, with the then Surveyor General of Western Australia writing to the Under Secretary for Lands to suggest an inspection of the Fitzroy and Ord River valleys "with the object of ascertaining what portions of Kimberley are adapted for the cultivation of tropical products" (Graham-Taylor 1978:25). Two experimental station sites were subsequently chosen 24 miles from Wyndham for possible cotton, tobacco, maize, sorghum, bananas, rice, hemp, pineapples, sugar cane and rubber trees (Graham-Taylor 1978).

In 1909 an expert in tropical agriculture with the Department of Agriculture, Adrian Despeissis, was commissioned to travel to the Kimberley to collect information for the future development of agriculture in the tropics.

>This gentleman was sent to the Nor'-West to seek information as regards those far-away lands and the possibilities of growing cotton, tobacco and other things, and a most excellent handbook was the result of his travels. (*Sunday Times* 17 April 1921)

Despeissis believed that dams and water distribution would open up millions of acres of alluvial plains for the plough, and he saw cotton as becoming a leading industry for

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Western Australia's tropics (Graham-Taylor 1978, Maskell 1981). He also identified and highlighted the already existing problem of soil erosion in the Kimberley.

Meanwhile small experimental cotton plots were grown by local enthusiasts and some at “Native Stations” including La Grange Bay (Graham-Taylor 1978:29), where in 2012 major agriculture plans are afoot (Conversation 3). Arthur Wynter reported that he had previously grown unirrigated cotton successfully for 8 years in the garden of the Derby State School, samples of which were sent to the Department of Agriculture who wrote up the results (Sunday Times 8 August 1920). Another effort at Derby in 1914, also without irrigation, came to naught with insect pests already a problem. Cotton samples sent to the Imperial Institute of London for testing had bollworm larvae in every one (Graham-Taylor 1978).

Further pressure for agricultural development came in several forms at the beginning of the 1920s: the Premier hoped to produce tropical food as the Federal Government had increased duties; the British cotton manufacturers were seeking cotton sources from within the Empire; and a Western Australian politician, Colebatch, returned from a 5 week tour of the north-west courtesy of the “North-west Railway and Development League” seeking the establishment of a North West Department. The North West Department of the Western Australian Government was duly formed in 1920 with Colebatch as the Minister and Mr F. Wise from the Qld Department of Agriculture appointed as ‘tropical advisor’. The Premier believed that once the commercial viability of certain crops was proven "men and money" would flow to the north (Graham-Taylor 1978).

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73 Years later the Sunday Times claims that, despite this, the then government had “retired him, not by age but simply retired or ‘fired’ him (Sunday Times 17 April 1921). The entry in the Australian Dictionary of Biography simply states “After being commissioner of tropical agriculture for the North-West of Western Australia in 1910-12, he retired.” (Maskell 1981) It is interesting to contemplate not only why this occurred, but what may have eventuated if this early advocate had not been retired at the early age of 52.

74 This became a significant issue for the Ord River Dam in the 1970s with siltation a potential threat to the irrigation scheme. The Department of Natural Resources identified about 4 800 square kilometres subject to excessive erosion and to protect the irrigation scheme a program of catchment stabilisation was undertaken upstream, including controlling cattle numbers, fencing, contour tilling and seeding. (Department of Natural Resources 1976, Aldrick et al 1978)
In 1920 the Minister for Agriculture, Mr Baxter, had cotton seed available for free distribution to settlers willing to trial the crop in order “to encourage people to experiment and to stimulate the industry”. The Minister also undertook to purchase all the raw cotton of “standard quality” produced at a set price, 5 ½ d per pound; the seed to be used for further distribution and the cotton to be exported with any profits distributed between growers, and advertised this in the Sunday Times (12 December 1920). Nothing came of the initiatives (Bolton 1986).

Demand for cotton from within the Empire to feed the mills of Lancashire was a regular topic in the newspaper during this period. “Where is Lancashire to look for her supplies” one article opines while reporting on the declining production out of India and Egypt. What was driving the decline in Egypt? “Insect pests, lack of fertilisation, failure to alternate crops and failure to balance irrigation and drainage” (Sunday Times 6 August 1922), all familiar. A later article announces “Lancashire distressed” and explains that, with demand growing, the dangers of supplies being cut means there is a push to source cotton from within the Empire. In fact there is a British Australian Cotton Association “Fathering Farmers” with the objective to make Australia one of the greatest cotton producers in the world. They “keep a friendly eye” on people, provide free seed, and take delivery of the raw product (Sunday Times 29 July 1923).

Championing cotton at this time was the “W.A. apostle of cotton-growing”, Mr FW Teesdale, MLA (Sunday Times 30 July 1922). Teesdale worked on the public imagination through the press, and on his political colleagues and the bureaucracy to kick-start what he believed was an opportunity passing the State by. His ally, Western Australia’s Sunday Times, had frequent editorials and articles following (and promoting) efforts to establish a cotton industry, printing pieces by Teesdale regularly. In one he thanks the paper for an earlier article:

My honest opinion is that the thanks and appreciation of hundreds of small growers will yet be accorded to ‘The Sunday Times’ for your arresting and enthusiastic leader on ‘Why Should Not Western Australia Grow Cotton?’ (Sunday Times 4 June 1922).

Teesdale travelled to Queensland in May 1922 to learn about their cotton industry, a journey described in his newspaper article “Cotton Growing for Cinderella: What Queensland is Doing and What We Can Do – How to Settle Our Unoccupied Areas”. He was reassured regarding several aspects of the industry previously raised as possible
barriers to success in Western Australia – the most significant at that stage being the availability of labour cheap enough to make the crop financially viable – "the labor bogey". According to Teesdale:

...the solution is: Never crop more ground than you and your family can personally pick and handle easily... and there are no labour troubles and no awards. While the harvest is on, just get up a little earlier and work a little later and all is well...where there is a family the picking would be more of a picnic than a labour" (Sunday Times 4 June 1922).75

Teesdale befriended the ‘pioneer of the Queensland cotton industry’, Dan Jones, who was invited by the Western Australian Government to tour the State and advise on the development of a commercial cotton industry. Jones was publically welcomed, a headline announcing “Cotton Growing in W.A. Arrival of Mr Dan Jones – Premier Mitchell Enthusiastic” (Sunday Times 24 September 1922). Jones tours the North-West and Kimberley for six weeks with Mr Teesdale, and on his return “is emphatic in his opinion that there is any quantity of land eminently adapted to cotton growing” pronouncing that Western Australia could surpass Queensland in production (Sunday Times 15 October 1922). Jones suggested that the North-West would "accommodate hundreds of thousands of migrants who in a very short time should make prosperous farmers" (Graham-Taylor 1978).

As a result of Jones’ recommendations in 1922 Knowsley Agricultural Area was marked up near Derby (Graham-Taylor 1978). One hundred lots of between 160 and 220 acres were available for tropical agriculture at 10/- per acre (Millington 1977). Maps of the area from the period show the geometric layout of the Knowsley blocks in the region, ruler marked straight lines with no apparent relation to the characteristics of the location.76

75 Despite the apparent naivety of Teesdale’s glossing over of the hard work of picking as a picnic, he was not a society man wrapped in his own urbanite cottonwool. According to his obituary his pursuits were as diverse as the State he’d adopted; he prospected in the Pilbara, pearled in Broome, kept store in Roebourne, undertook cattle shipping - even circus days were mentioned. He was also, as is revealed in the previous quotes, “no friend of the Labour movement”. (The West Australian 19 December 1931)
76 I first sited one of these maps at the Kununurra Historical Society Archives.
In November 1922, under the weight of the hot humid blanket of build-up prior to wet season, nine returned soldiers, assisted by the Repatriation Department, sailed from Perth to Derby on the SS Bambra. Several others were already in the North-West, and a couple were to be picked up on the way (Sunday Times 12 November 1922, Western Mail 16 November 1922). Only one settler had previous cotton growing experience (Graham-Taylor 1978) and was to “act as instructor” for the Cotton Group Settlement Scheme (Sunday Times 12 November 1922). The North-West Department intended to supply fencing material, farm equipment, and even some cottages, while twelve horses purchased by the Department were to be picked up by the steamer on the way. The Minister for the North-West, Mr Colebatch, is quoted in the article as stating “As far as possible every provision has been made, and it now only remains for the men to demonstrate what can be done on the blocks” (Sunday Times 12 November 1922,
Western Mail 16 November 1922). A photo of the men in suits and ties ready to depart is titled “Our Cotton Pioneers – The Fortunate First” (Sunday Times 12 November 1922). Yet when they arrived at the Knowsley Agricultural Area there was nothing there, not even water at the campsites (Millington 1977). Even the blocks were yet to be surveyed. The newspaper article explains that a Mr Easton was joining the SS Bambra in Broome “for the purpose of making the surveys” (Sunday Times 12 November 1922).

Only a few months later in January 1923, Lieutenant Colonel Evans, the Director of Agriculture Bengal, visited Knowsley with the Commissioner for the North-West for a “thorough examination” (Western Argus 6 February 1923). By then the farmers had planted about ninety acres of cotton and the Minister for the North-West had submitted a scheme to Cabinet for greatly increasing the area of cotton (Western Argus 6 February 1923). Evans reported that the pindan soils selected (by Dan Jones) were not of the right class, being too light, and the crops were likely to fail. He recommended shifting cropping to the heavier black soils (Sunday Times 4 March 1923, Millington 1977, Graham-Taylor 1978). Evans also found cotton bollworm and suggested that experimental work be undertaken before beginning commercial growing. He stressed the need to find rotation crops for the cotton.

As champion of the cotton ambition, the Sunday Times ran an article in response to Evan’s report on Knowsley headed “No Crisis in Cotton Growing – Col. Evans’ Report”. The article reassured readers that although Evans advised that the current land being worked for cotton was “wholly unsuitable” he stated “with equal emphasis...that there is good soil not very far away”. Most important, the article claimed, was the determination of the growers to:

‘stick to their guns’ and make a success of the venture...Evans’ report has, if anything, given a decided fillip to the young cotton industry in this State, and far from anything in the nature of a crisis has occurred. (Sunday Times 4 March 1923).

In response to Evans’ report the Western Australian Government transferred the group to another site (Sunday Times 4 March 1923).

77 While on his way to Queensland where his services were being loaned to the Qld Government by the Empire Cotton Growing Corporation.
Despite The *Sunday Times* proclaiming there is no crisis, in April the Government Entomologist reports that pink bollworm has been found around Broome. The newspaper acknowledged but downplayed this hurdle to establishing a cotton industry, “It will undoubtedly have the effect of delaying planting on a commercial scale for a season or two at least” (*Sunday Times* 15 April 1923). A Lancashire cotton expert suggests a conference of botanists and entomologists to investigate cotton insect pests in Australia before an industry is “seriously” established (*Sunday Times* 15 April 1923). One wonders what the struggling soldier settlers would have made of this valuing of their hard personal efforts. Meanwhile the Government Entomologist decrees that cotton around Broome be destroyed (Graham-Taylor 1978).

Given the presumed importance of the venture to Western Australia, and the fact that opportunities are being realised elsewhere, the *Sunday Times* calls for Commonwealth assistance to overcome any difficulties, a sign of things to come. “We have the advantage of profiting from their experience”. It finishes with a call to arms that echoes through the years, the imperative to develop – “Cotton must be grown on a commercial scale in Western Australia. There is no hindrance too great to be overthrown” (*Sunday Times* 15 April 1923). The Commonwealth Government is still intent on stimulating an Australian cotton industry and in 1923 guarantees growers a price per pound of seed cotton.

The unfortunate soldiers were not to become the first cotton settlers, or the last to fail - just more individuals in a long line who suffered the consequences of enthusiasm and naivety, particularly of the government and its lobbyists. Evans' visit had led to a letter from the North-West Department ordering them to move locations. They refused “because the locality did not promise success” and all they found there, despite Evans’s optimism, was “a patch of good soil surrounded by marsh” (*Sunday Times* 17 June 1923). Additionally the settlers explained that they were not receiving enough “sustenance”, even with their pensions, and were in debt to the local storekeepers (*Sunday Times* 17 June 1923).

The three married settlers did move to Galbraith’s well after having been offered additional sustenance however there was no room for the rest (*Sunday Times* 17 June 1923, Graham-Taylor 1978). Some of the others worked building a jetty to make money for their passage south. On their return these men visit the Minister of the North-West
with the secretary of the RSL after which the Minister writes that he cannot accede to the request of the returned soldiers for suitable land in the north:

...until experimental work had proved the possibility of growing cotton commercially in the north no further financial assistance to settlers would be offered by the Government, but that experiments would be carried out in various localities (*Sunday Times* 17 June 1923)

A researcher later comments that

Such projects were typical of the perfunctory efforts made in the 1776 style to farm the North, projects which were certain to fail before they were launched, and resulted in grave injustices to the settlers involved. (Millington 1977:152)

In one final irony, Dan Jones, the Queensland "father of cotton" whose recommendations sited the Knowsley attempt, writes in September 1923 about "The Plague of Alleged Experts". He takes to task those who would provide advice on a region that they do not know personally as not being "conversant with the seasonal and climatic conditions and other factors prevailing, are naturally unable to tender the best practical advice on these questions" (*Sunday Times* 23 September 1923). He explains that Queensland growers are regretting taking advice from the Americans as local requirements are quite different.

The lack of availability of cheap labour continued to dog northern cropping. For crops such as cotton, sugar, tobacco, rice and peanuts, Australia was competing with tropical countries with low wage costs. There was still a question mark over the suitability of the tropics for white Australians or immigrants, particularly for physical work, and yet the White Australia policy did not allow alternatives, limiting options for the cotton industry. Once again White Australia, with its grand development visions for the north, was hoist on its own petard. The only way off the hoist, perhaps, was suggested in an article:

But in spite of Sir James Mitchell’s statement of the other day that the northern parts of Western Australia should produce enough cotton for Great Britain’s needs without the use of colored labour, the experts are dubious. Frankly, they say, cotton growing is not a white man’s job. Although Australia might grow enough cotton to satisfy all our needs there is at present little available labor there. The importation of colored labor is not permitted. And white labor can only be successful
when the machinery for ploughing, weeding, and picking cotton has been immensely improved. (*Sunday Times* 6 August 1922)

High labour requirements for cotton, particularly casual labour for picking, influenced the cotton industry across Australia. Australia saw an expansion in cotton in the 1930s with an increased availability of cheap labour but nevertheless individual cotton farms generally had small acreages until mechanisation came along with average cotton acreages per grower only between 10 and 20 acres from 1920 to 1959 (Christian 1965).

So what of the existing local population, Kimberley Aboriginals? The parliamentarian and cotton champion Teesdale proposes in an article encouraging cotton growing at La Grange Bay, west Kimberley:

> There is a camp of indigent natives at the Bay. They are in the charge of a white man, who issues rations and looks after them generally. Now it would do these natives good to have a little light toil once or twice per day, and would certainly not be opposed to the regulations. They are not supposed to work, but a gentle stroll with half a kerosene tin of water twice daily would help their digestion, and would also be good for the white man in charge. (*Sunday Times* 7 May 1922)

Of course at this same time both the free labour and knowledge of country of Aboriginal men and women were underpinning the viability of the pastoral industry across the north.

As discussed in Chapter 4 a contradiction arises between the desire to develop and populate Australia’s spaces for its white colonisers, and the desire to keep the population white through selective migration: a bind that at the time was considered would only be solved by appropriate mechanisation. The theme of race and the tropics is fascinating and arises throughout the history of the north.

In 2014 the Western Australian Government has revived Knowsley. A government pamphlet *GROWING THE NORTH - Knowsley Agricultural Opportunities* proclaims that it “has been identified as a potential site for the development of intensive agriculture”. With 3 pages of text and a schematic map the pamphlet, a “Concept Plan” for the now “Agricultural Precinct” (as opposed to “Area”) explains the market advantages including under-utilised natural assets and proximity to South East Asia (with a map of international time zones for Western Australia and Asian cities). Water investigations are underway and if deemed promising negotiations with Traditional Owners will begin. (Department of Regional Development n.d. c2013)
**Cotton on the Fitzroy – Late 1990s**

In 1996 the Western Australian Government again “recognised the capacity for large scale agricultural development in the West Kimberley area”. Community consultation was undertaken through 1996 and in 1997 the government called initially for Registrations of Interest from private parties for submitting proposals to undertake a feasibility study and “subsequent development of an integrated, large scale irrigated agriculture industry in the West Kimberley”. Submissions were evaluated and Cabinet selected Western Agriculture Industries Pty Limited (WAI), chaired by NSW cotton grower John Logan. An MOU was signed in 1998 (Government of Western Australia 2001). WAI proposed to spend over $5 million on feasibility studies over the 3 years from mid-2000 and the project was to include both Canning Basin groundwater and Fitzroy River surface water (Government of Western Australia 2001).

In WAI’s project brief they describe the extent of the proposal. It was a large development by any standards, let alone in the barely cropped north. The proposal had three stages to be developed sequentially and totalling 200,000 hectares as shown below.

<table>
<thead>
<tr>
<th>WAI Proposal</th>
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<tbody>
<tr>
<td>Stage 1 - 20,000 hectares groundwater irrigation development - at full potential will generate over $80 m/annum in export earnings.</td>
</tr>
<tr>
<td>Stage 2 - 20,000 hectares off river irrigation development - utilise a small portion of the Fitzroy River flow to supply irrigation water through an off-river lake storage.</td>
</tr>
<tr>
<td>Stage 3 - 160,000 hectares of irrigation to further utilise the water from the Fitzroy River system to provide water for aquifer recharge.</td>
</tr>
</tbody>
</table>

(WAI n.d. c2000)

Table 5. Proposed stages for the WAI West Kimberley proposal

According to the proponents the irrigation development would generate around $1 billion per annum in export earnings, up to 5,000 jobs to the local community, and provide a long term economic base for the region and Western Australia (WAI n.d. c2000).
The MOU required WAI to demonstrate that large-scale irrigation activity was feasible and sustainable by 30 June 2000 with an option to extend for a further three years. An extension of the MOU was requested and granted in late 2000 (Cotton CRC n.d.).

There was, however, fierce opposition to the cotton proposal by members of the community in western Kimberley and the formation of EnvironsKimberley, a community environment organisation. People were worried about the implications of the scale of the proposal and the concomitant water use and chemical spraying. A discomfort about the establishment of extensive cropping in the west Kimberley also figured (Conversation 20). Multiple iterations in design emerged, some less apparently feasible. A Broome conservationist explained about a proposal for a canal from the Fitzroy River “It was insane, it was going to cut the Kimberley in half”, and queried the company about evaporation. They responded that they would cover the canal with a membrane (Conversation 20).

The company did not fulfil its obligations under the Agreement even with the extension and support was withdrawn. In 2004 the Western Australian Government announced a ban on genetically modified (GM) crop production in Western Australia. This was considered a death knell for cotton production in the Kimberley which was likely to rely upon GM varieties.78

During this period research into cotton growing in northern Australia continued apace with a program by the Cotton Cooperative Research Centre (CRC). John Logan of WAI sat on the CRC’s northern committee which advised the Management Committee on research priorities and were a focus for interaction with northern communities and interest groups (Cotton CRC 2005). Logan, a former cotton farmer from NSW, had ran small-scale trials from 1993 to 1996 near and south of Broome through the company Kimberley Agricultural Industries (KAI). The Western Australian Department of Agriculture monitored insects at the sites (Cotton CRC n.d.). This research was expanded when WAI formed in 1997 (comprising KAI and Queensland Cotton Holdings) with WAI employing research agronomists and support staff and establishing a research site at Shamrock Station (Cotton CRC n.d.). In 2001 Yeates, a researcher

78 This was overturned in 2013 by the then conservative WA State Government.

Chapter 8 Cottoning on
with the Cotton CRC writes that there is considerable potential for the west Kimberley and Ord River to become cotton growing regions. In the review and scoping study of cotton research in the north he notes “significant commitment by many organisations to cotton R&D in the Kimberley region of WA”. In fact Yeates states that more than 20,000 ha could be grown in the west Kimberley using groundwater reserves south of Broome without any additional water from the Fitzroy River. “A greater contribution by the Cotton CRC in WA is well justified” (Yeates 2001:8). However Yeates is also categorical in the report that the CRC is not an advocate for cotton growing in northern Australia.

Over the next decade a full swag of documents are published from the CRC’s research specifically for northern Australia including guidelines for cotton production in the Ord River Irrigation Area 2007.

**Cotton and the Ord River Irrigation Scheme – 1960s to 1974**

*The Ord River Irrigation Project is much more than a scheme to dam the Ord...it is a symbol of the development of the north. And northern development is an article of faith amongst most Australians, and amongst all those who live there. (Huxley 1967:239)*

A young lake in an old country Lake Argyle has existed for less than half a century, completed in 1971 to provide water for up to 100,000 hectares of irrigation and for electricity generation. The lake and its ‘main’ dam were preceded by a smaller ‘diversion’ dam, enabling agricultural development before the lake was created. The Ord River catchment covers about 55,000 km² and the river runs about 650 km. Only one of the Ord’s five largest tributaries, the Dunham River, meets it below the two dams (Petheram et al 2008). The dams have substantially altered the flow regime of the Ord with peak flows particularly reduced (Storey and Trayler 2006).

The Ord River Irrigation Area became a lightning rod for the oppositional debate on agriculture in the north. Slim Bauer, geographer of the north, calls the Ord "perhaps the most controversial of all Australian irrigation projects" (Bauer 1984:12). How this played out in the decision-making processes of governments to fund the scheme is explored in Chapter 3, particularly with regards to the role of Davidson’s work.

In the first edition of *The Northern Myth* Davidson investigates the potential costs, outputs and returns of irrigation in the Ord focusing particularly on cotton, then
considered to be the most likely monoculture for the region. He concludes that Australia would achieve more "per unit of subsidy" by expanding existing rural industries than attempting to grow irrigated cash crops in the Ord; and if the motivation was not economic but to populate the north, than it would be cheaper to pay people 2,000 pounds per annum to live there than to subsidise farming on the Ord (Davidson 1965:196). In my grandfather’s copy of the book, where Davidson sums up his economic analysis for cotton production on the Ord, Christian has, again, heavily underscored some words and provided brief pencilled challenges in the margin. Perhaps this interaction is as much a tension between disciplines and methodology as optimists and cynics.

Cotton in the north came to public prominence with the Ord Irrigation scheme in the 1960s, and even more with the industry’s dramatic failure in the 1970s. This section explores the early history of the Ord scheme through the story of cotton, a defining crop for the scheme and the legacy of failure which still clings to the Ord. For it was cotton, and only cotton, that was grown from the launch of the Ord River Irrigation Area (ORIA) Stage I in 1963 through until 1974, when the crop was abandoned and the future of the Ord was at its lowest and most uncertain point.

The Ord is a very unusual case in the history of north-west Australian agriculture, being the only location where there is a ready supply of such a large quantity of water. If water is truly the limiting factor, we should surely see crops spreading forth from the beneficence of the lake. So to boosters who believed ‘just add water’, has the desert bloomed, or have the naysayers been confirmed? D.I. Smith titles a section in Water in Australia: Resources and Management - “The Ord: a pork-barrelling failure” commenting that:

...the Ord scheme is widely regarded as a colossal folly, and is used as an example of the worst excesses of the pork-barrelling of Federal Funds (Smith 1998:170).

Others are now less categorical. The 2009 CSIRO report says that though Davidson might have been proved right for the first few decades of the scheme, matters since then have changed and “more recent analysis has shown that the Ord scheme has more recently become economically defensible, and even attractive” (Webster et al 2009). C.S. Christian believed it would take a number of decades to come into its own (pers. comm. c. 1980s). Figures from the Agriculture Department’s regional economist
estimate 13,858 hectares under irrigated production in 2009/10 with a gross value of about $125 million (Bright unpublished 2011). Webster et al state that for 2007/8 15,000 hectares were grown with a gross value of $96 million however they provide no reference for these figures. According to several locals interviewed the more recent farmers have been doing well, although by 2011 more than half of the land under production in the Ord was planted to Sandalwood trees, a rather different form of cropping.

Proponents of the Ord Project often described it as the beginning or first step of a larger development process. Of course it was to benefit other industries as well. Improving ports and roads supports pastoralism and mining as well and nowadays is usually driven by the latter. Tourism came later, and seemed to creep up on government policy makers. In this way investing in a project such as the Ord was framed as investing in the north as a whole, and as contributing to achieving the threshold of infrastructure required for ongoing and self-sustaining growth.

The ORIA illustrates the complexity of determining the validity of each view; how do you define what constitutes success or failure, and over what time-frame? Even deciding upon a discount rate to determine the financial outcome can be fraught, as illustrated in Chapter 2. Assessment of the Ord scheme’s performance is changing over time as are farm practices and crops and the context they operate in.

Reinvention is an art form for governments. And the Ord scheme has been reinvented, or certainly repackaged, many times. With each repackaging there comes a new categorisation of the stages of the scheme, up-to-date justifications (though it is remarkable how some remain the same for so many decades as shown in Chapter 3), and each revision is accompanied by a new colour brochure, each time fancier. In later times the brochures also contain faces and text from the State and Commonwealth politicians involved. Initially, in 1959, the Ord scheme was presented as having four stages, estimated to cost a total of $29million: Stage 1 – construction of the diversion dam with works to irrigate 4,000 hectares; Stage 2 – construction of the main dam with works to irrigate a further 12,000 hectares; Stage 3 – gates on the dam and spillway with installation of hydro-electric generator (10,000kw), plus works for an additional 12,000 hectares; Stage 4 – Installation of further electricity generation capacity (10,000kw) and works for yet another 12,000 hectares (Young 1979).
In 1965, when the diversion dam was complete, the town established and farming begun, the stages of development were aggregated and the scheme presented as three stages: Stage 1 – construction of diversion dam, the development of 10,000 hectares and infrastructure including the establishment of Kununurra; Stage 2 – construction of the main dam, works for an additional 60,000 hectares (40,000 in Western Australia) plus additional infrastructure; Stage 3 – construction of 30MW hydro-electric power station. A significant difference in this version of the program was the substantial increase in the proposed amount of irrigated land to be made available with the construction of the main dam. At this time the Western Australian Government was advocating for Commonwealth funding for construction of the Main Dam and associated irrigation infrastructure, later forthcoming.

By 2008 the scheme had been reconceived again. Everything that had come before was now Stage 1. The Ord-East Kimberley Development Plan “a comprehensive and integrated package of funding initiatives, to be delivered in the East Kimberley region through a collaborative partnership between the Australian and Western Australian Governments” was launched. With $220 million promised from the Western Australian Government and $195 million from the Australian Government, Stage 2 was now to be a release of 8,000 hectares of agricultural lots (Department of Regional Development and Lands, n.d.). Crassly calculated that’s about $50,000 invested per hectare. The Australian Government’s investment, however, is for social infrastructure such as health, aged care, housing and employment. Excluding their portion that brings the investment to about $27,500 per hectare.

The most significant difference at this time, enormous progress, is that an agreement has been reached with the Traditional Owners of the area for compensation for ‘Stage 1’, and for involvement in ‘Stage 2’.79

Patterns emerge from the timeline above. The marketing or communication of the Ord Scheme over half a century can provide insights into the changed circumstances and expectations of the scheme.

79 These changes and the Ord Final Agreement are discussed in Chapter 4.

Chapter 8 Cottoning on
Despite several sources writing that interest in the Ord River for irrigated agriculture first stirred in the late 1930s (Department of National Resources 1976, Young 1979, Ghassemi and White 2007) an Ord River dam was promoted almost 100 years ago in 1921 (Graham-Taylor 1978). Initially mooted by local pastoralists wanting to protect freshwater about 35 miles up the river from Wyndham, it was taken up by then Commissioner for the North-West and engineer Geoffrey Drake-Brockman, who saw possibilities for the irrigation of tropical agriculture. Plans for a dam were drawn up. Its projected cost was £200 (Graham-Taylor 1978). Nothing eventuated.

Intermittently throughout the 1920s several public figures advocated damming the Ord or other northern rivers including Geoffrey Drake-Brockman, Sir James Mitchell (Western Australian Premier 1921-24), and the Commonwealth Engineer of Way and Works. In 1928 the Western Australian Legislative Assembly moved that the government engage an irrigation engineer to investigate the northern rivers for potential irrigation (Graham-Taylor 1978). Once more nothing eventuated. In fact a short time later the Department for the North-West is abolished.

In a twist to the White Australia policy a Jewish settlement scheme was promoted for the Kimberley in the late 1930s however numerous barriers, including practical logistics, stopped the scheme from ever being more than a high profile proposal and a lightning rod for national discussions on race and immigration. Many years later the former Labor leader Calwell said the scheme was never a serious option for government (Gettler 1993).

In 1940 the Fyfe Royal Commission, inquiring into the “Financial and Economic Position of the Pastoral Industry in the Leasehold Areas in Western Australia”, suggested one avenue for development of the East Kimberley was “closer settlement for tropical agriculture and mixed farming” (1940:145) recommending that country along the Ord River be classified to determine “the extent of land suitable for irrigation and pasture development” (1940:144).

The Inquiry was actually sparked by the poor performance of the pastoral industry in Western Australia, to which one contributing factor was drought, and it may be that this also prompted reconsideration of how the extensive lands of the north could be better used. In any case it seems that the Fyfe Inquiry re-engaged the Government of Western Australia with the question of the potential for tropical agriculture in their north. Fyfe
concluded correctly that the war would postpone major development proposals (1940:171). The war period must have been one of frustration for northern development advocates – their views, even fears, regards the empty north seeming to be realised yet no resources with which to act.

A party of engineers and scientists exploring in 1941 reported a dam site on the Ord 130 kms up from Wyndham (Basinski et al 1985, Smith 1998). Kim Durack had been experimenting with cropping at Carlton Reach and a 5 hectare research station was established early the next year (Robertson and Chapman 1985). From 1942 to 1945 the Western Australian Government undertook further investigations of dam sites, access roads and soil types (Department of National Resources 1976).

By 1945 the knowledge that northern Australia sits on South East Asia’s doorstep had been brutally hammered home. The Commonwealth’s Rural Reconstruction Commission applied itself to northern Australia, initially recommending more extensive agricultural investigations. In their 8th report they recommended that the scheme itself should proceed, and that the Commonwealth should discuss with the Western Australian Government the basis on which this could occur. The vision that it could become a centre for intensive agricultural development with new crops and methods tested for application across the north (Young 1979, Basinski et al 1985) was a strategic response to the sour taste of vulnerability left by the War. The Commission also understands that a “new system of agriculture” will be required for the region (Basinski et al 1985).

The newly formed Northern Australian Development Committee endorses the Commission’s recommendations and itself recommends research in the Ord-Victoria region (Department of National Resources 1976). Christian, then with the CSIR Division of Plant Industry, is invited by the Western Australian Agriculture Department to visit the Ord and discuss what “plant investigations” would be required “as a preliminary to development of the region” (Basinski et al 1985:24). The specificity of the request regarding “plant investigations” already seems to be a narrowing from the “new system of agriculture” the Commission felt was required, perhaps the pitfalls of government bureaucracies ‘operationalizing’ visions.

Christian recommends that the research be undertaken jointly by CSIR and the Western Australian Department of Agriculture and overseen by a joint technical supervising
committee (Basinski et al 1985). As a result in late 1945 the 800 hectare Kimberley Research Station (KRS) is established by the Western Australian Government at a different site to the smaller research station, and in 1946 the Australian Government agreed to share costs and KRS becomes a joint venture between Western Australia and CSIR (later CSIRO). The joint arrangement seems a sensible approach however later reports explain the challenges of the arrangement which was clearly difficult to manage: balancing different organisational objectives and research priorities, and the changing research priorities of the Department of Agriculture. An internal report records in scarred detail the collaboration difficulties (Basinski 1973 unpublished). Others later discuss problems such as inexperienced and isolated staff and, in the early days, the lack of “problem definition” given there were no farmers or commercial industry to work with (Robertson and Chapman 1985:473).

Experiments in growing irrigated cotton commenced in 1947 (Davidson 1965), a preliminary exploration of a wide range of crops and pasture species. At this stage there was no recorded quantified information on cropping for the Ord region, whether the productive potential of different cultivars or methods of land preparation and protection against pests and weeds (Basinski 1973 unpublished). However it was not cotton that came to attention through these investigations as the first possible commercial crop but sugar cane (Basinski et al 1985).

A first approach was made to the Australian Government by the Western Australian Government for financial assistance to implement the Ord Project in 1949. No agreement was reached; rather the Snowy Mountain Scheme was funded (Department of National Resources 1976, Smith 1998). In fact the Commonwealth’s Bureau of Agricultural Economics elucidated in 1951 that:

\[\text{...the problems involved in any development of north-west Australia are very great, and that a premature plan to direct financial assistance to the development of this region would serve no useful purpose (Quoted in Young 1979:17).}\]

They recommended further research. So the two governments formed the Kimberley Development Committee with joint membership in 1951. The Kimberley Research Station continued with farm-scale trials of rice and sugar, entomological surveys and land-use survey (Young 1979, Basinski 1985).
In the 1957 Progress Report of the Kimberley Research Station less than a page is dedicated to cotton. Sugar cane and rice featured in the report each with 4 pages, then “Other Grains”, then cotton. A wide range of cotton varieties had been tested, however the “first difficulties associated with cotton growing appear to be entomological ones”. Frequent application of DDT-BHC mixture was shown to control the leaf eating insects but not the boll pests (CSIRO 1957). A new insecticide, endrin, had shown promising results and research was looking at how to better time the planting and flowering of the crop. Yields were shown to bring a greater return than other crops and the section concluded “There is a fair prospect of cotton being the crop which will make development of the region possible” (CSIRO 1957:13).

In May 1959 the first stage of the Ord River Project was resubmitted to the Australian Government for funding, the diversion dam and development of 12,000 hectares, and in August, ten years after the proposal was first submitted, the Australian Government approved the use of money from the *Western Australian Grant* (Northern Development) Act 1958-1959 for the diversion dam. Construction commenced in 1960. At this time the research station considered rice and safflower to be possible commercial crops. Three years later sorghum and cotton were added to the list. A large-scale pilot farm also began in 1960 to test the research on a commercial scale (Basinski et al 1985). Northern Developments Pty Ltd entered an agreement with Western Australian Government to develop a 970 hectare commercial pilot farm at the Ord. The agreement specified farming to be carried out on at least 810 hectares in order “to determine production and economic factors relating to the growing of various crops on a commercial basis” (Department of National Resources 1976:8). Trials were undertaken on rice, linseed, safflower and cotton between 1960 and 1966 but with an emphasis on rice. The pilot farm was unsuccessful (Department of National Resources 1976).

The stage was still open for a range of crops, and commercial farming began with four – rice, safflower, sorghum and cotton. However commercial farming revealed new problems not apparent in the research station’s smaller experiments so KRS moved into a new phase, working to support a newly born farming industry (Basinski 1973 unpublished, Basinski et al 1985).

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80 The company also involved in Camballin Irrigation as discussed in Chapter 10.
A new town, Kununurra, is proclaimed in 1961 (Wainwright and Wright 2006). Established in the east Kimberley to service the Ord River Irrigation Area it is over 820 kms from the nearest city, Darwin, and over 3,200 kms to Western Australia’s capital city, and 97 kms to the Wyndham port, predominantly on dirt roads. It is difficult to imagine just how different and difficult the conditions were only half a century ago for this new town which sprang up in such an unlikely place. Describing Kununurra in the early days a local says “She was the wild west out here” (Conversation 29).

The April 1962 brochure of the Western Australian Government informing prospective farmers describes Kununurra as “grown from virgin bush over the last three years” and “planned carefully to meet the needs of a modern community under tropical conditions” (Government of Western Australia 1962:13). A picture of slim white women in sun dresses on a shady treed lawn accompanies the text (Fig. 24).

Figure 24. Picture in 1962 government brochure

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81 The literature rarely distinguishes between or provides practical details about ports which can be misleading. For example shipping access to the Port of Wyndham is limited due to extreme tides and shallow harbour.
The booklet provides an entire paragraph of information on each of factors such as the soil, climate, expected yields, and pest control. It informs applicants that the lessee will be expected to “accept guidance in his farming operations from the Director of Agriculture or his nominee in relation to: (i) Crop to be grown (ii) Area to be fallowed (iii) Time of planting (iv) Variety, source and rate of seed” and so on for 6 more points (WA Government 1962:9). It states that the “crops will be oilseeds, cotton, rice or such other crops as may be acceptable to the Director of Agriculture or his nominee”. Leases were to be for a period of 30 years at a cost of £1 per acre and a £750 survey fee.

While acknowledging that there is as yet no marketing or processing infrastructure it advises that the government is considering building a small cotton ginnery and a rice mill (Government of Western Australia 1962). Research is a different matter. The government reassuringly explains that there are 20 years of research to draw upon. Yet, in writing of that time many years later, two CSIRO scientists say that between 1945 and 1960 apart from annual reports and progress reports “only a handful of research papers were published” and “Most of the information remained in the experiment station’s files, or existed only in the form of a researcher’s general experience”. Only one of the scientists employed at the time had any experience with the crops they were expected to grow or with farming in clay soils (Robertson and Chapman 1985:475).

The farming application form explained that the Land Board would consider “the relative merits of every applicant and make their allocations accordingly”. Even before the application form was released there were over 300 enquiries, including international. The form is just one page and nine questions, the first being “Are you married?” through to “What experience have you had in irrigation or other farming?” and “What is your financial position?” It is difficult to understand what criteria the Land Board actually based their decision upon as it seems that the minority selected were farmers, and even fewer had relevant farming experience. Locals nicknamed some farms accordingly, for example “9 to 5” belonged to an accountant (Conversation 23).

By August 1962 the first five farms in the progressive release were allocated, each of about 600 acres. An investigation at this time on the economics of possible crop enterprises including cotton, rice, linseed and safflower showed that “cotton production, under known technology, offered the best economic prospects in the immediate future”

Chapter 8 Cottoning on
(Patterson 1965:2). Sugarcane was not considered a good market prospect. The Western Australian Government decided cotton should be the principal enterprise on the Ord.

Why were the eggs of the Ord in just the one, cotton, basket? The Kimberley Research Station had been trialling a number of crops and in several sources it seems that others did not share the assumption of the Bureau of Agricultural Economics report above and the Western Australian Government. Was the decision based solely upon the economic analysis of the Bureau? And, if so, the later failure of the monoculture reveals the flaws of Davidson’s rather strident advocacy that economic analysis should be the major determinant of these decisions.

Basinski explains that a major increase in experimental yields coinciding with modern insecticides and application methods “played an important part in the decision to proceed” with Stage 1. Additionally, given transport costs are the main economic constraint, the high value of lint and cottonseed at the time mean this is unsurprising (1973 Unpublished).

The Kimberley Research Station increases research on cotton. Scientists involved at the time state that “the delay in implementing specific entomological research is difficult to comprehend”. They explain that when the decision to grow cotton was made there were still many unanswered questions likely to impact upon a commercial cotton industry. In fact a pest control strategy for commercial cotton growing is recommended before the appointment of the first entomologist (Robertson and Chapman 1985:477).

With the diversion dam completed in March 1963 water storage could commence. Just over $8 million of the original $10 million northern development grant had been spent. An additional $4 million is allocated by the Australian Government (Young 1979). Total Australian Government assistance for Stage 1 totalled $12.18 million and the Western Australian Government provided another $8.6 million (Department of National Resources 1976).

Meanwhile the new Ord farmers were organising themselves and in 1963 the Ord River District Cooperative was formed through an agreement between the current farmers with Wesfarmers who undertook management of the Cooperative. It handled farmers’ returns, supplies of seed, fertilizer and chemicals, and ran the general store. A local explained that there was no infrastructure, no expertise in farming in that area, no
markets, and no history. Everything was foreign. His family had grown cotton in Victoria so they started with that and then moved through a whole range of crops: “But initially you had to grow what the government told you” (Conversation 29).

A cotton gin was built by the Western Australian Government in 1963 and leased to the Co-op, which went on to finance a second gin later. All housing was provided by the government in Kununurra for purchase or rent: a decision based on economics, physical problems and the intention of establishing a community (Courtenay 1982).

With Stage I underway the Western Australian Government submitted a request to the Australian Government in February 1964 for financial assistance for Stage II. During that year 1,650 acres of cotton was grown. In November 1965 the request is again submitted. The Australian Government advises that a decision is deferred until Stage I is fully underway in order to enable an assessment of the project. In that year a total of 5,460 acres of cotton was grown (Patterson 1965:3). Patterson, then director of the Federal Government’s Northern Development Division, wrote in 1965 that cotton production under known technology “is a sound economic undertaking as far as the individual farmer is concerned, irrespective of whether the bounty is removed…” (Patterson 1965:39). It was in this year however that Davidson wrote *The Northern Myth* and claimed that even after thirty years of experiments and seven years of
commercial cropping “techniques had not been developed which would enable farmers to produce crops without heavy subsidies” (1965).

By 1966 a total of 30 farms had been allocated and water from the diversion dam was fully committed. The irrigated area increased to 5,540 hectares in 1967 of which 4,779 were under cotton, 98% of the total cropping area (Young 1979). Again the Western Australian government submitted its request to the Australian Government for financial assistance for Stage II. In a supplementary submission they say that “years of detailed research had convinced agricultural scientists that the area was ideally suited to cotton” (quoted in Robertson and Chapman 1985:479). Patterson, although concluding the prospect for cotton is sound, acknowledges that only limited work has been done on cotton specifically (Patterson 1965).

With the beginning of commercial scale farming the Kimberley Research Station entered a new phase. Many new problems had emerged with large-scale farming and research needed to respond to the requirements of the farmers (Department of National Resources 1976).

The push and pull between proponents and sceptics of the scheme regarding funding, and the process and politics of the Federal Government’s decision, are detailed in Chapter 3. After years of very public delays and doubts in 1967 the Australian Government finally agreed to finance construction of Main Ord Dam (Second Stage) with the development of 40,000 hectares of land in Western Australia (Department of National Resources 1976, Graham-Taylor 1978). In 2014 the scheme has still only reached 13,000 hectares. With the release of 1966 Federal Cabinet papers suspicions were confirmed that the Federal Government’s decision to fund the dam was influenced by upcoming Western Australian elections: “It is clear that political expediency overrode agricultural and economic wisdom” (Smith 1998:171).

The Western Australian Agreement (Ord River Irrigation) Act 1968 gave financial assistance to the Western Australian Government of $48.18 million, which included a grant for the construction of the dam and a loan for construction of irrigation channels. Australian Departmental officers joined the Ord project’s Coordinating Committee which also had a number of ad hoc sub-committees, including one for Agricultural planning and marketing (Department of National Resources 1976). In 1969 construction commenced.
All is not progressing smoothly on the farming front however. The existing farmers were in financial trouble, and there were concerns that this was impacting upon potential investment in the Ord Irrigation Area. Insect pests were becoming an increasing problem, and rapidly.

The crisis came just as the main dam is being completed. While the main Ord River Dam structure is completed in November 1971, with a capacity to irrigate 70,000 hectares, (CSIRO), a review of Stage 1 by a sub-committee of the Ord Project Co-ordinating Committee shows that current Ord farmers are in serious financial difficulty (Young 1979).

The results of the sub-committee’s 1971 review concluded “there were no obviously viable farming systems presently available” detailing the poor prospects of commercial success for cotton, sorghum, rice, peanuts, safflower, sugar cane, wheat, or integrated cattle and fodder production systems. The poor likelihood of profitability for cotton without government assistance was regardless of the acknowledged high yields and efficient farming practices (Young 1979:30). This is only six years after Patterson’s paper analysing the economic justification for the scheme which concluded that “Ord farmers will be able to profitably grow cotton even if the cotton bounty were removed…” (Patterson 1965:57).

Yet, while dealing with these potentially fatal issues, the Ord crop had doubled yields from 417 kg/ha mean lint yield in 63-64 to 1083 kg/ha in 70/71, and in 1971 were producing 19.7% of Australian cotton production. The following year this was down to 8% of national production though bales were only down from 17,224 to 15,500, showing how quickly production was increasing elsewhere in Australia over that period (Wood et al 1974).

After two years of increasing difficulties with pest control suspicions had been growing at KRS of the development of insecticide resistance (Basinski 1973 unpublished). \textit{Heliothis armigera} collected in the Ord region can “survive much higher doses of DDT than the samples of the same species from areas not exposed to heavy insecticide applications to date” (Basinski 1973:22 unpublished). \textit{H. armigera} rises from only minor pest status to major significance as it develops resistance to DDT. Meanwhile the KRS is looking at ways to reduce the cost of chemical control such as the timing of fertiliser application and irrigation to reduce the window in which pests are attracted to
the crop (Basinski 1973 Unpublished). There is also an increased “urgency for seeking alternative crops” (CSIRO Undated). Bizarrely in later KRS Visitor Information booklets, published in about the late 70s, there is no mention of cotton in the summary of research undertaken, from 1946-1974, or under “current”. Everything from sugar cane to linseed to mungbeans to kenaf is discussed (CSIRO undated).

Insect pest control is requiring not only higher chemical applications but far more precise timing and therefore monitoring and management. Effective spraying must be timed to within 12 hours. Spraying increases from less than 20 per crop in 1971 to more than 30 in 1973 (Wood et al 1974, Henzell 2007) or even 50 times per crop (Ghassemi and White 2007, Smith 1998), increasing input costs to an economically unsustainable level. For the ten year period from 1964 to 1974 four hundred and thirty five tonnes of DDT and 412 tonnes of toxaphene were applied to the cotton crops (Gorman 1979). As one participant said who lived and farmed there at the time “Brilliant place to live. There were no flies because we’d poisoned everything. DDT, Andrin, Parathene, you name it we used it” (Conversation 29).

One local farmer says he bought 3,000 acres in 1973 “cause nobody wanted them”. “Cotton was failing already – there was already farms out here that had closed down” (Conversation 23). A 2009 CSIRO report states that by 1973 12,000 hectares of cotton had been established (Webster et al 2009). From all other accounts this seems to be a rather over-optimistic amount.

Reporting to the interdepartmental committee which was to determine the future of the KRS, CSIRO scientist Basinski, questioned the way forward. Should research stop and the cotton industry be allowed to die? Yet it was still one of the most promising crops and work overseas for replacement crops in similar areas had been unsuccessful. He resolved that research should continue; in the short-term investigating chemical control and in the longer-term developing integrated pest management systems. He warned it would take several years, be costly, and may fail (1973 unpublished).

What would the conversations have been in government and agency meeting rooms? They were opening a new dam with a greater capacity than any other in Australia, while reading that there was nothing to be grown commercially with the water. A decision was made not to invest in irrigation infrastructure to new land. Cropping of the existing 10,000 hectares of irrigated land reduced over the next few years (Young 1978).
This did not stop the pomp and circumstance. A Prime Minister wants at the least a ribbon to cut for that many millions of dollars, and in June 1972 the Ord River Dam was opened by the Prime Minister of Australia, William McMahon. Photos show a substantial crowd of seated onlookers, at least a dozen men on stage (all white shirts and ties), and a long row of flagpoles flying the Australian and Western Australian flags, at least six apparent in the photos (Kununurra Historical Society [KHS] Digital Archive No. KHS-1998-3-fs-P2-D).

There was no effort to protect Indigenous heritage from the flooding or development (Smith 1998, Craig 1991). In fact there was no effort to consult with Indigenous people during planning and development of the scheme (Graham-Taylor 1995, Smith 1998, Barber and Rumley 2003, KLC 2004). The area covered by the Ord scheme is primarily the traditional country of the Miriuwung and Gajerrong people (Guest 2009). The impact of the loss of areas of cultural, social and economic value, including significant sites such as graves, was and is significant (Coombs et al 1989, KLC 2004, Storey and Trayler 2006). Grief for the flooded country remains (Durack 1986, Barber and Rumley 2003, KLC 2004, Conversation 25 & 26). The reports and literature of the time are starkly silent in relation to those who were the majority of the population and the original owners.

Commercial cotton growing ceases in 1974. According to all written and verbal reports it was an “abrupt” end (Department of National Resources 1976, Young 1979, Courtenay 1982, Smith 1998, Ghassemi and White 2009). By 1974 insecticide spraying had become the largest single cost for farmers (Courtenay 1982).

Arrangements between the Federal and WA Governments for joint operation of the Kimberley Research Station halted. The Research Station was taken over by CSIRO (Basinski et al 1985). CSIRO publish a series of technical papers *A Review of Prospective Crops for the Ord Irrigation Area* in 1974. Various crops are reviewed and the “most promising” selected, “Crop selection is based on a consideration of the agronomic, market and economic prospects” (Wood et al 1974:1).

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82 In preparing for the flooding of the country of Argyle Station, the old Durack homestead was relocated onto safe ground. It is now a tourist attraction. Native fauna trapped on the islands was also rescued in what was called “Operation Ord Noah” (Department of National Resources 1976).
The situation, a stalled development trajectory and enormous sunk capital, must have embarrassed the all-conquering dam builders of the Court government.

Then came more reviews. In 1976 a State Government Review with Premier Sir Charles Court and two State Government members of Parliament concluded that there was no crop which could be economically produced by the majority of farmers, and no foreseeable change to this. In 1978 a Joint Commonwealth and Western Australian Government Review, chaired by Sir Norman Young stated:

Unhappily the huge volume of water that, by now, had been captured and stored in Lake Argyle, had no immediate or foreseeable agricultural use (Young 1978:32).

The review also recommended the establishment of a Tropical Ecology Research Centre at the Ord given the rapidly changing environment in order to monitor ecological changes and provide a basis with which to plan any future expansion or similar projects elsewhere (Department of National Resources 1976:71). This did not eventuate.

Looking back, how does Davidson’s analysis and negative predictions for cotton and the Ord fare? Certainly his assessment that cotton would rely upon government subsidies to survive seems true; at one point the cotton bounty is said to have been providing at least a third of the income that farmers were receiving. When the Federal cotton bounty was diminishing in 1967/68 the Western Australian Government stepped in with alternative subsidies to support the fledgling industry and region. When the national scheme ceased in 1970/71 they introduced further support. There were also indirect subsidies from the State including deferral of rent payments, subsidised ginnery power charges and low water charges (Department of National Resources 1976). However it wasn’t the farm finances as Davidson had modelled them that were the major problem, it was the pest insect resistance and build-up that led to the cost of required insecticide eventually equalling the entire value of the crop (Smith 1998).

And although this was the immediate cause of the industry’s demise cotton also had other disadvantages. The Ord region was reliant upon a monoculture that required large amounts of costly inputs. These high costs were exacerbated by the remote location of the region and its distance from suppliers and markets (Department of National Resources 1976); the high cost of transport and the lack of infrastructure (Henzell 2007:214).
Early sampling by the Department of Agriculture in the area showed significant increases in DDT, dieldrin and parathion residues from 1971 to 1973. “Applications of this magnitude could have a serious effect on soil fauna and perhaps on soil structure over the longer term” and could present a serious hazard to aquatic life and wildlife (Department of National Resources 1976:67). In fact substantial fish kills were reported for three years running adjacent to the irrigation drains and the research station. Pesticides were implicated as there was no other apparent cause, and it coincided with the maximum application (Department of National Resources 1976)\textsuperscript{83}.

Insect pests were no new thing to the Kimberley, no surprise to researchers or government. Given bollworm were first recorded in the west in the early 1900s, why wasn’t it expected and managed accordingly? Early accounts suggest how they were introduced and became widespread throughout the North-West, hosted by native plants such as the native Hibiscus (Graham-Taylor 1978:26)\textsuperscript{84}.

Western Australian Government entomologist, C.F.H. (Clee) Jenkins, published a short book in 1944 titled \textit{Ord River Irrigation Area: Entomological Problems} in which he listed the range of insect pests in the district including the now renowned bollworm, \textit{Heliothis}, and its cousins the Pink Cotton Bollworm and the Rough Bollworm, both different genera. Jenkins reports that they were identified back in the 1920s by a range

\textsuperscript{83} A Kununurra local alerted me to the story of the international travel of a freshwater crocodile carcass. A Japanese team researching chemical residuals had the carcasses flown across. Unfortunately the crocs were lacking the correct entry forms so were denied entry and flown back. It seems that their second trip to Japan was more successful. The research, published in 2006, compared crocs from the irrigation area, downstream and upstream (the control) over 30 years after the cessation of cotton in the Ord. Unwittingly Australia had created a unique study site for “the long term breakdown and effects of pesticides applied in a tropical environment” (Yoshikane et al 2006:649). The results showed some of the highest ever concentrations of p,p\textsubscript{0}-DDE and some toxaphene congeners recorded in wildlife, and a lack of any obvious effects of these on the crocodiles that accumulated them (Yoshikane et al 2006:659).

\textsuperscript{84} Several suggestions have been made as to how the bollworm was first introduced in the Kimberley. Prominent Western Australian agriculturalist LJH Teakle questions whether Grey, in establishing his garden at Hanover Bay in 1837, may have unintentionally introduced it (1944). Others question whether the bollworm was imported with the camels and cotton seeds in the early 1900s. The North West Echo claimed in 1923 that it had warned the Western Australian Government many years before. According to the paper in March 1909 the SS Century landed 515 camels at Hedland with fifty tons of Karachi cotton seed from which was then distributed to every port across the North-West. The “cotton was a moving mass of parasites” but their advice advocating its destruction was ignored (Quoted in Graham-Taylor 1978:33).
of people. Professor Dunstan of the Imperial Institute, London identifying Pink Cotton Bollworm in a sample wrote:

...in attempting cotton cultivation in Western Australia, it would be necessary to devote great care to the prevention of damage by insects (Quoted in Jenkins 1944:7).

Jenkins himself collected Cotton Bollworm and Rough Bollworm on a trip and noted that as the insects were found on numerous native plant species they should be considered to be widespread across the Kimberley. He concluded that any cotton growing in the region must take “due regard” of the pest and further investigation be undertaken “before any extensive scheme is launched (Jenkins 1944:8). However, pest control was even more of a concern by the 1920s than Jenkins describes. In May 1923 the Secretary of the North West department had ordered that all cotton plants in Broome that Jenkins referred to be destroyed by fire as every plant was reported infested (Graham-Taylor 1978).

In a 1964 study of insect pests in the Ord region 1,380 species of insects were collected; 163 of which were considered pests (Wood et al 1974). What constitutes the major cotton pests has changed over time. The introduction of Endrin demoted rough and pink bollworms from top position to be replaced by tobacco cluster grub. Control was achieved through another chemical. It was then replaced by cotton budworm, which was a year later replaced by the now infamous cotton bollworm, \textit{H armiger}. These populations were all influenced by a multitude of factors, including what other crops were being grown (Basinski et al 1985).

The lesson was heard and broadcasted. In a symposium paper Christian writes “It is evident that no agricultural industry can risk being dependent on chemicals alone for pesticide control. Alternative technologies are essential” (1974:10), though it was a lesson that had been learnt elsewhere previously. A local farmer reframes the public history of cotton in the 1970s:

Cotton did not fail – the ag department and the farmers and the banks failed. Cotton didn’t...The insect was the result of, but not the cause of” (Conversation 23).

He explained that already in 1963 in the US they beat the insect by breaking the lifecycle. As a result they had what was called “a plough-down”, an enforced break. “...you can’t even grow okra, cause it’s in the cotton clan. They’ll plough your okra
crop out” (Conversation 23). This was not instituted in the Ord. In fact a 1959 CSIRO brochure for the Katherine region emphasises removal and burning of all plant material after picking: “strict crop residue hygiene is essential” (CSIRO 1959:11). This is despite not yet recommending commercial cotton growing.

The downfall of the Ord cotton industry has been presented in all reports as a story of an inevitable loss in a battle with insect pests, just as the failure of rice in the Northern Territory is explained away on magpie geese. The reason may appear that simple but there was a lot more going on. If not insect pests perhaps something else would have finished the cotton industry? And in this case the list is long. The Commonwealth’s 1976 *Outline of the Ord Irrigation Project* described five factors that led to the demise of cotton on the Ord: rising costs such as of fertiliser and freight; ineffectiveness of insect control at reasonable cost; declining yields; poor quality; and, lack of finance. The Ord farmer above also provides a long litany, and though just one perspective his list is damning. First cab off the rank is the Government’s Lands Board. The initial release of land in the Ord seems a peculiar throw back to a time reminiscent of colonial British bureaucracy; an assumed capacity for the bureaucracy to know best. For example the Lands Board’s initial allocation of farms:

You need experience and finance to start a new farm. The Lands Board gave them to people with none of either....For example an accountant. They don’t work Saturday and Sunday – he would start water on Friday – and change it on Monday. Just let it run the whole two days.” “Another farm was called the 8.30 farm – why? Cause he would start at 8.30. He was a solicitor. No joke. He was the nicest guy in the world. People would say ‘I’m going over to the 8.30 farm’ (Conversation 23).

A renowned and entrepreneurial figure in the Ord region, this farmer’s family originally came from the US to grow seed crops but to use cotton as a base crop, as a rotation. His family’s story, as with every other of the Ord farmers, would make its own book, and he was happy to share it with me as he sat in his red braces in his cluttered office. “Problems went on constantly – same problems we have today” For example a tractor problem would be exacerbated by not being able to get parts. Other problems included complaints by spinners of the quality of Ord cotton. It was shown that there was no inherent inferiority in the cotton but that the growing system led to prolonged boll setting and opening which exposed the cotton to weathering and harmed the quality of
the lint (Department of National Resources 1976). At its peak there was said to be 12,000 hectares of cotton grown in the ORIA.85

**The Ord Postscript**

In November 2011 *The Ord-East Kimberley expansion project Land Release Information for Prospective Buyers* announced the area's “distinct market advantages” explaining that the “mostly rain-free” growing season lowers disease pressures and that “the region is relatively free of major pests and diseases encountered in other parts of Australia and the world”.

A lot of water has passed over the dam since the resounding and still reverberating cotton failure. Farmers tried a range of crops including horticulture, finding high value crops or those that could be produced out of season hence gaining a market advantage and concomitant price advantage (Conversation 14). As one local said it was the best kept secret, the following farmers made lots of money. What helped was “other people’s mistakes, bitumen roads, refrigerated trucks, infrastructure, access to markets... knowledge...It was just an evolution of farming” (Conversation 29).

A study on the past, present and future of Ord Scheme completed by Hassall and Associates for the Western Australian Government calculated that by 1991 the scheme incurred a net public loss of $511m and private benefit $14m at 1991 prices. According to a CSIRO report that is equivalent in 2009 to a private benefit $18.8m and public loss of $668.2m. However the Hassall report went on to predict a positive rate of return calculated out to 2021; 3% to 5% (combined public and private) based upon new production and marketing strategies. At that time only 4,400 ha was under cultivation (Webster et al 2009).

Key developments have included the increased capacity of Lake Argyle in 1996 and establishment of a hydro-power generator. The Department of Water is required to manage the needs of irrigators, hydro-electricity generation and the downstream environment, and has established water release rules (Department of Water 2014). As

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85 For some context the Cubbie Group with property near Dirrinbandi in Queensland produces cotton from 33,000 hectares of irrigated land relying upon a one in ten year flood, and with privately financed infrastructure. [http://www.cubbie.com.au/](http://www.cubbie.com.au/)
irrigation expands, however, pressure on the water supply will increase and despite holding an enormous amount of water the dam cannot drop below a certain level for hydro-generation (Conversation 5). Research has investigated more efficient irrigation methods.

Settlement of Native Title in 2005 was a ‘pivotal year’ (Conversation 22). The Ord Final Agreement (an Indigenous Land Use Agreement) with the Traditional Owners of the area, the Miriuwung and Gajerrong, as outlined in Chapter 4, established mechanisms for them to finally benefit from the Ord River Irrigation Area. Cotton has left other legacies. The Agriculture Department has become more conscious of Indigenous engagement and employment. In trying to encourage this they have come up against unresolved issues for local Aboriginal people with chemical usage, also discussed in Chapter 4.

*Figure 28. Flying into Kununurra with the Ord River Irrigation Area to the left, 2012*

In 2005 the Department of Agriculture and Food, Western Australia, proudly announced the “impressive” results of GM cotton trials, a 25 hectare site of Bollgard II. Trials had been underway for 10 years with research partners and farmers; 3,000 hectares of GM cotton over that time had been evaluated with guidelines for cotton production in the Kimberley due to be published in 2006 (Cotton CRC 2005). According to the Cotton CRC research update in which this was contained the gross margins for the trials at Kununurra were $1,200 for cotton – better than other crops (sugar was $270, pumpkin
$800 and grain sorghum -$140) (Cotton CRC 2005). At the time legislation did not allow GM crops to be grown on the Ord, it had not yet been approved for commercial use in northern Australia by the Gene Technology Regulator. Additional research was being undertaken to determine whether the GM cotton could become a weed (its invasiveness and potential threat to the environment and other production), or whether insects may become resistant.

Much significant research had been undertaken by the Cotton CRC in the Ord determining a farming system that could be used for northern Australia. In fact the Objectives of their Program One: “Growth in Northern Australia” were to enhance the prospects for expanding cotton production by researching viable and environmentally responsible cotton production systems for new regions in Western Australia, the Northern Territory and north Queensland” (Cotton CRC 2005).

The State Government lifted a ban on growing GM cotton in the Ord River Irrigation Area in 2008 (The West Australian 5 May 2011). According to one article there was a push on from the Chief Executive of Cotton Australia to allow GM, backed by Senator Bill Heffernan who wanted a change to GM crop restrictions “in order to transform the water-abundant north into the nation's next food bowl” (The Age 9 March 2007). In 2011 800 hectares were planted in the Ord. With cotton prices improving the GM cotton was described as being “embraced” by the local farmers (The West Australian 5 May 2011). The Chief Executive of Cotton Australia at the time explained that being close to Asian markets provided a natural advantage. In fact as there was no local gin to process the cotton it was being trucked to Dalby in Queensland for processing (The West Australian 5 May 2011). By the time the area was harvested prices had crashed. By 2014 cotton had still not made a major return.

With the Northern Territory Government announcing Ord Stage III, an area of 14,500 hectares across the border from Western Australia, and with a 2003 ban on cotton now overturned, cotton may yet emerge again. Explaining that the modern cotton industry is very different to that of the past, and with R&D in the north showing it can be successfully grown, the industry again sees itself as a viable option (Brown ABC radio
25/9/2014\textsuperscript{86}). In 2014, however, cotton prices had slumped to their lowest in five years due to a reduced demand by China and a global surplus.

Chapter 9: Particularly Peanuts

- Peanut production begins at Daly River, N.T. (1914-15)
- Seventy sealers growing peanuts on the daly (1929)
- Twelve settlers growing peanuts of the daly (1946)
- Commonwealth Report advises 1,000 acres sown annually on Katherine and Daly Rivers (1949-1953)
- Peanut area crop decreased
- Peanut Company of Australia (PCA) begins trials in Katherine region with NT Government
- Family farm growing peanuts in Dougla-Daly region
- NT Government undertaking peanut research
- PCA purchase 1st property Katherine region (2001)
- PCA purchases 2nd much larger property Katherine region (2007)
- PCA decides to sell off properties in the N.T. (2010)
- PCA properties sold to forestry company producing Indian Sandalwood (2012)
Peanuts have not captured the imagination of nation-builders or provided succour for national security by potentially filling the bellies of potential communists in the way rice did. The literature does not contain romantic quotes conjuring up endless peanut fields thriving under northern skies. Since their introduction to Darwin by the Chinese in 1884 peanuts have, however, persisted in the Top End of the Northern Territory for longer than any other crop (Payne and Fletcher 1937, Christian and Stewart 1953, Price 1972). Additionally, by the mid-20th century, peanuts were the only crop that had been an “export” crop, meaning not just grown for local or animal consumption (Commonwealth 1955:20), and consistently so. Yet despite the doggedness of efforts by peanut growers over the length of a century, the peanut ‘industry’, an overly generous term, has never thrived. This is mirrored by even smaller, less regular attempts in the Ord Irrigation Area in Western Australia (McGhie 1990) so this chapter focuses on the Northern Territory.

Two broad periods encapsulate the Top End’s history of peanuts, the first in the 1930s and 40s, and the second in the 1990s and 2000s. Each illustrates how much the industry progressed in sophistication and yield per hectare, yet not in overall production or success.

Descriptions of Daly River peanut growers in the 1930s and 40s portray a threadbare and hand-to-mouth existence far from the prosperous success to which agricultural proponents and governments aspired. The second period covered in this chapter includes two stories from the late 20th and early 21st century which bring research, technology, and both government and private investment to the picture - yet it was still not enough.

Whether promoting the potential of cropping or describing previous attempts, public accounts tend to gloss over the human cost of those who don’t have a politician’s amplified voice or status to join recorded history. Stark personal stories scattered across the region and through time remind us of the impact of failed ventures upon actual lives, not just regional reputations and national self-esteem.
Figure 29. Sites of peanut schemes.
Along the Daly River, Northern Territory – 1930s and 40s

One of the most comprehensive published records of the early peanut industry is found in the CSIRO report of the Katherine-Darwin Land Survey. According to Christian and Stewart peanut production began on the Daly River in 1914-15. Seventy settlers in the Northern Territory were growing peanuts by 1929, dropping to 28 in 1935 and by 1946, when they undertook the Land-Survey, it was down to just a dozen (Christian and Stewart 1953). Those left were struggling, as described further below. This peak in numbers probably reflects that 44 unemployed men had been assisted to become farmers by the Administration (Holmes 1963) rather than being motivated by the promising call of peanut farming opportunities.

Even when peanut farmer numbers were at their peak, conditions could be dire. As described in a Territory newspaper:

A report...stated that the whole country was in flood. The Daly River Police Station was under water- all the peanut farms were washed away and were now probably in Anson Bay or the Gulf. The farmers had to abandon their dwellings and seek refuge in the hills. It was still raining when Doyle left to report. Constable Kennett was sending out two trackers on Monday to proceed to the Daly and return with a detailed report. It is impossible to travel by horse so the boys are proceeding on foot. They are expected back by the end of the week. (Northern Territory Times 4 March 1930)

As Robin describes the Daly settlement at this time was "more notable as a key police outpost than for its agriculture" (Robin 2007:134). A year later a local newspaper article, while spruiking the welcome potential of the tobacco industry, concedes the difficulties the peanut industry has faced:

This year has afforded us the opportunity of realising and appreciating the destructive effect which our isolated position from the markets has wrought upon that (peanut) industry, and regardless of many other causes which have contributed to its present bad state - with which it is not proposed to deal at the moment. It is obvious that some measures will have to be adopted in order to justify the existence of the "Man on the Land" in North Australia. (Northern Standard 17 November 1931)
This call for “measures” to be adopted is despite the existing Commonwealth Government support to the peanut industry through a tariff and a grower subsidy of £1 a week (Price 1933). Writing of his 1932 Northern Territory journey geographer Grenfell Price (a northern realist) describes the situation first-hand:

The men have worked hard. For a time the crops were successful. Then the un-certain rainfall and poor soil brought the usual results. Soil analyses showed a lack of potash, but the government refused to supply fertilizers. The one crop industry lies at the mercy of the monsoons and of the Queensland growers who can meet the needs of the whole continent (Price 1933:366).

Regardless of the conditions it seems the world came to the Daly River in the first half of the 1900s. In their 1937 inquiry of Northern Territory land industries Payne and Fletcher catalogue the nationalities of the 35 non-Indigenous inhabitants on the Daly River and town of Katherine, a collection of natural-born British subjects, Russians, Chinese, plus an Italian and a Scandinavian (1937:78). Even at the time of the inquiry the number of growers was decreasing. According to the authors, however, peanuts of good quality were being produced, shipped from Darwin and marketed in the South; still protected by a tariff.

The settlers already established are hard workers and deserve every possible encouragement. But no matter what encouragement is given, the Territory, in our opinion, is not likely to carry an appreciable agricultural population (Payne and Fletcher 1937:78).

In the Administrator’s 1941 Report on the Territory he explains that only seven people remain on their farms at Katherine, considered the main centre, and only five farmers continued to operate on the Daly River, with a total of 130 acres of peanuts cultivated the previous year. In fact he attributes the failure of agriculture in the Territory to the fact that farmers relied upon a single main crop – peanuts (1941). In the late 1930s there were unsuccessful attempts by farmers to find alternative wet season crops such as tobacco, cotton, broom millet and soya beans (Holmes 1963).

Just five years later, in Christian’s unpublished journal of the 1946 CSIRO land survey he describes an almost Dickensian scene on the Daly "The picture of these peanut farmers reminds me of the poor whites of S[outh] Kentucky" (Unpublished 1/1946:17). It is difficult to comprehend that this was not so long ago - still within only one lifetime. Christian comments that:

Chapter 9 Particularly peanuts
The farms are set in the midst of the tall trees, part jungle which grows along the river bank are really the small flat areas which are above the floodline. Even then most of them are flooded in times of extremely heavy rain. On the average once each wet the river floods its banks which are slightly higher than the nearby country. The water extends for miles and much of the country is 10-15 feet below the water level. There is then no way of communication and each farm is an isolated unit for several weeks. Some of the farmers can visit one another by wading through the water waist deep but then only nearby neighbours. They don't seem to have boats although they do have native canoes for crossing the river in normal times (Unpublished 1/1946:17).

On the 18th of July 1946 the survey team visited one of the peanut farmers, Squizzy Taylor. They visited his two blocks in a dugout canoe. Squizzy's house was "a large galvanised shed with a small room partitioned off with bamboo. Everything is of the crudest" (Christian unpublished 1/1946:18).

A day later they visited Charlie Jo, an old Chinese peanut grower. "Charlie is having a lot of trouble. Not only are the natives leaving him but he is finding it very hard to get tobacco and to top it all he sees debil debils." Christian explains in his journal that the farmers depend upon "natives" to do all the work but that they are not tied and can leave at any time (Unpublished 1/1946:19). As with the pastoral industry of the time it is those from whom the country was taken who, through their unpaid labour, enabled any agriculture to occur.

On their next run through three months later (8/10/46), in what would have been the height of the hot humid build-up period, the survey team visited Russian peanut farmer Ivanetz, about nine miles down the river from Katherine. "Ivanetz is having domestic trouble. Apparently he employed a man on the farm for a few weeks while he was in hospital. His wife and two children have now gone off with the man. It seems a popular pastime up here." He quotes Ivanetz "'I come here, no money, land easy to get, land not too good but I worked hard, no help from government, I put in peanuts, sell peanuts at good price, every year a crop, rains never miss, sometimes early, sometimes late, but always come'". And yet the next day, following an old track down the Katherine River, they passed a series of abandoned peanut farms (Christian unpublished 1/1946:19).

Christian recounts that "the farms grow practically nothing other than peanuts although one grows and manufactures a plug tobacco for the natives, and 2 others grow vegetables which they cart to Darwin, 155 miles away." Rigdale, who had been in the
Territory for 35 years and was the only licensed tobacco manufacturer in the Territory, explains to them that "variety makes little difference, the climate and soil having an overwhelming effect. The result is splendid growth of tobacco but rather poor quality" (Unpublished 1/1946:23). Ridgdale does not believe the area has any future. He explains to Christian the factors; lack of markets, poor transportation, the proportion of long flooded country with only small areas of good soil not flooded. According to Ridgdale pigs, peanuts, fodder crops and crop peas are the only possibilities (Unpublished 1/1946:23).

In an understatement Christian summarises "The peanut industry has fluctuated over the last 15 years and none of the farmers are prosperous" (Unpublished 1/1946:23).

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<tr>
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</tr>
<tr>
<td>Mean Average</td>
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</tr>
</tbody>
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*Figure 30. Peanut production 1926 to 1940 (Christian and Stewart 1953).*

The table above shows the acreage planted peaking in 1938 at 1500 acres and the inconsistent yield per acre dropping from its peak in 1936. Christian and Stuart explained the decline in producer numbers in terms of: low prices, bad seasons, poor husbandry causing low production and choice of unsuitable land. Poor husbandry included the use of a continuous one-crop system, damaging the soil structure, and, as reported by Christian and Stewart, leading to soil erosion. High transport costs discouraged the use of fertilisers, but when phosphate was applied it had a positive effect. Variable rainfall also damaged the wet season crops with early excessive rain and/or early end to rain damaging crops (1953).
Australian geographer Holmes’ interpretation is that farming before the 1940s failed due to declining farmers’ incomes, a result of Queensland’s increased peanut production, and, likewise, low yields resulting from “a high incidence of meteorological ‘accidents’ and poor farming practices” (1963:284). The now quaint term “meteorological accidents” reveals the novelty or unfamiliarity that new Australians had with their variable and extreme environment. Holmes categorises the “hazards” into three types: “excessive flooding of levees, long dry spells during the wet season growing period, and a shorter-than-average growing season” (1963:284).

Yet from 1949 to 1953 about 1,000 acres of peanuts were annually sown on Katherine and Daly River (Taylor 1955, Commonwealth 1955). So peanuts clung on, even expanding post World War II87. A newly created agricultural section within the Land and Survey Branch of the Territory Administration was running peanut experiments and trials. Their advice to growers included avoiding wet season planting, a significant point given it wasn’t until the late 1990s that a grower himself trialled this approach and it became more commonly accepted.

Three hundred acres were planted in 1955-56 but “heavy late rains” resulted in poor germination and the “planting was a failure” (Commonwealth 1957b:24). The 1957 Commonwealth report on the Territory was less rosy about peanuts; the total area planted had decreased with smaller areas sown on individual farms and a reduction in producers. It concluded that this reflected the instability of the small industry and “its failure to develop financial reserves” (Commonwealth 1957a:28). Given Christian’s descriptions of the farmers’ situation just 10 years earlier it would be more surprising to find that any of the farmers had managed to achieve financial survival let alone a financial buffer. Perhaps the Administrator had not travelled down the Daly prior to writing the report, or the department had written it from Canberra. The report does not leave peanuts on a defeatist tone though, explaining that trials carried out over this time “give promise of the possibility of re-establishing the industry on a wider range of soils should economic conditions become favourable” (Commonwealth 1957a:28). The next reference to peanuts is cursory however, one line in the 1958 Territory Annual Report

87 One of the farms owned by the Parry family became a mango farm and now provides tourist accommodation on the banks of the Daly and under some beautiful old mango trees. Unfortunately the business still suffers with regular flooding.
under the Katherine Experiment Farm - "An area of 23 acres of peanuts was made into excellent baled hay, of very high protein content, which will be used for cattle feeding trials during the dry season" (Commonwealth 1958:22).

Geographer Slim Bauer’s explanation three decades later for the failure of the promise of peanuts in the first half of the 19th century differed from that of Christian and Stewart; he wrote that the industry had "succumbed to a combination of variable quality, inadequate labour, and marketing problems" (Bauer 1984:12).

**Digging in the Douglas-Daly Region - Late 1990s**

The Douglas-Daly region, bounded by the Douglas and Daly Rivers, sits about 200kms south of Darwin and 200km north-west of Katherine in the Northern Territory. Due to its 1,200mm annual rainfall and comparatively better soils the region has been promoted for decades as an area of higher agricultural and cropping potential, for example as advocated in a Northern Territory Government website in 2013 “(The) Douglas Daly Region is part of the most prospective region for primary industry development in the Northern Territory”.88

As early as the 1960s the Douglas-Daly Research Farm (DDRF) was established to investigate and support agricultural development in the Top End of the Territory. Agriculture within the Douglas Daly has changed over time moving “from cropping in the 1980s, intensive livestock production in the 1990s to a mixed diversity of agricultural industries in later years” (Shotton 2011:8). The region was boosted during the period of the Northern Territory Government’s ADMA scheme established in 1981/82, a few years after self-government.89

Melissa and Geoff Plant moved to the Douglas Daly region in 1997 after farming in central Queensland and with four years’ experience growing peanuts there under flood irrigation. A visit to Queensland by a Northern Territory Government officer to ‘recruit’ farmers for the Douglas Daly was their first introduction to the Northern Territory as a possibility for farming. A departmental poster used at the time was titled “Australia’s Northern Territory Irrigated Peanut Production Opportunities”. It presented the potential

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89 The scheme is discussed further in Chapter 10.
of the region for peanut production in a very positive light highlighting “Disease free production”, “Two growing seasons per year” and “Research development and extension support”. From their account the Plants thoroughly researched their decision as to where to relocate, and with further assistance from the Primary Industries employee above, who also hosted Geoff on a trip to the Douglas Daly.

Several factors were in the Plants’ favour when they arrived to establish their enterprise; they came with capital, he was experienced in the crop, and they were hard workers. An agricultural professional working in the region explained “he had a couple of million bucks in his back pocket, he was a smart operator and he worked hard and he did everything on a shoestring”. Despite this it did not run smoothly. In just the first year there was “the big Katherine flood” and “60-80 hectares went underwater” (Conversation 8).

The Plants documented their first four years peanut farming in the Douglas Daly in a Technical Bulletin for the Northern Territory Government’s Department of Primary Industries and Fisheries, in particular their 2000 crop: “the first commercial scale peanut crop planted according to recommendations derived from literature searches, trial crops and computer modelling” (Plant 2000:5). They contended with an array of issues: from the unpredictable and high rainfall to the crop’s disease load; lack of relevant information for dry-season cropping to a reduction in the fertiliser freight subsidy; and large rocks in the soil to lack of all-weather road access.

As one example the extremely unpredictable wet seasons were much wetter than average over the four years. This raised the water table, created water logging and inhibited harvest of wet season crops and delayed planting of dry season crops. During wet season cropping it made herbicide and fungicide spraying ineffective thereby reducing weed and disease control and ultimately the yield and quality of the peanuts. Diseases such as early and late leafspots (Cercospora spp.) white mould (Sclerotium rolfsii), aflatoxin (Aspergillus flavus), Rhizoctonia (Rhizoctonia solani), Crown rot (Aspergillus niger) and rust (Puccinia arachidis) were all present, and were expensive to control. A lack of a suitable rotation crop also led to disease build up. Weed and disease control costs were therefore higher than expected, as was fertiliser, increasing cropping costs.
Compounding these factors both the yields and grades of the wet season peanut crops were low due to the heat and the wet. Growing two commercial scale crops a year on the same land was “almost impossible” (Plant 2000:8). All of these factors led to the fact that “Gross Margins on a commercial scale were lower than budget indications” (Plant 2000:8). To top it all off, despite the third assertion of the government department’s poster listed above, there was a paucity of research on broad-acre irrigation available for the Douglas Daly. The Plants therefore relied upon advice from Queensland, which, inevitably, was not always appropriate to their conditions. The Territory had very few relevant specialists available to provide advice so the family “had to guess and experiment” (Plant 2000:9).

An agricultural researcher who worked in the region at the time described the situation. With the Peanut Company of Australia interested and commercial farmers such as Geoff Plant arriving:

there was a bit more impetus for the government to consider peanuts as a commercial crop again. I guess it is fair to say that we were always behind the eight-ball because we had these growers that turned up and then went ‘we’re having all these problems - things aren’t turning out quite the way we thought they would’, so we were trying to do research to at least understand what was going on with these problems and then whether we could do anything about them. (Conversation 3)

This went on for a number of years and they developed a close relationship with growers and with the company, “we did some great work”. He explains that although trials were:

very rough and ready... don’t think any of it will make it into the agricultural journals... it was very pragmatic research and very much on your feet, and very much ‘what’s that going to mean in the paddock’ kind of research ... but between us all we increased all of the growers yields on average by 60%. (Conversation 3)

The average yield per hectare was sitting at about 2.5 tonne and got up to 3.8 “but the sad reality was that none of that was enough to keep them afloat...I think even before the peanut company came over a lot of the growers had given up or gone broke” (Conversation 3). This had taken between four to six years depending on the grower.

In checking the relevant Northern Territory Government Department’s publication listings there are four ‘Agnotes’ specifically addressing peanut production, one of which
is for growing peanuts at home, and all from 2004, once the Plants and other small growers had left. Curiously the technical bulletin written by the Plants is not listed in the publications available on the Department’s website⁹⁰.

The Plants’ Technical Bulletin of 45 pages is dense with information from bed preparation to disease control to irrigation scheduling. It shares thorough detail of comparative yields for different planting areas and the factors that influenced these such as cool temperatures during emergence/early growth or flowering, warm temperatures in late season, disease build-up in soil, poor volunteer control in row and digging/thrashing losses due to disease (Plant 2000). The level of detail reminds us how complex farming is and the breadth and detail of knowledge and skills required; let alone when one is farming at the cutting edge where there are no established benchmark practices.

The close relationship that the Douglas-Daly researchers had with a relatively small number of growers indicates that, despite lack of formal publications, information was being shared two-way between the parties – the researchers were learning what the farmers’ needs were and the farmers were learning from the trials directly, even participating in them or undertaking them. Where this falls down is the lack of mechanism for sharing information more widely. How is it made available for those who might come after all of these players have moved on, which they have. There is a small amount on the Department’s website⁹¹ last updated in February 2006 (accessed October 2013).

Geoff Plant left the Douglas Daly and his peanut farm after about 6 years, with little to show for it. An agricultural professional from the region when asked why Geoff ‘failed’ suggested the cost of production and a marriage breakdown (Conversation 8). Personal and family difficulties emerge in many stories of the north, yet they are rarely discussed in the formal literature while hardship is often romanticised in the informal. “I’ve seen the system break more marriages than I care to talk about...because of the stress and the pressure of working in this environment” (Conversation 8). The contributing factor of the availability, or lack thereof, of social infrastructure such as schools and support

⁹⁰ The copy I have was passed to me by a colleague.
⁹¹ http://www.nt.gov.au/d/Primary_Industry/

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networks, along with the stress of isolated and remote living and working conditions is seen in other narratives and discussed further in Chapter 11.

So much sits behind this one story and the associated, apparently straightforward, technical document; personal and family hardship and loss, injudicious use of over-optimistic information to promote the NT Government’s development agenda, the intractability of the economics, and the hard work of many others to try and find a way through and make it a reality.

**Coming and Going in the Katherine Region, Northern Territory – 2000s**

*Katherine could grow about a million acres of peanuts* (C.S. Christian quoted in Carter 1961:44)

Coinciding with a backlash against the Land and Water Taskforce’s cautious report (2009) on the potential for northern agricultural development, newspapers carried another, contradictory, piece of the northern puzzle. Advertisements appeared in the classifieds for the sale of properties near Katherine, Northern Territory, properties owned by the Peanut Company of Australia (PCA) which had been developed for irrigated agriculture and with access to bore water. The PCA’s original investment in these properties had been hailed as the beginning of a substantial peanut industry in the Northern Territory. The Company did not manage to sell the places until February 2012, about two years.

The story of PCA’s enterprise in the north contrasts with many other cropping attempts. They seemed to have covered off on many of the potential pitfalls, as the then CEO advised me “We read Fisher’s work – all of my agronomists have read that”. He is referring to ‘The role of technical and related problems in the failure of some agricultural development schemes in northern Australia’ from the 1977 conference proceedings *Cropping in north Australia: Anatomy of success and failure*, still one of the most comprehensive analyses available.

Bob Hansen started as CEO with the Peanut Company of Australia in 1993. From the 1980s he was interested in climate science and at some point it crystallized for him that climate change was a reality. Productivity was declining in the peanut producing region of south east Queensland and research undertaken by the Queensland DPI with the PCA
revealed that “aflatoxin risk has increased and pod yields have declined since 1980 due to higher temperature and lower rainfall associated with climate change” (Chauhan et al 2008). Peanuts are vulnerable to fungi that produce the carcinogenic aflatoxin when they are produced under high temperatures and drought.

As a peanut processor the PCA was vulnerable to decline in local production and had been forced to import peanuts to meet their processing requirements. Bob believed that if the company continued to focus on southern Australia for peanut production they eventually wouldn’t have a crop. He goes on to explain that in the late 1990s while trying to determine why this decline was happening he came to the conclusion that “we had to move the whole operation to northern Australia” (Hansen pers. comm.). They needed to establish security of supply. PCA bought their first property in the Northern Territory in 2001, 500 hectares on Florina Road near Katherine with about 200 hectares under irrigation. They purchased a second and much larger property in 2007. The company had actually started trials in the region in 1985, before Bob’s time, through the Territory’s Department of Primary Industry:

We didn’t just come and say we’ll invest 20 million here – we did it in a staged and programmed way...We tried to start off at a small scale and scale it up... The company also didn’t simply import southern methods to the north instead using a totally different agronomic process and different cultivars. Everything was tropically based. (Hansen pers. comm.)

The Territory Government saw the PCA’s investment in the region as a boon. Primary Industries Minister Chris Natt gushing “It's fantastic for our economy, it's creating jobs for rural families, and, you know, if we can somehow sustain their development into the future, it's going to be great for the Katherine region (Courtney ABC Landline 1/6/2008).92 The Peanut Company of Australia arrived as a vertically integrated production chain, what one participant described as “the buzz word at the time” (Conversation 3). This was seen as the way to finally make it work – a market for the crop was guaranteed.

In a 2002 Business Plan for the development of the Northern Territory peanut industry agricultural consultant Peter Wylie from southern Queensland concludes that a peanut

92 http://www.abc.net.au/landline/content/2006/s2260753.htm Accessed 3/10/2013

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industry is feasible, in fact quite profitable, although he does identify hurdles. According to Wylie an individual farm would provide a return on capital of 8%, with irrigation equipment capable of irrigating 360 hectares at a time, while a large corporate farm would provide a 10% return using 980 hectares of irrigation equipment. He explains that moving peanut production from the wet season to irrigated dry season has improved reliability and that “the timing of this production is of interest to the Peanut Company of Australia, which can achieve efficiencies in processing and reduced carry charges of peanuts harvested in spring, instead of autumn” (Wylie 2002:2).

Yet Wylie includes in his references a 2000 report done by the Northern Territory Government’s Office of Resource Development which states uncategorically that "This study shows that potential irrigators of field crops in this area need to proceed with caution” (Hristova 2000:3). Hristova’s work compares efficiency indicators in the Northern Territory with similar crops in other States. It reveals that, among other points, gross margins and returns to water use are lower for all crops examined while variable costs for inputs are higher. She cautions that “there is insufficient knowledge at present on soils, water availability, crop agronomy, crop yields, crop rotations, etc. to fully assess the viability of irrigated field cropping in the NT” (Hristova 2000:3). Wylie does acknowledge the need for a robust farming system, suggesting sesame or cotton as potential rotation crops, nevertheless he concludes that peanuts could become a “much larger industry with an output of 20,000 tonnes of peanuts annually and a gross income of $50 million” and could “stimulate the economy of the Northern Territory by $125m a year and result in the employment of more than 600 people” (Wylie 2002:4). Wylie’s conclusions seem at odds with the government report.

Bob resigned as Managing Director of PCA in July 2009. What happened to the PCA’s own peanut growing enterprise? What led to the properties being put up for sale in 2010? Bob listed three points several times in the interview; a lack of funding, a lack of commitment by company management, and the lack of a profitable rotation crop. Gaining private investment was a major hurdle for the company. The funders wanted to exit. “The biggest failing the peanut company had is funders really. Funders lose confidence and there’s just got to be one small hiccup”. This was exacerbated by the new management not having much interest in the project and therefore lacking the desire to negotiate with funders. (Hansen pers. comm.)
As with peanut growing throughout the previous century the lack of a profitable rotation crop was a major hurdle. At one point Bob states that “for PCA (it was) the biggest problem we had...You can’t grow peanuts on peanuts on peanuts”. According to Bob peanuts could be grown successfully if there was a profitable rotation crop. The Company trialled corn and fodder for cattle. As early as 1953 Christian and Stewart in their CSIRO report advised that experiments to find a “system of crop rotation to replace the existing one-crop system” would provide an immediate contribution to peanut cultivation (Christian and Stewart 1953:120).

Bob’s view regarding the lack of profitable rotation crop was reinforced in an interview with the then agricultural researcher of the region:

If I could boil it down, peanuts themselves made money but none of the rotation crops and they couldn’t really form a production system based upon the rest of it – and that has always been a problem since the day I got there. (Conversation 3)

He agreed that PCA would now be broke anyway due to the live export ban and its impact upon fodder growers. Additional difficulties emerged in discussions with Bob building an understanding as to why the funders may have been wary.

Our cost of production was higher than I anticipated. The isolation was harder than I envisaged...It was hard to get competitive freight rate quotes...everything you needed had to be imported from Brisbane – very little actually comes from here (Hansen pers. comm.).

Water licenses were another hurdle, and another risk as perceived by investors, regardless of the Northern Territory Government’s public support for the company and industry. PCA started trying to get a water license for Florina Road in 2001 when they started in the Territory. Although they did have a temporary license PCA didn’t get an “official” one until 2008/9. Taylor’s Park, which the company acquired in 2007, also had only a year to year license, remaining the case until the property sold in 2012. This situation did not interfere with the cropping itself as water remained available however, as Bob emphasised, the lack of a longer-term license does make investors nervous and unwilling to invest further without greater certainty.

There was also resistance from other quarters. Large-scale water use and licensing in the region raised concerns for others in the region, both in regards to potential environmental impact and equity of water resource distribution. David Higgins of the
Katherine Horticultural Association was very concerned that any one large operator might be allowed to extract a large proportion of any aquifer “there's a nervousness around what's happening here” (Courtney ABC Landline 1/6/2008).93

An agricultural researcher from the Douglas-Daly during this period explains another hindrance for cropping in the region, particularly large-scale:

Being in a very wet climate triples your problems because you’ve got more insect problems, you’ve got more disease problems, you’ve got a shorter window to work in and you’re competing against what could be done under rainfall alone. If you’re going to go to the cost of putting in irrigation you have to make that tick 365 days of the year and that’s much harder to do in a wetter climate... That’s something people don’t realise – the window of opportunity is very small and applies to peanuts, fodder, cotton – it applies to any crop... and therefore large areas are going to be very very difficult because you have to have so much machinery, so you overcapitalise to plant in a very small window, and then it sits there for the rest of the year. (Conversation 3)

Their research determined that 15 March was the best day to plant peanuts and every week after that the yield would be reduced by 5 or 10%. It was a two week window, planting in April would lose ½ tonne per hectare and May would lose 2 tonne. Despite people’s perception of the dry season as “one nice bit of homogenous dry weather” it is not and very subtle changes drastically affect how crops perform – “it’s the combination of all these little effects”. Peanuts have to flower before the night time temperature drops below 15degrees so you work backwards from that to determine your planting window. The peanut company moved to “double cropping again and trying to go back again to all these things that weren’t working in the first place that’s just desperation but it isn’t going to work” (Conversation 3).

Bob discussed the difficulty of convincing funders to invest in cropping in northern Australia in general:

I mean you go and talk to anybody down south and ask will you invest in agriculture and immediately they start talking about magpie geese and rice! When was that? I can’t remember – the 60s? And it wasn’t even magpie geese, it was the salt – salt ingress – and a lot else...There’re a lot of people my age around who were involved in

93 http://www.abc.net.au/landline/content/2006/s2260753.htm Accessed 3/10/2013

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those programs like Lakeland Downs, ADMA, Victoria River Downs, Kununurra. I mean even Kununurra is still not successful really...and that just really reinforces the thought processes of investors (Hansen pers. comm.)

With a change of ownership and Bob’s resignation, the Company’s Board and management decided in 2010 to focus back onto processing and marketing and to reduce the debt they were carrying through selling the Territory properties (Peanut Company of Australia [PCA] 2011). Incongruously the classifieds went on to appear, without fanfare, at the time of a public backlash to the Northern Australia Land and Water Taskforce report, which stated there was limited potential for cropping across the north - 40-60,000 hectares of ground-water irrigable land. For example the National Farmers Federation was quoted as saying “there’s huge potential for agriculture in northern Australia, despite a Federal Government report finding that the north can’t be the nation’s food bowl” (ABC Rural Monday, 08/02/2010 ); and despite NFF president David Crombie being a member of the Taskforce.

The Peanut Company of Australia’s properties did not sell until early 2012, “bringing to an end nearly ten years of direct involvement in farming in the NT” (PCA 2012:7). The 12,206 hectares were bought for $13.25 million by the Indian sandalwood company, Tropical Forestry Services, after two years on the market. The new CEO of PCA, John Howard, explained that he believed, regardless of the sale, there is a future for peanut growing in the region94. The fact that the Northern Territory can grow peanuts in the winter months is an advantage (ABC Radio Rural News 20/02/2012). Meanwhile further irrigated cropping land is taken up by forestry to produce a non-edible crop.

The PCA tried to counter mistakes that others had made, “But I think the problems are just too big, especially up here” and without significant government support (Hansen pers. comm.). In another agricultural professional’s words “if they can’t make money out of selling the product to themselves then no-one can – and I think the answer is that no-one can, because they’ve since stopped and gone home.” (Conversation 3)

Talking with Bob in 2012 he acknowledged that his views had changed – he no longer believed there was a future for agriculture (cropping) in northern Australia with the

94 John Howard was a guest speaker at the Northern Australia Food Futures conference in Darwin November 2014.
current agricultural practices. Why does he think it is still promoted? “Cause it’s just myth in our culture” (Hansen pers. comm.).
Chapter 10: Going Grain

A significant thread running through attempts and recommendations to establish cropping has been the relationship of cropping with the pastoral industry. This thread can be picked up from both the pastoral and the cropping ends. The former is the need for pastoral enterprises to diversify and to provide supplementary feed to cattle, particularly over the dry season when the predominantly native pastures lose nutritional value. This need spurs a push to grow fodder crops such as sorghum, and eventually to integrate cropping within pastoral enterprises. From the cropping perspective it has been seen as a means to establish an integrated farming system within an existing enterprise.

Two large-scale private schemes in the late 1960s and early 1970s have become infamous in the Territory, Tipperary Land Corporation (TLC) at Tipperary Station and Northern Agricultural Development Corporation (NADC) on Willeroo Station. Later came the Northern Territory Government’s endeavour with the Agricultural Development and Marketing Authority (ADMA) in the 1980s. Of equal significance in the west was the grand though eventually impossible vision for the Camballin Irrigation Area on the Fitzroy River.
Figure 31. Sites of grain schemes.
Two for the Territory

Tipperary Station occupies 922,000 hectares in the North-West Daly River catchment of the Northern Territory. In March of 1967 Tipperary Land Corporation (TLC) of Texas agreed to lease the station for $1.68 million to establish a farming and cattle enterprise growing principally grain sorghum, peanuts and rice. A public prospectus raised over $3.5 million on US securities markets (Fisher et al 1977). The project was managed by Gunn Rural Management Pty Ltd with Bill Gunn (by then Sir William) as managing director. The US interests held 95% with 5% held by Gunn’s family interests (Department of National Development [DND] 1968). Gunn had previously been advisor to Territory Rice Ltd which had failed less than a decade earlier.

Fundamental changes were required in the land tenure system to allow pastoral leaseholders to develop areas for agriculture and subdivide for conversion to perpetual tenure for sale (Fisher et al 1977, Martin 1983, NTG 2003). This was done with changes to the Crown Lands Ordinance in 1967 (Ling 2010). Clearing began in 1967 and according to a Commonwealth Parliamentary trip report 12,000 acres were planted in the 1967/68 season (DND 1968). The company optimistically planned to double the cropped area each year from 24,000 acres in 1968/69 to 192,000 acres in 1971/72. Tipperary Land Corporation planned to grow grain sorghum on about 78,000 ha and it is estimated that 79,000 ha were cleared over 5 years (DRMAC 2009). The development was expected to require $20 million (DND 1968).

The touted grand vision, expectations and investment dollars came to naught. After just three years farming was abandoned (Fisher et al 1977). The actual area cropped reached just 7,300 hectares (Lapidge 1979b) and 8,200 hectares according to Fisher et al. Only 2,900 tonnes of sorghum were ever exported to Japan (Fisher et al 1977). The majority was below export quality standard and was sold for stock feed, dumped or used in the Tipperary feedlot (Martin 1983). Tipperary was sold in 1973 and has had a chequered history since, a cattle station, a private zoo95 and a widespread and expensive weed problem, perhaps exacerbated if not created by the original clearing.

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95 One time station owner billionaire Warren Anderson established a zoo with over 1800 animals, an indoor equestrian centre and an oversize bitumen airstrip. With his fortune lost he sold up in 2003. A
Getting out just in time, Bill Gunn\(^96\) resigned in 1968. “He felt he had played his part in getting Tipperary established as a major sorghum grower.” (The Age 31 May 1968) Through Tipperary Land Corporation Gunn went on to develop, sometimes controversially, mineral deposits in Australia and internationally (Qld Hansard 9 March 1976). Agriculture was only one pie for his fingers and perhaps not his real end-game; another big man with big ideas for the north, but smaller results.

Many variables contributed to the ignominious failure of this large American investment scheme. Fisher et al provide a detailed explanation. They range from constraints of the biophysical environment to a lack of suitable sorghum varieties to inexperienced and remote management. Erodible soils were cleared and no contouring was undertaken. Sometimes it was a lack of understanding, even when the knowledge was available. One example was field management not acknowledging the limitation to crop production of the period available between rains beginning and the soil becoming too wet for cultivation, despite this information being documented (Fisher et al 1977). Staff had no experience in the tropics, while the corporation itself had no experience with such large-scale agriculture (Fisher et al 1977). Tipperary also over-capitalised in irrigation equipment and bores without producing a single commercial irrigated crop. Mollah (1980) recognised two additional factors; overly ambitious goals caused by ignorance or misinterpretation of available information and insufficient finance to continue after the initial planting.

A detailed articulation of one harvest provides a sense of the challenges TLC faced, some perhaps of their own making. Tipperary’s first crop, in 1968, was ready for harvest in April but the road to the highway was not yet suitable for heavy haulage and field storage for the grain was not available. Heavy rain in May caused further delays leading to mould and the growth of secondary grain heads. These green heads played havoc with the harvesters and resulted in cracked grain. No drying equipment was

\(^{96}\) Bill Gunn also played a key and eventually destructive role in the wool industry as a Chair of the Australian Wool Board (Massy 2011) His own family company, Gunn Development, invested in the cattle industry in the Territory and in 1977 went into receivership. (Sydney Morning Herald 28 April 2003) Despite all of this Gunn was hailed as an industry leader and pioneer. It seems front, as opposed to real success, leads to acknowledgement.

Chapter 10 Going grain
available for the grain and although it was installed for 1969 it was then not needed. Nevertheless the majority of the grain, now of unsaleable quality, was transported to Darwin where it was stored in the open resulting in even greater rain damage (Fisher et al 1977).97

The livestock side was also fraught, sounding incompetent at best, negligent at worst. The feedlot was a failure. “Approximately 17,000 tonnes of sorghum stover was ensiled and fed to calving cows. The nutritive value was so low that many of the cattle died” (Fisher et al 1977:60). Over the course of this three year fiasco both sorghum and beef prices were good.

Despite the end of Tipperary’s farming enterprise a similar scheme was starting not too far away. Northern Agricultural Development Corporation (NADC) was formed in 1971 to acquire and develop Willeroo Station, 150km south of Darwin and 70km southwest of Katherine.

The failure at Tipperary did not appear to inhibit investment in NADC. It is therefore unfortunate that many of the mistakes at Tipperary were repeated at Willeroo (Fisher et al 1977:61).

About 20,000 hectares were cleared for agricultural production on Scott Creek and 48,600 hectares on Willeroo Station (DRMAC 2009). Incidentally the Northern Territory Administration had approved the sealing of the road from Willeroo to Katherine in 1965 at the cost of $1.55million from the Commonwealth funded Beef Roads Program (DND 1968:12).

NADC were planning to grow 25,000 hectares of commercial grain sorghum. They never exceeded 10,000 hectares (Lapidge 1979b). Sorghum farming was to be undertaken with pasture improvement (80,000 hectares to be sown to Townsville stylo) and increased cattle numbers, from 10,000 to 80,000. 120,000 hectares were to be cleared in the first five years. In their first year 1970/71 800 hectares were sown. This increased to 5,000 hectares the next year, 10,000 hectares in 1972/73 and dropped back to 4,500 hectares in 1973/74. In September 1974 the Northern Agricultural

97 A list of impacting variables is in Table 6, Chapter 11.
Development Corporation went into receivership (Fisher et al 1977, Martin 1983). What happened?

In Fisher et al’s definitive account there were problems due to the company not using available technical information, having limited understanding of and experience with local conditions, relying too much on borrowed capital and then spending that on the wrong and unnecessary equipment. They claimed that NADC ignored available detailed land capability surveys when selecting areas for development, instead using Northcote’s Atlas of Australian Soils. This led to the government taking legal action more than once to prevent the company clearing highly erodible soils. “Erosion caused yield losses of about 10-15%, and would have become more important had the scheme continued” (Fisher et al 1977:68). Planning was inadequate. Although 48,600 hectares was cleared only 16,000 hectares was cultivated. NADC’s resistance to using information was revealed when “the company was unwilling to accept” the results of further surveys showing substantial amounts of land were not appropriate for cultivation (Fisher et al 1977:68).

NADC’s failure did not deter the new Northern Territory Government who in 1977 proposed to buy Willeroo along with two other properties to kick-start a grains industry. Initially with bipartisan support it later gets muddy with questions regarding $150,000 advanced from the Primary Producers Board to the NADC receivers. Even in 1987 there are references in the NT Legislative Assembly to the matter “The third main grain failure in the Northern Territory was at Willeroo which happened about 1977-78 when the government unfortunately had some sticky interference and certain matters to explain away.” (29 October 1987)

With the failure of these large schemes there were still smaller family farms struggling to make a go of it. In 1978 at the request of producers the Cropping Development Committee of the Northern Territory (CDC) was established comprising three producer and three government representatives to investigate crop development and recommend development initiatives to government. Acting on the Committee’s report the government introduced the Cropping Development Scheme to be oversighted by the CDC. In 1978 the scheme was introduced installing new handling and storage infrastructure and establishing a range of production incentives costing about $228,000. Subsidy incentives to farmers included fertiliser freight costs, aerial crop spraying,
shipping freight costs, reimbursement for loss on input costs, admin costs for the co-operative and for a qualified header operator during harvest (CDC 1979). Poor response by farmers to the incentives highlighted the difficulties, and a subsequent report explains that farmers lacked machinery, financial liquidity and expertise (CDC 1979). Hesitant to blame the farmers the report goes on to say that there were also gaps in crop technology which led to marginal yields. Their suggestion? To increase resources for improving farmer expertise, increasing crop experimentation and attracting experienced farmers (CDC 1979). For the 690 hectares included in the scheme total returns for the 1978/79 season were $16,746 (CDC 1979:9).

**Agricultural Development and Marketing Authority (ADMA) Northern Territory**

In 1980, two years after self-government, the Northern Territory Government passed a bill to establish the Agricultural Development and Marketing Authority (ADMA) – a two-staged agriculture and horticultural development program “to investigate, organise and assist in the development and continued operation of agricultural projects in the Territory, including the processing and marketing of agricultural products” (s.13 of the Agricultural Development and Marketing Act, quoted in Kearney 1991) and containing three components – project farm development, grain marketing and storage.

The operational plan for ADMA was developed from recommendations of the Lapidge Report and a working party of the Northern Territory Government (Cameron and Hooper 1985). Lapidge saw the major constraint on Territory agriculture as scale, believing agriculture needed to develop quickly, hence minimising the government subsidy required. Identifying the Douglas-Daly area as most suitable for development, although stressing the need for detailed soil and water surveys, Lapidge considered farms of 1000 hectares desirable.

Through establishing a number of pilot farms in the Daly River Basin ADMA Stage 1 was to determine whether farming was economically viable under commercial conditions (Cameron and Hooper 1985, Kearney 1991). If this was shown to be the case then Stage 2 would proceed; a 10 year development phase at the end of which there was to be 45 farms producing rice on the Adelaide river area and 120 farms producing grain, oilseeds and peanuts in the Douglas-Daly area (Steele 1980). The Commonwealth’s Bureau of Agricultural Economics was to do an analysis to determine this.
There appears to have been much riding on the ADMA scheme; a newly independent Northern Territory Government seeking to establish itself and show that it could succeed where the Commonwealth had not; a desperate need to diversify the economy of the jurisdiction and to increase investment and revenue (Everingham 1982), and a cohort of constituents who expected a conventional trajectory of development, and perhaps were more likely to benefit from it. An officer of the Department of Primary Industries wrote during the life of the scheme “It is suggested that the establishment of the ADMA scheme resulted mainly from socio-political pressures…” (Cameron and Hooper 1985:488) concluding with “It is not a question of whether the ADMA scheme will succeed. It cannot afford to fail” (Cameron and Hooper 1985:501).

Yet despite the importance of the scheme to the then Country Liberal Party Government the timeframe set for the first stage, to establish commercial viability, was remarkably short particularly when you consider that this was green-field development all to be established on ‘new’ uncleared land, in fact the land hadn’t even been acquired. Whether this was a lack of understanding of the task ahead, an overriding political imperative, or an arrogance in assuming they could achieve what no-one else had before them, and quickly, (or all of the above) can only be speculated.

In 1981 ADMA bought 20,010 hectares in the Douglas-Daly area within which to locate the first pilot farms. Due to the scattered nature of suitable soils each farm required about 5,000 hectares in order to ensure about 1,000 hectares of arable land, with the balance to be used for grazing. Detailed soil mapping was done to guide clearing work (Kearney 1991). The first grain depot was also built this year in Katherine at a cost of $490,000. These facilities were considered rudimentary and required a high amount of labour (Cameron and Hooper 1985). The depot was expanded and another built close to the six pilot farms in 1982 (Cameron and Hooper 1985). ADMA additionally functioned as a grain marketing board and sponsored further research into commercial broad-acre agriculture (Kearney 1991).
Of 60 applicants three farmers were recruited on the basis of their experience, ability and finances. In contracts with ADMA the pilot farmers were supplied the cleared land and the fixed improvements (fencing, housing, shed, power, water supplies, access road and airstrip), paid a living allowance and had their losses underwritten. They had to provide their own farm machinery, labour and working capital, and kept the proceeds of their crop. If the farms were proven to be economically viable by June 1985 the farmers had an option to buy them. Only 2.5 pilot farms could be created from this initial purchase, not a sufficient sample size for determining commercial viability, so Oolloo Station was compulsorily acquired by the government about a year later and four more farmers installed. Over the 1982-83 wet season a total of 1,839 hectares of maize, sorghum and soybean were planted on the six pilot farms, together with 415 hectares of mungbeans. That year there was a very 'late' start to the rain and significant crop losses (Cameron and Hooper 1985, Kearney 1991).

In 1984, the 3rd wet season of commercial scale, broad-acre crop production, three of six farms were in full production. Total area cropped was 2,260 hectares (2280 in table of report) of which 560 was virgin country – including 975 hectares maize, 637 hectares sorghum, and 404 hectares soybean, and a scattering of small other crops. Serious soil erosion occurred on Oolloo due to the short time available for land preparation plus heavy June-Feb rainfall: "Intensive late cultivation, on this soil type, must be avoided" (Price and Garside 1984:47). The rough physical condition of land, shortage of
harvester and the presence of weeds caused many harvesting problems. Additionally there were issues with fertiliser cost and efficiency, inferior seed quality, failure of herbicides, and feral animal damage - pigs and buffalo. The farm monitoring report by the Department concluded, however, that "results were encouraging and auger well for the future of dryland cropping in this area" (Price and Garside 1985:3).

In 1984 ADMA was reviewed independently. The report noted that by 31 December 1983 ADMA had spent $3.56million on recurrent items and $7,824,000 on capital items. The total capital cost for the development of the six pilot farms had amounted to $5million or $839,000 per farm. Yields and production costs varied greatly between farms and, in comparison to other parts of Australia, the yield for cost of production were low. The report explained that unless the former went up or the latter down there was no future for maize and sorghum; more investigation was required to determine whether this was possible.

According to the report results had not yet shown “that the farms could be run on a commercial basis, even with a zero land value” (Martin Corporation Limited 1984:46) and that not enough thought had been given to government support, creating implications for the government through underwriting arrangements with the pilot farmers.

Three years later, in 1987, the number of farms was down by one; four of the same farming couples remained and two new families were on one farm. The total crop area had grown by 1,544 hectares (about 1.5 times) to 3,804 hectares of which 1,865 was planted to sorghum, 1,100 to maize, with the rest soybean, sesame, peanut and mungbean. The Farm monitoring report listed twelve major problems affecting the majority of farmers and impacting negatively economically. Most problems remained the same as above: finding the most efficient fertiliser rate, finding cheaper forms of sulphur, rapid breakdown of herbicide, weeds, and erosion from storms. Pigs and buffalo were not mentioned however birds were a problem. The report concludes "We believe that the project farms will succeed and that the major problems which are still placing constraints on their economical operation will be resolved"(Price 1987:58). In March 1987 the Authority was merged into the Dept. of Industries and Development. “ADMA was dependent upon government funding and the whim of government” (Conversation 13).
ADMA began producing maize while the Ord Irrigation Area was also growing it. According to an interviewee who worked at that time for a company producing chickens in Papua New Guinea the Western Australian Government couldn’t sell the corn produced in the Ord to southern markets due to freight costs so for three or four years the Western Australian Government subsidised half the cost of a ship to transport it to PNG for chook food. He imported the maize from Kununurra and ADMA to feed them: “We bought it for a song and the government shipped it!” (Conversation 1) He added that as soon as government stopped subsidising the shipments they stopped buying it.

In a 1991 report on the role of the Northern Territory Government in production of grain crops the government is visibly, but tactfully, trying to withdraw from its level of support. At that point despite government investment through three financial schemes such as the Fertilizer Freight Subsidy, along with standard government services, there was little to show. Two of the schemes cost one million dollars for the financial year of 1989/90, the third had advanced nearly two hundred thousand dollars to growers in 1991 while the marketing board cost nearly $1 million in 1989/90 just for administration. Yet in 1989/90 total grain production for the NT was valued at $1.5 million, not including the cost of RD&E or running relevant agencies, with an area of just 6,247 hectares. According to the Northern Territory Government’s own account “After ten years of assistance the industry has never exceeded 2% of the total value of NT primary production” (NTG 1991:ii).

When the Wagiman were making a Land Claim on the Upper Daly the Northern Territory Government submitted that “The loss of this land could significantly effect (sic) the possible Stage II agricultural development of the Daly Basin and A.D.M.A. intends to challenge the claim on this basis”. Justice Kearney’s response was damning in what it revealed about the implicit assumptions of the government. He explained that he did not consider that a grant of the land recommended would be deleterious to proposed land use:

Ironically over the last 10 years about 10,000 hectares of timber plantations (Khaya senegalensis) have been established in the Douglas-Daly River region (Raison et al 2012:13) while Indian sandalwood planting is also increasing.
I see no reason to believe that the lands recommended for grant would not be farmed, just as other lands with agricultural potential in the region in private hands would be farmed as the catalytic effect of the scheme started to operate. ...there is no reason why the traditional owners would not seek to participate in it [agricultural development], when it becomes practically and commercially feasible... (Kearney 1991:131)

With the forays into agricultural development in the 1970s in the Daly Basin, Northern Territory, came widespread soil erosion, exacerbated by monsoonal rains, the nature of the soils and inappropriate cultivation practices (Price and Garside 1984, van Cuyleenburg 1986, Howe 1995). Van Cuyleenburg notes that although dryland cropping in the Northern Territory “has been limited in extent and discontinuous in time, however extensive soil erosion has been a common feature of the industry” (1985:1). The further increase in cropping in the 1980s spurred the then Land Conservation Unit of the Conservation Commission to initiate a program to quantify erosion and assess factors influencing it in order to improve land conservation extension (van Cuyleenburg 1986). The study surveyed lands on 18 properties and determined about 18% of the cropped area suffered from erosion and correlated it with a range of by now familiar factors including: incorrect land selection and inappropriate site characteristics (soil type and surface slope); crop type and time of planting; inadequate soil conservation efforts; positioning of infrastructure such as roads (van Cuyleenburg 1985). Despite the appraisal of existing soil erosion the study nevertheless suggests that “Extensive additional areas of cropping potential exist (150,000 hectares in the Sturt Plateau south of Katherine).” (van Cuyleenburg 1985:1)

Farming has adapted since then, with the assistance of local research and practices land conservation techniques such as contour farming and reduced tillage. Due to high public attachment and recreational use of the Daly there have been significant community planning processes such as the Daly River Management Advisory Committee (DRMAC) (Lynch and Hill 2007). DRMAC played a significant role and was preparing to develop a conservation and development plan for the Daly catchment in 2012 when the new conservative government disbanded them.

In 2014 a new chapter opened for Tipperary cattle station, poppy growing or *Papaver somniferum* which produce Morphine, the majority of which is converted into Codeine for pain relief. Two small trials were undertaken at the Northern Territory Government’s Katherine Research Station and Douglas Daly Research Farm over one
growing season in 2012/13 producing good yields and quality. The company TPI, Australia’s third manufacturer of Concentrate of Poppy Straw (CPS), launched into 500 hectares in 2014 with the hope of eventually cropping 10,000 hectares (Brann ABC Rural 11 Oct 2013). In support of the supposedly burgeoning industry in May 2014 the government passed the Poppy Regulation Act which “provides for the regulation of opium poppy activities to cover the cultivation, processing, transportation and storage of poppy material and any related activities”. The application for non-pastoral use of pastoral land provides some details of the proposal which includes $3.5 million investment in irrigation infrastructure and $200,000 to build a secure electric fence. The proposed location is an already cleared paddock that the proponent explains has been used for cropping over the last 30 years, in the 2013/14 wet season being planted to Sorghum. The next iteration of a circular conundrum?

**Scheming in Western Australia**

One little-known proposal that occurred early in the life of the Ord River Irrigation Area was to build dams and develop land for irrigation on the Dunham River upstream from where it meets the Ord River. The Western Australian Government signed an agreement with the company Goddard of Australia Pty. Ltd. and with legislation to enact it, including approving “peppercorn rental” (Western Australian Government 1968). The company planned to produce export grain crops and develop the land for intensive cattle feeding (Stewart 1970). There was to be two stages; the first, to trial feasibility, a dam on a tributary to the Dunham with a pilot irrigation area of 10,000 acres and the second, if this was successful, to be a dam on the Dunham River itself with an additional 34,000 acres (Stewart 1970, DoW 2008), larger than the current ORIA area. Arthur Creek Dam is now a large private storage used by sandalwood growers the Tropical Forestry Services Corporation for irrigation (BOM 2012). The second stage did not proceed.

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99 (http://www.nt.gov.au/d/Primary_Industry/PoppyRegulationAct Accessed 27/07/20114)

100 Under section 86 of the Northern Territory Pastoral Land Act.
Another initiative was trialling of rain-fed cropping in the west Kimberley where Beverley Springs Station held a 2,000 hectare special cropping lease. Cropping of grain sorghum had been occurring occasionally since the 1970s. A request was made to the Western Australian Government to support private cropping research on 250 hectares and trials for grain sorghum, maize, mungbeans, soybeans and peanuts were designed (McGhie et al 1987). They resulted in no notable production.\(^{101}\)

Also in the West Kimberley, as discussed in Chapter 7, Kim Durack began rice experiments in the 1950s at Liveringa Station on the lower Fitzroy River (Forster et al 1960, Bauer 1985) and then working for Northern Developments Pty Ltd (Chapman and Basinski 1985). Camballin Irrigation District is on the Fitzroy River flood plain and depends upon diverted river flows and some storage behind the diversion structures on the Fitzroy River and Uralla Creek (ABS 1985). Through the 1960s varieties of fodder sorghum were successfully trialled at Camballin so this was followed by grain sorghum trials. The grain sorghum was plagued by grass-hoppers and birds - magpie geese, corellas, finches and even crows (Yuhun 1985).

The story of the area did not stop there, however. Another visionary, this time of a very different mould, arrived to plant his mark, and crops; unlike Kim Durack though, Jack Fletcher had no intention of building up slowly and learning from local trials and experience. Fletcher later wrote two books *Texas Jack's Australian outback dream: a pioneering investment journal* and *To dam or be damned: the mighty Fitzroy River*. One local who had worked with him described Jack as a "Bullshit artist and a visionary" (Conversation 29).

In 1969 the Australian Land and Cattle Company (ALCCO), with Jack Fletcher managing director, purchased Northern Developments Pty Ltd and the Camballin Irrigation Area, and a suite of other properties to develop irrigated cropping and feedlots for cattle production. ALCCO itself was a subsidiary of Crutcher Resources Corp of Texas which also established Agri-Consultants International (Agricon) for whom

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\(^{101}\) Beverley Springs Station later changed hands becoming a popular tourism site with camping and accommodation while remaining an operational cattle station. There are a plethora of references to it on Kimberley tourism websites and blogs though it was renamed Charnley River Station by new owners. The property has now been acquired by the Australian Wildlife Conservancy and while retaining the cattle and tourism enterprise will also manage areas for conservation; an example of the multiple-use land management that has emerged in northern Australia along with the growth of the tourism industry.
Fletcher was president, and CRC-Crose. Between them they bought seven Kimberley properties plus some small lots in Derby (Bauer 1982). Interestingly a skim of the Western Australian State Library records shows that Fletcher originally came to Australia under the auspices of Art Linkletter of Territory Rice Ltd fame102 who headed a group of investors seeking to develop a ranch program (State Library of Western Australia n.d.).

This sale required the first Act governing Camballin Northern Developments Pty Limited Agreement Act to be cancelled and another drawn up between the company and the Western Australian Government in 1969 including increasing the area available from 20,000 acres to 50,000 acres and allowing crops other than rice. It also allowed subdivision and sale of up to half of the developed land (Bauer 1982). An amendment was made soon after allowing for grain sorghum and larger parcels of land. There was no consultation with Traditional Owners of Liveringa (Conversation 27). Through the 1970s Fletcher appears to be seeking marketing and investment opportunities overseas with proposals and correspondence ranging from the Kuwait Real Estate Bank to the Secretary General of the Republic of Korea (State Library of WA 7733A).

Figure 33. Jack Fletcher, ALCCO, in front of 20 Steiger tractors at Camballin.

102 The large and unsuccessful attempt at commercial rice in the Northern Territory 1950-1960 - see Chapter 7.
In 1981 American insurance firm Aetna loans significant amounts to the enterprise. Not only did it have substantial corporate investment the Western Australian Government also invested considerably in constructing water control and in undertaking research (Yuhun 1985). The government’s ongoing, and apparently unquestioned support continued for many years, as evidenced by a 1981 amendment to an agreement between Northern Developments Pty Ltd and the Western Australian Government in which the government agreed to: refund the company for works undertaken and to require low water charges (WA Government 1981); the State to guarantee water supply; a quicker turnover of land parcels and therefore greater cash flow, and; provision to be made for drainage works to prevent salinisation (Bauer 1982).

Flooding destroyed millions of dollars of farm development including the levee and thousands of cattle. In 1982 Northern Development is put into receivership by Aetna. Legal battles ensue in America between Crutcher and Aetna. Crutcher has defaulted on the loan he personally guaranteed for Australian third-party entities and Aetna successfully sues him for over US$22million (Brown 1984). He is effectively bankrupt. As Crutcher owns ALCCO which in turn owns NDP which owns Camballin Farms, Fletcher is left to continue his Kimberley dreaming, and to continue to blame the government, even speaking in an ABC interview as recently as 2009 titled “Why the Kimberley cannot remain a park” (Brann ABC radio 2/11/2009).103

An entrenched Broome local talked of visiting a cattle station in the early 1980s and describes hearing the two-way radio traffic “and we heard people constantly demanding money from Camballin. It was obvious that they were going broke and not paying their bills” (Conversation 20). At the same time the State Government was building the silo out at the Broome wharf. “This is the folly – they don’t ask or listen to what’s going on.” The silo has never been used to store grain; it has been used as a cyclone shelter for caravans once, and a school group has abseiled down it. “And it ruined that bit of coast…things are never undone when they go wrong” (Conversation 20).

103 http://www.abc.net.au/site-archive/rural/content/2009/s2715428.htm Accessed 13/06/14

Chapter 10 Going grain
In 1985 Camballin and Liveringa were purchased by another company and the Government Agreement was changed once again. Nothing came of many years of investment and efforts with a range of grain crops (Bauer 1985, Yuhun 1985, Masters 1998, Conversation 29). The only legacy is the barrage, which has ceased to operate, though still diverts water into Snake Creek. The infrastructure surrounding the barrage has gone with the gates that used to collapse under flood conditions no longer functioning. Although a popular fishing spot the barrage is the only major artificial barrier to fish migrations on the main channel of the Fitzroy system and has a significant effect upon fish movement, including freshwater sawfish (Morgan 2005).

Many years later in 1998 caretaker for the Liveringa homestead Jim Anderson spoke at a Kimberley Society event, documented by Pam Masters. He described a visit with relatives to sites in the Camballin area where so much infrastructure for cropping and a feedlot for 9,000 cattle was disintegrating – buildings, abattoir, cattle yards, water tank, irrigation drains and levee banks – and away in Broome a $2 million storage shed near the jetty. They were struck by the waste and Jim is quoted as saying they were forcibly reminded of "how often reality makes mockery of human ... expectations and aspirations" (quoted in Masters 1998). A weathered and practical northerner described the "unbelievable waste" saying so much, too much, money was thrown at Camballin (Conversation 29). Overcapitalisation and wasteful expenditure in the large private cropping initiatives, when playing with investors’ money, is a consistent accusation.

A long-term agricultural researcher in Kununurra is optimistic that we have learnt lessons:

> Some things have changed – the idea of growing vast swathes of grain sorghum is ludicrous. It’s been tried at Tipperary and they lost. But there is a lot of interest in the pastoral industry for diversification and central pivots to grow fodder crops makes a lot of sense.” (Conversation 14)

Integrating fodder production into pastoral enterprises is occurring in the Kimberley. Liveringa Station continues to experiment with forage cropping and is selling hay across north western Australia. Liveringa’s cropping manager explains that "Our development from here on will be steady, consolidating each step as it goes, rather than going in, in a large way and exposing ourselves to a great deal of risk" (Brann ABC Rural Radio 16/12/2010). With diversification permits made available in 2010 others
followed suit. Gogo Station near Fitzroy Crossing planted 300 hectares of dryland sorghum and 70 hectares of irrigated sorghum in 2014 to be used as supplementary feed for their export stock (Hayes FarmWeekly 2014).
Emerging from the narratives of Part II is a sense of the entanglement of multiple, multifarious variables that impact on cropping in north-west Australia. From the recurring accounts of destructive flooding of the 1950s rice trials south of Darwin to insecticide resistance on Ord cotton crops in the 1970s; or inappropriate site selection for sugar plantations in the 1880s to a lack of financing for peanuts in the 2000s, the variables have impacted them all. Despite many of these variables being found across the Wet-Dry Tropics this should not disguise the heterogeneity of the region. Scale adds further complexity. Variables may operate at one of, or across many scales, from paddock to region to international. And they may change over time.

In the circular conundrum the ‘Impacting variables’ are the arrow between the cropping attempts and the failed attempts. Chapter 11 interprets the variables influencing failure, framing them within the five categories of capital and exploring how together, with the relationships between them, they cause highly vulnerable cropping. How we define what constitutes this relationship is one key to the conundrum. Often they are identified as problems, impediments, or obstacles. These terms suggest difficulties which can be overcome, or at least managed, with a linear and dogged approach, as with jumping a track of hurdles one by one. ‘Impacting variables’ cannot. A reason that cropping in north-west Australia has failed to develop along the expected trajectory is the fact that what many people see as obstacles are variables, more complex beasts. The relationships between the variables creates even more complexity, variability and unpredictability; making the conventional vision of large-scale cropping even more difficult, if not impossible, to achieve. Just when you think you are getting on top of your defined problem something changes or another part of the system impacts. The concept of variables shifts understanding so as to acknowledge a complex socio-ecological system.

While Chapter 11 investigates the variables that impacted upon cropping attempts, Chapter 12 explores the relationship between repeated failure and continuing high expectations, or the mystery of the continuing circular conundrum. This last Chapter reveals the influence of many parts of the cycle and how they create the gap between learning and not learning; between “rhetoric and reality” (Powell 1977:83) and “a reprehensible aversion to learning by experience” (Bauer 1985:27). Much hinders our
learning as regards north-west Australia. These gaps reflect our slow and intermittent journey in developing Australian landscape literacy, reliant upon acknowledging the north as a cultural landscape; and our even slower journey as a society to develop complex systems literacy, including a capacity to deal with variability.

The place itself does have power, and remains the fundamental agent in these narratives. Additionally it challenges how we build a literacy of place in post-colonial Australia, and perhaps how we can identify alternative futures. Part III draws upon the data and narratives of Part I and II, and additional literature related to these final parts of the conundrum.

Figure 34 The Circular Conundrum showing the ‘Impacting variables’ (Chapter 11) and the final mystery (Chapter 12).
Chapter 11: Variables, viability and vulnerability

Crap soil, rains 6 months and drought the other 6 months, removed from the consumer, producers borderline unless have identified a window of opportunity that no-one else in Australia can fill, input costs, labour, transport...

(Conversation 16)

Many in the north are aware of the multitude of variables and confront them daily. A local working for a peak producer body rattled off the now familiar list above. There is more than this list however. Some variables are so implicit in our culture they are rarely noticed, whereas the more visible may be used as scapegoats. Some span attempts and are characteristics of northern Australia. Yet others have been unknown or are only now emerging. And even more challenging than the long list of variables is the relationships between them. They form a complex system.

Collating and describing the variables in detail through the narratives and the other northern cropping literature allows a deeper exploration than previously undertaken. It enables an understanding of the patterns of the variables; to become more than a list or a description of the obvious. Additionally, through re-framing the variables within the five capitals (natural, social, human, financial, physical), it becomes clear that in the context of large-scale cropping, north-west Australia is lacking in each capital.

Enablers and deterents to cropping attempts

'Enablers' precede 'Impacting variables' in the conundrum. Where cropping attempts have occurred they have required enablers, most simply access to resources - land, water, and financing - and a reason to undertake the challenge. Enablers are necessary but not sufficient to guarantee success.

Just as these factors have enabled cropping attempts to occur there have been deterrents or barriers that stop cropping attempts from even beginning. It is far more difficult to identify what has prevented attempts from occurring than what hindered attempts once they were underway ('Impacting variables') as the former is rarely on public record. From first principles it is likely they are the same, though ironically some claim that failure itself became an inhibitor to the development of northern cropping (Bell 1961,
Bauer 1964). Perhaps this is rather an example of learning with companies and individuals making an informed decision not to proceed with cropping. A researcher previously with an international food producer commented that of course companies regularly canvassed potential production areas across the globe including northern Australia (Conversation 21).

Land tenure is raised regularly as an inhibitor to cropping initiatives. The 1979 Lapidge report concluded that the Territory’s Top End had large areas of suitable cropping land and suitable crops however the best was tied up in pastoral leases preventing access by farmers. This is contrary to some work which suggests the starting point for cropping is with pastoralism in an integrated agricultural enterprise.

This weighty assumption of land tenure as a major barrier persists, though occasionally contested; and remains a default setting in political and public discussion. One early analysis of land tenure’s impact upon agricultural development categorically stated that “the form of land tenure has had no affect whatever on the industry since 1900” (Barclay 1961:7). A 1983 report for the Bureau of Agricultural Economics also challenged the claim that land tenure restricts agricultural development, explaining that the Crown Lands Act does not constrain activities and even provides for the creation of agricultural leases over the land held for pastoral lease, such as the 1980 advertisement for Willeroo Station which highlights subdivision underway with the potential for further irrigation leases (Martin 1983). In instances where land tenure and/or legislation limiting landuse have been removed it has made little difference to success. For each of Tipperary, Territory Rice, Douglas-Daly farms, Camballin and Dunham, governments passed enabling legislation which included provision of government support such as infrastructure, research, or subsidies. In each case the trumpeted removal of government barriers to development and diversification were neutralised and the results were not significant. An argument still remains that enabling diversification on pastoral leases is distinct from making land available for farmers who are likely to bring different skills and goals to the task.

The relationship between land tenure and agricultural development can be more contradictory than above. For most of the Commonwealth’s rule of the Territory the pastoral industry, particularly the large corporates such as Vesteyes and Bovril, actively lobbied against proposed changes to the pastoral leasehold arrangements that would encourage smaller blocks and increase settlement (Ling 2010). A Northern Australia
Development Committee report in 1947 accused that “many lessees, especially large companies, had failed to respond to repeated attempts on the part of governments to stimulate development” (Quoted in Ling 2010:156).

Lack of available finance has barred cropping attempts from occurring, along with impeding them once begun; whether rebelling sugar investors in the 1880s or reluctant peanut investors in the 2000s.

Lack of capital combined with too rapid movement to commercial production (without adequate research) has resulted in many failures (Yeates 2001).

Yet difficulty in accessing financing may reflect an analytical approach by investors. An insurance company economist provided a rare restraining tone at a northern development conference in his paper on financing, explaining why risking capital in the north is difficult to justify for private investment compared to elsewhere. The area “suffers from a great number of disabilities” (Bell 1961:91) including a dependence upon overseas markets which are “largely beyond our control or even influence” (1961:87). He refers to the Forster report’s confirmation that agricultural potential in that part of northern Australia is severely limited, Forster himself acknowledging that although there were some opportunities capital would need to be made available in “large slabs” (1961:2). Some would query the low risk appetite of financiers, or the need for quick returns that sideline nation building or long-term projects, yet the stories of Part II are strewn with millions of lost dollars, both government and private, the benefits of which are no longer visible. In 2014 the talk is of foreign investment. Chinese delegations to the north are regular. Perhaps their investment requirements will be different enabling further large scale attempts.

Cost of land is another obstruction to start-ups. Successful melon growers explained that land in the Ord was too expensive for them as Managed Investment Schemes (MIS) leasing land for sandalwood was pushing up the cost. The Younghusbands had moved to Mataranka in the Northern Territory where they have 500 hectares of irrigated freehold land. They were emphatic, everything costs more in remote locations and that the Northern Territory is an expensive place to farm. Referencing a Federal politician who had been spruiking the farming potential of northern Australia - move north for sun and water – they responded that it was not that easy “We are operating in a farming vacuum” (ABARE Outlook Conference Darwin 2009). Despite the enterprise being
horticulture this second point highlights a major deterrent to broad-acre cropping, after 150 years attempted cropping in north-west Australia it is still effectively greenfield development. A scientist bluntly explained that cost was a major inhibitor to cropping attempts: “it still costs more to develop the north” (Conversation 13).

Public rhetoric by politicians on dismantling perceived barriers to northern development is ongoing. “Red tape” and “green tape” are the culprits for a lack of development. A 2013 press release on the Coalition’s Vision for Northern Australia described “cutting business costs by $1 billion a year through cutting red tape and green tape”\(^\text{104}\). In 2014 Prime Minister Tony Abbott restates the Coalition Government will “get rid of the red tape and the green tape which is still holding back development.”\(^\text{105}\) A professional working to develop agriculture in the Ord believed that today the inhibitors are outstanding native title, water allocation and better use of water (Conversation 22). In the Northern Territory a belief still exists that Indigenous land ownership is a barrier to development. Indigenous organisations and landowners deny this. There are examples of agriculture on Indigenous lands, both Indigenous owned and otherwise, particularly of pastoral enterprises. Centrefarm\(^\text{106}\) based out of Alice Springs in the Northern Territory is an Aboriginal-owned entity established by Traditional Landowners in the NT to drive the commercial development of their land.

Spatial variations in the occurrence of agriculture have spawned explanatory, sometimes competing, theories for hundreds of years. Yet economic behaviour, location of markets, the physical environment, institutional and social factors\(^\text{107}\) all contribute to agriculture patterns (Grigg 1984, Robinson 2003), more broadly and in northern Australia.

**Defining Failure**

The majority of the enterprises and crops in the narratives of Part II no longer exist, certainly not at a commercially productive level. Yet defining failure or success is a


\(^{106}\) (http://www.centrefarm.com/ Accessed 30/11/14)

\(^{107}\) This is linked to the discussion in Chapter 4 to define drivers of the circular conundrum and drawing from the literature on drivers of land-use change.
debateable point, a grey zone, a crop may succeed but the enterprise growing it fail; an enterprise may succeed but the industry or agricultural district of which it is a part fail. As the regional economist for the Ord region challenged me “How do you define success? What does it look like and over what time-frame?”

It depends upon the parameters and scale used, both temporal and spatial. A case in point is the Ord. Over what period should it be judged and what factors? If judged by economic factors what discount rate should be used for the investment and over what period? Should externalities such as environmental or social impact be costed or a monetary value placed on secondary benefits (that tussle in the funding decision for the Ord dam in Chapter 3)? Should indirect subsidies be costed or only direct ones such as the water? And there is also the opportunity cost. What could have been done with the Governments’ money elsewhere and what benefits could that have generated.

At what geographical scale should outcomes be judged? At a local farm scale there is now success in the Ord River Irrigation Area. A local explained “the next round of farmers made lots of money”. (Conversation 29) The farmers, a very small number, have successfully adapted their farming systems to the conditions (biophysical, economic, and social) and are making a good living. They have also independently developed the boutique crop Chia, vertically integrating the business so that they control the value chain and sell the high value boutique product (Conversations 10, 14, 22). Many are now leasing their land to sandalwood companies (over 50% of the irrigated area as of 2011).

At a community/regional level there is now a township that supports a range of industries, particularly tourism, along with government services. Kununurra exists because of the Ord River Irrigation Area. Argyle Dam has been a boon to tourism and also supports a small fishing industry of “silver cobbler”, which now sells well under this new brand name rather than as catfish. Kununurra provides the only major service hub for hundreds of kilometres and attracts ongoing funding for regional services such as health and education.

Assessing impact upon Aboriginal people locally and regionally the story is different (Young 1979, Barber and Rumley 2003, KLC 2004, Hill et al 2008). The development of the original Ord scheme had negative outcomes for the Miriuwung Gajerrong people,
ignoring them completely. With the arrival of Native Title and the negotiation of the Ord Final Agreement\(^{108}\) the situation changed, at least theoretically. And there are those who believe that cropping development in the Ord can bring positive change. The impact upon the environment has been substantial with close to 1,000 square kilometres of country flooded and the flow regime downstream significantly altered.

At the State level the government is incurring costs to support regional agricultural production at the least through relevant government agencies such as the Department of Agriculture and Frank Wise Research Institute and the Department of Water, and the ongoing costs of provisioning water. The Ord is not contributing significantly to Australia’s food production. It wouldn’t make a blip on our national figures let alone international ones. It is not a food bowl for anywhere yet if that is your criteria.

**Priming the pump**

Sitting on the deck of a friend’s house in Broome enjoying the last of the dry season and the red sand of the garden, I was talking about northern agriculture to a visitor from Melbourne. “It’s obvious” she pronounced “the government just has to plan better. Rather than letting people plant what they want the government has to be strategic and guide what crops are grown.” It was an interesting comment for a number of reasons. It epitomised the uninformed nature of debate over the century. It also, unwittingly, put a finger right into one of the tense muscular spots of the conundrum of northern agricultural development. Whose responsibility was it and what is, or should be, the role of governments? What about private enterprise and investment? Many different variations of this are played out over time across the north with governments in several instances actually determining what crops are to be grown, as illustrated in Part II of this thesis. Both the Government-planned attempts and the large private investments have failed.

Governments have entered and exited the northern stage from both stage left and right, sometimes at the urging of the public at large, sometimes pushed by one key politician, or by international economic fashion. They have been dressed in varied costumes, from the Australian flag to the friend of Indigenous northerners. They have played varied roles: investor, infrastructure builder, law and policy-maker, guardian of land access,

\(^{108}\) Outlined in Chapter 4.
dictator of industries and crops. Government investment in northern cropping has not been consistent at either the Commonwealth or State/Territory level (Day 2005). It has cycled with public interest, or the interest of those with political sway. Despite this a study of all governments’ investment into cropping in northern Australia over time would reveal a substantial (if not consistent) amount. Significant and ongoing input has occurred, often implicitly, through the funding of relevant government agencies, research farms and associated activities, infrastructure or through subsidies such as the diesel fuel rebate or tax concessions.

The amount and type of government investment that should be undertaken to kick-start northern development is a gnarly question never resolved. One of Australia’s most influential bureaucrats and economists post World War II, Nugget Coombs, involved in northern development through post War reconstruction for nearly two decades, puzzled over it. In other settled areas of Australia, development had taken place “naturally” with Government services following or running parallel to privately funded economic development. With this not occurring in northern Australia he pondered how much needed to be done, what it should be, and whether it is worthwhile undertaking; with pump-priming would economic development have “sufficient intrinsic vitality to become self-inducing”; as relevant to individual sectors of development such as cropping (Coombs 1961:6). These questions retain currency in the 21st century, despite being less forthrightly articulated.

This push and pull of responsibility and investment has existed right from the first European settlement attempts in northern Australia. In a ‘Frontier’ there was an assumed role for governments to invest in infrastructure, from roads and ports to research farms and scientists. Nation-building is for government. And from there the whole thing should just roll on, shouldn’t it? The first northern example was the Britain’s East India Company push for the Colonial Office to establish settlements in the 1800s for trade interests discussed in Chapter 5. When the North Australia Commission was mooted in 1925 the attorney of Lord Vestey’s (large landowner and cattle king) contradicted the need for any such “costly proposal” which would waste money, all government needed to do was to remove the difficulties which private enterprise faces (Quoted in Kelly 1966:155); a still remarkably familiar refrain. The irony of Vestey’s position is that large companies fought against the Commonwealth Government’s attempts to encourage closer settlement and subdivision of their

Chapter 11: Variables, viability and vulnerability
enormous lease-holdings while at the same time doing little in the way of improvements themselves. Others have railed against the power these companies wielded to protect their own interests at the expense of the national interest, and often the condition of the country itself (Payne and Fletcher 1937, Kelly 1966, Ling 2010). Criticism directed at the Commonwealth Government for lack of development in the Northern Territory during its reign is countered by Ling (2010). In the first 35 years the Commonwealth was confronted with two World Wars and the Great Depression, constraining the finances and policy attention that could be applied. It was after World War II that the Federal Government focused again on the north.

A Federation means that this push-pull of responsibility is also between governments, as illustrated in the contest for Commonwealth funding for the Ord River dam. Speaking while Western Australia was waiting on a Commonwealth decision, then Western Australian Government Minister, Charles W. Court, articulated that the challenge of northern Australia as beyond the capacity of individual governments. He conjured the difficulties of developing such a vast, sparsely populated and “underdeveloped” area (1965:71) also referring to the need for “pump priming” (1965:80). This call upon the Federal Government to step in is regular through time: "To realise the promise of the North, the Federal Government must come to the rescue." (Munro 1961:28) Christian likewise questions “…to what extent national aid is essential to assist private enterprise in providing the basis for sound development” (1961:15). For Christian overcoming the economic inertia and lack of development “is a problem of policy, not of production." (1961:18)

In 1982 Roger Steele, then Northern Territory Minister for Agriculture, presents a clear view of the role he believes governments should play, funding basic infrastructure, services, and Research, Development and Extension with the commercial sector picking up property and plant purchase at enterprise level and investments such as grain handling and storage depots at industry level. He then pirouettes, adding that this does not apply in the Territory, however, where the attitude of lending institutions influenced by “lack of knowledge, well publicised failures, limited available funds, perceived high degree of risk and numerous secure alternative lending proposals” has resulted in “the burden of financing agricultural development has been largely borne by the Government." (Steele 1982:2) He finishes by saying that of course the government will continue to support agriculture in the Territory. Ten years later in 1991 the Northern
Territory Government again tries to reduce its level of support for grain production through three financial schemes, for which by its own accounts there was little to show (NTG 1991:ii). The equivalent cycling of support has occurred in Western Australia. For example in 1985 the Department of Agriculture explained they were reducing government support such as crop price guarantees and running the rice mill as “the value of production was inadequate when related to the cost of support” (McGhie 1985). In the 1990s government funded CSIRO likewise reduced its agricultural research staff in Katherine as “there were more researchers than farmers at that stage” (Conversation 2).

Geographer Bill Pritchard explains that insufficient attention has been paid to the interaction of investments at a regional scale:

> All too often in northern remote Australia, the paucity of local private sector activity and the minimal capital base of regions encourage the view that large-scale external investment (usually associated with resource development) is a regional economic panacea. (2005:77)

An assumption played out in the story of the Ord River Dam; the original Commonwealth investments and the more recent cycle of investment post 2010 by the Western Australian and Commonwealth Governments in Ord Stage 2, about $322 and $195 million respectively.

The narratives of Part II demonstrate how even where both governments and the private sector have played a role it has been insufficient to ensure large-scale success.

**Variables impacting upon cropping**

Many have catalogued the general challenges of the north for farming: some as proselytisers espousing the moral benefits of facing the difficulties that shall surely be met with human will and work; some acknowledging the challenges as would engineers and logicians, confident that they could be conquered; and others as a warning to those who will not see what they themselves consider to be the facts. The lists are relatively consistent, both between authors and through time. Distinctions are found in emphasis between the types of variables such as biophysical or economic. At its most polarised this extends to some authors and researchers believing that crops can be grown, it is other variables that impede the establishment of successful cropping industries, and those that believe that the crops themselves fail, a distinction raised earlier.
Drawn from the narratives of Part II the table below summarises the variables impacting upon cropping attempts.

**Table 6. Chronology of cropping attempts and variables influencing failure**

<table>
<thead>
<tr>
<th>DATES/ LOCATION/ CROP</th>
<th>‘IMPACTING VARIABLES’</th>
</tr>
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<tbody>
<tr>
<td><strong>1880s NT Plantations near Darwin</strong></td>
<td>Inappropriate site selection - Poor soils</td>
</tr>
<tr>
<td>SUGAR (See Chapter 6) and other (See Chapter 5)</td>
<td>Lack of agronomic knowledge</td>
</tr>
<tr>
<td>Delissaville Sugar plantation</td>
<td>Lack of skilled labour</td>
</tr>
<tr>
<td>Owston’s plantation</td>
<td>Lack of institutional/government support systems</td>
</tr>
<tr>
<td>Otto Brandt’s plantation, Shoal Bay</td>
<td>White ants</td>
</tr>
<tr>
<td>Fisher and Lyons, Beatrice Hill</td>
<td>Government policy leading to speculators</td>
</tr>
<tr>
<td>Poett’s coffee plantation, Rum Jungle</td>
<td>Brandt inherited a fortune and left.</td>
</tr>
<tr>
<td>Cloppenburg and Erickson, near Darwin</td>
<td>Fisher and Lyons found it uneconomical so far from markets.</td>
</tr>
<tr>
<td>Daly River Plantation Company</td>
<td>Poett’s beds overcrowded, no land preparation</td>
</tr>
<tr>
<td><strong>1890s to 1980s SUGAR General (See Chapter 6)</strong></td>
<td>Price – fluctuating world price, competing with cheaper suppliers in developing countries</td>
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<tr>
<td>(References as above)</td>
<td>Demand</td>
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<tr>
<td></td>
<td>Labour supply</td>
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<td></td>
<td>Infrastructure cost and establishment</td>
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<td></td>
<td>State politics and competition</td>
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<td>Protected market</td>
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<tr>
<td><strong>1910s Batchelor government farms, NT Various crops including rice</strong> (Chapter 5 and 7)</td>
<td>Climate – wet season variability and water management</td>
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<td></td>
<td>Management – from afar, poor decisions including financial, inefficiencies</td>
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<tr>
<td></td>
<td>Knowledge – lack of agronomic knowledge for conditions (southern ‘expertise’ used)</td>
</tr>
<tr>
<td><strong>1922 – 23 Knowlesy, near Derby WA</strong></td>
<td>Choice of site – inappropriate soils</td>
</tr>
<tr>
<td>COTTON (See Chapter 8)</td>
<td>Lack of agronomic knowledge and lack of local knowledge</td>
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<td></td>
<td>Lack of rotational crops</td>
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<thead>
<tr>
<th>DATES/ LOCATION/ CROP</th>
<th>‘IMPACTING VARIABLES’</th>
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<tbody>
<tr>
<td><strong>1930s and 1940s Daly River NT</strong>&lt;br&gt;Cotton insect pests&lt;br&gt;(Price 1933, Payne and Fletcher 1937, Administrator 1941, Christian unpublished 1946, Christian and Stuart 1953, Commonwealth 1957a, Commonwealth 1957b, Commonwealth 1958, Bauer 1984, Bauer 1985)</td>
<td>Poor husbandry including continuous one-crop system&lt;br&gt;Inconsistent and poor yields and quality&lt;br&gt;Flooding&lt;br&gt;Variable rainfall&lt;br&gt;Isolation including distance from markets&lt;br&gt;Poor transportation&lt;br&gt;Poor soil&lt;br&gt;Soil exhaustion&lt;br&gt;Poor choice of locations&lt;br&gt;Low prices&lt;br&gt;Financial viability&lt;br&gt;Labour&lt;br&gt;Personal hardship</td>
</tr>
<tr>
<td><strong>1937 NT RICE (See Chapter 7)</strong>&lt;br&gt;<strong>Proposed but nothing occurred</strong>&lt;br&gt;Interstate politics – agreement not to compete with Murrumbidgee Irrigation Area</td>
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<tr>
<td>DATES/ LOCATION/ CROP</td>
<td>‘IMPACTING VARIABLES’</td>
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<td>-------------------------------------------------------------------------------------</td>
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<tr>
<td>Chapman and Basinski 1985, Bolton 2008</td>
<td>Lack of appropriate technology</td>
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<tr>
<td></td>
<td>Pests – geese, rats, buffalo, cockatoos</td>
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<td></td>
<td>Pest insects – grasshoppers, stemborer</td>
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<td></td>
<td>Disease – Fusillarium</td>
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<td></td>
<td>Scale – too big too quickly, overcapitalisation</td>
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<tr>
<td>1951-1969 Camballin, Liveringa Station, Fitzroy River, West Kimberley, WA RICE (See Chapter 7)</td>
<td>Floods damaging crops and irrigation works</td>
</tr>
<tr>
<td>(Bauer 1982, Yuhun 2001)</td>
<td>Droughts leaving insufficient water to irrigate</td>
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<td></td>
<td>Poor yields</td>
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<tr>
<td></td>
<td>Bird damage, weeds and mould</td>
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<tr>
<td>1960s Ord River Irrigation Area, East Kimberley WA RICE (See Chapter 7)</td>
<td>Climate including extreme temperatures</td>
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<tr>
<td>[Planned area 72,000 hectares rice and cotton - Actual area 12,000 hectares]</td>
<td>Varietal limitations</td>
</tr>
<tr>
<td>(Basinski 1973 Unpublished, Fisher et al 1977, Young 1979, Chapman et al 1985,</td>
<td>Soil limitations such as micro-nutrients</td>
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<tr>
<td>Conversations 6)</td>
<td>Lack of agronomic knowledge</td>
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<tr>
<td></td>
<td>Kimberley Rice Disorder</td>
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<tr>
<td></td>
<td>Weeds</td>
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<tr>
<td></td>
<td>Stemborer</td>
</tr>
<tr>
<td></td>
<td>Harvesting</td>
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<tr>
<td></td>
<td>High costs caused by isolation including transport</td>
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<tr>
<td></td>
<td>Market – lack of scale and uncertain production</td>
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<tr>
<td></td>
<td>Financing</td>
</tr>
<tr>
<td>1962 - 1974 Ord River Irrigation Area</td>
<td>Insect pests</td>
</tr>
<tr>
<td>WA COTTON (See Chapter 8)</td>
<td>Lack of agronomic management of insect pests across area</td>
</tr>
<tr>
<td>[Planned area 72,000 hectares rice and cotton - Actual area 12,000 hectares]</td>
<td>Increasing costs due to increasing pesticide applications</td>
</tr>
<tr>
<td>(Basinski 1973, Department of Natural Resources 1976, Fisher et al 1977, Young</td>
<td>High costs of inputs caused by isolation</td>
</tr>
<tr>
<td>CSIRO undated, Ghassemi and White 2007, Conversations 23, )</td>
<td>Declining yields</td>
</tr>
<tr>
<td></td>
<td>Poor quality</td>
</tr>
<tr>
<td></td>
<td>Access to machinery parts</td>
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<td></td>
<td>Marketing arrangements</td>
</tr>
<tr>
<td></td>
<td>Varietal limitations</td>
</tr>
<tr>
<td></td>
<td>Transport difficulties</td>
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<tr>
<td>1969 - Camballin, Liveringa Station (&amp; more) Fitzroy River, Kimberley, WA GRAINS (See Chapter 10)</td>
<td>Water management (flooding)</td>
</tr>
<tr>
<td>(Chapman and Basinski 1985, Yuhun)</td>
<td>Yield</td>
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<td></td>
<td>Management</td>
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<th><strong>‘IMPACTING VARIABLES’</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1985, Bauer</strong></td>
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<tr>
<td><strong>1967-1970 Tipperary Station, Daly River catchment, NT, principally grain SORGHUM</strong></td>
<td>Short window for planting Poor land preparation and planting technique Inexperienced field management and labour Insufficient autonomy given by management (which was in US then Darwin). Variability of land underestimated (Inadequate info about land variability caused by misunderstanding the scope of the land system surveys) Scale of operation too large to be operated as a single unit Limitations of climate not understood Poor judgement to invest in irrigation and feed lotting Economy of scale not achieved except in initial clearing Overcapitalisation Soil erosion</td>
</tr>
<tr>
<td>(See Chapter 10)</td>
<td>(Fisher et al 1977)</td>
</tr>
<tr>
<td><strong>1971-74 Willeroo, SW of Katherine, NT SORGHUM (and cattle production)</strong></td>
<td>Rainfall - dry periods where evaporation exceeds rainfall after sowing Soils - low fertility, deficient in nitrogen and phosphorous, poor water storage ability, poor structure, subject to erosion. Ignored available information (Government took legal action several times to prevent clearing of very erodible soils.) Lack of understanding of the limitations of soils and climate. Ignored basic agronomic principles (seedbed prep, planting and erosion control) to achieve economies of scale. Erosion caused yield losses of about 10 to 15%. Overcapitalized, with too much big equipment.</td>
</tr>
<tr>
<td>(See Chapter 10)</td>
<td>(Fitzpatrick, in Speck et al, 1965, Fisher et al 1977, Lapidge 1979b, Bauer 1984,)</td>
</tr>
<tr>
<td><strong>1980s ADMA scheme NT maize, sorghum, and various</strong></td>
<td>Soil erosion Weeds Harvesting difficulties such as paddock conditions and access to harvesters Fertiliser cost and efficiency Failure of herbicides – rapid breakdown Feral animal damage Bird damage</td>
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*Chapter 11: Variables, viability and vulnerability*
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<tr>
<th>DATES/ LOCATION/ CROP</th>
<th>‘IMPACTING VARIABLES’</th>
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<tbody>
<tr>
<td><strong>1990s Daly NT PEANUTS</strong>&lt;br&gt;(See Chapter 9)&lt;br&gt;(Plant 2000, Hristova 2000, Wylie 2002, Shotton 2011, Conversations)</td>
<td>Inferior seed quality+&lt;br&gt;Rainfall variability and unpredictability&lt;br&gt;Temperature - cool at emergence/early growth, warm late season&lt;br&gt;Diseases&lt;br&gt;Lack of suitable rotation crop&lt;br&gt;High input costs (higher than expected)&lt;br&gt;Gross margins lower than expected&lt;br&gt;Lack of relevant detailed agronomic information&lt;br&gt;Yield - originally low&lt;br&gt;Impossibility of double-cropping&lt;br&gt;Lack of profitable rotation crop&lt;br&gt;Social and family hardships</td>
</tr>
<tr>
<td><strong>2000-2010 Katherine NT PEANUTS</strong>&lt;br&gt;(See Chapter 9)&lt;br&gt;Peanut company of Australia&lt;br&gt;(Hristova 2000, Wylie 2002, Chauhan et al 2008, PCA 2011, PCA 2012, pers. comm. Bob Hansen, Conversations)</td>
<td>Lack of support from funders&lt;br&gt;Lack of interest of new management&lt;br&gt;Lack of profitable rotation crop&lt;br&gt;Small window for planting&lt;br&gt;High production costs (higher than anticipated)&lt;br&gt;Isolation including freight costs, importing parts from interstate&lt;br&gt;Water security – access to long-term water licenses</td>
</tr>
<tr>
<td><strong>2010-ongoing intermittent Mt Keppler, Margaret River, NT RICE</strong>&lt;br&gt;(See Chapter 7)</td>
<td>Water management and availability&lt;br&gt;Vertebrate pests – birds&lt;br&gt;Scale&lt;br&gt;Quality</td>
</tr>
</tbody>
</table>
Variables over time

The list above is long and repetitive. This is important. Similar variables have impacted upon cropping attempts across locations and through time, revealing how unsuccessfully their impact has been mitigated or managed. Whether this reveals a lack of learning is explored in Chapter 12.

Yet while many variables appear regularly over time, the impact of some has changed. The most obvious is water management. The shift to irrigated agriculture in the Daly region in the Northern Territory and the creation of the Ord Irrigation Area in Western Australia enabled the change to dry season cropping and reduced the impact of flooding and rainfall variability. In other areas water can still be an issue, as evidenced by the Peanut Company of Australia access to water licenses and Camballin and flooding.

A senior researcher and manager involved in the north for several decades felt not enough had changed. Despite technological developments such as genetically modified (GM) cotton, which may improve technical or financial feasibility, the tyranny of distance and economies of scale remain. He concluded that it is technically possible but not culturally or economically so (Conversation 2). Others disagree. Cotton researcher Yeates noting Bauer's disparaging comments about the failure of northern agriculture responds that significant improvements since 1985 "in knowledge and infrastructure" have reduced the "limitations of distance and ignorance of the physical environment" (Yeates 2001:15). Transport infrastructure has also improved. The Beef Roads program of the 1960s and 1970s saw tens of millions of dollars invested in the roads of northern Australia. The total expenditure across northern Queensland, Western Australia and the Northern Territory from 1961 to June 1967 was $49.4 million of Commonwealth and State/Territory funds. (DND 1968) One participant involved in the Ord from the early days explained how well farmers post the cotton failure had done

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109 A stark example of this is the Kimberley Development Commission website in 2014. On a page for agricultural production statistics, with no recent figures, the sixth line of the seven on this scant page read, "Note: production year was affected by pests/diseases during the season and rain during harvest", with an acknowledgement of the source as the Department of Agriculture and Food. Another is the announcement in October 2014 that all banana plants in the Northern Territory will be destroyed to control the fungus causing banana freckle.

110 A local pilot at the time explains that he was mystified at these great roads going nowhere. The local explanation was that the beef roads were actually being developed for military reasons as there was disquiet about the military activities of the Indonesians (L. Andrews pers. com 28/07/2014)
-- helped by “other people’s mistakes, bitumen roads, refrigerated trucks, infrastructure, access to markets...It was just an evolution of farming.” (Conversation 29)

Other variables remain present without figuring so highly. This does not diminish the importance of these variables to northern cropping, simply shows that their impact on individual attempts has been mitigated through improved knowledge and practice. Soil is mentioned less frequently as contributing to the failure of schemes, a result of better soil mapping and improved techniques for soil management (van Cuylenburg 1985). Availability of appropriate soil still limits cropping establishment at a larger scale in the Wet-Dry Tropics, although even the extent of suitable soils is still debated.

Despite the changes in technology, infrastructure and knowledge noted above they have not substantially changed the overall outcome of cropping in the Wet-Dry Tropics; there is still very little of it.

**Understanding the variables**

Just as there has been no extensive compilation of the variables over time there is also not a sufficient categorisation or analysis of the variables as a whole. Approaches useful for understanding particular schemes are limited in picking up the non-agricultural and broader variables that influence cropping, including national and global. A more encompassing approach is required that draws upon the wider discourse of northern cropping. In analysing the long list of variables a logical categorisation emerges, detailed below.

**Table 7. Impacting variables aggregated and categorised into different domains**

<table>
<thead>
<tr>
<th>Biophysical</th>
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<tbody>
<tr>
<td>- Climate – variability, unpredictability and extremes of temperatures, rainfall, evaporation rates, sunlight</td>
</tr>
<tr>
<td>- Topography – available dam sites</td>
</tr>
<tr>
<td>- Hydrology – water availability both surface and underground</td>
</tr>
<tr>
<td>- Soils – suitability/capability for cropping (nutrients, structure, erodibility, water holding capacity, size of soil area), patchiness/variability</td>
</tr>
<tr>
<td>- Location/Distance</td>
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<tr>
<td>- Pests and Disease</td>
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<table>
<thead>
<tr>
<th>Infrastructure</th>
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<tbody>
<tr>
<td>- Transport infrastructure (lack of and/or expense of roads, ports, air, rail)</td>
</tr>
<tr>
<td>- Processing facilities and storage facilities (e.g. lack of and/or expense of sugar mill or cotton gin, grain silos off-farm at transport points)</td>
</tr>
<tr>
<td>- Housing, Health and Education (lack of facilities)</td>
</tr>
</tbody>
</table>
### Economic, finance and marketing

- Poor access to markets and marketing
- Competition or monopolies from interstate (e.g. Qld sugar, NSW cotton) and speculators
- Low and/or volatile price received for products
- Lack of access to or insufficient finance – at farmer and regional enterprise level
- High labour and transport costs – (e.g. competition from the mining and energy sector pushing up labour prices, distance and lack of regional infrastructure)
- High input costs (Distance and biophysical conditions - soil, pests and lack of economies of scale)

### Institutional including government policy and politics

- Restrictive government legislation (e.g. water allocation and licensing), tenure and land use legislation or policy (e.g. diversification controls on pastoral leases)
- Lack of or inappropriate government agency support including level of research and extension offered
- Disjointed government approach with siloed agencies
- Lack of northern-wide coordination or governance

### Social and cultural including demographic

- Lack of sufficient available and/or appropriately skilled labour
- Isolation
- Remote management - when decision-makers of enterprises are based elsewhere
- Lack of access to services - health, education, and family support

### Personal/ psychological (many not mentioned in individual examples)

- Willingness/unwillingness to learn (including arrogance)
- Intelligence
- Mental models and learning styles
- Persistence, resilience and adaptability
- High risk threshold of “Big men” drawn by a Frontier for example trying to do too much too quickly

### Information, knowledge, communication, skills and technology

- Lack of relevant information and access to information:
  - by topic, such as agronomic or hydrological
  - at the right scale, such as paddock or enterprise
  - in the right context, such as commercial farm or particular environment
- Lack of acknowledgement of relevant information, such as a disregard for local or Indigenous knowledge
- Lack of information and knowledge exchange processes, between locations and through time
- Lack of application of relevant information and knowledge
- Misleading communication of information and politicisation

It is tempting to believe that the long list in Table 7 is definitive and now it comes down to ‘managing’ these variables. Understanding is never complete, however, particularly in a changing and variable environment (biophysical, social and economic). As many
of these variables have been repetitively detailed in the narratives of Part II they do not require further explanation. Those such as distance to markets, lack of infrastructure, and climate variability are catalogued thoroughly in the literature and further discussion would provide little benefit. Others are elusive, unacknowledged or part of a larger pattern, and worthy of further attention.

**Scapegoats and Russian dolls**

Attributing failure of cropping events to particular variables is not a straightforward task, although attempted by some authors. Variables that impact negatively are not necessarily enough in and of themselves to cause failure. Or in cases where attempts failed due to a single variable others were likely to have impacted later. Additionally a publically acknowledged variable may actually result from an entirely different one. One such case is the Delissaville plantation. Why was poor soil a problem? It was a result of inappropriate choice of site suggesting inadequate knowledge. In this instance poor knowledge was the primary problem. Acknowledged causes for failure may be a secondary expression or result of other (primary) variables; the Russian doll phenomenon, open up one variable and find another inside and another...

Holmes claims that the heaviest blame for failure has been laid on pests and diseases. As the most visible cause in some well-known cases he explains that “they certainly cannot be held responsible for outright failure, as has been clearly shown for the much maligned magpie goose” (Holmes 1987:54). The magpie geese of the Humpty Doo scheme are the most obvious example of a scapegoat variable, and although now entrenched in local folk-lore they were not the cause of failure, perhaps rather a face-saving or visible factor to blame. Land tenure and pastoral leasehold restrictions, along with restricted access to finance have also been scapegoats as discussed earlier in this chapter. Scapegoating of variables can draw a veil over the other, multiple, problems which contribute to failure, a concern in that it “allows people to draw hope from failure” (Graeme Sawyer pers. comm. 2013).

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111 A claim made by critics at the time as discussed in Chapter 6.
112 Former Lord Mayor of Darwin and co-founder of Frog Watch NT.
Unknown, unexpected and emerging variables

...in new areas unsuspected factors may emerge as the limiting factors and these may only be appreciated following subsequent experimentation or land use experience. (Christian 1959b:597)

Variables may take time to emerge to the extent where they effect cropping (emerging or ‘sleeper’ variables), and/or take time to be identified (unknown variables). Others may be new and unexpected. Or perhaps mitigating a variable may bring other unknown or new variables to the fore, a domino effect.

Experience in southern Australia has shown that some ‘sleeper’ variables take decades to make their presence felt. Salinity is one such example. As recently as 2008, research identified rising water tables in the Ord region, caused by inadequate deep drainage management and resulting in secondary salinity in some areas (Petheram et al 2008:80). Potential salinity from irrigation in the Ord is rarely mentioned yet a small portion of the intended Stage 2 land release was removed due to a belatedly identified risk. In fact funding for the assessment of soil salinity in the Ord River Irrigation Area did not come from the Western Australia Department of Agriculture, who had not undertaken any such analysis themselves, but from the Federal Government through the initiative of the local natural resource management group (author, Smith and Price 2009). This assessment was done in the early 2000s, about forty years into the life of the irrigation scheme. As the risk of salinity had not been formally recognised early on, there was little historical information about incidences of primary salinity, and less about how it had changed in response to pastoralism and agriculture. Additionally routine measurement of soil salinity was not being made and therefore not regularly reviewed to determine trends. Incidences were mainly reported informally (Smith and Price 2009). This lack of baseline data, monitoring and systems to respond, are indicative of a ‘sleeper variable’.

Salinity issues may continue. As previously mentioned work done in the proposed expansion area in the Northern Territory showed saline soil water and salt stores in the unsaturated zone that may be problematic under irrigation; though later modelling determined with adequate water level monitoring remedial action could be taken if necessary (Tickell et al 2006).

Domino variables are also ever ready to surprise. In 2014 sole Territory rice farmer Bruce White changed planting time to avoid magpie geese in his 60 hectare crop, only
to discover that the windier period created wave action that pulled the rice seedlings up. "So we haven't had any bird problems but we've had wind problems, so there's always a challenge."113 (McCarthy ABC Rural Radio 19 August 2014)

A number of variables began as unknown; impacting but unidentified. High soil temperatures are one such example. High seed bed temperatures at crop establishment produce severe reduction in seedling emergence (Day 1985). A problem for maize, a review of maize research in the NT from 1954 to 1986 noted that this was not acknowledged for the initial years of research and at the time of writing had not been resolved (Roberts n.d. c1986). Another example was the “rice disorder” discussed in Chapter 7. Present since the beginning of the rice trials though becoming more severe by the mid-1960s, new introductions of rice cultivars made little headway due to the disorder. Finally in 1972 the disorder was shown to be caused by the low availability of micro-nutrients zinc and iron due to the nature of the local soils. A lack of adequate knowledge exchange between researchers meant that this variable, while already affecting crops, remained an unknown (Basinski et al 1985). As befitting this type of variable, there are sure to be others yet to be identified.

Unacknowledged or implicit variables
Some variables are not raised in documentation of specific attempts (as tabled above) but appear in more general discussion of northern cropping. Less tangible, perhaps taken-for-granted, perhaps even less acceptable, these implicit variables are less likely to be documented. They include cultural characteristics at a societal level, and attitudes at an individual level.

Arrogance to apathy
One such variable appeared particularly in conversations with northerners and in documentation about the larger schemes - the attitudes of people coming to northern Australia from ‘The south’ and of big companies. A surprising number of northerners, and a couple outside, expressed chagrin at newcomers who don’t listen and learn about local conditions, discussing the refusal of newcomers to learn from locals, whether local researchers, government officers or farmers (Conversation 1, 3, 7, 8, 10, 29, 30).

“People come from down south and treat us with disdain” (Conversation 29). This was described by several locals as “arrogance” or “ego” (Conversations 7, 8, 16). In some cases this unwillingness to listen stemmed from seeing northerners as “small time” or “not successful” (Conversations 1, 7, 8, 16, 29).

Territorians illustrated this with the example of soil erosion from forestry plantations on the Douglas Daly as recently as 2009. It created loud concern in the local community, including the powerful lobby group for recreational fishers. A later report assessing plantation forestry code of practice noted some environmental damage through soil erosion however plantation management had since been modified to address this (Raison 2012). An Ord horticulturist and farmer recounted how her hard-won experience was ignored by growers arriving from Queensland, who did not adapt their technique to local conditions, and suffered the consequences (Conversation 7). Earlier examples of a refusal to learn occur in the narratives of Part II, the most obvious being on Willeroo where despite the recent failure at Tipperary the company went on to make similar mistakes (Fisher et al 1977).

Even more intangible is the cultural lens that can create this attitude, an inability for people to shift their preconceptions and assumptions of cropping as it occurs in southern Australia to the northern context.

What’s inhibiting it is as much conceptual – what agriculture in northern Australia looks like...One of the biggest difficulties is that people keep thinking temperate – all the time (Conversation 13).

Sometimes this was expressed in a blinkered unwillingness to learn. On the CSIRO land survey Christian met Leo Burns on Tipperary Station:

Leo more or less placed himself when he said ‘We are too busy working on cattle to worry about grasses’...This lack of knowledge of local pasture, trees and country appears to be general (Christian unpub 1946:16).

One Territory researcher described the difficulty of working with apathy “The NT - not today not tomorrow, not Tuesday not Thursday” (Conversation 3). Although meant in a humorous way he added: “you can be broken down in the middle of a paddock and you

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114 This is discussed further in the chapter 12 in the context of inhibiting learning.
115 http://www.abc.net.au/site-archive/rural/nt/content/200904/s2537587.htm Accessed 4/03/2014
need a part and it doesn’t matter how much you scream down the phone it isn’t going to turn up."

**Big men and mates, speculators and shysters**

*The true motivation of privately financed projects also bears examination. Speculation on land subdivision, share dealing, or foreign tax concessions could lead to a different approach to crop development from that of a scheme based on profits from crop production alone.* (Christian 1977:15)

Frontiers attract certain types of personalities, and the characteristics of the Frontier allow these personalities to flourish, at least for a while. In fact they can encourage a caricature, the cult of the big man, the ‘can-do’ man. “It is a big man's country, needing capital, resourcefulness, the courage to make decisions that will break a man or make his fortune.” (Farwell 1951:153) A Frontier attracts and feeds big personalities – Jack Fletcher, Bill Gunn, Art Linkletter - boosters and alpha men. With the ‘can-do’ attitude comes a high risk threshold, though often risking other people’s money, as the American court cases touched upon in earlier chapters attest. This also brings a size syndrome, ‘bigger is better’, and an impatience, trying to do too much too quickly. These variables are identified in the failure of some larger cropping cases. Yet nevertheless in the Top End we seem to welcome these larger than life figures who bring no doubt, no complexity, and no compromise. And ‘Big men’ have mates. It is a fact of Australia’s political and business life, intensified in the small pond of the Territory. The network of connections and the doors this opens, as seen occasionally in the previous narratives, may reduce critical analysis and questioning of the viability, value or ethics of schemes.

A close brother to the ‘big man’ personality is the role of speculators and shysters, behaviours shared across frontiers of the New World. Land speculation arrived in the north with the first colonisers and cursed agricultural development in the north for the next 100 years. South Australian Government aspirations suffered first:

> The prospect of a profitable investment rather than a commitment to settling and civilizing the North prompted the dealing in land orders in the 1860s, when these pieces of paper were the favourite "gamble" of the Adelaide people (Asche 2007:3).

Others blame the failure of later schemes on intention to speculate rather than crop:
...their business models were based on profits through tax concessions, share dealing and the realisation of increasing land values, rather than through sale of agricultural products (Cook 2009:18).

In the 2010s concerns are occasionally raised about the plantation forestry industry, now the major user of cropping land in the Ord and growing in the Daly. One Ord local questioned Managed Investment Schemes (MIS) and the business model of plantations based upon tax minimisation benefiting from public investment (Conversation 14), something the forestry companies would challenge.

Speculation influenced agriculture in general not just cropping. Describing pastoralism in the first half of the 20th century Ling baldly states “it is clear that most land was held on speculation for future profit, or simply taken to prevent competitors from acquiring it” (2010:17), a constant tension between large pastoral landholders and governments who sought closer settlement. Others have railed against large absentee landholders and speculators (Kelly 1966). Foreign ownership was entangled in this contest between corporate profit and national goals, a constant in the Northern Territory since the domination of the British Vesteys. Some still consider it more of a constraint than government land tenure restrictions (Pearson and Lennon 2010) however there is a growing voice in public discourse claiming that Australian agriculture will only receive the enormous additional investment it requires from foreign investment and without this productivity growth throughout the value-chain will stall.

**Northern variables**

Several variables relate to characteristics of the north as a whole. These relate to information, governance, scale and variability.

**Scratching for information**

Those dealing with uncertainty or other types of ignorance "distinguish between error and incompleteness" (Smithson 1989:19). Cropping in northern Australia began with the latter, the former became more apparent through time. There is no area in the world equivalent to Australia’s Wet-Dry Tropics where western agriculture is practised. Conventional western farmers in northern Australia were, and often still are, starting from scratch. Research is only one source of knowledge; local experience and Indigenous knowledge (including traditional knowledge) are also now recognised in the literature as equal and different knowledge domains.
Geographer Griffith Taylor was renowned for cataloguing the Australian nation’s ignorance of its continent, and its north in particular:

The writer well remembers the surprise expressed by the head of a Commonwealth Department when he found that the region just south of Darwin was clothed in a straggly eucalyptus 'scrub', which in no way resembled a tropical jungle. (Taylor 1955:6)

Although a lack of information is the most obvious information related variable, others are numerous and substantive including: the lack of means for accessing or sharing information between people, between regions and through time; patterns of miscommunication and politicisation of information; and a disregard for relevant knowledge and lack of application of that knowledge. Just as they contribute to the failure of cropping schemes, these factors also hinder learning thereby helping to perpetuate the circular conundrum. They are therefore explored in Chapter 12.

It would be tempting to believe that we have worked through our limitation in knowledge and are now sufficiently placed to make informed decisions about cropping in north-west Australia. This is not generally the case. Even in 2000 an economic analysis identified that both research and on-farm data in the Northern Territory was limited on everything from soils to water availability to crop yields. It concluded that there is:

...insufficient knowledge to fully assess the viability of irrigated field cropping in the NT...This study shows that potential irrigators of field crops in this area need to proceed with caution (Hristova 2000:3).

More has been done since that time yet we are still learning how much we don’t know. The narratives of Part II show the contextual specificity yet breadth of information required for establishing cropping in what are still undeveloped areas. The ongoing time, effort and learning that is required over a long period, is also apparent. More research is not in and of itself a panacea, nor synonymous to learning. What type of research is useful and how much is enough? For example researchers themselves Chapman et al (1985) questioned research at Camballin and why work that relied upon water management was undertaken when the river was unregulated.

Critiquing northern development Jull (1991) emphasises how research can serve the colonising agenda, providing knowledge to support their goals while further disempowering the colonised and further marginalising their knowledge. There have been exceptions. Through the late 20th century and early 2000s governments funded
research that was less obviously serving a conventional development agenda such as environmental and cultural research. Initiatives included the Tropical Savannas CRC and Tropical Rivers and Coastal Knowledge research initiative.

"Thin" northern governance

Governance of northern Australia and its multiple jurisdictions has been much mused upon over the last 150 years and would make a fascinating thesis in itself. It remains an unresolved, contested, and many would say unsuccessful, situation. Such challenges were not peculiar to frontier Australia alone as explored in the discussion of the ‘New World’ in Part I. Environmental historian Graeme Wynn pithily describes of Canada’s parallel colonisation “Claiming territory was one thing, administering it entirely another” with authorities finding it difficult to effectively use such vast areas (2007:105). This awkwardness is ongoing, carried through to current public discourse about northern development.

In two of Northern Australia’s three jurisdictions, Queensland and Western Australia, the decision-making centres (capital cities) are thousands of kilometres to the south; a situation falling clearly into geography’s model of the core – periphery (Muchow 1985). Rule from the south has been a much bemoaned constant by northerners. Self-government in the Northern Territory in 1974 is perhaps still overwhelmed by reliance upon the funds and programs of the Australian Government, and the occasional over-ruling of legislation.

Surprising proposals have broken out occasionally, whether like pox or good ideas it is hard to be sure. Over the last 150 years many have suggested that the north be reconfigured to be its own State, or that other, more modest cooperative arrangements be made.\(^{116}\) Proposals to establish a northern or north-western jurisdiction occur intermittently, progressing to varying degrees but never succeeding.\(^ {117}\) In 1966 Kelly disparagingly notes:

\(^{116}\) In chapter 5 the numerous attempts are listed.

\(^{117}\) One proposal for a new province from Alfred Cotton in 1933 described as “excellent and practical” initially gained support from the Commonwealth Government. His alternative suggestion was to develop northern Australia by chartered or development companies; an idea unanimously supported by delegates to the Federated Chambers of Commerce of Queensland, and the then Premier of Queensland (The Courier, Brisbane, 16 May 1933). Less extreme options included co-operative arrangements across the north such as the 1926 North Australia Act.

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there was nothing really new in the concept of an authority for northern development, in which the Commonwealth, Queensland and Western Australia could be joined (1966:153).

Yet politicians are still proud to announce ‘new’ measures for northern governance from within their historical vacuum, for example the 2010 arrangements by the then Labor Commonwealth Government followed only a few years later by those of the new conservative Commonwealth Government.

Inadequate governance affects a range of scales, from a lack of coordination across the north to a lack of capacity in individual agencies of the jurisdictions. A retired long-term employee of a relevant Northern Territory department complained that over one 12 year period they had 14 heads of department (Conversation 32), resulting in chopping and changing of priorities and activities. The comment bears a striking similarity to the Northern Territory of the 1880s with a successive 29 Ministers in charge (Hillock 2000). Hillock lays much blame for failure on this revolving door, along with disinterest and ineptitude. Churn of leadership, inadequate leadership, and a lack of a long-term coordinated approach is a constraint for northern development per se, not just agriculture, and this situation continues. Added to this is a lack of evidence-based policy and decision-making; inconvenient truths are not known to impede the rhetoric of northern politics.

The apparent legislative constraints of land tenure and labour regulations are regularly identified and less regularly contested, as previously discussed. Other government policy has in the past created unintentional and perverse outcomes, however. One such was the Navigation Act in the 1930s which Grenfell Price considered particularly crippling to northern transport. The cost of shipping cattle became “almost prohibitive”. Price concluded that Government management “had a disastrous history in North Australia” (Quoted in The Advertiser 13 January 1934).

A recent account of northern governance details the complexity and layers of relevant legislation across the north and the challenges this creates (Dale 2013). Describing the north as having “thinner human and institutional capacity” than the south, Alan Dale politely frames a lack of capacity, a situation exacerbated by the “fragmented” nature of governance across the north and the difficulties inherent with most seats of government being distant (2013:2).
Another pattern apparent in the Ord River Irrigation Area is the growing complexity of governance arrangements at this smaller regional scale with the proliferation of associated Government agencies, QANGOs and NGOs\textsuperscript{118}. All have a role but perhaps it is also an example of fragmentation and creates the potential for a siloed approach.

When northern residents, Indigenous and non-Indigenous, do not have access to adequate information for “making informed political choices and to engaging in political activity” then the fundamental conditions required for good democratic government is lacking (Jull 1991:49).

\textit{Seduced by size}

There are contradictory views about the effect of scale of production; either trying to get too big too quickly, an accusation against Territory Rice Ltd (Chapter 7), or being too small for viability, a problem for sugar on the Ord (Chapter 6).

For some crops sufficient scale is required in order to service the necessary infrastructure such as milling or ginning, benefit from cost savings of bulk handling inputs and outputs, and to access markets. Sufficient scale can also create enough demand to establish service industries for agriculture such as spare parts or technical support. There is a threshold. Some believe lack of scale is a constraint to agricultural development, claiming an agricultural enterprise needs to increase quickly in order to achieve economies of scale and achieve commercial viability, and to minimise the amount of government support required (Lapidge 1979, Martin 1983). One such, the Lapidge report, helped guide the Territory’s ADMA scheme.

Scale came up consistently regarding the Ord. “We can’t supply the volume international markets require” stated a senior government development officer explaining that for non-boutique crops such as rice, cotton and sugar, size matters “you need critical mass to make these industries work” (Conversation 22). This was clearly the situation for the Ord sugar mill and its Korean owners (Conversation 7). Lack of scale can also result in a lack of associated industries right along the value chain.

\textsuperscript{118} These include the Ord East Kimberley Expansion Project, Kimberley Development Commission; several State Government departments including the Departments of Food and Agriculture, Regional Development, and Water; several Indigenous organisations established with Native Title and the Ord Final Agreement; and grower organisations such as the Ord River District Co-op, and Ord Land and Water.
including processing and marketing. This situation has not changed dramatically in the Ord where still “irrigators struggle with issues associated with economies of scale” (Petheram et al 2008:81).

Yet some involved in northern cropping believe the assumption that “bigger is better” is erroneous (Conversations 3, 8, 13), with big schemes failing partly because they got too big too quickly. The Forster Committee emphasises “slow and steady” development in the early post-pilot farm years (1960). Some critiques claim being seduced by size created more problems than solutions. NADC at Willeroo is one such example. Fisher et al (1977) explain that the savings of large-scale operations was “grossly overestimated” and although clearing was done cheaply other simple agronomic principles were ignored to achieve economies of scale such as seedbed preparation and erosion control. Additionally NADC overestimated their capacity to follow through and planning was poor. Of 48,600 hectares cleared only 16,000 hectares were cultivated with suckers coming back through the remaining (1977:69). Large-scale cropping also creates the problem of over-capitalisation:

...your planting window is very small, and therefore large areas are going to be very very difficult because you have to have so much machinery, so you overcapitalise to plant in a very small window, and then it sits there for the rest of the year (Conversation 3).

Ord farmers have adapted to this problem in a number of ways. One is by growing high-value crops, preferably that have a long shelf-life, are easy to transport, not reliant upon expensive local infrastructure and not requiring large quantities for markets. Chia is an excellent example of local innovation and vertical integration with growers in charge of the value chain. Secondly by growing non-boutique crops only when the price was good enough to manage this such as shipping cotton south for ginning as they did in 2011 (Conversation 19). This requires being price-responsive and not locked in to a certain crop. Other significant responses to price signals include leasing land to sandalwood companies which provides a higher and more certain return.

With cropping there has been a lot of pendulum swinging, and that is because the Ord is quite small so the growers are price takers and they respond to markets and prices. (Conversation 22)

Some small enterprises succeed because of their size. They take advantage of a niche market or a window of opportunity in a market, such as being the first available each year, and relying upon the higher price received as a result. Ironically these very success
stories can be threatened by growth in their own industries. Additional supply or competition can strip the price advantage and undermine viability. Poor quality can also threaten hard-won markets, even by local competitors.

One professional expostulates that in the north “You are not allowed to think small” and regarding the large government investment in Ord Stage II:

I find it incredible that we continue to stick all of our eggs into one expensive bloody big basket....There are better ways you could spend the money and do the job. (Conversation 13)

Scaling up is difficult for many reasons: finding large enough areas of suitable soil (Wilson et al 2009), the tyranny of distance, and achieving experimental yields at the broad-acre scale (Davidson 1962, 1965); this last point underpinned Davidson’s scepticism of the potential for broad-scale cropping. In some cases although crop husbandry had been well researched and demonstrated there was little information available on large-scale commercial production (Fisher et al 1977:69).

Scale also influences the other ‘Impacting variables’ which operate at many and different scales, as illustrated in the table below.
Table 8. Examples of variables at different scales

<table>
<thead>
<tr>
<th>Level</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddock</td>
<td>Soil characteristics</td>
</tr>
<tr>
<td>Enterprise</td>
<td>Water management</td>
</tr>
<tr>
<td>Region</td>
<td>Transport infrastructure</td>
</tr>
<tr>
<td>State/Territory</td>
<td>Land tenure and restrictions upon land use</td>
</tr>
<tr>
<td>National</td>
<td>Government trade and marketing policy</td>
</tr>
<tr>
<td>International</td>
<td>Commodity prices and international trade agreements</td>
</tr>
</tbody>
</table>

All of these variables may come together to impact upon a single attempt revealing the complexity faced by farming in general, and the north in particular.

**Variability**

Apparent through the entirety of this thesis and its narratives is this God of the North, whether climate, soil, markets or knowledge.

Most obvious is climatic variability, both between and within seasons. Christian (1959b) stated that this required experiments over a sufficient number of years before conclusions could be made. Forster recognised not just the difficulties of the extreme climate but the additional challenges of the variability, particularly at the “beginning and end of the season” (1961:2). Forty years later cotton researcher Yeates concluded that the extent of climate variability requires a modelling approach as three year studies for example may not catch the full seasonal range (2001). One agricultural researcher described the importance of the combination of many little effects:

People see the dry season as one nice bit of homogenous dry weather but it’s not; it’s got very subtle changes that drastically affect how crops perform (Conversation 3).

In addition to temporal variability there is spatial variability. Soil is the most obvious example with such variability that it “has implications not only for whole regions but even for individual farms” (Martin 1983:10). Recent research in the Queensland Gulf country, outside of the north-west of the narratives, highlights this point. Despite the proximity of two close catchments they are substantially different physically, and as a
result their suitability for agricultural development is likewise significantly different (CSIRO 2013a:1).

**Future variables**

Positive future variables for northern agriculture are frequently highlighted in the public arena, such as the growing middle class Asian market. Potentially negative trends and future variables are less frequently raised. The cost price squeeze is one such example; despite being standard fare for Australian agriculture which has responded over time by increasing efficiency and outputs while maintaining or reducing inputs such as labour.

For northern cropping the particularly high cost of inputs and additional burden of transport costs to outputs will continue, if not increase. Characteristics of the Wet-Dry Tropics mean that cropping requires high farm inputs. Most obvious is fertilisers, particularly nitrogen and phosphorous. Availability of affordable fertilisers will remain a key concern. Manufacture of nitrogenous fertiliser is extremely energy intensive and hence its cost is closely tied to energy and oil prices and availability (Prime Minister’s Science, Engineering and Innovation Council [PMSEIC] 2010). A rise in price or change in availability will more substantially affect those more reliant upon these fertilisers, and could tip such a farming system from viability. An additional concern is that only a few companies control production of nitrogenous fertilisers in Australia.

The major source of phosphorous, phosphate rock is a limited, non-renewable resource which is becoming increasingly scarce. One estimate is that the world will reach peak phosphorous before 2035 after which demand will exceed supply (Cordell 2010). Previously Australia has relied on Nauru and Christmas Island, both mined for phosphorous, and now upon Phosphate Hill in north Queensland, although the majority of its production is exported (PMSEIC 2010).

This intimate link between oil, energy and farm productivity cannot be underestimated (PMSEIC 2010:31).

This link is even more stark for remote northern enterprises, extending beyond reliance upon energy intensive inputs such as the cost of transporting products to market. Further pressures limiting affordable energy sources will impact upon enterprise viability regardless of agronomic success. Holmes spells out how trends in modern agriculture such as an increasing reliance upon industrial inputs undercut northern Australia and how modern agriculture favours “more intensive, high productivity agricultural systems

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located near major markets” (1987:53). These broader trends in agriculture highlight the current and future difficulties for cropping development in northern Australia.

Climate change, discussed as a ‘Driver’ in Chapter 4, will also influence variables, probably, but not necessarily, negatively. There is not the scope to examine this in detail however several broad findings inform potential influences. Although annual average rainfall projections are uncertain and varied across northern Australia the intensity of rainfall events may increase (CSIRO & BoM 2014). Likely increased temperatures and more hotter days may exacerbate existing problems of finding suitable crop varieties while an increased intensity of cyclones, though a decrease in number, may also impact. Increased variability with more extreme events is likely to increase existing farming challenges. Climate change may also amplify other existing variables, such as increasing the occurrence and distribution of crop pests and diseases while decreasing the effectiveness of measures to manage them. The range of mosquito borne diseases is also increasing. If living conditions become harsher in the north as predicted it will become more difficult to attract farmers, researchers and employees, or exacerbate the turn-around.

Yet the future may also bring positive game-changers; ones that create a tipping point for successful cropping. One possibility is GM crops. GM cotton varieties have already been tested in the Ord Irrigation Area. If GM varieties reduce input costs by decreasing pesticide applications, and pass the public acceptability test, they could make the crop economically viable. Other potential technologies may also tip the balance. A limitation, however, is that often a technology addresses only one variable while a multitude of others remain limiting, or once again it has a knock on effect creating or exacerbating others. Technological optimists remain a part of the culture that continues to drive development.

Another type of game-changer is the economic and market context. The growing middle-class markets of Asia are gaining a head of steam in the political and public rhetoric of the 2000s (NTG 2014, Commonwealth 2014). Sceptical voices are also present. Northerners involved in agricultural production commented that these places

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119 Such as the flooding of Kununurra in February 2014 with over 300mm recorded at Kununurra Airport from 6 to 8 February, and the subsequent damage to infrastructure – transport, water and sewage – costing the local Shire over $5 million www.abc.net.au/local/audio/2014/02/10/3941740.htm
are still able to produce food such as crops and horticultural products at much lower costs. Additionally in situations where we have come to rely upon these markets and only these markets, it has created vulnerability (Conversations 24 and 3).^{120}

**Relationships and windows**

Relationships between variables are as diverse as the variables themselves, particularly when of different domains such as the biophysical and social as in Table 7. They may be cumulative, causal, amplifying, reducing, reinforcing or masking.

Plant growth alone is influenced by the relationships of so many biophysical variables; day length, solar energy, precipitation, temperature, mineral nutrients available, soil biota, soil structure, and while some can be modified all are costly (Grigg 1984). As long ago as 1959 Christian explained that it was impossible to predict how “the particular assemblage of factors composing the environment will interact to influence potentialities” particularly in northern Australia (1959b:589). Soil suitable in one climate may present problems in another. Climatic characteristics influence such an intimate scale of soil and plant growth vital to successful cropping (Williams et al 1985). The problems are not only the relationships between plants and climate but also topography and soil: “the practical significance of climate can be determined only if it is studied in conjunction with these other specific factors” and must be “interpreted locally” (Christian 1956:148). This acknowledgement of the contextual nature of variables, their relationships and their impacts, is a fundamental axiom that is rarely explicitly made, and which makes it all the more difficult to extrapolate knowledge across the diverse north.

The absolute importance of timing in cropping also expresses the significance of relationships between variables. Problems can be magnified as you have a shorter window to work in:

... people don’t realise – the window of opportunity is very small and applies to peanuts, fodder, cotton - any crop (Conversation 3).

^{120} Ironically on 5/12/14 local ABC radio news announced Vietnam’s intention to export horticultural products to Australia. This followed soon after a trade trip to Vietnam by the Northern Territory Government to establish markets for Australian agriculture.
**Viability, vulnerability and risk**

*It is high risk farming in an isolated area...you put yourself out there on a limb. The tropics are not very forgiving if you get it wrong.* Ex-Ord farmer and horticulturalist (Conversation 7)

The cropping narratives and literature reveal that there is no right answer, the problem is not linear, and there are no apparent short cuts. One cannot identify a single variable to work on first or alone, they are connected. Perhaps the growing horticulture sector in the Northern Territory illustrates this slow but possible development process\(^{121}\).

This thesis has hammered home the variables and their relationships that impact upon cropping, and the complexity this creates at multiple scales. What framework exists today that may help understand this system; the relationships between the elements and the characteristics of the whole?

Contemporary literature addressing development considers the different forms of 'capital' available in the system. An inter-disciplinary paper on social-ecological and eco-cultural systems describes five components of a resilient system which can be applied at any scale (Pretty 2011). The use of these five capitals is consistent with relevant approaches such as the sustainable livelihood approach (Woodhouse et al. 2000, FAO n.d.) developed from a seminal paper on capital by Scoones (1998). In fact this approach was identified as a potential framework for modelling the dynamics of tropical savannah regions as it considers shared aspects and properties of the socio-economic and biophysical systems (Stafford-Smith et al 2003). Brondizio, Ostrom and Young (2009) also discuss capitals in the context of managing social-ecological systems.

The five capitals as defined by Pretty (2011) are: Natural capital, delivers ecosystem goods and services such as soil and water; Social capital, relations of trust, norms, obligations and institutions fundamental for collective action; Human capital, knowledge, skills and capabilities; Physical capital, infrastructure such as housing and transport; and Financial capital. This model of capitals can provide a means of

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\(^{121}\) In October 2014 the Northern Territory horticultural industries received a double blow – the decision to destroy all banana trees in a portion of the Territory over a two year period to eradicate the fungus “banana freckle” and a disease in watermelons requiring quarantining and destruction of crops.
understanding the variables in a more coherent way that is relevant to the current literature.

Table 9: Variables re-categorised in the five capitals

<table>
<thead>
<tr>
<th>Natural (Biophysical)</th>
<th>Social and institutional (including cultural, demographic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate (extreme temperatures, pattern of rainfall, high evaporation rates, variability, unpredictability, sunlight hours)</td>
<td>‘Public’ shared knowledge and skills</td>
</tr>
<tr>
<td>Soil – suitability for cropping (nutrients, water holding/shedding, structure and erodibility)</td>
<td>such as lack of relevant and publically accessible agronomic knowledge</td>
</tr>
<tr>
<td>Hydrology – surface and groundwater availability and location</td>
<td>Access to appropriate technology (availability, cost etc)</td>
</tr>
<tr>
<td>Topography – for managing water (flooding and storage), and erosion</td>
<td>Government legislation and policy</td>
</tr>
<tr>
<td>Pests (vertebrate and invertebrate) and diseases</td>
<td>- access to water resources eg water licensing</td>
</tr>
<tr>
<td></td>
<td>- land tenure – access to land and right to develop cropping</td>
</tr>
</tbody>
</table>

Institutional (government and non-government) |
- lack of institutional support such as for agricultural extension |

Access to labour – skilled and non-skilled

Human |
- Information and knowledge |
- lack of agronomic knowledge – to choose suitable soil and sites, farming systems |
- lack of specific required knowledge about topic at the right scale, such as paddock, in the right context, such as commercial farm |
- lack of acknowledgement, use or application of knowledge |
- lack of process to incorporate learnt/acquired knowledge in the longer term or to share it |
- Personality – willingness to learn eg from local sources, adaptability, |
- Management decisions – remotely managed, Enterprises going too big too quickly |

Physical/manufactured (Infrastructure) |
- Distance to suppliers and markets |
- Suitable crop varieties and rotation crops |
- Transport and transport infrastructure (roads, ports, railways, air) |
- Agricultural infrastructure such as processing and storage facilities |
- Quality of outputs |
- Lack of social infrastructure (health, education, and housing facilities) |

Financial |
- High price of inputs |
- Low and/or fluctuating price of outputs
In allocating variables to categories it becomes obvious how interlinked they are, with some sitting across categories. Knowledge is one of these, belonging in different forms in both human and social capital. This also highlights a limitation of this model; it does not explicitly distinguish scale. Some of the above are very location specific and others broad reaching, some paddock level and some global.

Figure 35. Variables framed as a lack of the five capitals

The sketch above is based on a capitals diagram used by the Forum for the Future where the nested relationships of the capitals depicts the dependence and hierarchy that is often otherwise glossed over. Social and Human capital sit within the Natural, and within them sit the Financial and Infrastructure (or manufactured). And the entirety of the above are influenced by variability (whether temporal or geographic) and scale; the Gods of the North.

http://www.forumforthefuture.org/project/five-capitals/overview
Framing the variables as forms of capital brings into stark relief the narratives of Part II. It becomes apparent that in the context of conventional broad-acre cropping there is a dearth in each of the five capitals. This lack is not skewed to any in particular but spread across them all, whether a lack of transport infrastructure, economically viable crop rotations, or suitable soil located near available water. So much so that it additionally emphasises that addressing any one capital alone will not be sufficient. Such responses are likely to be ineffective or transient.

Due to this lack of capital, and the highly entwined and interdependent relationships between them, there is little buffer in the system. If machinery breaks down, parts need to come a long distance and the short window of time for planting or harvesting is lost. Make a mistake with your management and the climate and soil do not forgive in the Tropics.

It is apparent that one size does not fit all, whether policy, investment, farming practices, research and development and so on. There has been a naivety in approaching the north as an homogenous entity, across space and time; diversity, whether in crops, land use, or policy, can be a constructive adaptive response to variability, unpredictability and vulnerability.

If it exists at all the safe operating envelope for cropping is much smaller in the Wet-Dry Tropics than in southern Australia. Less room for forgiveness, higher risk, and lack of capital of all types, creates greater vulnerability and threatens viability.

In exploring the variables as capitals and the relationships between the variables what emerges is a complex social-ecological system. Establishing large-scale cropping requires moving to a new system for which there is a paucity of the necessary capital available – whether human or natural. “Sustainability is an emergent property of systems that are high in social, human and natural capital” (Pretty 2002:167); large-scale cropping is not yet sustainable in northern Australia. Yet if we turn this on its head, and look from the perspective of the place itself, the lack of capitals to support northern cropping can perhaps be reframed as strong capital to maintain the existing system, a resilient system?

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123 An Ord farmer of several decades vented his frustration at the difficulty of getting tractor parts, a problem that hasn’t changed (Conversation 23).

Chapter 11: Variables, viability and vulnerability
Chapter 12: Hindered learning in the Circular Conundrum

If pressed to pinpoint the factors that have most hampered European man’s attempts to make a commercial success of agriculture in the north-west, I would unhesitatingly nominate distance, ignorance of the physical environment, and a reprehensible aversion to learning by experience. (Bauer 1985:27)

This story of a circular conundrum is coming towards its end, though the cycle itself is likely to continue. The thesis has taken us around the cycle from ‘high expectations’ to detailed narratives of ‘cropping attempts’. It has delved into the variables impacting upon these cropping attempts, most often leading to failure, and investigated the ‘drivers’ which, regardless of these failures, propel the cycle around. What of the relationship between ‘failed attempts’ and the recurring, even stubborn, ‘high expectations’, this last arrow in the conundrum. Can we satisfy any of the curiosity about the mystery of the ‘circular conundrum’?

Following the conundrum has taken us from the understandable ignorance of colonisers in the new world to the fraught multi-layered processes of learning that followed. The circular conundrum cycles on as this learning is hindered. In contradiction to the familiar learning cycle, a lack of learning is implicit in this conundrum. The hindrances to learning are themselves diverse and complex, perpetuated by elements of the conundrum itself. The conundrum takes place in a complex and variable context across geographic and temporal scales. The geographical scale from paddock to planet and the temporal scale from a cropping season to across generations. Threading through these are key cultural tropes such as the frontier mentality which, while it remains unquestioned, will continue to inhibit learning and change.

Emerging over time through hard won experience and research is a slowly growing understanding of the northern landscape by the colonisers and growing landscape literacy; fundamentally based upon an acceptance of the north as a cultural landscape. Then comes improved climate literacy where variability and unpredictability becomes the norm. Painfully, in the case of cropping, colonisers are learning about how the northern landscape functions (though from an ecological perspective we have just
scratched the surface). This landscape literacy contributes to a bigger picture, complex systems literacy. Just as we have been grappling with learning about place, we are learning about our relationship with place (the social-ecological system) and it seems that it is our lack of complex systems literacy that hinders us most, allowing the circular conundrum to continue.

Due to the journey this thesis has taken in its exploration of the 'circular conundrum', this chapter draws on the thesis itself, and on material not previously covered.

Learning and forgetting, ignorance and arrogance

“'I'm afraid you're not making any sense”

“Perhaps. But I'm learning all the time”

(Monty Python)

Accusations have been cast that Australia’s colonisers have not been learning in the north; whether from history, experience, or the land itself (Price 1933, Taylor 1955, Bauer 1963, Powell 1988, Asche 2007, Robin 2007). This was to be expected in the early days of colonisation when our knowledge “was essentially a rich amalgam of fact, fiction and rampant guesswork” (Powell 1988:xiv). Yet some believe this remains an endemic problem in the north “…where history, particularly the history of failures, often goes unacknowledged” (Robin 2007:123).

Is this the case or too harsh an assessment? Australian water scientist Peter Cullen used to say: “At least let's not make the same mistakes twice”. It is easy to believe as you read the narratives of Part II that the history of cropping is a litany of repetition of mistakes. A more detailed consideration shows this was not always the case, sometimes lessons were learnt and new mistakes made, or different variables arose. And sometimes lessons were learnt but were lost over time. Overall how does the hindered learning present itself and what does learning look like? Given the understanding of the last chapter, learning is unlikely to result in large-scale cropping, or at least for a very long time. While large-scale cropping would be success according to the 'high expectations' of the conundrum, rather learning is likely to significantly modify expectations and hence cropping attempts, or result in entirely new types of farming. Or perhaps no more large-scale attempts. With learning, the cycle would change and cease to be a circular conundrum.

Chapter 12: Hindered learning in the Circular Conundrum
A government researcher with nearly 20 years in the Northern Territory and the west Kimberley explained “Everybody goes through a learning curve and everybody underestimates the time and cost. And it depends on how arrogant they are!” (Conversation 3) He went on to say that people who know nothing may do best as they are willing to learn whereas others try to retrofit their ideas on to the situation. The cost of learning, both in time and resources and opportunity cost, is mentioned by many others. One Territory local, a farmer and ex-government employee, explained that a successful business model needed to build in a “budget for learning” (Ian Baker 2014 pers. comm.).

Learning, however, like the soil of the north, is patchy; learning is also intermittent, occurring in different places, at different times and at different scales. Throughout the thesis we find that learning about Australia’s North is not a linear, cumulative process. Not only does learning occur in fits and starts in both research and practice, that is, it is ‘lumpy’, it is also lost in a variety of ways - it forms a ‘leaky’ knowledge system. Learning is occurring, mostly at an individual and community level. The Ord farmers’ responsiveness to price and capacity to jump from crop to crop is an example. Even sceptical researcher of the north ‘Slim’ Bauer believed we were learning, eventually. In the 1960s he wrote that “this barrier of ignorance” was at last “being breached” thanks to research from which “…surely come some of the answers to the many problems posed by the natural environment.” (Bauer 1963:46) Yet this most sceptical of writers was overoptimistic, focused on a limited type of knowledge addressing a limited scope.

And learning what? One senior CSIRO researcher bluntly explained that cropping was technically possible in the north but, in earlier times, not culturally or economically so. He believed therefore that there was not much more for CSIRO to do: “The constraints aren’t ones science can solve” (Conversation 2) inadvertently raising the distinction between types of research and the role of institutions to undertake social and economic research.124

Griffith Taylor believed Australians were finally learning, not how to establish large-scale cropping but rather the inevitability of what would be very slow growth (1955). Like Bauer, Taylor was being uncharacteristically over-optimistic.

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124 Such as CSIRO’s 2013 Land tenure report.

Chapter 12: Hindered learning in the Circular Conundrum
**What hinders learning?**

"It might almost be said, indeed, that the most stable images are those which are least susceptible to feedback." (Boulding 1961:168)

The multiple narratives and diverse material of this thesis expose a plethora of instances where learning has been hindered. Together these create patterns. From these I have identified numerous types of hindrances and have grouped them into five categories as shown below.

![Figure 36. Detail of hindered learning](image)

**A lumpy, patchy, leaky knowledge system**

Knowledge formation, both through research and practice, is challenging in any circumstances; knowledge exchange even more so (Andrews 2012). In the case of north-west Australia there are additional difficulties including the disconnection between people and cropping attempts over time and between locations.

Lack of information has been a regularly acknowledged impediment to cropping with the many government inquiries held over the last century with research often seen as the single means of filling the knowledge void. The processes recommended for undertaking and extending research were less consistent though often involved a perceived need for graduated steps - experiments, trials, pilot farms, then commercial.
Some identified that without concurrent commercial industry to engage with, the research was too disconnected from what was needed\textsuperscript{125}. Despite diverse formulas being applied successful industries did not result. A fundamental distinction identified by Davidson and discussed in Chapter 3 was the consistent differences between the yields of trial crops and commercial farms (Davidson 1962, 1965b), a constant difficulty for projecting viability.

The intermittent nature of research created another hurdle. As emerged in the thesis there was a lack of consistency in research effort on crops over time. This stop-start nature of research is demonstrated across the crop narratives. For example the discontinuous and distinct periods of sugar-cane research in the 1950s, mid-1960s and mid-1970s (Basinski et al 1985; Cox and Chapman 1985; SRDC n.d.) with a fourth at the end of the century associated with the Ord sugar industry (SRDC n.d.). A number of factors influenced this pattern. When commercial interest was piqued or attempts underway research would ramp up. If an inquiry identified a crop’s potential, world prices were improving or policy settings encouraging, then research was initiated or resurrected; the reverse was also true. This pattern was paralleled in other crops such as peanuts (Conversation 3). This created ‘\textit{lumpiness}’ of research attempts and outcomes through time.

With practice and research occurring in different locations, often in different jurisdictions, and through different agencies or research organisations, ‘\textit{patchiness}’ also characterised the knowledge system. An evaluation of rice research explains that although through the 1950s and 1960s rice varieties and information were exchanged “there were no regular meetings either to identify or discuss common problems. Investigations were conducted almost independently in each river valley.” As a result problems such as grain quality and sun-checking “escaped notice for many years” (Chapman et al 1985:215). ‘Patchiness’ was also exacerbated by competing institutional research priorities. With the jointly run Kununurra Research Station CSIRO sought transferable learning for the national good, whereas the Department of Agriculture wanted immediate practical advice for farmers. There have been attempts to share information between jurisdictions and agencies through tripartite meetings, and also Northern Territory scientific liaison conferences as recommended by the Forster

\textsuperscript{125} An ongoing debate more broadly in applied and agricultural research.

\textit{Chapter 12: Hindered learning in the Circular Conundrum}
Committee (quoted through the thesis). Different scales of research also contributed to patchiness. Work done at a small-scale was not necessarily transferable to a paddock scale let alone a farm enterprise.

Finally the situation was plagued by ‘leakiness’. Knowledge was lost from the system regularly. This occurred in a practical sense through turnover of farmers and the loss of hard won practical knowledge as well as the lack of sufficient transfer of research outcomes to others and through time. Churn of people had implications on learning, sharing of that learning, and for developing relationship with place, a characteristic of Frontiers shared in northern Australia (Bauer 1984:15).

A Traditional Owner in the Territory extended upon this problem: “I think a big part of it is that someone will sell the land but they don’t sit down and discuss their failures – no-one would – only discuss successes” (Mona Liddy, Wagiman Traditional Owner, pers. comm.). Even when people remained their knowledge was not necessarily sought.

The lumpy, patchy nature of the knowledge system contributed further to ‘leakiness’. Little had been done with the large amount of data collected through CSIRO research experiments in the Ord. When visiting the Frank Wise Research Station at Kununurra (now run by WA Department of Agriculture) I was shown the old CSIRO ‘archives’. I was led to an older building, a lot like a temporary donger, and stepped around a sapling growing up through the stairs. Boxes of material were stored apparently at random inside.126 In the Territory it was similar “CSIRO previously did huge amounts of research up here. A lot has been archived and doesn’t get used.” (Conversation 1)

If learning was not literally lost it slept like Sleeping Beauty in a hedge of thorns. Attempts to learn from the past dot some narratives such as Christian and Stewart in their CSIRO survey report (1953) and Yeates surveying lessons from past research in his work on cotton (2001, 2009). Yet exacerbating the above was the questionable value of some of the research. Quality was inconsistent between locations and groups. There were poor records and in some cases no available results for many early experiments. For example one particularly scathing analysis claimed research undertaken at

126 A bone of contention with the Kununurra Historical Society who had asked to hold the documents at their climate controlled storeroom in town (where they have index books listing the experiments that were undertaken).
Camballin by the government and agricultural company had achieved nothing (Chapman et al 1985).

Information exchange was difficult between researchers, between disciplines, and between researchers and farmers. Researchers were stymied by a lack of interaction when a local industry was not present, a chicken and egg situation. Sometimes technology developed by researchers was impractical at a commercial scale such as deep placement of solid nitrogen fertilisers (Chapman et al 1985) and research can be “misleading when conducted in a commercial vacuum.” (Garside et al 1985:133) The accusation also arises that too much research has been “oriented to problems of interest to researchers” (Williams 1966:5-5), familiar across research fields and time (Andrews 2012). More starkly apparent is the inadequate connection between research and policy, with little hint of co-learning.

A healthy knowledge system relies upon social capital. Social networks link similar people or groups such as farmers, or diverse groups such as farmers and government (Scheffer et al 2002). Co-learning, participatory action research (Carberry 2001) and social learning are processes that can create and share knowledge in a different way to conventional research methods, also strengthening social capital (Keen et al 2005). Social capital in north-west Australian cropping is still low, particularly in comparison to the more productive areas of Australia, and even by the simplest quantitative measure - number of ‘actors’. CSIRO pulled out of Katherine in the 1990s because “there were more CSIRO scientists working on agriculture than farmers” (Conversation 2).

One Ord farmer poignantly described the lack of an older farming generation to learn from and the sense of being on your own it creates (Conversation 7). This situation is changing now with a second generation of farmers who have grown up in the Ord. An Aboriginal participant identified this lack in the Territory “No inter-generational transfer of knowledge like Aboriginal people.” (Conversation 30)

It would be illuminating to undertake further work tracing the relationship between different forms of knowledge, research and agriculture in north-west Australia over time, and the changing roles as agricultural research moves from the public good days

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127 Despite this there are examples of co-operative learning where researchers work and learn with farmers, determining the research questions and boundaries together, such as the peanut research outlined in Chapter 9.
of Christian into the commercial world of the knowledge economy (Sörlin and Vessuri 2007). This is likely to affect how research is undertaken, for whom and on what. It will become even more complicated with the expansion of foreign investment in Australian agriculture such as the Chinese conglomerate leasing Ord Stage II. Who will do or fund the relevant research? Who will own it and who will benefit?

Contested and invisible knowledge

"Ignorance, like knowledge, is socially constructed and negotiated." (Smithson 1989:6)

The jockeying for pre-eminence and credibility by different academic disciplines, agencies and domains of knowledge also hinders learning. Each discipline has approached the challenge of cropping in northern Australia through their particular frame – from the hard work of agronomic trials in the middle of last century to the vehement positioning by economists in regard to the federal Government’s decision on whether to fund the main Ord dam. Economists insisted northern cropping must be understood through an economic lens128, creating tension between what was then the ‘humanist’ agricultural science domain (seeking ways to feed the world) and the discipline of economics (seeking ways to create efficiency). Even within economics we saw the disagreement between the likes of Cannegieter and Davidson – whether and how secondary benefits may be taken into account through to how much economic analysis should influence political decision-making. The economist’s lens, as for any one lens, is inadequate alone.

Competing ‘expert advice’ has dogged northern cropping. Experts were pitted against each other in the push for a cotton industry in Western Australia in the 1920s129, providing blatantly contradictory advice. One, whose advice led to a misplaced cropping attempt in the Kimberley, later decried “The Plague of Alleged Experts” exclaiming that only those with local experience should provide advice. (Sunday Times 23 September 1923) This rivalry is not something of the past. The story of a rice disorder as: "a good example of the tortuous way in which scientific research often proceeds and the personal rivalries which usually accompany it" with researchers and administrators blaming farmers for the low rice yields rather than “question their own

128 As detailed in Chapter 3
129 Described in Chapter 8

Chapter 12: Hindered learning in the Circular Conundrum
diagnostic competence" (Chapman et al 1985:218). These rivalries, or barriers, occurred between individuals, agencies, organisations, and disciplines.

One step on from contested knowledge is invisible knowledge. In the cropping narratives we see that some types of information or knowledge are ignored; either they do not accord with the beliefs and objectives of individuals and organisations using the information or their very domain of knowledge are not recognised. A study of European agricultural policy networks shows how policy communities can be closed with "Old hands" determining who is included or excluded in policy-making and dialogue (Termeer and Werkman 2011:283).

Invisibility hampered learning from 'Northern knowledge'. Disregard for either local experience or research outcomes in the north was revealed in the narratives and highlighted in the previous chapter. As much as this arrogance towards northern knowledge impacted upon cropping attempts, it obstructed learning even more significantly. Vietnamese growers in the Darwin region have a turn-over of about $60 million in Asian vegetables and mangoes (Joint Select Committee 2014), a higher value than the Ord River Irrigation Area, yet we hear very little about them, and they received no government assistance in developing the industry since the late 1980s (Ian Baker pers. comm. 5/9/2014). There is no documented attempt to learn from the successful small-scale Chinese farmers at the turn of the 1900s (Bauer 1964, Reynolds 2003).

The most sustained and significant form of invisibility in this context is Indigenous knowledge. Knowledge disjunctions were created with colonisation, and Indigenous knowledge was, with some rare exceptions, denied. This applies more broadly than just agriculture. It creates a tension in what is accepted as evidence or knowledge which "becomes ideological and selective". Rather than being acknowledged as knowledge holders able to contribute to a solution, Indigenous Australians are often framed as the problem requiring solving (Maddison 2012:269).

Just as knowledge is socially constructed so is ignorance. It also provides foundations for the discussion to come that shows the way deeply embedded cultural beliefs, including the drivers of the conundrum, can inhibit learning. "If knowledge and

\[130\] Articulated in Chapter 2.
ignorance are social products, then their production is driven by human motivations, values, goals, and interests." (Smithson 1989:218)

**Blurred communication, marshmallow facts, and filters**

*If true progress is to be made, we must courageously face the facts. This is the first essential. Actualities must be respected. Facts, whether pleasant or not, must not be distorted or concealed. The limitations of the Territory must be presented in their true light.* (Payne and Fletcher 1937:6)

Powell describes “blurring” (1977:49), Taylor blames the “too free use...of geographic shibboleths” and “propaganda” (1955:6), and Bauer “gross exaggeration” (1963:46). Miscommunication, whether intentional or misguided, stemming from naivety or self-interest, plays an enduring role in perpetuating the high expectations of cropping in northern Australia, and in limiting our capacity to learn from what is around us and from what has gone before.

Blurred communication of facts enabled the portrayal of abundance and opportunity (Lansbury 1970)\(^\text{131}\). This was done through initial overly enthusiastic observation of unknown country then disseminated by others with their own vested interests, to receivers who would only hear information consistent with their pre-existing beliefs. The communication was “multi-channelled, with abundant 'noise' to block or distort the original messages.” (Powell 1977:55) Bauer concurred in the role of the colonisers’ explorers who from the 1830s began to “provide new knowledge and misconceptions” (1985:13). Self-interested and naïve disseminators are also a key part of this sequence. This communication sequence can be applied to a number of the cropping stories in Part II, and more broadly to the Nation’s approach to its north, from the hype about the Delissaville sugar plantation in 1882 to the gushing descriptions of the Ord region’s potential by journalists in 2006. Is it ignorance of agriculture and geography, naïve over-enthusiasm, or co-option into the great Frontier myth? Whatever drives the skewing of ‘facts’ it becomes self-fulfilling in that this reporting fuels the public and politicians and their expectation of agriculture in the north. “Ignorance was compounded by optimism” (Asche 2007:4).

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\(^{131}\) Illustrated in Chapter 5.
Bauer names and shames a number of explorers including Stokes whose declaration of the ‘Plains of Promise’ about Queensland’s Gulf Country in 1841 set up “an irresistible chimera which costs hundreds of settlers dearly”. When explorers did understand the country and climate however, such as A.C. Gregory (1848) “warnings were drowned in paeans of praise from optimistic governments and prospective settlers.” (Bauer 1963:46) Others agree. Asche writes that “in his eagerness to encourage development” the explorer Stuart “overstated” and thereby joined others whose imaginations got the better of them. Asche dryly advises that when relying on an expert best to know what their expertise is in: “Stuart was a fine explorer. He was not an agricultural scientist.” (2007:4). This resonates through the narratives, whether the 1920s cotton experts feted by the Western Australian Government or those welcomed by Territory Rice Ltd such as Bill Gunn. In fact any single expert is unlikely to bring sufficient knowledge.

Blurring and exaggeration continued as obvious through the narratives. One hundred years after the explorers’ optimism a CSIRO researcher pronounced the history of rice in the north has been “dominated by the optimistic assessments of potentialities and insufficient recognition of limitations.” (Basinski 1981:4) A more recent example is the Northern Territory Government’s material to encourage peanut growers to the Daly in the mid-1990s. Boosterism overstated cropping potential even more, whether for the self-interest of speculators, developers or governments. It is documented in the thesis and found across the New World (Powell 1977, Wynn 2007). One Territory old-hand was scathing, labelling some schemes or proposed schemes as “Big white elephants” where proponents jigged the business figures around to “hype it up in terms of economies of scale” (Conversation 8).

A small piece of information or fact can be remarkably malleable when taken out of context or used selectively. Common examples of ‘marshmallow facts’ are statistics about fresh water in northern Australia. For example Chief Minister of the Northern Territory in 2014, Adam Giles, in promoting development of the Territory stated that 60% of Australia’s rain falls in northern Australia, not mentioning that with evapotranspiration the region has a water deficit for most of the year, or that the Territory itself has a paucity of appropriate and economically feasible dam sites. This selective and skewed presentation of information to benefit an agenda has been
occurring since European settlement. Closely related to moulding marshmallow facts is the filtering of information that does not accord with people’s preconceptions, values or intentions, a well-documented phenomenon also exhibited in stories of the north and identified by Powell.

The other side of over-positive communication is what cannot be said. “Crying stinking fish” is the expression Taylor used to describe the response to naming the limitations of the northern environment. In other words communication was not only “blurred” it was inhibited, even censored. “Dissenting opinions…were ignored or actively suppressed by organisations and individuals paid to act in the public interest” (Webster et al 2009:10); the politicisation of knowledge. One long-time government researcher explained that sometimes the “hierarchy doesn’t want to hear the bad stories” (Conversation 32). One tangible example was the altered Annual Report of the Territory Administration (1957/58) where the original wording “the problems of the past…did not seem so severe” was crossed out and altered by hand to “were controlled”. At times politicians and/or senior bureaucrats don’t want to hear what they believe they can’t afford to hear – information that undermines their political message or goals. Australia’s public discourse veers towards the simplistic. Explain that a situation is complicated and will take time, particularly in the context of development, does not accord with dominant perceptions of leadership and nation-building. Silver bullets and simplification would be keywords for an Australian political communication handbook.

Another way of understanding the process of skewed communication is to understand the role and the power of discourse. This “shared way of apprehending the world” which helps us “to define common sense and legitimate knowledge” including the terms for analysis and debate (Dryzek 2005:9). Just as the dominant discourse frames what can be discussed and how, it also excludes information and worldviews, thereby curbing learning at an individual and a societal level; embedded assumptions influence, even confine analysis and debate, ensuring that those very assumptions remain unchallenged.

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132 As evidenced in ‘Conjuring Australian Arcady’ in Chapter 5.
133 As previously mentioned this accusation was made against C.S. Christian and CSIRO in regards to Davidson’s work. I have found no justified written record. It is a shame they are no longer around to ask.
134 More recent examples I am not at liberty to use.
Inadequate governance and politicised decision-making

_Governance and all that it involves, from the formal processes of government policy-making, planning and investment through to the many other organisations and informal processes that make up a robust system, are required for learning to occur at more than an individual scale and for that knowledge to be maintained through time. Complexities of context and limitations of northern governance hinder learning, within and between jurisdictions across the north and through time. It exacerbates the problems of the leaky, patchy, lumpy knowledge system. The constraints of “fragmented” and “thin” governance described in Chapter 11 again apply (Dale 2013). Inadequate governance can condemn us to no improvement at best, and at worst a downward cycle that depletes social, environmental and economic capital. Scale influences decision-making in this context as others: “What is good for a community, is not necessarily what is best for the region or the nation as a whole” (Campbell 1964:16)_

Government decision-making processes have been a consistent problem in the stories of northern cropping. Coombs politely described a lack of continuity in policies for the north and unwillingness by governments to finance development (Coombs 1947). Taylor was blunter than others accusing “patriotic” politicians of “propaganda” which had led to much economic loss particularly in regards to farming in the Territory (1955:6). Describing the decision-making processes for the Ord River Scheme up to the late 1970s, Graham-Taylor described “a seemingly endless sequence of small, incremental and unco-ordinated adjustments...” (1978:ii) hampered by the number of individuals involved from government agencies at both levels, researchers and farmers, and by the momentum created by earlier smaller decisions. More damning is the well-founded accusation of politicisation of the decision presented in earlier chapters. Politicisation of decision-making (as opposed to political decision-making) does not just hinder learning but overrides it entirely; when information and analysis is ignored to serve political goals and vested interests than we see cultural tropes exploited to excuse and undermine any process of learning.

Just as knowledge is contested so too is governance and decision-making; in regards to the equity of any cropping development this is a more pressing and cutting concern. Change is illustrated most clearly by the case of the Ord River Irrigation Area where the initial development ignored the Traditional Owners, Miriuwung Gajerrong, while in the
later stages an agreement was required to be reached under Native Title, the Ord Final Agreement 2006. In an evaluation of this agreement for the Office of Native Title in Western Australia, aptly titled Lessons learned, the authors identify a number of success factors that led to achieving an agreement, including good generic negotiation processes such as trust and equitable power (Bogan and Hicks 2006). Ord Stage III on the Northern Territory side of the border is much touted by the NT Government and was provided major project status in 2012. The Ord Development Unit webpage claimed in early 2014 that Native Title negotiations were underway, along with media reports of this135. Yet in September 2014 the head of the Northern Land Council publically denounced the government for not having bothered to begin negotiations with the Traditional Owners. The website then read that the “NT is poised to engage in Native Title negotiations”136.

The capacity and interest of the Commonwealth level of Government also ebbs and peaks. The Northern Australia Ministerial Forum established in 2010 was supported by expert committees, one being the Indigenous Experts Forum to provide advice on “Indigenous rights and interests in those policy issues relevant to sustainable economic development of northern Australia” (Quoted in NAILSMA 2013b). The government’s website comments that the Ministerial Forum “proved to be an effective vehicle for the four jurisdictions to collaborate on a range of initiatives relevant to the sustainable development of the north”137. The last meeting, the sixth, was held in 2013. The Indigenous Experts Forum was also stopped. What changed? The Federal Government. When governments end or change initiatives of previous governments regardless of positive evidence it undermines much needed continuity of processes and opportunity for learning. Re-invention is often later required.

Culture, beliefs and northern myths

*However, like other evolutionary processes, cultural evolution is susceptible to path dependence, multiple equilibria, lock-in, and traps* (Costanza and Atkins 2014:422)

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Culture is the most fundamental aspect of what encourages or hinders learning, determining characteristics of all the earlier factors. In the context of establishing cropping in north-west Australia the enduring dominant culture influences how we in northern Australia define, create and share knowledge; what is communicated and why. It influences how we are governed and the decisions that are made. Underlying paradigms influence natural resource management and agriculture in Australia (Allison and Hobbs 2006).

Australia is dominated by the idea of industrialised export agriculture. It appears that the agricultural discourse is not moving on and political discourse borrows its narrative from this: “... factual and the valuational images are inextricably entwined” (Boulding 1961:174). Threading through the narratives and discourse described in this thesis are powerful and persistent cultural themes, perhaps myths. Just as these dominant cultural beliefs hinder learning, they can also inhibit or disrupt learning entirely, perhaps even assist in forgetting. Culture creates filters that determine what we see, let alone how we respond, and what we aspire to. Learning is as much about the questions we ask as the answers we find to them. Our cultural beliefs, often so taken for granted they are not recognised as beliefs, but are a key to determining the questions we ask. In this way they frame the quest for cropping.

**The Frontier mentality**

“Can’t work that out [Why it goes around and around]. Maybe in the white man’s world its anything you can do I can do better. If someone’s a failure that they can say I can do better - I’ve got a better way of doing it.” (Mona Liddy, Wagiman Traditional Owner)

The northern frontier relies upon three beliefs, each of which inhibits learning. The first, an “empty” north, occurs particularly from outside the north and brings with it blindness to Indigenous Australians’ land ownership and roles, such as the view that they are a barrier to development. This critique is made by Northern Indigenous leaders seeking a partnership approach in appropriate northern development such as Professor Patrick Dodson and Peter Yu. Secondly the Frontier mentality can create an

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138 In Chapters 2 and 5 I discuss the nature of the ‘Frontier’ in Australia with a nod to the American literature.

*Chapter 12: Hindered learning in the Circular Conundrum*
unwillingness to learn from what has come before; there is no history to learn from in this continual frontier. It is Tabula rasa or the “Year zero” (Rose 2004). Price in his geography of Australia accuses those who have criticised Australia for a lack of attempts to develop northern Australia as “in most cases ignorant of, or deliberately blind to, the historic geography of the country” (Price 1972:163). Third is an unshakeable belief in the inevitability of a particular development trajectory, as addressed below.

Additionally two knowledge disjunctions occurring with colonisation are integral to the Frontier mentality; ignoring Indigenous peoples’ relationship with and expertise of country, and the imposition of knowledge from entirely different environmental contexts.

**Arrogance of the contemporary**

*We are at crossroads in the development and establishment of agricultural endeavour* (Everingham 1982:xii)

Everingham, then Chief Minister of the Northern Territory, epitomises the persistent belief that we have arrived at a turning point – we are on a cusp. Occurring regularly in the narratives is a sense that this time it will be different, whether an overt statement or an implicit optimism. This may be put down to technological improvements, to new government arrangements (there was huge optimism with the establishment of the Northern Territory Government), better infrastructure, bigger markets, the larger size of a venture, or perhaps to better agronomic knowledge. And who is to know at each of these times that the optimism is misplaced? It is only with looking back through time that one sees a pattern. It does, however, create the impression of ‘an arrogance of the contemporary’; we know better than they did in the past, now is the time and the past didn’t count. As with the Frontier mentality the arrogance of the contemporary hinders us from learning from history. It is also allied to the characteristics of the ‘Big men’ and egos of the Frontier.

This belief carries a sense that previous barriers to cropping can now be conquered, with technology, knowledge and will. A report on the Territory from the Administration, after detailing the failure of cropping to date, stated that “It is believed, however, that scientific research and experiment will make possible the development of a successful agricultural industry in the northern part of the Territory.” (Commonwealth 1955:20)
This view did not fade after the post WWII investment peak in agricultural science, but rather continued to appear into the following millennium. An acknowledgement of a need to learn is required before a willingness to learn is possible.

**Southern assumptions**

One does not like to think that one's most carefully considered judgements are determined by anything other than calm consideration of available evidence. (Dixon 1980:76)

Viewing the north through a southern lens can bring southern assumptions and expectations, and impose a southern agenda. The Forster Committee warned of the dangers of this given how much the north differs from the south (1960) and some researchers have identified how assumptions and expectations of cropping based upon temperate experience have been applied in the north (Ridpath et al 1985). Does this still occur?

“There are some funny perceptions in Canberra, I think, which are not really terribly realistic. We have a series of people coming up and talking about food-bowls – the food-bowl of Australia – I mean really, what do they think?” (Conversation 14)

This agricultural researcher and long-term Kimberley local mentioned several politicians from both sides of politics. Southern assumptions underlie many of the cropping narratives and knowledge or governance processes, and impacts significantly enough to be separately identified.

“The policy environment for northern Australia is moving very fast and currently being driven from down south” (Joe Ross140 Tropical Rivers Futures Forum 9/04/2009)

Various Federal government processes have sought to alleviate this problem of the core and periphery such as the Northern Australia Indigenous Experts Forum on Development, 2010 to 2013. A Parliamentary inquiry held in 2014 ran consultation

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140 Joe Ross is a Bunuba man from headwaters of the Fitzroy River and was Chair of the Northern Australian Land and Water Taskforce and on the Indigenous Water Policy Group.

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processes however this is fundamentally different to running an inclusive participatory process, something of which Australian government seems not yet capable.

Southern arrogance also inhibits learning\(^\text{141}\). Just as once European agricultural knowledge was brought and applied to southern Australia, southern knowledge comes with an assumption of its superiority. There has been a refusal of some newcomers to learn from locals, whether farmers or researchers. Northerners labelled it “arrogance” and “ego”. Examples abound in Part II of instituting practices from elsewhere and making the same mistakes unnecessarily. Attitudes to local knowledge and experience play a role in limiting learning.

Perhaps learning in a foreign environment depends upon unlearning. Bringing pre-conceptions of how things are done (even between places in northern Australia) and finding it hard to let go of those ideas, or trying to retro-fit ideas and technology unsuccessfully. The imposition of the desires of the centre upon the periphery, as recognised in geographic literature, is not unique to Australia. Rather we are another example of internal colonisation of the north from the south, often using science (Sörlin 2002).

**Great expectations**

"Technological determinism is a dominant feature of modernist thought and action, and science and technology are understood as having control over nature, with the solutions to nature's problems lying in cleverer and more sophisticated technologies." (Pretty 2002:151)

Two fundamental beliefs, the development imperative and technological determinism, underlie the many drivers of the circular conundrum\(^\text{142}\). They also impede learning. Technological determinism sees nature's problems as manageable through technology (Pretty 2002), just as rice growing south of Darwin in the 1950s was touted as an engineering problem and much money was spent on engineering solutions. The Frontier myth is tied to a belief in the inevitability of the western development trajectory. This leads us to see certain elements and make links forward from them, ‘The great

\(^{141}\) As discussed in Chapter 11.

\(^{142}\) As explored in Chapter 4.
expectation’ of the North. For example, ‘plentiful’ water and space must lead to cropping and productivity and wealth; Ernestine Hill’s “Water into gold” (1937).

To have this belief regularly frustrated through the failure of the accepted trajectory of progress affronts deep cultural tropes. Yet the result of the assumption of this model of advancement is that the plurality of alternatives is not seen, alternatives to “orthodox development...based on intimate knowledge of the changing, complex realities of particular places” (Sluyter 2002:5). The ongoing push for conventional development limits us from seeing outside this trajectory. Viewed from this perspective failure leads to a response that we need more of the same whether dollars, land, people, political will, or research. It limits how we frame cropping, agriculture and development in northern Australia. Canada’s northern frontier shares similar “northern visions” of a treasure trove to be exploited with the establishment of ‘hard’ infrastructure such as railways and road building, and “grand-scale” plans. In Canada also “’Northern development’ was virtually a political mantra” and seen as inextricably entwined with the future of the country (Wynn 2007:31).

Scale and complexity - again

Just as impacting variables apply differently at different scales and through time, so do hindrances to learning and learning itself. Evidence of learning is present though, particularly at an individual and farm enterprise level. Farmers can be the deftest of complex system practitioners, indeed need to be. The Chia story on the Ord is one success (though still small-scale in area) epitomising learning through addressing many of the impacting variables. First the crop was identified as suitable for the Ord climate and it is a high value, long shelf-life, transport resilient product. The farmers control the industry that is vertically integrated with a very smart marketing strategy, and not vulnerable to global price fluctuations. There are also other examples of success in horticulture, such as the Territory mango industry, however they are still very vulnerable as is all of horticulture and learning is less clear in the industry as a whole (Conversation 24). Although not the subject of this thesis, further research into the success factors across agricultural industries and what enables learning would be insightful. There is some evidence of learning at a policy level such as the withdrawal of State or Territory government subsidies and schemes for cropping, or of research investment. This fluctuates through time showing how other factors interplay. There is,
however, very little evidence of sustained learning in the political discourse, either at a State/Territory or Federal level.

We are also confounded by learning across a social-ecological system. As shown throughout the thesis even when cropping would work in one aspect of the system, such as the agronomic, it could fail in another, such as the cost of production exceeding the price for the crop. The same applies to our learning across the complex system; we may learn in one part of the system but fail in another.

**From learning landscape literacy to complex systems literacy**

"Nature demands wisdom of her children." (Holmes 1963:130)

Examples of a lack of comprehension of the northern landscape are legion; whether an imposition of southern assumptions, a blanketing of the north with a fictional homogeneity, or naïve ignorance of place. Many are documented throughout the thesis. Calls for greater understanding of the many North’s are also present however, as is occasional optimism of learning such as Bauer’s “the barrier of ignorance at last being breached” (1963:46). The slow journey by colonising Australians to cultivate landscape literacy in northern Australia can be conceived as four strata, layered upon each other as in a soil profile. The most fundamental layer, the bedrock upon which the others are formed, is cultural landscape literacy. The second one is climate literacy. It blends closely with the third layer, landscape literacy. Finally, dependent upon all three upon which it lies, is complex systems literacy. This layering illustrates how each cannot be achieved without the one below. Each literacy has grown slowly over time however in the non-linear nature of learning, with the fits and starts and backward jumps found in all close history.

**Recognising a cultural landscape**

Understanding the northern Australian landscape requires recognition that it is a cultural landscape; a result of tens of thousands of years of culture and law, with intricate, intimate land and sea management, as touched upon in Chapter 2. We see a stuttering but significant progression from Terra nullius to Aboriginal Land Rights to the recognition and revival of Indigenous Land Management to Indigenous organisations and voices insisting upon participation in the northern Australian development agenda. There is a tension in Australian literature for white Australia to grow past their
European beginnings and learn from the first Australians (Day 2005:324); a struggle that is more than between knowledge domains.

Recognition of a cultural landscape may seem a trite irrelevancy when one is working at the paddock scale, yet is elemental for the health of northern Australian landscapes and the healthy future for its people. Recognising that this place is the result of a long relationship with people brings three things: acknowledgement of existing Indigenous knowledge of country and respect for this knowledge domain, better understanding of the country, and the capacity to recognise and create multiple and varied opportunities for the future.¹⁴³

A challenging parallel exists between the colonisers’ original motive for cropping as a means to populate the north and current Indigenous goals of getting Indigenous people back onto their country. “Bringing people back” and “looking after country” is seen as fundamental to the health of people and health of country (Hill 2013). In order to achieve this we need to shed the Frontier mentality that haunts the north.

**Climate literacy to landscape literacy**

*People keep thinking temperate* (Conversation 13)

The second layer, the struggle to achieve climate literacy in the Wet-Dry Tropics, has been amply documented in the thesis such as the 1950s rice trials in which every year the weather was “unusual” or “record-breaking”. Establishing resilient farming systems relies upon an understanding of the Wet-Dry Tropics, of the changes both between and within seasons (Mollah 1991). Some believe that despite an increase in information we still lack an understanding of monsoon systems in our cropping systems (Conversation 13). It seems that although we have acquired more information about northern climate we are still learning how to apply it. Some of the stumbling blocks have been articulated above but the trap of thinking in averages still catches out unwary players, particularly those not of northern Australia.

Climate literacy is a precursor to landscape literacy, an understanding of the environment one lives in and the relationships that form it. Even in 1956 Christian

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¹⁴³ In this context recognising the north/s as a cultural landscape is distinct from: recognition of ethical and legal rights due to loss of land; recognition of cultural issues in development of country including the need for protection of sacred sites; and from the recognition of Indigenous rights to resources for development, such as the Indigenous water reserves (Armstrong 2008, Grafton and Hussey 2011).
highlighted the need to study the relationship between the monsoon climate and flora (1956). Yet our capacity to undertake research in northern Australia within this suite of relationships and their complexity is still limited, for example our ignorance of the factors and their relationships leading to the North’s dramatic biodiversity decline. It is damning of our political will, and therefore investment, and our research capacity and methodology. New Australians are learning landscape literacy in the north, just taking time to do so, perhaps too much time.

**Growing Complex Systems Literacy**

It is humanly tempting to impose patterns of progress over time (mirroring the development imperative). However the growth of understanding, and lifecycles of ideas, is never that straightforward or linear, and the fashions of academic jargon do not necessarily mirror understanding and concepts, plenty of which exist before the terms themselves. Despite this caveat there are several touchstones reflecting the journey towards complex systems understanding, if not practice, in northern Australia. I am highlighting the land systems approach (1940s), farming systems approach (1970s) and moving towards complex systems.

In 1961 Blunden acknowledged that attempts to achieve even an integrated solution often degenerated to lip service. Referring to the 1954 conference on northern development he noted insightfully that although all were conscious they were addressing only a facet of the problem, they lacked both a common philosophy and a methodology to solve “large scale problems of this type” (1961:80). His critique holds true today.

The development of CSIRO’s land systems approach was the first major innovation in land evaluation in Australia. Developed to survey large areas of northern Australia quickly the method used aerial photography and on-ground survey work to map and describe “land systems” (Christian and Stewart 1953, Christian 1958, Stewart et al 1970). The evolving method was applied to large tracts of Australia from the 1940s through to the final report in 1977144. A number of its characteristics warrant the approach’s description as innovative (for the time, and some still today), one being the multi-disciplinary nature of the survey teams working with a common objective rather

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than on independent studies. Describing the benefits of "integration through teamwork in the field" Christian explains that collectively the team was able to recognise aspects that would be missed by an individual specialist\(^{145}\) (Christian 1959b:595). Wiens et al (2006) identify the landscape systems approach as an antecedent to landscape ecology reproducing Christian's 1958 paper in *Foundation papers in Landscape Ecology*.

Farming System Research gained recognition in the 1970s despite having been around a long time (Dillon and Virmani 1985) and the approach was adopted by some northern agricultural researchers through the 1980s. The multi-disciplinary approach, draws upon physical, biological and social sciences, understanding the broader context of the agricultural research and seeing the farm itself as a system (Dillon and Virmani 1985, Nix 1985, Ridpath et al 1985, Holmes 1987, Mollah et al 1991). A general systems approach was also emerging. Additionally research to develop sustainable farming systems for northern Australia through integrating cropping with livestock production has been underway since the 1960s (Chapman et al 1996).

In the 2000s the Northern Australia Irrigation Futures research program, established to inform debate and decision-making, investigated mosaic style irrigation, an alternative to traditional large-scale irrigation that involved small discrete patches of production in suitable areas across the landscape (Northern Australia Irrigation Futures [NAIF] 2009). It was identified that this would work best integrated with other enterprises such as pastoralism, mining, tourism and Indigenous land management (Petheram et al 2008). The term mosaic irrigation was adopted by some politicians previously spruiking cropping development however whether the term is being accurately used or understood is difficult to ascertain. While the concept shows an understanding of the Wet-Dry Tropics landscape it does not overcome variables such as over-investment in plant and machinery, transport infrastructure and tight windows for planting and harvest; all which could be exacerbated if an enterprise is managing dispersed cropping areas. Key messages from the NAIF research concluded that: irrigated systems are complex systems; water availability for irrigation in the tropics is poorly understood; and that before irrigation occurs we require catchment scale water, salt and nutrient management plans to ensure sustainability. (Story et al 2008) "A systems approach is required" (Yeates 2009:26).

\(^{145}\) A lesson that it seems research, let alone field-based work, needs to keep re-learning.

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The Northern Australia Land and Water Taskforce report (2009) viewed water development opportunities as a whole package, such as Indigenous enterprise and conservation or commercial fishing, agriculture did not stand alone. Broaching mosaic cropping developments and intensification, the report received a backlash in response to its measured forecast for cropping (as discussed earlier). As with previous inquiries the Taskforce sensibly addressed planning instruments and northern governance arrangements, even institutional capacity and northern leadership, none of these appear to have been taken up. Importantly the Taskforce, chaired by Bunuba man Joe Ross, acknowledged the need to recognise Indigenous rights and interests. In the accompanying publication by CSIRO the authors of the irrigated agriculture chapter present an abridged complex systems lesson including that there is often a long lag between a cause, such as a land use change, and an effect; and most impacts interact with each other. Their most important lesson is that “each generation of decision makers face uncertainty, and that we must expect the unexpected. We can, however, narrow the odds.” (Webster et al 2009:9) These more encompassing inquiries come near to a regional development approach that considers a broader system, and a broader philosophy including equity (Pritchard 2005, Regional Australia Institute 2013).

The history of Australian agriculture and natural resource management has been dominated by a problem/solution approach rather than a systems approach (Allison and Hobbs 2006). Although we are opening our eyes to the necessity for this more sophisticated approach we are yet to grasp it. We are yet to understand what to do with it and how to apply it. This reflects a lack of capacity within our government systems to apply a complex systems approach\textsuperscript{146} (Dovers 2005).

More than this - a wicked problem?

\textit{It is not fanciful, however, to detect pathological relationships at certain times and places in history between the public images and the rest of the social universe. Curiously enough, it is often the most successful images that become the most dangerous. The image becomes institutionalized in the ceremonial and coercive}

\textsuperscript{146} This is despite an astute publication from the Australian Public Services Commission (ASPC 2007) and despite recognition that Australian Public Service leaders need to be able to “work collaboratively across changing, complex systems” (http://www.apsc.gov.au/learn/leadership/pages/background-to-the-thes-leadership-programs Accessed 24/10/2014)
institutions of society. It acquires thereby a spurious stability. As the world moves on, the image does not. (Boulding 1961:79)

The circular conundrum carries a heavy load: unrealistic though overtly rational expectations for cropping; the burden of constant colonising – the forever frontier; and the powerful imperative to develop. Positive examples such as collaborative learning and inclusive processes exist but are not sustained or sufficient to tip into a changed system or approach. Several authors writing around the turn of the millennium optimistically assume these attempts are indicative of change (Kinnane 2002, Holmes 2010 and 2010b) however it seems that we revert back to a default of dominant cultural beliefs hard to displace as they are the only legitimised set.

Is the conundrum revealing more than the complexity of a social-ecological system? One characteristic that makes it a wicked problem is that the seeds of its own failure are locked within; an endlessly repeating Greek tragedy, as illustrated below. And as with any wicked problem a solution cannot be found within the thinking and practice that generated the problem.

![Figure 37. Hindered learning influenced by other elements of the conundrum](image)

The relationships between knowledge, scale and time in land management are captured by Stafford-Smith in relation to the Australian rangelands. He elucidates how a lifetime
of understanding is no longer enough; the long-term nature of desert climate cycles with its slow responses mean “that *individual* experience is quite inadequate”. Perhaps it has never been enough in Australia. In the Wet-Dry Tropics (despite quick seasonal responses) variability, change and unpredictability also belie short-term knowledge. Stafford-Smith identifies that we need ways to pass on knowledge as individuals change “a need for codified community knowledge at a regional scale”. Just as Aboriginal culture had means through songlines and cultural rules he emphasises that we require the equivalent “of shared stories and ethos (with incentives and penalties).” (2009:71)

More than the ability to pass on individual knowledge between people, the tough crux of the learning challenge we face is stepping up from individual learning to societal learning. This can be framed in many ways. Social learning and collective thinking have been posited as ways for societies to develop ecological literacy, understand complex systems and respond to wicked problems (Pretty 2002, Keen et al 2005, Brown 2008, Henry 2009, Brown et al 2010, Swartling et al 2010). This is done not through learning different things but through learning differently.

I identify three levels of questions and correspondingly three levels of learning. The first, quite constrained, sits within a specific cropping attempt responding to problems that arise; it is direct and applied - how to make this cropping scheme work? The next level up addresses cropping (and failed attempts) more broadly; how do we make this cropping industry work or cropping in northern Australia? It is still bounded by the problem/solution approach. Finally there is the meta-level that encompasses the conundrum as a whole. It seeks to understand the system as a whole, and to understand learning. At this level the problem definition is opened up and learning becomes a redefining of the ‘problem’. It ceases to be establishing broad-scale cropping in northern Australia and becomes a redefinition of productive land-use that is meeting the needs of the people and the place.

**Power of Place**

These stories coalesce into one story. What we learn is that the overarching narrative is not one of cropping, rather it is one of people’s and society’s relationships with place. Even more essential than complex systems understanding is the contextualised understanding of place.
There is a dislocation from location, a dislocation from northern Australia. While Australia’s sense of ‘North’ remains only a representation, the agricultural ideal of empty land and plentiful water (“signifiers” according to Barthes 2000), it can carry cultural tropes such as “The Frontier” and harbour great expectations. Together they create the myth itself, in this case “the Northern Myth” (Davidson 1965). Public and political discourse, particularly from southern Australia, regularly reveals this construction of the North. And it defines and constrains the knowledge and approach that can be used to understand it. Yet when we move from ‘high expectations’ to ‘cropping attempts’ we are moving from ideas to place, from thoughts and aspirations to contextualised action; and that is when the North becomes an agent, the most powerful in all these narratives. We see played out through time the stark distinction between ‘perception of place’ as opposed to ‘relationship with place’. In contrast to such a distinction Rose explains that “the genius of Aboriginal Australians finds its greatest expression in a theory and practice of place” (Rose 2002:320); an as yet unrealised praxis for settler societies.

A tangible way of expressing relationship with place is provided by Rose who describes “permeability”, opening us to dialogue with place and with history to place (2002:321). I imagine that the idea of a permeable self in which "place penetrates the body, and the body slips into place" (2002:312) is confronting to the conventional scientific approach. Another expression for the understanding that emerges from being in our environment is “mutual change” (Lakoff and Johnson 1980:230). And there is a deep contextualised learning in a place. One size doesn’t fit all, whether policy, investment, farming practices, or research and development. The naivety in approaching the north as an homogenous entity reveals the need for contextualised and local knowledge, identified by Christian who recognised we need an iterative process with ever more detailed knowledge developed in a local context (1959b).

**Resilient Myth or Resilient Futures?**

Alternative pathways have been travelled while the conundrum has been cycling; pathways which have not been the purview of this thesis. There are emerging opportunities and existing initiatives in cultural and eco-tourism, carbon abatement and sequestration through fire management, biosecurity and conservation management and a significant rise in Indigenous Land Management organisations and jobs across northern Australia (Armstrong et al n.d., Hill et al 2005, Hill et al 2008, Hill et al 2013, Russell-
Smith et al 2009, Yibarbuk et al 2001). A trend towards multifunctional use has been identified in the Australian rangelands where pastoralism is said to be being displaced by alternative consumption, protection and Indigenous values, contesting dominant production values (Holmes 2010a & 2010b).

Many years and multiple initiatives have been building these opportunities locally and regionally. Although the majority of the funding for this has come from governments, particularly the Federal Government, the private sector, not-for-profit sector and philanthropists are closely involved (Hill et al 2013). Is there an evolution within northern Australia of our understanding of managing land systems for production and a redefining of agriculture and development? Is northern Australia moving on from constant colonising? These alternative pathways are still vulnerable; as with any cropping attempts most are still reliant upon government assistance in many forms. They are therefore still vulnerable to the whim of the political and policy context, despite much work being done to make it otherwise. When viewed alongside the circular conundrum however these pathways tempt us with questions - do they offer a way through this wicked problem, or at least a way to learn? A new way embedded in the old and embedded in place, yet all the while adopting and adapting science and technology, and the power of the market. Just as I raised Lesley Head’s challenge “not to ink in the lines" (2000:xxii) in the introduction, myths or futures should not be reduced to a simplistic dichotomous choice, rather used as a tool to question, engage and deepen understanding in order to create multiple pathways as shown below.

Figure 38. A resilient myth or pathways to a resilient future?
Pervading any discussion of the future is the enduring sense of loss entwined with stoic hope that Indigenous people have for country, conjured by Kinnane in describing the many visions, complex and contested, layered over his grandmother’s country, now flooded and under Lake Argyle (2002).

An ending
In the introduction I explained that this thesis is a response to my curiosity about the phenomenon of publically expressed expectation for large-scale cropping in northern Australia and the consistent failure for this to occur. After ten years of living in northern Australia (and a childhood here) the conundrum is still present, and I am still curious.

At the beginning I framed three questions: What is this cycle? Why does the cycle continue when many cropping attempts fail? And what does this tell us about Australia’s relationship with northern Australia and its environment? The first question led me to iteratively create the conceptual tool ‘The circular conundrum’, and to explore its constituent parts and relationships. Building an understanding of northern Australia and of perceptions of northern Australia, particularly the north-west which is the focus of the narratives, is a necessary foundation to this exploration (Part I).

Through reawakening the stories of cropping attempts and collecting them in one place in some detail (Part II) a broader and deeper picture has emerged. Patterns are revealed through time and across place. The multifarious variables that impacted upon cropping attempts, mostly leading to failure, are able to be examined more thoroughly than ever before. In this way we can see that they are a complex system, even a wicked problem. They cannot be resolved individually or within the current framework. Additionally the narratives reveal persistent themes including race, learning and relationship with place. Following the cycle around to its most perplexing link, the relationship between failed cropping attempts and high expectations allowed me to scrutinise this last mystery; and enabled a new understanding. Elements of the conundrum itself hinder learning, thereby creating a self-perpetuating cycle (Part III).

By presenting sundry narratives of cropping attempts many threads have been exposed and many remain inextricably knotted. I cannot do them all justice nor create neat and precise order of them all. That is a task for others who will highlight different threads and patterns. What is notable is how this phenomenon, the circular conundrum, contributes to explanations of human relationship with nature, both individual and
societal. The thesis illustrates Australia’s relationship with northern Australia and its environment, and even more significantly, the hindrances to our capacity to learn from, and in, that relationship.
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Appendix 1: Guided conversations and personal communications

Note: The descriptions of the role or positions participants held were current for the time of the conversation and may no longer be current. Additionally many of the participants performed a myriad of roles so although I have placed them in one category they often belong in several. I have not specified locations only jurisdiction. People were from across the Kimberley and the Top End of the Northern Territory.

<table>
<thead>
<tr>
<th>Category</th>
<th>Conversations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Farmers and irrigators</strong></td>
<td>• Ex-Ord farmer and previous executive of Ord Irrigators Coop</td>
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<td></td>
<td>• Second generation Ord farmer</td>
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<td></td>
<td>• Long-term farmer and tourist operator</td>
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<tr>
<td></td>
<td>• Ex-CEO Peanut Company of Australia (permission was received to be identified in the text)</td>
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<tr>
<td></td>
<td>• First wave Ord farmer</td>
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<tr>
<td></td>
<td>• Previous farmer and business owner in the Ord</td>
</tr>
<tr>
<td><strong>Traditional Owners and Indigenous Organisations</strong></td>
<td>• Miriuwung Gajerrong Corporation executive member and staff</td>
</tr>
<tr>
<td></td>
<td>• Traditional Owner, Lake Argyle area, in Ord River region, WA</td>
</tr>
<tr>
<td></td>
<td>• Traditional Owner, Lake Argyle area, in Ord River region, WA</td>
</tr>
<tr>
<td></td>
<td>• Traditional Owner in Daly River region, NT (permission was received to be identified in the text)</td>
</tr>
<tr>
<td></td>
<td>• Ex-senior employee of Miriuwung Gajerrong Corporation</td>
</tr>
<tr>
<td><strong>Peak Producer Bodies</strong></td>
<td>• Executive Officer of producer peak body, Northern Territory</td>
</tr>
<tr>
<td></td>
<td>• Executive Officer of producer peak body and ex-government employee, Northern Territory</td>
</tr>
<tr>
<td><strong>Politicians</strong></td>
<td>• Ex-Western Australian Minister (permission was received to be identified in the text)</td>
</tr>
</tbody>
</table>
### State/Territory agencies or Government processes

- WA Department of Agriculture, ex-NT Government
- Executive with Regional Development WA
- Retired NT Department of Primary Industries official
- Senior staff member Kimberley Development Commission
- Chair of community advisory committee, NT, and research program; ex-researcher
- Government official, Department of Agriculture and Food, Kununurra
- Senior government official, Department of Water, Kununurra
- Executive Officer Regional Development Australia, Kimberley, and local government member
- NT Government official; previously employee of an NT producer group, and of a research corporation.

### Environmentalists

- Co-founder of Environs Kimberley, Broome
- Program director, Pew Charitable Trusts, Brisbane
- Program director, The Nature Conservancy, Darwin
- Executive Officer, NT Environment Centre, Darwin

### Researchers and research managers

- Senior manager, research institute, WA Government
- Local Government member, Kimberley and previously entomologist/agronomist for government agency, WA
- Senior CSIRO agricultural researcher and manager
- Senior CSIRO agricultural researcher

### Personal communications and informal conversations

As recorded in the text there are several people I have quoted, with permission, as personal communications. Mona Liddy, Kim Chance and Bob Hansen were part of my conversations and agreed to be identified and quoted; my heartfelt thanks for their significant contribution which could not be used without identifying them.

Two more personal communications acknowledged in the text with approval though not a part of the formal “conversations” were:

- Ian Morris is a renowned naturalist of northern Australia, and a cultural expert of Arnhem Land and Kakadu. A conversation on 17/11/13 is quoted however I...
have been lucky enough to have the opportunity to talk regularly with Ian, and hopefully learn a little.

- Graeme Sawyer is another well-known figure, particularly in the Territory, as co-founder of Frog Watch NT and many other community and environmental education initiatives, and as former Lord Mayor of Darwin.

In addition to the recorded conversations undertaken above I was fortunate to have many informal discussions with people across Australia about my thesis. Many were intrigued with the topic, disagreed with me or had their own stories of northern agriculture. The joys and learning of my PhD included enlightening conversations over:

- Cups of tea with Henry Nix
- Drinks with Bruce Sawyer
- Meeting tables with CSIRO Sustainable Agriculture Flagship Advisory Committee and researchers
- Dinners with Elaine Gardiner
- Cigarette breaks with Lawford Benning
- Mango and chia salads with Francis Bright
- Lunch with Russell Muchow and Peter Carberry
- Coffees with Leith and Kath Andrews (who worked in the livestock industry and managed cattle properties in the Top End)
- Even more cups of tea with Vera Kurtz
- And duck stir-fries with Graeme Sawyer.

Appendix 1: Guided conversations and personal communications
Appendix 2: Guiding topics for conversations

- Where is the north for you? Where does it begin and end? (If people have such a sense of ‘north’)

- What does the north mean to you? (If not originally here - What sparked your interest in the north? A person, book, experience?)

- Tell me about your experience of (or attitude towards) agriculture in the north? (As a researcher, farmer, government officer, first Australian...) What do you define as agriculture?

  Document peoples story.

- What do you think is the potential for agriculture in northern Australia? What leads you to think this?

- Has your expectation changed over time? Why might this be?

- What role do you think learning has played? How?

- What do you think is the future for northern Australia? What does this mean for you?