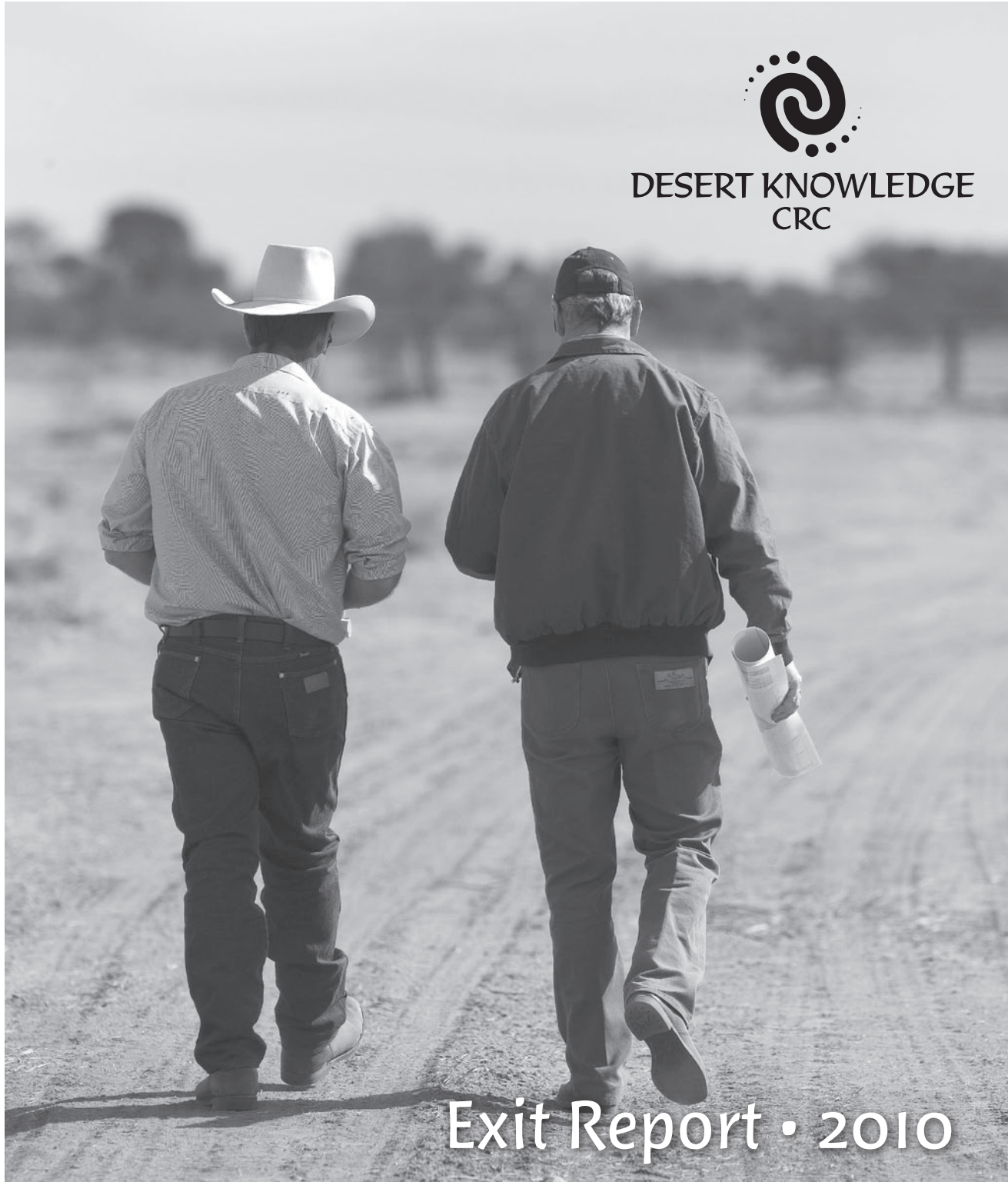




DESERT KNOWLEDGE
CRC



Exit Report • 2010



Established and
supported under the
Australian Government's
Cooperative Research
Centres Program





Vision

Thriving desert knowledge economies sustaining Australia's inland environments.

Outcomes

The Desert Knowledge CRC will help to create economic opportunities for desert people, and make a demonstrable difference for remote Aboriginal communities, through the application of excellent research and training.

We will contribute to developing the following broad outcomes in the national interest:

- Sustainable livelihoods for desert people based on new natural resource and service enterprise opportunities that are environmentally and socially appropriate.
- Remote desert communities that are more sustainable to support the presence of desert people, as a result of facilitating access to more attractive services that are delivered more efficiently.
- Thriving desert economies that are based on unique desert knowledge and which are more self-sufficient.
- Increased social capital of desert people, their communities and service agencies.

The Desert Knowledge CRC acknowledges the considerable support it receives from the Department of Innovation, Industry, Science and Research under the CRC Program.

The Desert Knowledge CRC consists of eight core and five centre partners, nine associate partners and six affiliate partners.

Core Partners

Central Land Council
Charles Darwin University
Commonwealth Scientific and Industrial Research Organisation
Curtin University of Technology
Desert Peoples Centre (Centre for Appropriate Technology and Batchelor Institute of Indigenous Tertiary Education)
Government of Western Australia
Northern Territory Government
Office of Indigenous Policy Coordination

Centre Partners

Griffith University
James Cook University
Murdoch University
Newmont Australia
The University of South Australia

Associate Partners

Flinders University (Centre for Remote Health)
New South Wales Department of Primary Industries
South Australian Department of Water, Land and Biodiversity Conservation
Southern Cross University
The Australian National University
The University of Adelaide
The University of Queensland
The University of Western Australia
University of Wollongong

Affiliate Partners

Australian Institute of Aboriginal and Torres Strait Islander Studies
Indigenous Australian Foods Ltd
Robins Foods
Tangentyere Council
Tapatjatjaka Community Government Council
Waltja Tjutangk Palyapayi Aboriginal Corporation

CORE PARTNERS

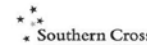


CENTRE PARTNERS



University of South Australia

ASSOCIATE PARTNERS



AFFILIATE PARTNERS





Desert Knowledge Cooperative Research Centre **2010 Exit Report**

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Established and supported
under the Australian
Government's Cooperative
Research Centres Program



Executive summary

THE DESERT KNOWLEDGE COOPERATIVE RESEARCH Centre (DKCRC) commenced its operations on 1 July 2003 and closed on 30 June 2010. These two dates frame a remarkable and intensive seven-year period of research, training, capacity building, research application and community engagement in Australia's desert regions. In that short period of time a diverse array of organisations and individuals set out on a course of dramatic change: change in the way research is framed in the desert; change in the way communities are engaged in research; change in the way organisations collaborate; and change in the way that the outcomes of research are applied on a day-to-day level in the real lives of desert people.

This Exit Report outlines the impact of those changes and describes how the DKCRC's outcomes matched the goals that its signatories laid out in their agreement with the Australian Government in 2003. Outcome areas were articulated in the Commonwealth Agreement and came under three program areas. To achieve these outcomes the activity of the DKCRC was organised into three program areas:

- **Desert Enterprises**, with a principal outcome of sustainable livelihoods for desert people based on natural resource management and service enterprise opportunities that are environmentally and socially appropriate.
- **Desert Systems**, with two main outcomes: to develop sustainable desert settlements that support the presence of desert people as a result of improved and efficient governance and access to services; and thriving desert regional economies that are based on desert competitive advantages, bringing together Aboriginal and non-Aboriginal communities, government and industry.
- **Desert Solutions**, with three main outcomes: to ensure that graduates are more aware of desert issues and more prepared to come and work in desert Australia; to develop links between local knowledge and Western science, leading to better integration and understanding of the value of different knowledge; and consolidation and integration of information about desert Australia.

Within these program areas a coalition of business groups, universities, Aboriginal organisations, research bodies and residents of desert settlements undertook and applied research. The following short list illustrates the breadth of our achievements.

- Our Research Report on *Population and Mobility in Town Camps* provided the first correct assessment of the numbers of people living in Alice Springs Town Camps and their mobility patterns. The study ultimately resulted in an Australian Government allocation of \$120 million for new housing, water and sewage works; Aboriginal researchers who were trained to collect and analyse data on the project obtained more work on the 2006 Australian Census and in other ways.
- Our Desert Fire project produced Australia's first large-scale investigation into the scale, frequency and impact of wildfires on infrastructure, productivity and biodiversity. The project won the Northern Territory Government's Desert Knowledge Innovation Award.
- Our work on remote settlement water management led the Australian Government to make recommendations to the National Water Commission and project outcomes became part of the Australian Drinking Water Guidelines produced by the National Health and Medical Research Council.
- Groundbreaking research provided a firm evidence base that helping to retain Aboriginal people 'on country' not only leads to healthier, happier people but also placed a dollar value on reduced healthcare costs.
- Our work with Aboriginal wild-food harvesters, growers and processors led to a more robust supply chain and more jobs, enterprises and skills for people living on country and in remote areas.
- Our work on technologies to increase the productivity of desert pastoral enterprises saw the development of a remote livestock management system which is now being commercialised.
- Our research into feral camels led directly to the Australian Government's decision to back a \$38 million feral camel population

reduction project, which among other things will employ and train Aboriginal people.

- To date our research has resulted in the publication of 59 research reports, 61 working papers, 287 conference papers and 102 journal papers, of which 30 are in ISI-ranked journals. There are more publications in the pipeline.¹
- Our international collaboration saw the uptake of the Australian desert knowledge model in South Africa through the initiation of the Karoo Development Foundation.

This summary illustrates the breadth and depth of the DKCRC's work in Australia's deserts, all at a time of immense change and upheaval. Our period of operation spanned several events that had significant impacts on Australia's desert communities, not least of these being:

- the enormous growth in international demand for commodities and mineral resources, and the shortage of skilled professionals to service that demand
- the global financial crisis that threatened those markets and many desert livelihoods
- a period of extended drought that, in parts of the inland, was the worst in many decades
- governance issues such as the Australian Government's Northern Territory Emergency Response, the dissolution of one core partner (ATSIC) within our first year of operation, and the Northern Territory Government's introduction of a shire system.

DKCRC adapted to these possibly damaging impacts because flexibility, response to extreme variation, and turning a challenge into an opportunity is what desert people do. This CRC can look back proudly on its ability to negotiate and implement change during times of change. Importantly, the DKCRC did not just carry out and apply research during its lifetime. Through its partners and through capacity-building exercises with people in remote settlements the DKCRC has ensured that its research will continue to contribute to Australia's desert future for years to come.



The Desert Knowledge story

THE CLOSURE OF THE DESERT Knowledge Cooperative Research Centre offered a great opportunity to examine the phenomenon we have referred to in this and previous executive summaries (as contained in our annual reports, from 2003 to 2010) as 'the desert knowledge story'. What was this story? What was its genesis, and how far had it come by 30 June 2010 – the final day of the DKCRC's operation? Were things better than before the DKCRC existed and, if they were, in what ways were they better?

The desert knowledge movement began in central Australia in the late 1990s. Australia's desert settlements were, at that time, beset by problems: a systemic failure in the supply-side delivery of services and local knowledge not being used in decision-making in far-off capitals; poor infrastructure that led to repeated failures in businesses; the extraction of wealth and resources with little apparent return to the source communities.

It was not all bad news. Australia's desert regions, which cover almost two-thirds of the continent, are home to around 600 000 people, the majority of whom are long-term residents. This population is young, is growing, and is generally made up of a much larger proportion of Aboriginal people than is found in tropical and temperate Australia. The deserts generate great wealth through primary industries and tourism, and Australia's desert dwellers are among the most wise, resilient and adaptable people in the world.

The challenge of building on these skills in order to address the litany of disadvantage became the focus of a group of people who set to work on recording and systemising home-grown solutions. The Aboriginal community worked towards a place of Aboriginal teaching and knowledge sharing: a Desert Peoples Centre. The Northern Territory Government initiated Desert Knowledge Australia, a networking organisation that creates critical mass for desert businesses. And the Australian Government backed the DKCRC for a period of seven years. These organisations came together at the Desert Knowledge Precinct in Alice Springs.

In 2010 the picture for desert Australia is in many ways different from that of only 15 years ago and yet, in other ways, unfortunately similar. Remote settlements still face supply-side issues, struggle to retain jobs and the wealth generated by their resources, and Aboriginal and Torres Strait Islander Australians remain significantly disadvantaged compared to non-Aboriginal and Torres Strait Islander Australians.

But on the credit side of the ledger there is much to be optimistic about. There is the magnificent Desert Knowledge Precinct in Alice Springs, a multi-disciplinary home to a wide range of scientific, educational, business and community organisations. The DKP creates the critical mass of researchers, practitioners and organisations who, in the past, were often isolated from their peers and those working in complementary spheres.

But the DKP is more than bricks and mortar. The DKCRC and its sister organisations have created a place of research, teaching and learning, and knowledge dissemination with an international reputation. Since its inception in 2003 the DKCRC has:

- audited the small and micro-business environment and used this knowledge to work with businesses, carrying out participatory action research during the crucial phases of establishment and growth in order to understand and articulate to other businesses the necessary measures for success
- developed remote technologies that improve the profitability of livestock management in pastoral businesses
- created opportunities in the bush products industry that steadied the supply chain by reducing the seasonal and market fluctuations that had hampered the industry's growth in times past
- increased the research capacity in desert Australia through our activities, education and training program
- increased the number and skills capacity of Aboriginal researchers, particularly in remote settlements

- created technologies that have the potential to make desert living safer and more productive (SAND, Fire Trailers, VRUM™).

The DKCRC was a critical episode in the desert knowledge story, though this story will continue long after the DKCRC winds up its activities in 2010. Those involved in the DKCRC can look back with pride on an extraordinarily productive period that will see the desert knowledge story continue to be told far into the future.



Our performance against the Commonwealth Agreement

DURING THE OPERATION OF THE DKCRC there were two notable variations to our Commonwealth Agreement, each of which impacted upon our performance against agreed milestones.

The first took place during our second year of operation (2004–05) and was the result of a Board-initiated Strategic Focusing Review. This review examined ways to maximise our research and management capacity and to further improve collaboration between research fields. The review recommended that the original four theme-based areas be restructured into six core projects under three program headings (see Executive summary). Governance and social capital outcomes were woven throughout these projects, with a Social Science coordinator liaising between core project managers, the Education & Training function and the Centre's executive. This restructure was agreed to by the Australian Government and new milestones were implemented from 2005–06 onwards.

The second, less consequential, variation to the DKCRC's agreed milestones took place during our final year of operation (2009–10). New milestones were agreed to, milestones that differ slightly to those in our annual reports from 2005–06 to 2008–09.

This Exit Report discusses the DKCRC's performance against the Commonwealth Agreement (2005) and includes reference to the outputs and outcomes for the theme phase.

Corporate governance was a significant strength of the DKCRC under the Chairmanship of Mr Paul Wand AM. The Board maintained high levels of corporate accountability. A Board Charter was developed and revised annually to ensure its applicability as the role of the DKCRC and Ninti One Ltd evolved. All directors were trained by the Australian Institute of Company Directors.

DKCRC maintained high levels of fiscal governance throughout its period of operation. Only one area deviated slightly from that agreed with Commonwealth: in-kind contributions from across all stakeholders and partners was approximately 3% below the targets outlined in our the

Commonwealth Agreement. While some core partners did fall below their agreed contribution, significant efforts were undertaken to ensure in-kind commitments were reached through the engagement of additional end users and SMEs in our core project work. Further, several key partners (such as CSIRO and Curtin University of Technology) far exceeded their contribution and made significant investment in the DKCRC.

Those partners who fell behind in their contribution often did so due to reasons beyond their immediate control. For example, the vast majority of Central Land Council's in-kind contribution was achieved through the involvement of individual Aboriginal communities and so was recorded in the 'other' category of in-kind rather than against this organisation. The in-kind commitment of the Western Australian Government (through its Department of Conservation and Land Management) collapsed after a specific research project did not eventuate due to stakeholder and recruitment difficulties; the WA Government's withdrawal accounts for almost all of the 3% shortfall.

These discrepancies were discussed in correspondence with the Australian Government by our Board and Managing Director in May 2010.

Our success in governance and internal management was a positive to emerge from our period of operation. The DKCRC experienced extremely low staff turnover for a desert business, with only minor changes to our upper management and Board. Indeed, our Board was recognised by the CRC Program and the Australian Government for its higher than average representation of female and Aboriginal members.

Our change from theme-based research to core project-based research late in our second year inevitably disrupted some research, but the benefits that accrued for end users and research providers from the restructure were significant and lasting.

Program 1 • Desert Enterprises

Outcome 1: Sustainable livelihoods for desert people

Among our most important work was our research into the creation and development of new enterprises and livelihoods for desert people based on natural resources and service opportunities that suit both their environment and social setting. (For details of the core project work in this outcome area, see the *Desert Knowledge CRC Annual Report 2009–10*, specifically: CP 1: Livelihoods inLand™; CP 2.1: Bush Products from the Desert; CP 2.2: On Track™: Better livelihoods through 4WD desert tourism; CP 2.3: 21st Century Pastoralism™; and CP 3: Desert Biz™.)

By understanding the many challenges that confront small business in remote areas, and finding ways through or around them, the DKCRC helped build a future economic base and new job opportunities for isolated communities.

Output 1.1: Develop a framework that values desert people as service providers of natural and cultural resource management.

Milestones under this output focused on understanding the opportunities for the supply of and demand for ecosystem and cultural resources; developing tools that value ecosystem and cultural assets; and creating business cases for identified livelihood opportunities. A range of working papers, research reports and video/DVD tools for Aboriginal land management were produced, such as the hugely successful *Ngurra-kurlu²* report.

Case Study • Multimedia meets traditional land management

The power of modern multimedia technology is being deployed to help protect one of Australia's most precious assets: the wisdom and knowledge of its Aboriginal elders.

DKCRC provided multimedia training for use across generations and large regions to young women and men in five central desert communities of the Warlpiri people. They received training in video creation and postproduction that provided them with skills and employment opportunities.

Participants produced five DVDs containing 14 stories for use as educational tools. However, one of the largest impacts of the project was to demonstrate the huge Aboriginal demand for video as a way for knowledgeable people to share their knowledge regionally, and to show that it can be done easily and for little cost by local people using existing technology.

As a result, Yuendumu School developed a literacy curriculum using the videos and conducted bush trips during which more were produced. Two communities also explored the use of video to share knowledge in health and education. As a result the Central Land Council has significantly increased its use of video to record local knowledge.

Case Study • Health and staying 'on country'

Groundbreaking DKCRC research provided a firm evidence base that keeping Aboriginal people on their country not only means healthier, happier people but also reduces healthcare costs to Australia generally.

Our Livelihoods inLand™ project demonstrated that people who remained on country were less prone to succumbing to high blood pressure, diabetes and kidney disease than those who moved to town. This important insight helped shift the paradigm for national and state policy towards remote Aboriginal settlements, their service delivery and health care.

When people manage their own country the benefits that accrue include engaging in healthy work and activity, partaking of healthy native foods and traditional medicines, meeting their cultural responsibilities and maintaining their social networks. Activities such as looking after the land, hunting, fire management and pursuing arts and crafts related to country all have a payoff in terms of reducing the impact of chronic disease in remote Aboriginal settlements.

The *Ngurra-kurlu: a way of working with Warlpiri people* report showed why relationships to country are so important for contemporary life and livelihoods and highlighted their critical role in the motivation and sense of identity, confidence and wellbeing of desert people. The study provided strong evidence for the growing policy shift towards helping people to remain on country as a way of overcoming chronic disease and social problems. It was one of the most highly downloaded reports from our website.

Program 1 • Desert Enterprises

Outcome 1: Sustainable livelihoods for desert people

Output 1.2: Generate knowledge and increase capacity for demand-driven bush products industries; expand and deliver benefits to Aboriginal desert people.

Milestones under this output focused on understanding the supply chain for bush foods, developing strategies for supply chain growth (while maintaining product quality and integrity), and creating business cases for identified livelihood opportunities.

Among the outstanding outputs under this section were the various publications that described the 'Walk the Chain' and 'Hands Across the Desert' projects³ (see box). Working papers⁴ describe the project's horticulture, genetics and intellectual property management work; a DVD⁵ on Aboriginal cultural significance of desert food plants, a confidential genetic marker report, and protocols and code of practice for the bush food industry were also produced.

Output 1.3: Understand the impacts created by tourism in desert Australia.

The milestones under Output 1.3 focused on the identification of enterprise opportunities and flow patterns of tourists in desert Australia, and evaluation of the social, cultural and environmental consequences of 4WD tourism.

Among the key outputs for this section was the customisation of VRUM™ and case studies for end users. The iVisit™ project, revised to iOutback™⁶, produced a scenario film plan that was published on the Internet along with an associated questionnaire.⁷

Case Study: Improving returns in the bush foods industry

A direct outcome of the work described in Milestone 1.2.2 was the creation of an Aboriginal bushfoods producers group. The group has given collective bargaining power in the supply chain to individuals who were previously price takers, at the mercy of wholesalers, and are now active as price setters.

One of the main challenges for the bush foods industry when relying on wild-harvested fruits is to keep the supply chain satisfied year-round when growth is seasonal and variable. DKCRC established a trial horticultural plot for bush tomato production to learn how to grow them commercially to supplement the wild harvest. This helped to build a more secure supply chain and increased the price paid for horticulturally produced fruit.



Maintaining supplies of otherwise variable plant crops was one focus of the bush foods project work.

Case Study: Understanding the impact of 4WD tourism

Flowing from the original *Desert Tourism Scoping Study*⁸, the OnTrack™ research project investigated the nature and needs of the self-drive 4WD desert tourism industry and developed a systematic approach for collecting and analysing data to assist the development of this fast-growing market segment.

The project created a system that mapped visitor flows across regions and across time, known as the Visualising Relatively Unpredictable Movement model (VRUM). The model showed road segments used, overnight stop locations and directions of travel. Its information can be used by tourist destinations and associated businesses in planning and collaboration: if businesses know where tourists are likely to be they can deliver services and products to them. Equally, tourists travel further if they know the services they need are available at their destination.



Understanding the needs of independent 4wd tourists is an essential part of enhancing the visitor experience and ensuring that remote settlements benefit from this growing industry.

Program 1 • Desert Enterprises

Outcome 1: Sustainable livelihoods for desert people

Output 1.4: Gather information and create products that deliver improved triple-bottom-line performance for the pastoral industry.

The milestones in this section focused on understanding the social, economic and productivity factors that will drive pastoralism in the 21st century, as well as developing tools and processes that will improve pastoral enterprise performance.

A group of three research reports⁹ on Aboriginal peoples' involvement in the pastoral industry were produced, along with several reports¹⁰ on the economics of remote water management technologies, and reports on grazing systems management¹¹.

The remote livestock management system (RLMS) was developed to commercialisation stage, with intellectual property and product licence issues resolved and transferred to a new company, Precision Pastoral Pty Ltd (PPPL). (Industry investment in RLMS has been attracted and other negotiations are ongoing.)

The remote configuration and power management aspects of SAND telecommunications technology were developed¹², and approaches for further research and commercialisation are ongoing.

Output 1.5: Increase knowledge to support desert business activity.

Milestones under Output 1.5 delivered data on business activity to desert Australia and created business models that are more appropriate and suited to desert Australia.

A hugely successful grants database was created and published¹³, quickly becoming one of DKCRC's most highly accessed publications. We were invited to provide submissions to two Senate inquiries on remote businesses¹⁴ and community stores¹⁵, and published input/output model profile data¹⁶ and a report on staff attraction and retention.¹⁷ Three research reports¹⁸ are forthcoming on desert SME successes and models.

Case Study: Understanding labour factors in the pastoral industry

DKCRC examined the engagement of Aboriginal people within the pastoral industry. The recommendations of our *Cattle and Country Project* were adopted by Meat and Livestock Australia for improvements to policies and strategies for the attraction and retention of Aboriginal staff. Evaluations of the Northern Territory Government and Indigenous Land Corporation's initiative in the NT, the Aboriginal Pastoral Program and the WA Kimberley Indigenous Management Support Service were conducted.



The Remote Livestock Management System continues to be successfully developed through a spin-off company – Precision Pastoral Pty Ltd.

Case Study: Desert Biz™

DKCRC's *Directory of Grants and Initiatives for Desert Businesses*¹³ was the first ever nationwide guide to grants, assistance programs and other initiatives of government, industry and organisations that are available to support businesses operating in Australia's desert regions.

This searchable 300-page reference listed the programs, funding and initiatives of government, industry and organisations available to support desert businesses. It described the type of grant or initiative, eligibility rules and cut-off dates, and provided contact details and other useful information to desert businesses operating in New South Wales, the Northern Territory, Queensland, South Australia, Victoria and Western Australia. DKCRC received overwhelmingly positive feedback from small businesses about the usefulness of the directory.

Program 2 • Desert Systems

Outcome 2: Develop sustainable desert settlements that support the presence of desert people, particularly remote desert communities, as a result of improved and efficient governance and access to services.

When the DKCRC began its work on sustainable communities and the services they need much of the policy discourse was on whether small, remote settlements were viable or should be closed down and their people resettled in much larger settlements. DKCRC's premise was that before trying to 'solve' the problem it was important first to understand it and to design solutions that were based on evidence. A vital aspect of this process was to conduct in-depth research among desert residents, especially Aboriginal people, and across a range of settlement sizes and types in order to understand their needs, wishes and aspirations.

(For details of the core project work in this outcome area, see the *Desert Knowledge CRC Annual Report 2009–10*, specifically: CP 4: Sustainable Desert Settlements; CP 5: Desert Services That Work; and Integrative Systems.)

This research yielded important new insights into how desert communities function and why, causing much re-evaluation of the assumptions that drove earlier policy changes. Important outcomes include the ongoing redesign of service delivery to remote regions by all levels of government to better meet the needs of their residents, enhanced local autonomy, and a deeper understanding at state and federal policy level on what is most likely to work and why.

Output 2.1: Increase knowledge of factors affecting settlement sustainability and how to influence them to support sustainability.

Milestones under Output 2.1 focused on understanding settlement function and developing models and resources to inform decision-making about settlements. A series of reports for each case-study settlement were published²⁰, as were five working papers and two research reports²¹ explaining settlement dynamics.

Planning resources for communities were developed and a special issue of the *Journal of Economic and Social Policy* featured eight papers by CP5 researchers.

Case Study: Understanding settlement typology

The words 'settlement' and 'community' are often used interchangeably. However, because of the complex character of desert society and the need for research to define and understand its features, DKCRC found it important to give each their precise meaning. The word 'settlement' for us refers to a physical space, containing all of its infrastructure, while the word 'community' refers to a set of people who share things – primarily living space but quite often language and other interests. Thus, the Warlpiri *community* lives in the settlements of Lajamanu, Yuendumu, Nyirripi and Alekarenge, but the Alekarenge *settlement* houses people from the Warlpiri, Warumungu and Arrernte communities.

DKCRC's foundational research into classifying the different types of settlement was published in the study and literature search *Desert Settlement Typology*.²² The research found there was not yet enough information to devise a clear typology for desert settlements as a basis for assessing sustainability. However, it set the ground rules, including the importance of using Aboriginal, local and scientific knowledge together as key components in defining and understanding sustainability and sustainable settlements.

Program 2 • Desert Systems

Outcome 2: Develop sustainable desert settlements that support the presence of desert people, particularly remote desert communities, as a result of improved and efficient governance and access to services.

Case Study: Creating the resources to ensure informed decision-making

Aboriginal Populations and Resource Flows in Central Australia was a trailblazing DKCRC study of the economic and social status of the Aboriginal population of central Australia. Among many outcomes, it provided insights into the composition of Aboriginal society in the central deserts, an informed basis for regional planning and a way to assess its impacts.

Our report *Attracting and Retaining Skilled and Professional Staff in Remote Locations*²³ outlined key elements in successfully staffing remote settlements with skills and professionals. When released it became one of DKCRC's most heavily downloaded studies and its findings are being put to use by several local governments and mining companies.

Our study into *The Transformation of Assets for Sustainable Livelihoods in a Remote Aboriginal Settlement*²⁴ followed on from overview investigation of Aboriginal economic and social status with a more comprehensive analysis of assets, stocks and flows of a small, remote community using the Sustainable Livelihoods Framework. It found the community's ability to influence these to increase livelihoods was substantially restricted by external agencies and there was a need for better communication on all sides.



The Sustainable Livelihoods Framework offered a comprehensive analysis of remote community assets.

Output 2.2: Create innovative service delivery options.

Output 2.2 evaluated alternative demand-responsive service delivery approaches and created business cases for identified livelihood opportunities.

From the case study work, four reports and 11 working papers were published.²⁵

Aboriginal people involved in data gathering and analysis continue to be employed in various capacities.

Case Study: Desert Services That Work

The DKCRC core project *Desert Services that Work* broke new ground in a three-year investigation into service delivery in desert Australia. Its main findings – that desert services are overwhelmingly viewed as driven by the needs of suppliers rather than recipients – prompted a major rethink among the federal, state and territory governments, all of whom used its findings to plan better service delivery in remote communities.

Partnership with government agencies was a key feature of our work. The Council of Australian Governments requested our input to its working group on *National Partnership Agreement on Remote Service Delivery*, a coordinated approach to service delivery now being pursued by all levels of government. DKCRC made several key recommendations – especially on service design and conceptual frameworks – that influenced the service delivery principles detailed in this national agreement.

We were invited by the WA Department of Aboriginal Affairs to assist in the development of their policy on remote communities, which led to a contract to supervise evaluation of the community capacity building program at Balgo.

In *Sustainability: A Case Study of Birdsville and its Environs*²⁶ we explored what makes the famous outback town function successfully. Our study noted several features that contributed to the town's sustainability, including strong local governance, an economic base consisting of three industries capable of offering full employment, Aboriginal people being able to stay on their traditional country, the strong bond between Aboriginal and non-Aboriginal people working together for a good life, and a tradition by local residents of reinvesting personal capital in vital infrastructure to maintain the town's high standard of services.

Program 2 • Desert Systems

Outcome 3: Thriving desert regional economies that are based on desert competitive advantages, bringing together Aboriginal and non-Aboriginal communities, government and industry.

Prior to the advent of DKCRC there was no organised research effort to systematically explore ways to strengthen the economies of Australia's desert regions, their businesses and supply chains; to explore new enterprise opportunities; or to identify and solve the many barriers to new businesses. There were few connections that allowed people with common interests to pool limited resources into larger and more effective combined assets and few resources to underpin better decisions about the future for desert people.

Australia's deserts fell under many jurisdictions and so their over-arching economy was not well understood nor even thought of as a whole entity. Seven years on, DKCRC established a solid foundation for understanding the essential character of the desert economy through a focus on two major industries: tourism and pastoralism. The economic prospects of desert people were improved through training, enhanced access to economic resources, and new and better-performing businesses.

Output 3.1: Enhance understanding of regions as systems.

Milestones under Output 3.1 developed systems of representations of the critical nature and function of outback regions and created resources to help decision-making about regional futures.

There were several high profile outputs, including the Outback livelihoods report²⁷, a multi-authored book on socioeconomic studies of the Lake Eyre Basin²⁸ identified interrelations of people/environment and policy, and a seminal book on desert systems (see case study below).

Our input/output model was used to generate reports on regional profiles, two regional transport documents (one working paper and one research report²⁹) were completed and two papers from the Science of Desert Living project were published.³⁰

Case Study: Outback livelihoods understood

A foundational review of *Desert Enterprises Reliant on Natural and Cultural Resources*³¹ developed a database that was subsequently expanded to create a directory of grants³² and initiatives for desert businesses, while our *Desert Tourism Scoping Study*³³ established 4WD tourism as a promising growth area about which little was known earlier.

Our *Outback Institutions* report³⁴ was vital in establishing the unique ecology, climate and sociology which dominates desert institutions and decrees how they function. Based on four very different settlements in Queensland and the Northern Territory, the study applied the globally recognised Institutional Analysis and Development Framework. An important finding was the need to devolve more power to local people, to build their capacity and to ensure transparency and fairness.

Another underpinning study was that made of communities in the Lake Eyre Basin, one of the least-inhabited regions on earth.³⁵ This study provided a comprehensive profile of the region, its inhabitants, communities and their institutions and drew attention to key challenges affecting the sustainability of the region and wellbeing of its residents, including having to grapple with numerous overlapping state and federal jurisdictions on very slender human resources.

Program 3: Desert Solutions

Outcome 4: Increased social capital of desert people in their communities or service organisations.

An important part of DKCRC research was our focus on ways to strengthen the human and social capital of desert Australians. Social and cultural capital was studied directly in our early theme-based studies on governance and later through our Social Science function. As core projects developed from year three onward this Social Science function ensured integration of social development processes with research. It yielded new insights into the values, traditions and practices that rule desert life, and the importance of incorporating these into new policies, activities and structures intended to benefit desert communities.

DKCRC also made an important contribution in the training of scholars specialised in developing the social capital of the Australian deserts. By the start of 2010 six PhD candidates had completed their research and 13 more were in the final writing stages. Seven postgraduate students had completed and 32 more were on track to complete by mid 2010. Fourteen graduate students and trainees had found jobs, 10 of which were in desert Australia. A total of 11 Aboriginal students and trainees are being supported to completion or to other employment, of whom five had completed by 30 June 2010.

Output 4.1: Ensure that Australian graduates are more aware of desert issues and more prepared to come and work in desert Australia.

The milestone targets under Output 4.1 required that at least 25 postgraduate degrees be completed with skills relevant to the future of desert Australia and that at least 10 Aboriginal students were supported to successfully complete postgraduate, graduate or vocational training and education programs.

At the time of the DKCRC's closure, 11 PhDs were completed, with 18 students on final writing stages or submitted.

Other milestones demanded that at least five DKCRC PhD students be employed by desert Australia organisations. By closure, 13 graduate students and trainees had jobs, 10 of which were in desert Australia. A total of 11 Aboriginal students and trainees were supported to completion or to other employment.

One milestone, '4.1.4 Develop postgraduate training courses about desert Australia', was cancelled in 2009 as notified in Agreement variation.

Output 4.2: Develop links between local knowledge and Western science, leading to better integration and understanding of the value of different knowledge.

Milestones under Output 4.2 demanded the improvement of protocols for collaboration, management and ethics, and the development of tools and training resources to improve research capacity.

Our *Aboriginal Knowledge and Intellectual Property Protocol Community Guide* was created and published as large-format book for Aboriginal people, and in PixelPage™ page-turning format on our website. Our IP and ethics registers were updated twice per year and background guides to IP (eight of) were web published; these were in the top 10 downloaded items from the DKCRC website.³⁶ A DVD on Aboriginal cultural significance of desert food plants was created.

Case Study: Walking Together, Working Together

The DKCRC *Collaboration Project*³⁷ laid the groundwork for the 'Vision for Collaborative Research', which guided and informed DKCRC in all our work and respectful dealings with Aboriginal people. This vision was based on 'good communication, informed consent and open negotiation of benefit sharing. Methodologies embrace ethics, good practice, respect for Traditional Knowledge, and accountable transfer practices.' Among its principles was that all research should be of value to the affected community on its own terms.

In *Walking Together, Working Together*³⁸ we identified important considerations for partnering between research organisations and Aboriginal organisations in desert Australia. This report explored the need for trust and clear understanding about the nature of the research partnership. It was one of several studies that had a seminal impact on the development of DKCRC's internationally acclaimed protocol for research work with Aboriginal communities and respect for Aboriginal knowledge.³⁹

Program 3: Desert Solutions

Outcome 4: Increased social capital of desert people in their communities or service organisations.

Output 4.3: Consolidate and integrate information about desert Australia.

Our focus under Output 4.3 was to develop and provide access to databases of desert information. Among the many successful outputs in this area were the VRUM™ traveller database, the directory of grants for small businesses⁴⁰, extensive new material on the population size, extent and impact of feral camels⁴¹, the ACRIS report 'Taking the Pulse', an extensive review and mapping of natural resources of the Lake Eyre Basin⁴², several maps of the extent and impact of fire across desert Australia⁴³, a series of wind erosion maps⁴⁴, and our trends and movements report⁴⁵.

Case Study: Desert Fire

Fire is a dominant feature of the deserts, ranging from seasonal spot fires to vast conflagrations hundreds of kilometres in extent that burn for weeks. Managing fire is key to managing desert landscapes and their resources and this management presents opportunities for sustainable livelihoods. DKCRC produced Australia's first large-scale investigation into the impacts of wildfires on infrastructure, productivity and biodiversity, and community attitudes to their management.

The project studied fire regimes and issues in the Tanami Desert. It examined Aboriginal use of fire as perceived by non-Aboriginal fire professionals and by Warlpiri and Pintupi people, as well as pastoralists' perspectives. It explored fire management of conservation reserves in central Australia and impacts on biodiversity, including a case study of fire in the West MacDonnell Ranges National Park. This huge, complex and highly collaborative research project won the Northern Territory Government's 2008 Desert Knowledge Research Award.



DKCRC's Desert Fire project won the Northern Territory Government's 2008 Desert Knowledge Research Award.



Outputs of the DKCRC

DKCRC RESEARCHERS WERE PROLIFIC in their published outputs. During the seven-year operation of the Centre we produced 59 research reports, 61 working papers and nine book sections and 102 journal articles. Journals, often the most influential media for disseminating knowledge, are ranked by the Journal Impact Factor index, which shows how many people are likely to read and cite papers from that journal. We had a total of 196 citations from 30 ISI-ranked journals, with an average citation score of 6.53. The impact factor of *The Rangelands Journal* rose from 0.545 in 2008 to 1.231 in 2009, partly thanks to the DKCRC special issue. Our most cited paper was 'Global desertification: Building a science for dryland development' in *Science* (vol. 316, issue 5826), with 61 citations.

Our outputs were not of course restricted to publications. The Fire Trailer, developed by the Northern Territory Fire & Rescue Service and partner the Centre for Appropriate Technology with funds from by DKCRC, made remote communities safer. It's a unit with a modular platform which houses a 600 litre polypropylene tank and pump and is attached to a dual axle frame; it can be towed by any 4WD and is rugged enough to withstand harsh treatment. Most communities have no dedicated fire-fighting equipment and so the Fire Trailer is an affordable option that is specifically designed for fire fighting. Building the trailer created training opportunities for Aboriginal youths working with CAT on assembling the trailers.

The intellectual property developed in our remote livestock management system (RLMS) project was transferred to a spin-off company, Precision Pastoral Pty Ltd, for commercial development. RLMS is an automatic drafting system that links ear tags to computerised monitoring in order to select market-ready stock without the need for physical mustering. Two prototype RLMSs were sold to the Northern Territory Government's Department of Resources for use in research trials, one at the Old Man Plains research farm and the second on several locations around the Douglas Daly research farm. Conventional mustering (via helicopter, motorbike or horse) costs around \$25

Case Study: Improving efficiency in the pastoral industry

DKCRC's 21st Century Pastoralism™ project yielded measurable economic benefits to Australia's pastoral industry. The technology for remote monitoring and control of infrastructure, saving end users time and money, was introduced to desert areas by DKCRC.

The WaterSmart Pastoral Production™ project introduced the best off-the-shelf ideas for saving and managing water in desert regions.⁴⁶ Managers of outback cattle stations reported savings of \$20–30,000 each a year from implementing its recommendations. One station saved 3000 kilometres per year of travel in bore runs from just two remote monitoring units.

DKCRC also developed new technology that increases a pastoralist's ability to monitor and manage livestock and infrastructure remotely. Greater frequency and accuracy of information about livestock reported through radio transmission back to a central point (homestead) at low cost allows better management and marketing decisions to be made. This 'remote livestock management system' (RLMS) went under trial on Napperby Station, NT. It identifies individual cattle with an electronic ear tag, records their weight when they come to water, and automatically drafts market-ready animals into a holding yard. RLMS saves on costs such as helicopters and labour for mustering and increases profits by giving the pastoralist more precise information on the size and timing of animals going to market.

End-user feedback: Kate Lawrence, Community Development Officer, Waltja Tjutangkku Palyapayi Aboriginal Corporation and Wendy Matthews, Director of Research and Education, Office of Indigenous Policy Coordination

Kate: 'Validation through, for example, the *AKIPP Community Guide* [was the main benefit]. The creation of the guide was a validation of [Indigenous] participants' knowledge. The CRCA award for the community guide was also a great validation and has enhanced Waltja's status with other organisations that seek to deal with them. Other organisations have "taken note".'

Wendy: 'DKCRC's linkage with other places in the NT has been useful as there's a wide field of expertise that can be called upon. DKCRC developed its intellectual property guidelines and these were great for local researchers. OIPC was doing similar work in regard to remote service delivery, both nationally and in the NT. This collaboration complemented the work OIPC was doing in Ntaria and Yuendumu, and part of the DKCRC model with the Waltja women helped in this regard. Having the relationship with DKCRC meant that OIPC was able to work with the Waltja women quite easily as both organisations were part of the 'DK' relationship; OIPC was also able to support those communities.'

per head and occurs twice yearly. RLMS drafting is based on tag number selected through weight-gain profiles built over time; at Old Man Plains a paddock of 180 head yielded 4000 weight recordings over two weeks; the RLMSs returned drafting accuracy rates of 95%. Precision Pastoral PL has since attracted funding of \$80 000 from the Australian Government's

AusIndustry 'Commercialising Emerging Technologies' (COMET) program.

The Sparse Ad hoc Network for Deserts (SAND) project is an innovative use of telecommunication technologies for remote and rural Australia. Originally envisaged as a cost-effective voice and data service for remote Aboriginal settlements, SAND went

End-user feedback: Roy Chisholm, owner-manager, Napperby Station pastoral enterprise

'[DKCRC] put me in touch with likeminded people and likeminded ideas; it's created synergies to move those ideas forward. That goes through from corporate bodies right through to individuals . . . The greatest benefit is that areas and opportunities that might not otherwise be picked up by the private sector were picked up by the DKCRC. This was particularly the case of course with the remote livestock work.'

End-user feedback: Daniel Walker, Deputy Chief of Ecosystem Sciences, CSIRO

'Communication has been better facilitated; it was a forum for Indigenous stakeholder groups that built trust in a culturally appropriate way. DKCRC's development of protocols and suchlike have made communication easier and more rewarding. CSIRO complies with these protocols and has used this knowledge in the development of its own protocols with Indigenous communities; CSIRO researchers contributed to this process and benefitted from being a party to this.'

Case Study: Respecting Aboriginal Intellectual Property

The DKCRC *Scoping Project on Aboriginal Traditional Knowledge* provided a foundation for the development of strategies in Aboriginal engagement in the research process that fully respected the role of Aboriginal traditional knowledge and practices. It was prepared by a team of Aboriginal and non-Aboriginal researchers and led to improved protocols for working with Aboriginal people.

The *Aboriginal Knowledge and Intellectual Property Protocol Community Guide*, which followed this development, outlined the principles of respect for knowledge in plain English. Designed to help Aboriginal communities partner with researchers learning about their cultural background, traditions and other information held by the community, it used the medium of dot paintings to explain the complexities of intellectual property ownership. The guide was launched in Federal Parliament and was used to inform policy and procedures in several federal and state government departments and agencies.

on to encompass digital voice services (voiceover IP) that improve capacities of existing inter-settlement infrastructure, ad hoc voice networks within settlements, and improved services similar to existing UHF repeater services. SAND has yielded potential commercial application of telecommunications technology and while the system does not yet have commercial application in its own right it has opened several options that are being explored.

Our world-first guide on the respectful sharing of Aboriginal traditional knowledge was awarded one of the research sector's highest accolades. The *Aboriginal Knowledge and Intellectual Property Protocol Community Guide*, produced by the DKCRC in partnership with Waltja Tjutangkku Palyapayi, was recognised in the Cooperative Research Centres Association Awards for Excellence in Innovation.

The guide illustrates complex issues of intellectual property negotiation using Aboriginal dot paintings and plain English language. It was created to assist partnerships between Aboriginal people and researchers working in areas that aim to 'close the gap' of Aboriginal social disadvantage or wishing to learn more about how to do research with Aboriginal people.

The guide is being used by government departments and researchers to improve cooperative relationships with Aboriginal people and to avoid confusion, misunderstanding and mistrust in addressing the key issues of Aboriginal disadvantage. It explains intellectual property rights in clear, transparent language and illustrates the process of reaching agreement about knowledge sharing in five vivid dot paintings by noted Aboriginal desert artists.



Impacts of the DKCRC

DKCRC'S IMPACT IN DESERT AUSTRALIA

has been immense; measured in dollar terms alone the investment by government as a direct result of our research rested at \$150 million upon our closure on 30 June 2010. Most importantly, our impact was at the highest levels: input into policy change at government level; the development of social infrastructure around the research community; a significant growth in the number of trained or qualified researchers finding employment in the desert; and the creation of networks within small enterprises such as the bush foods industry and the art movement.

Our report on *Population and Mobility in Town Camps* provided the first in-depth look at the numbers of people living in Alice Springs town camps and their mobility patterns (see case study).

The Lake Eyre Basin (LEB) is a vast area that covers parts of South Australia, Queensland the Northern Territory and New South Wales and is characterised by a sparse population with a marginalised political voice. Eight state, territory and federal governments exist across the LEB, each with its own set of funding priorities, particularly in the field of natural resource management.

DKCRC was commissioned by LEB's Community Advisory Committee (CAC) to understand the factors needed for meaningful engagement between residents and those in the often-distant policy-making centres. Our community-based research approach discovered that while residents strongly prefer face-to-face interaction with their policy-makers, governments preferred to conduct dialogue through 'cost effective' communication technologies using methods that do not require a physical presence.

The study demonstrated that the importance of context is critical to successful dialogue. It also demonstrated the crucial importance of community-based research when dealing with sparse, remote populations, building as it did critical social infrastructure around the research community.

Similarly, our work on feral camels has led to joint Commonwealth investment of \$19 million dollars in Australia's tristate desert regions, to be matched

Case Study: Creating livelihood opportunities

Our report on *Population and Mobility in Town Camps*⁴⁷ had a massive and continuing impact on the lives of one group of marginalised desert dwellers: those people living in Alice Springs town camps.

The study provided the first accurate assessment of the numbers of people living in town camps and their mobility patterns. It was based on a model of Aboriginal researchers collecting and analysing data to ensure better data quality and ownership. Our research found that there were twice to four times as many people living in the Alice Springs Town camps as was believed from censuses.

The impacts of the study were substantial: an immediate tranche of funding to improve the sewage systems and an evidence base from which to argue for more housing, which resulted in the Australian Government allocating over \$120 million for new housing. Aboriginal researchers who gained skills on the project obtained more work on the 2006 Australian Census and in other areas.

Case Study: Developing the bush foods industry

DKCRC worked closely with Aboriginal communities, wild harvesters, growers, food processors and retailers, beginning with a review of the commercial potential of desert plants and the existing commercial industry.⁴⁸ Research Report 2 was accessed up to 180 times a day in its first year.

Our research effort focused on the commercially established bush tomato (*Solanum centrale*) with the aim of developing a robust supply chain leading to more jobs, opportunities, enterprises and skills for people living 'on country' and in remote areas as a model for the industry as a whole.⁴⁹

Bush foods producers from central Australia were linked up with those from north Western Australia and, later, with Maori food producers from New Zealand. A number of senior women were introduced to the bush food supply chain, an important step in empowering harvesters to learn about the needs of the industry they supply and to achieve greater equity and control within the industry as produce consolidators and primary processors.⁵⁰ This 'walk of the value chain' also showed those at the downstream end of the chain the cultural importance of bush tomatoes to Aboriginal people, and the new relationships forged between different parts of the value chain has meant that harvesters have more selling opportunities and are able now to get higher prices for their product than they were previously.

dollar for dollar by the affected states and territories. The resulting Australian Feral Camel Management Project is by nature and necessity a truly collaborative venture. The monitoring of camel population and movement in particular requires close cooperation between government departments, communities and end users; camels traverse immense regions and ignore state and territory boundaries, so collaboration in the project will continue to be an essential part of its success.

Our work with bush foods producers resulted in changes in an industry traditionally riddled by problems of

fragmentation, supply, quality control, and marketing and distribution. The industry's alliance with the Rural Industries R&D Corporation generated research activities exploring the flavours of 16 bush foods, the use of bush food extracts to prolong the shelf life of products such as fish, and the health attributes of bush foods and how to include them in international food safety standards, via the Codex Alimentarius.

In two major action-learning case studies the DKCRC's research team provided advice to two businesses, held workshops for computer network

training, and established a commercial website for WestCAN. As a result of DKCRC work in these communities, new small businesses were established and general interest in developing small enterprises in the area increased (see End-user feedback: Patricia Gunter). A short DVD highlighting Patricia Gunter's *Pampul healing and therapy wiru* was produced; Ms Gunter went on to become an important role model, mentor and advocate for Aboriginal-owned micro-businesses in the region.

Case Study: Helping desert businesses

DKCRC's analysed business opportunities and provided assistance with planning, links to supporting agencies, feedback about products, sponsorship of attendance at trade fairs, marketing advice and help in launching products.

In the remote community of Scotdesco, WA, the residents were helped by DKCRC to source funding to purchase infrastructure for an internet cafe. The café proved to be a boost to community morale and brought new life and social interaction.

The Leonora community wished to start a business mustering goats for a market they knew existed. They had the funds, but needed a business plan. DKCRC helped them with the plan, with marketing and with further links to clients. The same community also had a number of talented artists and a store to sell their art but the traffic was insufficient to sustain the shop and so it closed. DKCRC helped the community to mount an exhibition at an art gallery in the major centre of Kalgoorlie, WA. This was very successful and led to many sales. However, the main benefit lay in the increase in the community's confidence from finding their work in demand. This galvanised them into sharpening their goals and vision, leading to an action plan and a new internet sales site.

End-user feedback: Terry Coulthard, Administrator, Iga Warta Aboriginal tourism enterprise

'It [involvement with the DKCRC] was useful, it brought us to the attention of lots of organisations that we weren't collaborating with. There were government organisations, state and federal, that we wouldn't otherwise have had any contact with.

'Iga Warta is a small business model and we really rely on ourselves to be self-sufficient. We were part of a study and that was useful to find out what other people were doing, but we were providing information on how to be sustainable to other places too . . . It's been good because it's brought us to the attention of other places but it's also brought us to the attention of other organisations and government. The raising of our profile was really useful.'

End-user feedback: Patricia Gunter, small business owner and member of Far West Coast Aboriginal Enterprise Network

'Sharing their information is good. It was really good, really well done. I suppose that when I met people from DKCRC they were reaching out to people like us, just bringing the hook to us and we grabbed the hook and went with them; they showed us the way and made us feel strong about our confidence. There was no shame in taking that help; DKCRC really supported us and got us going. They gave us that energy and strength, that power that we can do it.

'I'd like to thank DKCRC for coming and taking me through all those journeys so I have confidence and a strong spirit. I'm now a role model for other people talking about creating a business. People ask me 'How did you go up?' I always say, "Desert Knowledge". I believe it's a powerful word and it just took all of us with it . . . I've been doing healing through my business, and through DKCRC people are opening up to themselves. I think that the spiritual side of Desert Knowledge is as important as the physical side. I thank them for where I am in 2010.

'I'd just like Desert Knowledge to keep going on, keep helping Aboriginal businesses and meeting other communities. It's about healing ourselves and our communities, about meeting other people . . . For me, I believe powerfully that Desert Knowledge is the way to go.'



Impact of DKCRC's educational programs

THE DKCRC HAS MADE AN important contribution in the training of scholars specialised in developing the social capital of the Australian deserts. At the DKCRC's closure, 11 PhD candidates had completed their research and 18 more were in the final writing stages. Seven postgraduate students had completed and 32 more were on track to complete by mid 2010. Fourteen graduate students and trainees had found jobs, 10 of which were in desert Australia. A total of 11 Aboriginal students and trainees are being supported to completion or to other employment, of whom five had completed by 30 June 2009.

The chance for graduate students, trainees and community researchers to find employment in desert institutions was considerably enhanced by DKCRC's presence and the provision of study and training opportunities offered through our research and that of our partners. Core Project 1 alone provided an avenue for four DKCRC-supported students to find work, three of them in desert regions. CP1 research into the employment requirements of desert people and desert employers, based around Aboriginal rangers at the Alice Springs Desert Park, significantly aided employment prospects and retention in that sector. The research found that employment processes, mentoring and cross-cultural training are all important factors in accounting for success in Aboriginal employment. Outcomes from the research were published, thereby offering input for the provision of education and employment.

The provision of education and training to settlement residents through our 'community researchers' program provided outstanding employment successes. The *Population and Mobility in Town Camps* project and its aftermath has already been mentioned above. Training delivered through the Stories inLand™ project saw 12 young people in Warlpiri communities carry out the creation and post-production of videos in which elders recorded traditional knowledge; this led to several going on to gain employment in other video productions. In Dajarra, Queensland, 10 Aboriginal community researchers were trained to develop skills in the management and maintenance of their community's water supply system. This

Case Study: Jobs in the park

DKCRC's Livelihoods inLand™ project delivered important new insights into how Aboriginal people view employment, based on research with employees at the Alice Springs Desert Park.⁵¹ It found that pre-employment processes, mentoring, style of training, cross-cultural training, relationships with co-workers and the dual role of some Aboriginal people as both rangers and traditional owners were important factors in the park's success in interpreting and presenting Aboriginal culture. All these helped it to operate outside the normal workplace hierarchies and to accentuate relationships. The findings have been shared with Australian Government departments interested in increasing Aboriginal employment.

Case Study: Demand-side approaches to water delivery and management

Our study on *Remote Community Water Management*⁵² found that many small communities that had the skills to run their own water supplies had been discouraged or prevented from doing so by external managers. It found that these communities were quite able to meet Australian Drinking Water Quality Guidelines provided they had some training in risk management and were empowered to do so. This study fed directly into DKCRC's popular *The Water Handbook*⁵³, a do-it-yourself guide to risk management of water supplies for isolated settlements of 50–100 people and 8–20 homes.

On the strength of its findings the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) made recommendations to the National Water Commission (NWC) for best management of water supplies in remote communities.

Student profile: Jane Walker

Does Aboriginal participation in management enhance conservation outcomes within protected areas? Jane Walker's PhD research tackles this question, with particular focus on the Northern Tanami Indigenous Protected Areas (IPA) in the Northern Territory. Jane's research looks at the values and objectives that are important to Aboriginal people, the participatory processes required for effective management, and the regional and national priorities and standards for management.

Jane's preliminary findings have already illustrated that Aboriginal interests in management are driven by cultural and emotional attachments and responsibilities to country, while regional and national agendas are driven principally by the need to improve environmental outcomes. This diversity places pressure on the effective management of the IPA.

There are numerous other challenges, such as social and cultural commitments, youth engagement, and funding and support. With the recognition of such challenges comes the awareness that many management objectives for the IPA are not being met, in particular local management objectives. The research findings illustrate that management processes such as community ownership and involvement, shared learning, partnership development, and management recognition are key requirements for better achieving local management objectives and thus contributing towards the effective management of the Northern Tanami IPA.

Jane's project involves traditional owners and other Warlpiri and Gurindji community members, as well as the Central Land Council and the Department of the Environment, Water, Heritage and the Arts. Jane hopes to see increased recognition of Aboriginal land management practices as part of her research outcomes, promotion of more equitable and effective policy and support for Aboriginal land managers, and improved cross-cultural partnerships.

project not only provided educational and possible employment outcomes for these researchers but also resulted in the Australian Government's Department of Families, Housing, Community Services and Indigenous Affairs adopting the DKCRC approach to engaging Aboriginal people in evaluation of Remote Service Delivery and Closing the Gap policy initiatives.



From left; Lily Hargraves, Myra Herbert, Margaret Martin, Jane Walker, Rosie Tasman and Biddy Jurrah tracking bilbies and other mammals in the Northern Tanami Indigenous Protected Area for the creation of a tracking book with Ada Nano from the Central Land Council.



Impact of DKCRC collaboration

IN THE PERIOD BEFORE THE establishment of DKCRC there were several organisations (businesses, research bodies and academic institutions) whose sphere of operation traversed Australia's deserts. Some partners, such as CSIRO and the then Aboriginal and Torres Strait Islander Commission, were national organisations with sections or divisions devoted to the deserts. But there was no single, multidisciplinary body devoted solely to understanding, researching and developing desert knowledge.

DKCRC changed this completely. A key achievement of the DKCRC has been the substantially increased level of collaboration between organisations that operate in and across our deserts. In this final year of operation we were pleased to see the collaborations developed during our research period showing every sign of continuing.

A fine example of this continuity is the work carried out by Dr Mark Stafford Smith and Dr Ryan McAllister in the Science of Desert Living project. SDL's principal accomplishment has been to engage businesses, government, research institutes, communities and individuals in the academic debate about the drivers of difference in the desert. SDL produced several papers targeting specific topics, but the highest profile example of SDL work was the publication of *Dry Times: Blueprint for a Red Land* by Mark and Prof. Julian Cribb. Promotion of the book was not restricted to the regular book launch but innovatively took the desert to the nation's capital. Two seminars, held to attract a more political and bureaucratic audience than was possible in Alice Springs, discussed and explained the content of the book; the first was held at the CSIRO Discovery Centre while the second was held in the Australian Government's Department of the Environment, Water, Heritage and the Arts. Both events allowed the lead researchers to promote and reinforce the desert knowledge message with policy-makers and senior bureaucrats.

Tangentyere Council was a key participant in the town camp population mobility and density study which led to significant infrastructure funding for town camps by the Australian Government. Aboriginal people were trained in data-gathering and analysis during the project; these community

Case Study: *Dry Times: Blueprint for a red land*

CSIRO and DKCRC researcher Mark Stafford Smith's book *Dry Times: Blueprint for a red land*, written with Julian Cribb, distilled many of the central insights and findings from across DKCRC's whole research portfolio into advice for desert policymakers and also for Australia and the world in general. *Dry Times* showed how all life in our deserts is attuned to coping with scarcity and variability, and illustrated how this has lessons for humanity as global resources run low, for Australians seeking to live more sustainably in this lean and variable continent, and for policymakers in understanding why policies that work in cities do not always work so well in deserts, and what might work better.

Research partner feedback: Drew Dawson, University of South Australia

I think it [being part of the DKCRC] opened a lot of doors for us to engage in [desert Australia]. Jan and Craig and the guys were particularly good at building relationships. We came in at the end of the DKCRC process and we put ourselves in a good place for the next phase, CRC-REP . . . The management team of the DKCRC was the greatest I've worked with.

Research partner feedback: Daniel Walker, Deputy Chief of Ecosystem Sciences, CSIRO

Carrying out participatory research is challenging and expensive in terms of time and transaction costs; DKCRC has helped in providing a forum to meet participants and build trust quickly. DKCRC's ways of doing research were invaluable. Its research agenda fell between its original bid ambitions and those at the end of its life; at the end there was a lot more investment in social and institutional participation, particularly the Indigenous aspects. CSIRO was effectively doing this in parallel but this meant that CSIRO both contributed to and benefitted from this process. An example is the Livelihoods inLand™ project; there was a shift to a systems focus and the community view in arid environment. Both organisations' agendas changed but CSIRO's possibly changed more quickly because of its relationship with DKCRC.

researchers have become critical members of the Tangentyere research workforce.

The Australian Feral Camel Management Project (AFCMP), which was based on research conducted through the DKCRC but transferred to Ninti One Ltd following DKCRC's wind up, is a truly collaborative venture. The monitoring of camel population and movement in particular requires close cooperation between government departments, communities and end users; camels

traverse immense regions and ignore state and territory boundaries, so collaboration in the project will continue to be an essential part of its success. Our research triggered awareness of the feral camel problem and new collaborations for their management: state, territory and the national governments created the National Camel Action Plan and the AFCMP was funded from the Caring for Our Country program as a result of the collaborative proposal from 19 desert-based organisations and led by Ninti One Ltd.

Research partner feedback: Neal Ryan, Pro Vice Chancellor (Research), Southern Cross University

The strongest aspect of working with DKCRC was that it helped create partnerships with other universities, as well as with industry partners. DKCRC's credibility in communities and settlements allowed researchers to link up with these communities. Some of these relationships existed beforehand and so to some extent these were enhanced; however, there were several relationships that were entirely new . . . Compared to other CRCs we're involved with it probably makes its information more accessible. Although it owns the intellectual property it's disseminated it pretty readily.

Capacity building has been important, as well as providing access to projects that the SCU would not be able to fund by itself. Being involved in DKCRC has also helped broaden the horizon of researchers, especially those researching in 'narrow' areas; they've been able to see new ways their research could be used.

Working with DKCRC has also improved collaboration within SCU as it's improved our interdisciplinary research capabilities.

DKCRC Exit Survey: assessing our impact with stakeholders

In August 2010 the DKCRC conducted an exit survey among a representative group of stakeholders. Eight core partners and five end users participated in phone interviews to gauge their satisfaction with the DKCRC's research, collaboration, output and communication strategies. The questions were devised to elicit responses about the success or otherwise of our collaboration, our information sharing, and the value that each participant gained from its involvement in the DKCRC. An independent third party was engaged to conduct the survey in order to ensure frank responses were gained.

The survey responses (extracts from some of which are reproduced in this report) indicate high levels of satisfaction with DKCRC's operations, particularly from our end users. Collaboration was considered to be well managed and adding great value to the research and application process, and our information sharing was considered to be of a high standard. There was some criticism of the project management process; essentially, this related to the high levels of reporting required, though this was tempered with an acknowledgement that the CRC process itself is considered by several partners (particularly within academia)

as being 'report heavy'. Our realignment in year two from theme-based research to core project research was recognised as having slowed the overall research process but acknowledged as necessary to achieve our desired outcomes. Several interviewees commented positively on our responsiveness to partner feedback and our ability to 'fix problems' in a flexible and timely manner.

Importantly, DKCRC was seen both as valuable in its own right and an important contributing factor in many organisation and end users' decisions to become involved in the new CRC for Remote Economic Participation.



Future prospects

UPON THE CONCLUSION OF THE DKCRC many of the ongoing grants and projects, commercialisation activities and intellectual property (IP) were transferred to Ninti One Limited (NOL). NOL was the centre agency for DKCRC and has a separate, independent Board. It managed DKCRC's contract research and grants attached to programs that would endure after DKCRC's tenure ended and so it was well placed to take on the role of administering and supporting the financial, IP, and commercialisation and utilisation aspects of DKCRC research.

An early achievement of the DKCRC was the development of its Intellectual Property Register; preparing the transfer and management of the register's contents formed a key part of the wind-up activities that began in 2009. Each program area, project, research activity or education activity was examined and the IP generated was allocated to an appropriate body, organisation, group of organisations or key stakeholders, or transferred to the public domain. Examples of this transfer are cited below.

The Bush Foods core project (CP2.1 under Program 1: Desert Enterprises) developed a huge amount of IP. The milestone attached to this project

required that DKCRC 'create business case(s) for identified livelihood opportunities'; this milestone was achieved within the life of the DKCRC but the period beyond 30 June 2010 required control by key research partners no longer aligned to either DKCRC or NOL. Thus the horticultural knowledge was transferred to a group of key research partners: the Outback Spirit Foundation; Laramba Community (Napperby Station); the Northern Territory Government's Department of Resources (Primary Industry, Fisheries and Resources); and Pendleton's Agriculture.

Related work on the biomedical application of plant extracts (part of the Plants for People project) was handled differently. While results of the project's research into plant extracts were discussed with a number of private commercial partners, no agreement for ongoing development was reached by 30 June 2010. Discussions were, however, ongoing and so NOL will work with project partners (including Curtin University of Technology, the University of South Australia and the University of Western Australia) to seek appropriate mechanisms for the use of the project's IP in the future.

The IP for our prototype remote livestock management system (RLMS, an outcome of 21st Century Pastoralism™) required yet another approach. As at 30 June 2010, market research and business planning were underway that will inform the commercialisation of the technology. The IP in the technology was transferred to a spin-off company, Precision Pastoral Pty Ltd, and accepted into the Australian Government's AusIndustry 'Commercialising Emerging Technologies' (COMET) program.

As well as maintaining IP and commercialisation of research, NOL will be the agency operating the newly formed CRC for Remote Economic Participation (CRC-REP).

Due to the long lead time of writing up research a large volume of work will enter the editing and publishing process after DKCRC's formal closure. A number of research reports and working papers will be produced after 30 June 2010; these will be produced electronically and added to the DKCRC legacy website. This site will continue to host our publications, media releases and newsletters, with a bibliographic server ensuring that all tagged publications can be searched, accessed or downloaded well into the future.

Research partner feedback: Charlie Thorn, Director, Australian Sustainable Development Institute, Curtin University of Technology

Q. What value would you place on being part of the DKCRC?

A. Huge. Massive. Very important. Indigenous research in this university is very large, in part but not all because of DKCRC. The DKCRC gave us the opportunity to build our presence. We're the number two [university] in Australia in this area so our marketing into that socioeconomic group was big. It's also been important in our involvement in the new CRC-REP too.

Endnotes

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Bush tucker photo (lower left): courtesy Alice Springs Desert Park.



DESERT KNOWLEDGE CRC

Desert Knowledge Cooperative Research Centre
PO Box 3971
Alice Springs NT 0871
Australia

Phone (+61) 08 8959 6000

Fax (+61) 08 8959 6048

E-mail info@nintione.com.au

Website www.desertknowledgecrc.com.au