Fact sheet 6
September 2015

ROBIN
Role of Biodiversity in Climate Change Mitigation

MODEL INDICATES BIODIVERSITY HAS A DIRECT EFFECT ON CARBON STOCKS AND FOREST BIOMASS RESILIENCE

Key findings

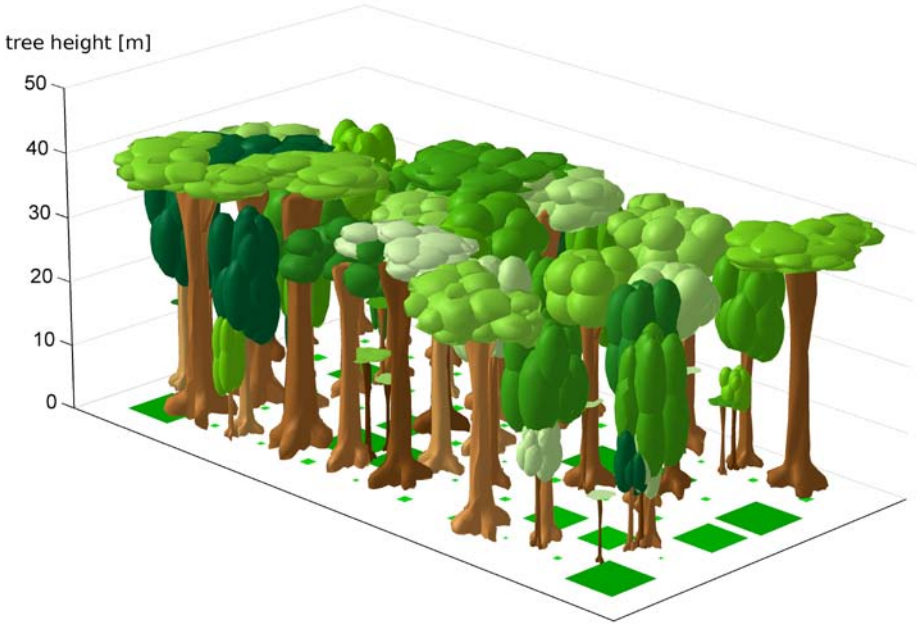
Through our computer modelling, we have found compelling evidence that the biodiversity of the Amazon can ensure its resilience under climate change.

Model simulations show that a naturally diverse forest is able to recover its biomass and height structure after several hundred years under projected future climate conditions. The positive effects of biodiversity on biomass are, however, limited by the strength of climate change.

Recommendations

- Biodiversity is an effective means to mitigate climate change in the Amazon basin and beyond, and should no longer be reduced to a co-benefit of ecosystem conservation
- The adaptive capacity of trees should be an integral part of ecosystem model forecasts that evaluate the future status of tropical forests as a carbon source or sink.

Evidence

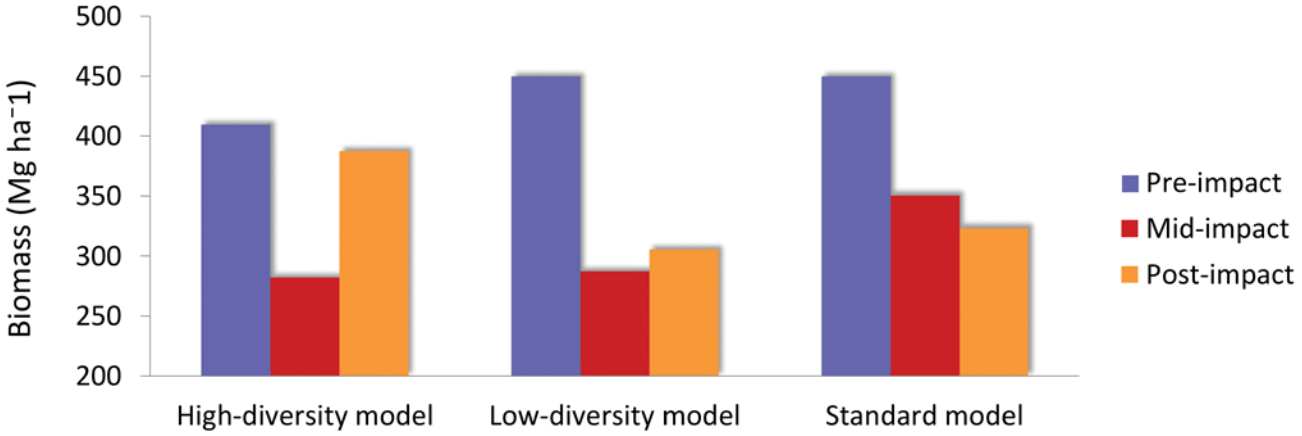


The LPJmL-FIT model simulates individual trees competing for resources in forest patches

ABOUT ROBIN

ROBIN has assessed the role of biodiversity in terrestrial ecosystems in South and Mesoamerica in mitigating climate change. It has evaluated socio-ecological consequences of changes in biodiversity and ecosystem services under climate change.

We demonstrated that tropical forests are able to adapt to a changing climate using a new terrestrial biogeochemical model (LPJmL-FIT) that simulates diverse forest communities on the basis of individual tree growth. Our results provide the first evidence that plant trait diversity acts as an insurance against climate change impacts across large spatio-temporal scales by maintaining biomass resilience.



Simulated biomass of a forest site in the Amazon with different levels of biodiversity. Forest recovery after severe biomass reduction through climate change occurs only when biodiversity effects are incorporated in the model

ROBIN outputs

- Sakschewski, B., von Bloh, W., Boit, A., Rammig, A., Kattge, J., Poorter, L., Peñuelas, J., Thonicke, K. (2015). Leaf and stem economics spectra drive diversity of functional plant traits in a dynamic global vegetation model. Global Change Biology, doi:10.1111/gcb.12870
- Sakschewski, B., von Bloh, W., Boit, A., Poorter, L., Peña Claros, M., Heinke, J., Joshi, J., Thonicke, K. (2016). Resilience of Amazon forests emerges from plant trait diversity. Nature Climate Change, doi: 10.1038/nclimate3109
- Thonicke, K., Blyth, E., Cisowska, I., Sakschewski, B., Boit, A. (2014). Joint land use and vegetation scenarios covering observation sites as well as regional-wide application under future climate conditions. ROBIN project report

More information

www.robinproject.info

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