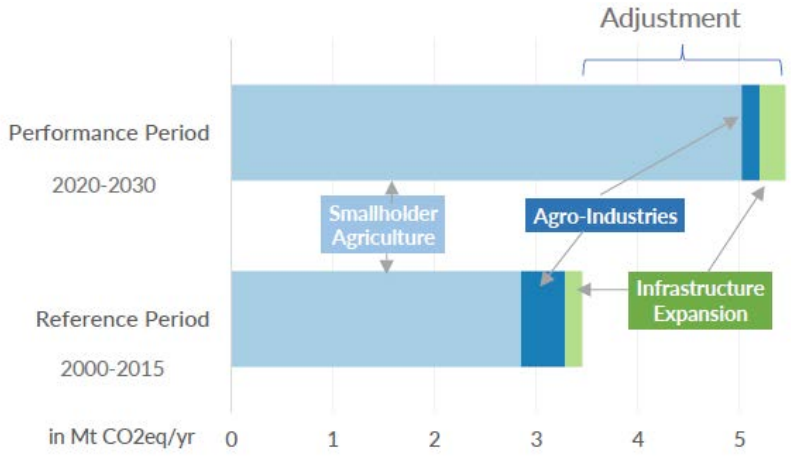
Developing a forest reference emissions level (FREL) in the Congo Basin



Source: Pirker et al. 2019

Figure: Projected emissions during the performance period with adjustment to societal megatrends (top bar) are 29% higher than emissions during the reference period (bottom bar); the increase is driven by expanding smallholder agriculture for which emissions are projected to increase by 48%.

RESTORE+Brief

- A transparent approach to developing a forest reference emissions level (FREL) adjusted to future local developments in Southern Cameroon is demonstrated.
- Deforestation during the virtual reference period 2000-2015 is dominated by non-industrial agriculture (comprising both smallholders and local elites) and increases over time.
- The land use model projections are consistent with this trend, resulting in emissions that are on average 47% higher during the virtual performance period 2020-2030 than during the reference period 2000-2015.
- The available data is suitable for constructing a FREL for periodic reporting to the UNFCCC.

Approach and aim

Avoided deforestation offers a large and very cost-effective potential to curb greenhouse gas (GHG) emissions in tropical countries. For the forest-rich countries of the Congo Basin, halting deforestation is of utmost importance, where restoration still plays a minor role. The development of a credible benchmark to compare efforts to halt deforestation should be considering future societal and economic development. This is needed to define how much would be emitted in the absence of REDD+ (Reducing Emissions from Deforestation and forest Degradation) interventions to halt deforestation. This benchmark is called a forest reference level (FRL) or forest reference emission level (FREL) and it is adjusted to account for the dynamic socio-economic development using a land use model.

Building on land use change projections for the Congo Basin region generated by the preceding REDD-PAC project (http://www.redd-pac.org/), RESTORE+ applies its tools and incorporates newly available authoritative datasets for land cover development and national forest inventory data to develop improved land cover change maps (so called activity data) and emission factors, respectively, for Cameroon.

Another component of the methodological development is the analysis of uncertainties associated with the calculation of a FREL, as stipulated by the IPCC Guidelines for National Greenhouse Gas Inventories and required by performance-based payment schemes like the Carbon Fund. To that end, a Monte Carlo Analysis encompassing land cover maps, forest inventory data and adjustment of the reference level to future development pathways allowed to estimate the uncertainty around the FREL calculation. In a nutshell, the land use model seeks to project societal megatrends such as urbanization, population growth and modest wealth growth to the future and estimates their impacts on land use emissions.

With the adjustment of the FREL for southern Cameroon to these societal megatrends (see top bar in figure), RESTORE+ demonstrated what can be done with available information and data, and outlines pathways to further improve the quality of future FREL's, considering possibly accessing performance-based payments.

Main results

The emission level for the period 2020-2030 developed for southern Cameroon is estimated to be 29% higher (see figure) compared to the virtual reference period 2000-2015. Deforestation during this initial period is dominated by non-industrial agriculture (comprising both smallholders and local elites) and increases over time. The land use model projections are consistent with this trend, resulting in emissions that are on average 47% higher during the virtual performance period 2020-2030 than during the reference period 2000-2015. This over-proportional development of emissions is due to increased expansion of staple crops with little carbon remaining on site. The Monte Carlo analysis points to the adjustment term as the main driver of uncertainty in the FREL calculation.

The results of the analysis show that the available data is suitable for constructing a FREL for periodic reporting to the UNFCCC. However, enhancement of quality and coherence of input data (notably for activity data and the model-based adjustment) is needed to apply for a performance-based payment scheme. Expanding the accounting framework to include forest degradation and forest gain are further priorities requiring future research.

Further reading: Pirker, Johannes, Aline Mosnier, Tatiana Nana, Matthias Dees, Achille Momo, Bart Muys, Florian Kraxner, René Siwe. 2019. "Determining a Carbon Reference Level for a High-Forest-Low-Deforestation Country." Forests 10 (12): 1095.

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