



3.5 Toward zero deforestation cotton in Zambia

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Introduction

Extreme poverty and a dependence on agriculture drive deforestation in Zambia's Eastern Province. Improving productivity through soil fertility measures is a key strategy to addressing deforestation, because poor production practices and soil depletion cause farmers to expand cultivation into forest areas. Depending on their specific circumstances, farmers should be offered a range of options to improve productivity. These include improved soil management, planting nitrogen-fixing trees, or simply improving the use of agricultural inputs.

Companies that have made zero deforestation pledges must be encouraged to actively engage with suppliers to meet these commitments. If agribusinesses comply by simply stopping sourcing from regions with high deforestation rates, other companies are likely to move in, taking advantage of the extra supply. Instead, agribusinesses should promote measures that boost productivity by offering technical assistance and financing to farmers as incentives to reduce deforestation. Climate financing can absorb some risk and catalyze companies to invest in their supply chains instead of shifting their sourcing to deforestation-free regions.

Supply chains are often large and complex; they include small farmers in remote areas, traders and other intermediaries, and affect relationships between suppliers and purchasers. Monitoring deforestation across these supply chains will be expensive. In order to demonstrate performance against deforestation commitments, a combination of activity-based proxy indicators that are monitored along the supply chain and statistical sampling can help to keep costs down. Law enforcement and public sector monitoring should complement private sector initiatives, to mitigate the risk that the causes of deforestation leak into other commodities, supply chains and regions.



COMPANIES MUST ACTIVELY ENGAGE IN PROBLEM AREAS IN THEIR SUPPLY CHAINS.

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Cost-effective deforestation-free supply chains

More than 700 companies have made zero deforestation commitments to date, as part of and since the New York Declaration on Forests of 2014. However, many have yet to implement their pledges through policies specific to commodities and geographic areas, and evaluating progress remains a significant challenge. The first step toward meeting



such commitments is to understand the drivers of deforestation in a particular company's supply chain. Increasing public access to satellite imagery and commodity flow data helps to better track deforestation and its drivers. However, even as such information becomes increasingly available, it remains difficult for a company to link land use and deforestation to a specific supplier or commodity.

Once a company understands where and how it is affecting deforestation, it must take steps to reduce deforestation in its supply chain, and not just shift its sourcing to regions not associated with deforestation. By taking these steps,

it improves relationships with suppliers and increases productivity, better securing the supply of raw commodities and meeting consumer demands. Notwithstanding these benefits, agribusinesses often see expanding support to suppliers as a risk. Low-cost climate change financing may help to overcome cost barriers.

The context

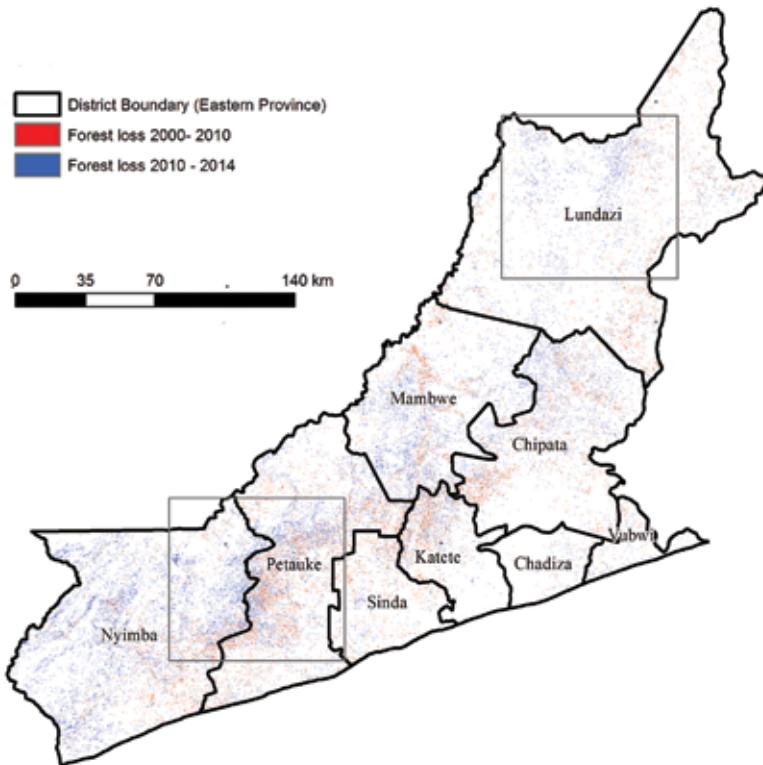
Eastern Province is one of Zambia's poorest provinces. Half of the population are unable to satisfy their basic food requirements and more than three-quarters live on less than US\$ 1.90 a day. Smallholder families cultivate about two hectares on average and they clear forests to expand the area under production. Yields are low, averaging about two tonnes per ha per year for the main maize crop. Extension services provided by governments, NGOs and agribusinesses tend to be very limited.

The clearing of forests for agriculture is driven by the need to open new land for cultivation due to declining soil fertility on existing agricultural lands, or to expand production in order to improve income and food security. The root causes of declining soil fertility are poor farming practices, such as burning crop residues and repeated planting of cereals without incorporating soil enhancing crops. Once land productivity has declined, farmers look for new areas to cultivate, clearing forests in the process. Between 2000 and 2010 in Eastern Province, 54,027 ha of forests were lost, with a further 102,087 ha lost between 2010 and 2014 (Figure 1).

The two main drivers of deforestation and forest degradation in Zambia are agricultural expansion and charcoal production (Chomba et al. 2012; Giesecke 2012; Vinya et al. 2012). Charcoal making is often the first step in deforestation, and as forests are depleted, they are eventually cleared for agricultural use. The main agricultural crops

include maize, sunflower, groundnuts, soy, cotton, tobacco and sweet potato. Maize has been the dominant crop for many years, but cotton production is increasing rapidly, driven by the increasing demand from national and international traders that export to South Africa and beyond (Figure 2).

Figure 1. Forest loss in Zambia's Eastern Province, 2000–14



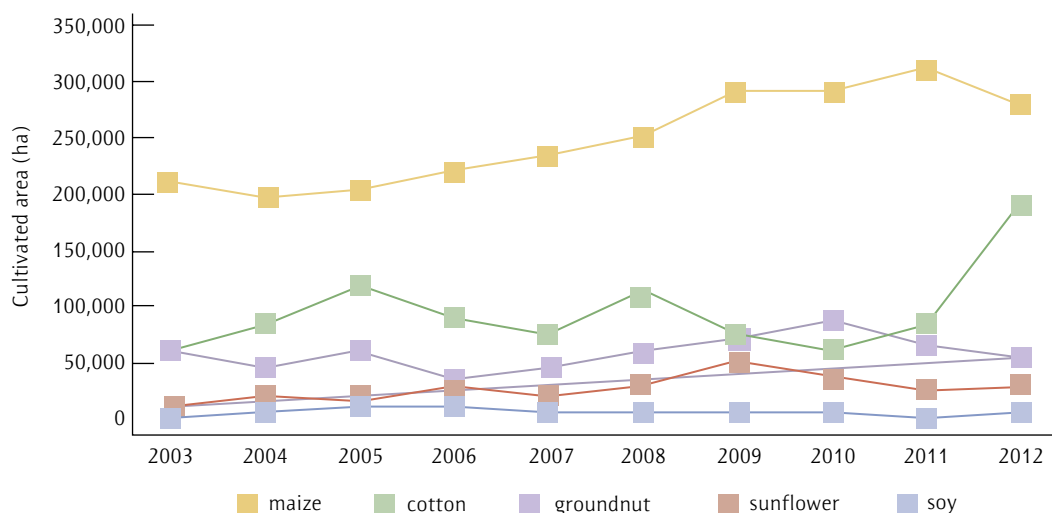
Source: Republic of Zambia 2017

The Competitive African Cotton Initiative

The Competitive African Cotton Initiative (COMPACI) was formed by an international group of cotton companies representing US\$ 65 million in annual turnover. The initiative includes four members who operate in Zambia: Alliance Gineries, Cargill, NWK Agri Services, and Continental Ginnery. Among other social and environmental sustainability targets, COMPACI requires its members to eliminate primary forest deforestation. To achieve this goal, they must boost productivity, since farmers will not stop deforesting if it means reduced income. Many companies already provide some forms of outreach, which can be adapted to encourage more sustainable practices and expanded to reach more farmers, especially in deforestation hotspots.

COMPACI members vary significantly in how they reach suppliers. NWK, for example, employs distributors that work through lead farmers to advise others. Lead farmers are often successful community members who have been trained by agribusinesses and who promote improved practices to their neighbours. Alliance Ginners establishes demonstration plots to promote best farm management practices. Cargill recently announced that it will scale back its direct outreach to farmers and instead will work through agri-dealers and other intermediaries.

Figure 2. Cultivated area (ha) of select crops, 2003–12, Eastern Province



Source: Tembo and Sitko 2013

Demonstration plots that show improved soil management practices are a cost-effective way for cotton agribusinesses to boost productivity among suppliers. Land preparation, inputs, maintenance and staff costs are estimated at US\$ 60 for a 0.2-ha cotton demonstration plot, and these efforts can increase productivity from 400 to 900 kg per ha. Alliance Ginners plan to increase the number of its demonstration plots by 50%, to 1,500 by 2017, at a total cost of US\$ 90,000. A productivity gain of 500 kg per ha on some 2,250 ha of suppliers' land would lead to an additional 1,125 tonnes of unprocessed cotton available to Alliance each year.

Although there are long-term benefits to increasing the engagement in supply chains, such a model remains untested, and is perceived as risky for many commodities. Some of the proposed business models do not break even for years, meaning that such investments would require a leap of faith from agribusinesses who do not have external support.

Sustainable business models

COMPACI members can choose various ways to boost productivity among their suppliers. The four key options are inorganic fertilizers, improved soil management practices, agroforestry, and pest management.

Inorganic fertilizers

Inorganic fertilizers have become expensive, and at approximately US\$ 500 per tonne they are now difficult for some smallholder farmers to afford. However, input financing can help to overcome temporary liquidity gaps, and an investment of US\$ 50 in additional fertilizer leads to an increased output of US\$ 330 in yields of maize.

Improved soil management practices

Improved soil management practices include minimizing soil disturbance through ripping, and the preparation of planting basins, permanent organic soil cover, and crop rotation. These increase yields by improving soil fertility and soil moisture while reducing erosion and increasing nutrient availability (Kabwe et al. 2014). The Indaba Agricultural Policy Research Institute used an existing Rural Agricultural Livelihoods Survey (2015) along with their own surveys to estimate the actual costs and benefits of improved soil management practices in maize production. They found that a very small (4%) increase in total input costs was far outweighed by a 15% increase in revenues, adding to an overall increase in the gross margin from 84 to 135%. Maize production is a low-margin venture; conventional agriculture or improved soil management practices generate US\$ 84 and US\$ 135 per ha per harvest, respectively. Although this increase in profitability of 61% is substantial, only 5% of farmers have fully adopted practices in districts where it was promoted and partial adoption rates were only slightly higher (Chapoto 2016).

Agroforestry

Limited nitrogen levels in Eastern Province soils are a major constraint to agricultural productivity. As a response, nitrogen-fixing agroforestry systems have been promoted in Zambia by ICRAF and others since the 1990s (Ajayi et al. 2005). Leguminous trees such as *Sesbania sesban*, *Tephrosia vogelii*, *Tephrosia candida*, *Faidherbia albida* and *Cajanus cajan* have high growth rates. In addition, they cause nitrogen to accumulate and improve the physical and chemical properties of soil, which increases yields and drought resilience while providing fuelwood and other byproducts. Considering all costs and benefits, agroforestry systems have a benefit-cost ratio of 2.77 to 3.13, compared to 2.65 to 3.13 for subsidized fertilizer and 1.77 to 3.13 for unsubsidized fertilizer; Ajayi et al. 2009), but if agroforestry is to succeed, agribusinesses must demonstrate its benefits to small producers. To date, COMPACI agribusinesses provide nitrogen fixing trees to producers for free, but members need to establish demonstration sites and work with lead farmers in order to convince others of



their benefits. They must also develop a business model to produce and distribute seedlings, since the low availability of trees and the lack of nurseries are barriers to widespread adoption.

Pest management

The most common cotton pest management approach involves pesticide. Many chemicals are highly toxic and require protective equipment for safe application that is unaffordable for smallholders. An alternative is integrated pest management, which includes intercropping and molasses traps. Molasses traps are increasingly being used in smallholder cotton plantations. They are relatively low cost, at around US\$1 per trap, they last two to three years, and only five to seven traps per ha are needed. This means that an investment of US\$7 per hectare could lead to a saving of US\$10 per ha in reduced chemical costs and an additional US\$90 in revenue over two years. Given this rapid payback, COMPACI members could supply traps as a part of their input package and promote them on demonstration plots.

Advancing zero deforestation goals

Cotton farmers in Zambia will need significant assistance to make these changes, which include improved inputs, technical assistance and long-term investment. COMPACI members have the capacity to promote productivity among their suppliers, while linking support for farmers to the elimination of deforestation. Financing for climate change mitigation goals can be used to help overcome barriers that currently prevent agribusinesses from engaging more deeply with their supply chains.

As COMPACI members formulate strategies to reach their suppliers, it will be important to develop a means of verifying compliance with zero deforestation. In order to supplement remote sensing, which is one method of verification, COMPACI members will have to use their existing networks with suppliers to physically monitor deforestation. Given that there are hundreds of thousands of small, remote farmers in the Eastern Province alone, it will be necessary to develop and implement cost-effective means of monitoring. It is strongly recommended that methodologies involve sampling in the selection and assessment of farmers.

Initiatives led by the private sector can help to address deforestation, but it is necessary that these efforts collaborate with the public sector to maximize their impact. Many agribusinesses that operate in Eastern Province are not COMPACI members and they are not likely to make the same investments as members in reducing deforestation in their value chains. Furthermore, commodities that members do not produce or trade, such as tobacco and charcoal, are also important drivers of deforestation.

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