Congo Basin forests under pressure: the role of increasing population and palm oil international demand

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Introduction

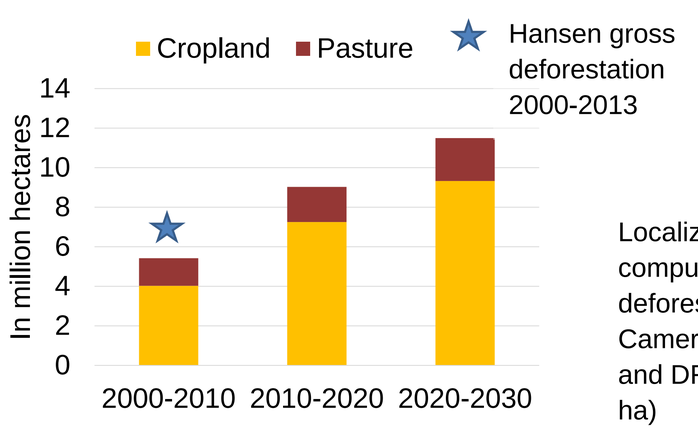
- The Congo Basin forest is the second largest rainforest area after the Amazon forest
- Historical rate of deforestation has been low in the Congo Basin compared to the two other rainforest basins.
- But risks of deforestation will likely increase in the next decades:
  - The Congo Basin ***population*** is expected to increase by 55% between 2010 and 2030.
  - Large ***development needs***: Congo Basin countries are among the countries with the lowest Human Capital Index
  - New opportunities from ***global markets***: global palm oil consumption has more than doubled over the last decade and continues to increase

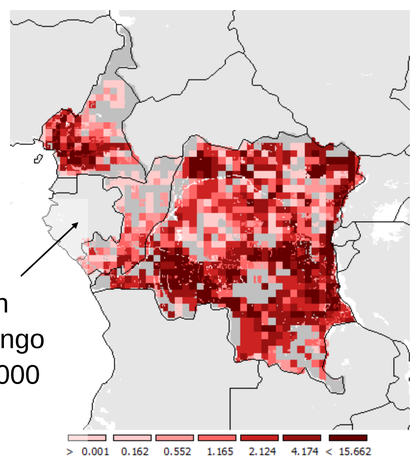
Understanding the main drivers of deforestation and their evolution in the next decades can support the development of policies compatible with development objectives and REDD+ initiative

Methodology

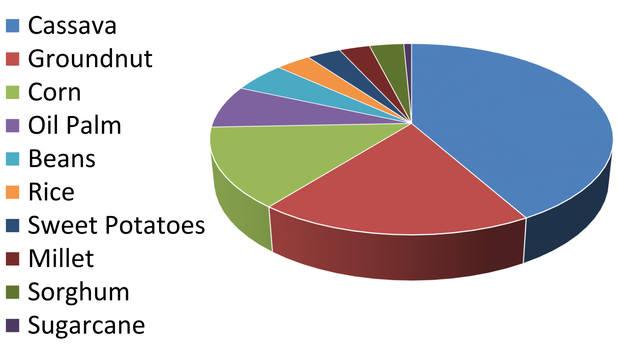
- We use ***GLOBIOM, a global, partial equilibrium model including the major land-based production sectors*** (Havlik et al., 2010). It accounts for 18 of the most globally important crops - 14 cultivated in the COMIFAC region, 6 livestock types, major forestry commodities, and bio-energies.
- ***Prices and international trade flows are endogenously determined*** at the regional level. The 5 sub-regions of COMIFAC can trade among each other and/or with the other global regions. The supply side of the model reflects a ***detailed spatial resolution*** that accounts for land heterogeneity at 0.5 degree (~50x50km).
- ***Subsistence agriculture*** is characterized by 2 years cultivation followed by fallow between 4 and 7 years depending on population density, and auto-consumption constraints. Fuelwood can be either harvested on fallow land or on unmanaged forests leading to forest degradation.
- ***Oil palm biophysical suitability*** has been computed based on climate, soil, and topography (Pirker and Mosnier, 2015) i) with all currently available techniques to mitigate biophysical constraints (e.g. *agro-industrial plantations*) and ii) without mitigation techniques (e.g. *smallholders*).
- Population and GDP projections by 2030 are taken from the ***SSP2 scenario*** developed for IPCC (middle-of the road scenario).
- ***GHG emissions*** from deforestation are computed as the difference between carbon content in the origin land cover and in the final land cover using different biomass maps.

Deforested area in COMIFAC region computed with GLOBIOM

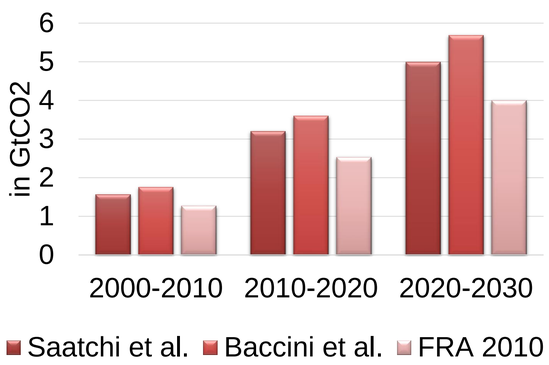




Share of each crop in total cultivated area expansion over 2010-2030

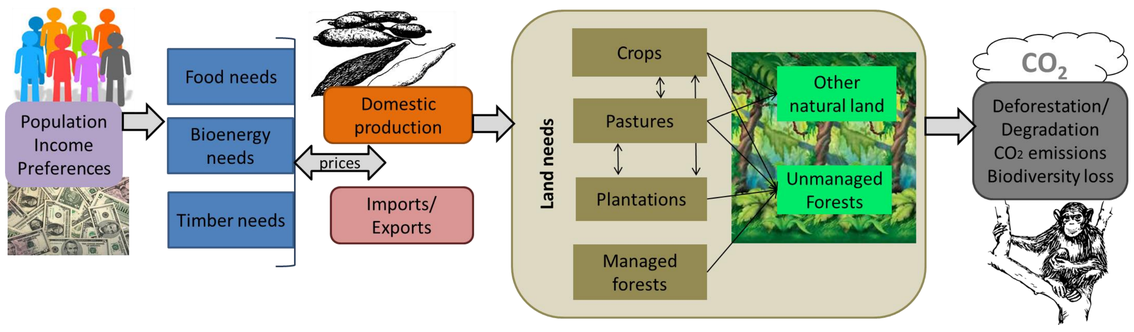


Computed emissions from deforestation over 2010-2030

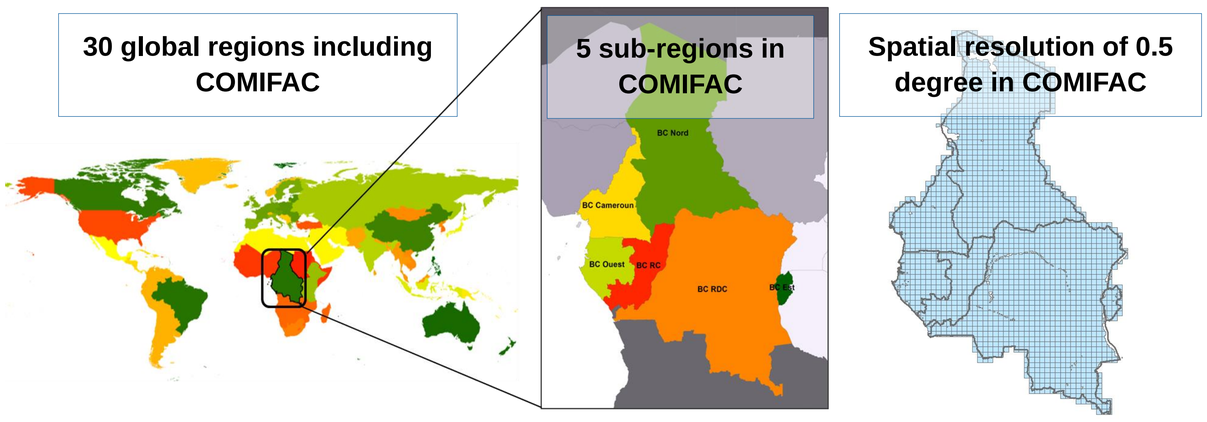


For biodiversity impacts: see P-2214-14

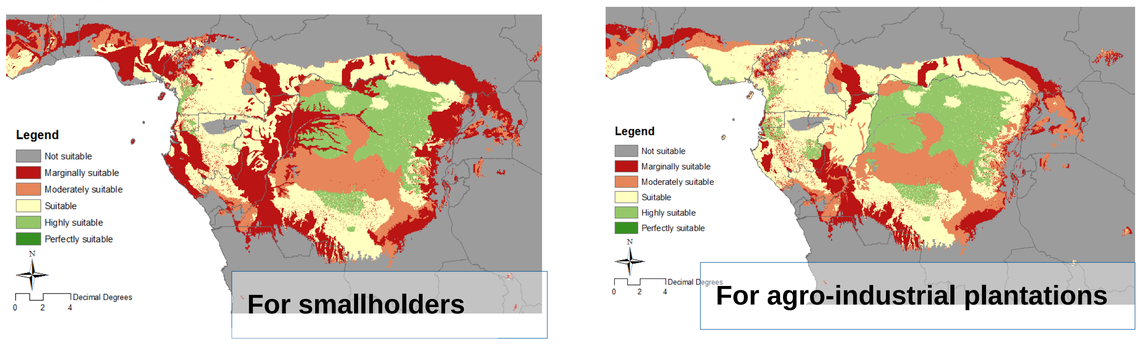
Emissions from deforestation and forest degradation are driven by food, bioenergy and wood demand in GLOBIOM



Integration of different scales in GLOBIOM-Congo Basin



Oil palm suitability in the Congo Basin



Voir aussi www.moabi.org

Results

- Computed deforestation for the whole COMIFAC region amounts 5.4 million ha over 2000-2010 while measurement from Hansen et al. (2013) is 7.6 over 2000-2013. This leads to very close estimates of historical average annual deforestation rate of 0.54 and 0.58 million ha respectively.
- We project a strong increase of deforestation in the next decades in COMIFAC countries***: 2000-2010 deforestation level increases by 1.66 by 2020 and by 2.12 by 2030***. The area deforested due to pasture expansion increases over time but remains under 20% of total deforested area.
- From our results, ***cassava, groundnut, and corn*** account for 2/3 of the total cultivated area expansion over 2010-2030. These three crops are mainly consumed domestically. When we account for fallow, the total arable land is three times bigger than the cultivated area in the COMIFAC region, driving significant deforestation.
- According to our projections, ***oil palm area doubles between 2010 and 2030***, but even if exports also increase, the oil is mainly used to satisfy higher domestic consumption. This is lower than expected from the national development plans.
- While deforested area doubles over the period, emissions more than triple, meaning that the risk of deforesting carbon-rich forests increases in the future.

Conclusion

- In the context of REDD+ framework, ***the adjustment of historical deforestation rate based on national conditions is largely justified for the Congo Basin countries***.
- We estimate that ***the increase of population will be the major source of pressure on Congo Basin forests by 2030***. Reaching scattered subsistence farmers is a major challenge in the framework of REDD+.
- Carbon uptake on fallow land has not been taken into account in this study but could be quite high in the Congo Basin humid forests area.

REDD pac

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For the work on Brazil in the framework of the REDD-PAC project: see O-2219-04 and P-2219-02.

CoForTips