Carbon, biodiversity & ecosystem services: exploring co-benefits

Initiatives aiming to Reduce Emissions from Deforestation and forest Degradation, and conserve, sustainably manage or enhance forest carbon stocks (REDD+) can help to deliver important benefits in addition to their primary goal of carbon management. Such co-benefits include conservation of forest biodiversity and maintenance of ecosystem services.

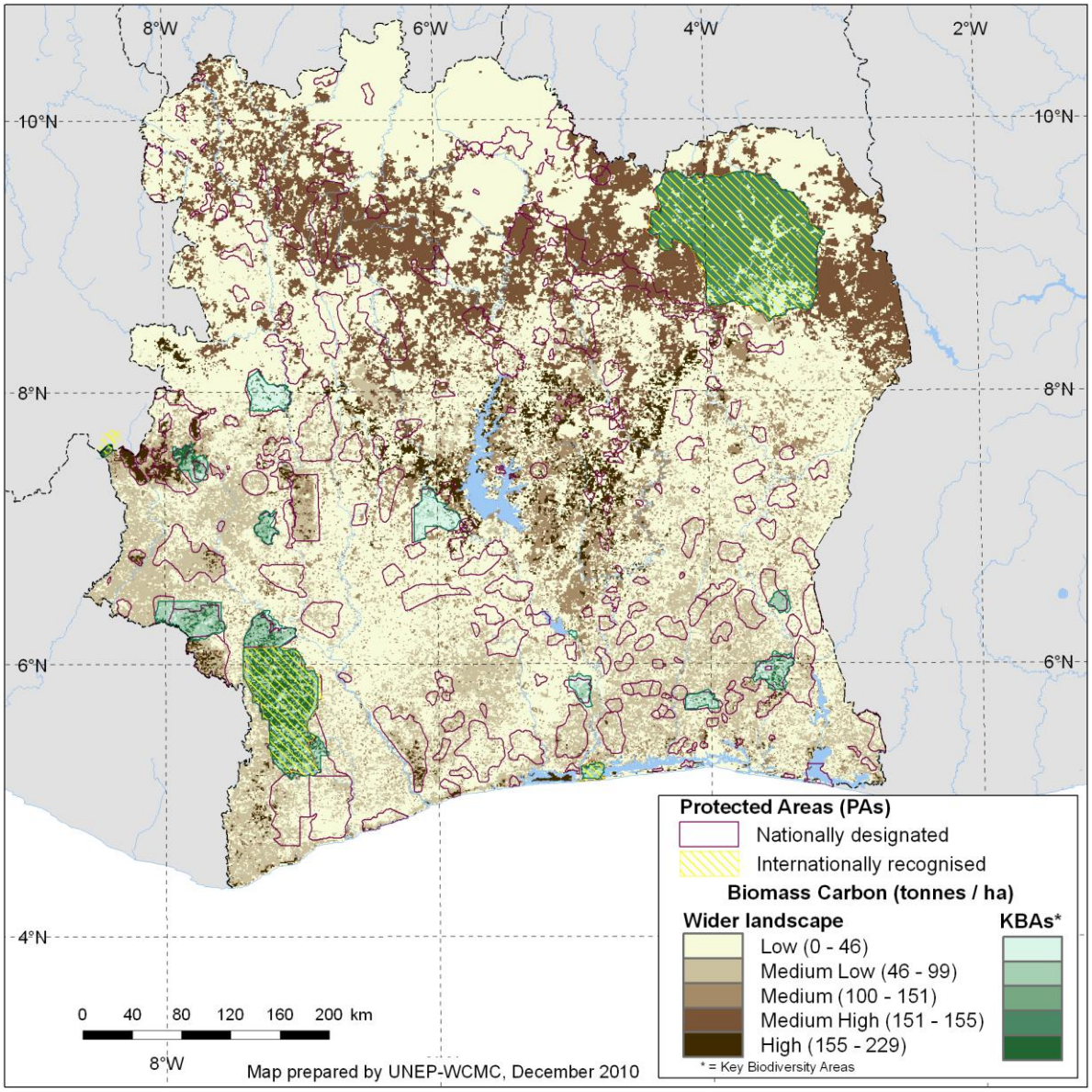
Côte d'Ivoire

Land area: 318 000 km^2 (1)
Population: 20 228 000 (2007 estimate, 3)
Bordering countries: Liberia, Guinea, Mali, Burkina Faso, Ghana
Forest extent: 104 030 km^2 (1)

REDD+ and its potential co-benefits are important in Côte d'Ivoire, where large tracts of primary forest have been destroyed for timber trade, conversion for agriculture and due to uncontrolled fires (2). Côte d'Ivoire's biodiversity is among the richest in Western Africa. The country contains an important part of the Guinean Forests of West Africa Hotspot, which is known for its numerous endemic and threatened species.

Carbon in Côte d'Ivoire's biomass and soil

Côte d'Ivoire's terrestrial carbon stocks total about 4.1 Gt, comprised of 2 Gt of carbon in above- and below-ground biomass (Map 1) and 2.1 Gt in soils (to 1 m depth, Map 2).



Map 1 Distribution of biomass carbon, Key Biodiversity Areas (KBAs) and protected areas (PAs) in Côte d'Ivoire (underlying data from 4; 5; 6; 7)

Both biomass and soil carbon are distributed unevenly over the country; areas of highest biomass carbon density contain 11% of Côte d'Ivoire's biomass carbon but cover only 4% of the country's land area (i.e. around 11 800 km^2; Figure 1). More than half of Côte d'Ivoire's land is low in biomass carbon, but some of these areas are characterized by high soil carbon.

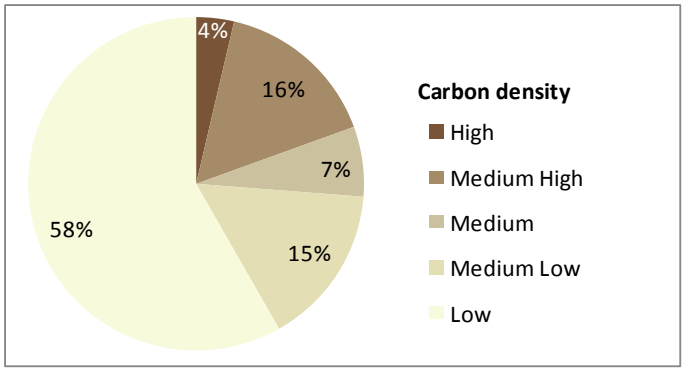
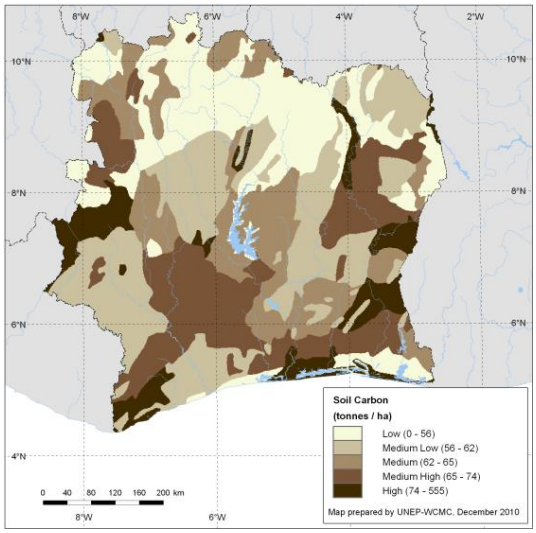


Figure 1: Percentage of country area covered by different biomass carbon density classes

Therefore, it may be important for Côte d'Ivoire to consider soil carbon management as it develops its national strategies for climate change mitigation.



Map 2: Soil organic carbon stocks of Côte d'Ivoire (underlying data from 8)

Carbon, biodiversity and protected areas

Key Biodiversity Areas (KBAs) are areas of high priority for biodiversity conservation that have been identified by stakeholders in country according to internationally agreed criteria (9). The 14 KBAs that have so far been identified in Côte d'Ivoire (Map 1) cover about 22 310 km^2 of land, and include roughly 0.25 Gt of biomass carbon and 0.14 Gt of soil carbon. About 11% of the land within KBAs (2 560 km^2) is of high biomass carbon, and represents about 22% of the high carbon area in the country. However, not all of the KBAs are of high biomass carbon.

Côte d'Ivoire has 245 protected areas (nationally designated and internationally recognised) covering around 71 200 km^2, or 22% of its total land area (Map 1). In total they contain about 0.54 Gt of biomass carbon (and 0.47 Gt of soil carbon) and cover 95% of the land area that is both high in biomass carbon and of biodiversity importance (defined as being located within a KBA). Of the 227 Mt of biomass carbon stored in land that is high in carbon, about 33% (76 Mt) is in protected areas (Figure 2). Only 5% of the land area important for both carbon and biodiversity has no form of legal protection.

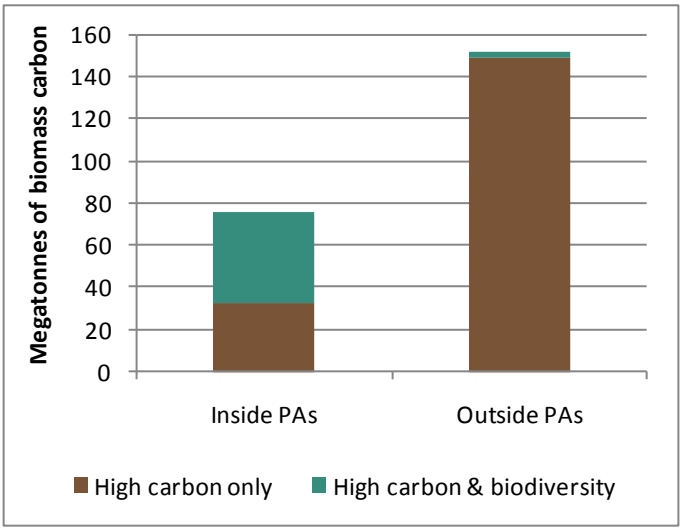


Figure 2: Biomass carbon from areas that are high in carbon and of biodiversity importance inside and outside protected areas (PAs)

Well-designed REDD+ interventions in these areas are likely to provide a considerable benefit to biodiversity. Similarly, projects that improve the effectiveness of protected areas in retaining both forest carbon and biodiversity value may make a significant contribution to REDD+.

Further development

These preliminary analyses are based on regional and global data. They represent a first step in exploring the potential for co-benefits of carbon management for climate change mitigation under REDD+ in Côte d'Ivoire. Any future work should be conducted in close collaboration with national stakeholders and institutions to ensure that national priorities are considered and best available national data are used. Further analyses could build on these first results by: improving the carbon map; integrating additional datasets on biodiversity and ecosystem services; and exploring how pressures on carbon (e.g. infrastructure, mining) relate to carbon distribution.

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