

**UNFCCC COP23 Side Event**

**Mangroves in the Tropics: Realizing their Potential for  
Climate Change Mitigation and Adaptation**

# **Measuring mangrove blue carbon**



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# **Roles** of Mangrove Forest

- Mangrove forests in tropical and subtropical countries play important roles:
  - ✓ water quality maintenance
  - ✓ storm wave protection
  - ✓ fish habitat
  - ✓ ecotourism activities
  - ✓ carbon stocking
  - ✓ **trapping**



# Lessons from Tsunami

- The Indian Ocean Major Earthquake off the Coast of Sumatra and **Tsunami** in the Indian Ocean occurred on 26 December, 2004.
- It caused much victims and heavy damages in **coastal zones**.
- Some studies reported that mangrove forests filled the role of mitigation of the damage by the Tsunami.
- On the other hand, Mangrove forest themselves suffered both direct and collateral damages of the Tsunami.



# Mitigation and adaptation

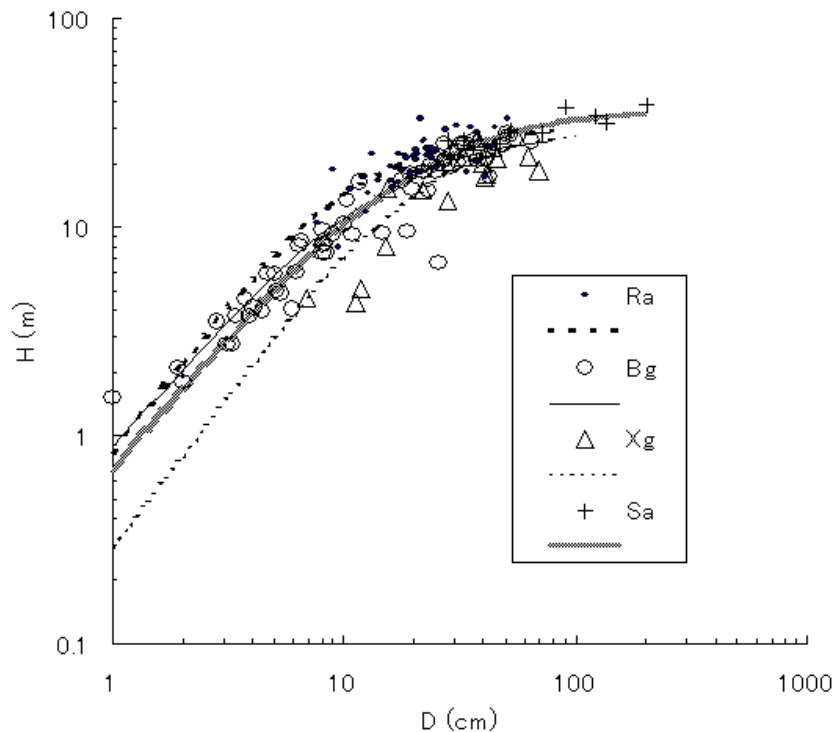


- Sustainable management of mangrove forests plays an important role in both mitigation and adaptation for climate change.
  - Mitigation:  
Blue carbon stock
  - Adaptation:  
Maintenance of life of local community
- Accurate measuring and monitoring of blue carbon is needed for action plans.



# Measuring **carbon** in the field

- Scientific approaches are needed to measure mangrove carbon.
- Many allometric relationships to estimate mangrove carbon have been investigated in the field for several decades.



Relationship between diameter and height for mangrove species

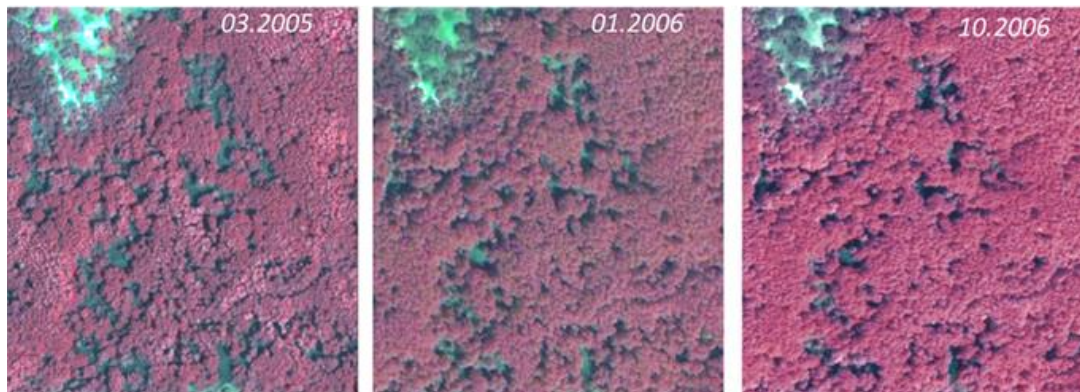


# Remote sensing for monitoring blue carbon

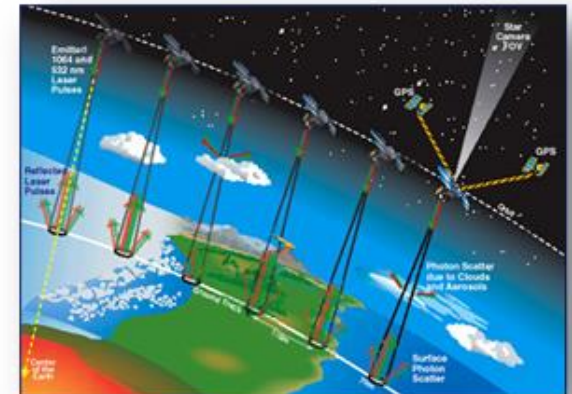
- Remote sensing is a useful tool for monitoring of forest condition.
- The historical Landsat database together with the satellites' regular coverage and its free data have made Landsat a vital tool for assessing forest conservation.
- High resolution satellite sensors can observe forest dynamics in detail.
- LiDAR remote sensing opens a new era for monitoring of three-dimensional forest structure.



Mangrove from Landsat imagery



Mangrove forest dynamics from high resolution satellite sensors



3-D forest structure by satellite LiDAR





How may we leave mangrove for the next generation as measures of mitigation and adaptation for climate change?

