Economic Analysis of Investment in Indigenous Natural Resource Management

Background

Indigenous Australians directly own and/or manage approximately 20% of Australia's land area. They are therefore significant managers of Australia's natural resources. They are also key stakeholders in the management of other areas and resources (e.g. water) over which they don't hold the primary management role. Indigenous Australians also hold significant intellectual property in understanding and managing these natural resources.

Land & Water Australia (LWA) had a Social and Institutional Research Program (SIRP) that aimed to focus on understanding, supporting and informing people working in natural resources management (NRM). As part of SIRP, a range of projects have been funded in the area of Indigenous Natural Resources Management. The program manages research projects in partnership with Indigenous people, communities and organisations. The projects focus on Indigenous Australians, their relationships with the environment and their involvement in natural resource management.

The projects

The projects to be included in this ROI analysis are presented in Table 1. Five of the projects were funded out of SIRP, while one of the projects (NTU18) was funded out of the LWA General Call.

Table 1: Project Information

Project Code and Title	Other Details
NTU7: Healthy Country Healthy People (Sustainable northern landscapes and the nexus with Indigenous health)	Organisation: Charles Darwin University Period: December 2003 to June 2007 Principal Investigator(s): Stephen Garnett
TRC3: Indigenous knowledge capacity in the Northern Territory	Organisation: Tropical Savannas Management Cooperative Research Centre Period: May 2004 to July 2007 Principal Investigator(s): Joe Morrison
NTU18: Indigenous participation in water resource management: The Anmatyerr Kwatj project	Organisation: Charles Darwin University Period: July 2004 to April 2008 Principal Investigator(s): Naomi Rea
ACF1: A cultural and conservation economy for northern Australia	Organisation: Australian Conservation Foundation Period: April 2006 to July 2007 Principal Investigator(s): Rosemary Hill
TRC13: Indigenous participation in the National	Organisation: Tropical Savannas Management Cooperative Research Centre

Water Initiative	Period: June 2006 to July 2007 Principal Investigator(s): Joe Morrison
NTU23: Customary law governance in water resource management	Organisation: Charles Darwin University Period: June 2006 to October 2008 Principal Investigator(s): Donna Craig

Project objectives

Table 2 presents the objectives for each of the six projects.

Table 2: Project Objectives

Project Code and Title	Objectives
NTU7: Healthy Country Healthy People (Sustainable northern landscapes and the nexus with Indigenous health)	• To determine if landscape health, using a number of simple measures, is different under contrasting Aboriginal land management regimes. • To compare the health and wellbeing of Aboriginal participants in land management compared with non-participants. • Initiate critical evaluation of policy options for land management contributing to the development of Indigenous sustainable futures. • To seek Indigenous views about sustainable northern Australian landscapes.
TRC3: Indigenous knowledge capacity in the Northern Territory	To develop a strategy titled "A Strategy for the Conservation and Application of Indigenous Knowledge across North Australia" through: • Documenting the needs and aspirations by Traditional Owners (TOs) with respect to the conservation of Indigenous knowledge (IK) across north Australia. • Identifying the constraints that impede the use, articulation and engagement of IK into broader NRM R&D across the region. • Developing an overview of what has been undertaken in Australia and internationally and why it has succeeded and failed. • Developing an overview of other issues relevant – intellectual property rights, information technology requirements, communication needs, resourcing for on-country activity needs across jurisdiction, collaborations between Indigenous landowners and researchers. • Developing a workable strategy for the systematic conservation and application of IK to integrated NRM at the local, regional and north Australia levels. • Communicating and disseminating findings to ensure full exposure and investment in local and regional scale knowledge conservation and that application occurs swiftly.
NTU18: Indigenous participation in water resource	• In collaboration with Indigenous people, further develop methods for documenting cultural values of water and formats for acknowledging and conveying this traditional knowledge. • Support training of Indigenous people in research and foster

management: The Anmatyerr Kwatj project	understanding of management processes so that on project completion, individuals can continue as ambassadors for water in their communities. • Determine existing Indigenous rights and precedents from international and Australian law and negotiated agreements. • Build working relationships with relevant agencies to explore opportunities for values and rights to be recognised. • Initiate modifications to NRM structural arrangements, management processes and legislation to better reflect existing rights and emerging priorities surrounding Indigenous issues and water. • Create opportunities for Indigenous people to achieve economic gain from water, achieve rights and participate in decision making.
ACF1: A cultural and conservation economy for northern Australia	• To prove the relevance of the concept of Ecotrust Canada's 'conservation economy' model for Indigenous and rural sustainable community development in Australia, particularly northern Australia. • To examine the opportunities and limitations within the current Australian institutional settings, particularly of northern Australia, that would affect the application of the principles and components of Ecotrust Canada's model.
TRC13: Indigenous participation in the National Water Initiative	• Consider Indigenous water policies, management models and economic opportunities arising from water use. • Provide sound information and knowledge to Indigenous organisations and state water resource managers, the National Water Commission and researchers. • Produce an endorsed research program detailing research questions, methods, partnerships and budgets to be submitted to LWA and other research providers in 2007 for funding in subsequent years. • Provide advice to the Tropical Rivers Consortium currently under development. • Develop communication materials for northern Indigenous communities. • Generate and recommend policy options for government, industry, research and non-government sectors on a range of issues including best-practice in Indigenous participation in water resource planning and other standards for working with local Indigenous communities.
NTU23: Customary law governance in water resource management	• Negotiate a Governance of Water Agreement for N'gul (Anna's Reservoir). • Build capacity in all partner organisations, communities and individuals in environmental governance and the benefit sharing approach to NRM. • Research and develop the two-way process for working within NRM. • Identify and demonstrate Indigenous livelihoods in land and water management from agreements about research and management, and benefit sharing approaches (i.e. rangers, researchers, linguists, negotiators, project managers).

	• Forge good relationships between actors that provides for further partnership opportunities (Indigenous Nations, Desert Knowledge CRC, NT Parks and Wildlife, other arms of Government, Charles Darwin University, Macquarie University Centre for Environmental Law (MU-CEL)). • Demonstrate and communicate approaches for forming Agreements and best practice examples for research, protocols, traditional knowledge management and recognition of customary law that will significantly improve effective governance arrangements for water resource management.

Investment costs

Details of the funding of the projects by LWA and others are provided in Tables 3 and 4. Table 5 presents a summary of the total funding for the six projects.

Table 3: Resources Invested by Year by LWA (nominal dollars)

	NTU7	TRC3	NTU18	ACF1	TRC13	NTU23	Total
2004–05	110,000	180,000	101,739	0	0	0	391,739
2005-06	150,000	92,700	103,373	22,000	0	25,000	393,073
2006-07	85,000	20,160	10,000	30,000	172,000	58,000	375,160
2007-08	40,000	0	70,636	31,000	62,763	0	204,399
2008-09	0	0	25,000	0	0	10,000	35,000
Total	385,000	292,860	310,748	83,000	234,763	93,000	1,399,371

Table 4: Resources Invested by Year by Others (nominal dollars)

	NTU7	TRC3	NTU18	ACF1	TRC13	NTU23	Total
2004–05	239,296	0	35,000	0	0	0	274,296
2005-06	189,732	0	40,000	20,800	131,963	0	382,495
2006-07	77,742	0	45,000	15,000	107,431	56,000	301,173
2007-08	0	0	0	0	0	0	0
2008-09	0	0	0	0	0	0	0
Total	506,770	0	120,000	35,800	239,394	56,000	957,964

Table 5: Total Resources Invested by year (nominal dollars)

Year	LWA	Host Organisation and Third Parties	Total
2004–05	391,739	274,296	666,035
2005-06	393,073	382,495	775,568
2006-07	375,160	301,173	676,333
2007-08	204,399	0	204,399
2008-09	35,000	0	35,000
Total	1,399,371	957,964	2,357,335

Investment description

A summary of the principal activities carried out for each of the projects is provided in Table 6.

Table 6: Summary of Principal Activities

Project Code and Title	Activities
NTU7: Healthy Country Healthy People (Sustainable northern landscapes and the nexus with Indigenous health)	Traditional owners in central Arnhem Land worked together with a trans-disciplinary team of medical, ecological and social researchers. Three separate but interlinked groups were established to consider health, landscape and ecology, and policy. The methods of data collection and analysis varied depending on the component of the research project.
TRC3: Indigenous knowledge capacity in the Northern Territory	The project involved extensive consultations and a series of workshops and forums with traditional owners across northern Australia.
NTU18: Indigenous participation in water resource management: The Anmatyerr Kwatj project	The project applied the principles of Collaborative Indigenist Research, which is a process whereby Aboriginal people inform the research direction and content, and Aboriginal knowledge and ways are considered equally valid to empirical methods. The process recognises and respects the restrictions of customary laws, and distils key elements from cultural water values rather than conveying the complex, gender-specific and often sacred body of law and knowledge. The project was focused in the Northern Territory's Ti Tree region which is home to the Anmatyerr language group.
ACF1: A cultural and conservation economy for northern Australia	The project used a 'proof-of-concept' approach to test the applicability of the concept of a conservation economy in Australia, and also the relevance of the Canadian Ecotrust model to foster the emergence of such an economy. The project was a collaborative effort between Indigenous, environment, business and philanthropic partners.
TRC13: Indigenous	The project involved management, research and communication

participation in the National Water Initiative	components. A significant part of the project was coordination with the Indigenous Water Policy Group (IWPG) which is made up of key Indigenous representatives from across northern Australia.
NTU23: Customary law governance in water resource management	The project follows on from previous research projects funded in the Anmatyerr Region, including NTU18. The project involved three streams of research: 1. Working with Indigenous people and providing traineeships to record, store and convey knowledge in appropriate formats. 2. Determining existing Indigenous rights through examining international and domestic law and management processes. 3. All partners working closely with Government to find ways for values and rights to be better recognised and incorporated into government structures and processes.

Principal outputs

A summary of the principal outputs from each of the projects is provided in Table 7.

Table 7: Summary of Principal Outputs

Project Code and Title	Outputs
NTU7: Healthy Country Healthy People (Sustainable northern landscapes and the nexus with Indigenous health)	The project produced a final report summarising its findings. Several fact sheets were also produced. The key findings of the study were: • Indigenous people actively involved in the management of natural and cultural resources were demonstrably healthier than their counterparts who weren't. Associated health outcomes include major reductions in risk of cardiovascular disease and diabetes. • The landscape where Indigenous natural and cultural resource management is practised was also in better condition than landscapes that don't have such involvement. • Without active management by Indigenous people, northern landscapes will continue to degrade. Threatening processes include poor fire management and the impacts of exotic plants and animals. • Benefits from active Indigenous involvement in cultural and natural resource management are sufficiently strong to justify co-investment across a range of policy sectors. • Indigenous people have demonstrated their determination to be active in the landscape, demonstrated by the Indigenous ranger movement. • National policy analysis is required to: o Ensure that investments associated with encouraging active management are not undermined by contradictory Indigenous policy in such areas as support for outstations,

	remote housing, education and definitions of legitimate work. o Review current investments to ensure that their scale is congruent with the seriousness of both the environmental and human problems confronted in remote and regional north Australia, and with the anticipated benefits of this integrated approach. o Develop governance procedures so that investment success is measured in terms of cultural and natural resource management outcomes, and health outcomes, and not simply against process-related targets.
TRC3: Indigenous knowledge capacity in the Northern Territory	A final report was produced that: • Documented the priority needs and aspirations of traditional owners for Indigenous Knowledge (IK). • Identified impediments to the engagement of IK in wider NRM planning and processes. • Reviewed and assessed Australian and international models. • Reviewed database technology and IP protection. • Developed a strategy for the conservation and application of IK. • Developed a communication strategy for IK promotion and investment.
NTU18: Indigenous participation in water resource management: The Anmatyerr Kwatj project	• The project developed a method for collating, conveying and providing for cultural values in water plans. • The five key elements of cultural water values that were identified were: o Law; o Responsibilities and Protocols; o Economics, Environment and Education; o Recreation and Well Being; and o History of People and Place. • There were five overarching ways of providing for these values that were identified including: o Water Allocation; o Use of Anmatyerr Names and Protocols; o Access, Land Management and Coexistence; o Livelihoods and Skills Exchange; and o Governance and Participation. • It was recommended that the Anmatyerr tyerrty and the Northern Territory Government develop an Anmatyerr Water Agreement to deliver the three major categories of cultural water provisions: o Arrangements for non-volumetric provisions (language, protocols, access and co-existence, livelihoods, equity between Australian and Anmatyerr water law and governance). o A non-licensed volumetric surface water and groundwater allocation to sustain water places and associated cultural

	and environmental assets or values. o A licensed volumetric water allocation for future economic and cultural enterprises.
ACF1: A cultural and conservation economy for northern Australia	A final report was published that included: • A description of the concepts of a 'Cultural and Conservation economy' and the Canadian Ecotrust model. • The findings from four case study regions that were used to ascertain whether the concept of a cultural and conservation economy is consistent with the visions and aspirations of the people in these regions. • A gap analysis comparing the Ecotrust model to existing northern Australian organisations and services. Also, challenges for Indigenous communities in accessing the services provided by the Ecotrust model were identified. • Identification of priority sectors for developing a cultural and conservation economy in Northern Australia, including ecosystem services, Indigenous arts and cultural industries and visitor services. Other possibilities were pastoralism, renewable energy, community infrastructure, social and lifestyle services, and some forms of low impact aquaculture. • A series of options for applying the Ecotrust model in northern Australia including strengthening existing organisations, building new networks and creating new organisations to fill the identified gaps. Research recommendations were also made. • Four key recommendations emerging from the findings of the research were: o Ongoing information sharing and networking between groups interested in the cultural and conservation economy should occur. o Continued collaboration between key Indigenous, environment and business groups should be fostered to ensure a policy response from governments. o A future Ecotrust Australia implementation group should be developed with clear commitments reflected in a Memorandum of Agreement or similar document. o The implementation of an Ecotrust Australia should be monitored by a research effort aimed at identifying key factors that are associated with success and/or failures in the applications arising from this proof-of-concept study.
TRC13: Indigenous participation in the National Water Initiative	• Development of a detailed research program to be augmented in the next phase of the Indigenous Water Policy Group (IWPG). The research program identifies seven themes: o Identification of Indigenous water rights o Interactions between water markets and the customary sector o Examination of international experience, frameworks and

	models o Indigenous economic positioning in water use and markets o Representation on environmental bodies o Communication o Scrutiny of water services, maintenance and delivery • Identification and appraisal of a number of case studies that have contributed to the development of the research program. At the time of the final report the case studies had not yet been completed. The case study areas are: o Katherine Daly River region in Northern Territory o Maningrida district in Northern Territory o Ord River in the Miriuwung Gajerrong region of Western Australia o Century Mine in the Southern Gulf region of Queensland • The case studies provide information on: o Institutional frameworks that articulate Western water resource law and policy and customary water use, rules and norms. o Mechanisms to enhance the participation of Indigenous people in multi-stakeholder and collaborative water management structures and processes including methods to evaluate and benchmark Indigenous participation. o Barriers to the incorporation of Indigenous values, rights and responsibilities in water (e.g. Indigenous institutional capacity). o Identification of potential incentives to overcome barriers (e.g. land and possible water use agreements, conflict resolution). • Six issues papers were developed over the life of the project. • A booklet titled "Water Planning in Katherine: an information book for Aboriginal people living in the Katherine region" provides information to communities in plain English. • Two project fact sheets on the project and on the Indigenous Water Policy Group were published on the web. A draft policy fact sheet was also prepared.
NTU23: Customary law governance in water resource management	• Demonstration of a process for local active parties to take on management of places of significance to them that improves cultural and natural heritage values and Indigenous futures. • An understanding of governance, customary law and natural resources. • An understanding of an 'agreement approach' for customary law governance of water. • An understanding and comparison of Canadian and Australian Negotiated Agreements, and other Regional Agreements in Australia.

	• A description and understanding of the Regional Agreements and Indigenous Land Use Agreements (ILUAs) as they relate to Indigenous Governance in general, and agreements with Anmatyerr Governance in particular. • An Agreement process for the Anmatyerr customary law and management trust was established. • A 'Draft Umbrella Agreement in Principle' was developed and presented, including a workplan and other provisions. • The strengths and weaknesses of the process used in this project are presented.

Principal outcomes

A summary of the principal outcomes from each of the projects is provided in Table 8.

Table 8: Summary of Principal Outcomes

Project Code and Title	Outcomes
NTU7: Healthy Country Healthy People (Sustainable northern landscapes and the nexus with Indigenous health)	The following recommendations were made with respect to policy changes out of the report: • Consolidate and institutionalise the new investments in Indigenous Cultural and Natural Resource Management (ICNRM) which this research demonstrates are likely to provide benefits in multiple policy domains. • Ensure additional investments incorporate adequate capacity building in management, using a process in which both success and failures are used for learning. • Quantify other ancillary benefits of ICNRM to expand the proof of concept beyond physical health and the environment. In particular describe the impact of engagement in ICNRM on educational, economic, employment, governance and judicial indicators as well as mental health. This would help determine whether involvement in ICNRM can be considered an integrative force in Indigenous policy. • Obtain a deeper understanding of the relationship between residence on outstations and ICNRM and its ancillary benefits, particularly a comparison between investment in ICNRM in very remote areas and other types of policy delivery. • Develop national indicators for involvement in ICNRM that can be reported alongside those that measure Indigenous disadvantage and the State of the Environment. In 2004 the Council of Australian Governments (COAG) agreed to a

	National Framework of Principles for Government Service Delivery to Indigenous Australians. Under the framework the Commonwealth developed a bilateral agreement with the NT govt which now includes a schedule "Healthy Country, Healthy People: Supporting Indigenous Engagement in the Sustainable Management of Land and Seas". This schedule was agreed prior to this projects completion, however its implementation may be influenced by this project.
TRC3: Indigenous knowledge capacity in the Northern Territory	The project developed a strategy for understanding IK in Indigenous terms and thus engaging effectively with traditional owners and the knowledge they possess. Five key strategies were developed, with associated actions. The five strategies are: • Identify and implement appropriate mechanisms for IK support across northern Australia. • Develop effective means for evaluating the wide range of benefits derived from IK and associated activities. • Ensure effective representation and articulation of Aboriginal and mainstream aspirations across northern Australia. • Secure appropriate, adequate and longer term funding commitments to IK support across northern Australia. • Negotiate and coordinate Whole of Government/All of Agency approaches to IK support.
NTU18: Indigenous participation in water resource management: The Anmatyerr Kwatj project	• The Ti Tree Water Resource Strategy 2002, which comes under the Northern Territory Water Act was reviewed in 2008 and this project had the opportunity to provide input to that revision. • It was recommended that a new Anmatyerr-run organisation be established that represents Anmatyerr culture followed by new water governance arrangements based on equity between Anmatyerr and Australian law. • The proposed Water Governance Model consists of a Council of Elders, the Anmatyerr owners and managers who direct the Resource Group from the younger generation through the Anmatyerr Customary Law and Management Trust. Agreements and decisions can then occur between the Trust and other parties in the neutral space of a clearing house. • The project contributed to other research, including LWA project NTU23 that also addressed NRM involving the Anmatyerr people.
ACF1: A cultural and conservation economy for northern Australia	• The report recommended the possible establishment of several new organisations including: o An Ecotrust Australia organisational structure based on principles identified in the report. o Ecotrust Franchises and Community Partnerships. o An Ecotrust Australia banking partner. o An Indigenous Sustainability Trust • At the launch of the final report in Broome, it was announced that

	agreement had been reached between the ACF, the Poola Foundation, Kimberley Land Council and Community Sector Banking to progress the development of Ecotrust Australia. An Ecotrust organisational structure called "Culture and Conservation Ventures" was registered by ASIC on 10 July 2009. • Recommendations were also made for changes to existing Australian financial, Indigenous and environmental institutions to support the Ecotrust model. There has been some progress towards these goals including: o The Indigenous Protected Areas program has been greatly expanded with funding and multi-tenure opportunities. o The Cape York Peninsula Heritage Act is a new piece of legislation that provides greater opportunities in park and protected area conservation economies to enable formal joint management of existing parks and protected areas. • Cultural and conservation economies are now being investigated by the Northern Australia Land and Water Task Force
TRC13: Indigenous participation in the National Water Initiative	• The research topics nominated by the research plan are likely to be funded by new water-related initiatives involving the IWPG and the research team. • The case studies will build the capacity of Indigenous organisations in north Australia by articulating the least known aspects of water policy particularly relevant to north Australia in order to understand the influence the National Water Initiative (NWI) policy agenda. • The IWPG was funded by the National Water Commission (NWC) for three years following the project to continue its work on improving the understanding of Indigenous people living in remote regions with regards to the government plan for water reform; the IWPG will promote policies that have been developed based on community consultation, and will continue to engage in research relating to Indigenous rights, responsibilities and interests in water resources in northern Australia. • The IWPG has contributed significantly to research development under the Tropical River and Coastal Knowledge (TRaCK) consortium and have set the agenda for Theme Six of the TRaCK program. • The IWPG has overseen the Indigenous Community Water Facilitator Network (ICWFN) that was also funded for three years by the NWC. The ICWFN will assist in facilitating the integration of Indigenous interests in water management with the interests of other stakeholders.
NTU23: Customary law governance in water resource management	• The project provided greater understanding and recognition of Indigenous cultural values in water (inland water and groundwater) in Australia. • The project involved training and capacity building components

	for Aboriginal "experts" and institutions.
	• The report provided an up to date and comprehensive study of the legislative and policy aspects of Indigenous rights and interests in inland water.
	• There were six main steps in the agreement process that led to the signing of the Draft Umbrella Agreement.
	  o Discussing the idea for, and finding the right people to set up, a trust, corporation or group of Anmatyerr people who legally represent the voice of Anmatyerr people using Customary Law as a founding principle.
	  o Drafting a main guiding document called the Umbrella Agreement. This becomes the process by which other agreements are negotiated.
	  o Setting out a process by which a number of smaller documents called Subsidiary Agreements can be developed.
	  o Construction and signing of the first Subsidiary Agreement regarding the use and management of Mer Ngwurla and Aileron Station.
	  o Endorsement of the Umbrella Agreement through a 'Big Mob' meeting.
	  o Establishment of the Anmatyerr Customary Law and Management Trust.
	• The Draft Umbrella Agreement in Principle is titled 'Rules of Engagement and Negotiation Principles Concerning Traditional Knowledge, Natural Resource Management & Access to Significant Sites on Anmatyerr Country' and is abbreviated as TKNRMAA.
	• The Agreement is not an Indigenous Land Use Agreement (ILUA) or a settlement of land claims, but a broad, non binding agreement that forefronts Indigenous customary law. Where customary laws are practiced and effective, legally binding statutory rights, contracts and agreements may be entered into and can draw on the framework developed in the TKNRMAA.
	• The agreement can be elaborated and reviewed over time. However, the current TKNMRMAA provides frameworks, processes and protocols that can be used immediately.
	• At the time of the final report the agreement had been signed and well received by Anmatyerr representatives. However, an Anmatyerr entity such as a Customary Law Management Trust or Corporation to underpin the foundation of the Agreement had not yet been formed.

Benefits associated with the investment

The benefits from each of the projects are discussed below:

NTU7: Health Country Healthy People (Sustainable northern landscapes and the nexus with Indigenous health)

One of the key findings of the project was that the promotion of participation in cultural and natural resource management may result in major health gains in national priority areas. It also found that customary land management can strengthen existing natural resource management outcomes and justify further investment.

Examples of potential NRM benefits include those in the areas of weeds and feral animals. The project also found that country under traditional fire management has a superior abundance and diversity of animal and plant foods (Garnett and Sithole, 2007). It was reported that supporting Aboriginal people to be on and manage their lands has been argued to be a relatively low cost option when compared with managing large national parks.

Aboriginal informants consulted in the project supported the idea that the majority of benefits from ICNRM (both health benefits and benefits to landscape health) are derived primarily from the sense of well-being that comes from maintaining or re-establishing cultural connections to country as well as from the influences of improved diet and exercise (Garnett and Sithole, 2007).

The study was supportive of Indigenous assertions of health gains linked to ICNRM but the scale and scope of the project meant the project was unable to determine any causal associations. However it was concluded that the evidence collated was sufficient to support the proof of concept that investment in ICNRM appears to be an important strategy for the prevention of chronic diseases and their complications in Indigenous communities. It was further concluded that investment in ICNRM is likely to result in substantial direct savings from health care costs saved and reduced individual and social impacts.

Examples of health care issues facing the Indigenous population are presented in the report. For example, cardiovascular disease and diabetes account for 40% of excess Indigenous mortality and more than 21,800 potentially preventable hospital admissions each year. A lower proportion of Indigenous people in remote areas reported one or more long term health conditions compared to those in non-remote areas. However, those living in remote areas reported significantly higher rates of diabetes/high sugar levels (9%), heart and circulatory diseases (14%) and kidney disease (3%). Diabetes/high sugar levels affected the activities of 20% of Indigenous people compared to 12% for non-Indigenous people (Garnett and Sithole, 2007).

TRC3: Indigenous knowledge capacity in the Northern Territory

Indigenous Knowledge (IK) has often been undervalued by researchers and policy makers with respect to the contribution it can make to the maintenance of a healthy

country. The strategy developed in this project was seeking to overcome some of the obstacles relating to this undervaluing and exclusion.

The final report describes the importance of IK to Aboriginal communities. IK forms the foundation for Aboriginal social organisation and environmental interaction, and therefore determines how people relate to places and to each other. Cultural obligations to care for country and kin are discharged through ceremony, ritual, hunting, harvest and other associated activities. It is reported that overall environmental well being provides a measure of success and reaffirms the integrity of the existing social order. Cultural and natural concerns are therefore inextricably linked. Where the connection with country is severed, cultural confidence is eroded and social capital is reduced.

Support of IK and its appropriate utilisation represents a capacity building exercise. Examples of areas where IK is of value are:

- NRM - IK has benefits relating to water quality, fire, feral control, weed management, biodiversity, habitat conservation, climate change and government obligations and commitment.
- Economy - IK relates to small scale enterprise development in the areas of art, wild harvest, tourism and provision of environment services.
- Education - IK provides opportunities for intergenerational transfer of knowledge, two way learning models and capacity building and appropriate learning environments.
- Health and social well being - IK is of benefit in cultural continuity; diet, exercise and lifestyle choice; and social, physical and psychological well being.

NTU18: Indigenous participation in water resource management: The Anmatyerr Kwatj project

Benefits of adopting the recommendations of the project would include:

- Sustaining of water places and environmental and cultural assets
- Water available for supporting future Anmatyerr enterprises
- Protection of cultural values and cultural knowledge

The final report for the project notes that “The Livelihood model that supports the provision of cultural values in water plans is based on the premise that Aboriginal and other people are best placed to protect cultural values when fully aware of regional water use and issues, and with the inter-cultural literacy and skills to create and implement equitable governance and culturally based livelihoods.”

ACF1: A cultural and conservation economy for northern Australia

Contributing to the development of a cultural and conservation economy has the potential to advance the sustainable development of Northern Australia, especially in Indigenous communities. It will do this by recognising Aboriginal culture, rights and title; building and supporting strong, vibrant, sustainable communities; providing meaningful work, good livelihoods and sustainable enterprise; and conserving and restoring the environment (caring for country).

The final report notes that the framework developed "will enable government policy makers, NRM agencies and not-for-profit organisations to improve their capacity to support long-term sustainable solutions for maintaining country and culture in Indigenous communities by empowering the local people to engage in a quadruple bottom-line approach to economic development". The framework also seeks to close the gap between the aspirations of Indigenous-led enterprises and their successful implementation on a scale necessary to sustain local communities.

TRC13: Indigenous participation in the National Water Initiative

This project has contributed to the development and structure of the IWPG and ICWFN. The NAILSMA website notes that the success of a number of projects being undertaken in northern Australia including the TRaCK program, are dependent upon a strong understanding and capacity for local communities (including Indigenous communities) to effectively engage in discussions about the future of north Australia's water resources. The ICWFN seeks to ensure that such engagement occurs, as in the past facilitation of such engagement has been deficient.

The aims of the ICWFN are to:

- establish a community based network to advance Indigenous engagement in research and management of tropical rivers, water use and conservation across northern Australia, and,
- act as a catalyst to ensure that Indigenous interests are articulated, encouraged and incorporated into water policy decisions, management plans and water allocations.

The goal is for this level of engagement will lead to a range of health, economic, cultural, environmental and social benefits among Indigenous participants. It could do this through:

- Enhancing and securing long-term engagement within Indigenous communities through the development of extensive community networks.
- Supporting communication, training, education, Indigenous engagement in research and the planning and establishment of management frameworks for tropical rivers.

NTU23: Customary law governance in water resource management

The Draft Umbrella Agreement seeks to protect traditional knowledge and also has provisions relating to a broad range of natural resources including water, minerals and gas, native plants and animals, geographic features and ecosystems.

There is a Workplan in the TKNRMAA that outlines a process that will allow any party seeking to enter into activity on Anmatyerr country to clearly explain their purpose and intentions. This will allow the Anmatyerr people to assess each proposal on its merits and to request further details and information where necessary, and to ensure that any decisions that are being made are based on the fullest amount of information which is freely being shared in good faith.

The area of the agreement is Anna's Reservoir Conservation Reserve (Mer Ngwurla). It is of immense importance to the Anmatyerr people as a place that includes sacred sites, open or free places for all people to use for recreation and a place of cultural heritage. It is a place on traditional lands where people can relax, camp, share stories and teach children.

Those with traditional manager responsibilities also visit and care for Mer Ngwurla for cultural purposes. The Reserve is not listed on the Schedules for new agreements under the Parks and Reserves Act 2003 (NT) and does also not have an ILUA under the Aboriginal Land Rights Act 1976 and is also not an authorised agreement under the Native Title Act 1993.

Summary of benefits

Together, this group of projects has greatly increased the understanding by policy makers and academics of Indigenous culture and values with respect to natural resource management. It has also resulted in increased involvement of Indigenous communities with policy and decision making processes with respect to water management in particular.

As one of the projects in the cluster has demonstrated, such involvement and active involvement in management of natural resources also improves the health of Indigenous people.

Type of benefits

A summary of the principal types of benefits associated with the investment is shown in Table 9.

Table 9: Categories of Benefits from the Investment

Benefits
Productivity and Profitability • Potentially saved costs in NRM policy and decision making through formalising effective and efficient processes for involving and/or consulting with Indigenous stakeholders. • Potential for increased profitability from NRM and other sustainable activities on Indigenous managed (or co-managed) lands.
Environmental • Improved quality of environmental values where land is being managed in consideration of Indigenous values and knowledge, including improved water quality outcomes and improved biodiversity.
Social • Protection of traditional knowledge and cultural practices. • Improved health and general quality of life for Indigenous persons and communities involved with natural resource management.

Public versus Private Benefits
The majority of the benefits will be public in nature, in that they will result in improved natural resource management outcomes, and in improved health and quality of life outcomes for Indigenous people. There may be some private benefits to individual enterprises such as agricultural and ecotourism operations that utilise traditional knowledge.

National Priorities
The Australian Government's national and rural R&D priorities are reproduced in Table 10.

Table 10: National and Rural R&D Research Priorities 2007-08

Australian Government	
National Research Priorities	**Rural Research Priorities**
1. An environmentally sustainable Australia 2. Promoting and maintaining good health 3. Frontier technologies for building and transforming Australian industries 4. Safeguarding Australia	1. Productivity and adding value 2. Supply chain and markets 3. Natural resource management 4. Climate variability and climate change 5. Biosecurity *Supporting the priorities:* 1. Innovation skills 2. Technology

The projects have contributed to National Research Priorities 1 and 2, as well as Rural Research Priority 3.

Quantification of benefits

Together, this group of projects will make a contribution to improving the involvement of Indigenous people in the management of the Australian landscape. This will result in net benefits to the landscape, and to the health and quality of life of Indigenous people through retention of some key cultural aspects.

The potential improvement in the quality of life of Indigenous people involved in NRM and policy as a result of these projects is the benefit that is quantified as demonstrative of the potential scale of benefit that can result from these types of projects.

The specific economic and environmental benefits in Table 9 are not quantified, due to uncertainty in any linkage between the research and specific benefits.

Valuing quality of life

In 2003, Abelson undertook a study to measure the Australian willingness to pay (WTP) for avoiding an immediate death of a healthy individual in middle age. The resulting figure was $2.5 million and this figure has previously been accepted by the Australian Government as an appropriate figure to use for Australian public policy decisions. This $2.5 million represents the value of a statistical life (VOSL).

The VOSL can be converted to a constant value of a life year (VOLY). If a life expectancy of 40 years and a consumer discount rate of 5% are used, the VOLY is approximately $150,000 (Abelson, 2003). This VOLY can also be used to value morbidity, and not just mortality. Quality of Life (QoL) indices seek to capture multiple dimensions of health in a single index number, and measure health status on a scale of 1 to 0 where 1 represents a healthy life year and 0 represents death. A quality adjusted life year (QALY) is one year of perfect health.

For the purposes of this analysis, it is assumed that the QoL indices for Indigenous Australians living in remote Australia can be improved through them participating in natural resource management and in policy making. Further, the research funded by LWA has assisted understanding and developing processes and institutional change that can facilitate such participation.

It is not possible within this analysis to calculate an appropriate or accurate QoL index for the individuals targeted as part of this research. However, given the relatively high levels of chronic health and social problems associated with these communities, it can be assumed that the average QoL is currently medium to low. For the purposes of this analysis it is assumed to be 0.50.

The average life expectancy of the Indigenous population in Australia was estimated by ABS, and reported by the Australian Human Rights Commission (2006) to be 59.4 years of age for men, and 64.8 years for women. A life expectation inequality gap between Indigenous and non-Indigenous Australians of 18 years was identified. For the purposes of this analysis, it is conservatively assumed that the average age of those benefitting from the research is 40 years old, and therefore the remaining life expectancy is expected to be 20 years.

The ABS reports that the Indigenous population of remote and very remote areas of Australia is 127,000 people. For the purposes of this analysis it is assumed that 5% of this population will be directly impacted by these six individual research projects at some point (6,350 people). Those directly impacted are likely to include managers and decision makers, as well as the members of those communities directly impacted by the decisions.

It is assumed that with the research, the quality of life for those involved in management, policy and decision making initiatives and institutions that have directly utilised the projects' outputs improves by 5%, and therefore the QoL index rises from 0.50 to 0.525.

Given past experience in attempting to improve the social health of Indigenous people, the road to this improvement will be uncertain and difficult and implementation may take some time. It is therefore assumed that the assumed improvement that is attributable to these six projects happens linearly over a 15 year period, starting in the year ending June 2009. Because there is considerable uncertainty as to whether the research outputs developed will successfully deliver the expected outcomes and benefits, a low probability of success of 5% is applied to the potential benefits. In addition, the outputs will not work in isolation of other efforts and initiatives, and significant activity and investment by governments and others will be required when utilising the outputs to achieve the benefits assumed, therefore an attribution of 10% of the benefits to this research is assumed.

It is noted that eventually, the broad policy changes could be made to benefit Indigenous quality of life, that have been influenced by the outputs of this group of projects, and therefore potentially a much larger proportion of the Indigenous population might be influenced by these projects than what is assumed in this analysis. Therefore, the investment criteria are likely to be an underestimate of the potential impact, however that potential impact is uncertain.

Summary of assumptions

A summary of all assumptions made is given in Table 11.

Table 11: Assumptions for the Valuation of Benefits from Investment in the Projects

Variable	Value	Source
Value of a life year	$150,000 per annum	Abelson, 2003
Indigenous population in area	127,000 people	ABS, 2008
Proportion of population impacted by research, through participation in policy making etc.	5% (6,350 people)	Agtrans assumption
Quality of Life index without research	0.50	Agtrans assumption
Quality of Life index with research	0.525	Increase of 5% (Agtrans assumption)
Average life expectancy remaining	20 years	Agtrans assumption (based on average life expectancy of approximately 60 years, and assuming involvement at average age of 40 years)
First year of benefits	Year ending June 2009	Final year of research
Number of years until	15 years	Agtrans assumption

maximum benefit achieved		
Probability of success of research in achieving assumed benefit	5%	Agtrans assumption
Attribution to this project	10%	Agtrans assumption

Results

All past costs and benefits were expressed in 2008-09 dollar terms using the CPI. All benefits after 2008-09 were expressed in 2008-09 dollar terms. All costs and benefits were discounted to 2008-09 using a discount rate of 6%. The base run used the best estimates of each variable, not withstanding a high level of uncertainty for many of the estimates. The base analyses ran for the length of the investment period plus 40 years from the first year of investment to the final year of benefits assumed.

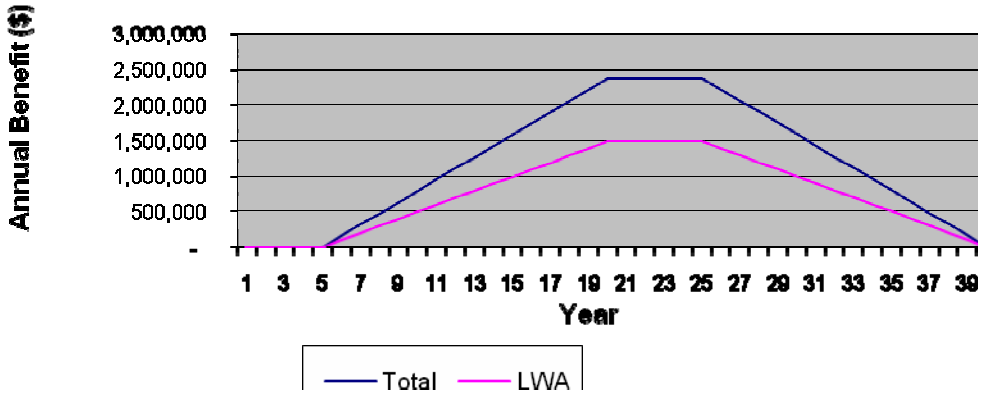
Investment criteria were estimated for total investment and for the LWA investment alone. The investment criteria are reported in Table 12.

Table 12: Investment Criteria for the Investment (discount rate 6%)

Criterion	LWA only	Total
Present value of benefits ($m)	12.54	19.87
Present value of costs ($m)	1.89	3.01
Net present value ($m)	10.65	16.86
Benefit-cost ratio	6.6 to 1	6.6 to 1
Internal rate of return (%)	22.1	21.9

Figure 1 demonstrates the rate at which net benefits accrue for the total investment.

Figure 1: Annual Net Benefit Flow



Sensitivity analysis

Sensitivity analyses were carried out on several variables and results are reported in Tables 13 to 15. All sensitivity analyses were performed on the LWA investment criteria using a 6% discount rate with benefits taken over 40 years from the first year of investment. All other parameters were held at their base values. Table 13 shows the sensitivity of the investment criteria to the assumed increase in the quality of life index with the research.

Table 13: Sensitivity of Investment Criteria to the QoL Index with the Research (LWA benefits and costs only)

Criterion	**Discount rate 6%**		
	0.515	**0.525 (base)**	**0.55**
Present value of benefits ($m)	7.52	12.54	25.07
Present value of costs ($m)	1.89	1.89	1.89
Net present value ($m)	5.63	10.65	23.18
Benefit-cost ratio	4.0 to 1	6.6 to 1	13.3 to 1
Internal rate of return (%)	16.8	22.1	30.9

Table 14 shows the sensitivity of the investment criteria to the proportion of the remote Indigenous population impacted by the research.

Table 14: Sensitivity of Investment Criteria to the Proportion of the Remote Indigenous Population Impacted (LWA benefits and costs only)

Criterion	**Discount rate 6%**		
	2.5%	**5% (6,350 people, base)**	**10%**
Present value of benefits ($m)	6.27	12.54	25.07
Present value of costs ($m)	1.89	1.89	1.89
Net present value ($m)	4.38	10.65	23.18
Benefit-cost ratio	3.3 to 1	6.6 to 1	13.3 to 1
Internal rate of return (%)	15.1	22.1	30.9

Table 15 shows the sensitivity of the investment criteria to the probability of success of the research in achieving the expected outcomes and benefits.

Table 15: Sensitivity of Investment Criteria to the Probability of Success
(LWA benefits and costs only)

Criterion	Discount rate 6%		
	5% (base)	**25%**	**50%**
Present value of benefits ($m)	12.54	62.68	125.36
Present value of costs ($m)	1.89	1.89	1.89
Net present value ($m)	10.65	60.79	123.47
Benefit-cost ratio	6.6 to 1	32.2 to 1	66.4 to 1
Internal rate of return (%)	22.1	46.2	61.5

Conclusions

Land & Water Australia's Social and Institutional Research Program has succeeded in funding a range of research projects aimed at addressing the involvement of Indigenous Australians in natural resource management. Six of these projects have been considered in this evaluation. The evaluation has shown that the research has been successful in achieving outputs, in terms of improving the understanding and knowledge surrounding these issues, and developing some frameworks for consultation and involvement, as well as the development of formal agreements.

The use of the project outputs in terms of actual policy and institutional changes to date would appear to be quite varied, however there was only limited evidence available to determine exactly how and where the outputs have been used. It appears that in general, the principles developed may be in the process of being accepted, but that on-ground policies directly stemming from these investments that can deliver benefits in terms of quality of life of Indigenous people have not necessarily been enacted to date. A general and indicative approach to valuing the potential benefits was therefore required.

The results of the quantified analysis show that there is great potential for significant benefits in this area of research, even if only a small part of the remote Indigenous population is affected, and the quality of life improvements are only modest.

Acknowledgments

Rosemary Hill, CSIRO Sustainable Ecosystems

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Addendum 1: An Economic Analysis of Investment in Indigenous Natural Resource Management: Results for CRRDCC Process

All past costs and benefits were expressed in 2008/09 dollar terms using the CPI. All benefits after 2008/09 were expressed in 2008/09 dollar terms. All costs and benefits were discounted to the year of analysis (2008/09) using a discount rate of 5%. These results are shown in Tables A.1 and A.2 and are reported for different periods of benefits with year 0 being the last year of investment. All analyses ran for a maximum period of 30 years from year 0. Investment criteria were estimated for both total investment and for the Program investment alone.

Table A.1: Investment Criteria for Total Investment and Total Benefits

(discount rate 5%)

	0 years	**5 years**	**10 years**	**20 years**	**25 years**	**30 years**
Present value of benefits ($m)	0.16	2.84	7.64	18.32	21.20	22.44
Present value of costs ($m)	2.93	2.93	2.93	2.93	2.93	2.93
Net present value ($m)	-2.77	-0.09	4.70	15.39	18.27	19.51
Benefit-cost ratio	0.1 to 1	1.0 to 1	2.6 to 1	6.3 to 1	7.2 to 1	7.7 to 1
Internal rate of return (%)	negative	4.5	17.0	21.6	21.8	21.9

Table A.2: Investment Criteria for LWA Investment and LWA Benefits

(discount rate 5%)

	0 years	**5 years**	**10 years**	**15 years**	**20 years**	**25 years**
Present value of benefits ($m)	0.10	1.79	4.82	11.56	13.37	14.16
Present value of costs ($m)	1.84	1.84	1.84	1.84	1.84	1.84
Net present value ($m)	-1.74	-0.05	2.98	9.72	11.54	12.32
Benefit-cost ratio	0.1 to 1	1.0 to 1	2.6 to 1	6.3 to 1	7.3 to 1	7.7 to 1
Internal rate of return (%)	negative	4.6	17.2	21.8	22.0	22.1

The flow of annual benefits is shown in Figure A.1 for both the total investment and for the LWA investment.

Figure A.1: Annual Benefits