

Presentation given at the Southeast Asia Katoomba meeting

## **Katoomba XVII**

# **Taking the Lead: Payments for Ecosystem Services in Southeast Asia**

June 23-24, 2010

Hanoi, Vietnam

Hosted by:

Forest Trends, the Katoomba Group, Ministry of Agriculture and Rural Development (MARD), Ministry of Natural Resources and Environment (MONRE), United States Agency for International Development (USAID) and Winrock International



This workshop was generously supported by the American people through the United States Agency for International Development (USAID), under the terms of the TransLinks Cooperative Agreement No.EPP-A-00-06-00014-00 to the Wildlife Conservation Society (WCS). TransLinks is a partnership of WCS, The Earth Institute, Enterprise Works/VITA, Forest Trends and the Land Tenure Center. The contents are the responsibility of the authors and do not necessarily reflect the views of USAID or the United States Government.

# Seeing the mangroves for the trees:

## The under-appreciated potential of mangroves for carbon and climate change management

Daniel C. Donato, Research Ecologist  
U.S.D.A. Forest Service

Katoomba XVII meeting

Hanoi, Vietnam, 23-24 June 2010







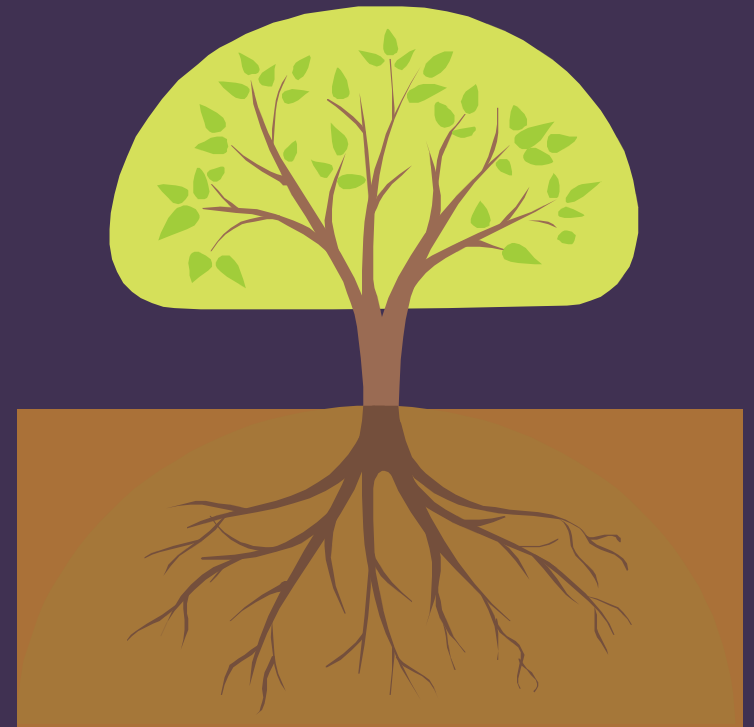


# Mangroves

- Tidal forests
- 16 million hectares
- 124 countries
- Throughout the tropics and subtropics
- Can have large trees and deep, rich soils









# Mangrove forests: many ecosystem services

- Biodiversity
- Water resources
- Sediment regulation
- Protection from typhoons and tsunamis
- Fish/shellfish
- Wood
- Carbon (C) storage



# Land-use change threats



- 1-2% deforestation per year globally
- 25% loss of SE Asian mangroves 1980-2005
- Aquaculture, land-clearing, over-harvest
- Functionally extinct within 100 years?

# REDD to the rescue

## ???



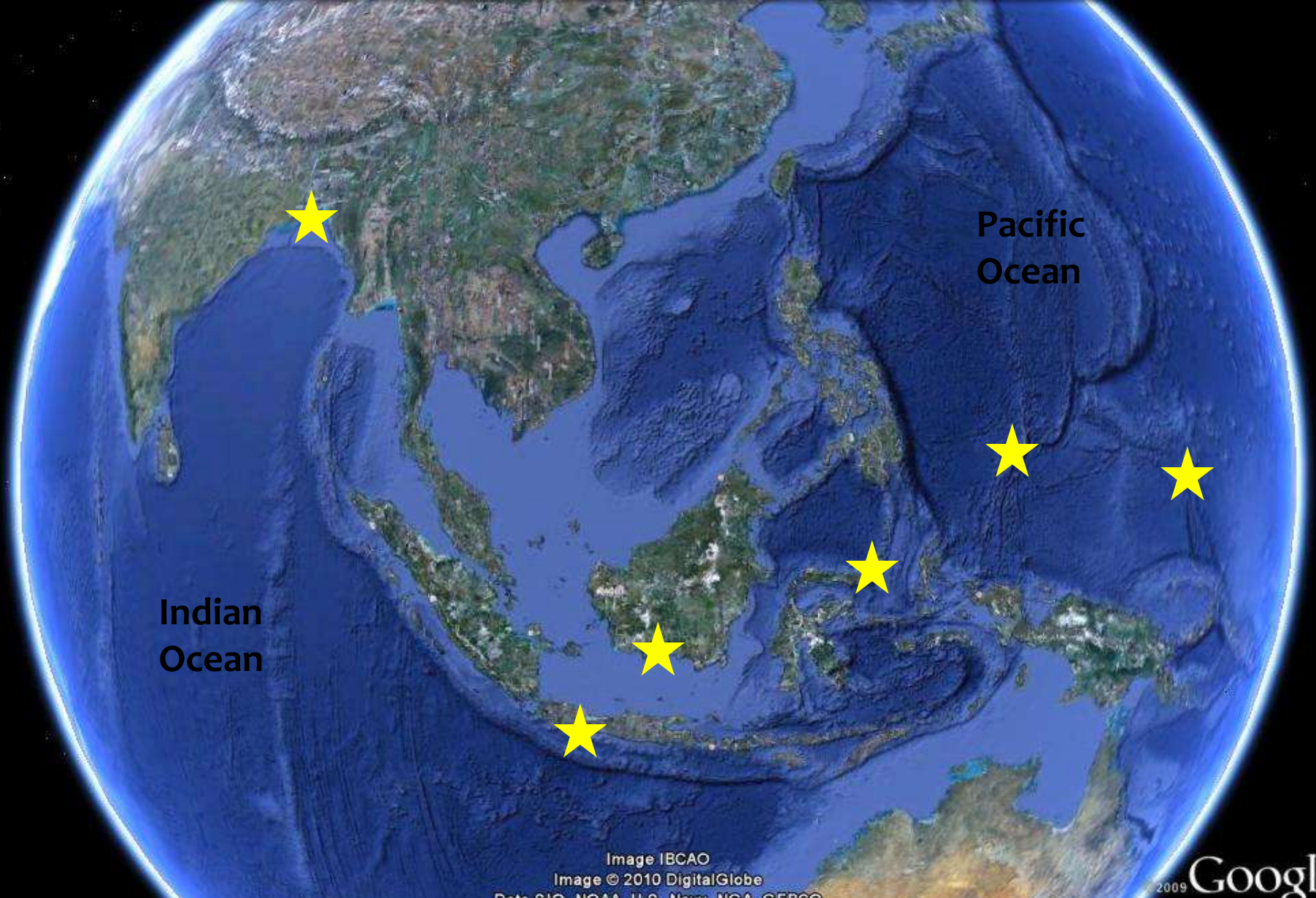


**REDD: Paid per ton of CO<sub>2</sub>  
equivalent saved**

**Greater carbon storage =  
Greater REDD potential**

**... But how much is in mangroves?**





Pacific  
Ocean

Indian  
Ocean

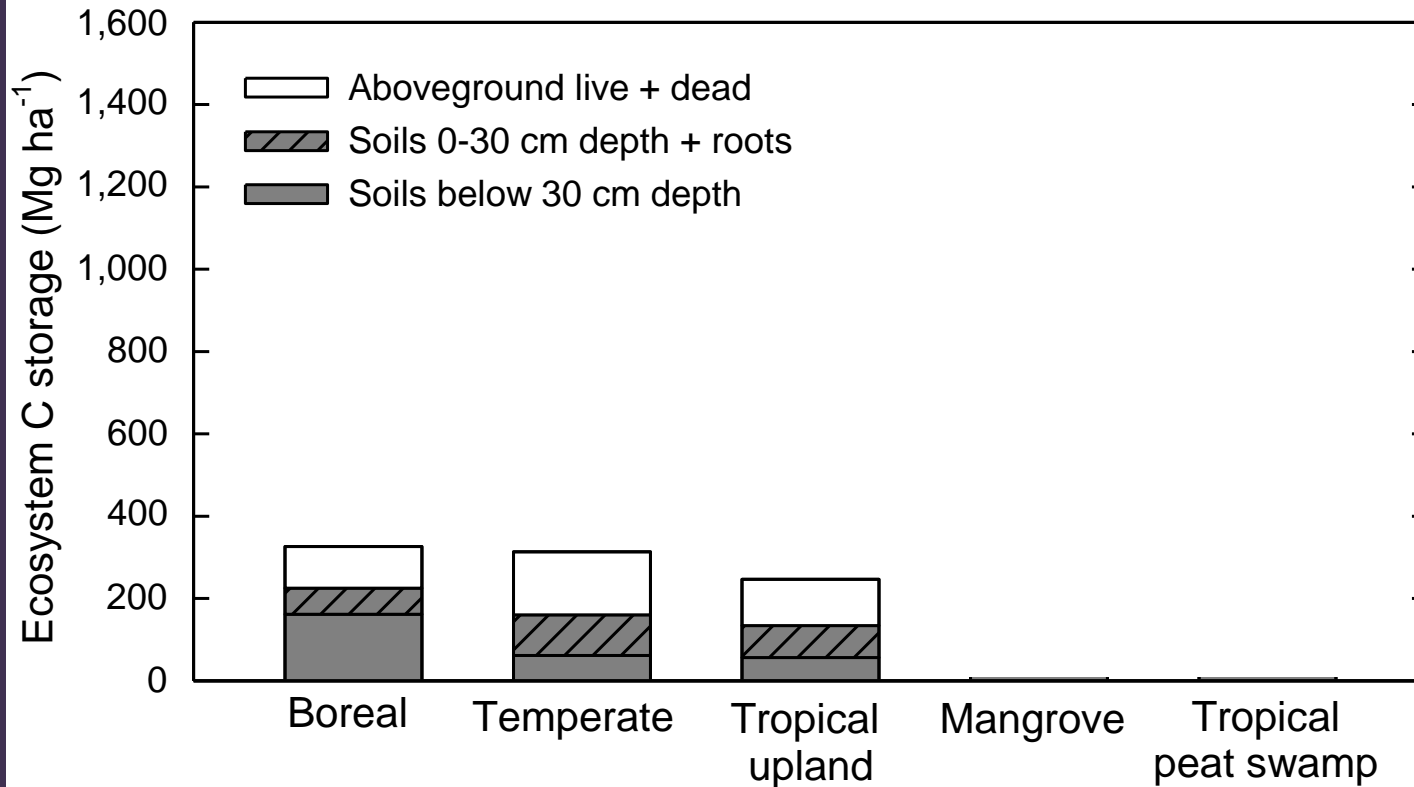
Image IBCAO  
Image © 2010 DigitalGlobe  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

2009 Google

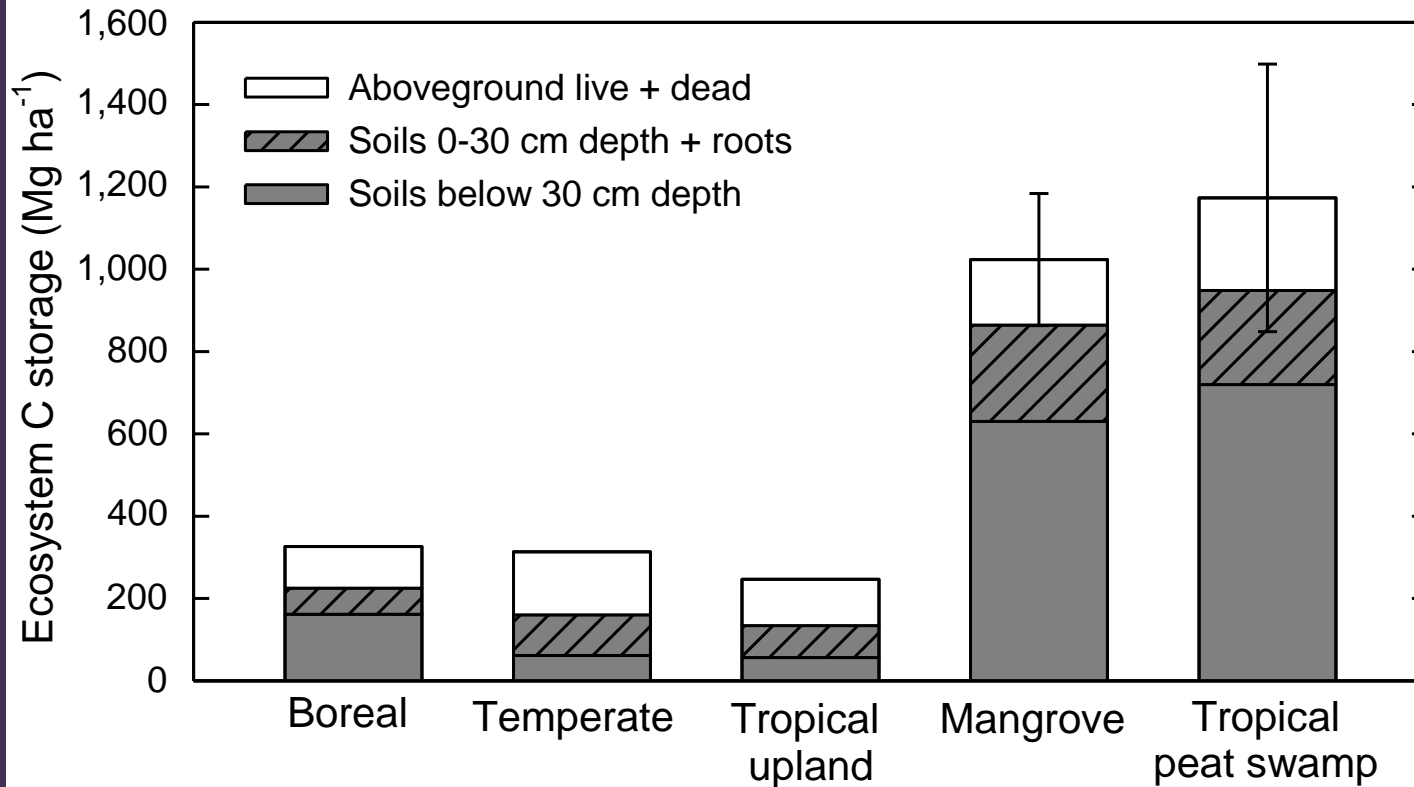




# Carbon storage



# Carbon storage





# Mangroves = strong potential for carbon conservation strategies (REDD)

- Exceptionally high C stocks
- Rapid deforestation currently  
→ High emissions
- UNFCCC and IPCC currently not explicitly considering mangroves



*COP16 and others would benefit by considering mangroves at similar level as peat swamps*

# Opportunities are high...

# ... What about the challenges?





# Challenges



- 1) **Measurement methods  
uncertain / intimidating**
- 2) **No precedent:  
→ Few, if any, mangrove C  
projects on voluntary or  
regulatory market**
- 3) **Sea-level rise**

# Getting past challenges

- 1) Measurement methods are actually not overly difficult
  - Largely same as other forests
  - Soil monitoring is probably key















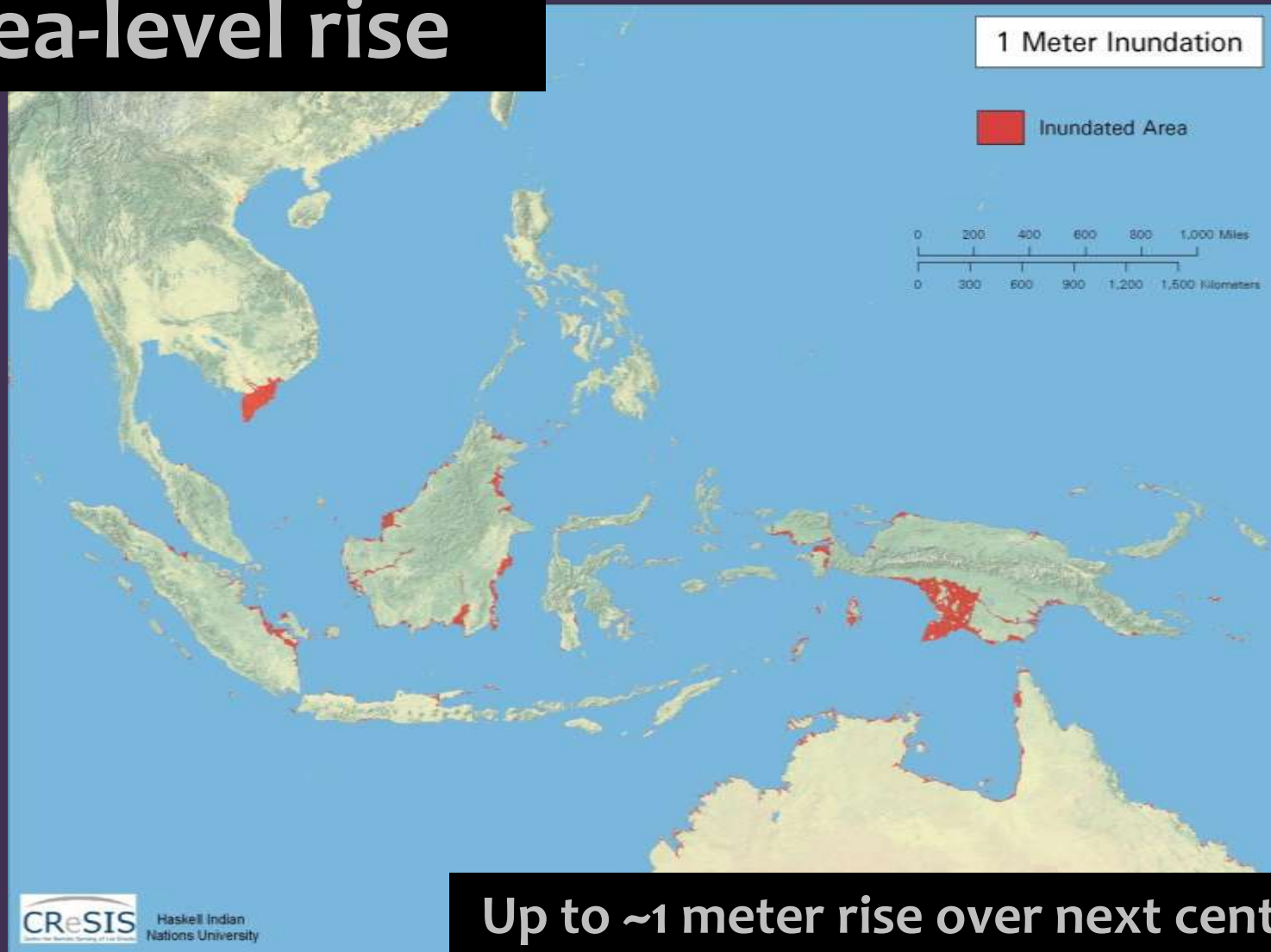
# Getting past challenges

- 1) Measurement methods are actually not overly difficult
  - Largely same as other forests
  - Soil monitoring is probably key
- 2) No precedent?  
→ Well, precedent can be made
- 3) Sea-level rise .....





# Sea-level rise



Up to ~1 meter rise over next century

# Sea-level rise

- Will affect mangroves, but they have been very resilient to changing sea levels





# Sea-level rise



# Sea-level rise

- Will affect mangroves, but they have been very resilient to changing levels
- Some mangroves more resilient than others
  - Intact forests → root production
  - Intact sediment regimes (challenge: dams, roads)
  - Low-lying land surrounding
- REDD strategies will need to address this additional aspect
  - prioritize most resilient sites
  - landscape-scale approaches with buffers
  - maintaining intact productivity & sediment regimes



# Thank you



# River deltas



Ocean margins

