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SCOPING REMOTE NORTH AUSTRALIAN COMMUNITY RESILIENCE AND DEVELOPING GOVERNANCE MODELS THROUGH ACTION RESEARCH

Annual project report 2014-2015

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Cover: Attendees at a workshop in Ngukurr, June 2015.

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EXECUTIVE SUMMARY

The '*scoping remote northern Australia resilience'* project is part of a larger suite of BNH CRC 'northern hub' projects being undertaken through Charles Darwin University. Collectively, these projects aim to promote enhanced understanding of the special circumstances concerning resilience issues in remote Indigenous communities, and identify culturally appropriate governance arrangements and enterprise opportunities that can contribute to enhancing community development and resilience.

We report here on the past year's activities undertaken through three complementary sub-projects—

(1) in-depth consultations undertaken by the Aboriginal Research Practitioners Network (ARPNet—a collective of Indigenous community researchers) addressing bushfire and natural hazard threats and issues at two large (>1000 persons) remote Arnhem Land communities, Gunbalanya and Ngukurr
(2) major desk-top assessments undertaken by the North Australian Land & Sea Management Alliance (NAILSMA) addressing (a) mapping of 'hard' and 'soft' infrastructure assets at Gunbalanya and Ngukurr, (b) a literature review of our current understanding of remote community resilience in northern Australia
(3) preliminary assessments of the value of ecosystem services (ES), and derived payment for environmental services (PES) opportunities, at Gunbalanya and Ngukurr, and more broadly on the Indiegnous estate in northern Australia.

While the project is still in its early stages, results presented in this report highlight:

- the substantial resilience challenges facing remote Indigenous communities from both natural hazards and "*hazards more broadly including those associated with colonisation and government intervention"*
- the mis-match between the expectations of emergency management agencies and local communities with respect to being appropriately informed about, engaged with, and resourced for, dealing with B&NH issues
- the challenges associated with building culturally appropriate sustainable land and sea management enterprises (e.g. ranger programs) that can provide front-line and ongoing support for local communities in the face of severe B&NH incidents.

ELEVATOR PITCH

***The problem*:**
Remote north Australian communities are susceptible to cyclones, floods and bushfires. Cultural and socio-economic factors combine with the challenges of remote service delivery (cost, low levels of infrastructure, and distance from the urban centres which host key service delivery organisations) to create situations where communities can be highly vulnerable to natural hazard events. In this context, it is important to understand how these variables can be navigated to enhance community resilience. This task requires a detailed understanding of current capacities, preparation and response strategies, communication pathways and local governance structures.

Additionally, a critical challenge for enhancing community resilience is to developing culturally appropriate, environmentally sustainable economic opportunities. The lack of wealth generation at the local level impedes community capacity to develop infrastructure, build human capital through training and experience of the workplace. As a consequence most policy initiatives seek to address 'subsistence' level issues, failing to prioritise preparation for BNH events. The ability of these communities to respond in a coordinated way at an appropriate scale is largely non-existent.

Why it is important:
The existing body of academic literature on resilience contains limited material which deals with remote Australia. By and large, this literature raises the need to foster greater community engagement and empowerment, and implement better communication and awareness strategies addressing preparedness and response in emergency management. This work however provides limited examples of current arrangements or how such goals can be realized, including the implementation of (1) culturally appropriate governance models, supported by (2) responsive, well-informed policy settings, and (3) culturally relevant, novel climate mitigation and related ecosystem / environmental services economies.

Addressing the problem: As part of the broader 'Northern Hub' suite of projects addressing *Building community resilience in northern Australia*, this project comprises two complementary programmes which respectively address:

(a) Scoping resilience issues in remote Indigenous communities: This component comprises three research strands.

- The Aboriginal Research Practitioners Network (ARPNet) consists of Indigenous researchers trained in Participatory Action Research. They will work initially in two Northern Territory communities (Ngukurr and Gunbalanya) to document community understandings of natural hazards, risks, current response strategies and community capacity.
- At these same study sites, the North Australian Indigenous Land and Sea Management Alliance (NAILSMA) will map the hard, institutional and cultural assets which underpin local capacity and the delivery of emergency services (and which are at risk during a hazard).

- The Research Institute for Environment and Livelihoods (RIEL) at CDU will work with community members and end users to explore the challenges faced by agencies in the delivery of emergency services to remote communities.

The project team will then work collaboratively to identify where community and agency understandings/expectations converge and diverge, and areas of community capacity which can be built on to enhance community safety.

(b) Developing economic resilience through payments for environmental services projects:

- articulating key contemporary terrestrial land use management, institutional, and policy challenges facing Indigenous people and local communities in north Australian savanna regions
- exploring opportunities afforded through emerging economies related to climate change mitigation, carbon trading, and ecosystem services to help address identified challenges
- undertaking rigorous valuation of Ecosystem Services (ES) to be derived from savanna landscapes of northern Australia, and associated scenario modelling of Payment for Environmental Service (PES) benefits which can be derived from emerging land-use options (e.g. savanna burning, carbon sequestration, diversified / mixed pastoral management activities, environmental stewardship arrangements)
- identifying beneficial culturally appropriate institutional / governance arrangements which can effectively support community development and resilience aspirations providing authoritative analysis of above findings to help inform Indigenous community policy development and community resilience outcomes in northern Australia

END USER STATEMENT

Suellen Flint, Director Community Engagement, Department of Fire and Emergency Services, WA.

The 'scoping remote northern Australia resilience' project involves three complementary sub projects that collectively aim to promote an enhanced understanding of resilience issues in remote Indigenous communities and identify culturally appropriate governance and economic opportunities that lead to enhanced community development and resilience.

This is a complex multi faceted project which aims to support Indigenous communities to learn from and empower each other, with each sub project having a theme of strengthening governance and improved resilience.

The Research Advisory Forum provided an opportunity for stakeholders to reflect on the progress to date, explore potential collaborations across northern Australia, as well as gain a deeper understanding of the project.

Over the last year the project team has made progress which has included workshops and fieldwork with pilot communities. These pilots have provided key learnings that will translate into further research or information in relation to emergency management understanding and practices.

INTRODUCTION AND PROJECT BACKGROUND

A first distinguishing, if often overlooked, demographic feature of the northern savannas is that, outside of the cities and towns, most northern savanna residents are Indigenous and, although 'land rich', are impoverished—and these trends are projected to exacerbate over coming decades. Nearly 45% of the north Australian community are Indigenous and the majority of these live in remote communities which are susceptible to major cyclones, floods and bushfires. Despite this, most are ill-served by existing emergency services. While these communities have significant Indigenous and local knowledge allowing them to understand and interact with their traditional estate, poor health, under-investment in infrastructure, restricted communication services and flawed governance models heighten vulnerability to the (increasing) array of natural hazards extant across the region. Current government services appear ill equipped to deal effectively with BNH events now and there is no clear path for improvement in the foreseeable future.

At the same time it will be prohibitively expensive to attempt to replicate the urban service model in remote communities. More importantly, such an attempt may not match the needs, capabilities and expectations of remote Indigenous communities: north Australia is replete with examples of development projects in remote communities that have failed due to poor communication in the planning phase, a failure to consult to achieve culturally sustainable outcomes and the mismatch of resources to requirements. A key question then is what service models can be employed to facilitate greater resilience in the context of Australia's remote Indigenous north?

Resilience is broadly seen as a capacity to respond to and 'bounce back' from a major natural hazard. Remote communities are generally seen as 'vulnerable' because of poverty, poor health, low education levels, and the lack of services and infrastructure associated with their isolation from major urban centres. Remoteness, and cultural and linguistic diversity, compound the issue of poor communication between communities and the structures of political representation, resource allocation, and service provision which are centred in the city.

Current Australian policy positions resilience as "the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals". It describes "a disaster resilient community" as "one that works together to understand and manage the risks that it confronts" (National Strategy for Disaster Resilience, COAG, p iii). In a remote Indigenous setting, the risks which need to be managed are different to those affecting other locales, as are the capacities of local communities. 'Working together' in such

settings requires different kinds of partnerships and response structures. This unique context underpins the rationale for the *Scoping Resilience* project.

Community resilience among Indigenous communities in remote areas is a complex and challenging concept. An appreciation of the complex nature of Aboriginal circumstance, lifestyle and history is crucial for the project. For example, initial discussions at a focus group meeting to plan for the project elicited such as *"them mob government worrying for natural hazards when being in a community is hazardous itself",* suggesting complexities inherent to how Indigenous people view natural hazards vis a vis the hazards they face in daily life. The notion that hazards may be punishments from ancestors for people because they failed to look after country or are not living on country is also very strong. The belief that hazards can be minimised, stopped or averted with good natural resource management presents interesting dimension to this work, and may represent an emerging space for developing mitigation and preparation/response strategies which bring both Indigenous and Western knowledge systems together. While approaches to 'resilience' often emphasise such contextual dynamics, little research exists which un-packages these complexities in detail, as they play out in remote Indigenous Australian communities.

A second set of issues addressed by this project is to explore the extent to which remote community resilience can be enhanced through development of culturally appropriate, environmentally sustainable, land and sea management economic opportunities. While it is apparent that some Indigenous savanna residents, especially those with educational and training qualifications, may take up mainstream employment opportunities (e.g. in mining, tourism, service, defence, and pastoral sectors), many others exercise other priorities including, in remote communities especially, cultural responsibilities to country. The reality is that for many Indigenous savanna residents the Gap will remain. Indigenous land owners are massive and ongoing investors of in-kind services to land and socio-cultural management. Building on this and substantial investment in more formalized Indigenous land and sea management programs (e.g. Working on Country's ranger program, Indigenous Protected Areas, the ILC's pastoral employment programs), an evident challenge for building resilience in regional and remote Indigenous communities is to support ongoing development of Indigenous environmental services enterprises.

Currently, however, there is a major mis-match between these development requirements for building sustainable communities and associated enterprises and contemporary political aspirations for the region. Thus, at the last federal election, both the Coalition and Labor parties made policy pledges to 'develop the north', and specifically to develop 'the northern food bowl'. Following their election victory, the Coalition have begun to implement that pledge through the establishment of a joint parliamentary enquiry into northern Australia and the possible establishment of a Cooperative Research Centre (CRC) focusing specifically on developing northern agriculture or, perhaps more broadly, northern development.

While recognising that development of northern Australia does indeed face many challenges (see below), the myth of the northern food bowl and associated agricultural development was first comprehensively addressed, and dismissed, in the 1960s by BR Davidson in his critical analysis of *The Northern Myth*, and again as recently as 2009 in the final report of the Northern Land and Water Taskforce (NLWT), *Sustainable development of northern Australia*. These and other recent authoritative studies consistently demonstrate that economically and ecologically sustainable opportunities for agricultural development in the north are very limited—rather than a prospective 'food bowl', potentially the most viable agricultural crops concern the restricted growing of sugarcane and cotton. Even on the oft-touted Ord scheme in the East Kimberley, the major growth crop is sandalwood.

The reality of the north is vastly different from the myth. The NLWT suggests that as much as 90% of the northern savannas are used ostensibly for (beef cattle) pastoralism—very substantially under extensive (as opposed to intensive, irrigated or grain fed) production systems. Industry reports show that, given low fertility soils, seasonal access issues, distant and volatile markets, most northern pastoral enterprises are either economically marginal or unsustainable if confined to pastoral production alone.

Conversely, those very same marginal lands are recognised internationally for their biodiversity (although increasingly stressed), carbon storage, and ecosystem services values—in turn, affording innovative diversified natural resource management enterprise opportunities in regions, or on parts of properties, with limited / no pastoral production potential. Recent discussions with key agricultural sector pastoral industry players indicate a growing recognition that diversified non-pastoral land management opportunities must be considered as part of the marketing and enterprise mix.

In sum, this project aims to:

First, using an action research approach involving local Indigenous researchers—

- document BNH threats and issues identifield by northern remote communities, and
- explore mutually appropriate and effective emergency management governance arrangements that involve local communities in partnership with external agencies

Second, for the purposes of exploring culturally appropriate land and sea management economic opportunities to help underpin local community capacity, autonomy and resilience—

- undertake local and regional evaluations of ecosystem services and derived opportunities for developing environmental services enterprises

And third, in conjunction with allied projects being delivered through the 'northern hub' of the BNHCRC—

- Present an authoritative report in Year 4 of the project which provides a robust assessment of the challenges and opportunities facing the development of resilience in remote north Australian communities.

WHAT THE PROJECT HAS BEEN UP TO

Key activities for the 2014/15 reporting period are provided below.

(1) ACTION RESEARCH FIELD PROGRAM AT GUNBALANYA AND NGUKURR—UNDERTAKEN BY ARPNET

Workshops

This part of the project has been undertaken by two research teams comprising 22 Aboriginal community-based researchers from The Aboriginal Research Practioners Network (ARPNet). There were 8 researchers from Gunbalanya led by Dean Yibarbuk and 14 researchers in Ngukurr led by Cherry Daniels. Community-based researchers received 5 days of pre-project training to familiarize them with the tools that are being used for data collection in the project.

Progress to date

The Scoping work has proceeded in stages, starting with the *Focal group meeting* that was held in Darwin. The focal group meeting involved a small group of Aboriginal people who were invited to talk about the project and provide ideas and guidance about how it should be conducted and identified some of the key issues that needed to be considered by the study. At the meeting several issues were highlighted including the meaning and perception of resilience, the importance of maintaining a presence on country and cultural connection as a means to to manage occurrence and severity to disasters.

Ethics clearance for the project was obtained from AITSIS while consent was granted from all the Traditional Owners and the clan leaders in each community. Permission to be in communities was obtained through the Northern Land Council.

Fieldwork in each of the communities was conducted over a 10 day period. In Gunbalanya field work was interrupted by funerals and was done in two visits, November 2014 and April 2015. Data were collected using a survey and some qualitative tools including key interviews and ranking. 104 surveys were completed in Ngukurr and 84 surveys were completed in Gunbalanya. Incomplete surveys and damaged surveys were not included. Data from the qualitative methods were collected using participatory tools including ranking, key interviews and focus group discussions. Preliminary results from the qualitative data were presented at the BNHCRC workshop at Yellow water, Ngukurr, In early June by members of the two research teams, Dean Yibarbuk from the Gunbalanya Team and Grace Daniels from the Ngukurr Team. Data analysis is underway and we expect to produce two community reports.

Key findings

Both Ngukurr and Gunbalanya are located alongside two big river systems and in close proximity to billabongs. Their stories about disasters are also stories about the fluctuations in these river systems. Fire brings lots of smoke to both communities and their locations relative to hills and rock outcrops can be both an advantage and a disadvantage. Stories about vulnerability and safety were connected to people's views about housing quality and infrastructure. Most of all, stories about vulnerability were related to absence of people on country, people's weak connection to culture, ceremonies and their traditional structures. A strong advocacy was expressd for bringing oldways back and putting people back on country to strengthern that connection to country and also the coping capabilities within families.

- *Disasters further weaken or worsen the physical, spiritual and economic conditions of most Aboriginal households.*
- *Of the 194 people surveyed for the project in Ngukurr and Gunmbalanya, only 46% of the surveyed population in both communities know that there is an emergency plan and of these 67% said they had not actually seen the plan*
- *Location of the emergency plans in Police Stations affects the accessibility of the plans to the wider population. To understand these issues, one must appreciate the extent of Aboriginal incarceration in the Territory.*
- *A little over a third of (34%) of all those surveyed in both Ngukurr and Gunbalanya felt safe to be in the community.*
- *Safe place does not always refer to cyclone shelter, it can refer to a brick house belonging to a relative. Improved housing remains a key issue in both communities –i.e provision of cyclone coded, adequate housing and safe shelters. Design of shelters must recognise cultural norms and practices that might affect how these facilities are used.*
- *Stengtherning existing local capacity for response should not be a one off goal, but an ongoing activity. Further, there needs to be recognition of local capability over externally derived teams.*
- *Recognition of the value and opportunities presented by local Aboriginal Organisations like DEMED (Gunbalanya) and Yugul Mangi (Ngukurr) in the provision of emergency response and development of fee for service arrangements so that these groups are adequately resourced to support community and outstation people.*
- *Planning must incorporate outstation people so that they can receive adequate support.*
- *Information must target young people who tend to discount announcements made on TV, Police etc*
- *Welfare payments do not address the increased costs associated with disasters.*
- *Strong message that communities want to be involved in planning for and responding to emergency sistuations.*
- *Communities want more information about disasters especially predictions in the future. Recent events in Elcho Island and Ramangining have taught people that the unexpected can happen.*

Outputs

Kamaljit K. Sangha, Jeremy Russell-Smith, Andrew Edwards, Cameron Yates, Jackie Gould, Christine Michael, Glenn James and ARPNet. 2015. *'Developing enterprise opportunities in remote North Australian Communities.* Submitted for AFAC 2015.

Jackie Gould, Bev Sithole, Andrew Campbell, Glen James and Stephen Sutton. 2014. *Building community resilience to natural hazards In Northern Australia.* Proceedings of the Research Forum at the Bushfire and Natural Hazards CRC & AFAC conference, Wellington, 2 September 2014.

Bev Sithole, Otto Campion, Dean Yibarbuk, Cherry Daniels, Hmalan Hunter-Xenie. 2014. *Scoping community resilience through participatory action research (PAR) in Northern Territory remote aboriginal communities*. Proceedings of the Research Forum at the Bushfire and Natural Hazards CRC & AFAC conference Wellington, 2 September 2014.

ARPNet 2015. *"Why yous mob only want to talk about big disasters, us mob are vulnerable to small ones too" - Community perspectives about disaster resilience in Gunbalanya in NT"* for the AFAC and Bushfire & Natural Hazards CRC 2015.

1. ARPNet/ NAILSMA Focus Group Meeting in Darwin
2. Yellowwater End User workshop, Ngukurr

Ideas for follow up work

While doing the scoping work, we could already see areas that these communities were identifying as requiring further research or information. Some of these are listed here:

- *Undertstanding the relationship between natural disastors and cultural practices on country.*
- *Identifying conducive spaces for the community to be an active part of preparation and response to emergencies.*
- *Identifying appropriate leadership to engage in decision making over managing country to bring ceremony back for the benefit of people and country.*
- *Developing appropriate materials to raise awareness among the community especially among the youth.*
- *Creating an up-to-date capability register in the community (e.g. listing the availability of skills resident in the community such that, in the event of a natural disaster, local rather external solutions can be deployed)*

(2) DESK-TOP STUDIES—UNDERTAKEN BY NAILSMA

NAILSMA has undertaken two major desk-top studies for the project to date. The first of these has involved a substantial 'asset mapping' exercise conducted at the same two NT remote communities of Gunbalanya and Ngukurr as used in the preceding ARPNet study. The second has involved a major literature review on current undsertanding of community resilience in northern Australia. Key findings of both studies are presented below.

Key Findings—Asset mapping study at Gunbalanya and Ngukurr

Exective summary

Community resilience is a complex concept involving various dimensions that make up a community. These dimensions include environmental, social, governance, infrastructure and economic resilience. Overall, community resilience can be considered as the function of these.

'Infrastructure' in this context refers to 'hard' infrastructure i.e. the physical assets necessary for the functioning of a community. However, it is the 'soft' infrastructure which is often more difficult to map. This 'soft infrastructure' refers to all the institutions which are required to maintain the economic, health, and cultural and social standards of a community (including emergency services).

For the purposes of the mapping exercise, 'hard' infrastructure consists of the following assets:

- *Transport/mobility;*
- *Communication;*
- *Energy;*
- *Water management;*
- *Waste management;*
- *Food supply;*
- *Housing.*

'Soft' infrastructure includes:

- *Social infrastructure;*
- *Cultural, sports and recreation infrastructure;*
- *Governance infrastructure;*
- *Economic infrastructure;*
- *Natural heritage;*
- *Emergency services.*

There may be risks and vulnerabilities associated with each of these areas (i.e. things that are harmful) as well as enablers of resilience (i.e. things that are helpful, including certain behaviours). That is, there are certain qualities or characteristics in relation to each of these areas which can be considered helpful or harmful.

Though preliminary in nature, this mapping exercise identifies some of the potential risks and vulnerabilities associated with each of these areas as including, for

example, government policy and service delivery style as well as development pressures and competing land uses.

This mapping exercise also seeks to identify some of the critical enablers of resilience that can strengthen and enhance community resilience capabilities. These enablers are not necessarily visible on a map but are vital in supporting community resilience. The key resilience enablers identified here include:

- *local Indigenous governance institutions/decision making;*
- *social networks/social capital (familial or kinship relationships, regional/external networks);*
- *cultural/local knowledge;*
- *economic independence and diverse economies;*
- *land management activities (both formal and informal); and*
- *the presence of a sustainable population on country (outstations/homelands).*

These enablers or strategies lead toward greater self-sufficiency, independence, empowerment, resilience and close contact with the natural environment.

The two categories relating to community resilience enablers on the one hand and vulnerabilities on the other, are not intended to be mutually exclusive. Indeed, some resilience enablers may themselves be vulnerable. For example, local decision making structures are an enabler of resilience however these structures may themselves be vulnerable to external governance/over-governance. Likewise, the geographical isolation and remoteness of outstations may be considered a risk (particularly in the event of a severe weather event when access to food, fuel and other essential services may be interrupted), however the benefits of being on country for the health and wellbeing of people and the landscape are well recognised and as such, it can be seen as an 'enabler of resilience'.

Some of the threats and constraints to strengthening community resilience have external origins at regional, state and federal levels and include; poor communication and engagement, top-down institutional processes that allow little Indigenous voice, and lack of recognition of Indigenous culture and practices.

Ultimately, in order to build stronger and more resilient communities, it is essential to have a better understanding of their current resilience capabilities so that their strengths can be enhanced and the risks and vulnerabilities associated with them can be appropriately addressed and mitigated. As such, this mapping aims to 'account for' (at least in a preliminary sense) existing community resilience capabilities, particularly those that may not be visible on a map, including enablers and potential threats.

Key findings—Literature review of community resilience in northern Australia

Conclusion

In light of the growing awareness of the effects of climate change and in the aftermath of a string of recent natural disasters, the concept of community resilience is increasingly used in both political and public discourse. North Australia is prone to floods, bushfires and cyclones, the impacts of which are exacerbated by climate change and the effects of colonisation on people and landscape (e.g. unmanaged wildfires).

A number of conceptual frameworks for understanding and measuring community (disaster) resilience have been developed in recent years. However, these conceptual frameworks essentially form part of a western discourse on the subject. Indigenous perspectives on community resilience largely come from reports in relation to practical projects such the West Arnhem Land Fire Abatement Project or successful music or sports programs in Indigenous communities. These reports focus on existing capabilities and strengths of Indigenous communities when considering 'community resilience' and focus not on 'natural hazards' but hazards more broadly including those associated with colonisation and government intervention.

This literature review identifies a gap in current literature in respect of Indigenous perspectives on risk and hazards, as well as an understanding of the existing capacity of communities to respond to these 'hazards'.

The literature, particularly that relating to climate change adaptation, identifies a number of key enablers of community (disaster) resilience including social capital and social networks, local/cultural knowledge, economic diversification and independence, local governance/decision making authority. The role of land management activities in enabling resilience – practically (i.e. environmental benefits) through fire management, for example, but also through its contribution to economic, social and cultural outcomes, including supporting local decision making authority, is highlighted in the literature.

The relationship between emergency management service providers and Indigenous communities is also considered in the literature. A disjunct appears between the approach taken in the 'community resilience' literature which can be seen as empowering and the more traditional 'command and control' style of emergency response. There also appears to be a gap in the current literature in translating strategies and policies for building community resilience into practical emergency response and recovery approaches and actions.

(3) VALUATION OF ECOSYSTEM SERVICES (ES) AND PAYMENTS FOR ENVIRONMENTAL SERVICES (PES)—UNDERTAKEN BY DCBR / CDU

Following initial discussions and a major preliminary workshop in June 2014, Dr Kamal Sangha was appointed to the project's ecologic economist post-doc position in October 2014, to help explore culturally appropriate land and sea management economic opportunties to assist building local community resilience. Since that time Dr Sangha has prepared three reports:

- an initial assessement of land management PES enterprise opportunities available at the Gunbalanya, Ngukurr and surrounding respective outstations. This work has built on both the detailed studies undertaken by ARPNet and NAILSMA in respective communities, and is the subject of a paper to be presented at the upcoming AFAC / BNH CRC conference in Adelaide.

- a detailed literature review has been conducted on current uses of savanna lands and related economic returns, and socio-economic and ecological factors that impact on current land uses while contemplating future options for ecosystem based opportunities (i.e. PES schemes) in Northern Australia. A shorter version of this report will be submitted to a journal in the near future.

- an intital assessment of the monetary value of tangible and intangible ES from Fish River Station, NT, was carried out at the behest of the property managers (Indigenous Land Corporation, The Nature Conservancy) to estimate the ES–premium required for maintaining the flow of ES, and to highlight the monetary value of ecosystem benefits obtained by the local Indigenous communities. This latter study provides an early template for conducting similar studies in different situations across the north.

A workshop was attended in April 2015 to apply the modelling software 'Stella' for the purposes of developing an ES-valuation model in the future. Two meetings were conducted with local Indigenous communities in remote locations to seek their interest in PES arragenments. Further discussions will be undertaken in the coming year to initiate focus group meetings and scenario planning workshops to explore and develop appropriate PES arrangements that meet community needs.

Key outputs:

- A literature review exploring opportunities for ecosystem based enterprises for Indigenous people in northern savannas— Kamal Sangha and others. 2015. *Transforming the north: opportunities for ecosystems based enterprises for Indigenous people in northern Australian savannas*

- A report on the monetary value of ES, Fish River Station, NT—Kamal Sangha and others. 2015. *Valuing Ecosystem Services from Fish River Station, NT*

- A paper submitted for AFAC 2015—Kamal Sangha, Jeremy Russell-Smith, Andrew Edwards, Cameron Yates, Jackie Gould, Christine Michael, Glenn James and ARPNet*. 2015. Developing enterprise opportunities in remote North Australian Communities*.

- Meetings with the Indigenous communities (Wongu [north QLD], Ngukurr, NT Gulf communities [Borroloola, Robinson River] to seek interest for PES and to plan for scenario planning workshops in the coming year

PUBLICATIONS LIST

Refer listings of publications given in the previous section

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