

# Briefing

## Forests, climate change

*Keywords:*  
REDD+, integration, scaling up,  
sustainable forest management



**Issue date**  
December 2016

## Policy pointers

**We know how to address** the main causes of Mozambique's deforestation — the challenge is in adequately deploying the approaches at scale.

**Land use change must** be financially viable in its own right, although carbon credit funding may provide additional incentives.

**Deforestation needs an** integrated and landscape-scale approach that tackles several causes simultaneously, and REDD+ programmes must have enough technical support to maintain progress beyond the establishment phase.

**Funding must be long** term, predictable and commensurate with large interventions' potential impacts. Changing land use practices is costly, but transaction costs will fall as scale and knowledge increase, while the cost of losing momentum is high. Public financing should provide enough initial investment to form sustainable business models and leverage sustainable private finance.

## Mozambique's REDD+: the challenge is scaling success

The Testing REDD+ in the Beira Landscape Corridor of Mozambique initiative closed in December. Over nearly four years, a consortium of public academic and research institutions, NGOs and social enterprises, supported by the Government of Norway, has explored what drives deforestation and forest degradation. The programme trialled four interventions: to expand conservation agriculture, to make logging more sustainable, to harvest and use biomass energy more efficiently, and to promote sustainable production of an important non-timber product. We now know what works. The challenge is in scaling it up. This briefing sets out our learning and recommendations.

The Beira Landscape Corridor of Mozambique includes Manica, Sofala and Zambezia provinces, which are dominated by miombo woodlands holding valuable forest products. These woodlands stock about 90 mtCO<sub>2</sub>/ha, but our research found deforestation is 3–4 per cent each year in Sofala and Manica and 1.9 per cent in Zambezia.<sup>1</sup> The potential losses can go even higher (98 mtCO<sub>2</sub>/ha in mopane woodland, or as high as 575 mtCO<sub>2</sub>/ha in the evergreen forests).<sup>2</sup>

The Testing REDD+ (TREDD) initiative had two components: i) it researched socioeconomic baselines and assessed what is causing the landscape to lose carbon stocks, so that emissions could be measured against reference levels and REDD+ interventions could be monitored; ii) it supported sustainable land uses developed in partnership with local organisations and land users.

### Factors driving forest loss

The four main *direct drivers* of deforestation and forest degradation in Manica, Sofala and Zambezia<sup>3</sup> provinces are:

- Poor access to, or limited use of, technologies for making agricultural production more

sustainable (in both subsistence and commercial sectors)

- Illegal and inefficient logging
- Unsustainable and inefficient harvesting and consumption of biomass energy
- Unsustainable harvesting of non-timber forest products, in particular using fire to harvest honey.

The key *indirect driver* of forest loss is entrenched poor implementation of policies and institutional arrangements. This includes weak law enforcement, insecurity of tenure over forest resources, poor land use planning, and inefficient structure for incentives and investment models.

### REDD+ and carbon credits

Initially, the UN's REDD+ programme<sup>4</sup> was designed as a performance-based payment mechanism to be funded partly through carbon credits. Unfortunately, the carbon markets have not evolved to provide secure revenues. But making changes in land use economically viable remains crucial. So we must now de-emphasise carbon credits and instead focus on implementing investments that themselves generate benefits

and incentivise changes in practice and behaviour (Figure 1). Carbon credits, if the markets mature, may yet offer a further premium. This is the premise that underpins TREDD.

## Interventions have to be economically viable to incentivise sustainable land use change

### Exploring solutions

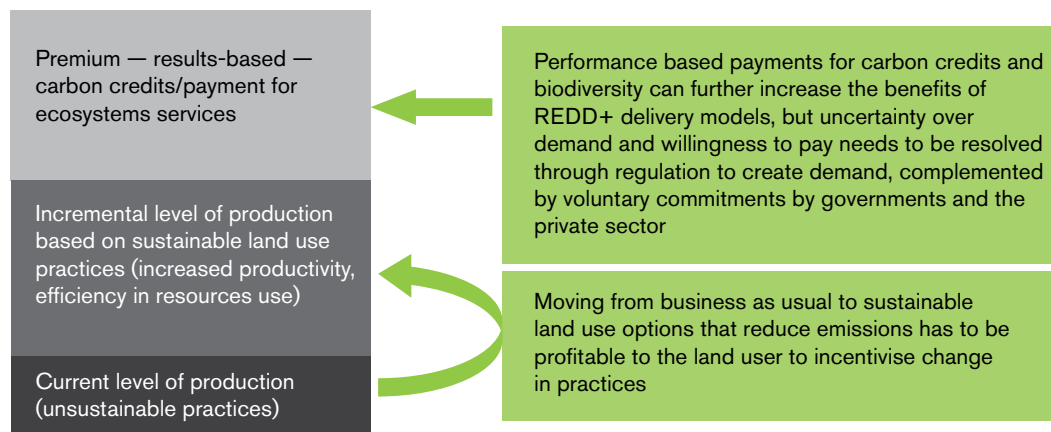
Testing always requires practical choices, especially where resources are limited. In essence, this is the difference between what's

possible and what's ideal. To deliver REDD+ effectively, Mozambique needs to look at competing uses and users and develop an integrated approach to the challenges (see below). However, TREDD resources were limited, so the models investigated were carefully selected to address the prominent driver in each location and to capitalise on existing partnerships.

The interventions were:

- Supporting 1,500 agricultural smallholders to adopt soil and water management techniques that improve productivity,**<sup>5</sup> This has been implemented in four Zambezia districts, supported by six agriculture extension officers during the project. Over the 2014/15 and 2015/16 agricultural seasons, 430 demonstration plots were established. Adoption was about 80 per cent. Production rates for maize rose from 160 to 800kg/ha. For peanuts and pigeon peas, harvests rose more than fourfold. Longer monitoring is required, but these encouraging results are important to farmers — both to early adopters and the more risk-averse. Comparing soil carbon between conservation agriculture and conventional shifting cultivation shows increases from 10 MgC/ha with shifting cultivation to 25MgC/ha, depending on the years under conservation agriculture.<sup>6</sup>
- Transforming 24 five-year licensees into nine long-term forest concessionaires** (see Box 1).<sup>7</sup> These 'early movers' now comply with the legal requirements of sustainable management. This model is being implemented in nine districts of Zambezia. It covers over 200,000ha of production forest (forest with high-value timber harvested for commercial purposes), of which just over a third had been converted to other uses such as agriculture. A reforestation plan was developed for these deforested areas with a mix of native and exotic species for biomass energy, construction, pulp and the paper industry. Seven of the nine prospective forest concessionaires were given equipment to help them add value to their products. The rationale was to create local employment, generate higher tax revenues (because incomes rise when value is added), and eventually even generate export revenue. Equipment also helps maintain a more controlled harvesting regime, which is essential for sustainable forest management.
- Developing sustainable high-value chains for non-timber forest products (NTFPs)**<sup>8</sup> The initial focus was bees, and the main rationale was that by introducing improved beehives and better hive management, and by processing honey for domestic and export markets, standing trees should become more valuable to farmers, so reducing agricultural encroachment and other extractive practices. Around Morribane Forest Reserve in Manica Province, nearly 1,000 beehives are now managed by ten associations and individual families. Household honey production averages 44kg and it sells at about US\$1/kg. Such income does make an important difference, but it is clear that honey income alone is not enough — more economic diversification is needed. Developing other high-value NTFPs and ecotourism could help in increasing the value of standing trees.

**Figure 1. How economically viable REDD+ delivery models can reduce forest loss**



- **Making biomass energy production and consumption more efficient and sustainable.** TREDD worked with key actors in Beira City (the main consumption centre) and along the value chain in Sofala (with charcoal producers, including two production districts; market intermediaries; stove producers and households). The programme ran forest assessments, trained charcoal producers to use efficient casamance kilns, and supported a stove makers' association to produce these. It also 'mapped' more than 1,200 households in Beira City, collecting location and socioeconomic data to generate household profiles of energy consumption patterns. These can be used to monitor ongoing impact. Fifty per cent of these households received improved stoves. However, the complexity of this model has highlighted the need for a changed strategy (see the section on 'What needs to happen next?').

TREDD also had some success addressing the institutional difficulties indirectly driving deforestation. The programme garnered enormous government support at all levels — from the National Directorate of Forests, the National REDD+ Coordination Office, the provincial governments and sectoral Directorates of Forestry, Geography and Cadastre, Energy, Agriculture and Environment, and from local District Services for Economic Activities. Some participated in field work, others provided transport. Still others helped the programme navigate the bureaucratic process for issuing forest concession contracts.

Among NGOs, Adventist Development and Relief Assistance (ADRA) facilitated the conservation agriculture work, the MICAIA Foundation and ECO-MICAIA (a social enterprise) supported NTFP work, the Agency for Local Development (ADEL) in Sofala partnered on biomass energy and IIED supported timber operators to take up forest concessions.

However, implementation has often been challenging. Constraints include limited availability and capacity of agricultural technical support for sustainable and more productive cultivation; absence of long-term finance, both for technical support and for investment in sustainable land use models; and limited or lack of resources for monitoring, for learning and for adapting interventions.

### What needs to happen next?

The fundamental requirement for reducing deforestation and forest degradation is that interventions **have to be economically viable** so as to incentivise sustainable land use change.

### Box 1. Changing timber practices

For over two decades, Mozambique used legislation to disincentivise logging. Royalties were increased to reduce the number of simple logging licence holders and fines were readily imposed. But the result was increased illegal logging, growing unregulated timber trade with Chinese traders who have based themselves in Mozambique, and loss of government revenue.<sup>i</sup> Government assessments in 2016 confirmed the numerous illegalities. It took over a year of information sharing, mobilisation and consistent engagement with members of agriculture and timber associations in Zambezia — the Timber Association of Zambezia (AMAZA) and the Agriculture and Timber Association of Zambezia (APAMAZ) — to get together a group of 24 operators willing to consider change. They themselves lost revenue over two years as they agreed to interrupt or significantly reduce activities while we helped them organise into forest concessions. The associations in Sofala and Manica were more sceptical, but joint training for the most interested mobilised interest. If further funding is secured, these more risk averse players will be offered support. There is strong potential for scaling this model and significant interest from government and from bilateral and multilateral donors.

<sup>i</sup> Chinese traders have based themselves in Mozambique in order to buy timber (logs) for export to China. This has caused significant degradation of forests and proliferation of illegal activities. For more on this, see: Mackenzie, C (2006) Forest governance in Zambézia, Mozambique: Chinese takeaway! Final report for the Forum of NGOs in Zambézia (FONGZA); Environmental Investigation Agency (2014) First class crisis. China's criminal and unsustainable intervention in Mozambique's Miombo forests; Wilkes, A (2016) China-Africa forest trade and investment: an overview with analysis for Cameroon, Democratic Republic of Congo, Mozambique and Uganda. IIED, London. <http://pubs.iied.org/17585IIED>; Muianga, M and Macqueen, D (2015) Exploring options to improve practice for Africa's largest exporter of timber to China. IIED, London. <http://pubs.iied.org/G03947>

In addition, deforestation must be tackled on several fronts:

- **Landscape approach:** now that the models have been tested, successful interventions need to be implemented across the landscape in order to have a significant cumulative impact. For example, in Zambezia alone over a hundred timber operators could benefit from support to establish forest concessions. With each operator entitled to 10,000ha, sustainable management could be implemented across a million hectares. This model could also be replicated in other provinces. Similarly, using biomass energy sustainably needs a landscape approach. The districts of Dondo, Nhamatanda and Gondola (along the road linking Beira Port to Mutare in Zimbabwe) suffer the highest deforestation because they supply biomass energy to Beira City and Chimoio City.
- **Integrated approach:** interventions need to be implemented simultaneously to reduce 'leakage' (ie displacing deforestation or creating another adverse situation away from the intervention). For example, forest concessions need to plan timber harvests for construction and furniture industries, while also considering NTFPs such as thatch grass, bamboo and honey. Similarly, reforestation plans won't work unless local communities also get help developing sustainable agriculture so as to halt or slow further forest clearing.

- **Technical support:** this is crucial both for starting and consolidating land use change. For example, boosting sustainable agriculture requires sustained (but gradually reducing) help for farmers. Technical support is needed to introduce better technologies and also to encourage farmers to share better practices. And it is important to also improve storage, processing and links with fair markets. Technical assistance is needed across the value chain — for sustainable forest management and community concessions; for training in efficient charcoal production; to support stove producers' associations; for mapping and monitoring how urban households use stoves; and for monitoring emissions. A concerted effort is needed to build on other ongoing public and private sector activities. For example, all agricultural extension officers should be trained in REDD+ so as to link action on productivity with action on climate change, and hence achieve a multiplier effect.
- **Long-term predictable and adequate financing:** this is a 'make or break' for REDD+. Past failures in addressing deforestation have partly been because interventions were short term. Public finance plays a crucial role in establishing enabling conditions — such as training, business and resource use planning, and help with building organisations. This support is critical in the establishment phase, before net benefits materialise. The private sector also has a role, but its contributions should be long term, including investment phases, particularly on building capacity for processing high-value timber and non-timber forest products; growth periods with incremental net discounted gains; and a consolidation phase. Certainly, public and private financial support for REDD+ needs to go beyond the establishment phase. Consolidation, scaling up, monitoring socioeconomic impacts and changes in carbon stocks require long commitment of resources and support.
- **Long-term change:** nearly 70 per cent of Mozambique's population, including in the capital city Maputo and most other urban dwellers, still rely on biomass energy.<sup>9</sup> Deforestation has risen to meet demand. Efficient conversion of wood to

charcoal, efficient consumption, tree planting, and sustainable forest management are all urgently needed. But even longer-term change is also crucial. Mozambique needs to look ahead and develop alternative sources of energy, including using its gas to meet domestic demand. Renewables such as biogas, solar and wind are also needed.

## Conclusion

Providing adequate resources so that economically viable interventions can be integrated and scaled out is the key to reducing emissions and delivering sustainable development through REDD+. Economic viability is critically important for generating immediate benefits for land users. Development of carbon markets, including domestic markets,<sup>10</sup> will bring an additional incentive for REDD+ but should not be used as an entry point for sustainable land use changes.

The TREDD initiative, and any successor, could reduce deforestation and contribute to several Sustainable Development Goals, including those on climate action, employment, gender equity and equitable and inclusive growth.

In the past, resource constraints led to a cycle of programmes establishing potentially sustainable enterprises which were then left to fail. Stakeholders are becoming familiar with enthusiasm followed by disillusion. Breaking this cycle has to be a priority and would reduce the transaction costs of delivering programmes.

The biggest challenge for effective delivery of REDD+ is securing adequate ongoing finance, both public and private. TREDD sought to leverage finance from other bilateral and multilateral donors, including impact investors and commercial banks. So far there are only promises, but IIED will continue such discussions. It is clear that winning 'hearts and minds' on land use change, through mobilisation, training and technical support, can establish potential REDD+ delivery models. It is equally clear that more resources will be needed to scale these up and out.

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## Knowledge Products

The International Institute for Environment and Development (IIED) promotes sustainable development, linking local priorities to global challenges. We support some of the world's most vulnerable people to strengthen their voice in decision making.

A consortium led by IIED, involving Universidade Eduardo Mondlane, University of Edinburgh, IIAM, CDS, MICAIA, ORAM, ADRA and ADEL has implemented the 'Testing REDD+ in the Beira Landscape Corridor in Mozambique' project. Farmers, charcoal users and timber operators were the main target groups that made the results reported here possible. The delivery of the project results benefited from the engagement of various Government departments and sectors at national and provincial level and funding from the Government of Norway.

### Contact

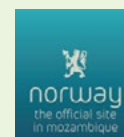
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This research was funded by the Norwegian government through its embassy in Maputo. However the views expressed do not necessarily reflect the views of the Norwegian Government



## Notes

<sup>1</sup> Ryan, C and Stedham, B of University of Edinburgh with input from IIED, UEM, MICAIA and ORAM (2013) Biomass and biomass change in the Beira corridor landscape: Discussion document on preliminary findings. A contribution to: Testing REDD+: Developing a biomass map and reference level for the Beira Corridor. (Forthcoming). IIED, London. / <sup>2</sup> Siteo, A *et al.* (forthcoming) Linha de referência de emissões e desmatamento subregional: Manica, Sofala e Zambézia. TREDD. IIED, London. / <sup>3</sup> Nhantumbo, I and Maússe, A (2015) Testing REDD+ in the Beira Corridor: Who drives land use and land-use change, and why? IIED, London. <http://pubs.iied.org/13582IIED> / <sup>4</sup> REDD+ means Reducing Emissions from Deforestation and forest Degradation plus the role of conservation, sustainable management, and enhancement of forest carbon stocks. / <sup>5</sup> Nhantumbo, I and Maússe, A (2015) TREDD Testando a eficiência e viabilidade do modelo de agricultura de conservação na redução de emissões. IIED, London. <http://pubs.iied.org/G03962> / <sup>6</sup> Vilanculos, A (2015) Stock de Carbono do Solo em Sistemas de Agricultura de Conservação. MSc dissertation sponsored by TREDD. UEM, Maputo. / <sup>7</sup> Nhantumbo, I and Maússe, A (2015) TREDD Testando cenários concorrentes para a exploração sustentável da madeira ao nível de operadores de licença simples na Província da Zambézia. IIED, London. <http://pubs.iied.org/G03964> / <sup>8</sup> Nhantumbo, I and Maússe, A (2015) TREDD Investindo nos produtos florestais não madeireiros para a conservação de estoques de carbono na Reserva de Moribane. IIED, London. <http://pubs.iied.org/G03963> / <sup>9</sup> Baumert, S *et al.* (2016) Charcoal supply chains from Mabalane to Maputo: who benefits? IIED, London. <http://pubs.iied.org/17350IIED> / <sup>10</sup> Nhantumbo, I *et al.* (2015) REDD+ and the private sector: tapping into domestic markets. IIED, London. <http://pubs.iied.org/17319IIED>