Global Forest Biodiversity Initiative

People, Nature, World, Diversity

GFBI Organization and Function

Jingjing Liang, Gert-Jan Nabuurs, Thomas Crowther

Inaugural Global Forest Biodiversity Initiative Conference & GFBI-FECS Joint Symposium 2017

Our species thanks to

北京林业大学
Beijing Forestry University

Forest Ecosystems
a SpringerOpen Journal
www.forestecosyst.com

"This is an era of big data." - Prof. Xiuhai Zhao (2012)

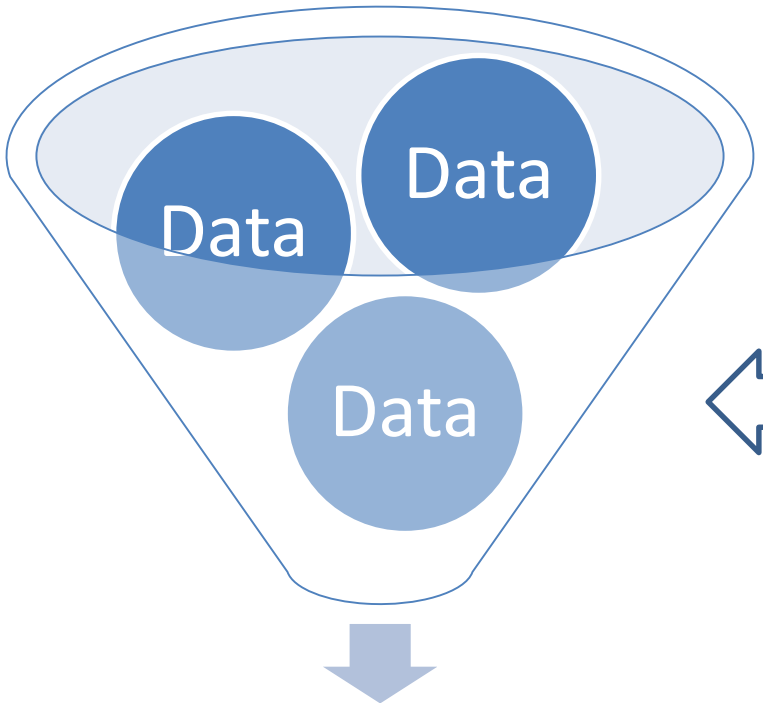
GFBI

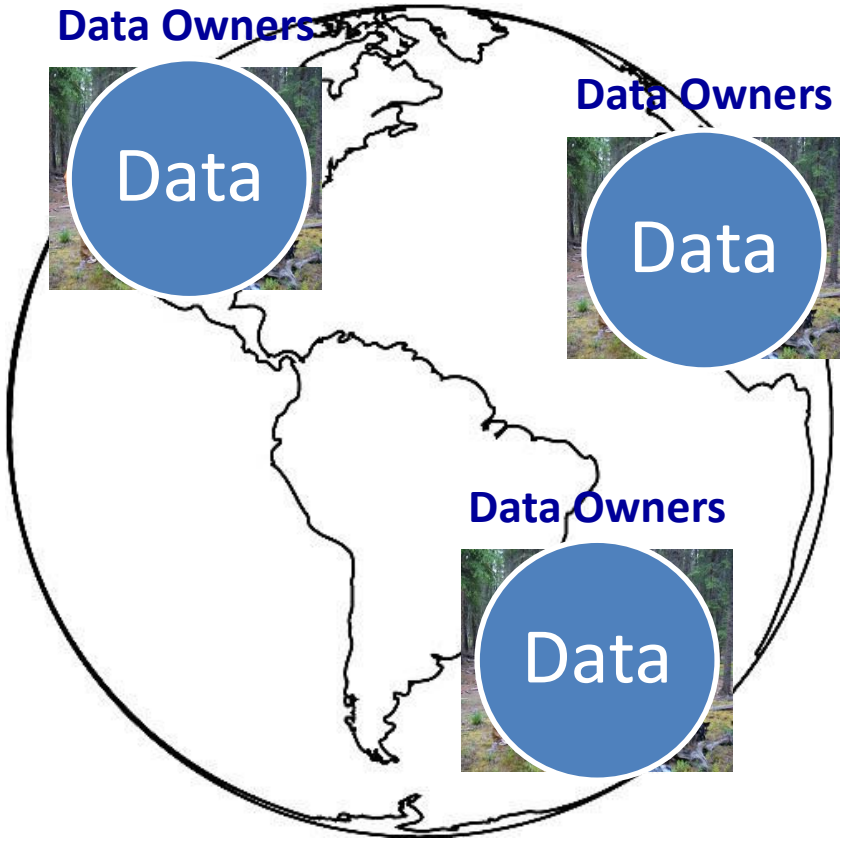
statu viae

Data Users

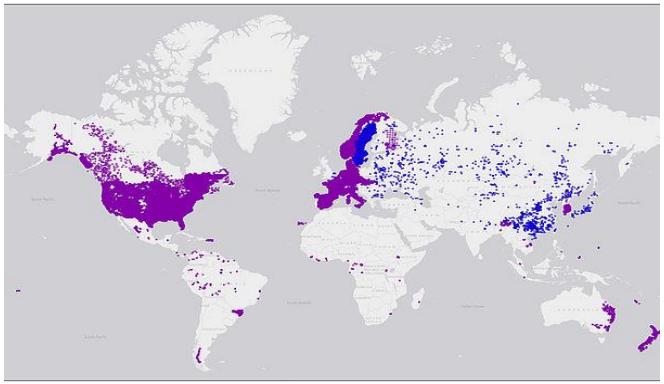
Data Owners

GFBI data compilation



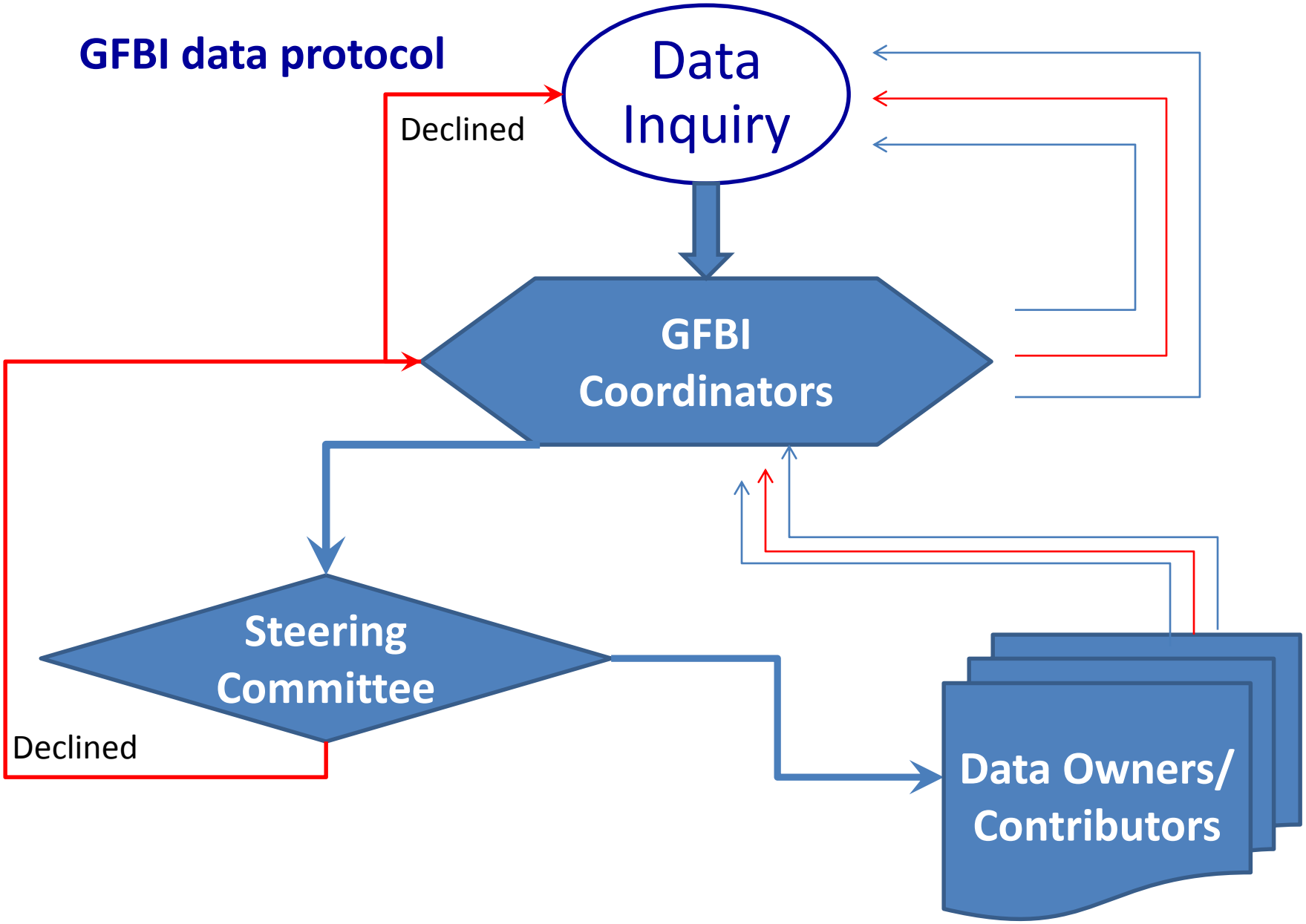


GFB Database v.2.0

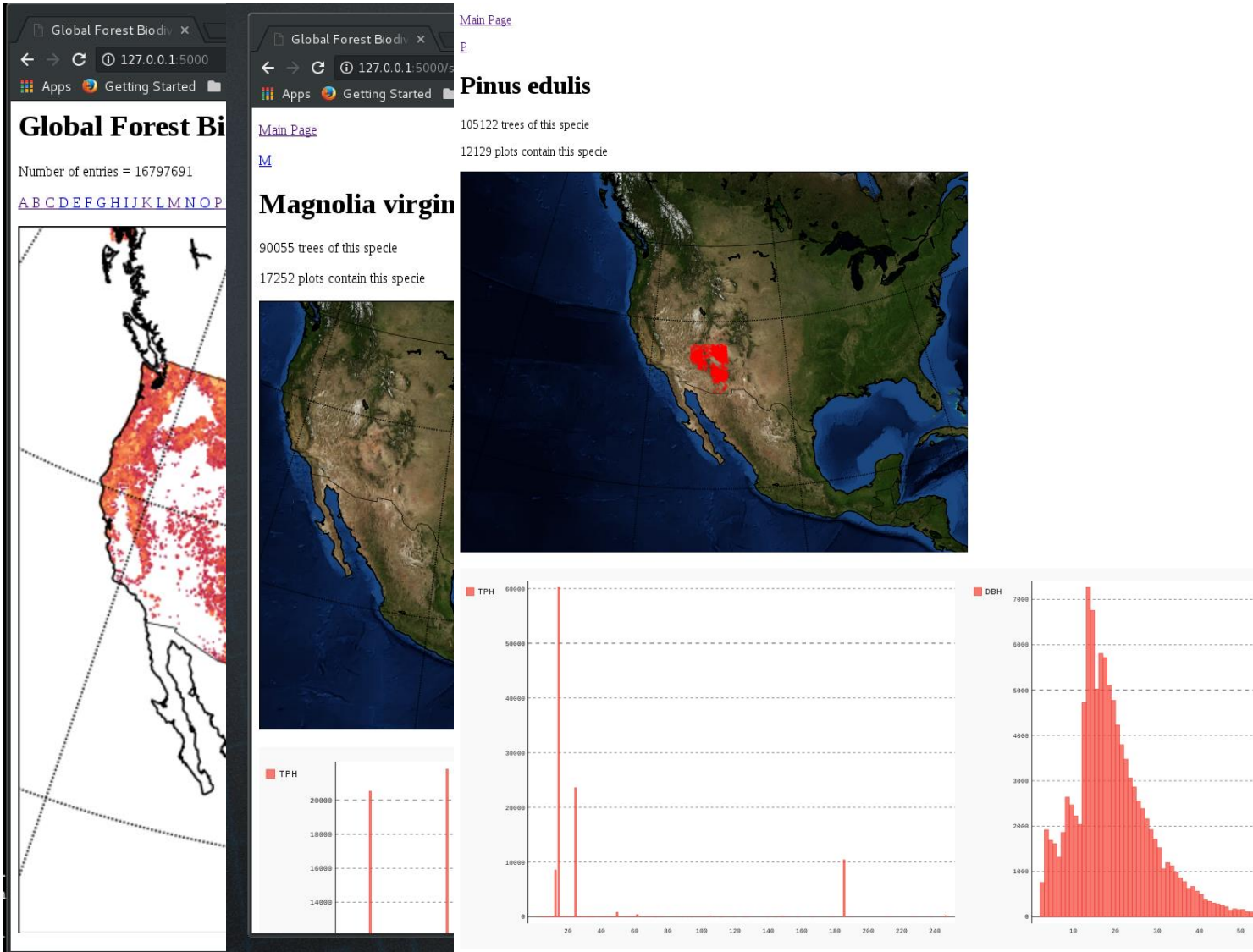


•GFBI studies and manages the world's largest forest inventory database;
•With over 1.23 million plots from across the world;
•The database covers more than 90 countries in all the continents except for Antarctica

GFBI data protocol



GFBI web interface- forthcoming



Origins of GFBI

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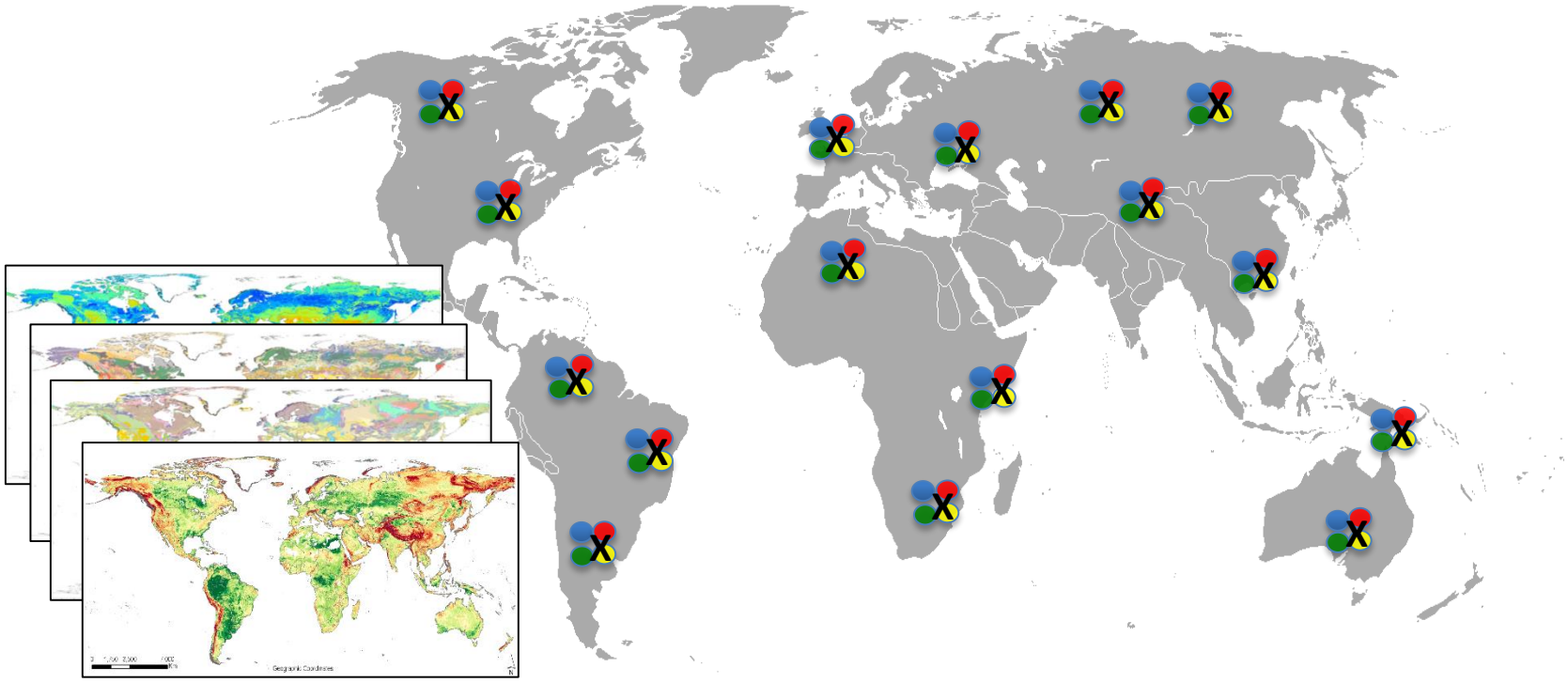
Origins of GFBI

429,775 plots

Origins of GFBI



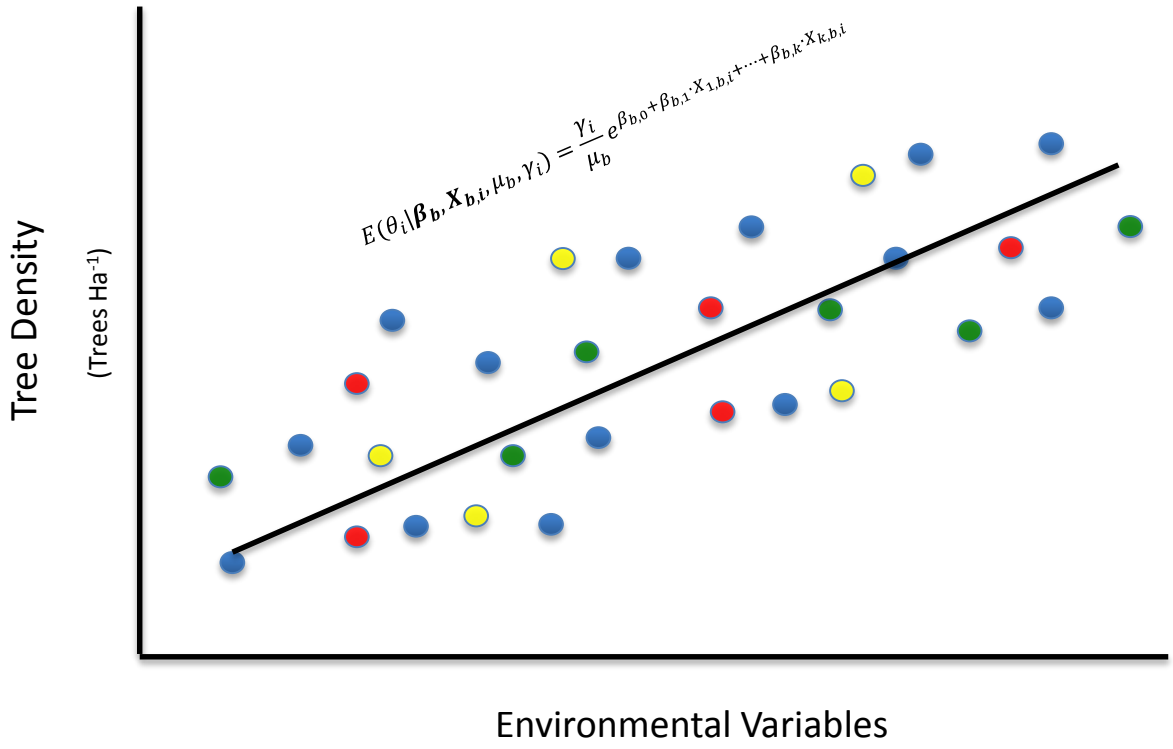
Climate

Remote Sensing Data

Soil/Geology

Topography

Origins of GFBI



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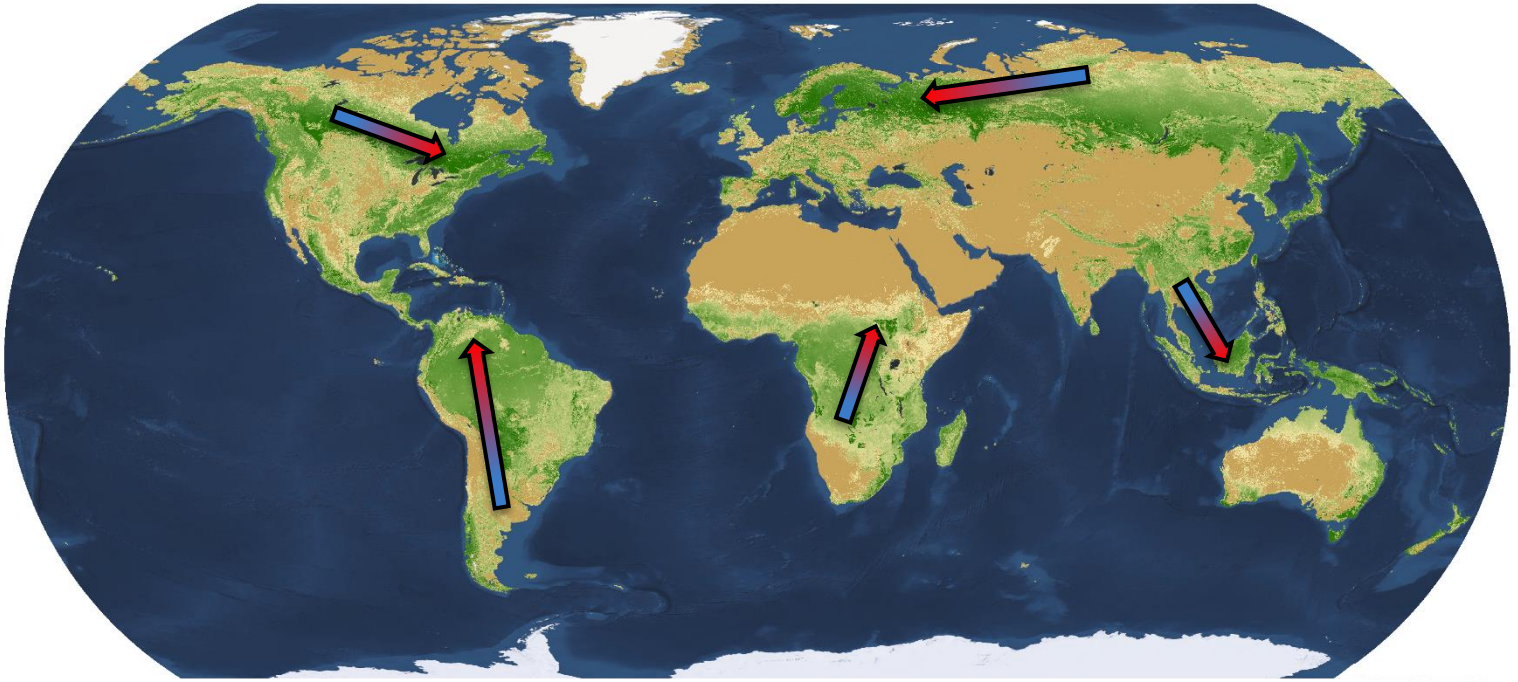
Crowther *et al*. (2015). Nature



3 trillion trees on
Earth

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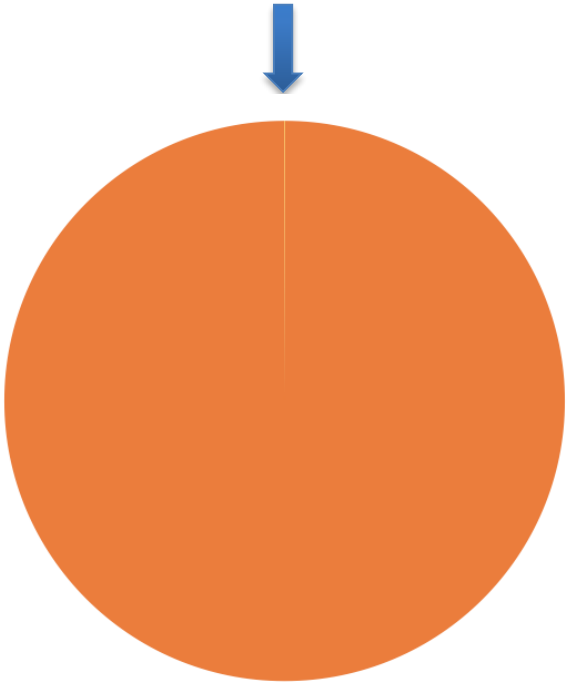
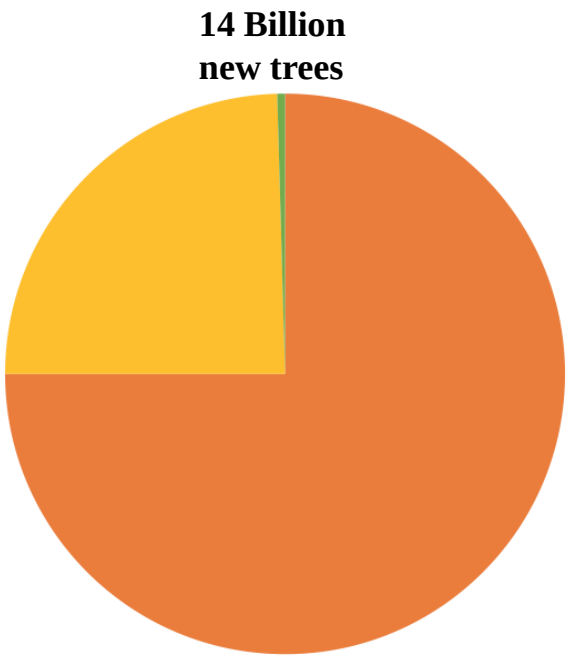
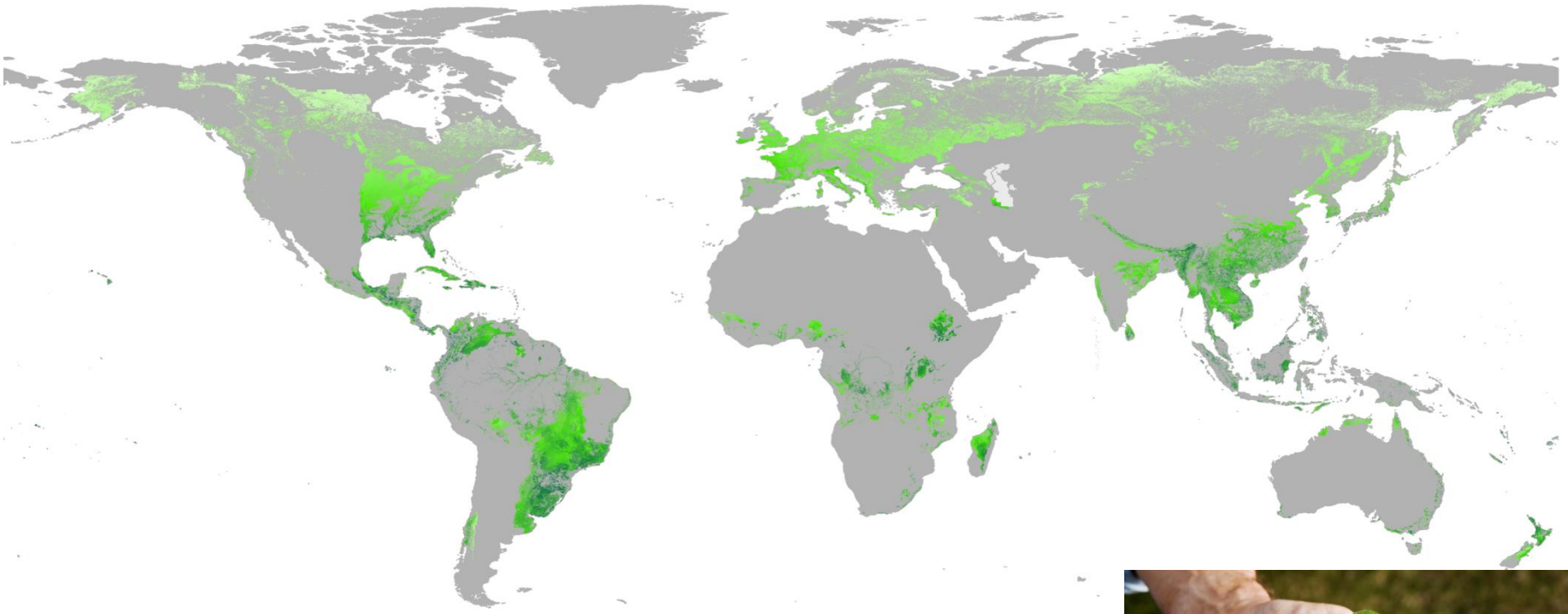


The Billion Tree Campaign



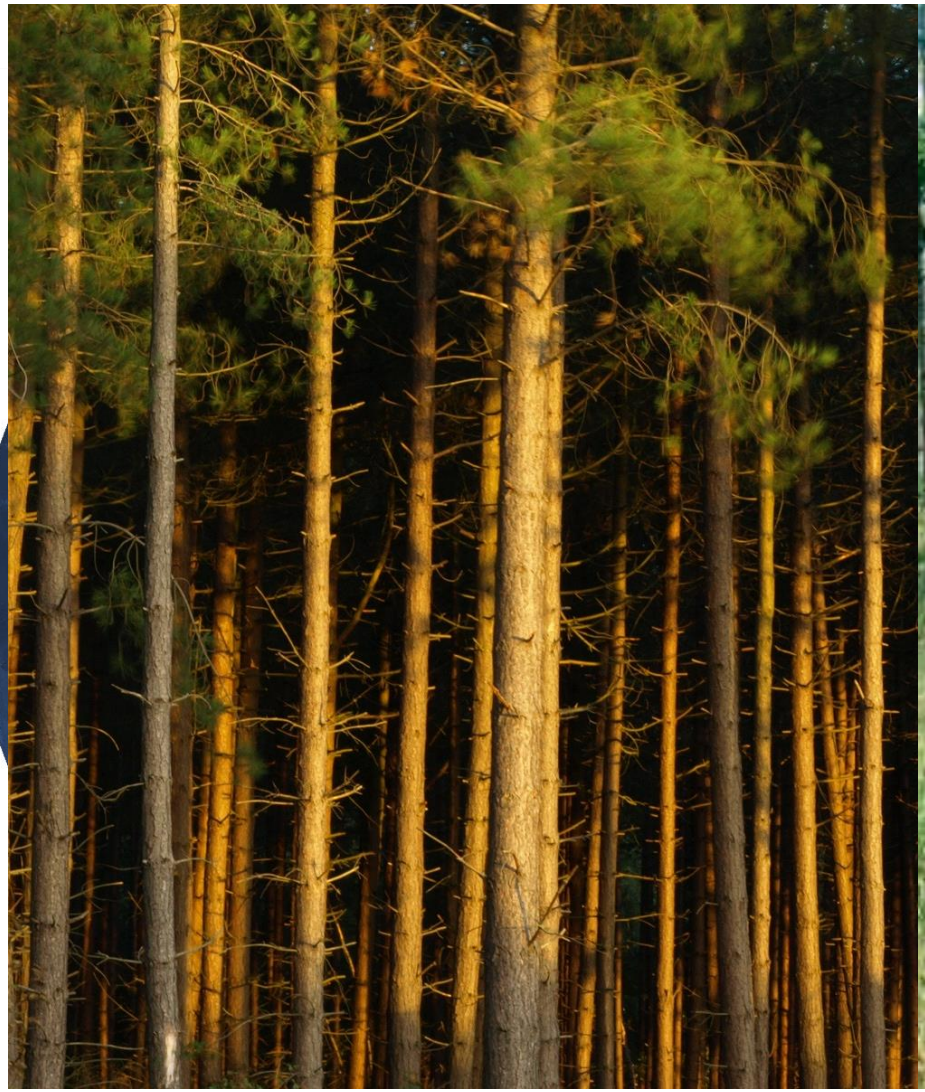
The Trillion Tree Campaign

Origins of GFBI



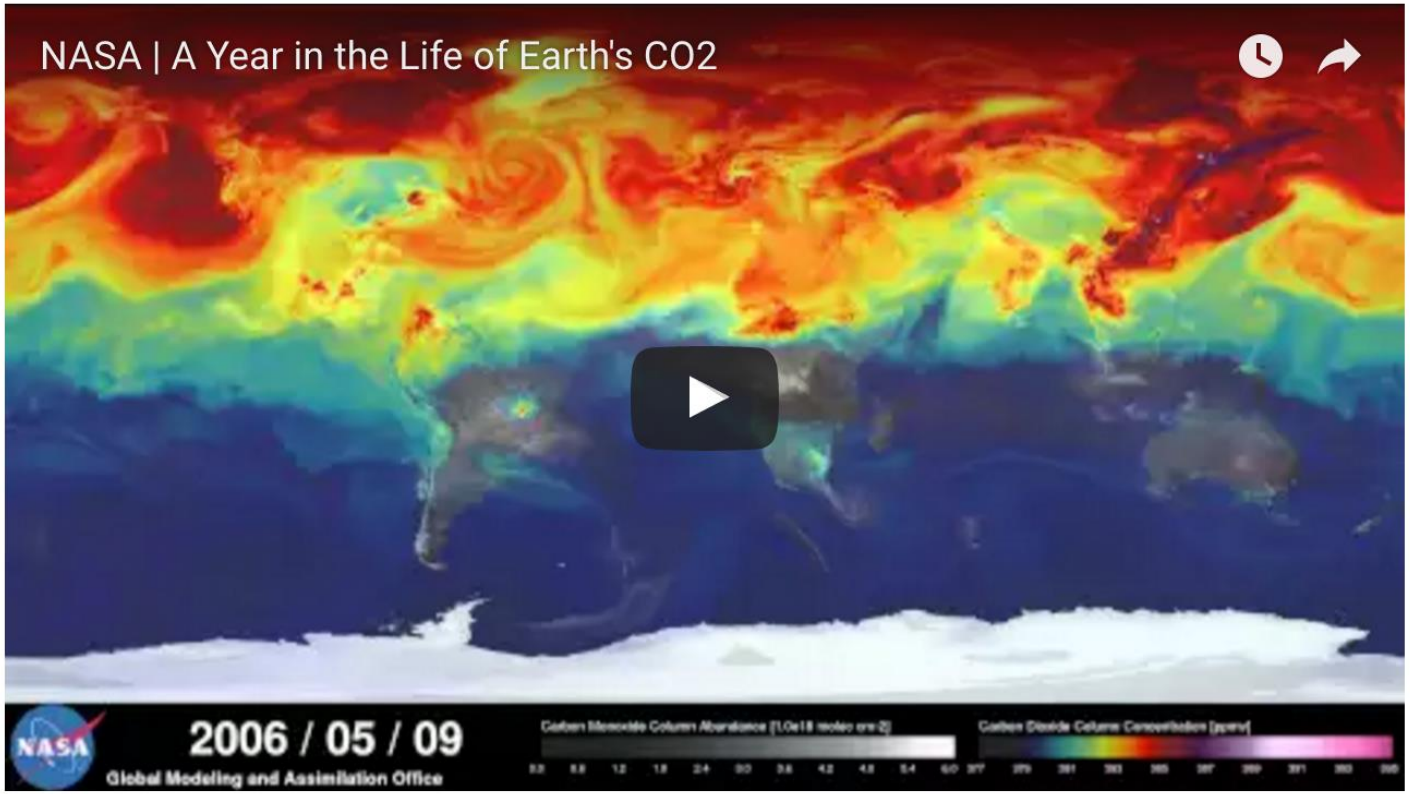
Room for 1.3 trillion more

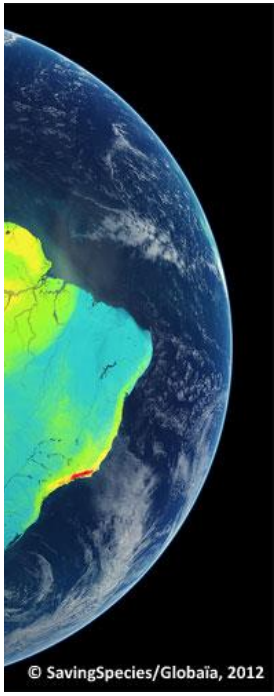
Origins of GFBI



Origins of GFBI

Mafipula

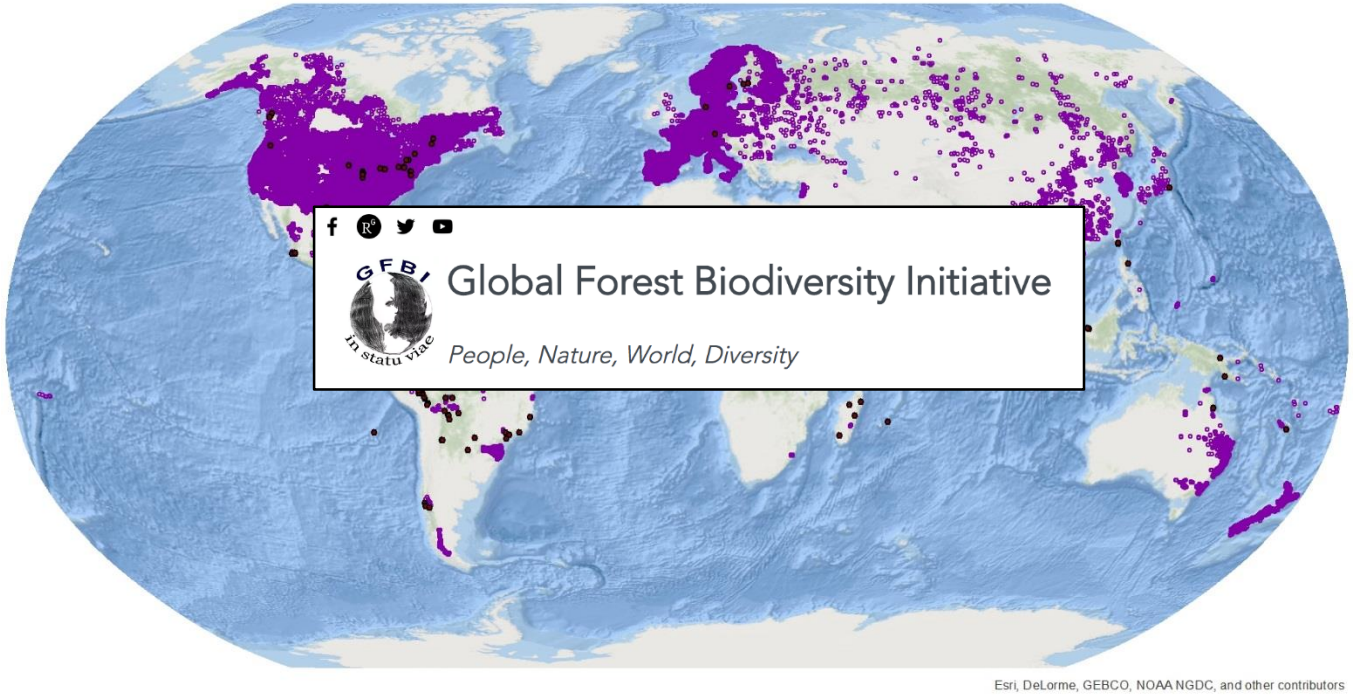




Consider the fantastic scale of this global dance. It starts, as I said, with 3.1 trillion trees. That's the latest census, published a few months ago in the science journal *Nature* (see page 201) by Yale's Thomas Crowther, a Climate and Energy Institute postdoctoral fellow. If he's right, there are more trees on Earth than there are stars in the Milky Way.

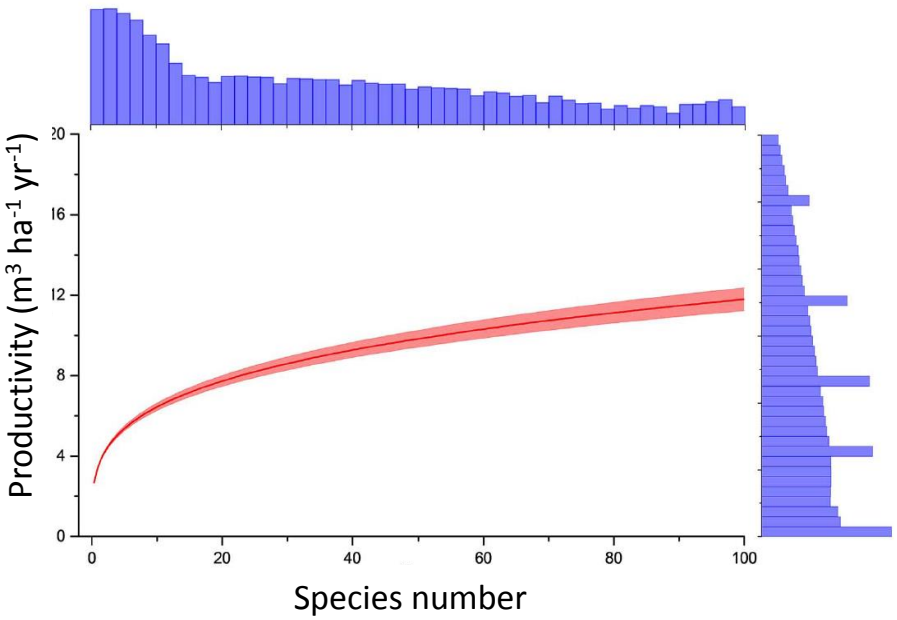
Origins of GFBI

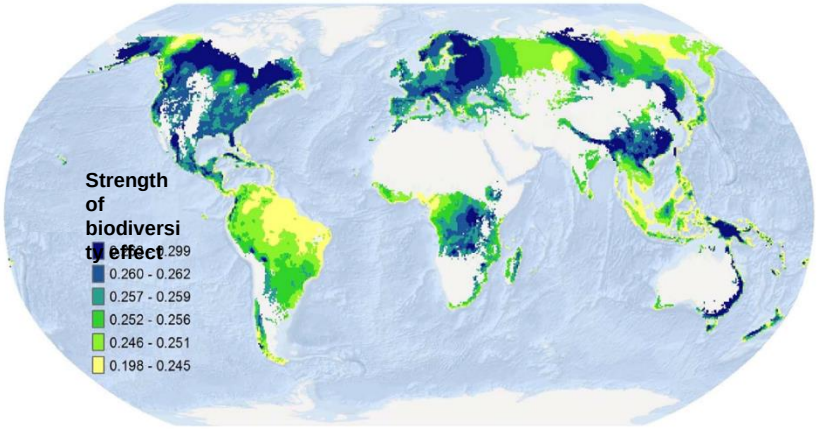
Over 1.2 M Forest Inventory Plots



Origins of GFBI

Liang *et al*. 2016
Science





Origins of GFBI

Liang *et al*. 2016
Science

$606 Billion

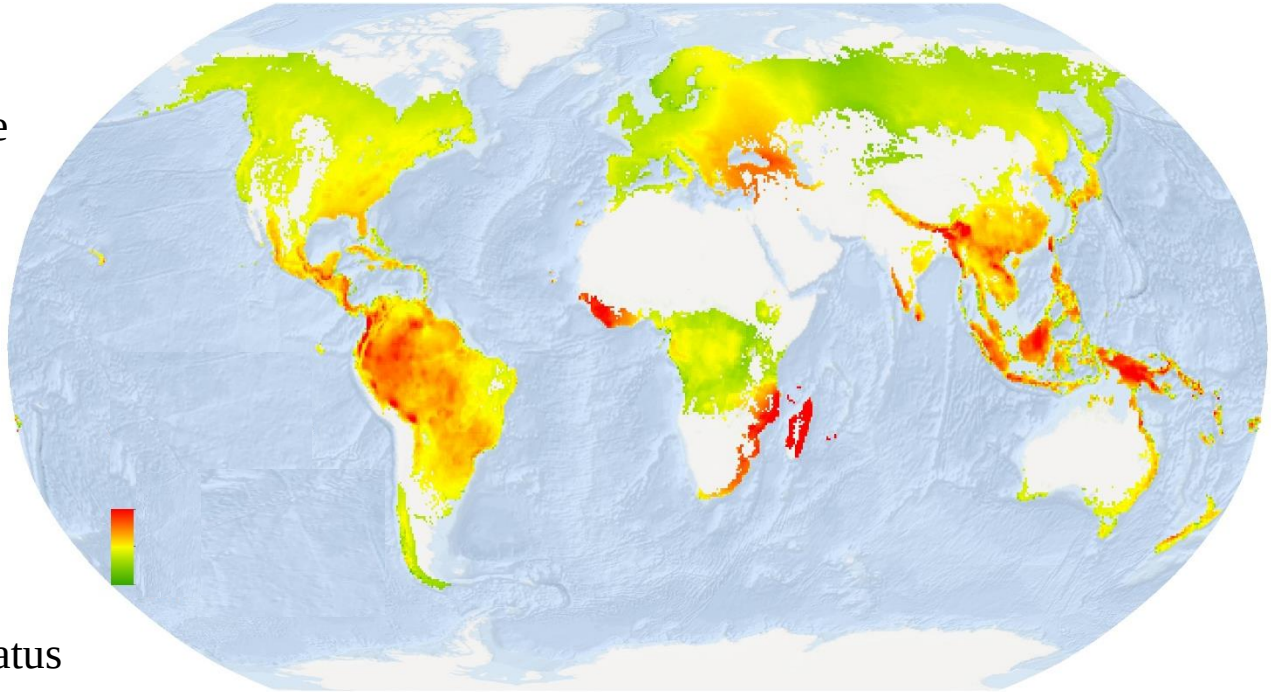
>

$116 Billion

>

Origins of GFBI

- Biomass
- Carbon Storage
- Productivity
- Wood density
- Tree Diversity
- Foliar C:N
- Mycorrhizal status
- Water Content
- Etc etc



A vision on GFBI

..a lasting and recognised independent network in global forest-related studies based on a large ground truth dataset,

Active in a wide array of fields: from biodiversity to climate change and the forest sector.

GFBI is mostly a virtual network, though with hubs and a governance structure

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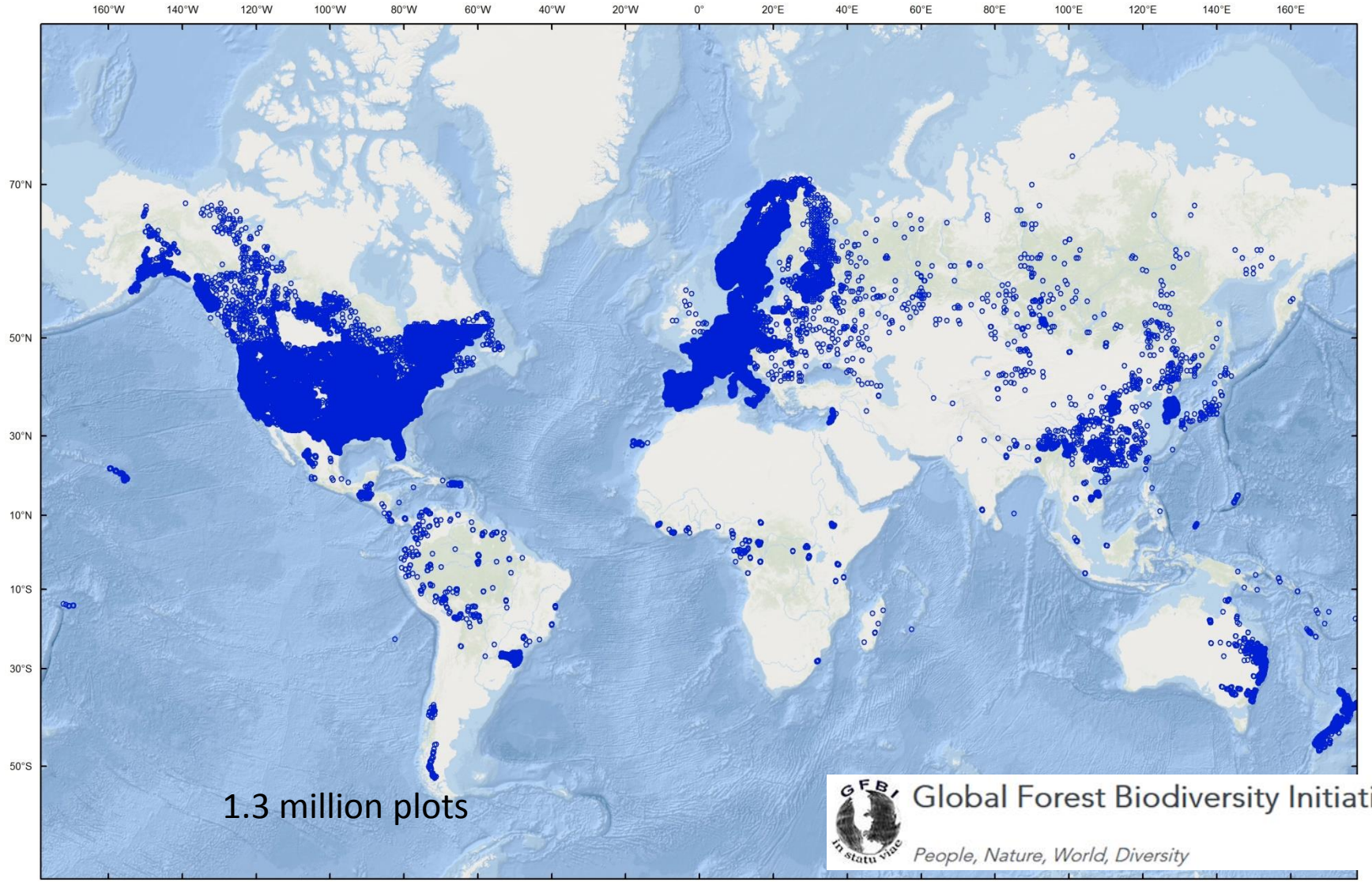
1599 map of arctic exploration by Willem Barentsz

An unprecedented amount of forest groundtruth data has been compiled



Will be of enormous importance to areas like:

- Biodiversity assessments
- Carbon balance assessments
- Forest resource assessments
- Forest sector outlook studies & sustainable harvesting
- Ground truthing
- Etc..

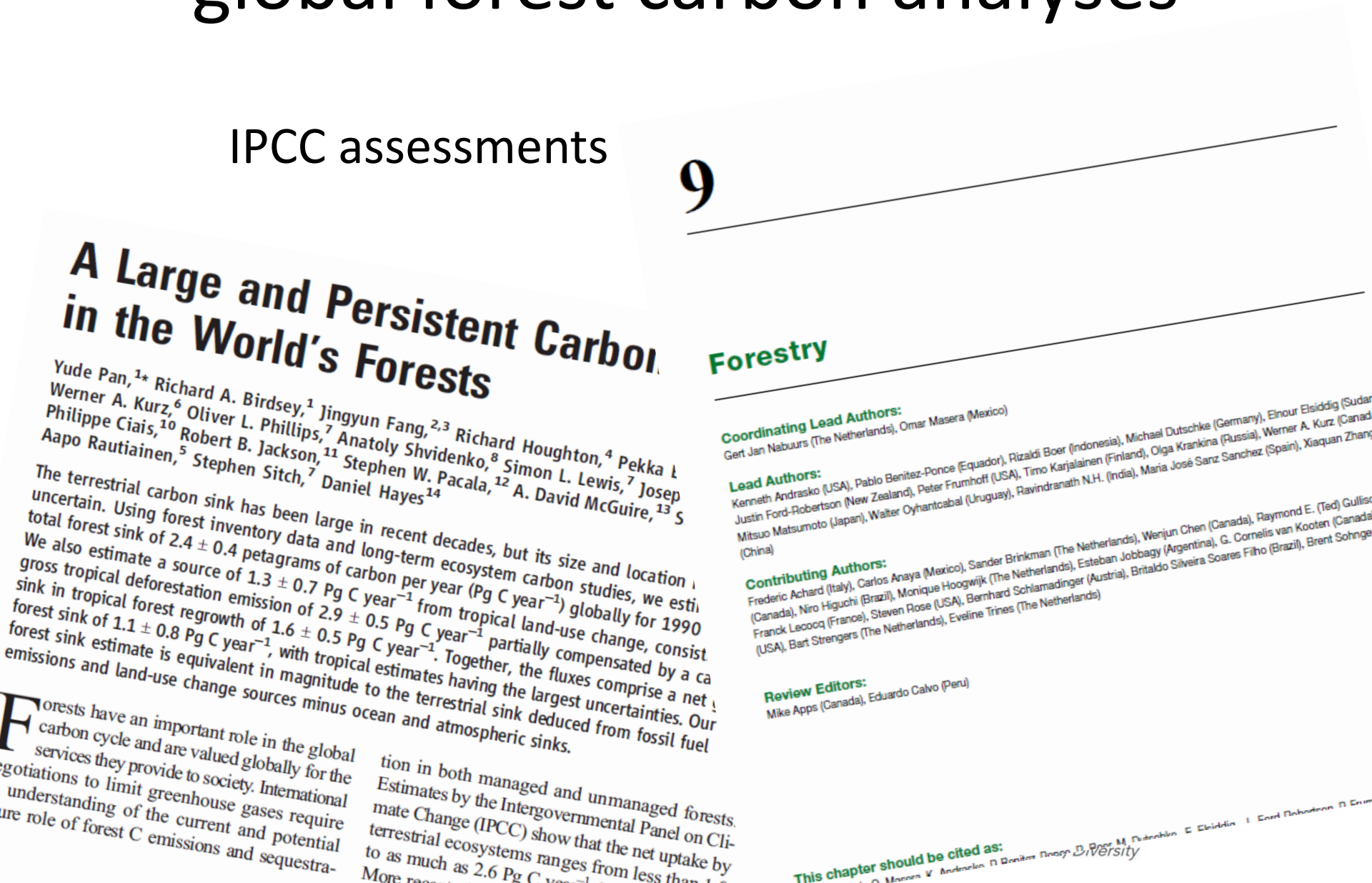
Biodiversity

Will greatly enhance our capacity to understand the role of diversity for e.g. resilience of the system, or productivity, or e.g. its role in connection to soil fungi, or effectiveness of reserves.

connecting to other more local data sets will be crucial

global forest carbon analyses

IPCC assessments



A Large and Persistent Carbon in the World's Forests

Yude Pan,[1*] Richard A. Birdsey,[1] Jingyun Fang,[2,3] Richard Houghton,[4] Pekka E
Werner A. Kurz,[6] Oliver L. Phillips,[7] Anatoly Shvidenko,[8] Simon L. Lewis,[7] Josep
Philippe Ciais,[10] Robert B. Jackson,[11] Stephen W. Pacala,[12] A. David McGuire,[13] S
Aapo Rautiainen,[5] Stephen Sitch,[7] Daniel Hayes[14]

The terrestrial carbon sink has been large in recent decades, but its size and location
uncertain. Using forest inventory data and long-term ecosystem carbon studies, we esti
total forest sink of 2.4 ± 0.4 petagrams of carbon per year (Pg C year^{-1}) globally for 1990
We also estimate a source of 1.3 ± 0.7 Pg C year^{-1} from tropical land-use change, consist
gross tropical deforestation emission of 2.9 ± 0.5 Pg C year^{-1} partially compensated by a ca
sink in tropical forest regrowth of 1.6 ± 0.5 Pg C year^{-1}. Together, the fluxes comprise a net
forest sink of 1.1 ± 0.8 Pg C year^{-1}, with tropical estimates having the largest uncertainties. Our
forest sink estimate is equivalent in magnitude to the terrestrial sink deduced from fossil fuel
emissions and land-use change sources minus ocean and atmospheric sinks.

Forests have an important role in the global carbon cycle and are valued globally for the services they provide to society. International egotiations to limit greenhouse gases require understanding of the current and potential ure role of forest C emissions and sequestration in both managed and unmanaged forests. Estimates by the Intergovernmental Panel on Climate Change (IPCC) show that the net uptake by terrestrial ecosystems ranges from less than
to as much as 2.6 Pg C
More rec

9

Forestry

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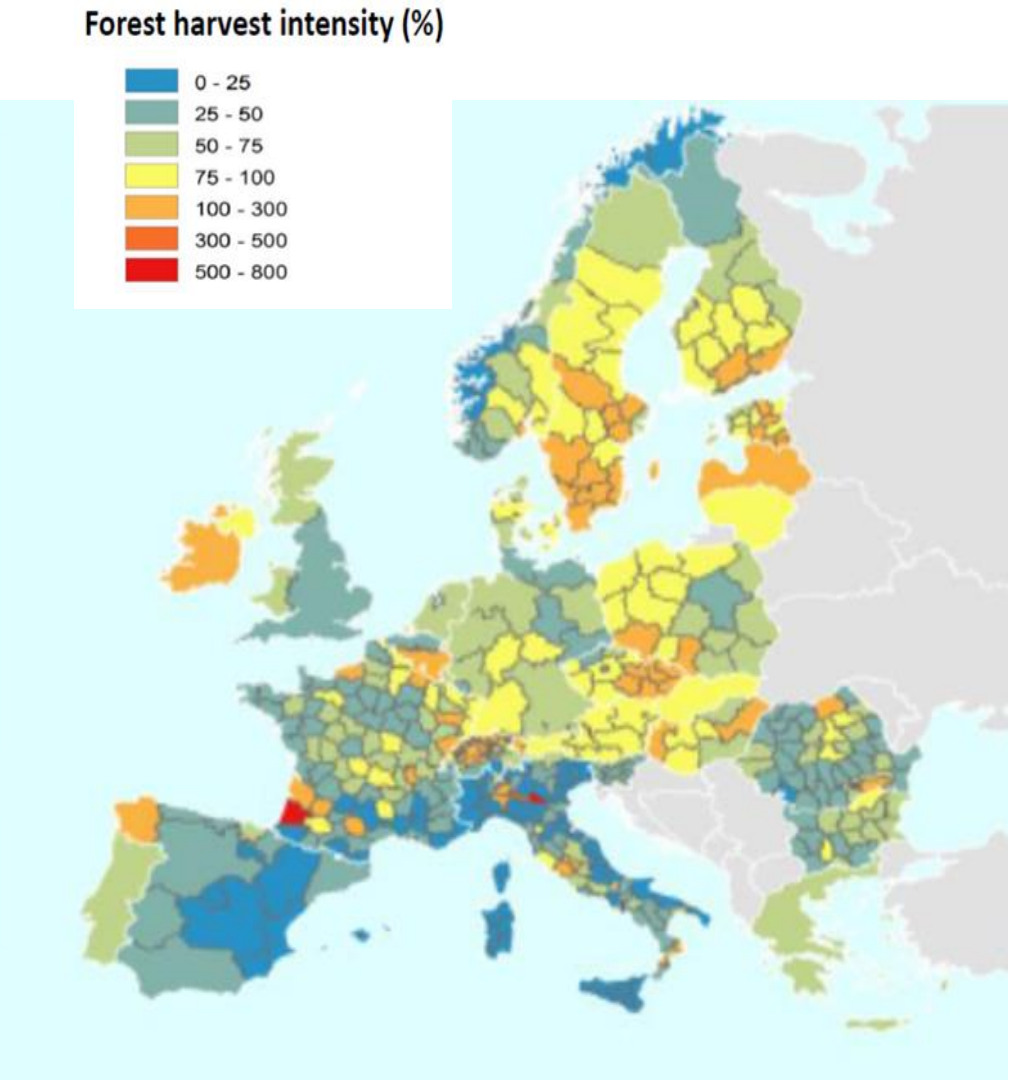
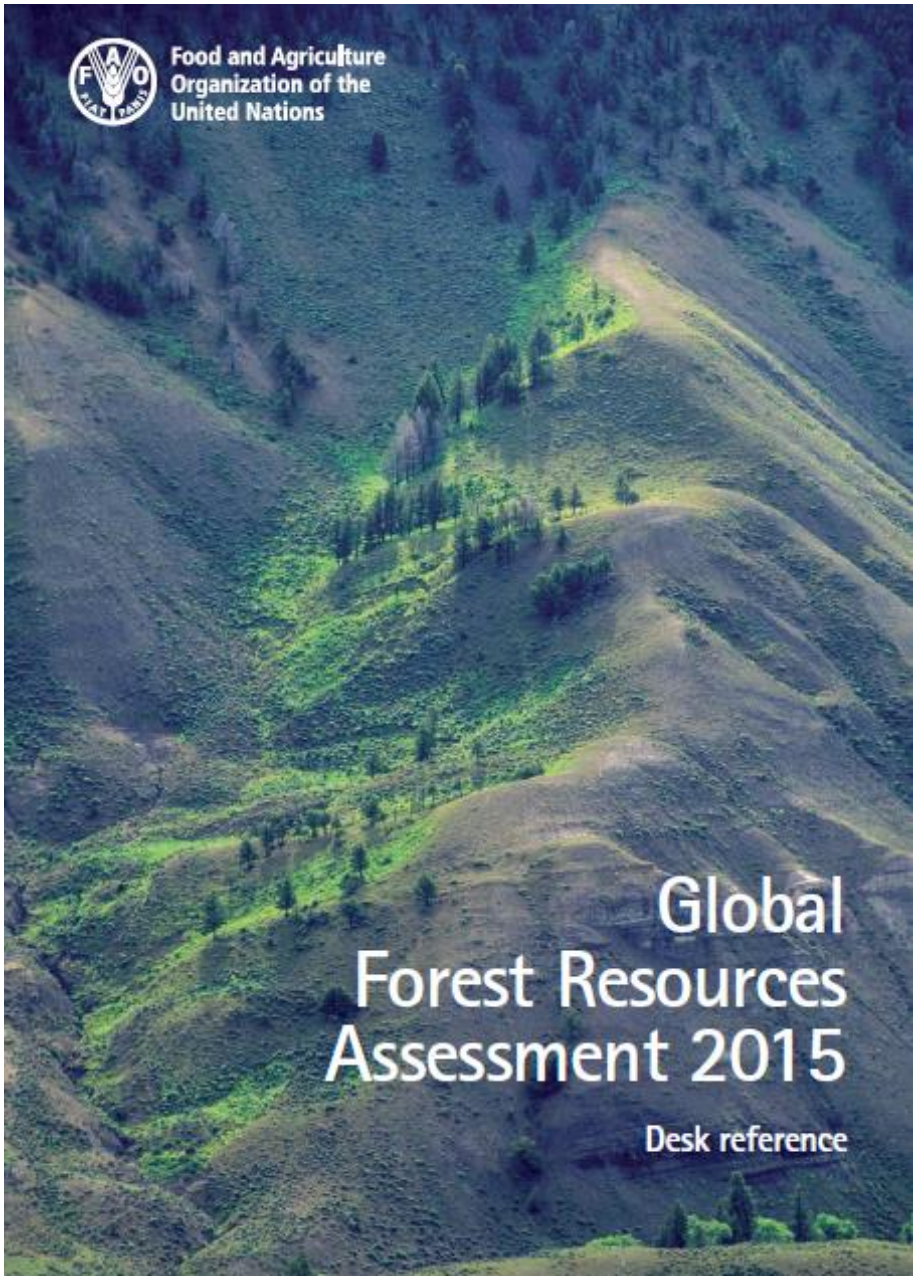
This chapter should be cited as:

Examples where we are now: even in Europe often only regional assessments



EFISCEN: Harvesting intensity as % of increment *(Levers et al. 2014)*



GFBI can greatly improve global forest resource assessments

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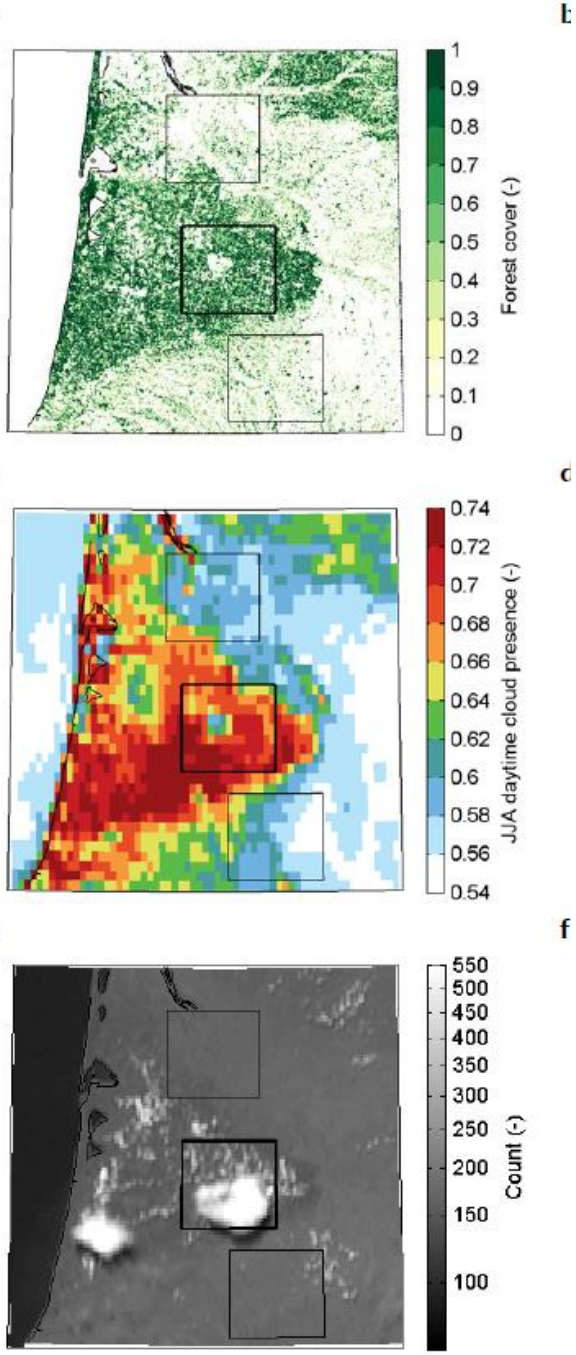
GFBI not only in relation to timber

it can serve in REDD+

and non-timber forest products & ecosystem services

Cloud formation over forests

(Teuling et al. 2016)

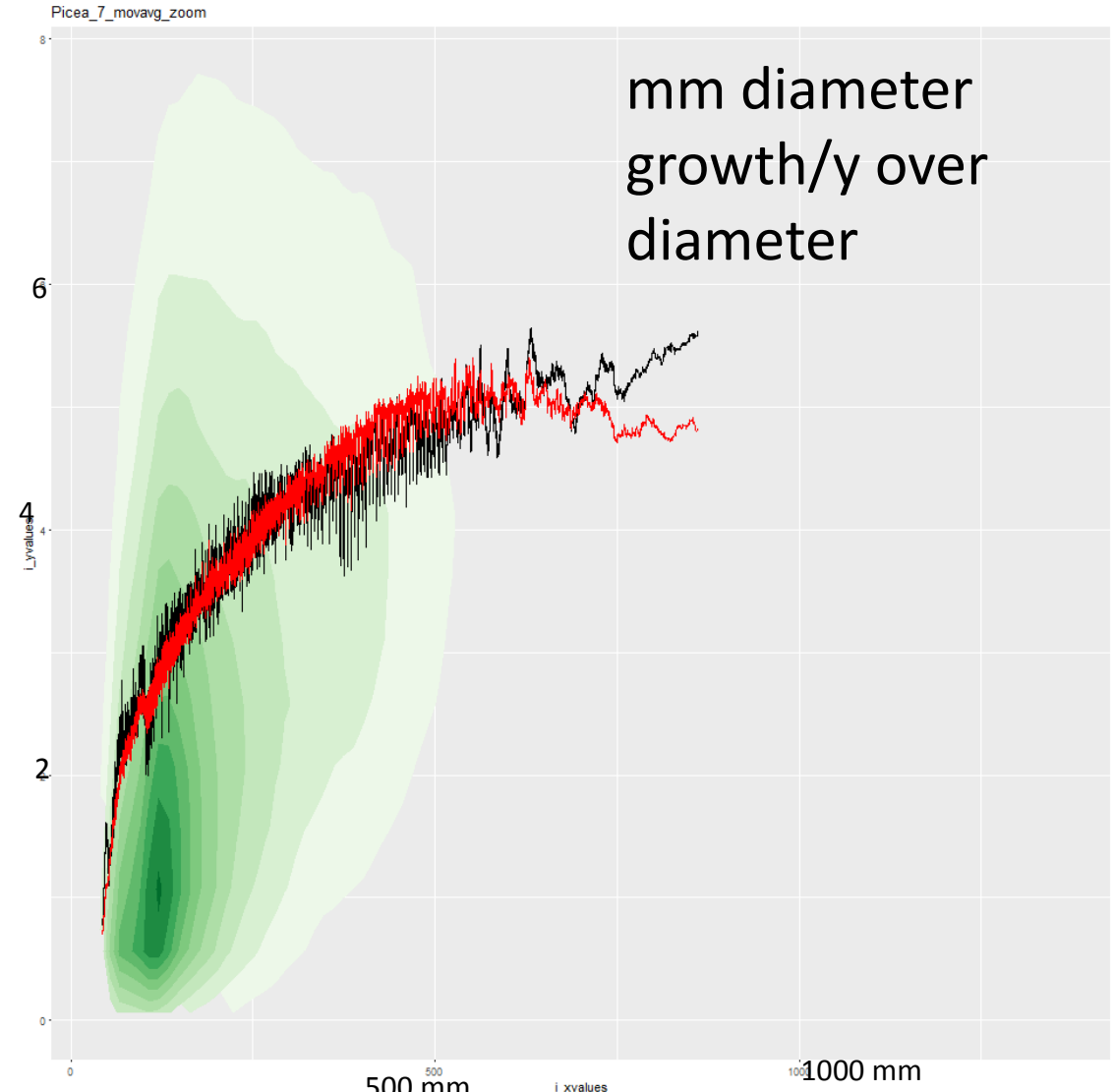


And resource outlooks

A much better coupling of forest sector models to resource models is now possible.

FAO, UNECE and
also US-RPA outlooks
hampered by
limited knowledge
of the forest resources

More generic and wider applicable growth functions can be fitted now.

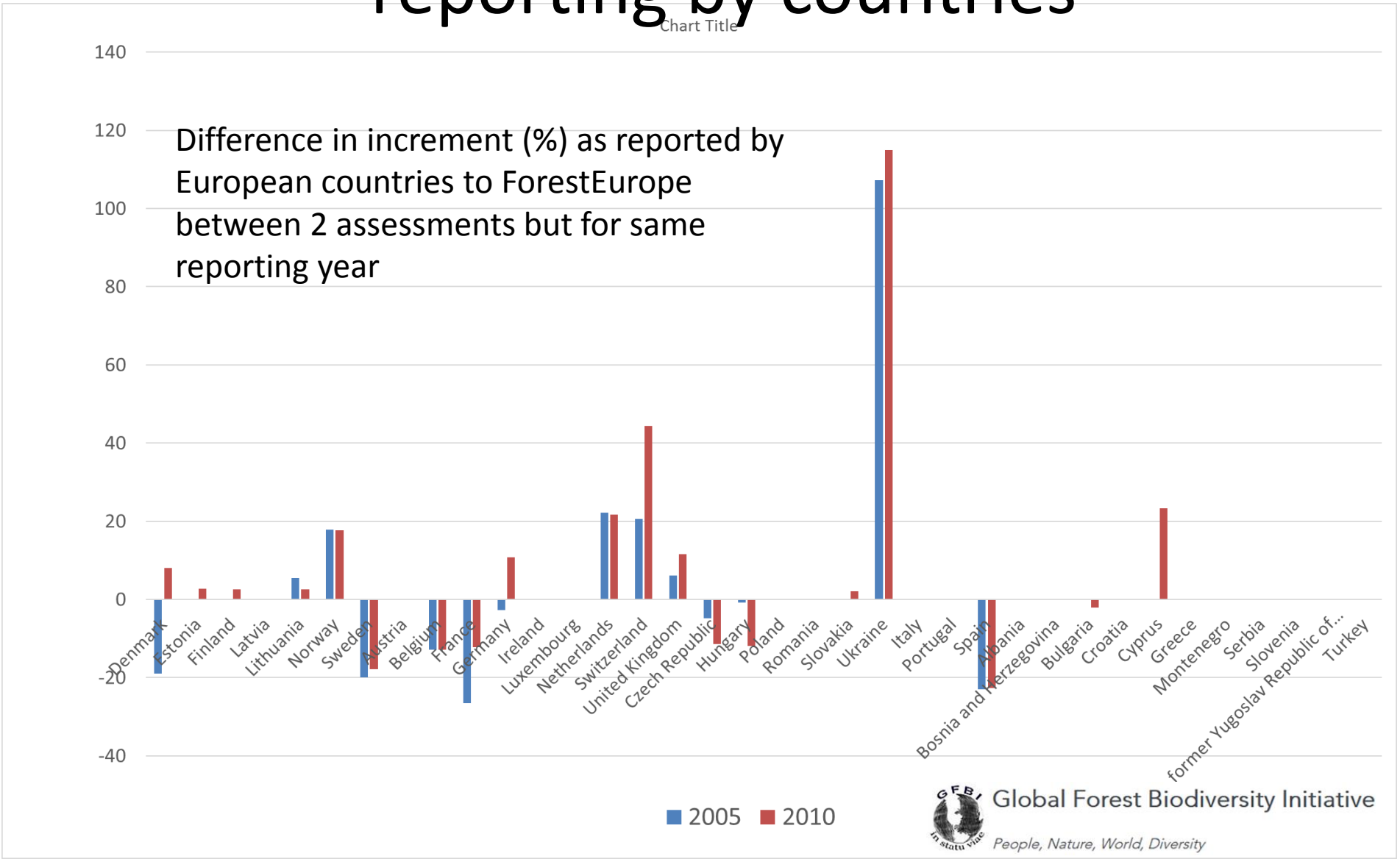


e.g. Picea abies

Schelhaas, Hengeveld, Nabuurs et al. for Europe based on 192,000 NFI plots. (gathered before GFBI) Subm to FECS

SIMWOOD
Sustainable Innovative Mobilisation of Wood

At present still large uncertainty in reporting by countries



Much better ground truthing of remotely sensed data

GLOBAL BIOGEOCHEMICAL CYCLES, VOL. 21, GB1012, doi:10.1029/2006GB002760, 2007

Effects of soil freezing and thawing on vegetation carbon density in Siberia: A modeling analysis with the Lund-Potsdam-Jena Dynamic Global Vegetati Model (LPJ-DGVM)

. Beer,[1,2] W. Lucht,[3] D. Gerten,[3] K. Thonicke

eived 18 May 2006; revised 8 November 2006;

The current latitudinal gradient in nass in high latitudes. Understanding eir relative importance, is required t

e.g. study like below was based on MODIS, Fluxnet and Terrestrial global vegetation models

doi:10.1038/nature

LETTER

Global patterns of drought recovery

Christopher R. Schwalm[1,2], William R. L. Anderegg[3], Anna M. Michalak[4], Joshua B. Fisher[5], Franco Biondi[6], George Koch
Marcy Litvak[7], Kiona Ogle[8], John D. Shaw[9], Adam Wolf[10], Deborah N. Huntzinger[11], Kevin Schaefer[12], Robert Cook[13],
Yaxing Wei[13], Yuanyuan Fang[4], Daniel Hayes[14], Maoyi Huang[15], Atul Jain[16] & Hanqin Tian[17]

Drought, a recurring phenomenon with major impacts on both human and natural systems[1–3], is the most widespread climatic extreme that negatively affects the land carbon sink[2,4]. Although twentieth-century trends in drought regimes are ambiguous[5–7], regions more frequent and severe droughts are century[3,7–9]. Recovery time—how long ht functional state—

Precipitation–Evapotranspiration Index (SPEI)[24], in
negative values indicate more severe drought relative to a
term conditions. SPEI can be based on a range of integ
(for example, 24-month SPEI integrates water status ove
24 months; see Methods), so we evaluate recovery time a
both integration time (1-, 6-, 12-, and 24-month SPEI) ar
This allows multiple lines of evidence to be comprehen
while providing an extensive sample of about 4.5 milli

Unprecedented possibilities, but ..

GFBI's success depends on Good Governance

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This is what we want to discuss with you this week

- Ownership and use
- Access to data
- Role of data suppliers: members
- Steering committee & Board

- Dealing with requests for data and studies
- Data centres: Lleida, Beijing, ETH

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There are no dragons, only opportunities

Acknowledgement :
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Journal Forest Ecosystems