



*Tropical forests and climate change*

# REDD: What Contribution from Carbon Markets?

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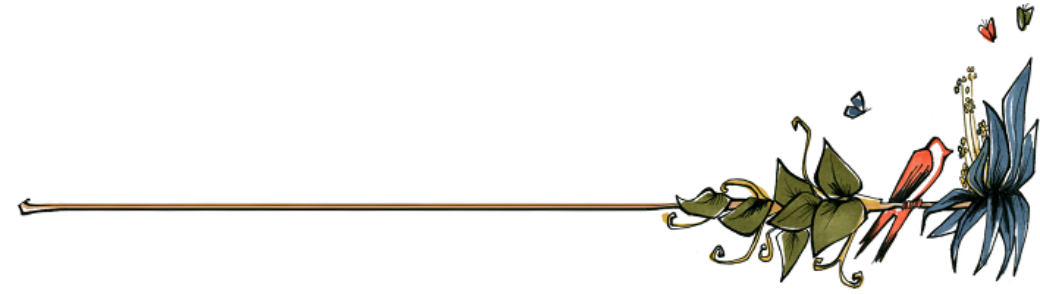
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2. Current links between forestry and carbon markets: disappointing results
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4. What kind of links between REDD+ and carbon markets?

# Carbon markets, a source of financing



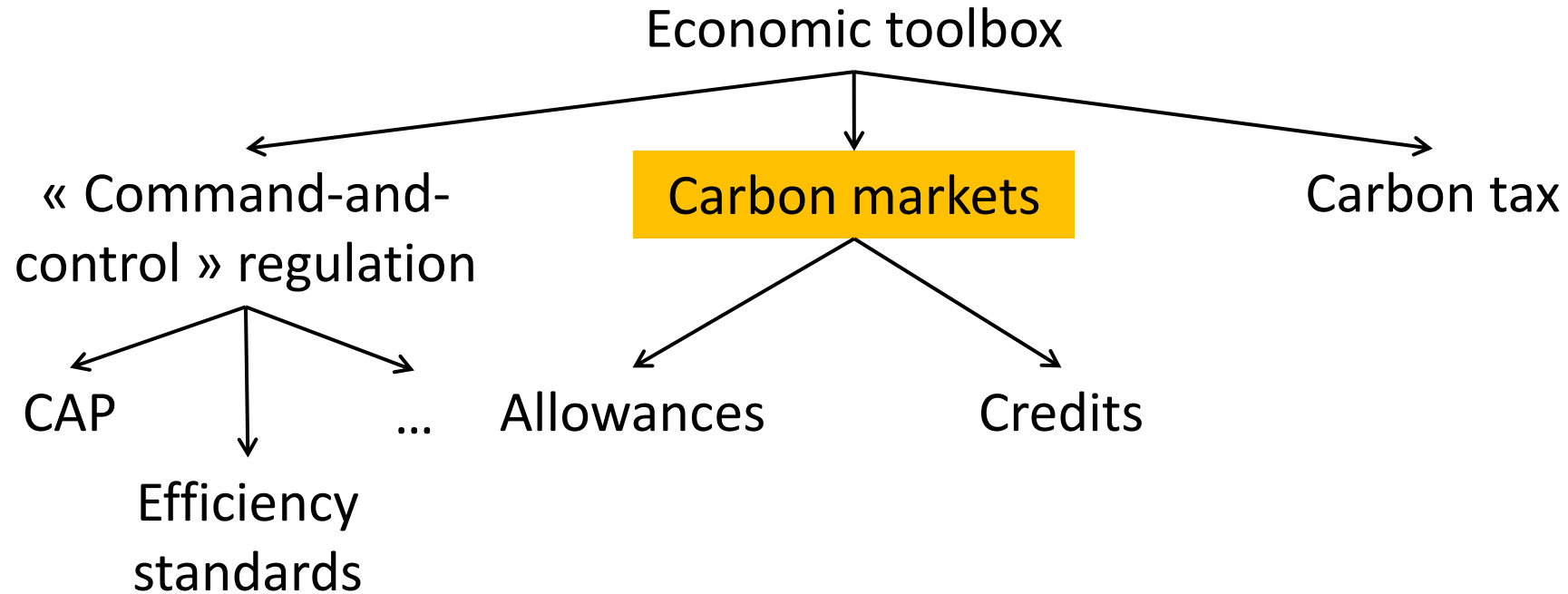
- Climate quality: the tragedy of commons



# Carbon markets, a source of financing



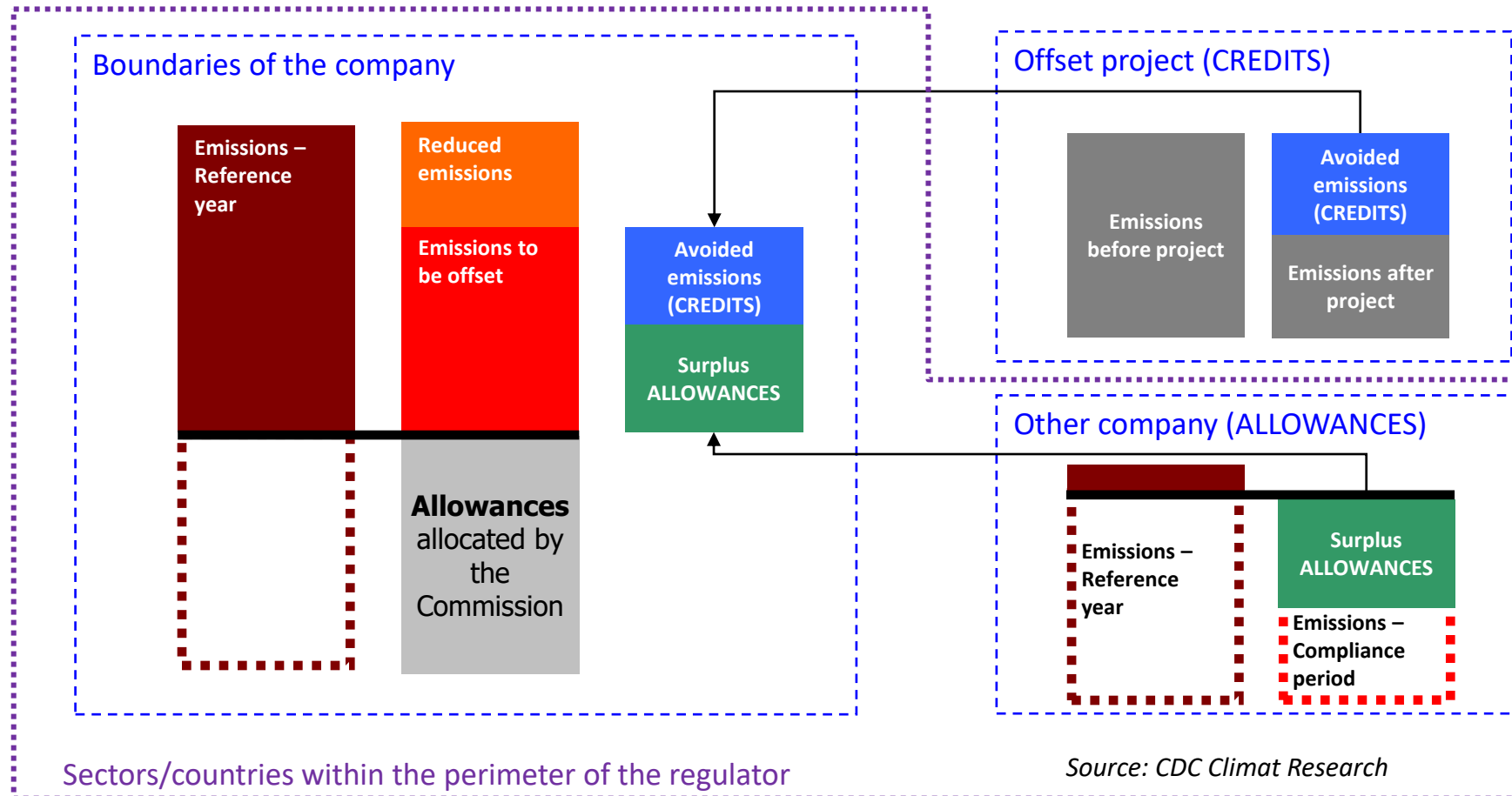
- Carbon markets: a public policy to internalize climate quality costs



# Carbon markets, a source of financing



- Compliance demand and supply



# Carbon markets, a source of financing



- Compliance “continent”

Allowances (EU ETS, ...), C taxes, etc.

82 G\$US in 2018 (+56% compare to 2017)



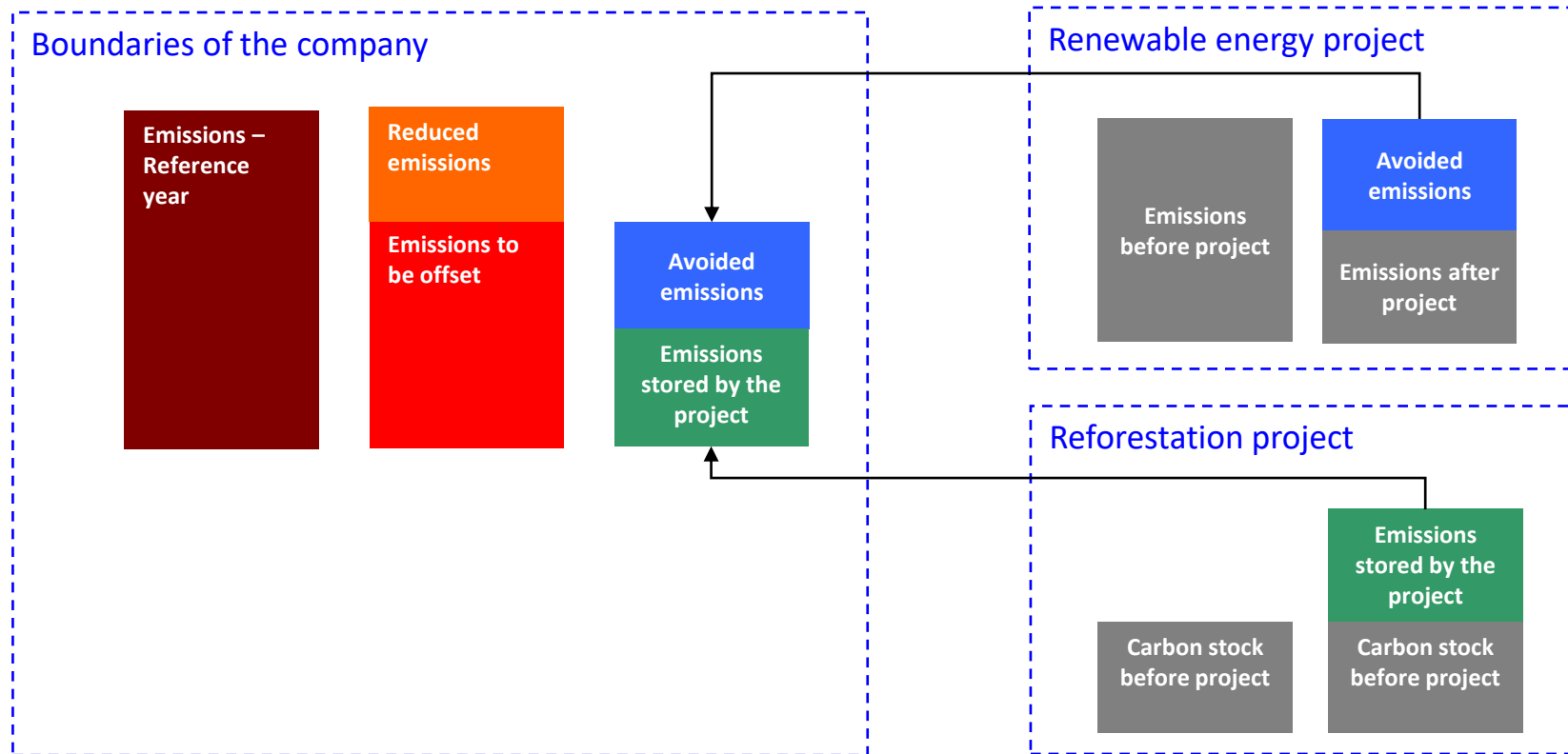
UNFCCC offsets (CDM, JI): 20 M\$US in 2015

*Source: World Bank, 2018*

# Carbon markets, a source of financing



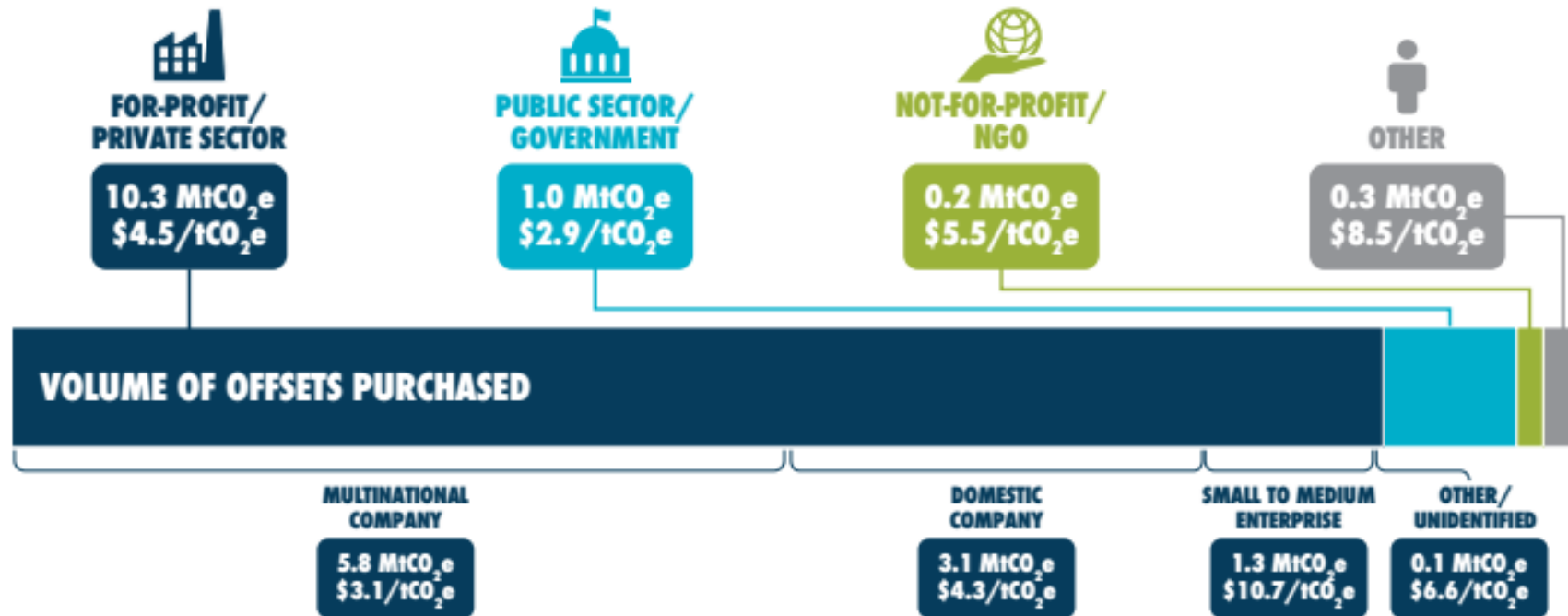
- Voluntary markets demand and supply



Source: CDC Climat Research

# Carbon markets, a source of financing

- Voluntary demand is driven by businesses (Eurostar, Avis, Voyageurs du Monde, Air France, BP, ...)



Notes: Based on survey responses representing 11.7 MtCO<sub>2</sub>e transacted to end buyers by all suppliers.



# Carbon markets, a source of financing

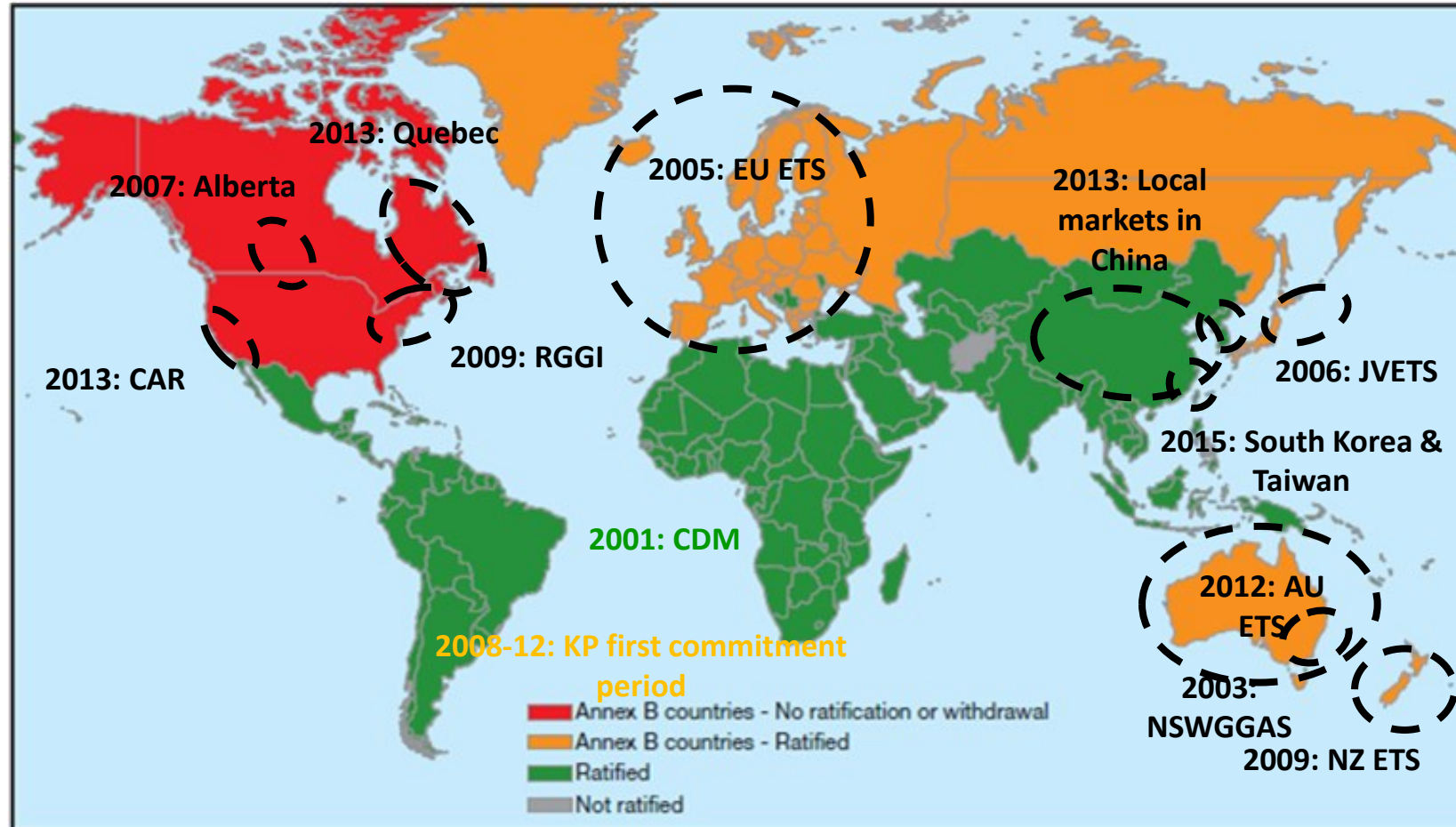


- 2 different markets, 2 different pricing methods

	<b>Compliance</b>	<b>Voluntary</b>
<b>Stakeholders</b>	Companies, countries	Companies, organisations, individuals
<b>Demand</b>	Allowance shortage	Voluntary emissions target
<b>Supply</b>	Supernumerary allowances (AAUs, EUAs) Offsets (CERs, ERUs)	Offsets (VCUs or GS credits)

# Carbon markets, a source of financing

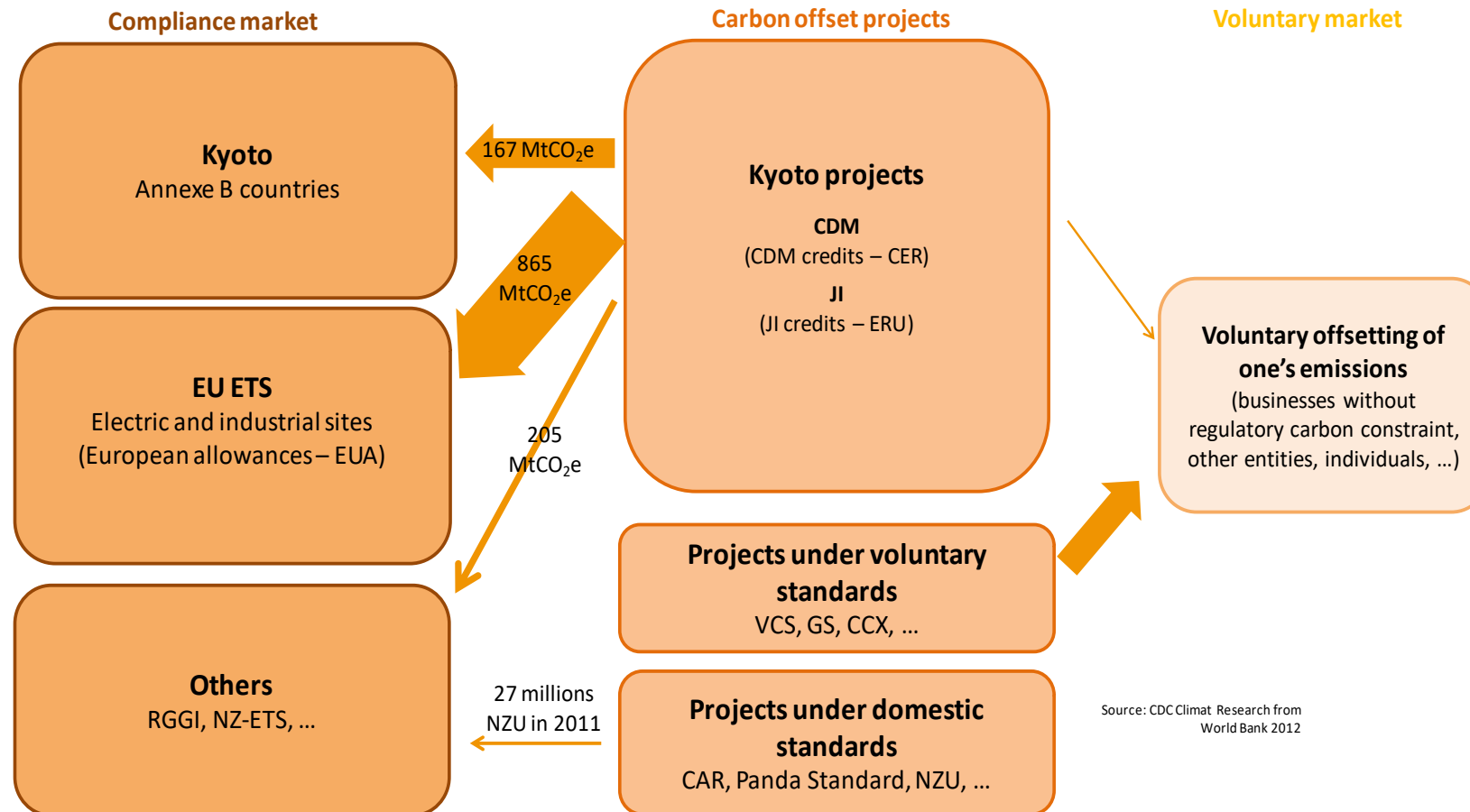
- Geographical reach of carbon markets



# Carbon markets, a source of financing



- Situation of C markets

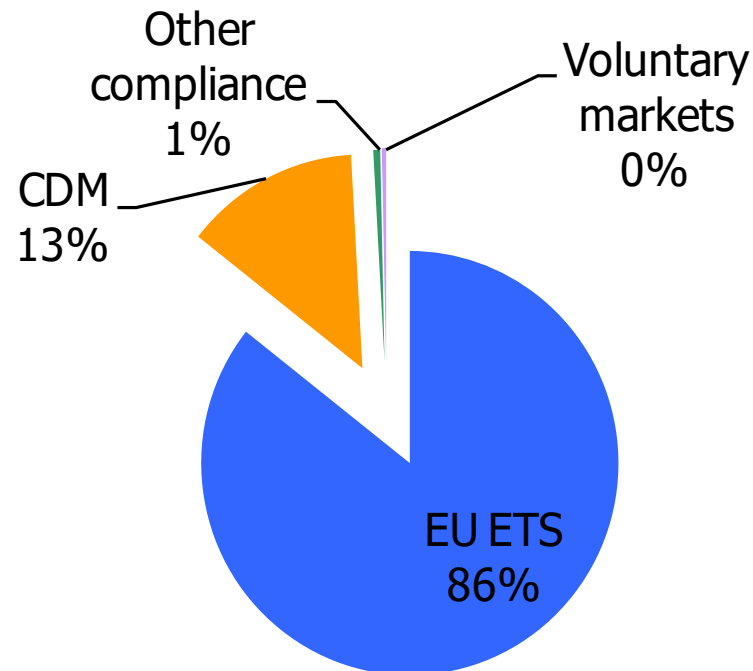


# Carbon markets, a source of financing



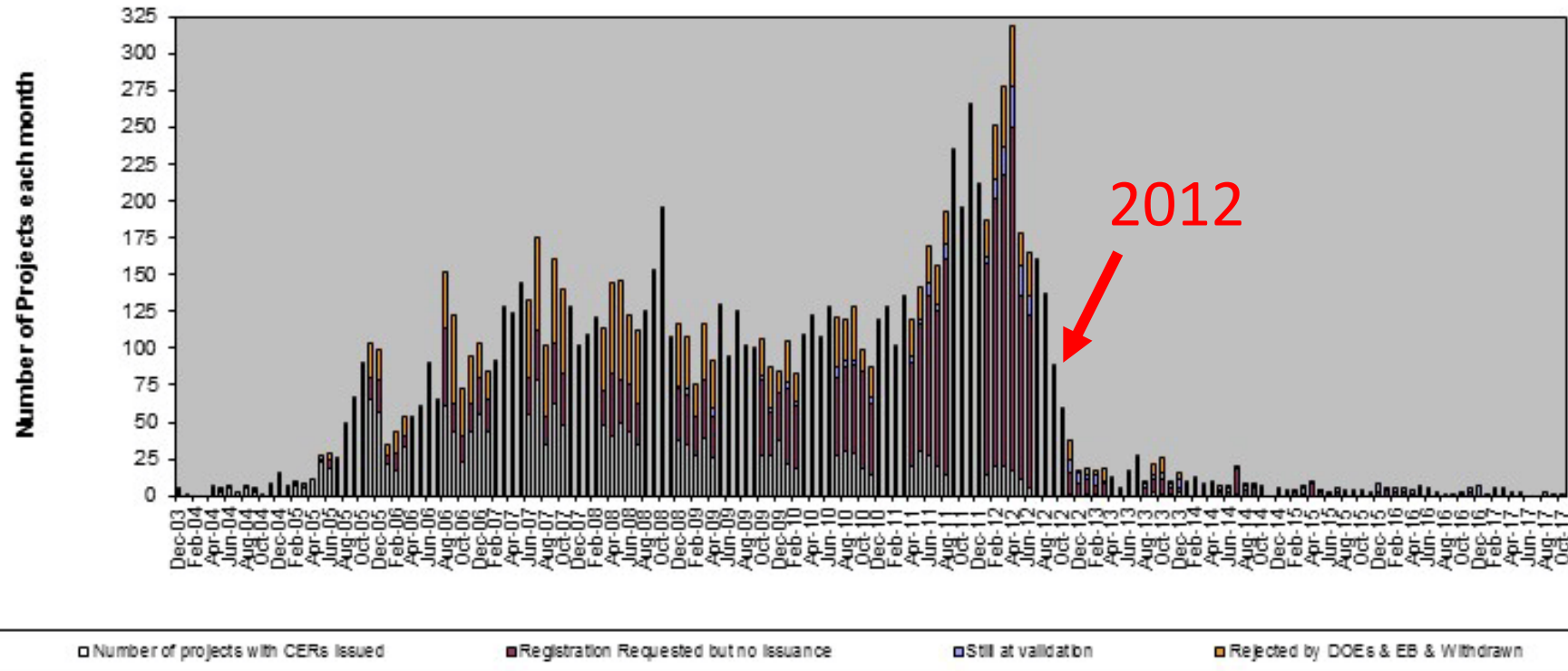
- Two big fishes in 2012
  - The EU ETS in the pond of carbon markets
  - The CDM in the pond of carbon offsets

Part of global market value in 2011



# Carbon markets, a source of financing

- Number of CDM projects per month:



Prices in 2012:



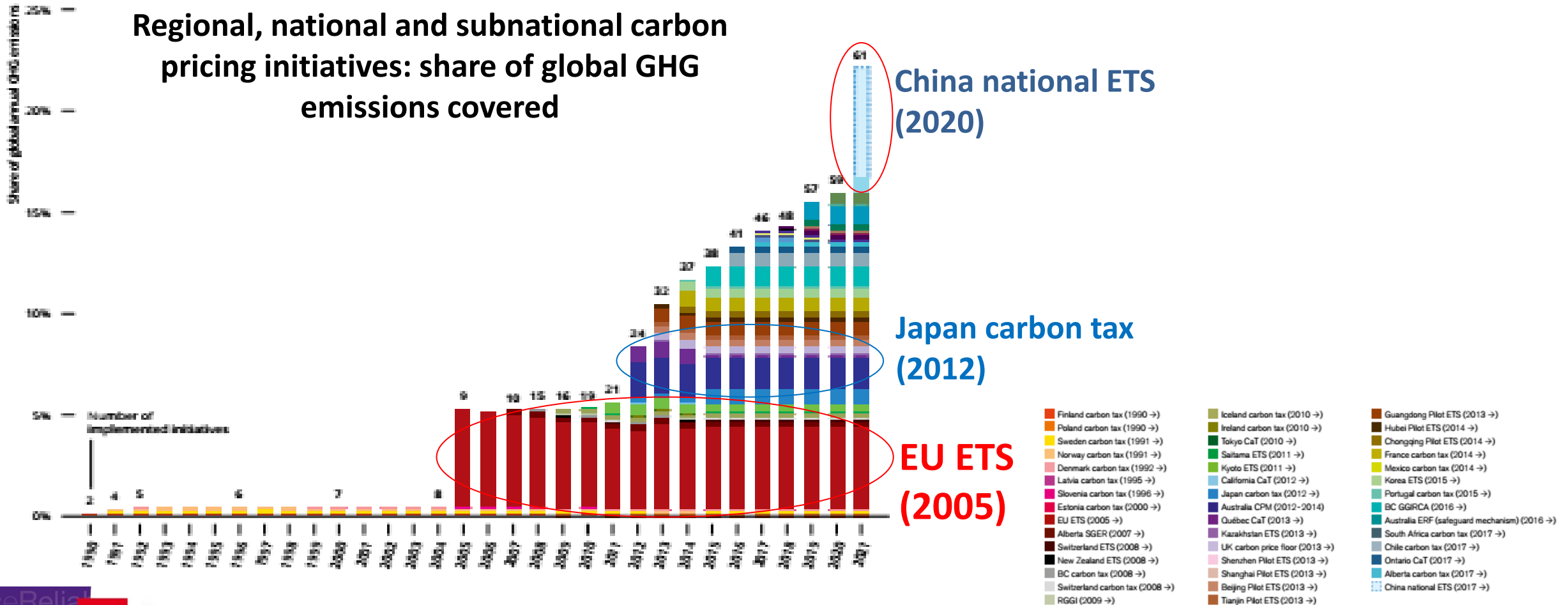
Source: UNEP-Risoe, 2017

# Carbon markets, a source of financing



- Situation in 2020

**Regional, national and subnational carbon pricing initiatives: share of global GHG emissions covered**



- Finland carbon tax (1990 →)
- Poland carbon tax (1990 →)
- Sweden carbon tax (1991 →)
- Norway carbon tax (1991 →)
- Denmark carbon tax (1992 →)
- Latvia carbon tax (1995 →)
- Slovenia carbon tax (1996 →)
- Estonia carbon tax (2000 →)
- EU ETS (2005 →)
- Alberta SGER (2007 →)
- Switzerland ETS (2008 →)
- New Zealand ETS (2008 →)
- BC carbon tax (2008 →)
- Switzerland carbon tax (2008 →)
- RGGI (2009 →)
- Iceland carbon tax (2010 →)
- Ireland carbon tax (2010 →)
- Tokyo CaT (2010 →)
- Saitama ETS (2011 →)
- Kyoto ETS (2011 →)
- California CaT (2012 →)
- Japan carbon tax (2012 →)
- Australia CPM (2012-2014)
- Québec CaT (2013 →)
- Kazakhstan ETS (2013 →)
- UK carbon price floor (2013 →)
- Shenzhen Pilot ETS (2013 →)
- Shanghai Pilot ETS (2013 →)
- Beijing Pilot ETS (2013 →)
- Tianjin Pilot ETS (2013 →)
- Guangdong Pilot ETS (2013 →)
- Hubei Pilot ETS (2014 →)
- Chongqing Pilot ETS (2014 →)
- France carbon tax (2014 →)
- Mexico carbon tax (2014 →)
- Korea ETS (2015 →)
- Portugal carbon tax (2015 →)
- BC GGRICA (2016 →)
- Australia ERF (safeguard mechanism) (2016 →)
- South Africa carbon tax (2017 →)
- Chile carbon tax (2017 →)
- Ontario CaT (2017 →)
- Alberta carbon tax (2017 →)
- China national ETS (2017 →)

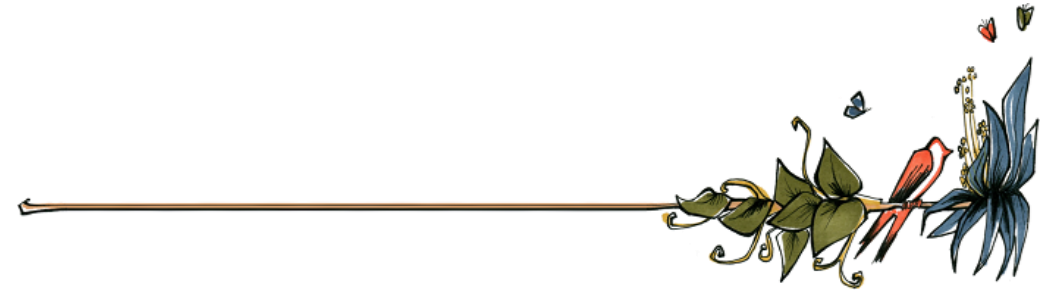
Source: World Bank, 2020

# Carbon markets, a source of financing



- Carbon offsets are:
  - **A public policy ...**
    - ... flexible ...
    - ... “bottom-up” and pioneer.
  - **A market ...**
    - ... regulated by the UN ...
    - ... transparent and (therefore ?) criticized ...
    - ... the first one to attract private investment worth billions of € in green projects
    - ... in a bubble which burst in May 2012.

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# Current links between forestry and carbon markets: disappointing results



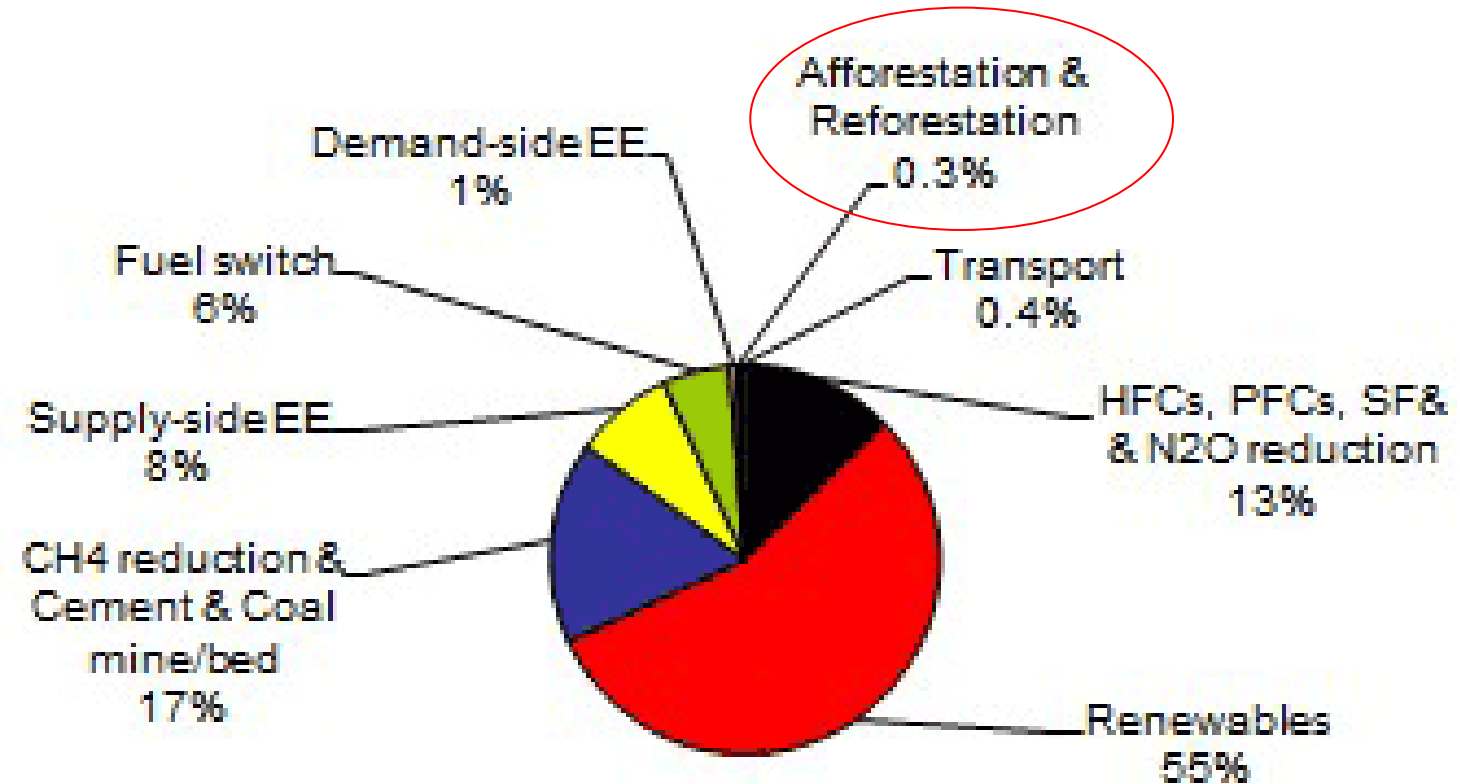
- Forestry offsets today, rather voluntary:
  - Compliance carbon markets and forests: what did not work?
    - Little success for forestry in the CDM
    - CDM forestry projects generate temporary CERs
    - No access to the biggest source of demand (EU ETS)
    - No access for the biggest source of supply (REDD)
  - REDD is faring well on the voluntary carbon market

# Current links between forestry and carbon markets: disappointing results



- Little success for forestry in the CDM

**CERs expected until  
2020 in CP2 from CDM  
projects in each  
sector:**



Source: UNEP-Risoe, 2017

# Current links between forestry and carbon markets: disappointing results



- Carbon offset projects: 6 key quality criteria
  - Additionality of the project
  - Monitoring of emissions reductions
  - Verification
  - Timeline of offset issuance
  - Transparency and tracking of issued offsets
  - The case of forestry: permanence of emissions reductions

# Current links between forestry and carbon markets: disappointing results



- Forestry projects in the voluntary market:

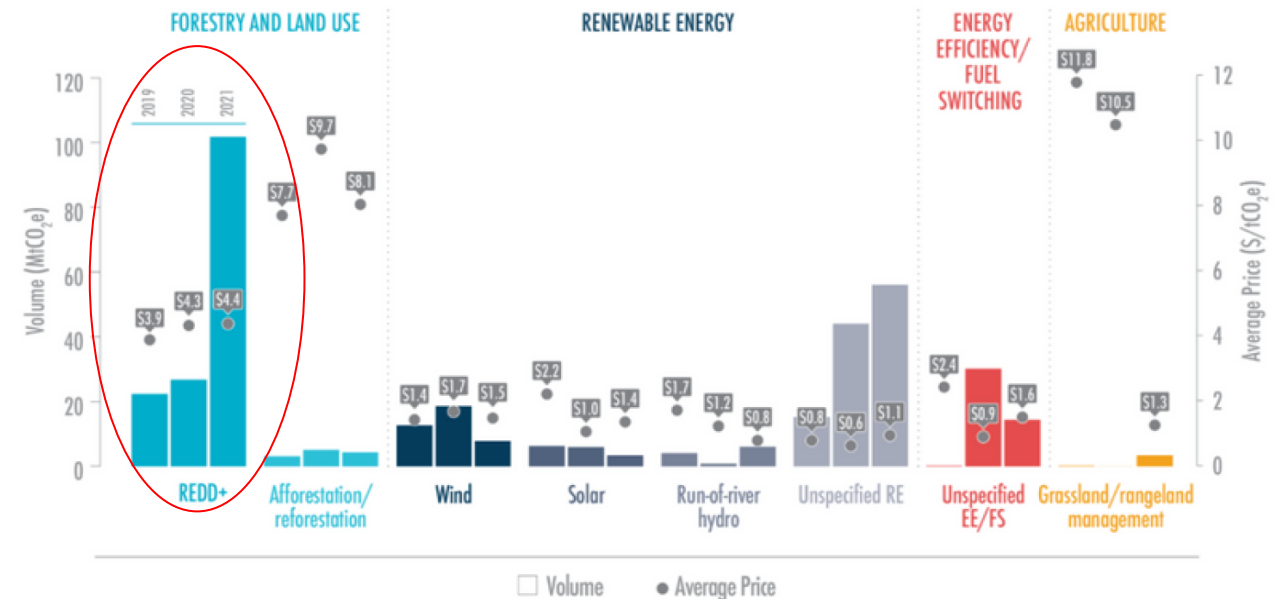
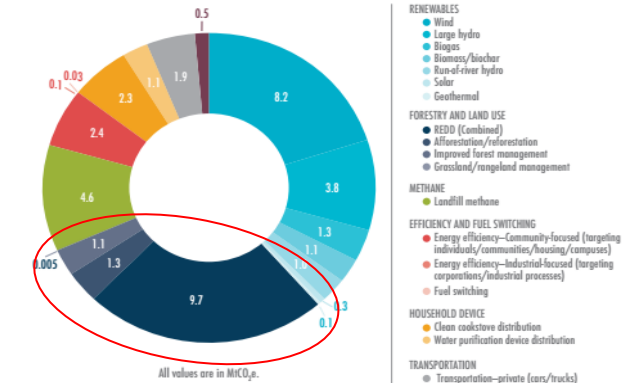
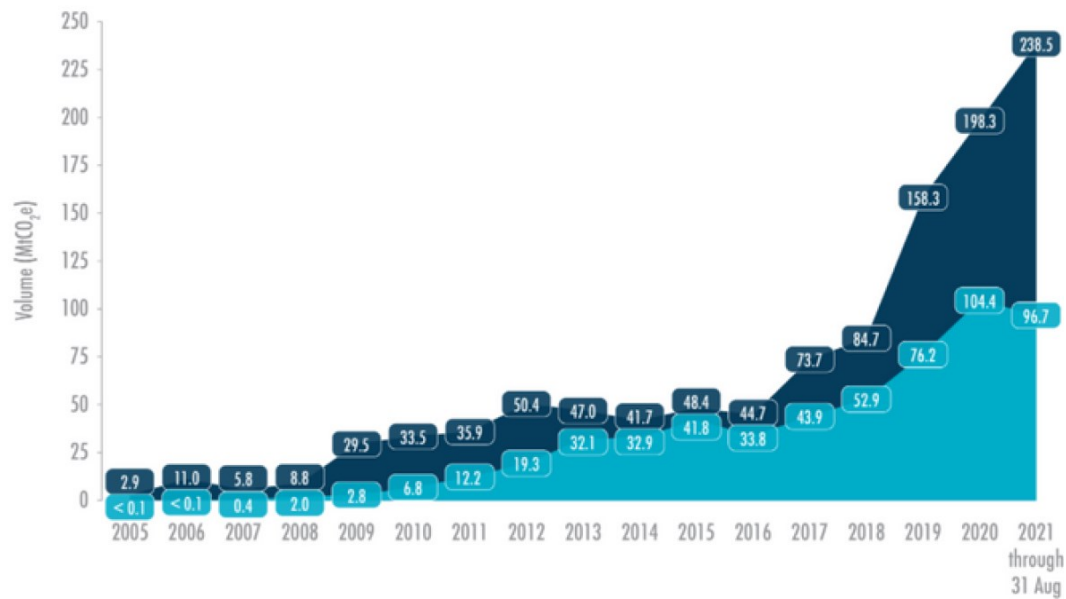
	VOLUME MtCO <sub>2</sub> e	AVERAGE PRICE	VALUE
<b>RENEWABLE ENERGY</b>	<b>42.4</b>	<b>\$1.4</b>	<b>\$60.1 M</b>
<b>FORESTRY AND LAND USE</b>	<b>36.7</b>	<b>\$4.3</b>	<b>\$159.1 M</b>
<b>WASTE DISPOSAL</b>	<b>7.3</b>	<b>\$2.5</b>	<b>\$18.0 M</b>
<b>HOUSEHOLD DEVICES</b>	<b>6.4</b>	<b>\$3.8</b>	<b>\$24.8 M</b>
<b>CHEMICAL PROCESSES/ INDUSTRIAL MANUFACTURING</b>	<b>4.1</b>	<b>\$1.9</b>	<b>\$7.7 M</b>
<b>ENERGY EFFICIENCY/ FUEL SWITCHING</b>	<b>3.1</b>	<b>\$3.9</b>	<b>\$11.9 M</b>
<b>TRANSPORTATION</b>	<b>0.4</b>	<b>\$1.7</b>	<b>\$0.7 M</b>

Source: Ecosystem Marketplace 2020

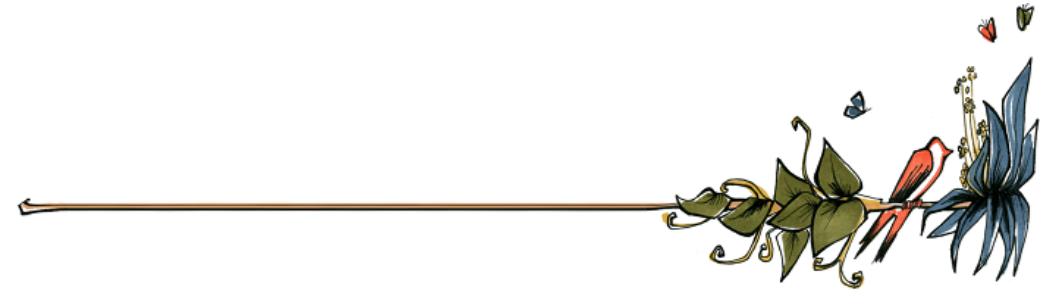
# Current links between forestry and carbon markets: disappointing results



- Forestry projects in the voluntary market:



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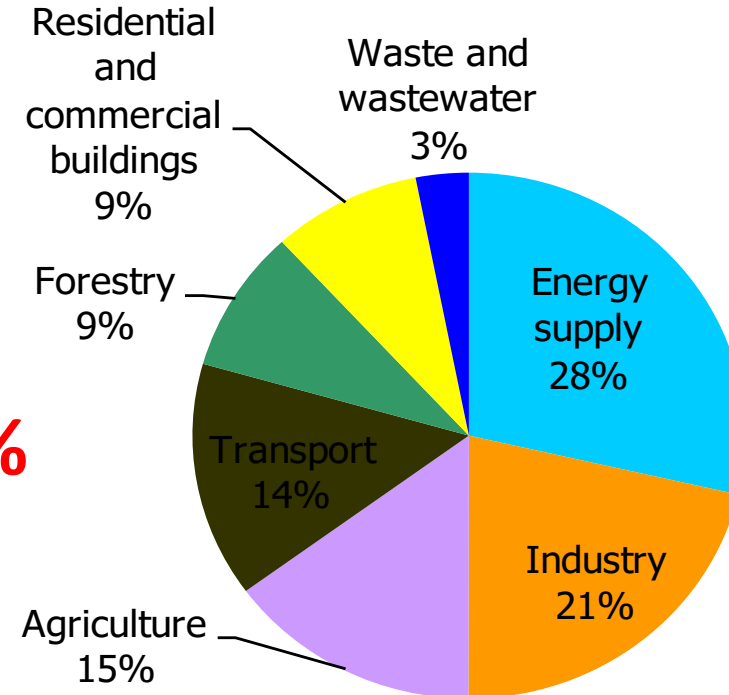
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4. What kind of links between REDD+ and carbon markets?

# Scaling up REDD+, a question of understanding and monitoring



- Deforestation intensity varies around the globe
  - Deforestation globally: 9% of total anthropogenic emissions of about 50 GtCO<sub>2</sub>e in 2004

**AFOLU = 24%**

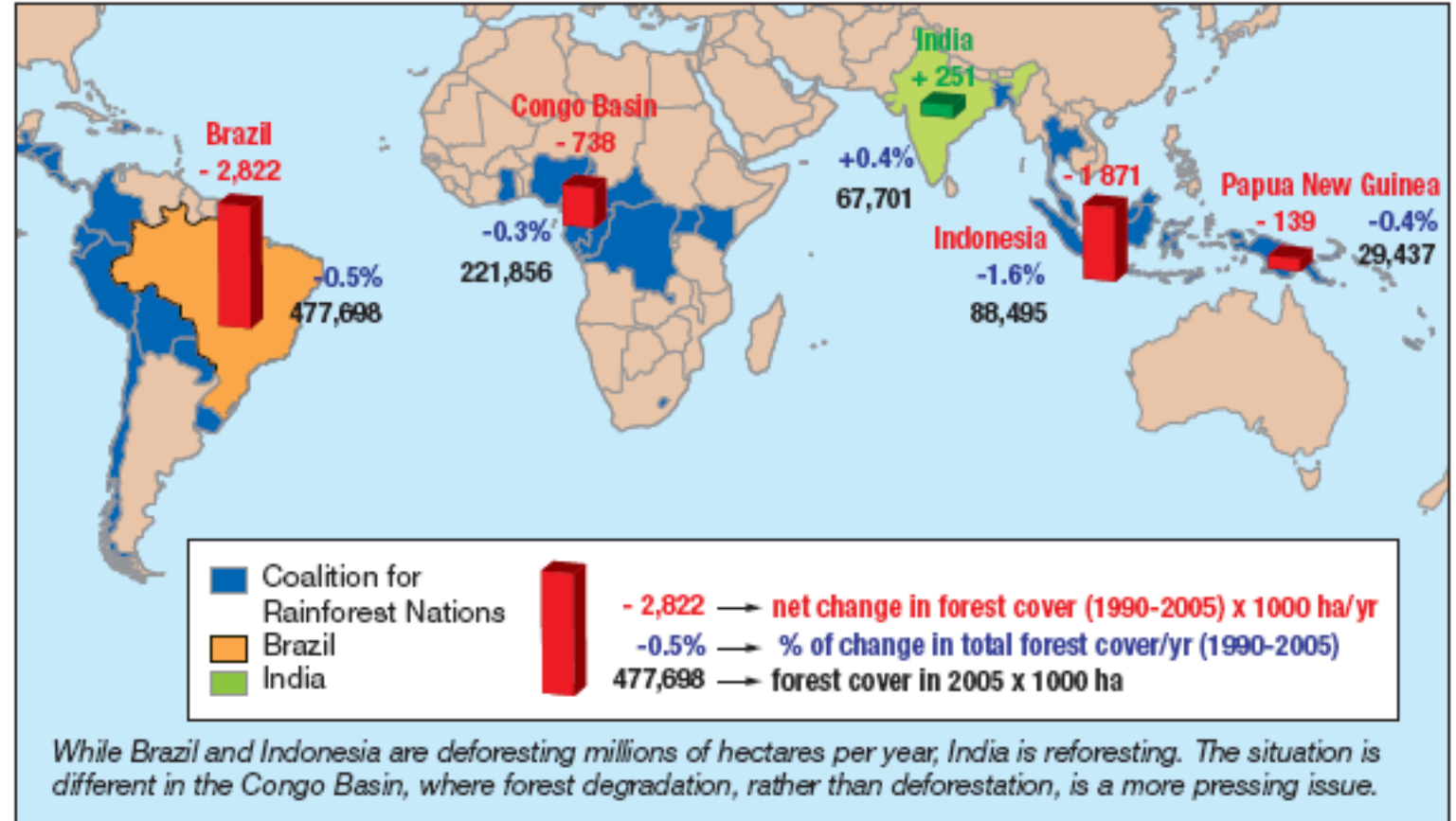


Source: IPCC 2007 revised by van der Werf et al. 2009 and Harris et al. 2012

# Scaling up REDD+, a question of understanding and monitoring



- Deforestation intensity varies around the globe
  - Deforestation regionally: contrasted situations
    - High level of deforestation rates in South America and South-east Asia
    - Moderate level of deforestation in the Congo Basin's rainforests



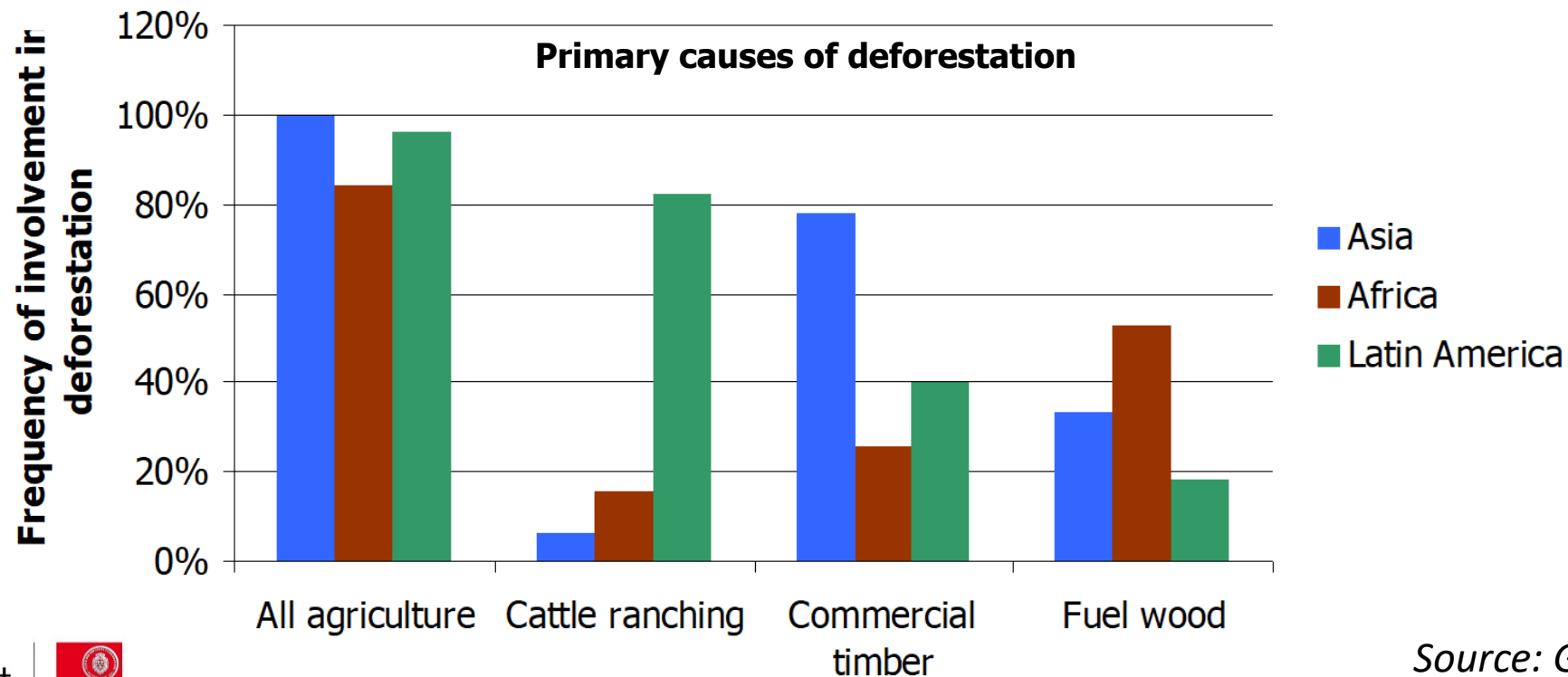
Source: CDC Climat Research



# Scaling up REDD+, a question of understanding and monitoring



- The causes of deforestation vary around the globe
  - Agriculture, the unusual suspect everywhere
  - Energy and commercial timber may be locally important drivers

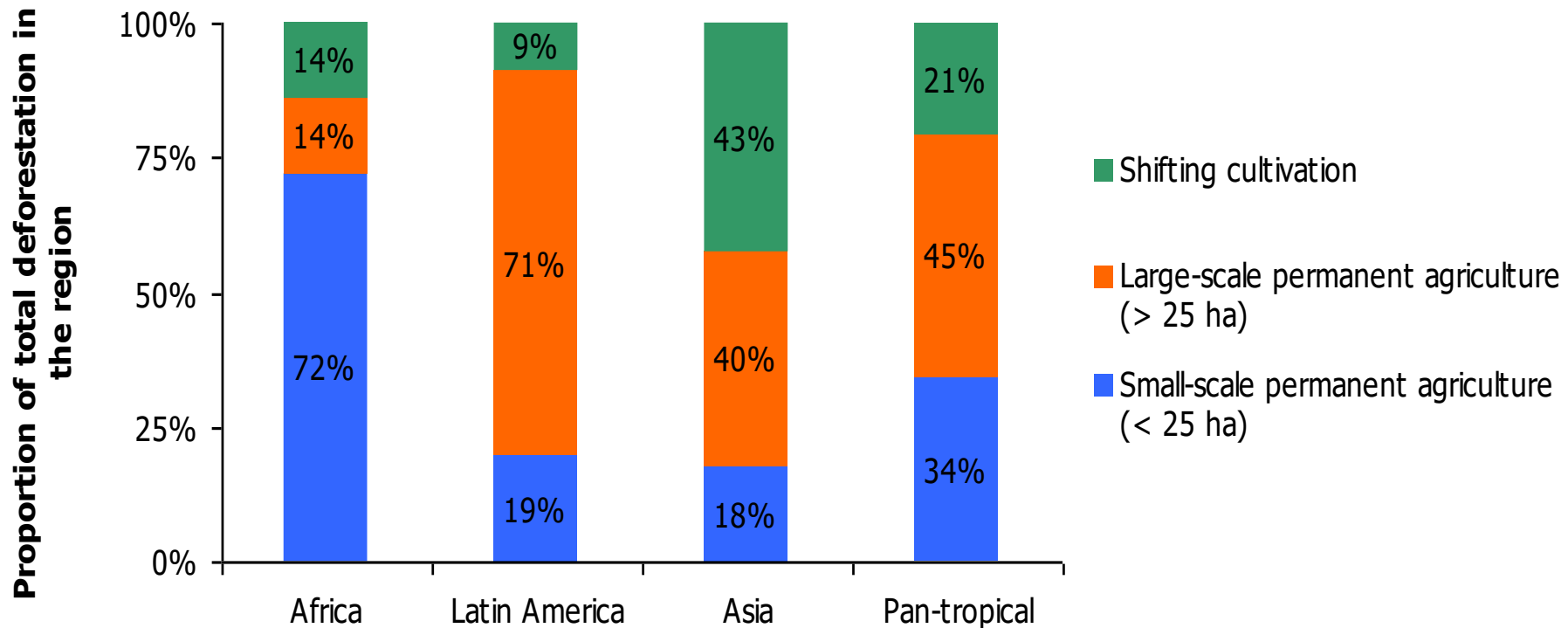


Source: Geist and Lambin

# Scaling up REDD+, a question of understanding and monitoring



- The causes of deforestation vary around the globe
  - The type of agriculture driving deforestation is region dependent

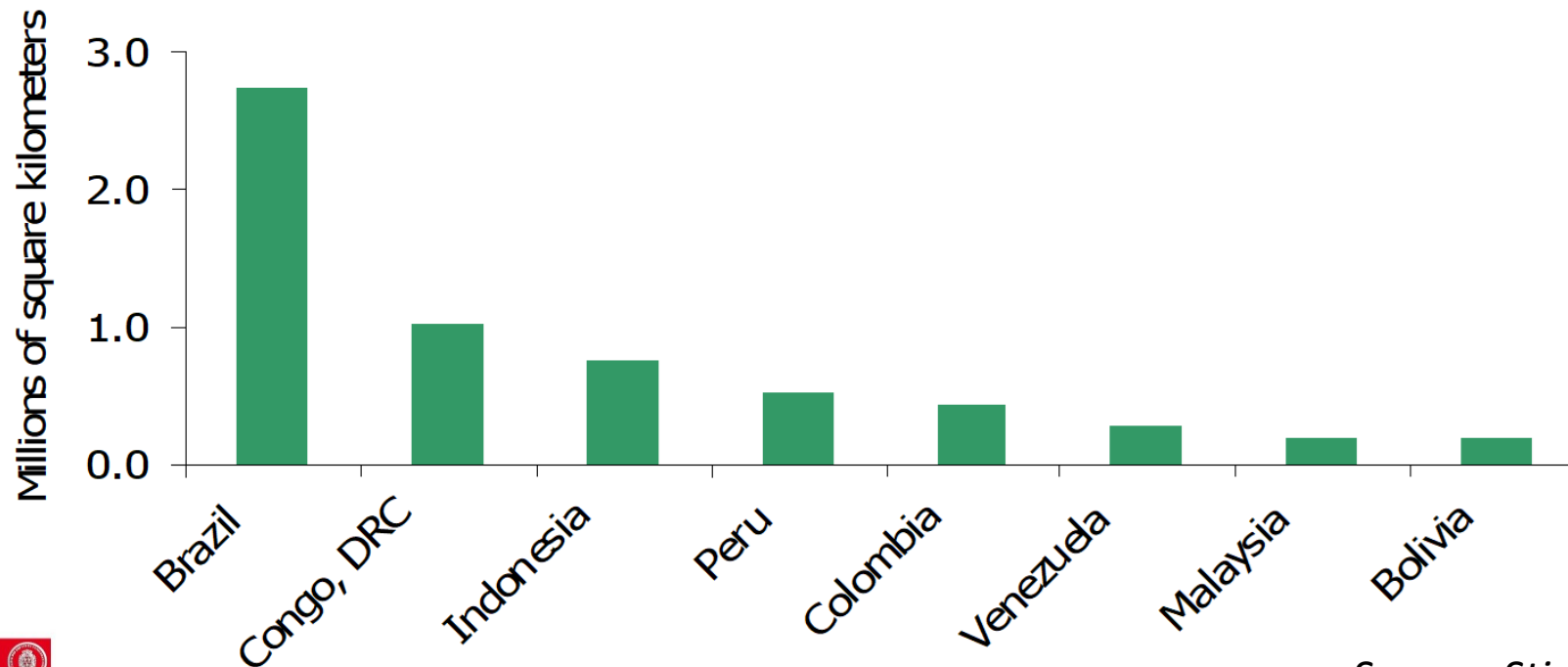


# Scaling up REDD+, a question of understanding and monitoring



- Understanding deforestation
  - There is still plenty of fertile land to deforest

**Forest Area with High Potential for Soy, Palm Oil, or Sugar Cane**



Source: Stickler et al., 2007

# Scaling up REDD+, a question of understanding and monitoring



- Understanding deforestation
  - The global picture:



Source: Stickler et al., 2007

# Scaling up REDD+, a question of understanding and monitoring



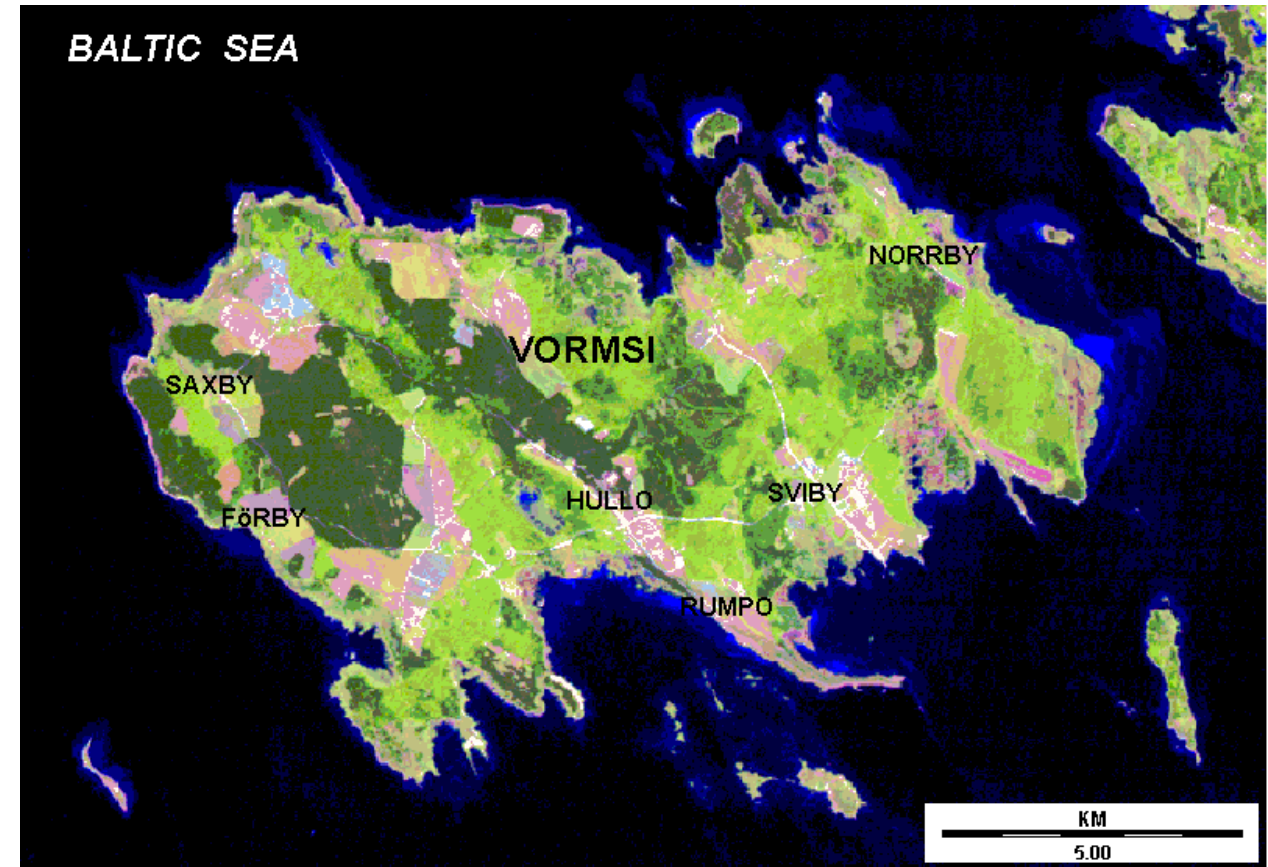
- Monitoring deforestation
  - Vegetation cover types have different spectral signatures:

## False-color satellite (LANDSAT) image of an Estonian island

- Band 3 (red) -> blue
- Band 4 (near infra-red) -> green
- Band 5 (mid infra-red) -> red

### Result:

- Dark green -> spruce forest
- Olive green -> pine forest
- Yellow green -> broadleaves
- Pale green -> grassland



Source: Emporia State University

# Scaling up REDD+, a question of understanding and monitoring

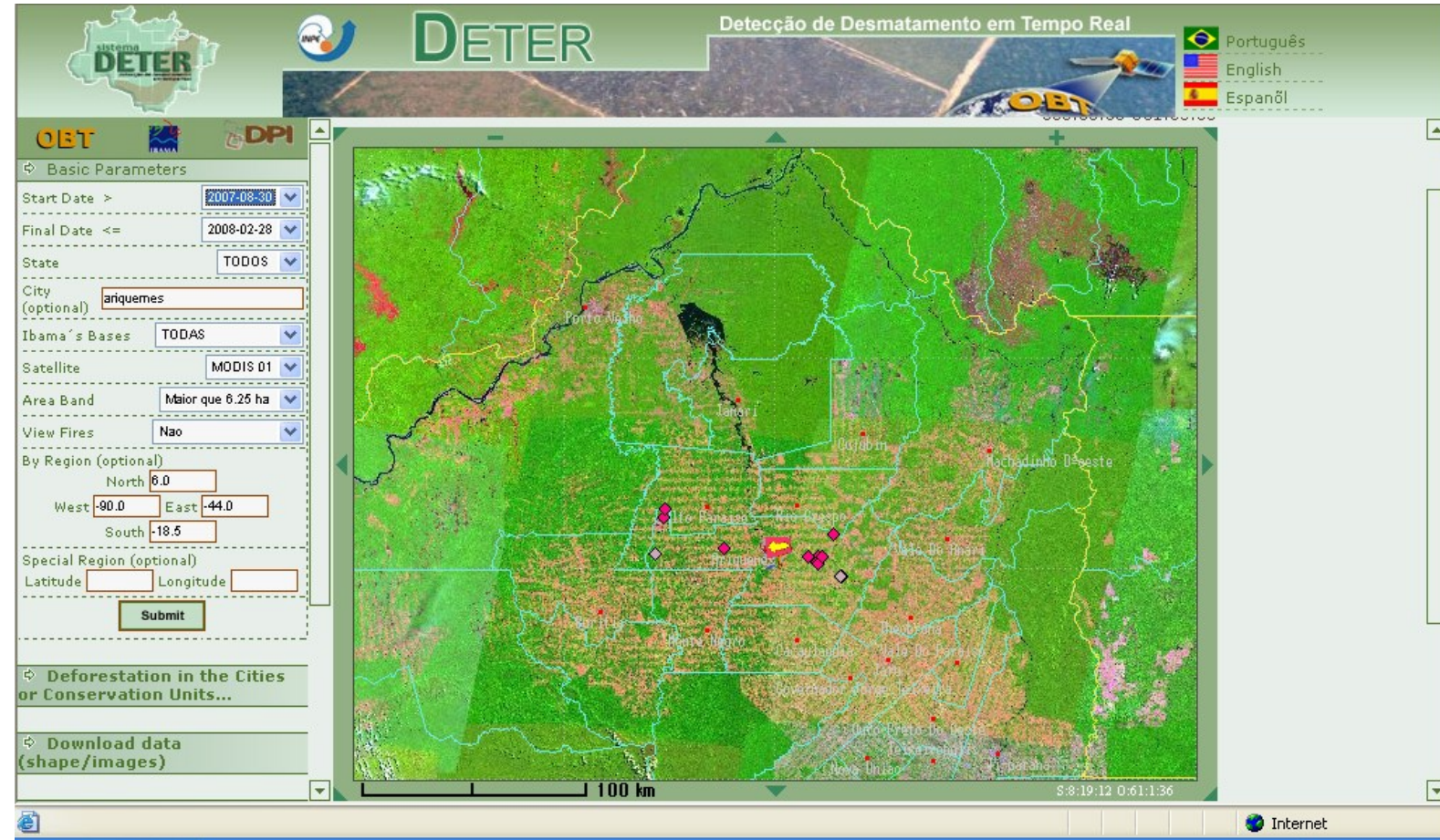


- Monitoring deforestation
  - The detection of deforestation can be achieved routinely

## Real-time deforestation detection in Brazil

Annual deforestation rate estimated within a 10% confidence interval

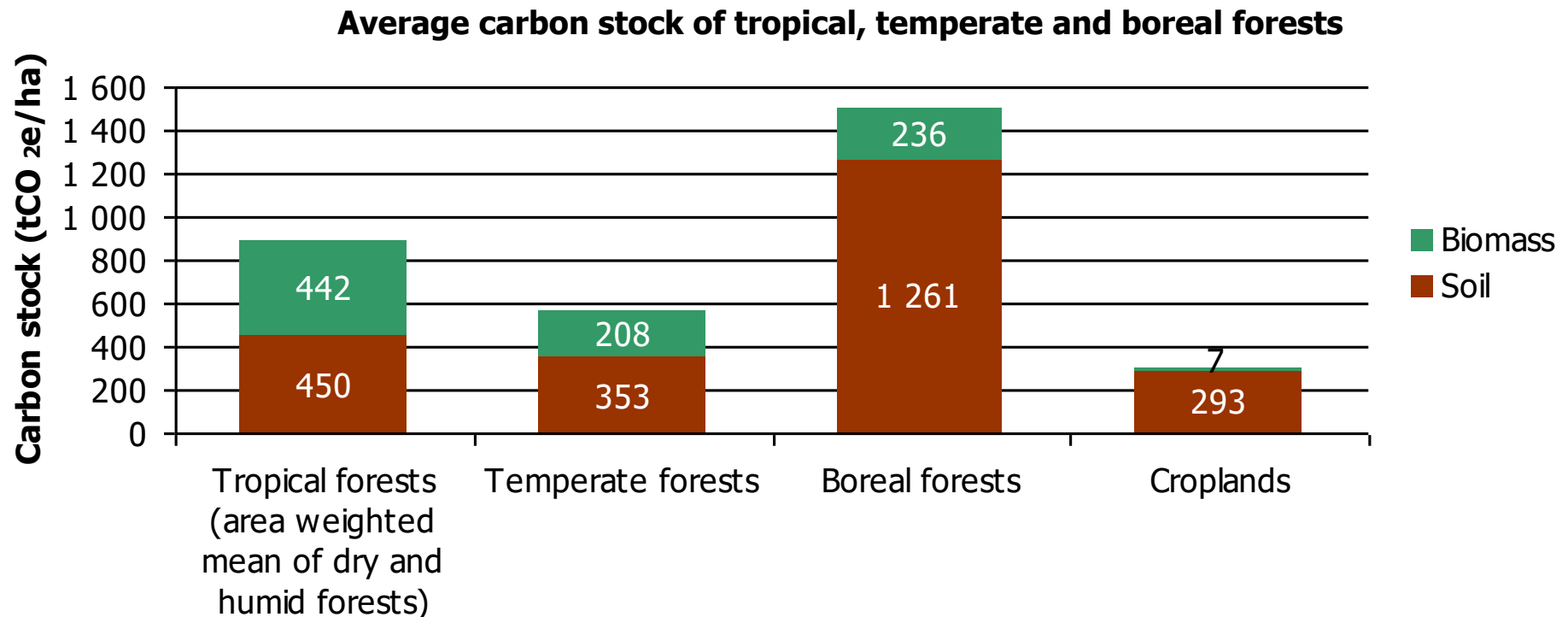
Source: INPE



# Scaling up REDD+, a question of understanding and monitoring



- Monitoring deforestation
  - Carbon stocks vary between forests: carbon pools, climate, management



# Scaling up REDD+, a question of understanding and monitoring



- Monitoring deforestation
  - Carbon stock mapping rely on ground measurements (diameter, height)
    - Volume from an allometric relationship
    - Carbon stock based on carbon density coefficient



*Source: University of Canterbury*



# Scaling up REDD+, a question of understanding and monitoring

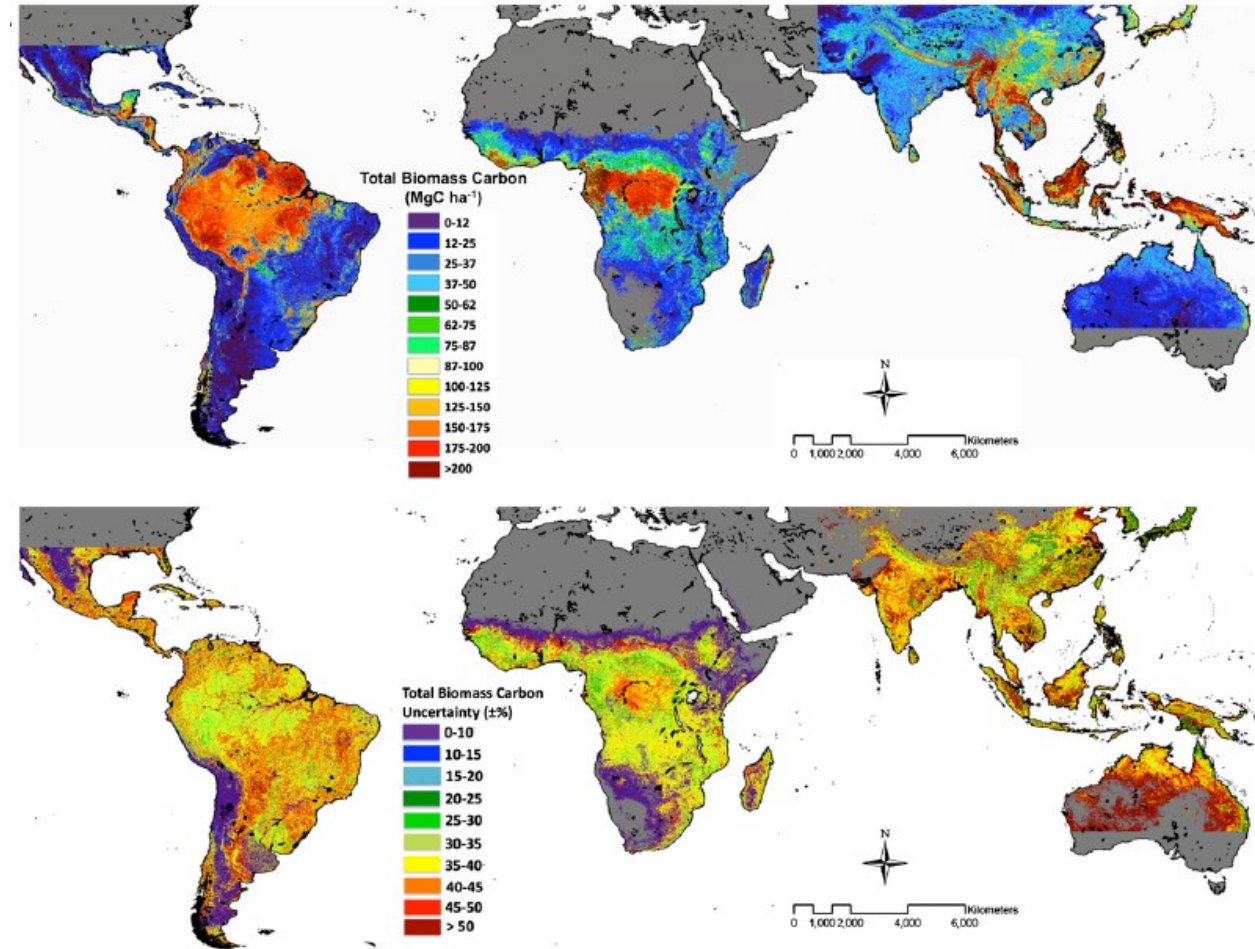
- Monitoring deforestation
  - Different interpolation techniques allow carbon mapping from samples of inventoried forests

Average 95% confidence interval (based on bootstrapped real error distribution):

30% at pixel scale

5% at 10 000 ha scale

1% at national scale

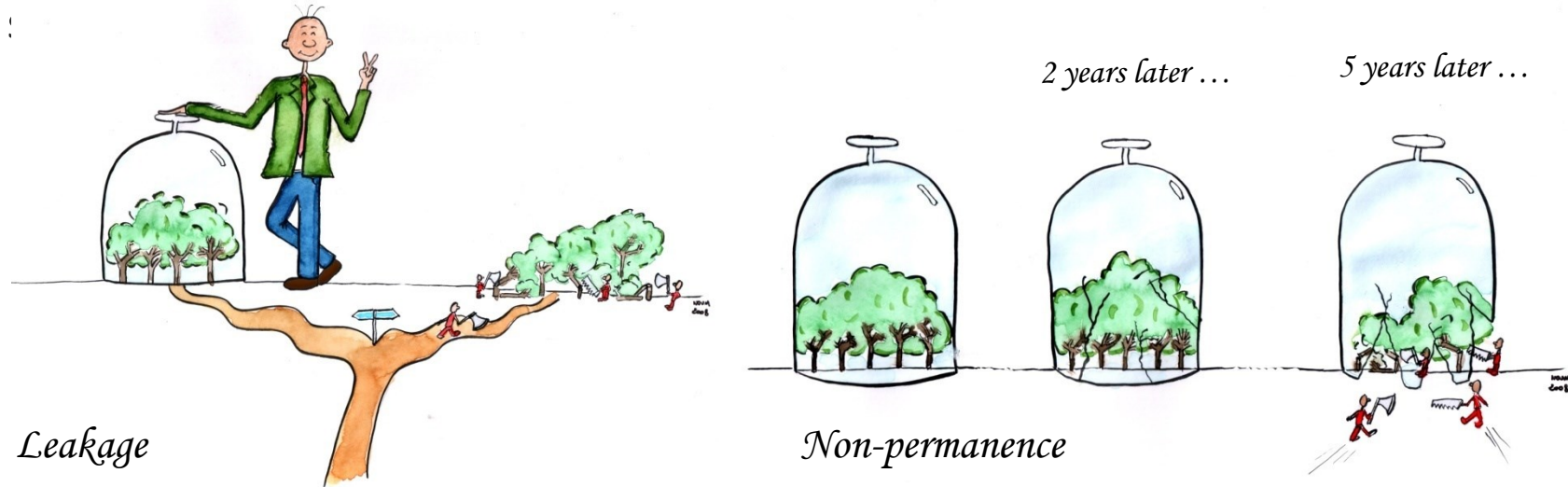


Source: Saatchi et al., 2011

# Scaling up REDD+, a question of understanding and monitoring



- Leakage and non-permanence risks:
  - Leakage is never 100%: estimates vary between 2-95%
  - Possibility to implement leakage-reduction activities (ecological intensification, fuel switch, or fuel efficiency, etc.)
- Non-permanence
  - CDM solution: temporary credits
  - An innovative :



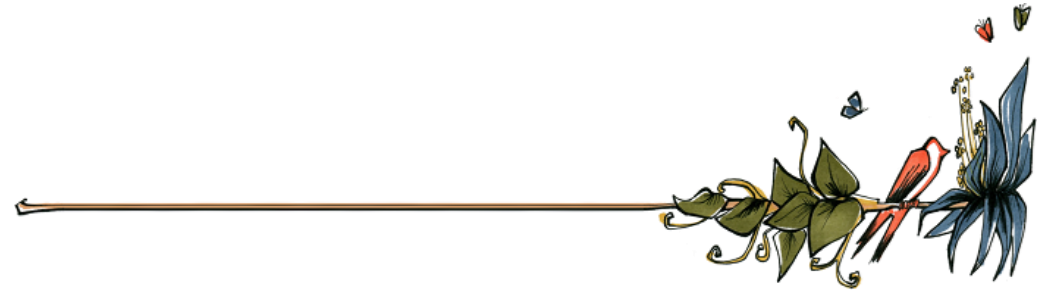
Source: Manu

# Scaling up REDD+, a question of understanding and monitoring



- Key points of part 3:
  - Deforestation is especially intense in South-east Asia, less dramatic in Central Africa:  
There is no “one size fits all” solution
  - Agriculture and food markets are the primary drivers of deforestation
  - Deforestation can be monitored by satellites
  - The solution to leakage and non-permanence lies in the accounting framework

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4. **What kind of links between REDD+ and carbon markets?**

# What kind of links between REDD+ and carbon markets?



- Two options: tradable credits or fund
- Hurdles from the supply side: REDD costs and baselines
  - REDD costs: models, opportunity costs, ... and ex-post assessments?
  - The political choice of baselines
- Hurdles from the demand side: would REDD flood carbon markets?
  - Latest news from international climate negotiations

# What kind of links between REDD+ and carbon markets?



- Offsets or fund: pros and cons

## Offsets

- Advanced financing & involvement from the private sector
- Existing source of demand/financing
- Targets low hanging fruits first

## Fund

- No risk of market flooding
- Political involvement on investment choices is easier
- Governance challenge

## Challenges for both mechanisms

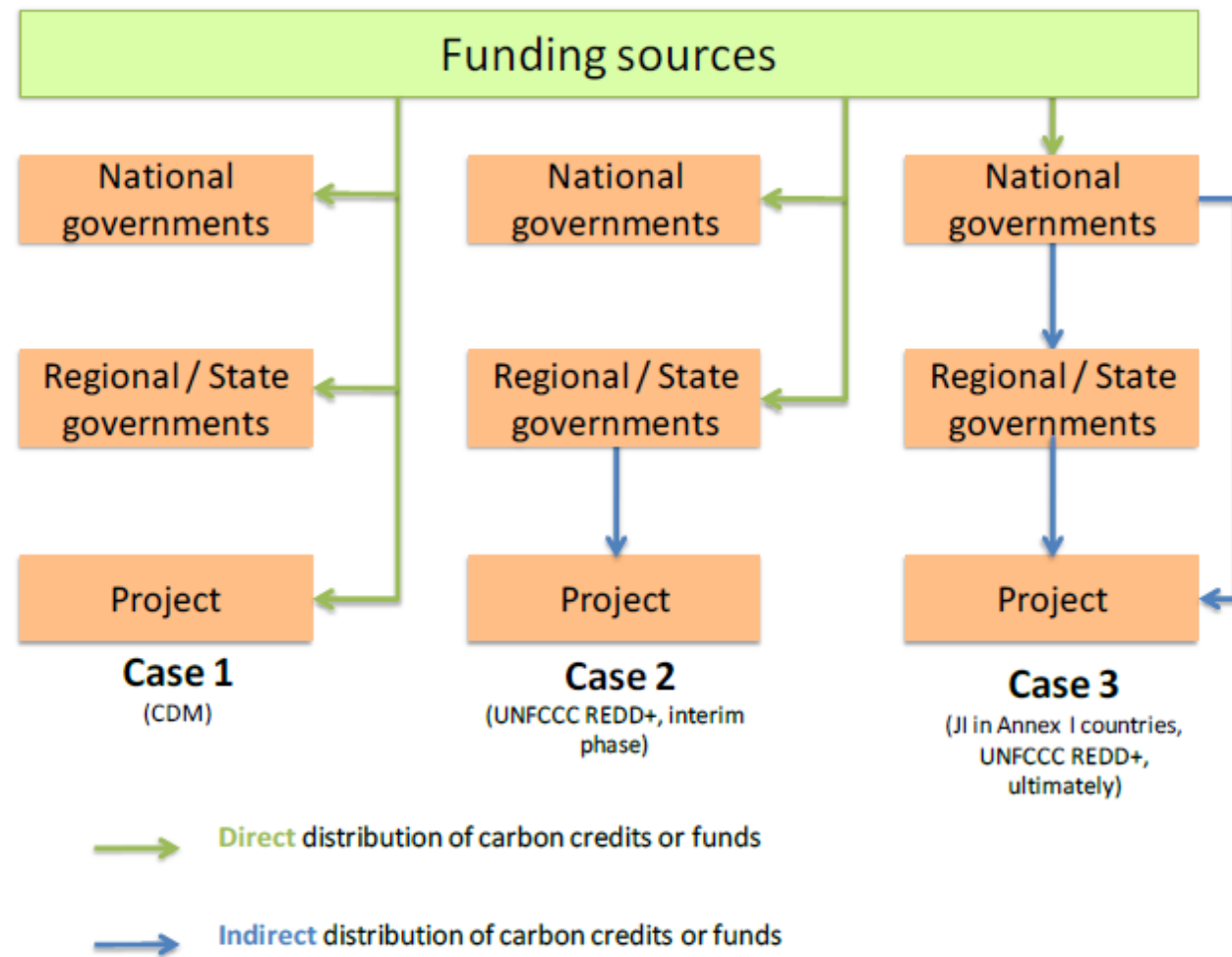
- Quality of reporting
- Distribution of incentives between stakeholders
- Result-based reward & baseline setting

# What kind of links between REDD+ and carbon markets?



- Options for the distribution of carbon incentives:

**What about the local communities...?**



# What kind of links between REDD+ and carbon markets?



- Forests and international climate negotiations: a brief history



2001, Marrakech : technical failure

- Creation of project mechanism: CDM and JI
- Avoided deforestation is excluded:
  - Measurement uncertainty
  - Probable « leakage »
  - Risk of destabilizing the young carbon markets



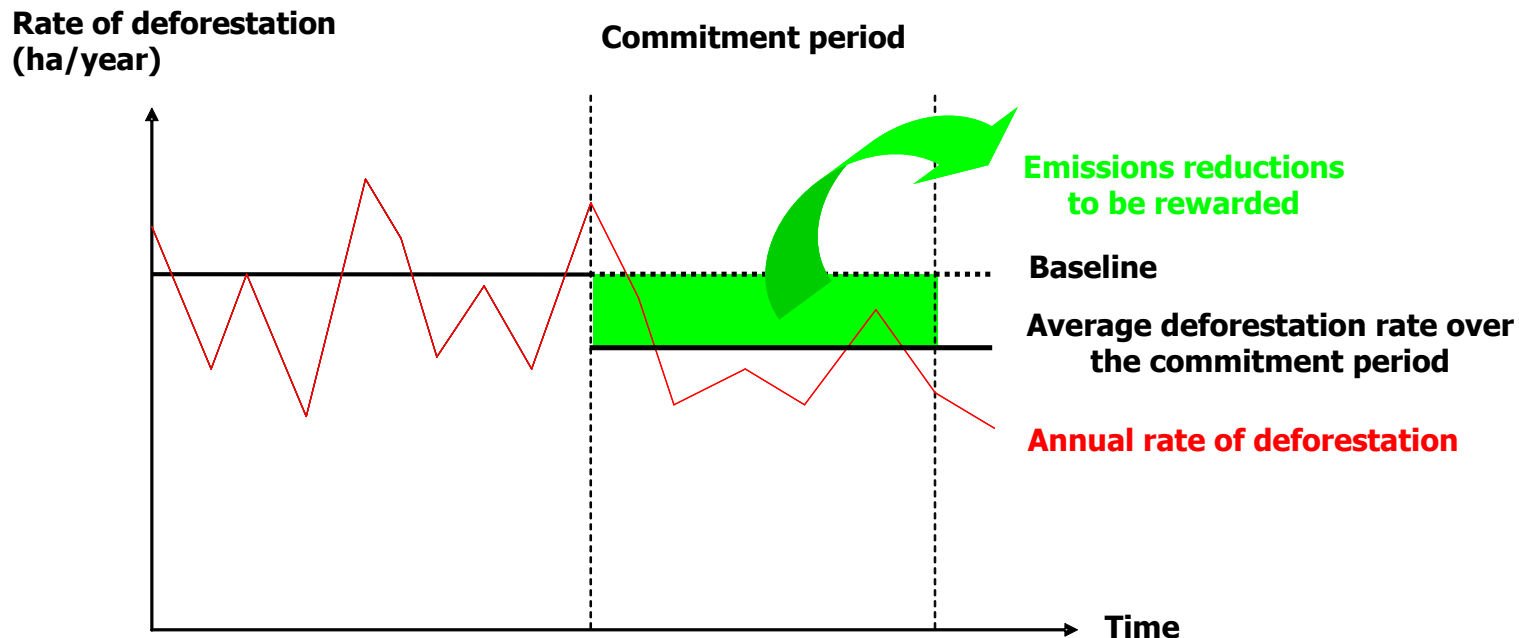
# What kind of links between REDD+ and carbon markets?



- Forests and international climate negotiations: a brief history



2003, Milan: conceptual breakthrough : The « Compensated Reductions » concept is presented by a group of scientists and NGOs as a solution to measurement and leakage issues



# What kind of links between REDD+ and carbon markets?



- Forests and international climate negotiations: a brief history



Montréal 2005

2005 Montréal, 2007 Bali: political breakthroughs

- In Montréal, the Coalition for Rainforest Nations brings « avoided deforestation » back on the official negotiation agenda
- In Bali, parties agree that REDD incentives will be part of the post-2012 framework
- In Accra (august 2008), Brazil and India agree that « avoided deforestation » and reforestation incentives shall be discussed in the same « REDD+ » package
- In Copenhagen (2009), 3.5 G\$ for REDD and call for national baselines



UN Climate Change  
Conference 2007  
Bali - Indonesia

# What kind of links between REDD+ and carbon markets?



- Forests and international climate negotiations: a brief history



## Cancun 2010

- Requests developing countries to develop
  - National/subnational baselines
  - National action plans
  - Robust MRV system
  - Information system to report on how safeguard provisions (indigenous rights, biodiversity, ...) are addressed
- Requests SBSTA to work on MRV specifications
- Financing will be result-based

# What kind of links between REDD+ and carbon markets?



- Forests and international climate negotiations: a brief history



## Warsaw 2013

COP19/CMP9  
UNITED NATIONS  
CLIMATE CHANGE CONFERENCE  
WARSAW 2013

- MRV rules are set
- MRV will be similar to annex 1 countries for developing countries seeking result-based payments
- Green Climate Fund will abide by these rules, and so will likely the current donors and recipients of bilateral and multilateral REDD+ funding as they are UNFCCC parties
- REDD+ sets a precedent for other sectoral NAMAs
- Yet, no large and secure source of funding

# What kind of links between REDD+ and carbon markets?



- Forests and international climate negotiations: a brief history



PARIS2015  
UN CLIMATE CHANGE CONFERENCE  
COP21-CMP11

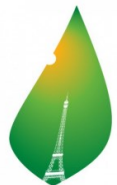
## Paris 2015

- The Paris Agreement was adopted by consensus by representatives of 196 parties:
  - “(...) keeping a global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C”
- Article 5 on REDD+:
  - Paragraph 1: “Parties should take action to conserve and enhance, (..), sinks and reservoirs of GHG (...) including forests.”
  - Paragraph 2: “Parties are encouraged to take action to implement and support(...), the existing framework (...) for: policy approaches and positive incentives for activities relating to REDD, and the role of conservation, sustainable management of forests and enhancement of forest C stocks in developing countries ; (...).

# What kind of links between REDD+ and carbon markets?



## • Forests and international climate negotiations: a brief history



PARIS2015  
UN CLIMATE CHANGE CONFERENCE  
COP21·CMP11

### Paris 2015

- Article 6 allows parties to use “cooperative approaches” (i.e., carbon markets) to contribute to their NDCs, and encourages the involvement of the private sector.
- Precursor to the replacement of the CDM by a new multilateral mechanism – probably not fully operational until 2030



COP26

### Glasgow 2021

- Provides guidance, rules and a work programme for the implementation of article 6
- Focus on ESG standards and the risk of double accounting of internationally transferred mitigation outcomes (ITMOs)
- Alignment of private markets to article 6 remain uncertain.

# What kind of links between REDD+ and carbon markets?



- Remaining issues

- Impact of national elections in USA, Brazil,...
- Benefit sharing...
- Design and implementation of REDD+ National Strategies, articulation with existing REDD+ projects...
- Which link to carbon markets?
  - Coalition for Rainforest Nations favors tradable credits / Brazil favors a fund
  - The European Union dilemma: providing sustainable financing to REDD while keeping a high carbon price on the ETS



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# Thank you very much!

