

# International Savanna Fire Management Initiative



Supported by the  
Australian  
Government





# Our Story – Drawing from the Australian Experience

Towards global applicability?



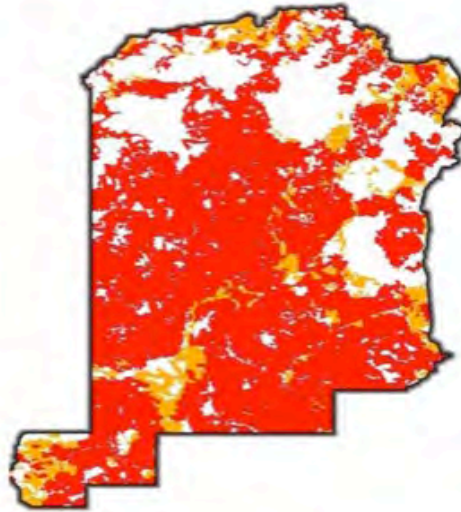
# The Australian Experience – In Brief

- Long history of Indigenous Fire Management in northern Australia was interrupted by colonisation.
- North Australian landscapes need fire, but they need the right kind of fire.
- Landscapes unmanaged by Indigenous people resulted in higher intensity destructive fires that could easily take hold in the hotter conditions of the late dry season.
- These hot destructive late dry season fires threaten people, places and biodiversity.

# The Australian Experience – In Brief

- Early dry season managed burning, similar to that done traditionally, results in less intense fires that are more easily controlled and that support the regeneration of species and landscapes.
- When fires burn in the early dry season they prevent late dry season fires taking hold, resulted in reduced emissions.

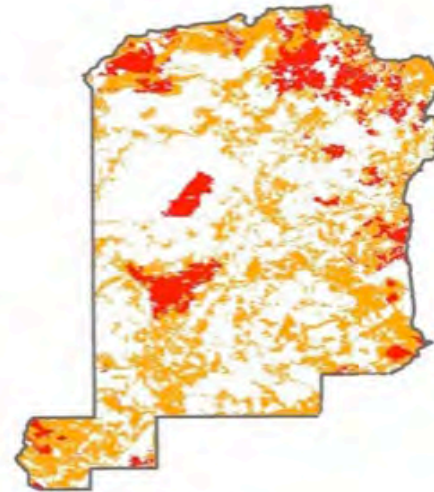
WALFA 2005



Late



WALFA 2009



Early



## WALFA Project Arnhem Land 2005 – 2009

Predominantly Late Dry Season Fire Regime (2005) to Early Dry Season Fire Regime (2009)

# The Australian Experience – In Brief

- Australian fire emissions methodologies quantify these emissions savings.
- The quantify of emissions reductions has an economic value.
- North Australian Indigenous communities are undertaking this work, proving through MRV systems that their fire work has led to emissions reductions, and reaping the economic and social benefits.

# Emissions Calculations

$$E_{oc} = M_o \sum_{pk} \left( A_{pk} P_k \sum_l \left( EF_{pl} FL_{npl} CC_l \sum_m (S_m BEF_{klm}) \right) \right)$$

Where the subscripts:

*o* = greenhouse gas species *o* (*oc*= CH<sub>4</sub>, *on*= N<sub>2</sub>O);

*p* = vegetation class

*k* = fire season

*l* = fuel size class

*m* = fire severity class

*n* = number of years since the patch of land was last burned

and parameters:

*E<sub>oc</sub>* = Emission (Gg) of CH<sub>4</sub>;

*E<sub>on</sub>* = Emission (Gg) of N<sub>2</sub>O;

*M* = Ratio of molecular mass to the elemental mass

*A* = Fire affected (scar) area (ha)

*P* = Patchiness

*EF* = Emission factor (% of fuel elemental content released in fire)

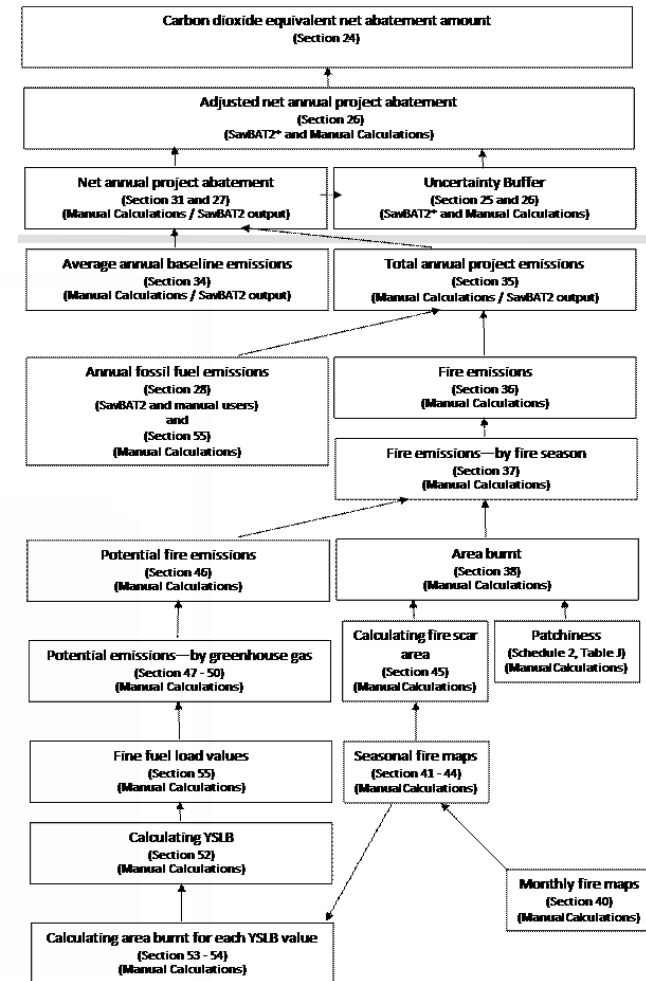
*FL* = Fuel load (t dry matter ha<sup>-1</sup>)

*CC* = Carbon content of fuel (gram of carbon per gram of dry fuel)

*NC* = Elemental nitrogen to carbon ratio

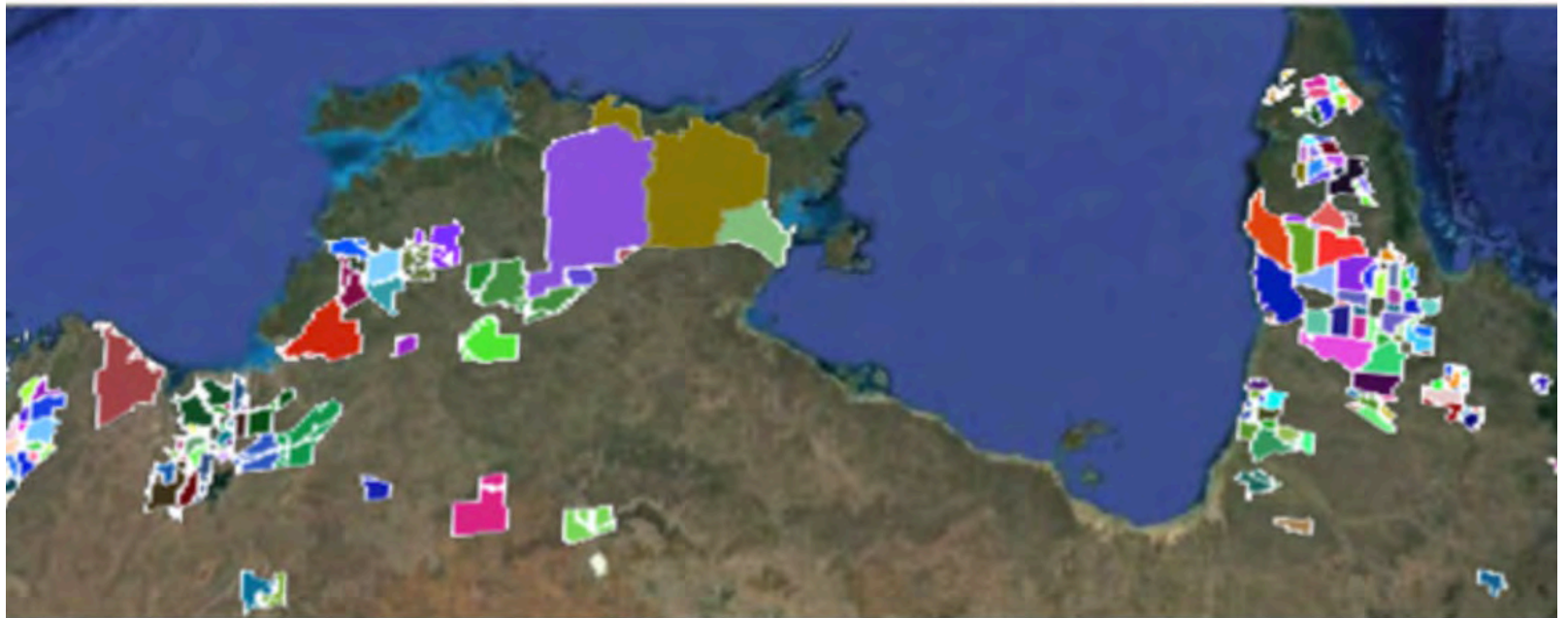
*S* = Severity class (fraction of fires of severity class *m* in fire season *k*)

*BEF* = Burning efficiency





Now more than 75 Projects  
across the north of Australia – 25  
Indigenous owned or involved.



# The Australian Experience – In Brief

- Methodology based fire management
  - Methodology.
  - Monitoring, Reporting, Verification (MRV) (NAFI)
  - National system accreditation (Emissions Reductions Fund).

## Indigenous led/owned projects.

- Climate (Emissions reductions) 30%-50% (additional in sequestration).
- Biodiversity.
- Communities (Employment, Reinvestment, Opportunity to stay on country).

# Impact: Climate. Biodiversity. Communities.



Success led to Australian stakeholders asking - Could this also work in other regions?



# First Phase 2013-2015

- First phase funded by the Australian Government.
- Two year 2.25 million AUD Investment.

# First Phase – Three Key Elements

- Sharing the Australian Experience – Exchanges Brazil to Australia, Australia to Namibia.
- Global and Regional Feasibility Assessments – Regional Workshops Africa, Asia. Research and Global Feasibility Assessment.
- Strengthening the resource base and Establishing a Global Network – Community of Practitioners (ISFMI Network), Toolkit of Resources on TFM.

# Learning Exchanges



# Regional Workshops





# Southern Africa Engagement – ISFMI Regional Workshop 2014

- Angola
- Botswana
- Mozambique
- Namibia
- South Africa
- Zambia
- Zimbabwe

Botswana Country Summary  
Improved Fire Management, Livelihood &  
Emission Avoidance Initiatives  
J.F.K. [Moeng](#) & P.O. [Dube](#)



# Global Potential ?

---

## **Can savanna burning projects deliver measurable greenhouse emissions reductions and sustainable livelihood opportunities in fire-prone settings?**

**Jeremy Russell-Smith · Catherine Monagle · Margaret Jacobsohn · Robin L. Beatty · Bibiana Bilbao · Adriana Millán · Hebe Vessuri · Isabelle Sánchez-Rose**

Received: 29 January 2013 / Accepted: 27 August 2013

© The Author(s) 2013. This article is published with open access at [Springerlink.com](http://Springerlink.com)

**Abstract** Savannas constitute the most fire-prone vegetation type on earth and are a significant source of greenhouse gas emissions. Most savanna fires are lit by people for a variety of livelihood applications. ‘Savanna burning’ is an accountable activity under the Kyoto Protocol, but only Australia, as a developed economy, accounts for emissions from

---

This article is part of a Special Issue on "Climate Change Mitigation and Adaptation with Local Communities and Indigenous Peoples" edited by Kirsty Galloway McLean, Ameyali Ramos Castillo, Edwin Castellanos, and Aqqaluk Lyngé.

---

# The Global Potential of Indigenous Fire Management

- Published Final Feasibility Assessment 2015.
- Focused on 3 Regions:
  - Southern Africa.
  - Asia.
  - Central and South America.
- Findings Launched at COP 21 Paris 2015 by Australian Minister of Environment.



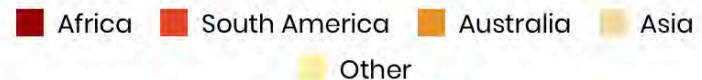
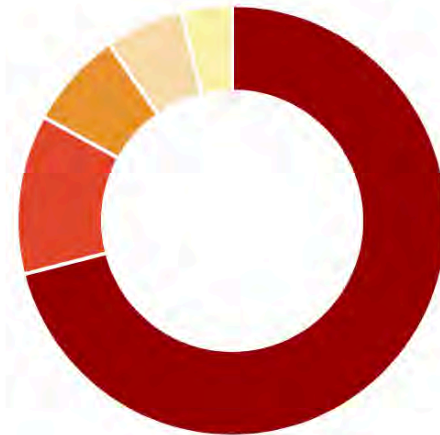
# The Global Potential of Indigenous Fire Management

- Report found methodology based TFM applicable across the savannas and tropical dry forests of the world.
- Traditional Fire Management Practices also important and relevant to other ecosystems.



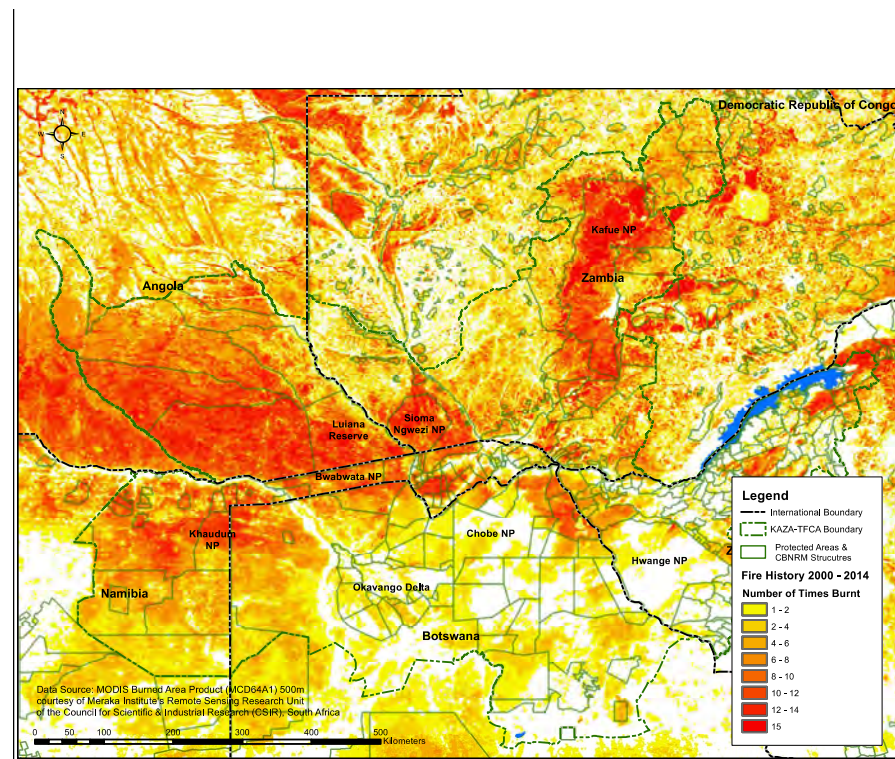
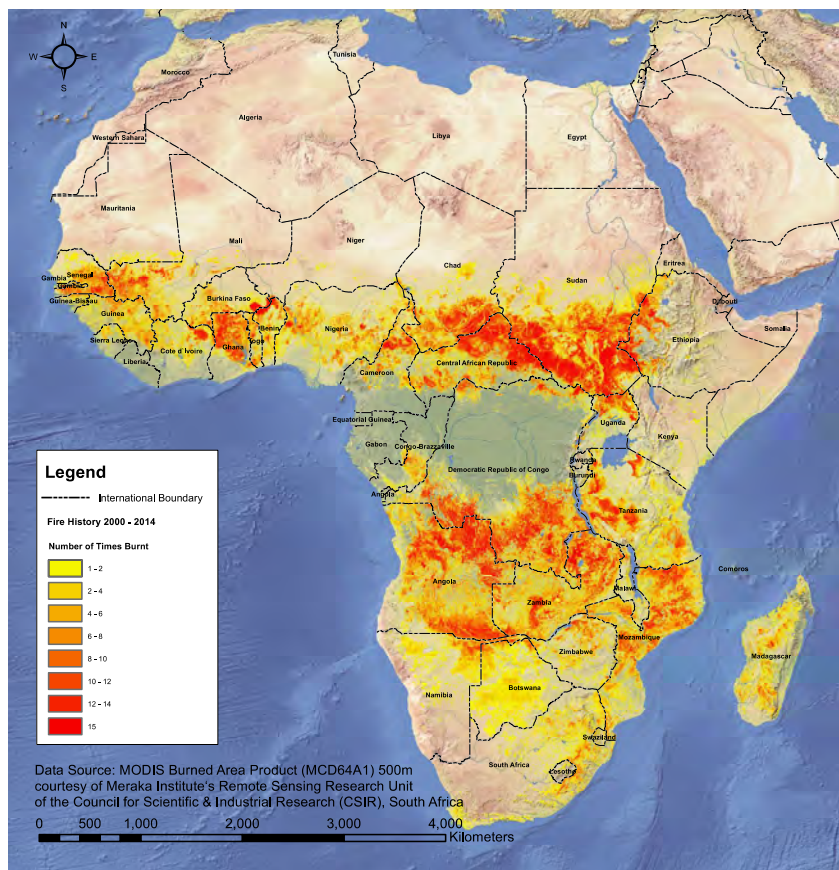
# Fire in Southern Africa

- ▣ Savanna fire emissions are predominantly sourced from Africa.
- ▣ Africa contributed approximately 71% of all savanna CO<sub>2</sub> emissions in the 1997-2014 period.
- ▣ Global opportunities for emissions reductions potentials through early dry season burning are apparent for 37 countries including: 29 countries in Africa (69.1 MtCO<sub>2</sub>-e yr<sup>-1</sup>).



*Approximate Regional Contribution to Total Global Fire Emissions*

# Fire in Southern Africa



# Second Phase 2018 - 2021

From Establishing Global  
Applicability...

...to Proof of Concept Activities.

## Second Phase 2018 - 2021

- Second phase again supported by the Australian Government.
- 3.8 million AUD Investment focused on testing feasibility in Botswana.



# ISFMI Activities

- Pilot Projects Botswana
  - MOU Government of Botswana.
  - Inception Meeting.
  - Community Consultations.
  - Data collection and methodology development.

# ISFMI Activities

## Botswana Pilot Sites Activities

- FPIC
- Pilot Site Law and Governance Assessment
- Identify necessary project consents and licences
- Provision of legal advice
- Baseline fire review
- Validated vegetation fuel type map
- Platform for MRV
- Methodological Development
- Fire Management Program for Pilot Sites
- Identifying relevant Traditional Knowledge
- Environmental and Social Impact Assessment

## Capacity Development and Knowledge Exchange

- Annual Project Partners Meetings
- Exchange Programme
- ISFMI Network

# Botswana Conference & Community Exchange



# Progress and Potential in Botswana

- Research team has established the applicability of Australian style methodologies in Botswana.
- Scientific paper in final stages of drafting prior to publication in coming months.
- Now to finalise methodologies and expand practical activities and community engagement.

# Next Steps Globally

- Where else can this work? Likely in many regions, including:
  - Other countries in Southern Africa (i.e. Angola, Namibia, Mozambique, Zimbabwe, Zambia). (GCF Regional Readiness Proposal)
  - Central and South America (i.e. Mexico, Belize, Brazil).
  - Asia (i.e. Indonesia, Timor Leste, Papua New Guinea).

# Type of Readiness Activities

- For example:
  - Identifying possible further pilot sites and doing further on the ground analysis to establish viability: Baseline fire emissions, Vegetation Maps, Community consultation.
  - Developing methodologies in other vegetation communities/rainfall bands.
  - Identifying national and regional Monitoring, Reporting and Verification needs and options.

# Type of Readiness Activities

- For example:
  - Developing the community and stakeholder capacity necessary to familiarise communities and national stakeholders in the approach through learning from the Australian experience and participating in a global community of practice.
  - Capturing all of the above in a Concept Note with elements at both the country and regional level.

For more information

[www.isfmi.org](http://www.isfmi.org)



The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. The shapes are primarily triangles and polygons, creating a dynamic, layered effect. The text is positioned in the center-right area of the white space.

ISFMI

Reflections on the Pilot Project

# 2019 BENCHMARKING VISIT

- ▶ Led by DFRR Director - Dr. Manthe-Tsuaneng
- ▶ Coordinated by TSS Division Head - Jomo Mafoko (fire Specialist)
- ▶ Accompanied by North West District Commissioner - Mr. Leipego
- ▶ With us were one officer from HQ, Ghanzi and North West District coordinators
- ▶ One member from the Tsodilo Community Development Trust wouldn't make it

# Objective of the Visit

- ▶ To share Indigenous fire knowledge by Australia and Botswana local communities, by combining the old ways and new ways of managing wild land fires - bring the two together for better
- ▶ Idea was to harness information on Carbon Trading for improving lives of the local communities
- ▶



## Local Community

A group picture after one of the day's workshop

# The visit

- ▶ Hosted by the Kimberley Land Council and ISFMI to get first hand information and experience on indigenous fire management
- ▶ Found that there were similarities within the two tribes
- ▶ MoU was signed at CDRU in the presence of the Northern Territory Foreign Affairs and Trade office
- ▶ Aussie was represented by LDI (Sam Johnston) and Botswana was represented by DFRR (Dr. Manthe-Tsuaneng)



MoU signing by DFRR Director and LDI Coordinator

# Aussie Rangers Visit

- ▶ 18 Aussie Fire Rangers attended Botswana National Fire Conference in Maun in 2019
- ▶ Had a visit to Tsodilo International Heritage Site
- ▶ Met with the local people and exchanged knowledge on fire
- ▶ Evening gatherings with competitions



The two groups sharing information



# Research work - CDRU Prof Jeremy Russell Smith and team

- ▶ Sites selection 3 sites were selected at first but CKGR was dropped out due to logistics
  - ▶ Lesoma in Chobe
  - ▶ Tsodilo in Okavango
  - ▶ Preliminary studies done for both sites
  - ▶ Engagement of one UB PhD student for carbon emissions
  - ▶ Intention I to train 3-4 PhD students who will form a support base (team) to DFRR after the project

# Challenges

- ▶ Malfunctioning of Fire detections station
- ▶ Lack of resources for local communities
- ▶ 2020 Rainfall Outlook good, leading to high fuel load
- ▶ Lack of PPE for communitites

# conclusion

- ▶ TFM is important in carbon Trade
- ▶ Bringing the two indigenous knowledge together is important
- ▶ Have exchange programmes

# INDIGENOUS-LED EVALUATION OF ENVIRONMENTAL, SOCIAL AND CULTURAL VALUES

CORE BENEFITS VERIFICATION FRAMEWORK



ABORIGINAL  
CARBON FOUNDATION

Photo: Jeremy Dore

# VISION

The vision of the Aboriginal Carbon Foundation is to catalyse life-changing, community prosperity through carbon farming.

In doing this our aim is to build wealth for Traditional Owners and non-Aboriginal carbon farmers implementing carbon projects that demonstrate environmental, social and cultural core benefits.



# THE CHALLENGE

- How do we build a system that facilitates authentic decision making, agency, confidence and self-esteem of Indigenous people to lead verification
- How do we build an approach that is inherently rigorous and independent and acceptable to a mainstream audience





Savanna Fire Forum 2018

**CORE BENEFIT  
VERIFICATION RESEARCH  
& DEVELOPMENT**

*“An innovative approach to enable Indigenous-Indigenous, peer-based processes rather than the ‘top down’ approach offered by mainstream standards”.*

*Dr Cathy Robinson – Director  
Northern Australia Research  
Alliance*



# GROWING DEMAND FOR VERIFICATION OF CO-BENEFIT CLAIMS





# AGENCY AND OWNERSHIP



- We didn't know the enormous resources we have, the strengths we have, the rights we have, the voice we have, the space we have. The time has passed when we would sit back and expect someone to do things for us, we now start on our own and request support where we cannot manage. All the changes you see in this village, these are our own making"

Janet Mpinganjira - Malawi





# STRENGTHS MODEL VS DEFICITS MODEL

What DO we have?

Existing Skills/  
Talents/  
Knowledge

Makes us  
Think of  
Possibility

Internal  
Reliance

Half full.  
Awesome.



What DON'T we have?

Problems/  
Needs/  
Gaps

Makes us  
Depressed  
and  
Overwhelmed

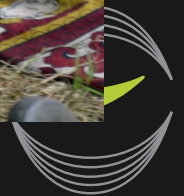
External  
Reliance

Ugh. Half  
empty.



# STRENGTH BASED APPROACH

- Mapping of human, environmental, infrastructural, social and economical assets
- “Start with what we know, build with what we have”
- “Everyone has something to contribute”
- “Nobody has nothing”



# PRINCIPLES UNDERPINNING OUR APPROACH TO CORE BENEFITS VERIFICATION



- Paolo Friere and Franz Fanon ideologies
- Build on existing resources/assets
- Peer to Peer (south to south)
- Indigenous decision making and empowerment
- Data sovereignty
- Celebration not an audit



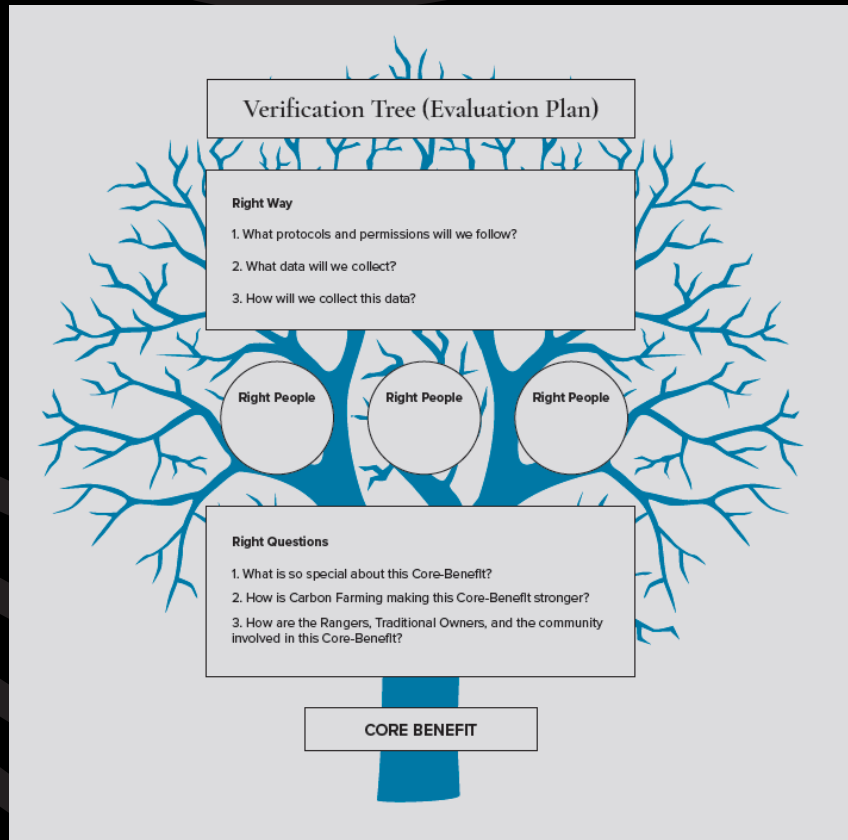
# CORE BENEFITS IDENTIFICATION



Traditional Owners and rangers deciding which environmental, social and cultural Core Benefits are most important.



# MODEL OF RIGOUR



- “Asking the right questions to the right people in the right way”





# BUILDING THE VERIFICATION TREE (EVALUATION PLAN)





# WHY BECOME A VERIFIER?



- Leadership
- Pride and role-modelling
- Income from meaningful work
- Respect and recognition
- Travel and adventure
- Working together experiencing other communities and country
- Nationally accredited qualification in carbon farming and new transferable skills
- Annual Verifiers' meetings
- Showcasing Indigenous land and sea management as solutions to climate challenges



# Savanna fire management—opportunities and challenges for community-based NRM in Botswana



Image: Matthew Stanton

## International Savanna Fire Management Initiative

Hosted by:



ISFMI project  
delivery partners:



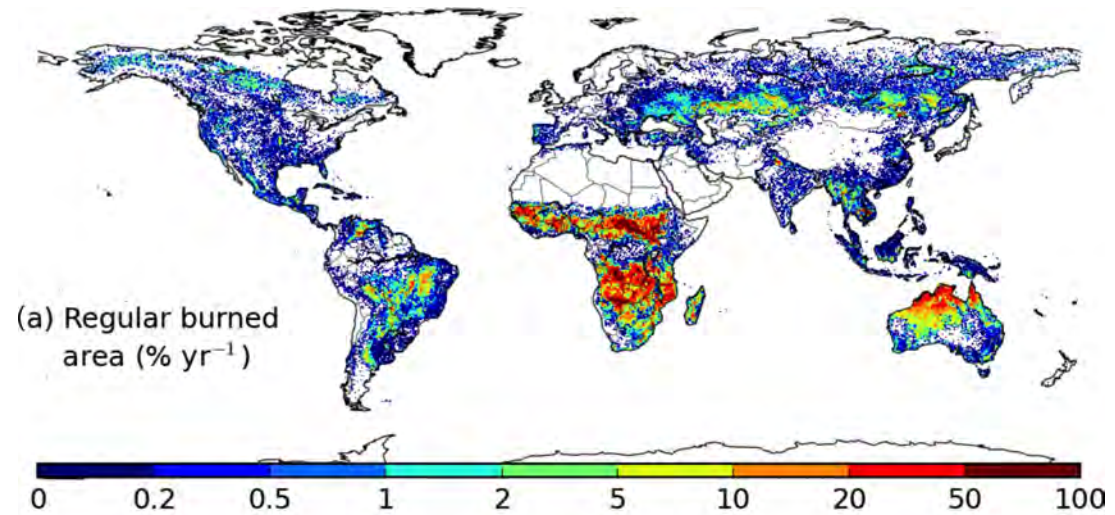
**Baker  
McKenzie.**



with support from:

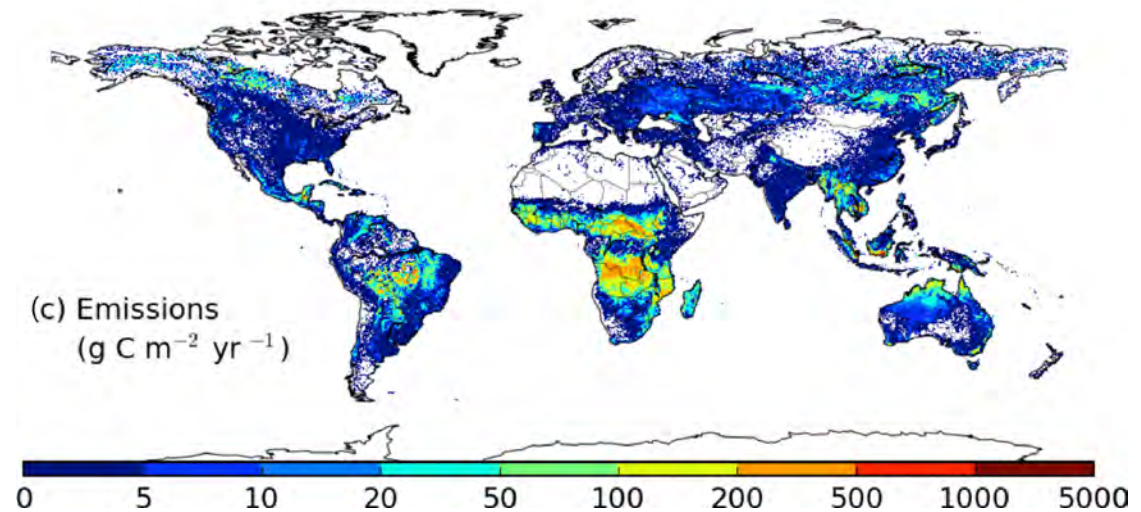


Proportion of  
area burnt, 2003-  
2016, per 0.25°  
cells

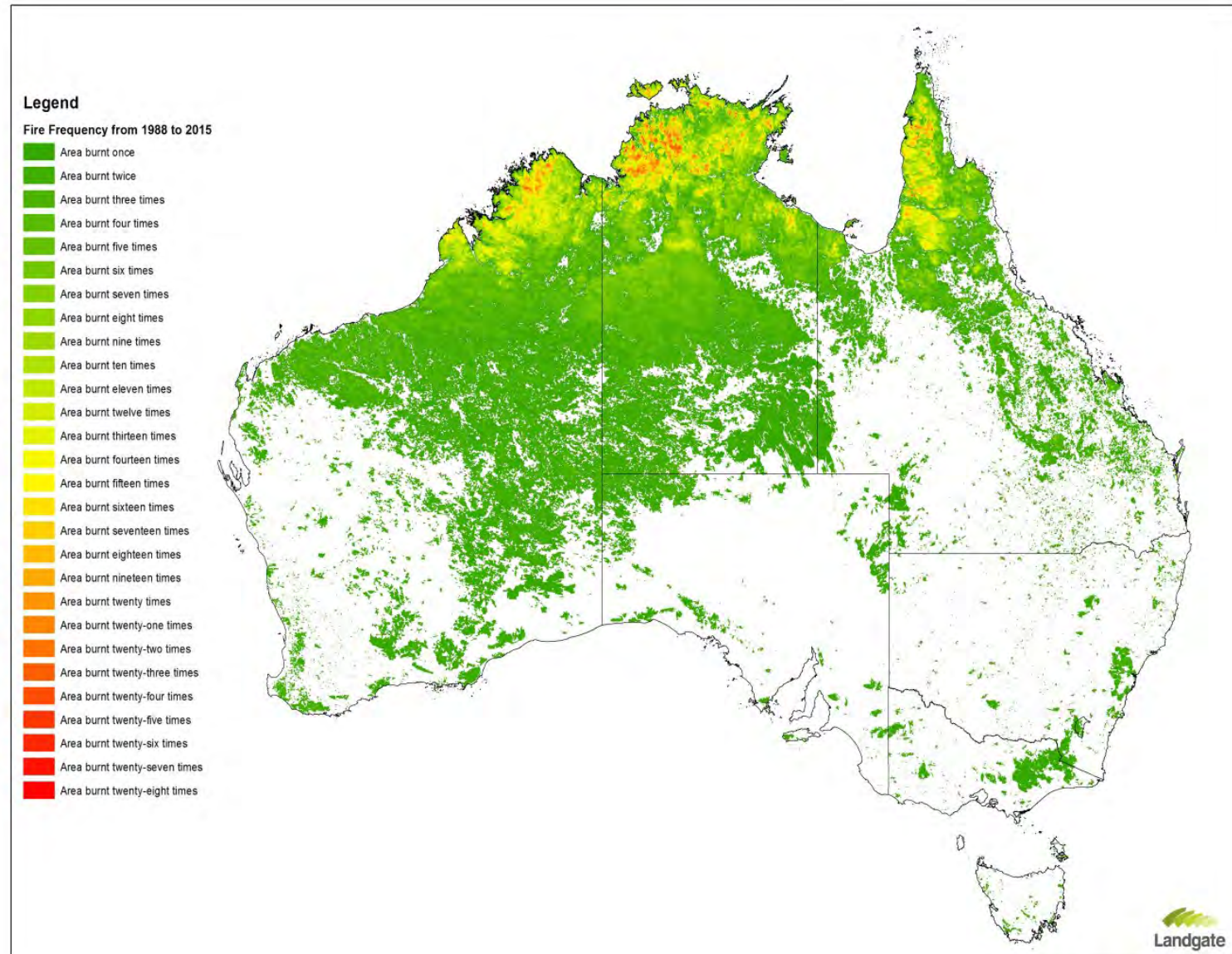


GHG emissions  
from fires—1997-  
2016

62% of global fire  
emissions come  
from savannas

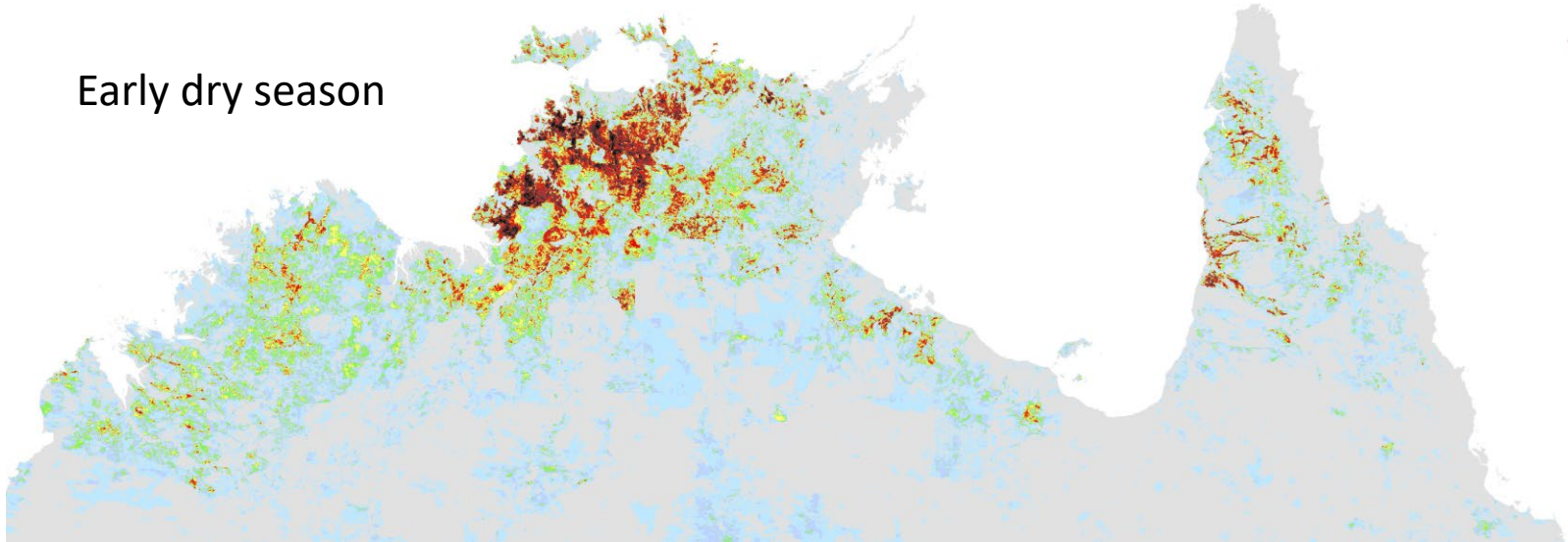


# Frequency of large fires (>~4 km<sup>2</sup>) 1998-2015, derived from AVHRR imagery

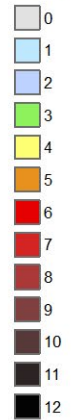


# Fire frequency 2000 – 2011, derived from MODIS imagery

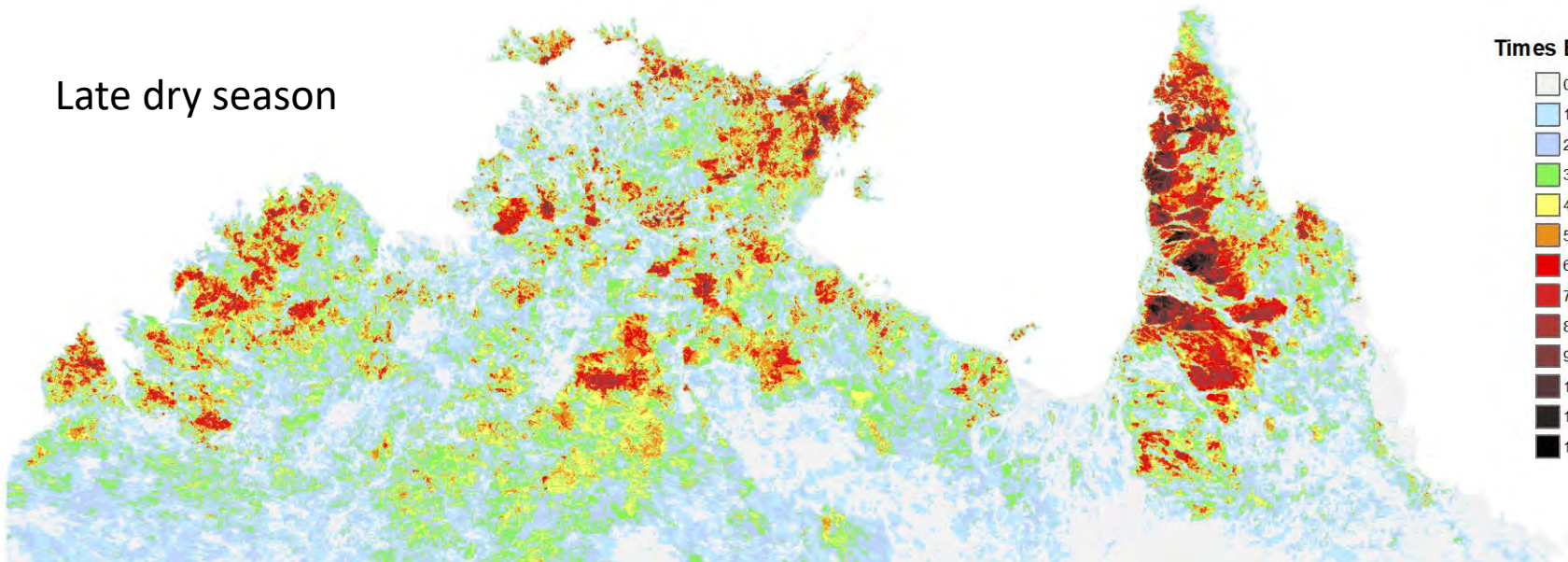
Early dry season



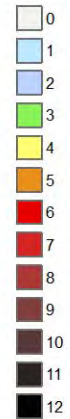
Times Burnt



Late dry season



Times Burnt





Early dry season low severity fire



05 01 2000



Late dry season  
wildfire in exotic  
*Andropogon* fuels

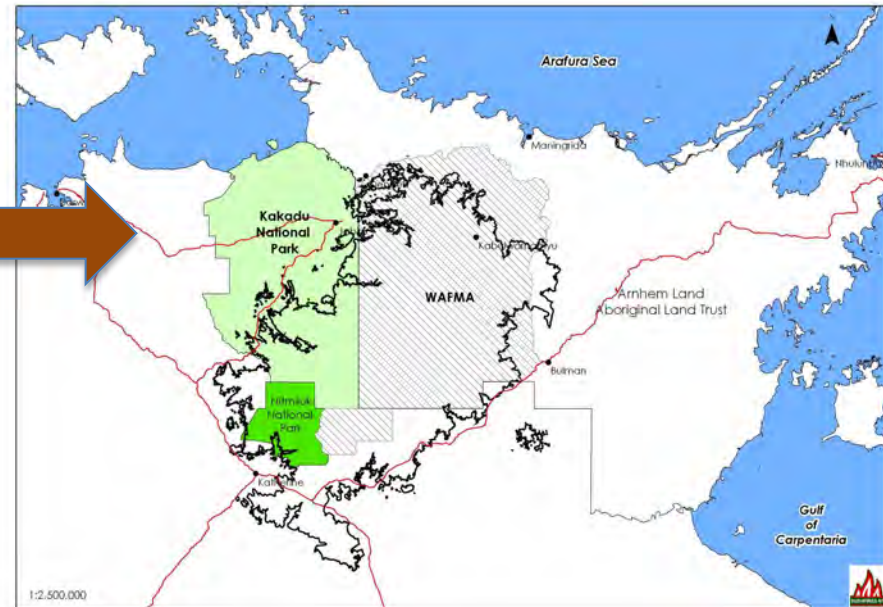


Extensive LDS non-patchy fires

26 10 2003

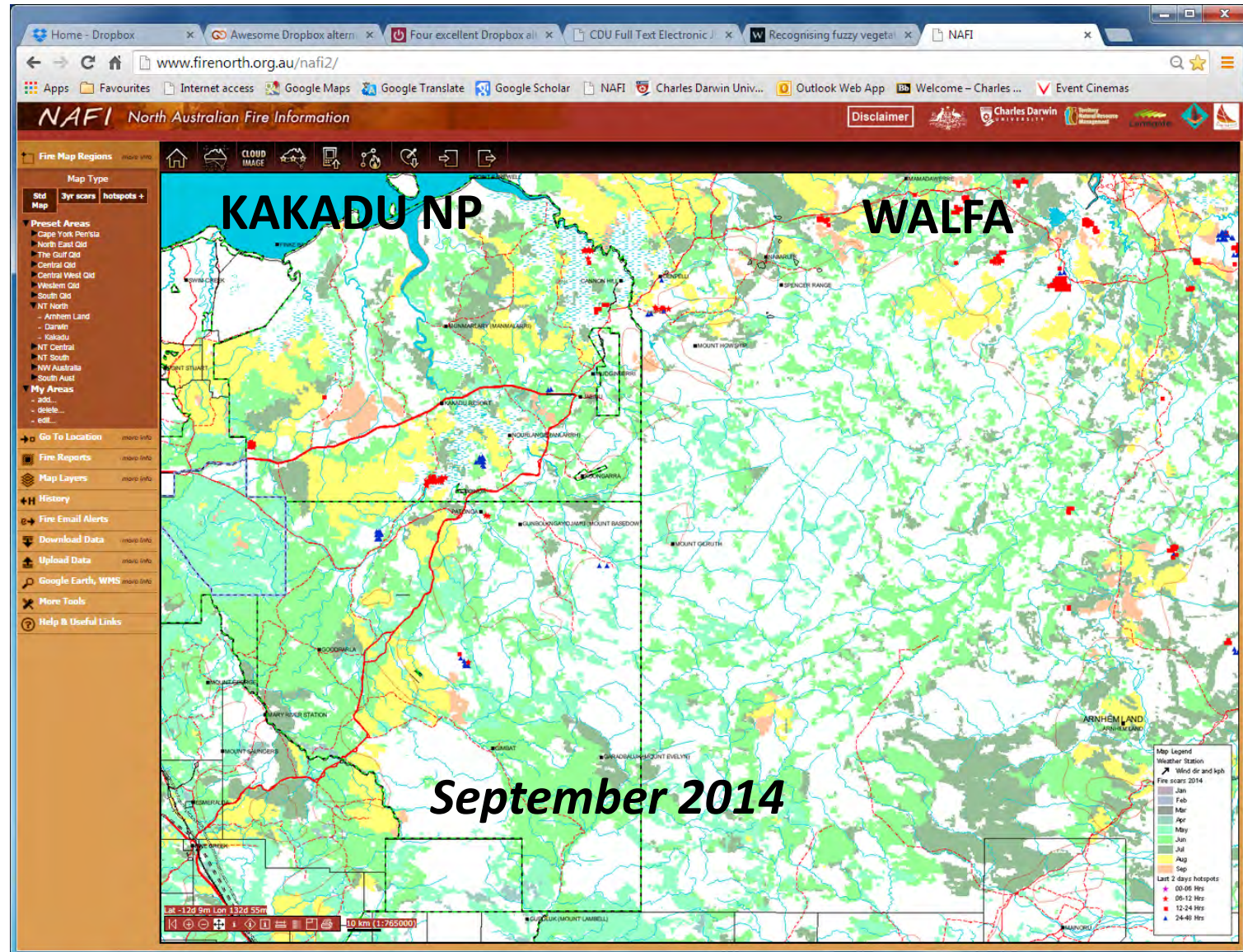
## Offset arrangement:

ConocoPhillips signs 17 year contract with Western Arnhem Land Owners in 2006 to deliver 100K t.CO<sub>2</sub>-e / yr



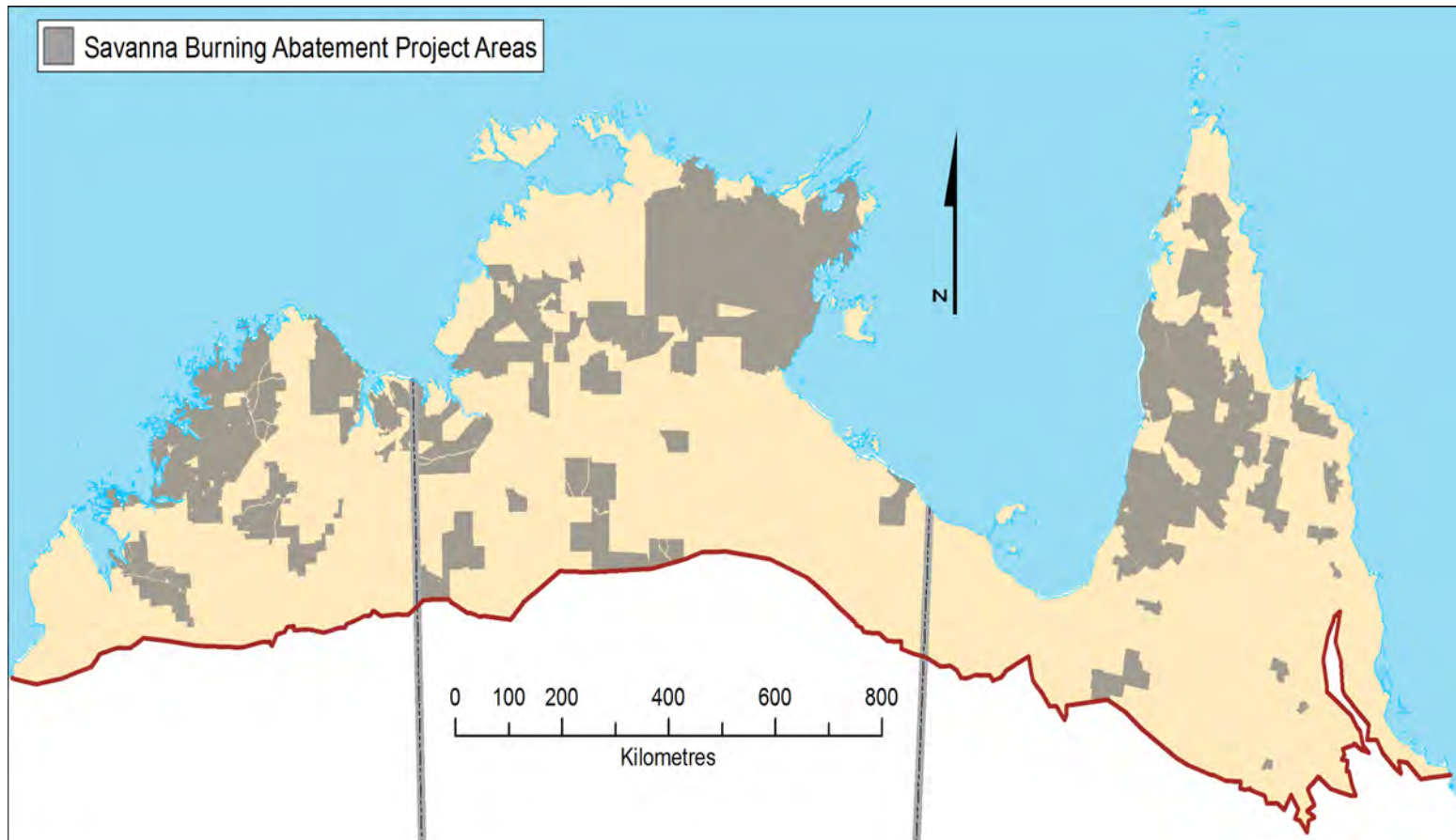


# North Australia Fire Information website: [www.firenorth.org.au](http://www.firenorth.org.au)





# Registered savanna burning Emissions Abatement projects, late 2016





# Culture, Ecology and Economy of Fire Management in North Australian Savannas

REKINDLING THE **WURRK** TRADITION

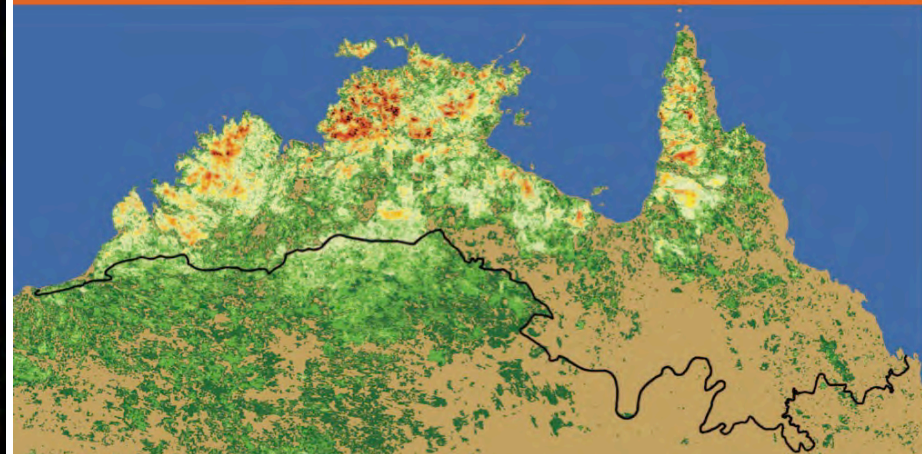


Jeremy Russell-Smith • Peter Whitehead • Peter Cooke



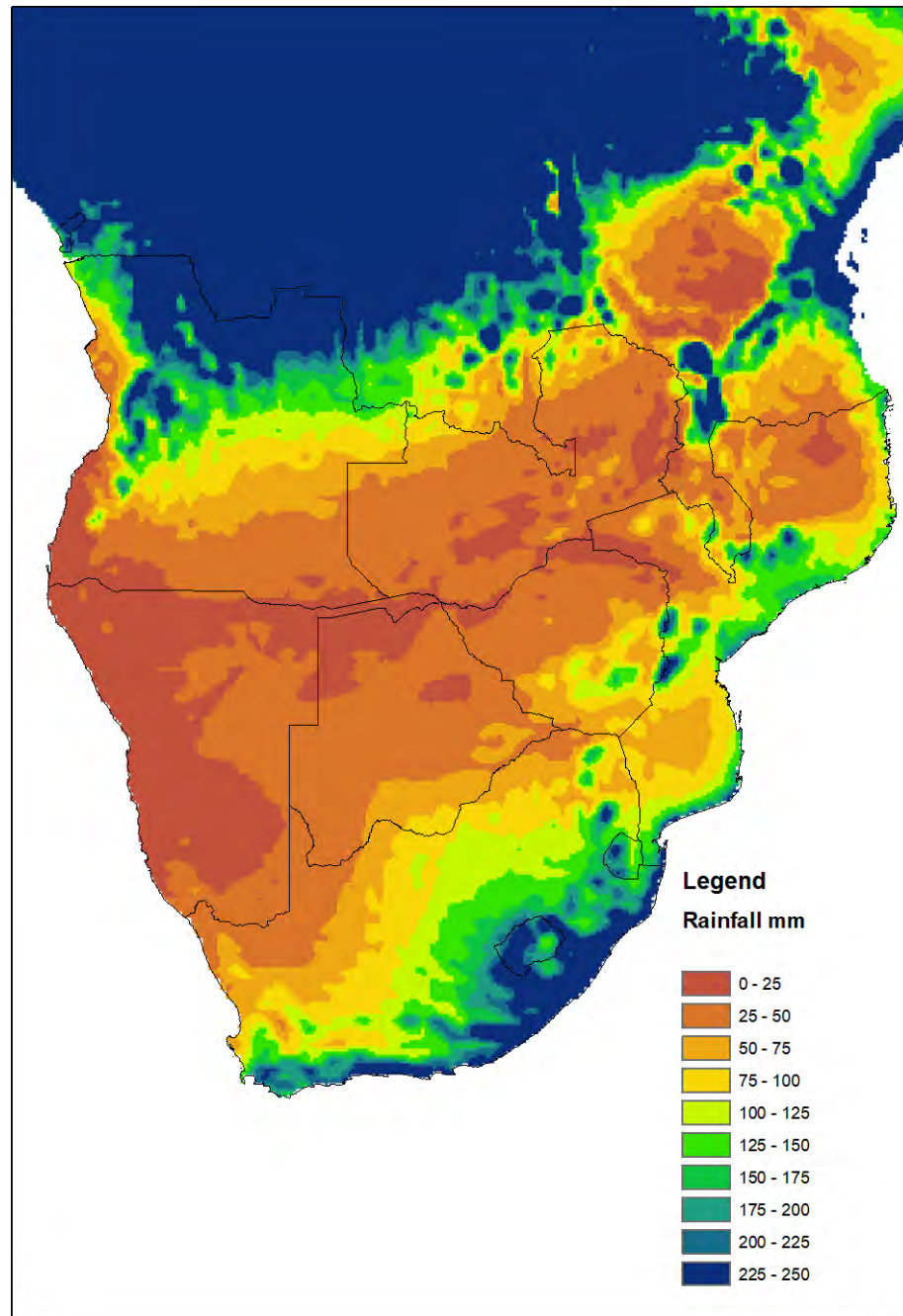
## Carbon Accounting and Savanna Fire Management

Editors: Brett Murphy, Andrew Edwards, Mick Meyer  
and Jeremy Russell-Smith

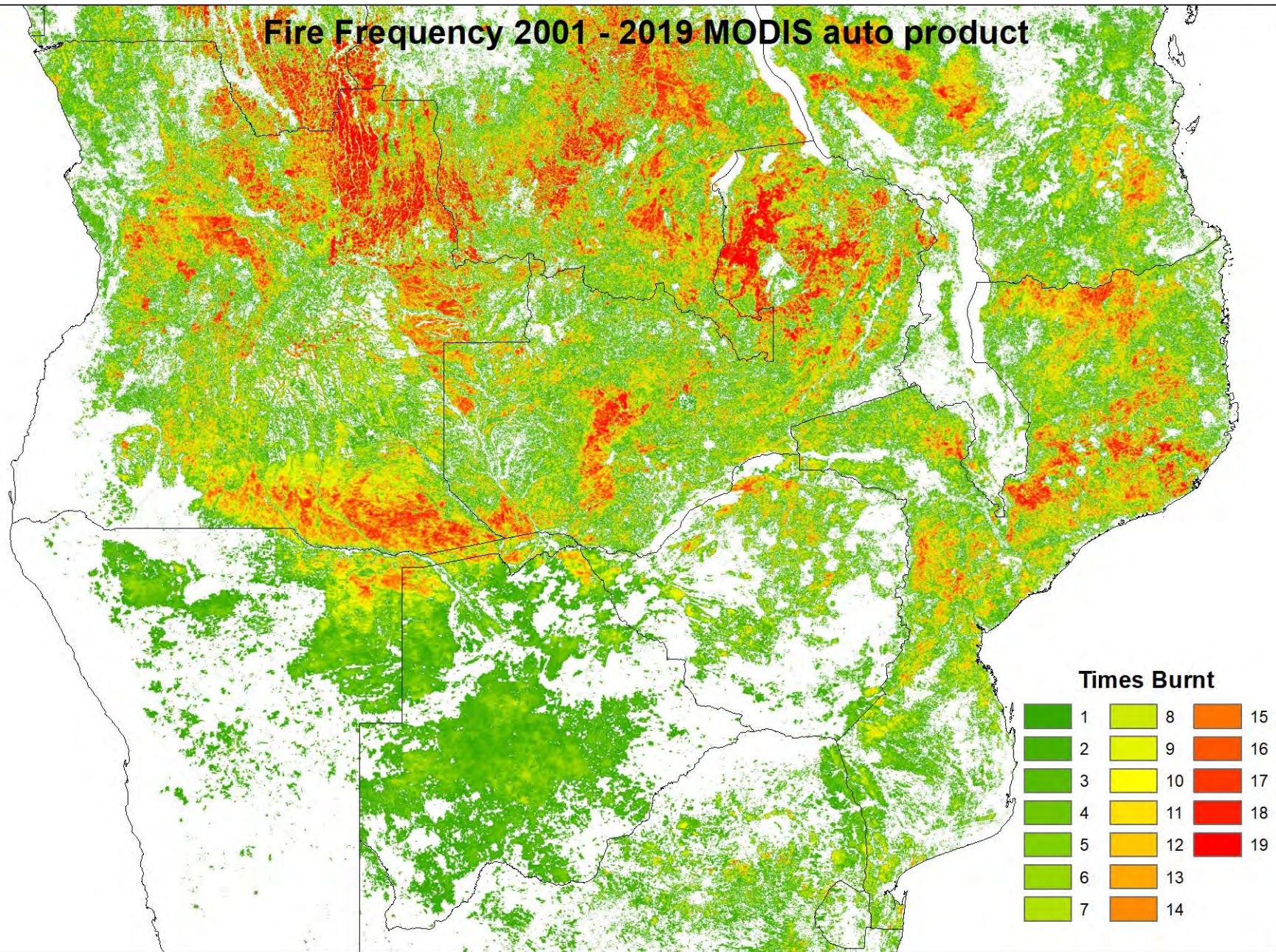


## Rainfall:

Total rainfall in 6 consecutive months receiving lowest rainfall



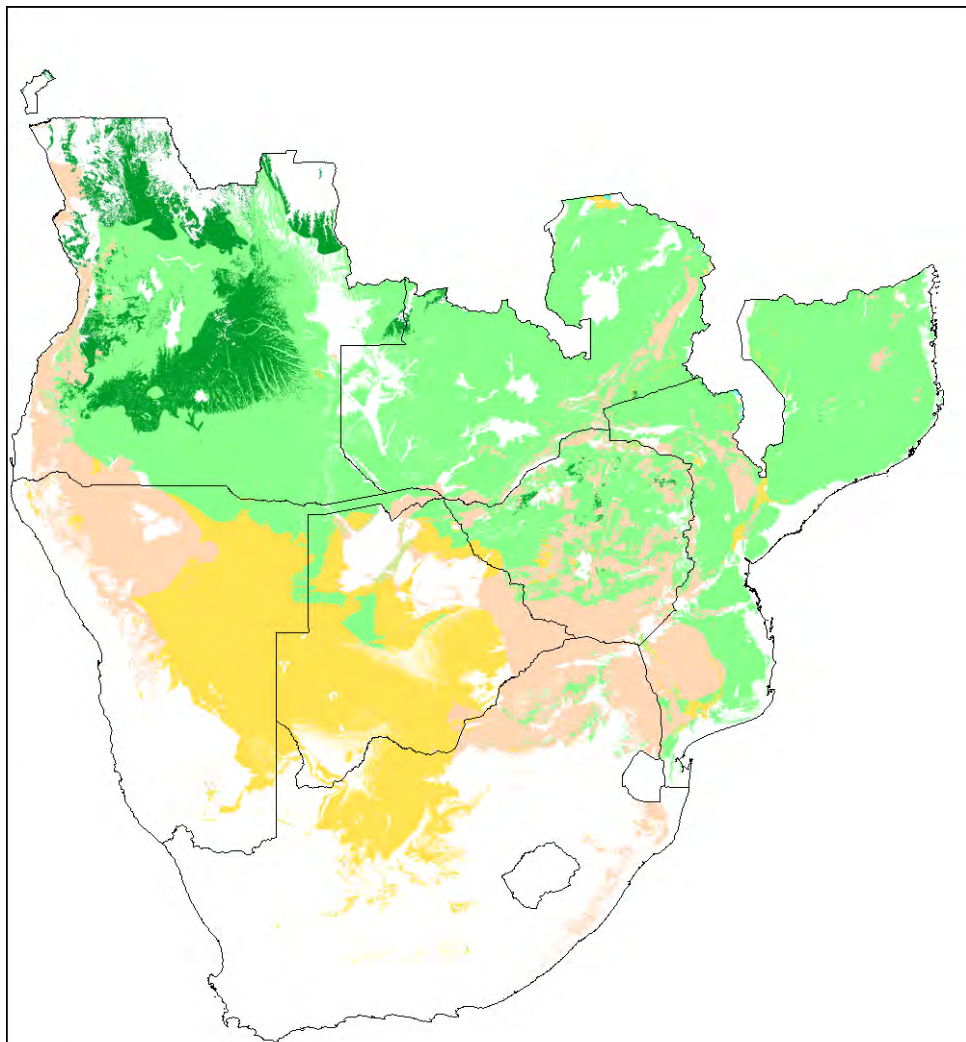
# Fire Frequency 2001 - 2019 MODIS auto product



## Times Burnt

1	8	15
2	9	16
3	10	17
4	11	18
5	12	19
6	13	
7	14	

**Source:**  
**Sayre et al. (2013)**  
**Ecosystems of Africa**



**Legend**

**Africa\_IVC\_20130316\_final\_MG\_country\_savanna.tif**

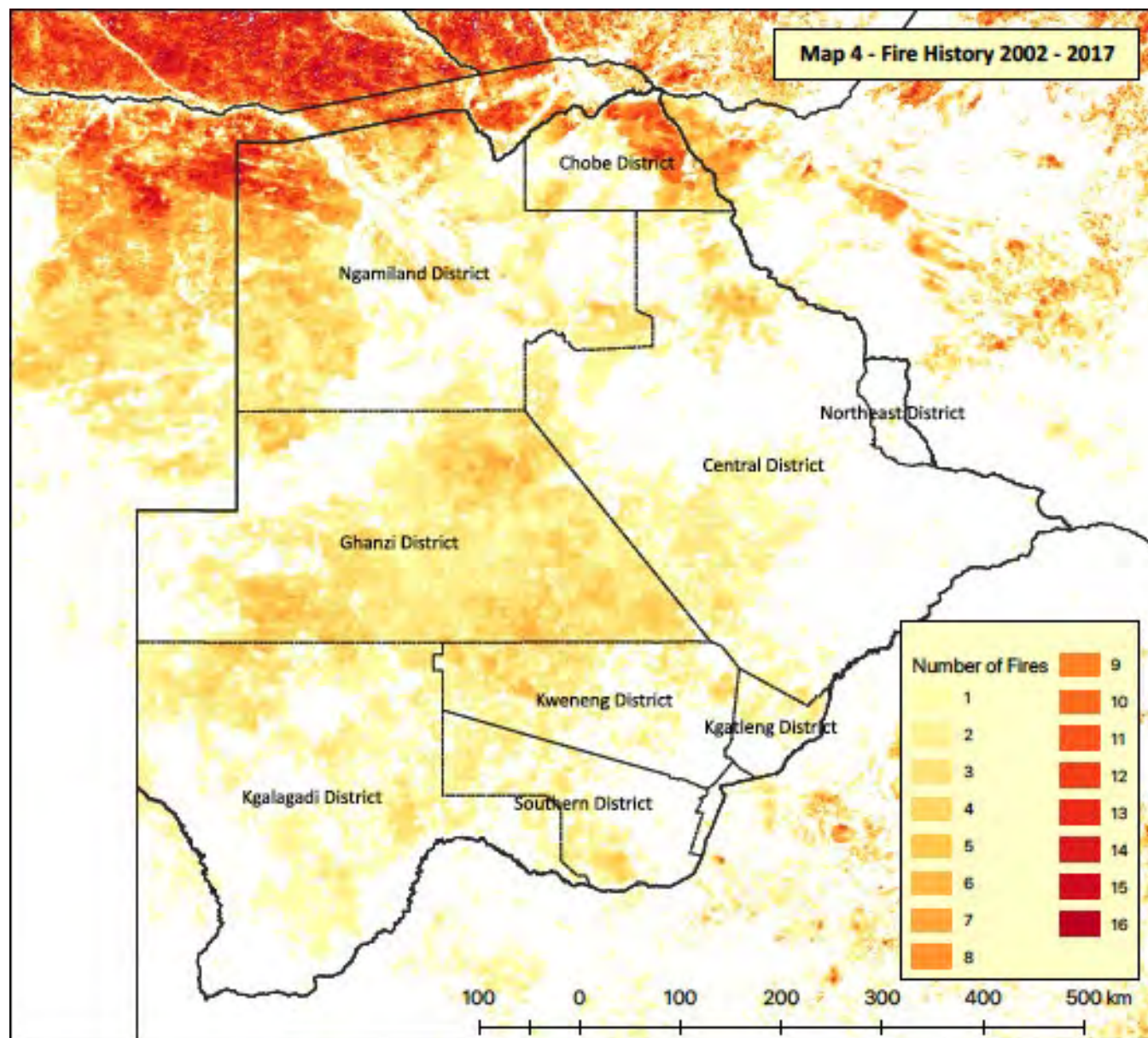
**Division**

-  2.A.1.Ff West-Central African Mesic Woodland & Savanna
-  2.A.1.Fg Eastern & Southern African Dry Savanna & Woodland
-  2.A.1.Fh Mopane Savanna
-  2.A.1.Fi Sudano-Sahelian Dry Savanna
-  2.A.1.Fn Miombo & Associated Broadleaf Savanna
-  2.A.1.Fo Eastern African Moist Woodland & Savanna

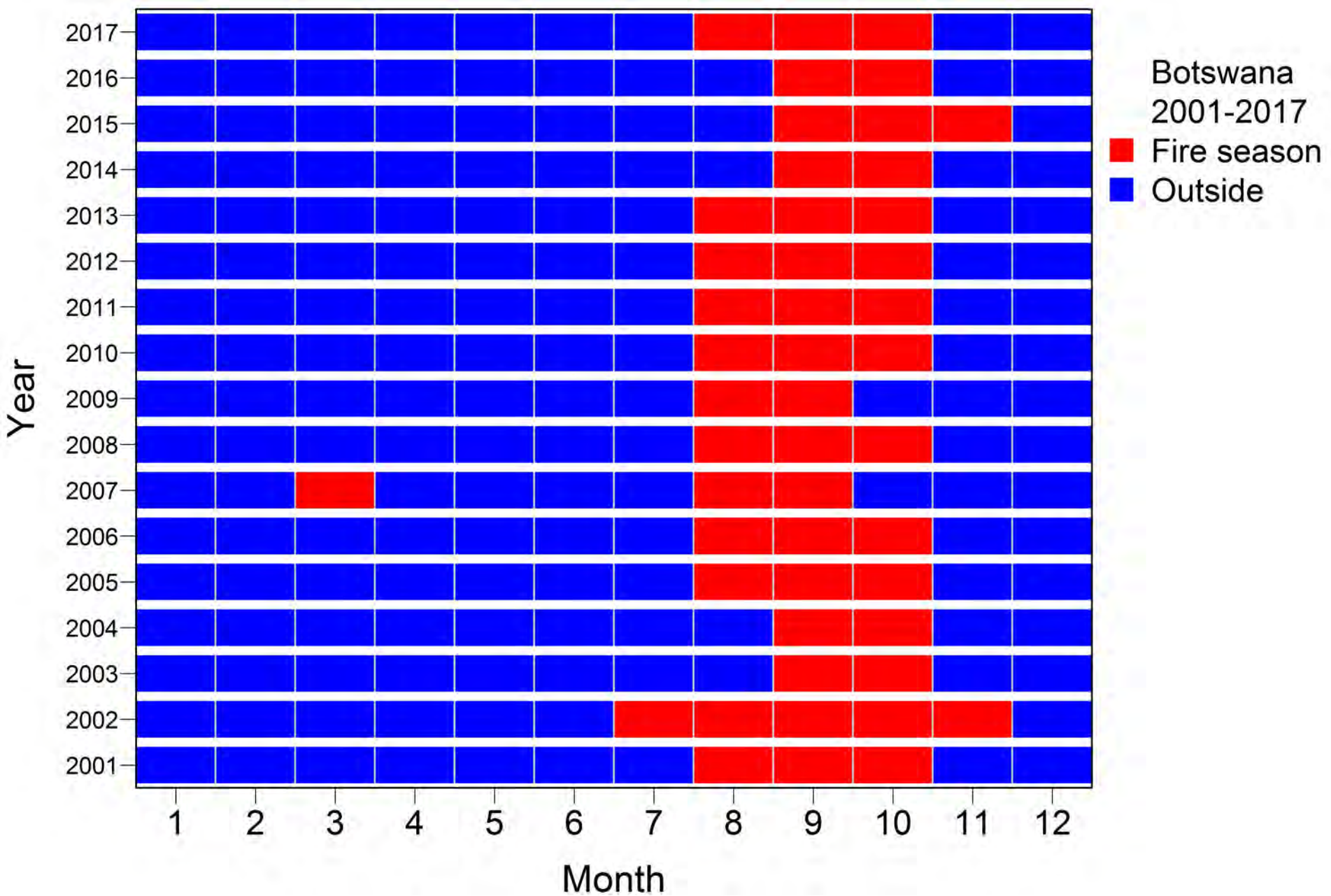
# Botswana fire frequency

2002-2017

MODIS  
imagery

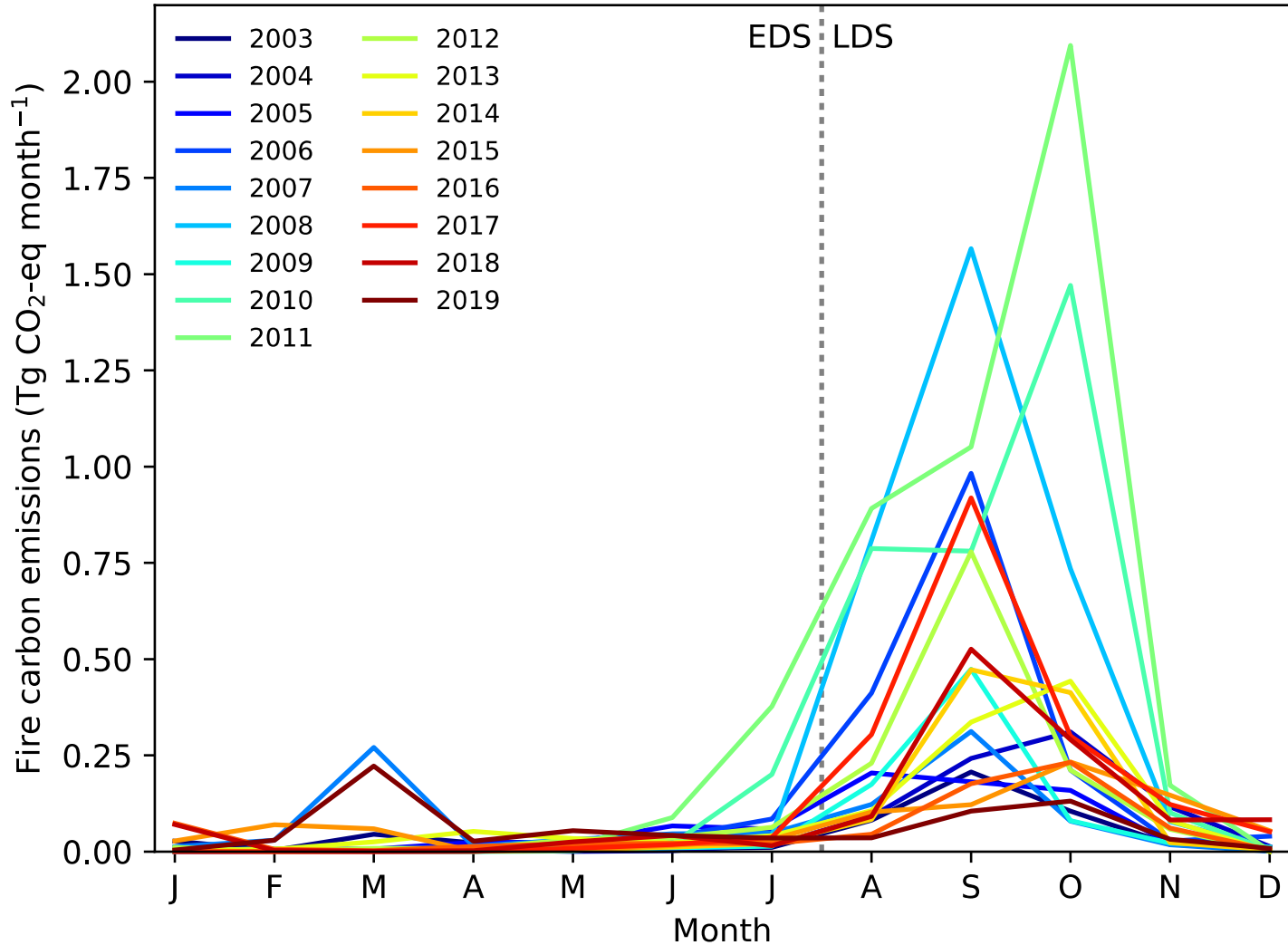






Source: Luigi Boschetti, University of Idaho

### Botswana (Average 1.5 Tg CO<sub>2</sub>-eq, 12% in EDS)





Empowered lives.  
Resilient nations.



GLOBAL ENVIRONMENT FACILITY  
INVESTING IN OUR PLANET



Republic of Botswana



## TSODILO ENCLAVE BUSH FIRE RISK MANAGEMENT STRATEGY

2017 – 2021





# Opportunities and challenges for savanna burning emissions abatement in southern Africa

Target journal: *Global Change Biology*

Jeremy Russell-Smith, Cameron Yates, Roland Vernooij, Tom Eames, Guido van der Werf, Andrew Edwards, Robin Beatty, Othusitse Lekoko, Jomo Mafoko, Catherine Monagle, Sam Johnston

Methodology Element / Parameter	Core methodology criterion	Field observation	Data source
<b>Vegetation fuel type mapping</b>	Project site includes substantial areas of fire-prone savanna vegetation	confirmed	Fig. 3a
<b>Fire regime mapping</b>	Project site is frequently burnt, especially by LDS fires	confirmed	Table 2; Fig 3b
<b>Pre-fire assessment</b>			
<i>Fine fuels (grass + leaf litter)</i>	Fine fuels tend to be greater in LDS attributable to increased leaf litter fall as dry season progresses	confirmed	Appendix S3:Table 2
<b>Post-fire assessment</b>			
<i>Fire severity</i>	LDS fires tend to be more severe than EDS prescribed fires	confirmed	Appendix S3:Table 3(i)
<i>Fuel combustion</i>	More severe (typically LDS) fires tend to combust more fuels	confirmed	Appendix S3:Table 3(ii)
<i>Patchiness</i>	More severe (typically LDS) fires tend to be less spatially patchy than EDS fires	confirmed	Appendix S3:Table 3(ii) Fig. 4; Appendix S3:Table 4
<i>Emission Factors</i>	EF(CH <sub>4</sub> ) and EF(N <sub>2</sub> O) tend to be equivalent in EDS and LDS under cured fuel conditions	confirmed	Fig. 5; Appendix S3:Table 5



POLLINATION

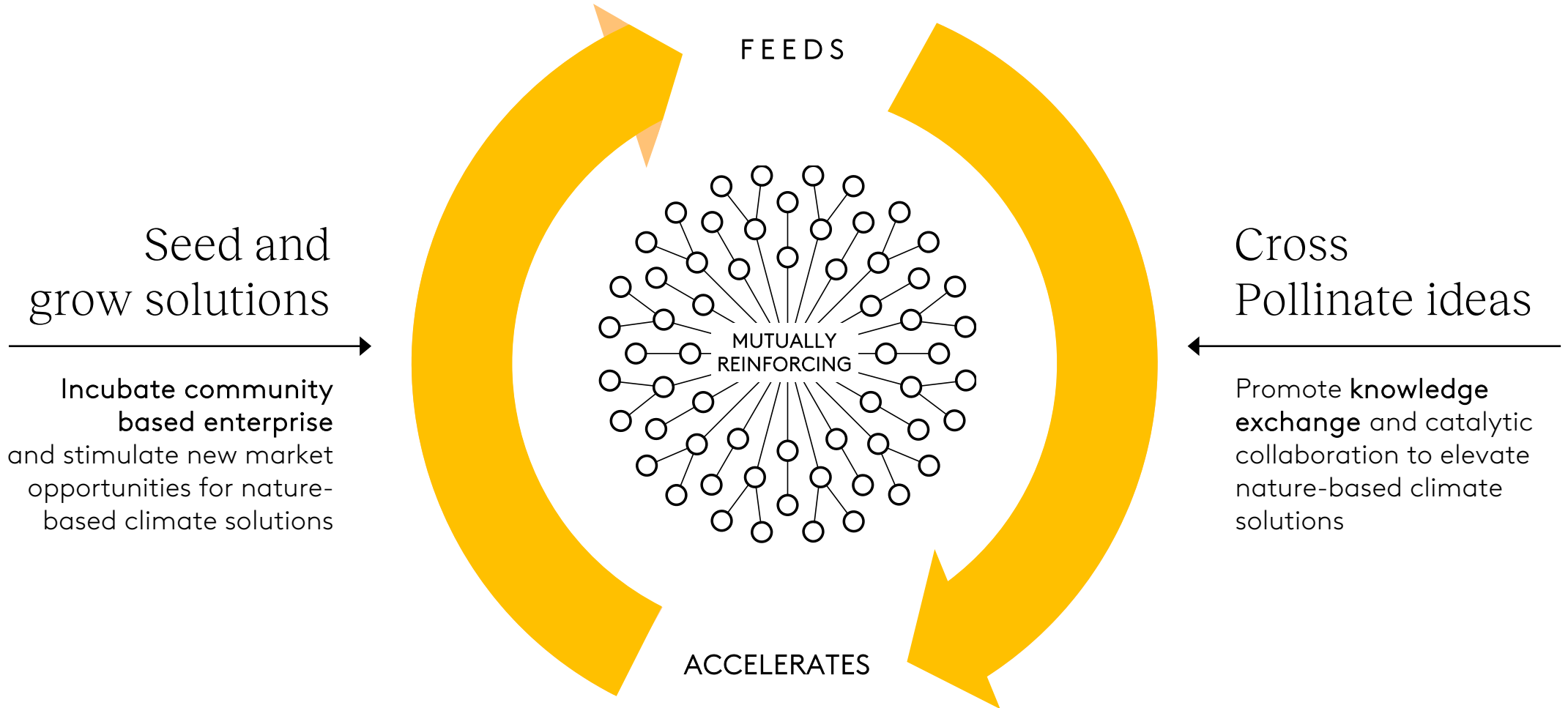
International Savanna Fire Management Initiative  
Project Meeting, 3 September 2020

# Pollination Foundation Vision



Place-based economies create a climate resilient future  
where people and nature thrive.

# Our Approach





# About Pollination Foundation

Pollination Foundation is a registered not-for profit organisation, committed to Pollination's mission to accelerate a net zero emissions, climate resilient future.

We draw on the unique law, policy and finance expertise of Pollination Group to deliver strategic initiatives that benefit people and nature.

We convene diverse voices; seed innovation and cross pollinate ideas to accelerate the transformation to a climate resilient future.

We understand the importance of unexpected partnerships and play a critical role in connecting and supporting community leaders, governments, international organisations, research institutions, philanthropists, corporate foundations and business – driving progress towards the Sustainable Development Goals.

To achieve net zero emissions, we recognise the need to elevate local and Indigenous led community solutions, valuing their deep knowledge and power, to drive change towards a future where people and nature thrive.



# About Pollination Group

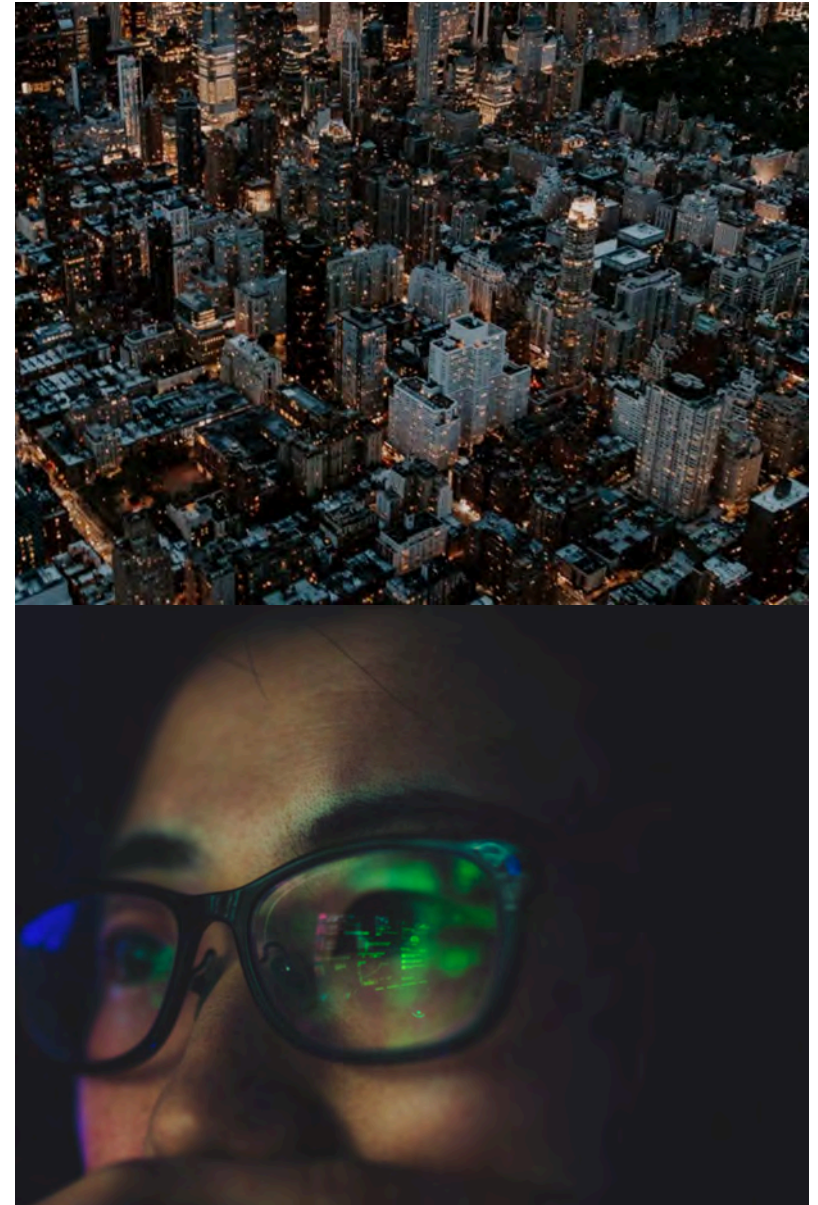
Pollination is a specialist climate change advisory and investment firm, laser focused on accelerating transition to a net zero, climate resilient future. We help organisations move forward, with confidence.

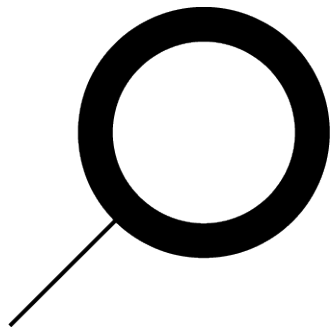
The combination of our experience is what makes Pollination different. Our people are individually recognised as world leaders across the climate change ecosystem.

We are leading experts in climate strategy, policy, law, finance, investment and technology, with deep government experience. Together, we can connect dots and link opportunity where others can't, developing the holistic, integrated solutions required to address the complex climate agenda.

Since launching Pollination, the speed of the net zero transition has intensified. The scale and pace of change is immense, but we're optimistic about what is to come.

With imagination and courage, we can step forward into a net zero, climate resilient future.





## Pollination Group's Role in the ISFMI

1. Undertaking a country level assessment of the policies, laws, regulations and institutional arrangements relevant to the implementation of savanna fire management in Botswana and identify possible barriers and solutions to address them.
2. Provide specific legal, policy and governance expertise with respect to implementing any reforms related to developing regulatory frameworks to enable and support savanna fire management in Botswana.

We are progressing this review and working with legal experts in Gaborone to develop our initial findings.



## The relevance of law for savanna fire management activities

1. **General Regulation:** The controlled burning of savannas involves carrying out an activity on land which must be undertaken in accordance with the relevant legal frameworks relating to land management and fire management. Is there any law in place that governs such activity?
2. **Permitted Activity:** Is savanna burning a permitted activity on the land? i.e. burning may be prohibited in protected areas or nature reserves.
3. **Regulatory Approvals:** This may require approvals from government authorities- i.e. permits to undertake burning. It may also require an environmental impact assessment?
4. **Landholder Approval:** Consent of the landholder or landholders will be required.
5. Consideration also needs to be given to issues such as **liability** for when fires become uncontrollable or loss or damage occurs.

## The ability to access carbon markets and achieve the targets of Botswana's NDC

- Botswana's NDC commits to **15% reduction of emissions by 2030** which it states will be achieved from energy, waste and agriculture (although the NDC refers to funding allocations to energy and transport to achieve these reductions)
- National Committee on Climate Change
- The Third National Communication to the UNFCCC (Oct 2019) refers to "veldt fire monitoring and management" as one of the planned projects with the potential to significantly reduce GHG
- The controlled burning of savannas reduces GHG emissions that would have been emitted without such management activities, and these emissions reductions can become tradeable tonnes of carbon if they can be measured and verified and then issued as carbon units.
- Australia has a domestic program that legally recognises tradeable emissions from savanna burning activities. There are also examples in the voluntary market such as under the Verified Carbon Standard.
- In addition, fire management is a key aspect of building resilience to climate change particularly in the context of COVID recovery, and savanna fire management could assist Botswana to meet the adaptation component of its NDC.

# Linking savanna fire management to carbon markets

If either individual project proponents or the Government of Botswana wish to access carbon markets to sell emissions reductions achieved from the savanna fire management projects then in addition to legal issues with respect to carrying out the activity, the following legal issues will need to be considered:

- a. the extent to which Botswanan law can give or create rights to GHG emissions reductions, and who is the holder of these rights
- b. compliance with the rules of the scheme under which tradeable emissions reductions units are created (for example the Verified Carbon Standard) including rules with respect to environmental integrity, additionality and free and prior informed consent
- c. how economic benefits from sale of those units can be shared amongst stakeholders
- d. how emissions reductions from savanna burning activities are treated under Botswana's Nationally Determined Contribution made under the Paris Agreement
- e. the ability to trade the rights to the emissions reductions under the market mechanisms established under the Paris Agreement.

## Initial considerations for Botswana:

- Land tenure is divided into state, freehold and tribal ownership. There are some restrictions on the use of the land.
- The *Herbage Preservation Act 1978* requires permits to undertake burning other than by the owner of the land, depending on the type of fire activities.
- State owns underground resources and resources. Is this applicable to emission reductions from savanna burning? Would the rights to resources take precedence over rights to emissions reductions?
- How are emissions reductions from savanna fire management accounted for?
- Can savanna fire management be financed by other Government policies and fiscal incentives on climate change?
- How is the work of the National Climate Change Committee taking into consideration potential for land-based emissions reductions, including from savanna fire management?



Delivering *Net Zero*

