

Section MA: Mitigation and Adaptation

Readings: Parts of Chapter 17, 18, 20

Learning outcomes

- know the definitions of mitigation and adaptation
- understand how ecosystems participate in mitigation, especially in agriculture and forestry
- describe ways humans can facilitate adaptation of plants/animals/ecosystems to future climate change

Mitigation options in agriculture

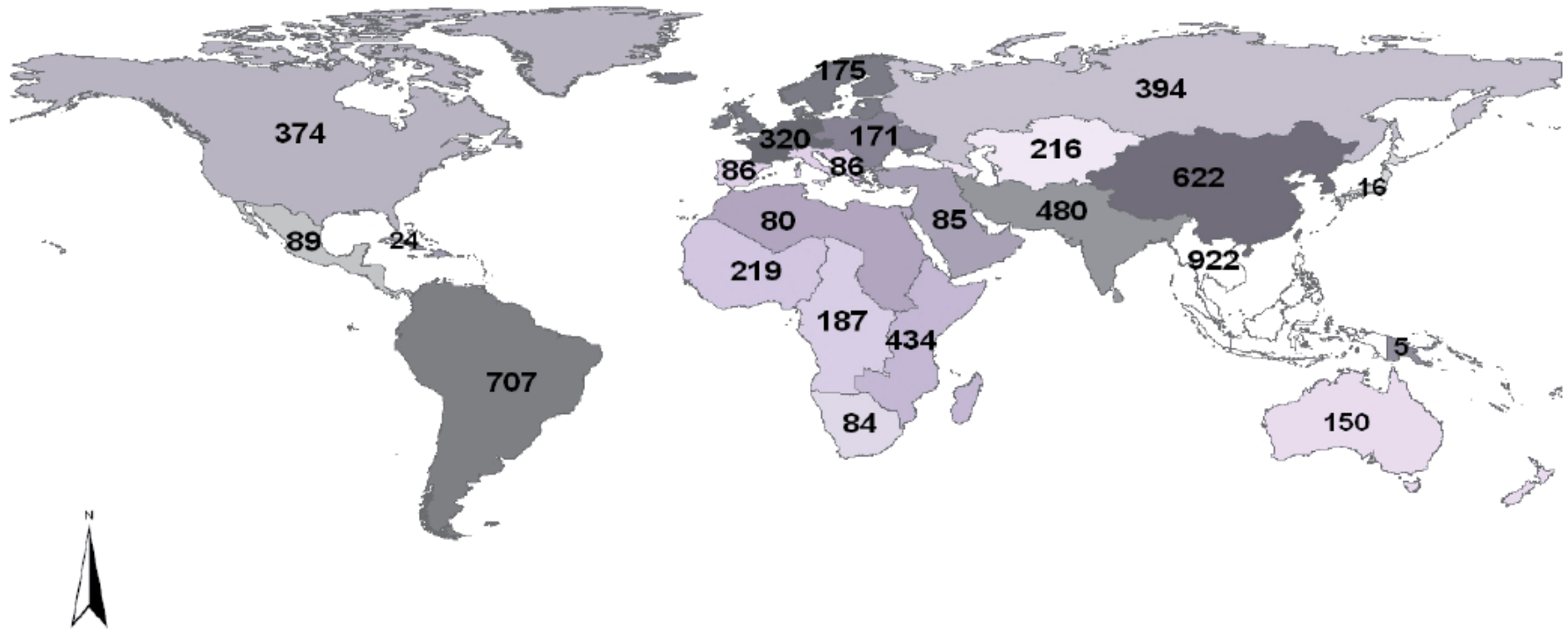


Figure 8.5: Total technical mitigation potentials (all practices, all GHGs: MtCO₂-eq/yr) for each region by 2030, showing mean estimates.

Note: based on the B2 scenario though the pattern is similar for all SRES scenarios.

Source: Drawn from data in Smith et al., 2007a.

(Current fossil fuel+cement emissions = 30,000 Mt CO₂/yr)

Mitigation options in agriculture

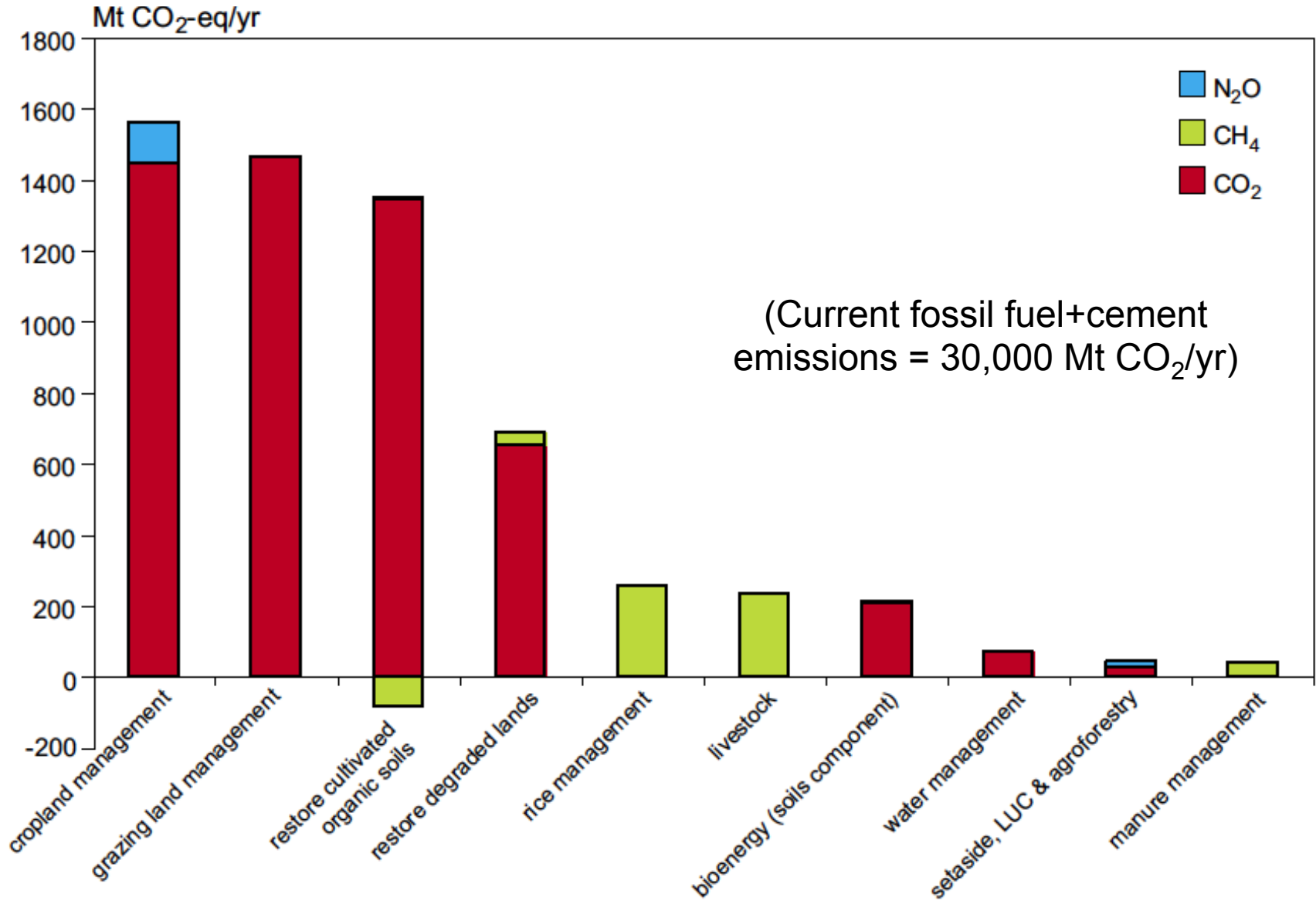


Figure 8.4: Global technical mitigation potential by 2030 of each agricultural management practice showing the impacts of each practice on each GHG. Note: based on the B2 scenario though the pattern is similar for all SRES scenarios. Source: Drawn from data in Smith et al., 2007a.

Mitigation options in forestry

Cumulative
CO₂ by
2055

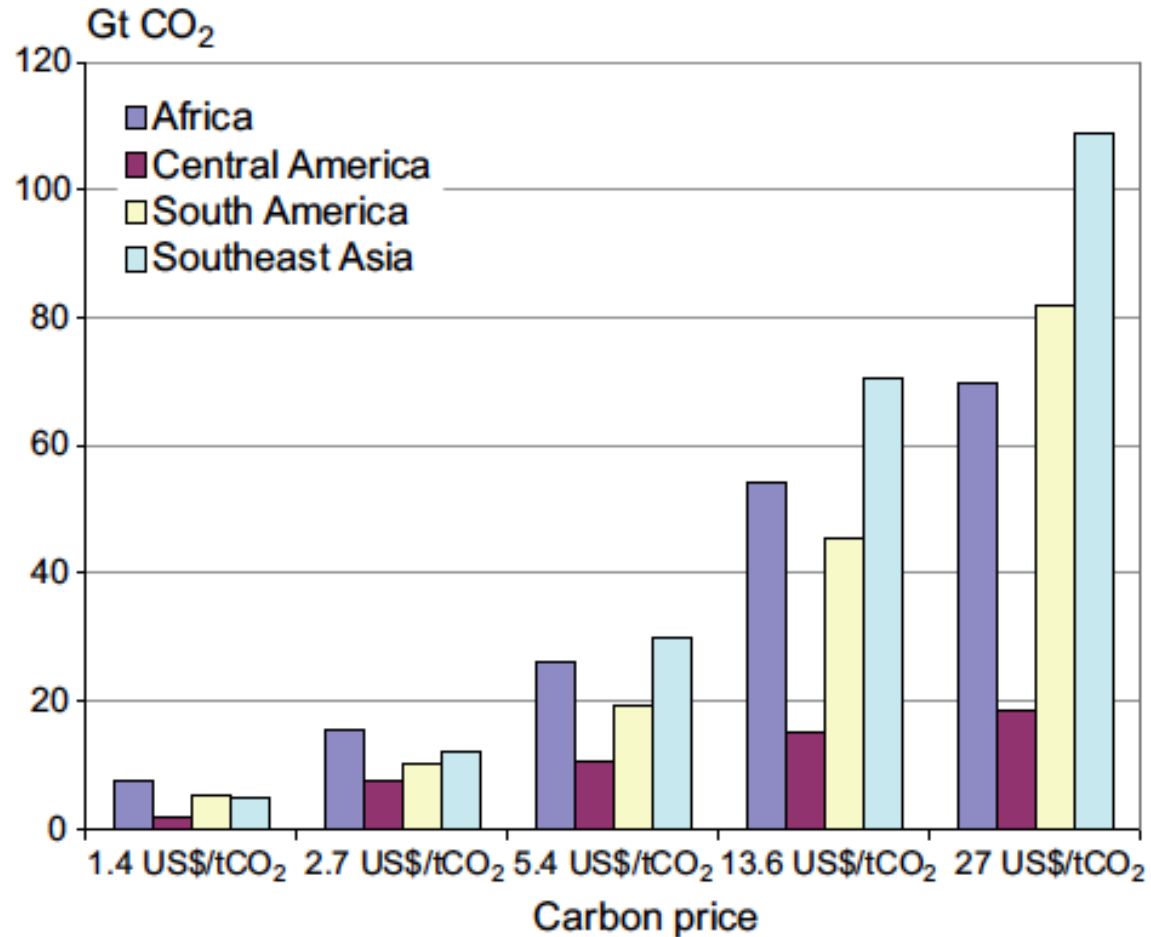
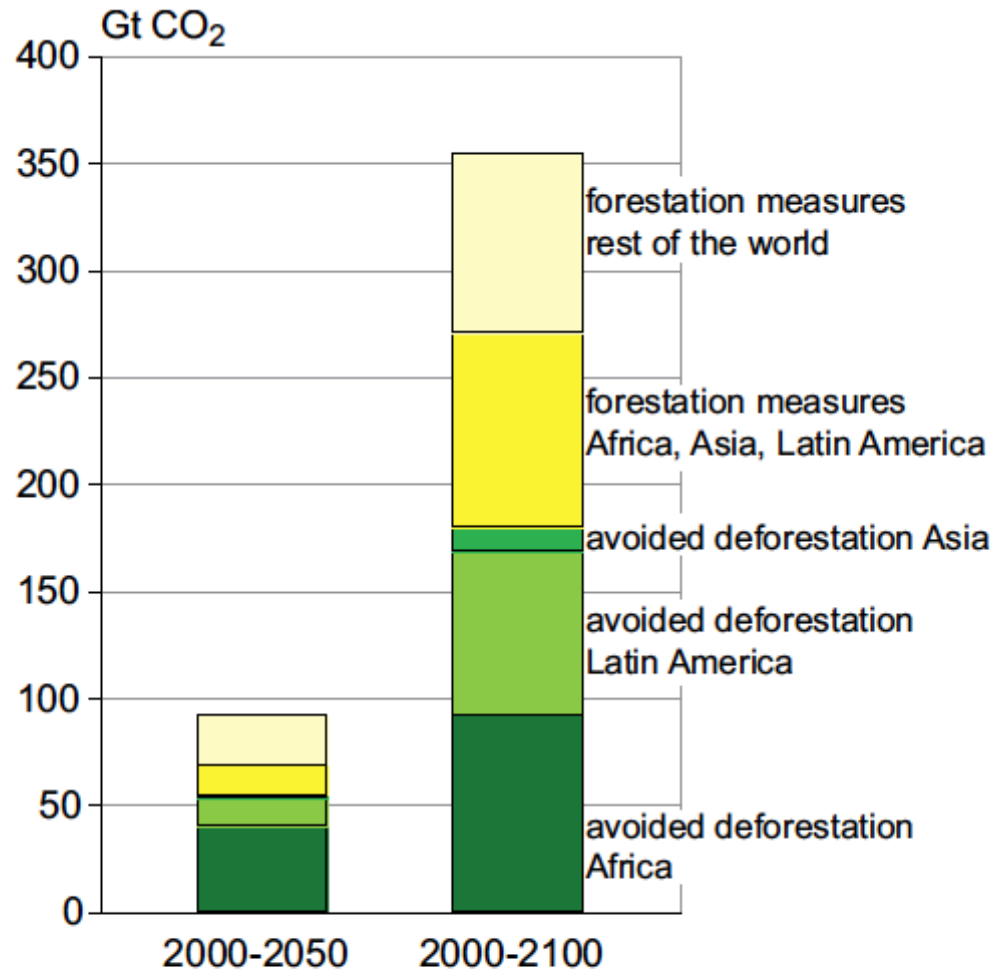


Figure 9.5: Cumulative carbon gained through avoided deforestation by 2055 over the reference case, by tropical regions under various carbon price scenarios
Source: Sohngen and Sedjo, 2006.

(Current fossil fuel+cement emissions = 30 Gt CO₂/yr)

Mitigation options in forestry

Cumulative
C by 2050
and by 2100



(Current fossil
fuel+cement
emissions = 30
Gt CO₂/yr)

Figure 9.6: Cumulative mitigation potential (2000-2050 and 2000-2100) according to mitigation options under the 2.7 US\$/tCO₂ +5%/yr annual carbon price increment

Source: Sathaye et al., 2007.

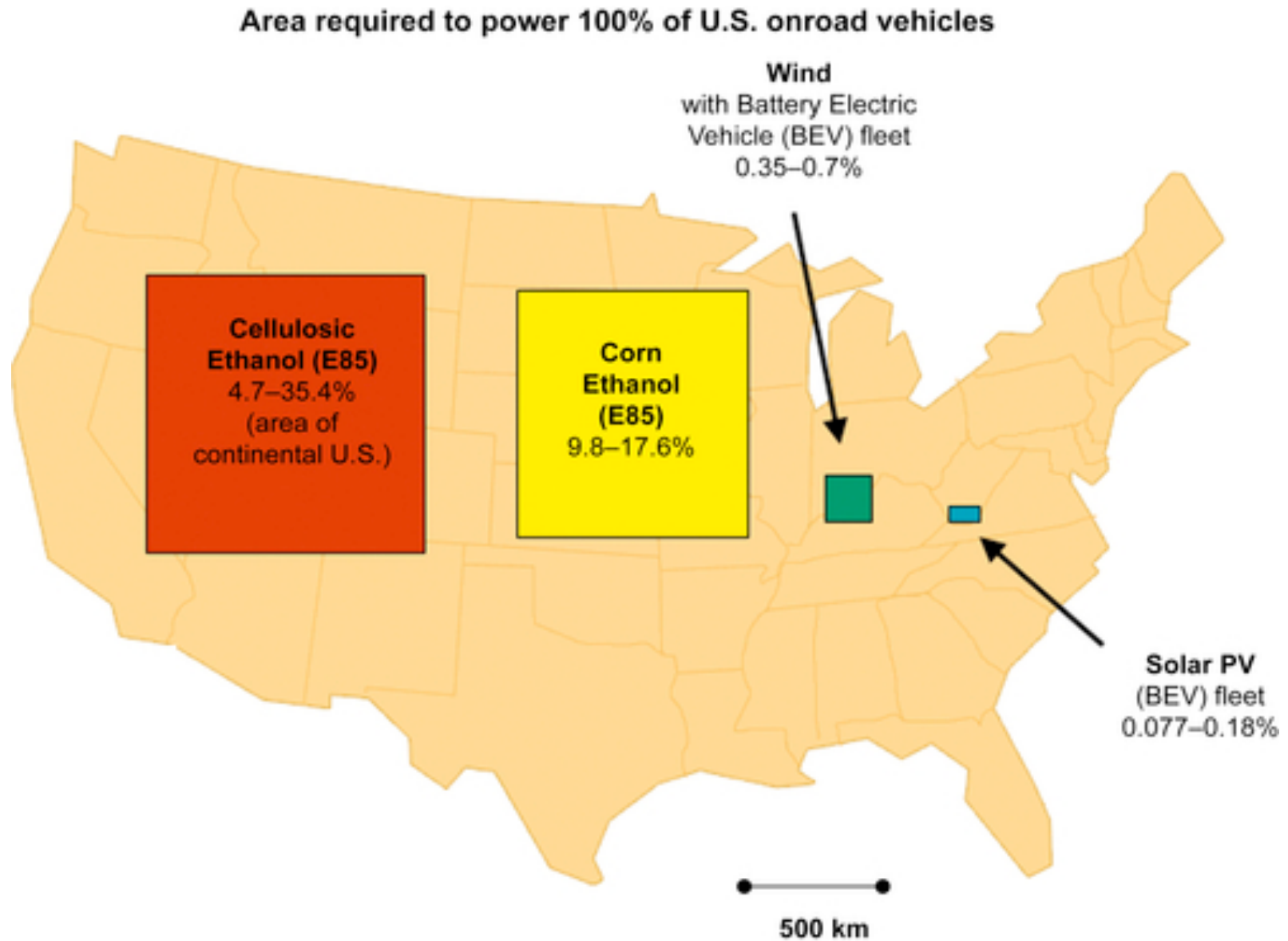
Mitigation potential of US forests

Item	Estimate (Tg C/yr)
Reference/context	
Forest growth	349
Forest sector C storage (includes harvested wood storage)	313
US CO2 emissions	1615
Fire emissions	67
Mitigation potential	
afforestation (1 Tg C/yr requires 262,000–1,133,000* ha of crop or pastureland suitable for tree growth)	1-225**
forest management (activities include longer harvest interval, increasing growth, establishing preserves)	29-105*
biomass energy	130-190

**size of 0.5xRhode Island-2xDelaware per 1 Tg C/yr

*depends on carbon price (\$18-183 per Mg C)

Mitigation options in agriculture



Adaptation in wilderness areas

34

PARK SCIENCE • VOLUME 28 • NUMBER 3 • WINTER 2011–2012

Climate change: Wilderness's greatest challenge

By Nathan L. Stephenson and Constance I. Millar

1. restraint (do nothing)
2. resilience (buy time)
 - facilitate an ecosystem's or organism's ability to rebound/recovery from a disturbance
 - remove other stressors (invasive species, human pressure)
 - thin forests to decrease drought vulnerability
3. resistance (buy time)
 - fuel breaks to stop wildfires
 - controlling insect outbreaks
 - drip irrigation
4. realignment (long-term change)
 - assisted migration
 - plant with species better adapted to new/future climate following severe disturbance
 - mixing genotypes from other regions (that may be more resilient/resistant)

2009 CALIFORNIA CLIMATE ADAPTATION STRATEGY

A Report to the Governor of the State of California
in Response to Executive Order S-13-2008



California Climate Adaptation Strategy, 2009

[www.climatechange.ca.gov/
adaptation/strategy/index.html](http://www.climatechange.ca.gov/adaptation/strategy/index.html)



TABLE OF CONTENTS

List of Figures and Tables

Executive Summary

Part I – Planning for Climate Change	Page
I. Introduction	11
II. California’s Climate Future	15
III. Comprehensive State Adaptation Strategies	22

Part II – Climate Change - Impacts, Risks and Strategies by Sector

IV. Public Health (Led by the Department of Public Health with assistance from the California Air Resources Board)	30
V. Biodiversity and Habitat (Led by the Department of Parks and Recreation and the Department of Fish and Game)	45
VI. Ocean and Coastal Resources (Led by the Ocean Protection Council)	65
VII. Water Management (Led by the Department of Water Resources)	79
VIII. Agriculture (Led by the Department of Food and Agriculture and the Department of Conservation)	92
IX. Forestry (Led by the Department of Forestry and Fire Protection and the Board of Forestry)	107
X. Transportation and Energy Infrastructure (Led by the Department of Transportation and the California Energy Commission)	122

Appendices

A. Acknowledgements	135
B. Governor’s Executive Order S-13-08	137
C. Glossary	140
D. Acronyms	143
E. Table of Short Term Climate Adaptation Strategies	146

References

Climate Change Adaptation Strategies to Conserve California’s Biodiversity

- Create a large scale well connected, sustainable system of protected areas across the State.
- Manage for restoring and enhancing ecosystem function to conserve both species and habitats in a changing climate.
- Adjust management actions as appropriate for threatened and endangered species
- Prioritize research needs and pursue collaborative partnerships with the research community to ensure that the best available science is informing management actions.
- Re-evaluate existing policies and programs to incorporate climate change and seek regulatory changes as appropriate
- Pursue endeavors that will support implementation of the strategies including funding, capacity building, collaborative partnerships, and education and outreach.