Savanna Fire Management: Lessons from 15 years of promoting a Nature Based Solution

Case Study for the UNFCCC Standing Committee on Finance Call for Inputs for the Next SCF Forum: Financing Nature-based Solutions

By

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Abstract:
This case study on Financing Nature-based Solutions (NBSs) describes an important NBS known as traditional fire management (TFM), provides an overview of a project to promote TFM, the International Savanna Fire Management Initiative, the challenges it has faced scaling up, attracting support and investments and next steps. Wildfire causes enormous damage and loss around the world. Climate change is predicted to make this worse. Indigenous people around the world hold the only viable mechanism for tackling this impact – TFM. Monitoring systems pioneered in Australia can help measure the GHG reductions generated by improved fire management and generate carbon credits. TFM skills are universal and the monitoring systems are relevant and available around the world. ISFMI has been working over the last 14 years to scale up globally TFM by supporting sustained exchanges of knowledge holders, experts, networking and adopting the techniques at scale. The experience has highlighted the importance of practical measures to secure investment and access finance; such as seed financing, networking, strong methods and standards for measuring impact, access to legal and financial expertise, promoting transparency, sharing market information and developing trusted brokering mechanisms.

1. Global Climate Impact of Wildfire

Wildfires annually burn a total land area of between 3.5 and 4.5 million km^2, equivalent to India and Pakistan together and affect every region of the world. Wildfire smoke alone is estimated to kill around 340,000 people annually. In 2017, insured losses from wildfires totalled USD14 billion. Wildfires have been estimated by the Economics of Ecosystems and Biodiversity (TEEB) to destroy ecosystem services in the range of US$146–US$191 billion per year. Wildfires are and major driver of forest degradation and desertification.

Fire dependant ecosystems such as tropical dry forests and savannas cover around one-sixth of the global land surface. A major problem in these landscapes is poor fire regimes result in the prevalence of large destructive fires that emit more greenhouse gases than well-managed areas. The net carbon emissions from wildfire between 1997 and 2014 – due to destructive wild fire, deforestation and fire in tropical peatlands – which is a measure of the poor fire regime was 2Gt CO_2ey [1]. Many of these fire-dependent landscapes are closely linked with tropical rainforests, so poor fire regimes in savannas can have a significant impact on these forests as well.

The IPCC predicts that it is highly likely that global fire activity will increase as a result of climate change. NASA predict that wildfire could increase by as much as 35% by 2100 and that most of these increases will take place in these fire dependent landscapes.

The history of fire dependant landscapes around the world is remarkably similar. Originally all of these landscapes were dominated by fire regimes that were actively managed by the indigenous people by lighting low-intensity, early dry season fires to create fire breaks and prevent the build up of fuel, which minimised later dry season destructive wildfires. With colonisation by Europeans of these landscapes the fire management activities of indigenous people were supressed for a variety of reasons.

The UNFCCC's Paris Agreement provides important opportunities for NBSs. Over 130 nations have referred to NBSs in their NDCs: 103 as adaptation tool and 27 as a mitigation tool. Properly managing wildfire will play an important role in securing many of the NBSs and their objectives. Wildfire for example is one of the major threats to tropical rainforests around the world and as such poses a serious threat to REDD+ schemes. Indonesia, as an example, accounts for wildfire as a significant source of GHG, with Indonesia's National Carbon Accounting System (INCAS) having shown interest in integrating savanna burning emissions in its accounting system.

2. *Savanna Fire Management in Australia*

In Northern Australia, Aboriginal people have managed land for generations by using traditional fire management (TFM). From this experience Australia has developed leading technologies that manage wildfires, understand the role that fire plays in climate change, measure that impact of TFM and the carbon emissions from TFM.

For example, the first project to use TFM to generate carbon credits was the Western Arnhem Land Fire Agreement (WALFA) that started in 2006. The images below for Western Arnhem Land illustrate the impact of the reintroduction of traditional fire management practises.

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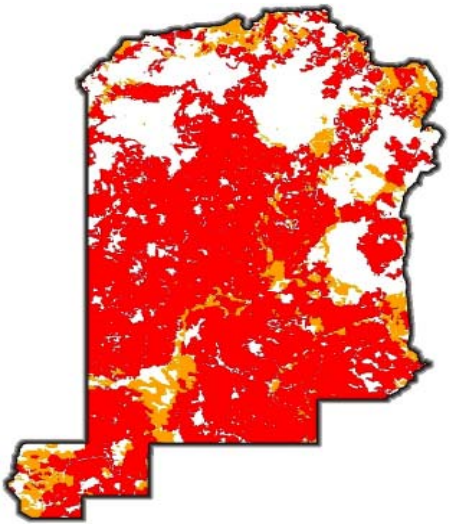
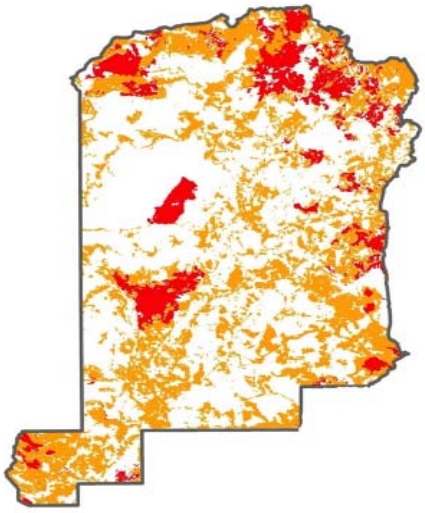


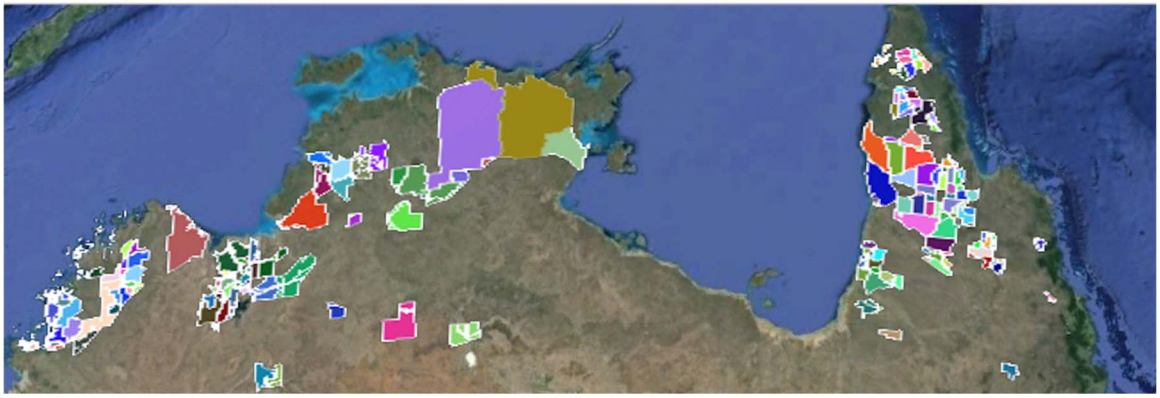


early

late

Today there are 75 TFM-inspired Savanna Burning greenhouse gas emissions reduction projects, managing a quarter of Northern Australia's 1.2 million km^2 annually fire-prone savanna region. These projects, the rangers and indigenous organisations involved are now the front line of fire fighting and management across Northern Australia. Recent analysis by the Darwin Centre for Bushfire Research, Charles Darwin University, finds that Savanna Burning projects have halved the frequency of wildfire on Indigenous lands over the last decade—an annual average reduction of nearly 3 million hectares. By 2025 it is estimated that Indigenous fire projects will provide 600 to 1,100 part-time or casual jobs for rangers and Indigenous land managers, deliver significant environmental outcomes and reduce 3.2 million tonnes of $CO2ey^{-1}$.

The following map indicates the areas being currently managed under this scheme.



The application of TFM has also generated substantial additional or co-benefits including creating market-based jobs in remote and vulnerable communities. improving biodiversity, reinvigorating culture, improving food security and health.

3. Global Assessment

From 2012-15 the ISFMI undertook a three year $3m detailed assessment of the feasibility of transferring savanna burning "technology" to countries in Asia, Africa and Latin America (the Feasibility Assessment).

The Feasibility Assessment concluded that TFM and the savanna burning methods are globally applicable and relevant, potentially a significant global mitigation option and global adaptation mechanism for predicted increases in wildfires. It also found wide spread international interest in these methods. The Feasibility Assessment showed that these methods provide a potentially important example of an international carbon credit, or offset, that is credible, reliable, transparent and avoids many of the pitfalls that other land use credits or offsets, such as REDD+ raise, like, permanence, land tenure, governance issues and monitoring, reporting and verification issues.

The Feasibility Assessment concluded that scaling-up this "technology" in a phased manner with the next stage being a proof of concept stage is appropriate and demand driven.

The Feasibility Assessment is available at http://isfmi.org/news/news/findings-of-the-regional-feasibility-assessments-launched-at-cop21.html#info.

The Feasibility Assessment proposed that a proof of concept phase could centre on several distinct but related activities, namely a series of pilot sites, supported by international work on MRV, a international network to ensure the sites develop together.

4. Proof of concept in Botswana

The first proof of concept site was chosen to be in Botswana and the Government of Australia have provided a further $4m to ISFMI to demonstrate that the technology can be successfully exported and used in other countries.

This proof of concept site was launched in launched in May 2018. Progress has been excellent and it is already clear this proof of concept site will be successful and produce the type of outcomes seen in Northern Australia.

5. The Challenges of Scaling Up

Scaling and promoting TFM faces important challenges that are illustrative for NBSs generally.

TFM like most NBSs require a require a paradigm shift in thinking, policies and management strategies. Fire is mostly seen as a threat and certainly not a tool. Suppression mechanisms, attitudes and policies still dominate the way the world approaches wildfire management. Fighting fire with fire seems so counter intuitive to many people. The experience the ISFMI has gained has provided important lessons for overcoming these barriers that provide important examples not just for TFM but all NBSs.

The most important lesson for using TFM is that the experience and knowledge developed by the rangers in Northern Australia is actually very universal and transferable to other contexts and environments. It is not, as one might expect, only relevant to the local context and country where the knowledge exists. Without exception, the numerous stakeholders the ISMFI has introduced to the experience of Northern Australia have agreed that Northern Australian style TFM ought to work in seasonal environments in Botswana, Brazil, Timor Leste or California. One example is the experimental fire programme carried out at the invitation of the Government of Botswana in May 2019 in Northern Botswana by indigenous rangers from Northern Australia. This programme emphatically convinced the fire managers of Botswana that TFM Northern Australia-style was much better than the European-style fire management they had been undertaking, given that it required less resources, was more effective and much safer. This universal applicability of experience and knowledge is not well known or understood.

Another key lesson is that given the widespread fear of fire, effectively (re)training people and communities to adopt TFM requires real demonstrations undertake by real people. Simulations and other training tools using *ex situ* methods have a very limited impact. This means there is no substitute for two-way knowledge exchanges.

A further lesson is that knowledge is scarce and experience even more so. Networking is therefore essential to make the most of the few experts and limited resources. The ISFMI has developed an active international network of experts that could help with developing the science, the monitoring systems, communication tools and community-based training methods.

An important lesson is that scale is very key for effectiveness. TFM relies on preparation and burning actively, strategically and at appropriate landscape scale before the fire season starts. In Northern Australia indigenous rangers burn on average 30% of the landscape in the early dry season to reduce the risk of late dry season wildfires. In South Western Australia fire management practice established since the 1960s has demonstrated that prescribed fuel reduction needs to be annually undertaken over 10% of forested landscapes to reduce wildfire risk, with substantially greater mitigation efforts in close proximity to communities and other assets. A couple of small sites, with a few local people will not make the impact that is necessary. The entire community needs to be involved and much more seasonal burning undertaken than has been possible so far. A significant increased resourcing of TFM approaches, including contracting Indigenous ranger and local community groups, would help alleviate recognised problems associated with diminishing climate-safe days for implementing prescribed mitigation burns.

5. Securing Investment

The experience of the ISFMI in attracting finance as well as the savanna burning sector generally also provides important lessons for all NBS accessing finance.

Attracting investment for the adaptation benefits of better fire management has not been successful to date, despite the strong adaptation potential of the technology. This is expected to change as the technology expands into countries that attract adaptation funding.

Consequently, the sector has been developed mainly by interest in the mitigation potential of the technology.

WALFA, the first TFM project, was in effect an example of a voluntary or offset credit. ConocoPhillips were required to deliver an offset for the impact caused to Darwin Harbour by their Liquified Natural Gas (LNG) terminal. Through Charles Darwin University they and the Northern Territory Government were aware of the possibility of delivering a biodiversity offset through improved fire management in West Arnhem Land. They agreed with the Northern Territory

Government to provide the traditional owners of the project area $1m per year for 17 years for undertaking TFM, and in return they were granted permission to build their LNG terminal in Darwin Harbour and receive 100,000 tonnes of carbon credits per year, representing the carbon abatement achieved by the traditional owners. In 2007, at the start of the project, the price was A$10 per tCO2e. This original price has been indexed to inflation so that in 2020 the project was receiving more. Despite significant changes in the global and Australian carbon market since 2006, both ConocoPhillips and the Traditional Owners remain fully committed to the original agreement. Another important value for the indigenous community has been the stability and longevity of the agreement, which in a very real way has amplified the value of the actual price of the carbon.

The most important demand for TFM credits so far has been the Australian Government through its ERF. These credits have developed and underwritten the development of almost all of the TFM projects in Australia.

The private sector's demand for TFM credits, or at least the co-benefits from these credits, remains an important option for TFM projects. For TFM projects outside of Australia, given the dynamic nature of carbon markets, the voluntary markets will be the most important source of demand in the short term. The flexibility of these arrangements, in particular, a willingness to value the co-benefits of TFM and to also consider long-term relationships, further enhances the attractiveness of this market and its demand. Resource companies have led the way in supporting TFM projects to date and are interested in developing this leadership more. Internal pricing mechanisms being adopted by many companies could potentially create more demand and opportunities for TFM Projects. A major challenge that most TFM projects face in developing this opportunity is finding the right company or a reliable trustworthy intermediary such as a broker. Another is being able to communicate effectively with companies, or, in other words, to translate their local based skills into the corporate world of accounting terminology.

REDD+ also provides some interesting opportunities for TFM projects that can also include tropical forests into their projects. Volume and prices would be sensitive to similar issues as outlined above for marketing TFM project directly to companies.

Long term demand and stability for the market will be driven by the timing and ambition of future climate policies, the importance of markets in delivering these targets, and the ability to implement the relevant policies (supply and demand side) effectively. As a result the uncertainty and heterogeneity of the demand and market seem likely to continue for the foreseeable future. Indeed, most countries recognize that the large uncertainties in future international credit demand mean that they cannot count on a high volume or high price for credits sold, at least in the near term.

The volatile and varying nature of demand further emphasises the importance of seed funding for new TFM projects to assist them to develop viable TFM projects. Although the level of capacity varies among these various communities and governments that the Initiative worked with, none have the resources to develop viable proposals for TFM projects without some seed funding. Also the vast majority of the holders of the relevant experience and knowledge in Australia, such as the Traditional Owners across Northern Australia, have the resources to support the export or transfer of this know how. Access to this type of funding will be needed to progress pilot projects in developing countries.

Practical steps to help TFM projects promote demand and access investments and finance include:-

- Securing seed funding for producers and NBS project developers;
- Developing networks of producers to promote exchange of market intelligence and address the asymmetry in capacities between the suppliers and buyers;

- Developing standards and methodologies to monitor verify and report outcomes and credits;
- Supporting access to legal and financial expertise for producers;
- Supporting efforts to link carbon markets and allow TFM projects in developing countries to access carbon markets in developed countries;
- Facilitating/brokering partnerships between producers and the private sector;
- Developing models that value and price associated co-benefits;
- Supporting efforts to raise awareness among donors; and
- Developing an international platform or registry for projects.

Case Study on GCF

An important potential investor is the GCF. Its investment criteria are similar to many potential donors and investors in NBS. The ISFMI has therefore considered how its projects meet these criteria. The following analysis demonstrates how simple NBS projects like the ISFMI can meet complex institutional criteria:

Impact Potential

Mitigation - *tonnes of carbon dioxide equivalent (t CO2 eq) reduced or avoided*

The Feasibility Assessment found that better fire management, through the application of the proven Australian technology of TFM, could lead to reductions of wildfire emissions by as much as a half, reducing global greenhouse emissions by 150 $MtCO_2e$/year, with significant further emissions mitigation through carbon sequestration over the long term.

Adaptation - *reduction in vulnerability and reduced exposure to climate risks*

It also concluded that this technology represents an important – in many cases the only viable – adaptation mechanism to the increased wildfire predicted to occur as a result of climate change.

Adaptation - *increase in generation and use of climate information in decision-making*

The Feasibility Assessment concluded that methodology for measuring the reduction of greenhouse gas emissions could be adapted to many other fire dependant landscapes around the world and that satellite monitoring and data is available and can be easily further built upon for all regions for reporting and verifying the carbon credits.

Paradigm Shift Potential - *Opportunities for targeting innovative solutions, new market segments, developing or adopting new technologies, business models, modal shifts and/or processes*

The Feasibility Assessment confirmed strong market interest in using the technology. The methodologies underpinning the technology meet all international or national standards. Major multinational companies are interested in considering how this technology might be useful for their operations.

Expected contributions to global low-carbon development pathways consistent with a temperature increase of less than 2 degrees Celsius as demonstrated through a theory of change for scaling up the scope and impact of the intended project.

The Feasibility Assessment has found that promising sites can be identified in most fire dependant landscapes. Specific sites in developing countries that have expressed an interest in participating in pilot studies include sites in Namibia, Mozambique, Tanzania, Angola, Zambia, Zimbabwe, Indonesia, Timor Leste, Myanmar, Peru, Mexico, Columbia, Brazil, Belize, Nicaragua, Costa Rica and Mexico

Country ownership

The Feasibility Assessment confirmed strong interest in the technology in many key countries, including in Indonesia, Timor Leste, Papua New Guinea, Myanmar, Cambodia, Namibia, Mozambique, South Africa, Tanzania, Botswana, Angola, Zimbabwe, Zambia, Madagascar, Peru, Mexico, Brazil, Colombia, Venezuela, Guatemala and Belize.

Indigenous people, philanthropic organisations and companies such as ConocoPhillips, INPEX and BHP Billiton are also interested in this technology.

Sustainable development potential

The Feasibility Assessment confirmed that the technology has great potential to deliver the types of extra benefits seen in Australia. These include creating market-based jobs in remote and vulnerable communities, promoting biodiversity, supporting tourism through retention of biodiverse landscapes, reinvigorating culture, improving food security and health.

The Feasibility Assessment concluded that not enough had been known about the potential of this Australian technology and an important and globally significant opportunity for emissions reductions is not being properly exploited. The Assessment found despite the potential of this technology to provide an important contribution to the post 2020 UNFCCC regime, the SDGs and the post-2015 framework for disaster risk reduction there is no reference to this technology in any of the existing negotiating texts, nor is there enough awareness amongst the relevant stakeholders in these processes of this technology.

Needs of the recipient

Although the level of capacity varies among these sites, the Feasibility Assessment found that the relevant communities and governments do not have the resources to adopt the technology. Many of the holders of the relevant technology in Australia, such as the traditional owners across Northern Australia, do not have the resources to support the export of this technology. Consequently, the Feasibility Assessment concluded that financial and technical support is needed to develop the capacity of traditional owners, local communities and governments.

Efficiency and effectiveness

The Feasibility Assessment concluded that because traditional fire management relies upon local communities applying proven technologies to generate annual abatement of wildfire emissions it avoids many significant problems that tend to arise with other land uses, such as REDD+, like, permanence, land tenure, governance issues and monitoring, reporting and verification issues (MRV).

The Feasibility Assessment found that programs to reintroduce traditional fire practices for cultural and environmental reasons have already taken place in other countries, but none of these incorporate methodologies to quantify emissions reductions, like those developed Australia. Several of these projects, despite proven significant social and biodiversity benefits, have ended due to the lack of sustainability in funding models reliant on one off public and philanthropic grants. Where this is happening to add the technology would be a relatively straightforward matter that would markedly increase the viability of these efforts.

5. The future of the ISMFI

The ISMFI is currently looking for more partners to participate in this exciting NBS.

Participation can centre around three main activities:

- Developing pilot sites;
- Developing Monitoring, Reporting and Verification; and
- Participating in and engaging the ISFMI network.

Developing pilot sites

The ISFMI has close links with governments in countries where there are promising sites including Namibia, Zambia, Botswana, Zimbabwe, Angola, Mozambique, Brazil, Belize, Mexico, Indonesia, PNG and Timor-Leste, with several additional countries across the fire prone regions of the globe also having landscapes suitable for the application of TFM.

Projects could use the experience gained from scaling up the technology in Northern Australia and the proof of concept site in Botswana as the lead or development site and these lessons will be used to develop improved mechanisms for the other sites.

Preparatory activities need to develop a pilot site will require the following type of activities: FPIC of relevant stakeholders; pilot site law and governance assessment; baseline fire review; and validated vegetation fuel type map.

Developing Monitoring, Reporting and Verification

Supporting the on groundwork with these pilot sites it is necessary to develop the framework for measuring the affect or impact of better fire management. Monitoring, reporting and verification procedures based on the methods developed by the Government of Australia and North Australian Fire Information (NAFI) service. Global satellite fire data is freely available from agencies such as NASA and ESA dating from 2001. This satellite data allows for historical and real time monitoring of fire and provides baseline data for the technology anywhere in the world. As a result, web-based platforms that monitor, report and verify fire are feasible for any region on the world. Potential range of such systems could be regional (e.g. Southern Africa or Timor Leste/NTT/PNG), national or local.

The Feasibility Assessment estimated that to establish a NAFI type system would require approximately 1-2 year(s) and $4m for each region. Maintaining these systems over the long term would require initially a further investment of $1m per annum for 5 years after which time the carbon credits being generated by the system would pay for its maintenance.

Participating in and Engaging the ISFMI network

The ISFMI has developed an active international network of expertise. Core members of the network include: the Kimberley Land Council, ALFA, Aboriginal Carbon Fund, NAILSMA, 321 Fire Mozambique, Indonesian National Carbon Accounting System, IRDNC Namibia, the International Indigenous Peoples Forum on Climate Change (IIPFCC), Charles Darwin University, UNESCO, UNDP, FAO, CI and Corporate Carbon. The network is interested in continuing to actively contribute to the ISFMI and support this proposal.

Other projects would be invited to participate in the network and engage this interest and expertise through active engagement in the proposed sites, learning exchange and outreach.