REFORESTATION IS THE LARGEST OPPORTUNITY

Climate mitigation potential in 2030 (PgCO₂e yr⁻¹)

Griscom et al. 2017 PNAS
REFORESTATION IS THE LARGEST OPPORTUNITY

Climate mitigation potential in 2030 (PgCO₂e yr⁻¹)

2.7 PgCO₂/yr   17.9 PgCO₂/yr
Confidence range is 50% greater than estimate

Griscom et al. 2017 PNAS
MITIGATION DEPENDS ON LOCATION
Natural forest regrowth
Assisted regeneration
Active restoration

Intensive tree monocrops
Multistrata systems
Tree intercropping
Silvopasture

MITIGATION DEPENDS ON APPROACH

Monoculture plantations
Mixed species plantations
Transitional land use
FIND THE RELEVANT RATE LITERATURE
FIND THE RELEVANT LITERATURE
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- Active planting (assisted natural regeneration & large-scale planting)
  Crowther lab, ETH Zurich
- Diverse plantations
  Jacob Bukoski & Cyril Melikov, UC Berkley
- Monoculture plantations
- Various agroforestry practices
- Natural forest regrowth
  Cook-Patton et al. 2020 Nature
- Diverse plantations
  Emily Warner, Oxford

Next up!
NATURAL FOREST REGROWTH =

the recovery of forest cover on cleared lands through spontaneous regrowth after cessation of prior disturbance or land use
MAPPING CARBON ACCUMULATION POTENTIAL FROM GLOBAL NATURAL FOREST REGROWTH


20 institutions  TNC, Smithsonian, World Resources Institute, SUNY, University of Connecticut, University of the Sunshine Coast, ETH Zurich, James Madison University, UC Santa Cruz, Woods Hole Research Center, University of Oxford, University of Exeter, Aberystwyth University, InNovaSilva ApS, Université du Québec, CSIRO, NASA, University of Edinburgh, Yale, Conservation International
ABOVEGROUND FIELD DATA + 66 COVARIATES

climate • soil nutrient/chemical/physical • radiation • topography • nitrogen deposition
SPATIALLY-EXPLICIT ESTIMATES OF CARBON ACCUMULATION POTENTIAL IN FORESTS < 30 YRS

100-x variation

Aboveground carbon sequestration rate in forest and savanna biomes

6.0 Mg C ha⁻¹ yr⁻¹

Cook-Patton et al. 2020 in press
Restoration of forest cover is a tool
- not “the” tool
- with the potential for wise use or mis-use
CHALLENGES:

- Limited or outdated data
- Future projections based on historical data
- Lack of reporting and monitoring on successes and failures
- Lack of consistent and reliable details about where restoration has occurred
Monitor progress towards large restoration goals

Adaptively learn what’s working and what’s not to scale successes
Test causes of project success or failure
Refine our estimates of potential (where & how much carbon)

Enable globally consistent and accessible monitoring
All three pillars are necessary

Each pillar enhances the others