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DEVELOPING ENTERPRISE OPPORTUNITIES AND RESILIENCE IN REMOTE NORTH AUSTRALIAN COMMUNITIES

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ABSTRACT

It is well recognised that local and indigenous communities face significant development challenges in remote regions of northern Australia. In this paper we contend that development of enterprise opportunities, especially through the fostering of land and sea management activities under culturally appropriate governance arrangements, can contribute substantially to the building of regional economies and community resilience with associated benefits for natural hazards management. We focus on recent experience with landscape fire management initiatives established as part of Australia's developing commitment to tackling climate change, and suggest that additional innovative incentives are available to help transform northern regional economies. In particular, we outline the case for promoting a range of economic benefits from CO_2-e emissions abatement that can be a source of income for Indigenous people and can improve savanna landscape values, thus supporting local and indigenous communities as well as government programs for developing healthy landscapes for healthy people.

INTRODUCTION

Tropical savannas occupy a vast area of 1.9 m km^2 in north Australia, about 1/3rd of the total continent area (Fig. 1). The region encompasses 22 bioregions including many endemic species and is internationally recognised for its biodiversity and cultural values. However, the region faces many challenges including economically marginal land management options, limited infrastructure, low population density (0.29 persons/km^2), low socio-economic status of local (especially Indigenous) people, and high socio-ecological risks for the local as well as for the broader Australian society. Additionally, there is an evident lack of understanding by all tiers of government concerning the inherent capacity of local institutions, the magnitude of the problems they face, and lack of culturally appropriate solutions that could better suit Indigenous and other regional stakeholders. These topics are well documented (e.g. Russell-Smith et al. 2014, Walsh et al. 2014, Whitehead et al. 2014, NAILSMA 2015, amongst others).

Many of the above-mentioned issues seriously impact upon the Indigenous population that comprises about 19% of the total region (Russell-Smith et al. 2014), and occupies ~50% of land under various title arrangements (e.g. Indigenous Protected Areas, freehold or leasehold land for pastoral and other purposes). Indigenous people's cultural, spiritual and subsistence living is still well connected to the landscape, unlike for many parts of Australia. Indigenous people practice fire management to 'clean' the country, for both cultural and ecological benefits (Altman 2009). However, cessation of fire as a management tool due to European influence over the last 100 years has compromised people's livelihoods, and led to major changes in landscape structure and function in terms of current extent of fires (Fig. 1), and loss of flora and fauna (Russell-Smith et al. 2003, Woinarski et al. 2011, Yates et al. 2008). This change (i.e. decline in fire management), over time has social, economic and ecological implications for the Indigenous people in region, especially for:

1. Increasing fuel loads that have exposed vast areas of land to severe, high intensity and frequent wildfires, thus increasing risk to community assets
2. Threatening many species of flora and fauna that are susceptible to resultant fire regimes which could be important as natural and cultural assets for community livelihoods
3. Increasing cultural vulnerability of Indigenous communities by not being able to use fire in customary ways

As a result of poor fire management, an average of ~20% of north Australian savannas are burnt annually, mostly under relatively severe late dry season conditions, and the region contributes annually ~2-4% to Australia's accountable Green House Gas (GHG; CH_4 and N_2O) emissions (CSIRO 2012, Walsh et al. 2014).

As part of the Bushfire & Natural Hazards CRC's (BNHCRC) community resilience research program, this paper serves to introduce research being conducted under the auspices of the 'northern hub' partnership (Charles Darwin University—CDU; Aboriginal Research Practitioners Network—ARPNET; North Australian Indigenous Land & Sea Management Alliance—NAILSMA) which aims to look at issues besetting, and solutions contributing to, resilience and natural hazards preparedness in remote north Australian Indigenous communities. In this contribution, we explore enterprise development opportunities for two large Northern Territory communities afforded through enhanced landscape fire management and associated marketable carbon emissions reductions. Together with an allied investigation of culturally appropriate community governance issues, our longer-term ambition is to consider a range of economic opportunities where ecosystem services can contribute to building resilience in remote north Australian communities (as suggested in Fig. 2).

CASE STUDIES: CO2-e EMISSIONS ABATEMENT BASED ENTERPRISES USING IMPROVED FIRE MANAGEMENT

The WALFA project was established in 2006 on 28,000 km^2 area in a voluntary agreement with Conoco Phillips (WAFMA report 2013). It currently abates an annual average (2007-2013) of 137,000 t of CO_2-e/year. These reductions in emissions are worth about $2.74m/yr, assuming a C price of ~$20/t CO_2-e. Based upon the success of the WALFA project, the Fish River Fire Project (FRFP) commenced in 2012-13 on a 1781 km^2 property to the south of Darwin. It was the first project to be set up under the Indigenous CFI (Carbon Farming Initiative). Currently, the project abates ~13,000 t CO_2-e/yr that are worth ~$260,000/yr at the same C price as that used above. Details of these projects are provided in WALFA and ILC (Indigenous Land Council) annual reports.

Based on above initiatives, here we explore the potential of similar projects undertaken in two NT regional communities, based at Ngukurr and Gunbalanya, respectively. Salient details concerning these communities and current fire management are outlined in reports (NAILSMA 2015a,b) and an accompanying paper (Edwards et al., submitted for AFAC 2015).

1. Ngukurr community is located in the north-east of NT where 35% area is burnt every year with 26% burning in the LDS (Late Dry Season) and 8.5% in the EDS (Early Dry Season) (annual average from 1998-2012; Infonet – Fire Scars report). The average annual GHG emissions are about 118,000 t of CO_2-e (2003-2012). Under the ERF (Emissions Reduction Fund) initiative, fire management in this area can contribute to reduce these emissions to 45, 000 t/yr on average (based upon the data available through SavBAT2). Thus, the Indigenous managers can abate about 73,000 t of CO_2-e emissions per year. Keeping in mind the feasibility of future fire management, there are following abatement scenarios (Table 1):

Table 1. CO_2-e emissions (t/yr) abatement scenarios for fire management under EDS and LDS fire regimes (with realistic scenarios in bold) (Source: SavBAT2).

EDS → / LDS ↓	20%	30%	40%
0%	69,290.80	**50,040.67**	30,790.54
10%	**33,573.47**	14,323.34	No good

Depending upon the fire management and the available C price, the monetary benefits are presented in Table 2.

Table 2. C benefits ($) for abating CO_2-e emissions applying fire management practices (with realistic scenarios in bold).

C price* **(**$/t of abatement)	Fire management				C benefits for 2013 reporting year
	EDS → / LDS ↓	20%	30%	40%	CO_2-e abatement (74,604 t/yr, 2003-12 baseline)
$10/t	0%	692,908	**500,407**	307,905	$746,050
	10%	**335,735**	143,233	No good	
$15/t	0%	1,039,362	**750,610**	461,858	$1,119,075
	10%	**503,602**	214,850	No good	
$20/t	0%	1,385,816	**1,000,813**	615,811	$1,492,100
	10%	**671,469**	286,467	No good	

*We used $10, 15 and 20 per t of CO_2-e emissions abatement based upon our current knowledge.

The financial benefits for reducing the burnt area to 30% range from $500,000–$1 M/year that can contribute towards Indigenous employment, apart from many intangible benefits that are discussed later.

2. Gunbalanya: This community is located north of Darwin, NT where 56% of the total area is burnt each year (annual average from 2000-2014; Infonet – Fire Scars report), with 27% burnt in the EDS and 29% in the LDS. The average GHG emissions are about 104,000 t CO_2-e/yr, (2003-2014 data). Given the best performance years where these emissions were minimal, improved fire management can contribute to reduce CO_2-e emissions to 67,000t/yr. Thus, an abatement of 37,000 t CO_2-e/yr can help to generate C income. Given the fire history of this area, the following feasible scenarios are proposed (Table 3):

1. 50% of area burnt per year with 40% in EDS and 10% in LDS
2. 40% of area burnt per year with 30% in EDS and 10% in LDS
3. 40% of area burnt per year, all in EDS

Table 3. CO_2-e emissions (t/yr) abatement scenarios for future fire management (with realistic scenarios in bold) (Source: SavBAT2).

	60% area burnt/yr		50% area burnt/yr		40% area burnt/yr		30% area burnt/yr	
1. EDS	30%	No good	30%	15,151.70	**30%**	**40,849.86**	20%	52,911.73
LDS	30%		20%		**10%**		10%	
2. EDS	40%	3,089.83	**40%**	**28,787.99**	**40%**	**54,486.14**	30%	66,548.01
LDS	20%		**10%**		**0%**		0%	

The corresponding C benefits ($) are presented in Table 4. The realistic options are for fire management on 50% and 40% of the total area.

Table 4. C benefits ($) for abating CO_2-e emissions applying fire management practices (with realistic scenarios in bold).

C price* **(**$/t of abatement)	C value ($) for 50% and 40% of the total area burnt per year				C benefits for 2013 reporting yr
	50%: EDS: LDS 30: 20	**50%: EDS: LDS 40:10**	**40%: EDS: LDS 30:10**	**40%: EDS: LDS 40:0**	CO_2-e abatement (23,112 t/yr)
10	151,517	**287,879**	**408,498**	**544,861**	231,120
15	227,276	**431,820**	**612,748**	**817,292**	346,681
20	303,034	**575,759**	**816,997**	**1,089,722**	462,241

*We used $10, 15 and 20 per t of CO_2-e emissions abatement based upon our current knowledge.

Depending upon the C price and fire management, the benefits can range from $280,000–$1 M/yr. Given the current situation, it is possible to achieve 40% EDS burning in this area, suggesting that the total benefits could be $800,000–$1 M per year. These benefits will provide culturally appropriate employment opportunities for people, apart from many other benefits.

Both these projects are assessed based on the Savanna Burning Methodology (SBM), which is recognized for emissions abatement under the current ERF program established by the Australian Government. The amount of GHG emissions abated by changing the fire regime and its respective economic returns can be used as a surrogate for income in this new enterprise that is in line with the Indigenous customary sector. There are also C sequestration benefits that are not yet accounted in GHG accounting system. Indeed, the benefits that will flow from improved fire management are numerous, as mentioned below in discussion.

DISCUSSION

Improved fire management can provide significant enterprise opportunities for Indigenous people under the current CFI/ERF program, including personal/household income while improving land and the value of various natural and cultural assets. Currently, there are meager employment opportunities in the region. According to the Australian Bureau of Statistics (2011), 29% and 23% people (>15 years of age) are eligible for workforce in Ngukurr and Gunbalanya respectively, while only 4-8% people are employed full-time. The median weekly personal income in these communities is <$270 (*cf*. $362 of average Australian), thus many people depend upon welfare payments. Currently, the WALFA project employs over 200 Traditional Owners and rangers for 9500 hours per year for fire management related activities (WAFMA 2013). Based on that WALFA experience we consider that the

proposed fire management projects, likewise, can provide culturally appropriate employment (especially part-time) opportunities for many Indigenous people in each of these communities.

Additionally, these projects are not only valuable in terms of C income but also for many co-benefits in terms of various socio-economic and cultural outcomes as outlined in Fig. 3. These co-benefits could further provide opportunities for biodiversity credits and related markets (e.g. stewardship arrangements). These projects will encourage people to live on and derive employment and other cultural benefits from their lands, including utilisation of their traditional knowledge systems. Ultimately, these fire management projects will contribute to improving natural and social capital, build capacity for dealing with natural hazards, and thus will contribute to enhancing community resilience.

Our present research project, on scoping resilience of Indigenous communities particularly through developing mechanisms for payments for ES, aims to explore and evaluate such opportunities that can support livelihoods and enhance well-being of Indigenous communities across the savanna region. Apart from co-benefits, such projects can contribute also to reducing Government expenditure on Indigenous welfare both through employment creation as well as enhanced health and well-being benefits. A tradeoff analysis of Government welfare expenditure for providing opportunities (such as these fire projects) may provide new insights into the range of benefits that these projects can offer. The critical aspects to consider for such future enterprises are:

1. Importance of partnerships between Indigenous (Land Councils, Indigenous Land Corporation, local Aboriginal corporations, etc.) and non-Indigenous institutions (R&D and Governmental organizations) in sharing of knowledge and building commitment
2. Recognition of Indigenous leadership
3. Need for consistent engagement of all the involved stakeholders
4. New arrangements for institutions to develop relevant policy frameworks, tool kits to monitor GHG emissions, and to share responsibilities/benefits

There is an evident need to develop relevant policy frameworks that can help establish these projects on the ground. It is anticipated that the suite of Northern Hub projects focusing on Indigenous community resilience will contribute to that development.

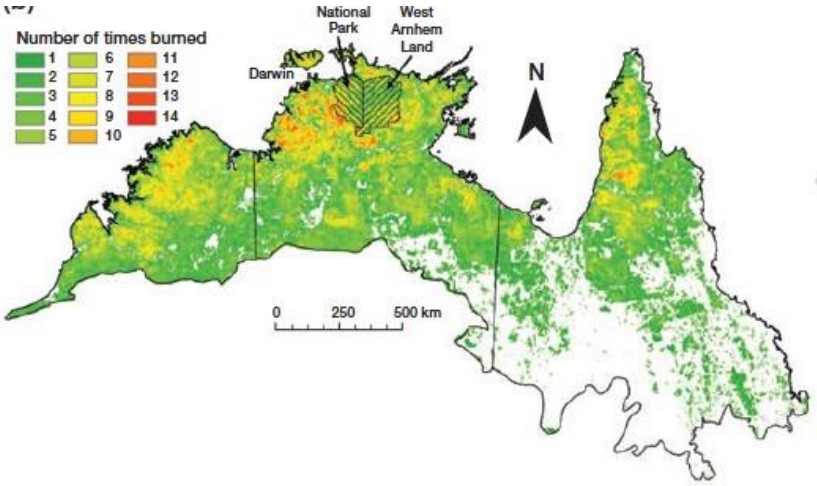

Fig. 1. Savanna region and fire frequency (no. of times burnt) from 1997-2010 (Source: Russell-Smith et al. 2013).

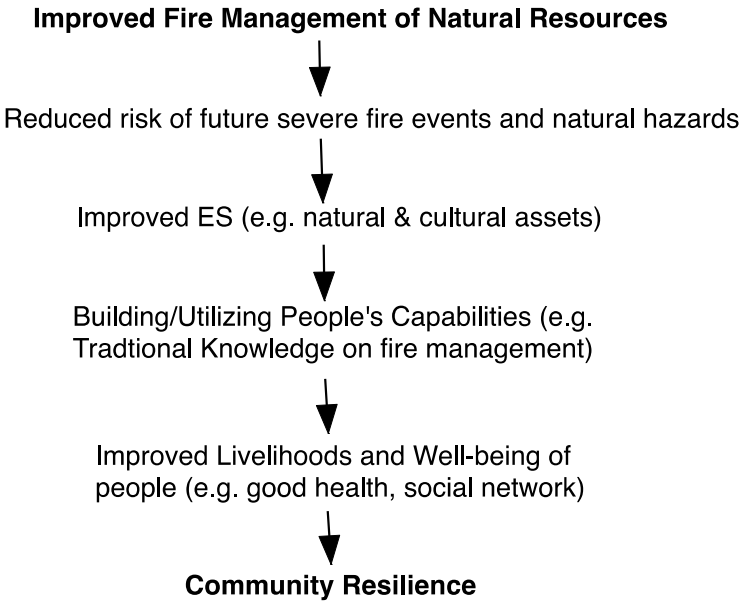

Fig. 2. The chain of benefits of ES-based enterprises for building community resilience.

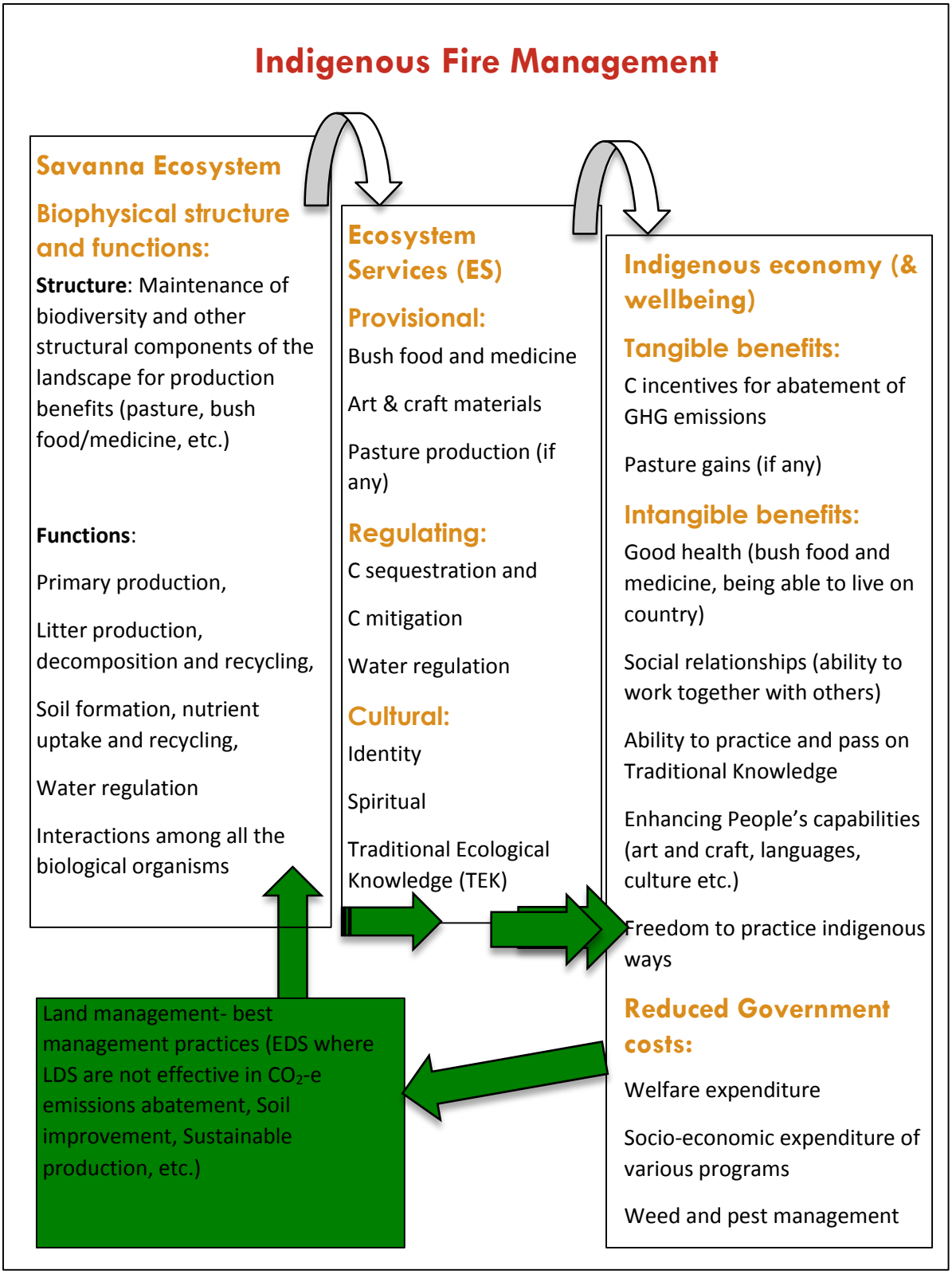

Fig. 3. Flow-on benefits from Indigenous fire management in savannas.

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