



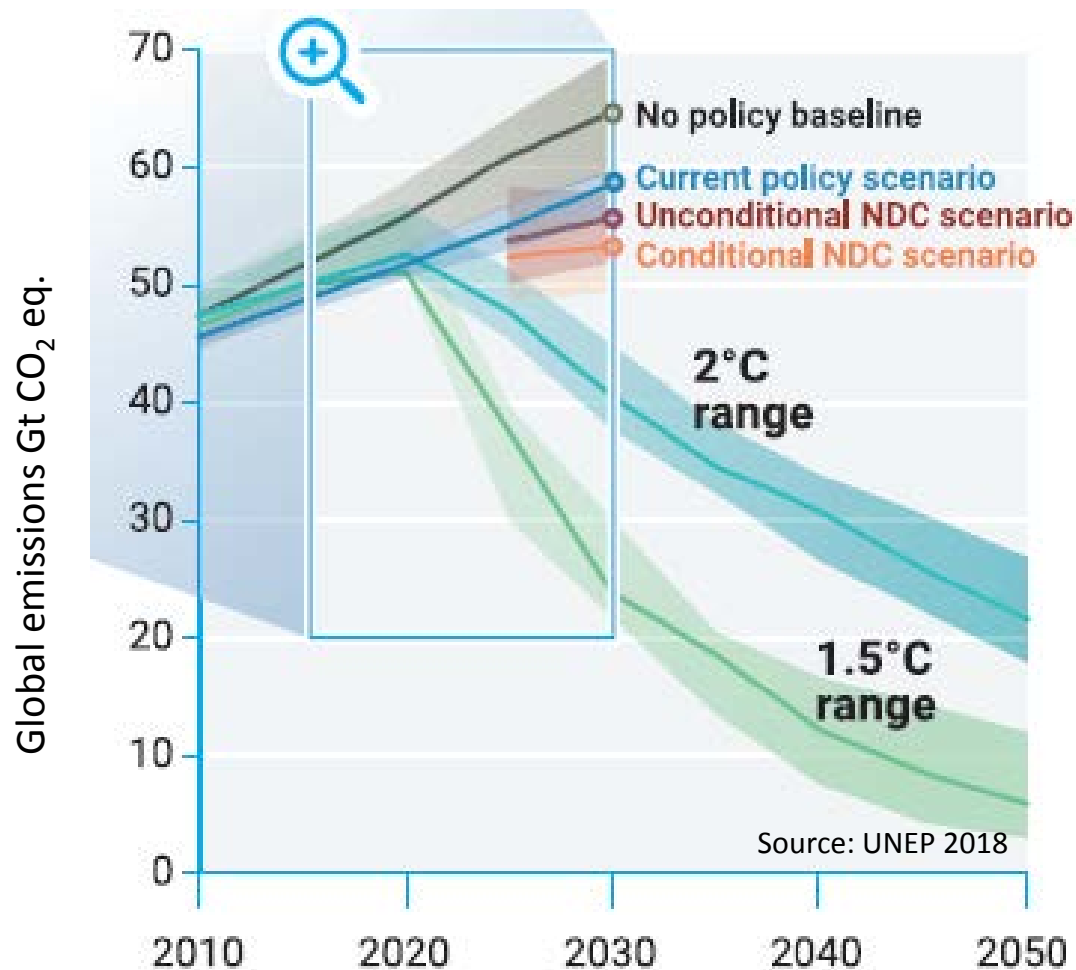
EUROPEAN FOREST
INSTITUTE

European forest under climate change and Climate-Smart Forestry

Hans Verkerk

YLP Eurasia, 11 March 2019, Joensuu, Finland

Global greenhouse gas emission trajectories



- Emission gap: difference between “*where we are likely to be*” and “*where we need to be*”
- Current policies and plans are inadequate to bridge the emission gap
- Urgent action needed to reduce CO₂ emissions (and increase removals)
- Even if 1.5 or 2°C targets are met, there will still be impacts on forests and other ecosystems

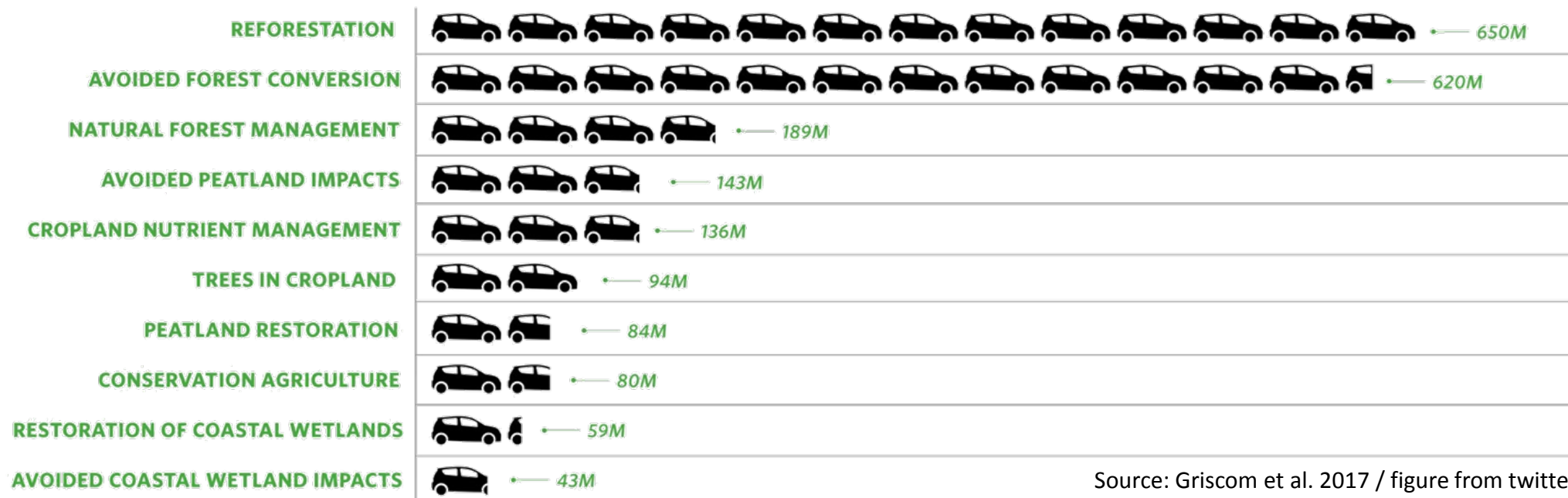
Natural climate solutions



NATURAL CLIMATE SOLUTIONS

TOP 10 MITIGATION PATHWAYS¹ WITH CO-BENEFITS

Natural Climate Solutions have the same impact on emissions as taking millions of cars off the road



Source: Griscom et al. 2017 / figure from twitter

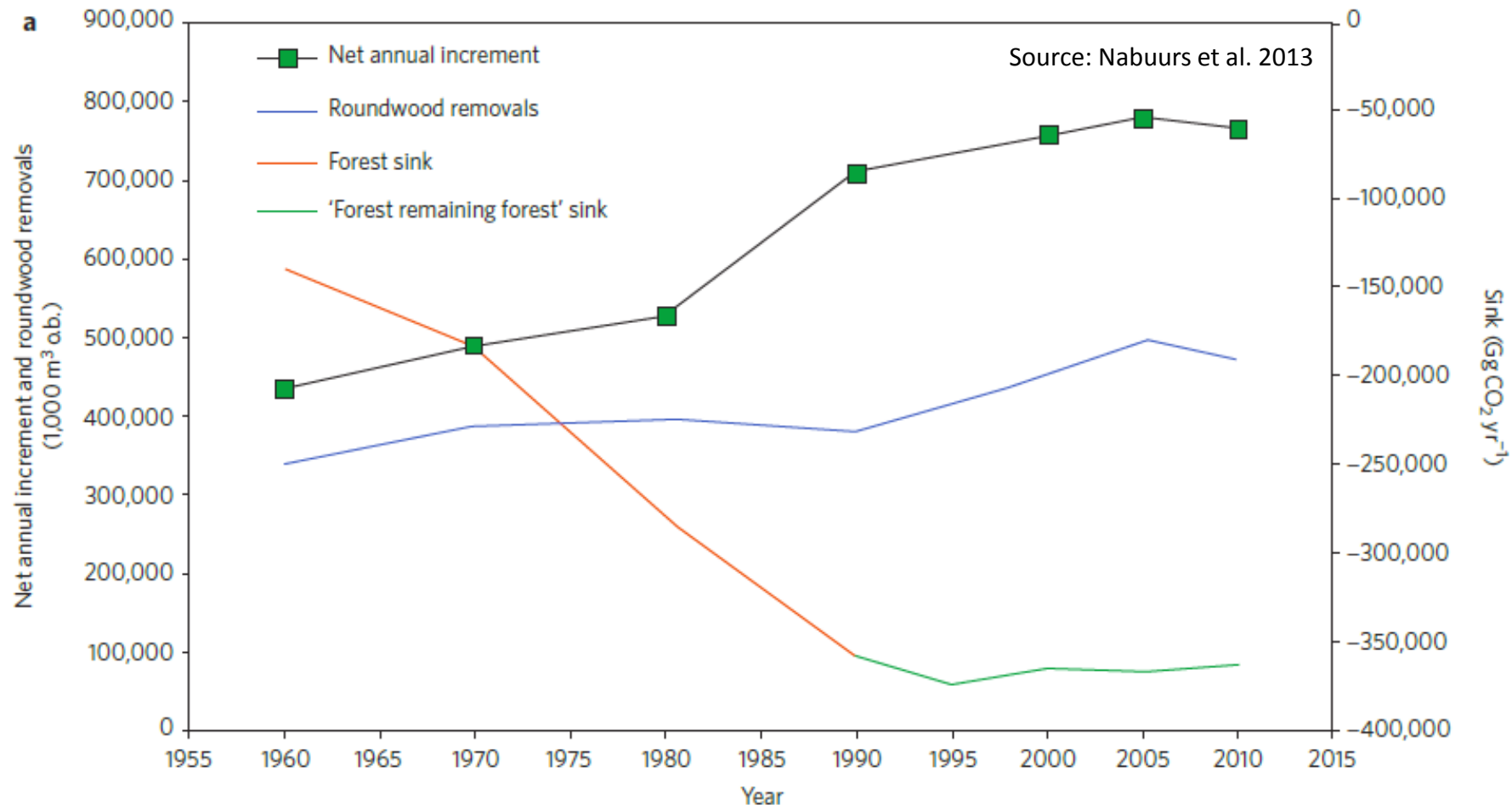
Global Mitigation Potential: Approximate Number of Cars Removed Each Year in Millions

= 50M cars

¹Cost-Effective

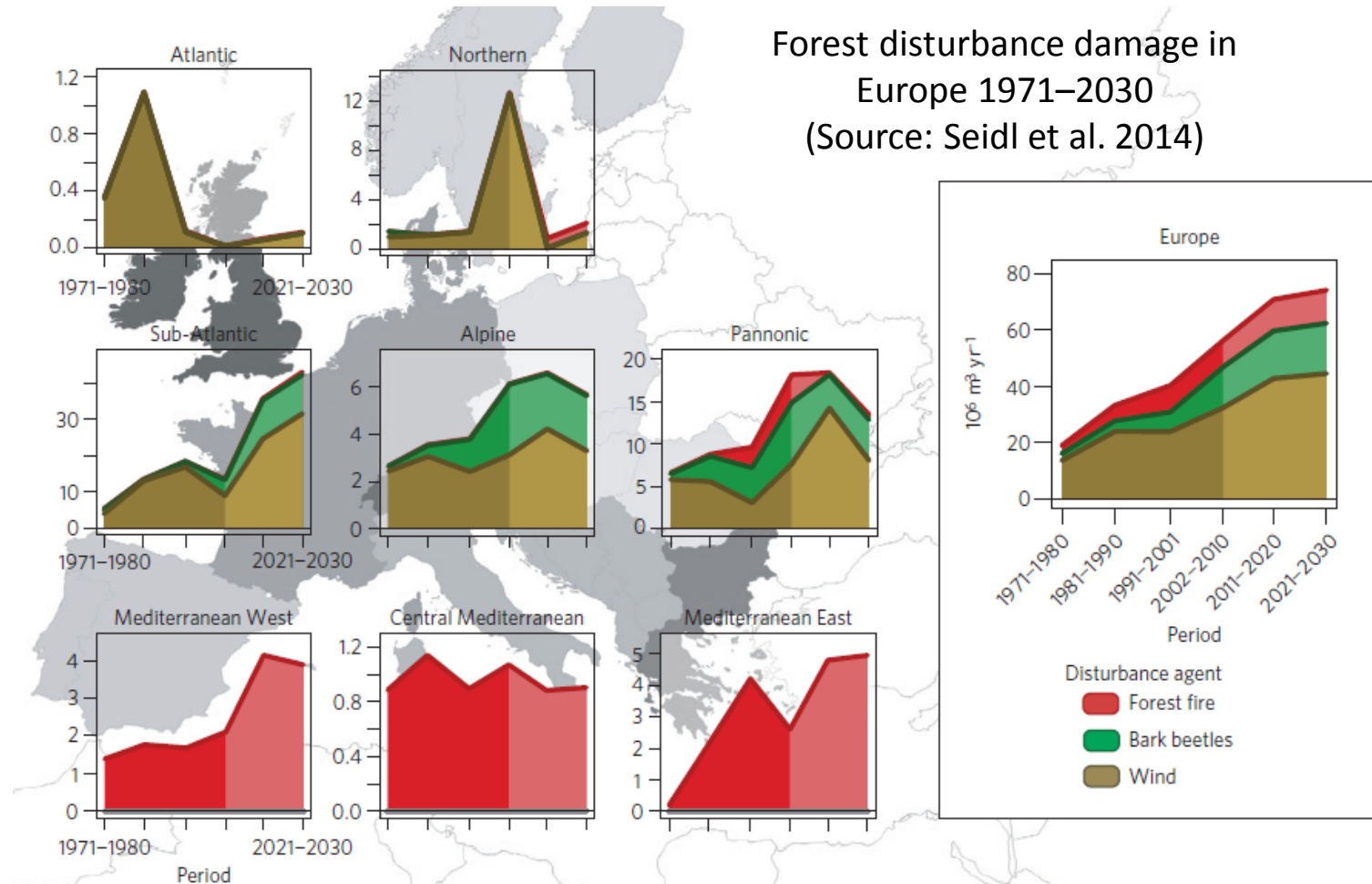
Natural climate solutions, but....

- A biological sink will eventually saturate



Natural climate solutions, but....

- Storing carbon in the forest is not free of risk

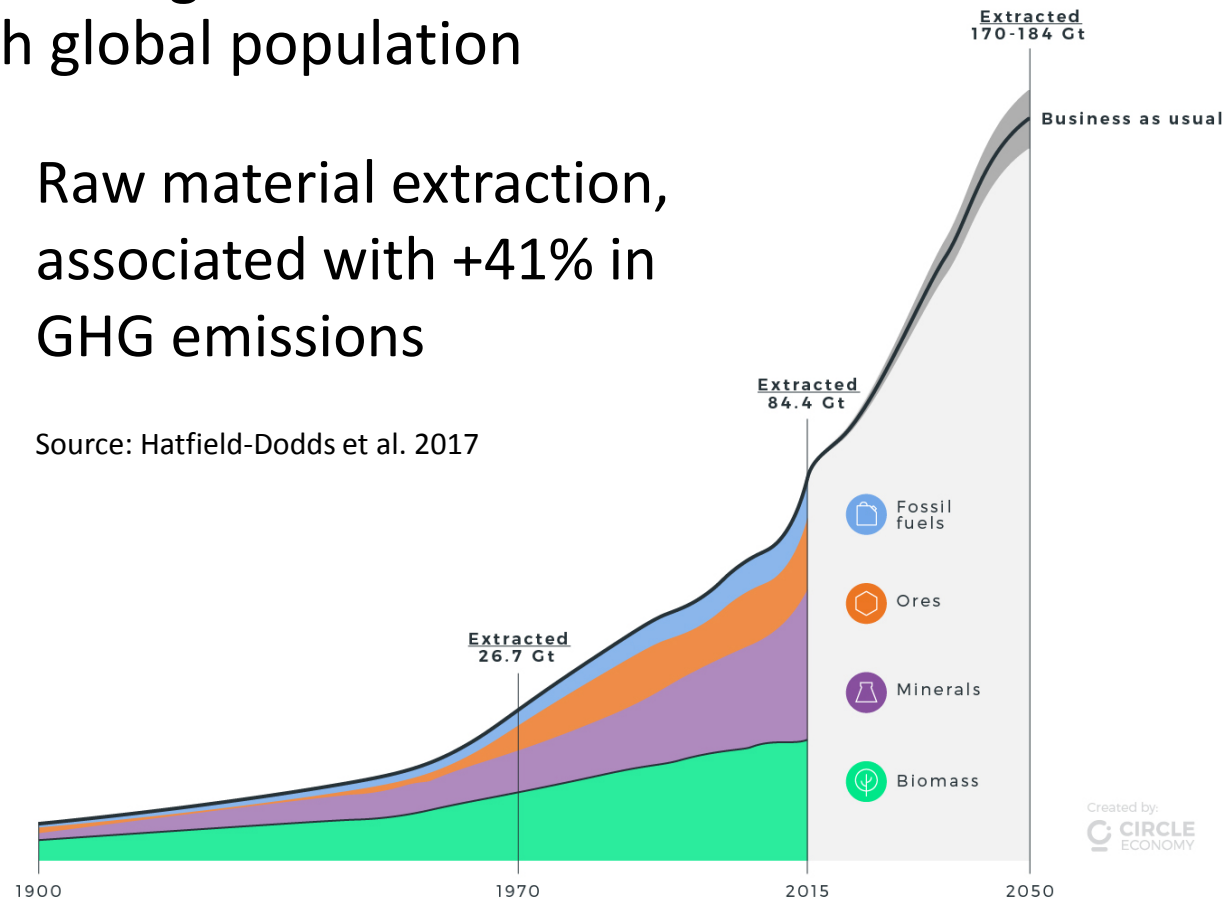


Natural climate solutions, but....

- There will be an increasing demand for materials to meet the demands by a growing and increasingly rich global population

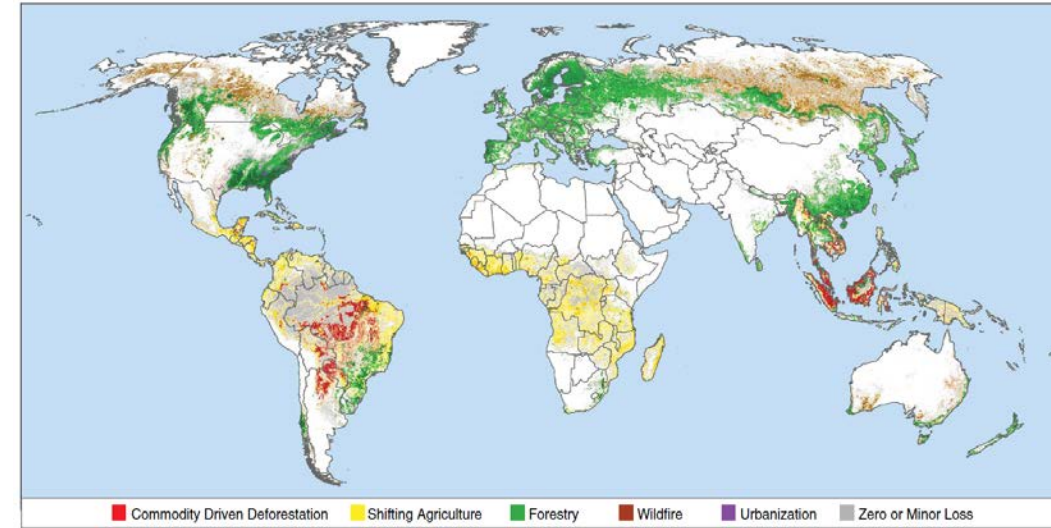
Raw material extraction,
associated with +41% in
GHG emissions

Source: Hatfield-Dodds et al. 2017



Climate-Smart Forestry

- Smart approaches are needed that are spatially diversified and combine mitigation and adaptation;
- CSF builds on the concepts of sustainable forest management, but has a clear climate focus
- Key messages:
 1. Enhance carbon storage in forest ecosystems;
 2. Combine mitigation and adaptation measures in the management of forests;
 3. Use wood sustainably and substitute non-renewable carbon-intensive materials.



Drivers of forest cover loss (source: Curtis et al. 2018)

Increasing carbon storage in forest ecosystems

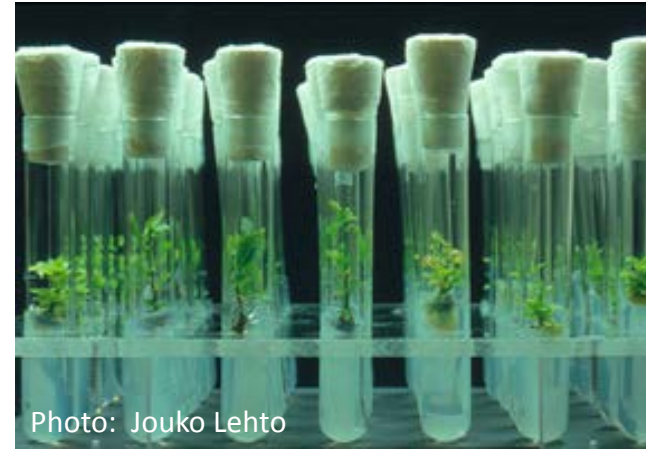
- "No brainers"
 - Increase global afforestation
 - Decrease global deforestation
- Improved management practices
 - Tree species and provenance selection, tending, thinning,....
 - Improved spatial planning of practices
 - Reduce / mitigate effects of disturbances
 - Some measures may take long to have effect, but should not be ignored!

Combine mitigation and adaptation measures

- Examples of CSF management options (Nabuurs et al. 2013; Astrup et al. 2018):



- Conserve high carbon stocks in old forests that are not at a high risk of disturbance;
- Conserve high carbon stocks on sensitive sites, high soil carbon sites and steep slopes



- Optimize silvicultural techniques (breeding material, planting, tending and harvesting) to arrive at a carbon-efficient management scheme in forests that are grown primarily for timber

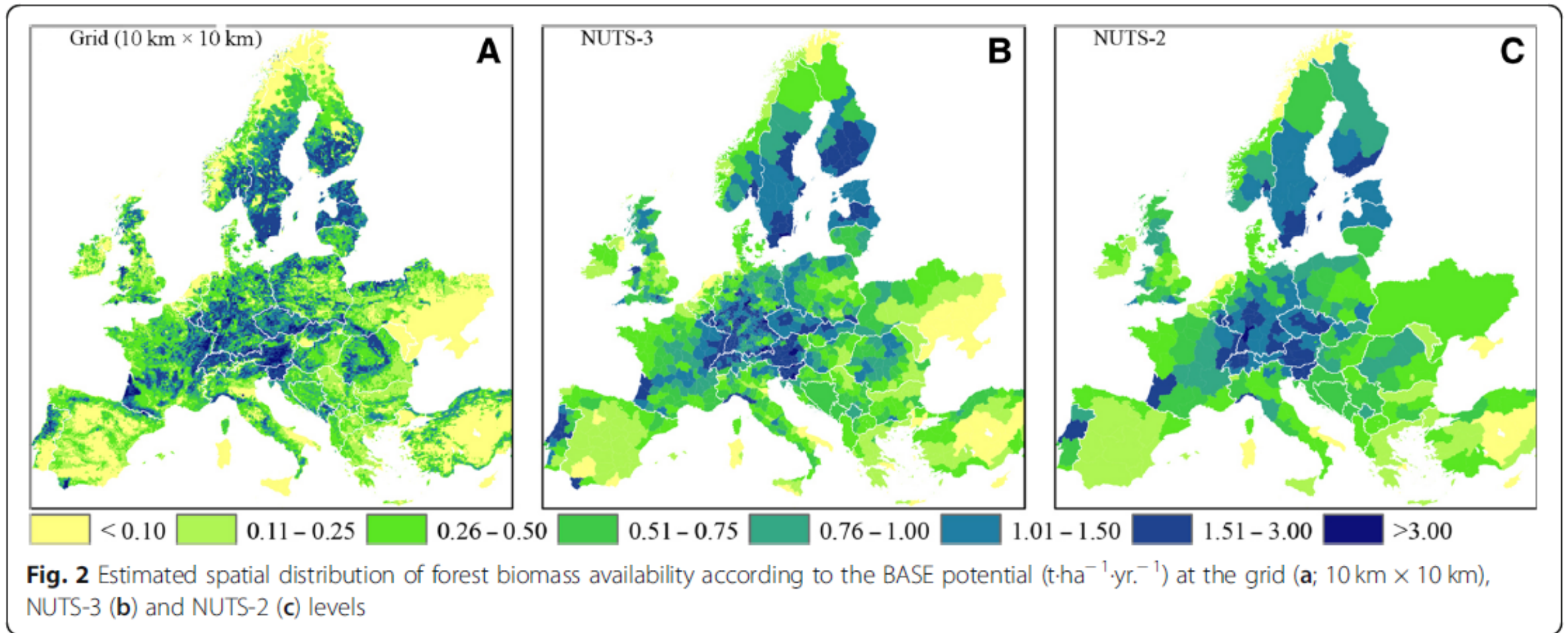


- Activate and improve the management and protection of fire-prone forests to safeguard their carbon stocks;



- Actively manage (mature) forests that are at high risk of disturbance;
- Increase share of broadleaves to increase resilience to disturbances

Sustainable use and substitution



Spatial distribution of the potential forest biomass availability in Europe
(source: Verkerk et al. 2019)

Sustainable use and substitution

- If more wood used →
reduction in short to medium term forest sink
- BUT:
 - Roundwood could be used for products → carbon accounted as Harvest Wood Products
 - Roundwood could substitute steel, glass or concrete → savings in other emission sectors
 - Wood (e.g. residues, waste) could substitute fossil fuels → savings in other emission sectors
- Often (mis)used substitution value: 2.1 kg C per kg C (Sathre and o'Connor 2010)

Substitution effects of
wood-based products in
climate change mitigation

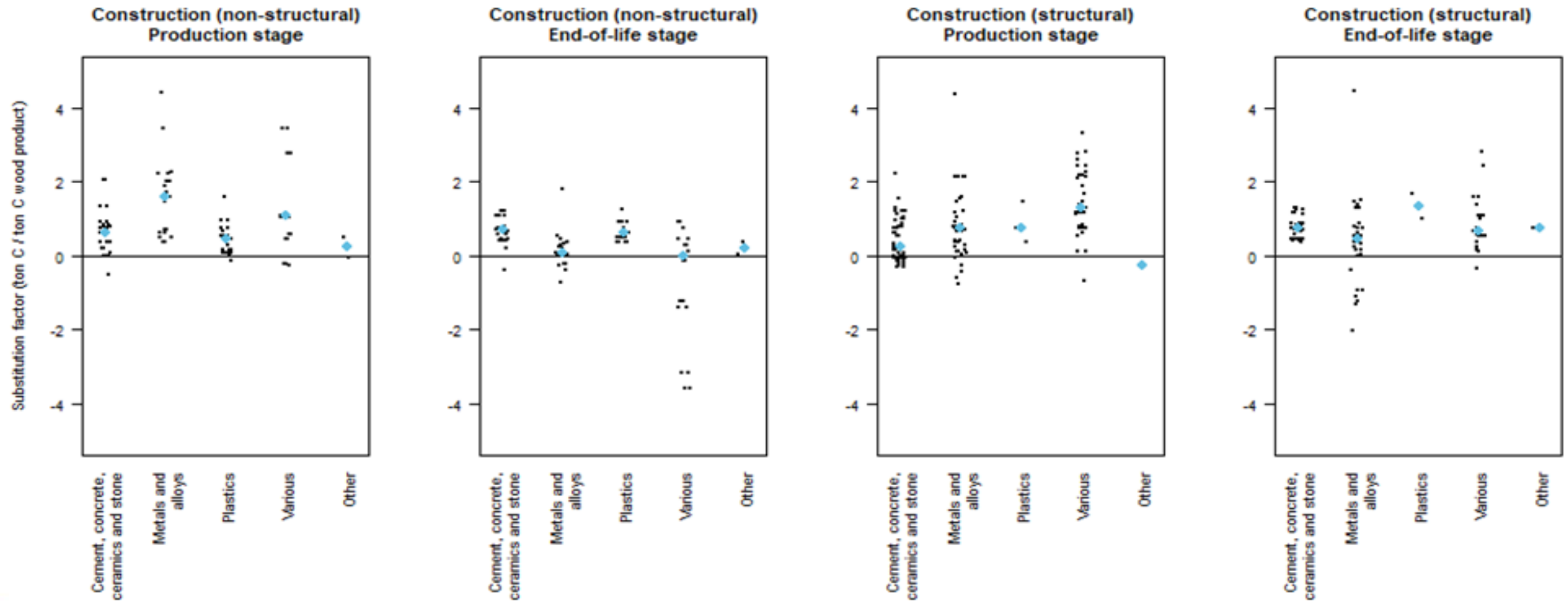


Pekka Leskinen, Giuseppe Cardellini, Sara González-García, Elias Hurmekoski,
Roger Sathre, Jyri Seppälä, Carolyn Smyth, Tobias Stern and Pieter Johannes Verkerk



Sustainable use and substitution

- New evidence from a meta-review the literature (Leskinen et al. / Verkerk et al.) :
 - Average substitution around 1.2 kgC / kgC (or 2.2 kg CO₂ / kg product)



Sustainable use and substitution

- Development of new products to substitute fossil-intensive materials and reduce emissions
- Development of a sustainable bioeconomy may provide new value chains and incentives (investments) to activate forest management



Concluding remarks

- Don't put all eggs in one basket;
- Forest management practices need to consider both mitigation and adaptation;
- Optimal strategies need to consider carbon balances of forest ecosystems, wood products and substitution effects, in the long-term;
- Better understanding needed of substitution effects, especially of newly emerging wood-based products;
- Better understanding needed on all effects on climate, not just carbon or CO₂

Concluding remarks



Donald J. Trump  @realDonaldTrump · 4h



With proper Forest Management, we can stop the devastation constantly going on in California. Get Smart!



14K



8.2K



37K



EUROPEAN FOREST
INSTITUTE

Thank you!

hans.verkerk@efi.int