

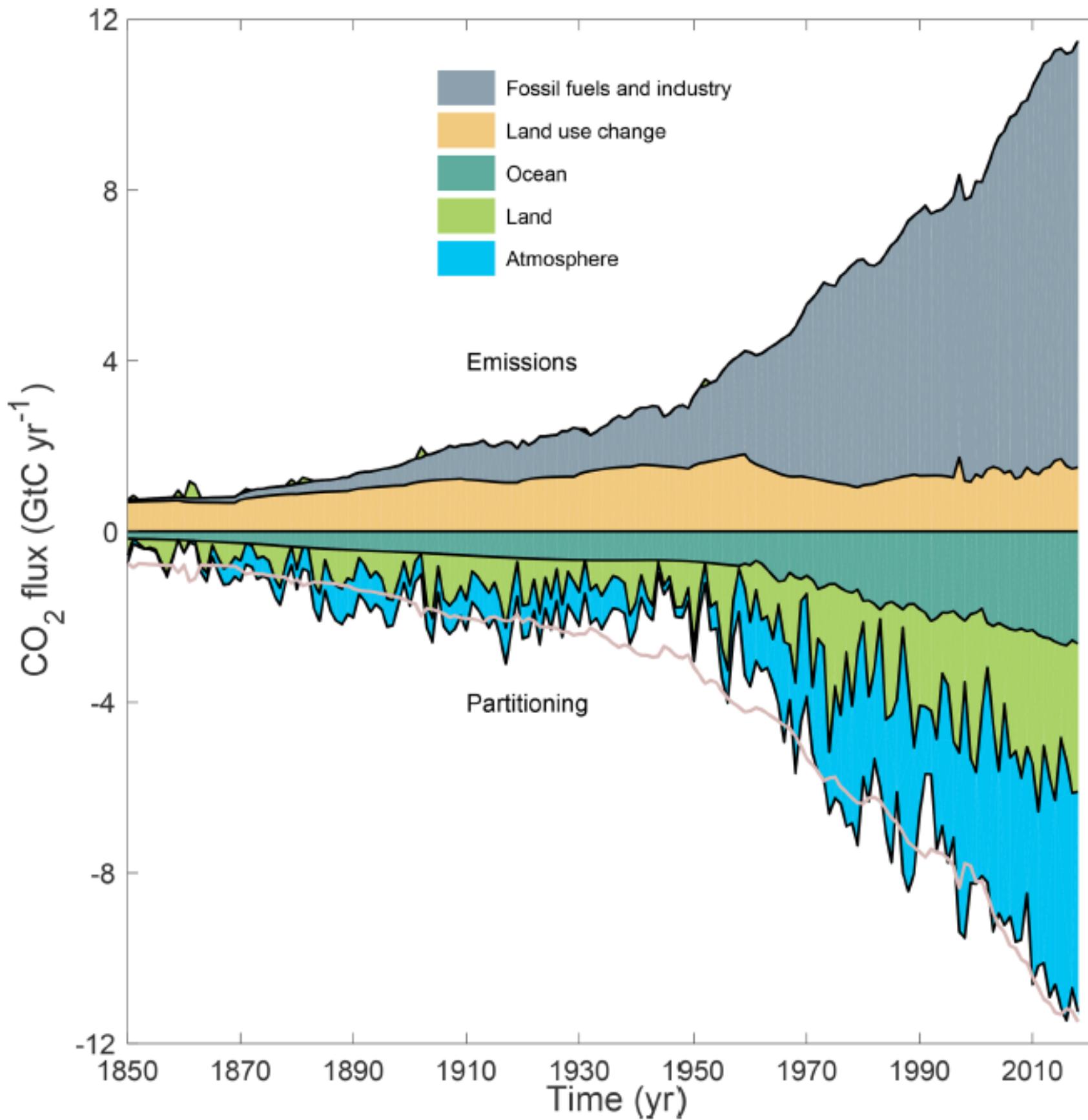
Il ruolo degli ecosistemi nella lotta ai cambiamenti climatici



Globo

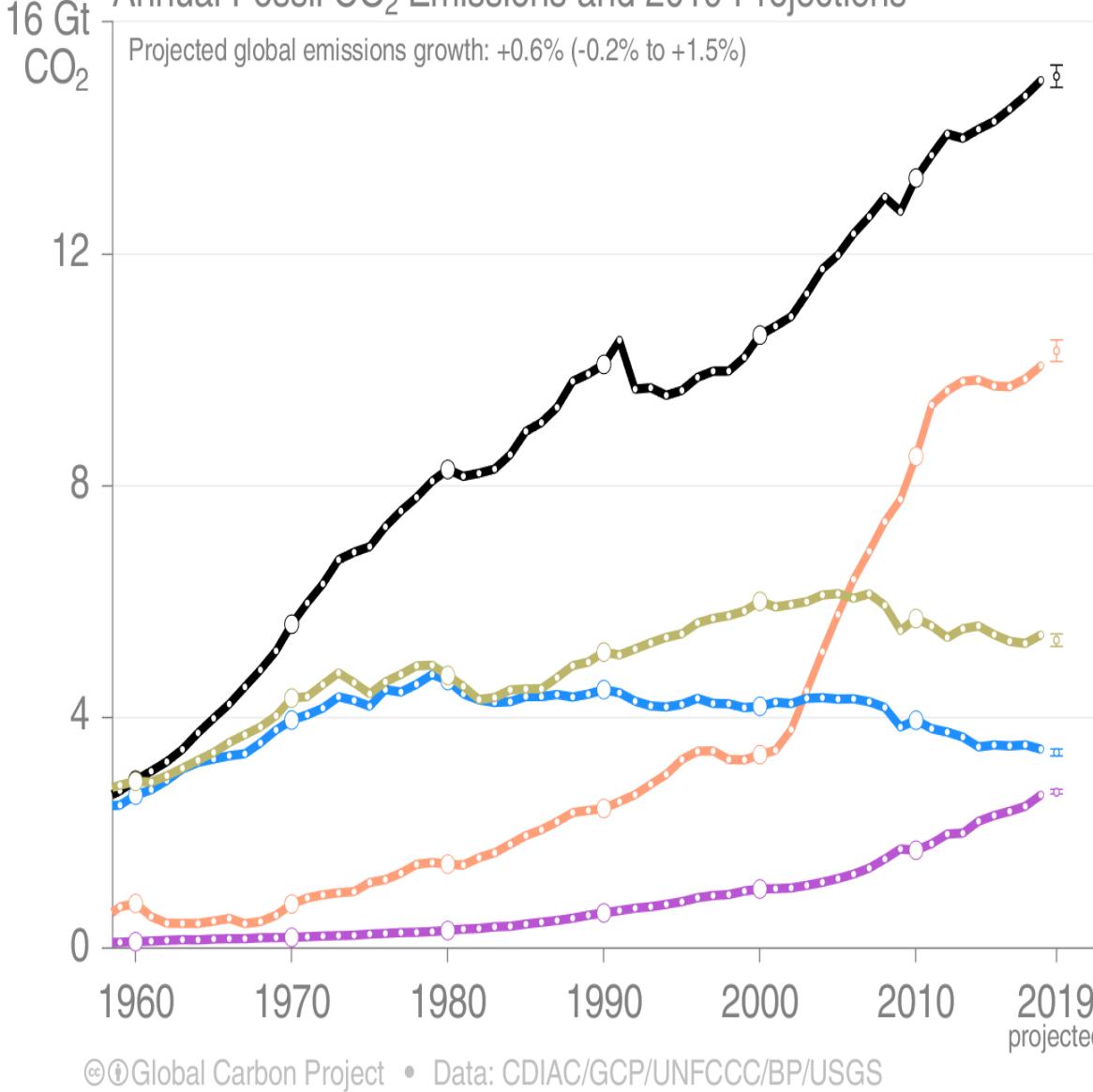
Italia

Flussi di CO₂



Fonte: Global Carbon Budget 2019

Annual Fossil CO₂ Emissions and 2019 Projections



Projected Gt CO₂ in 2019

All others 15.1

▲ 0.5% (-0.8% to +1.8%)

China 10.3
▲ 2.6% (+0.7% to +4.4%)

USA 5.3

▼ 1.7% (-3.7% to +0.3%)

EU28 3.4

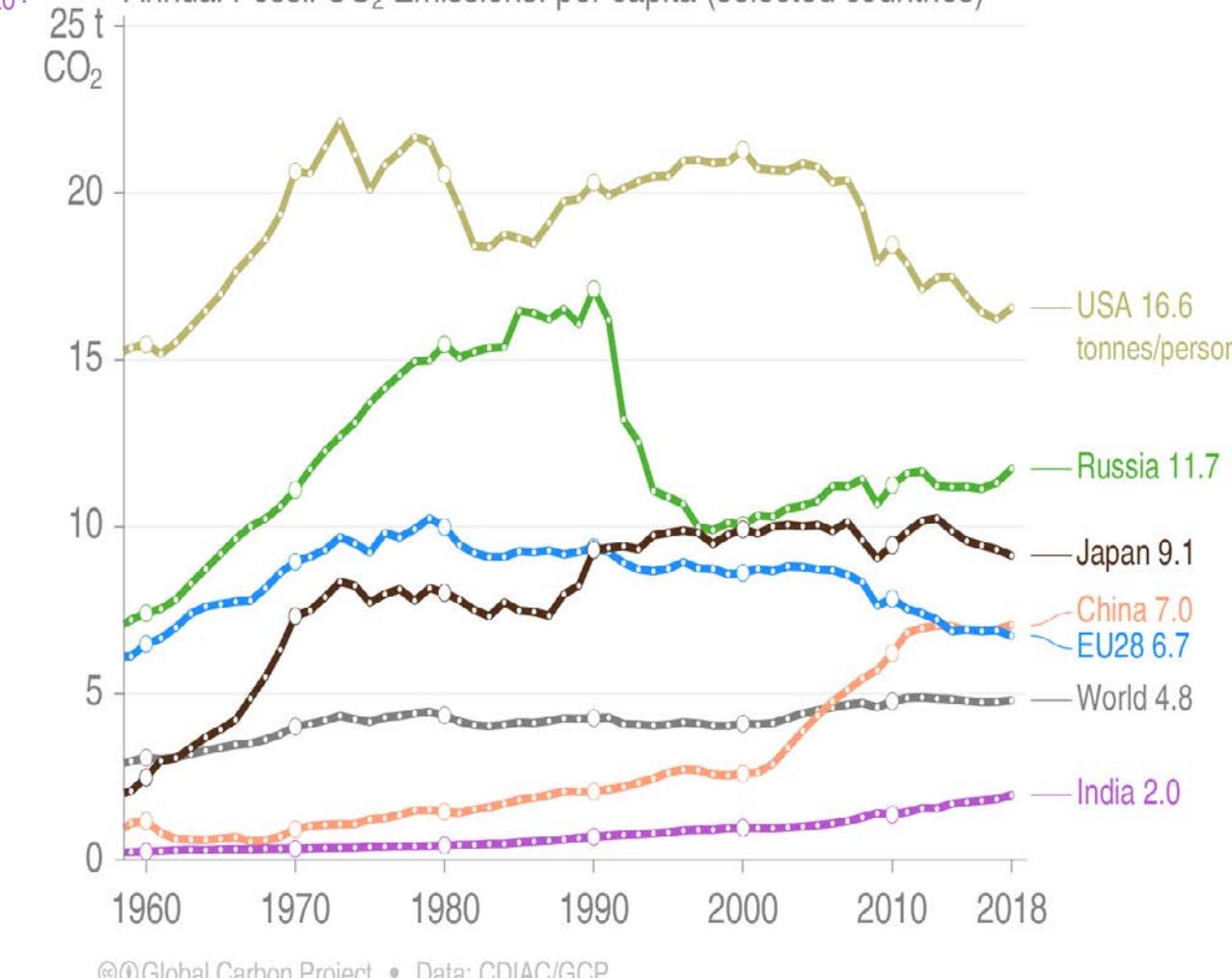
▼ 1.7% (-3.4% to +0.1%)

India 2.7

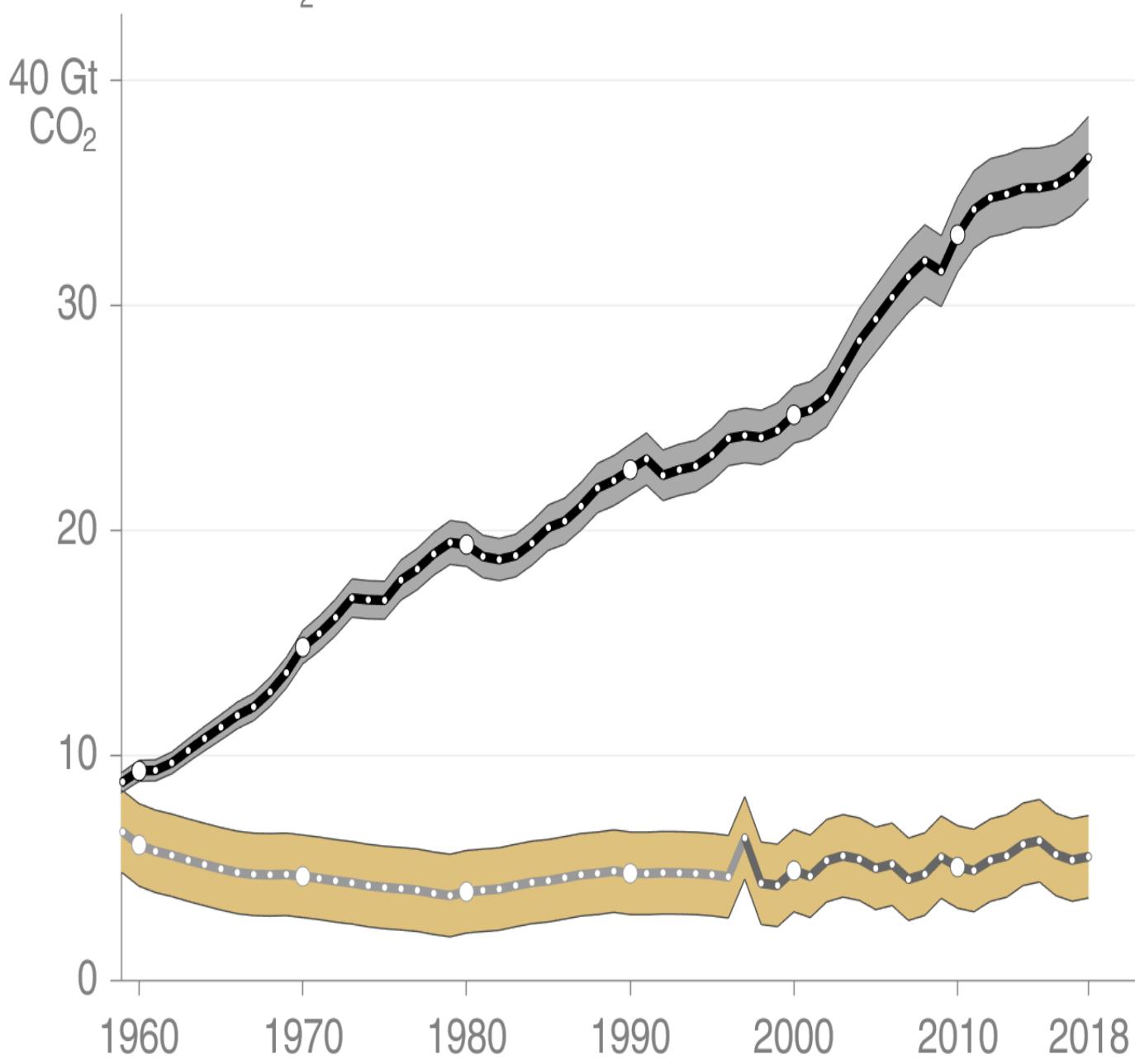
▲ 1.8% (+0.7% to +3.8%)

Emissioni di gas serra da fonti fossili

Annual Fossil CO₂ Emissions: per capita (selected countries)



Fonte: [CDIAC](#); [Peters et al 2019](#); [Friedlingstein et al 2019](#); [Global Carbon Budget 2019](#)



cc Global Carbon Project • Data: CDIAC/UNFCCC/BP/USGS/GCP

Fossil carbon

Land-use
change

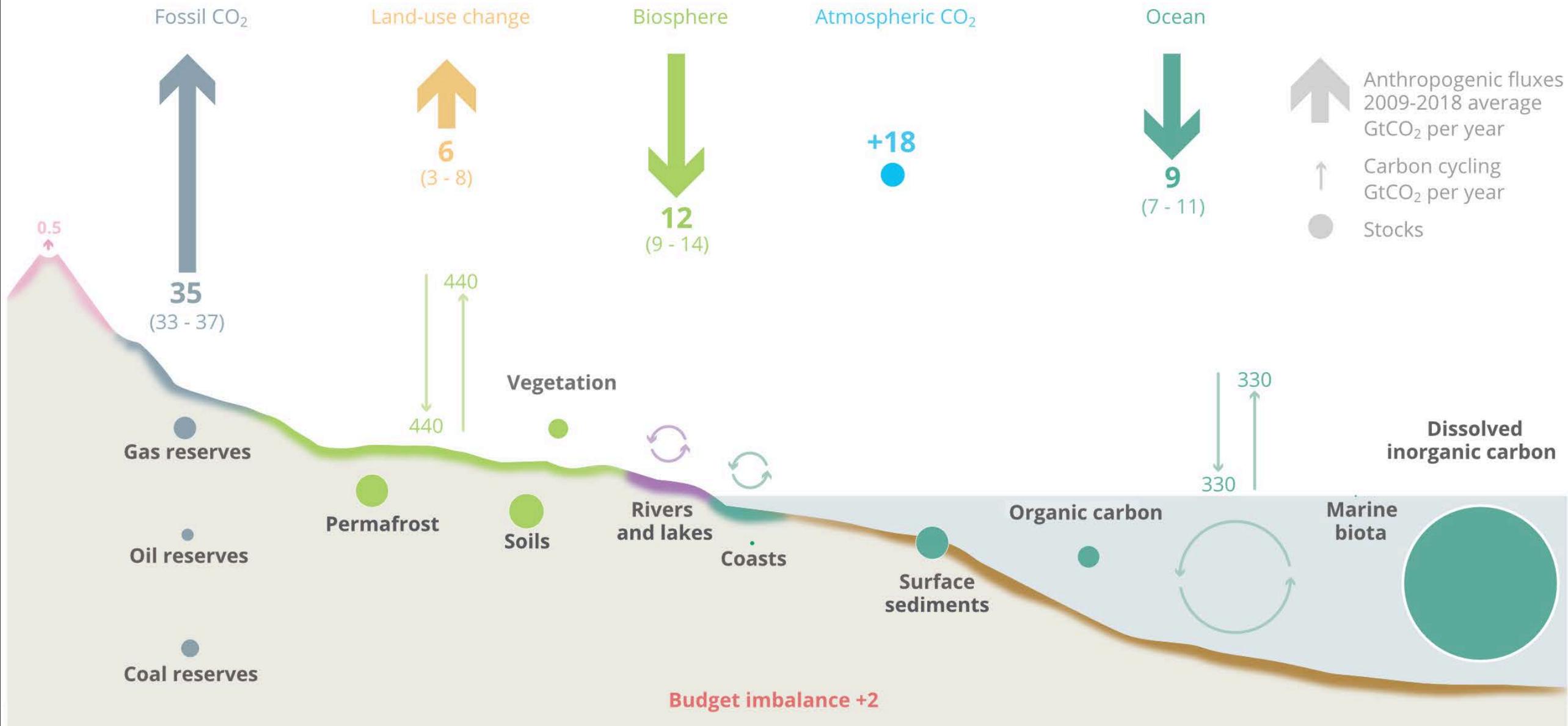
Emissioni di gas
serra e contributo
delle variazioni
di uso del suolo

- ✓ Emissioni di gas serra totali nel 2018: 42.1 ± 2.8 GtCO₂ in 2018, aumento del 55% rispetto al 1990
- ✓ Percentuale di emissioni dovuti alla variazioni di uso del suolo: 39% in 1960, 14%, in media, nel periodo 2009–2018

Land-use change estimates from two bookkeeping models, using fire-based variability from 1997
Fonte: CDIAC; Houghton and Nassikas 2017; Hansis et al 2015; van der Werf et al. 2017; Friedlingstein et al 2019; Global Carbon Budget 2019

Variazioni annuali antropogeniche del ciclo del carbonio [Gt CO₂]

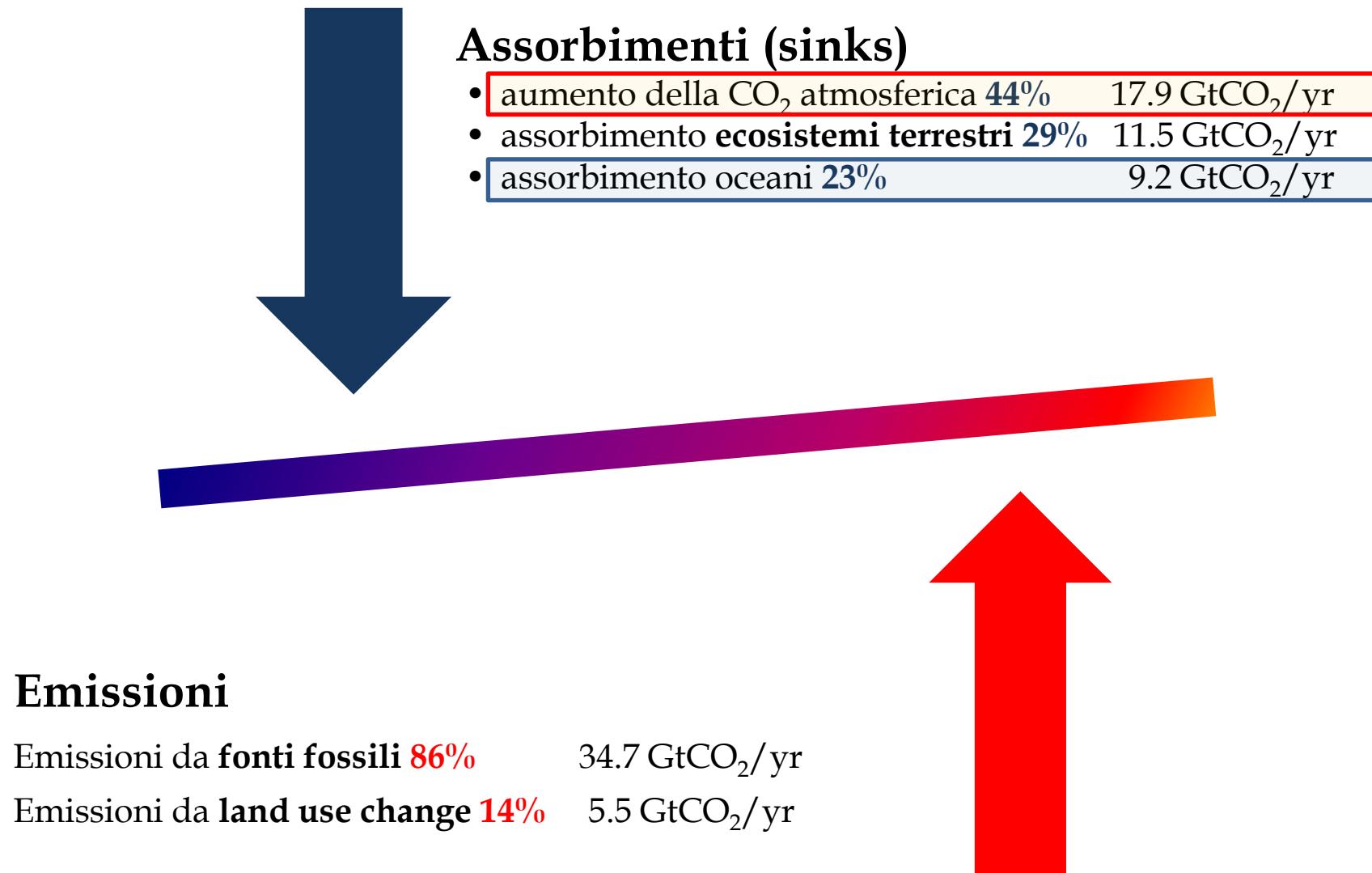
Media globale per il periodo 2009-2018



Fonte: Global Carbon Budget 2019; [CDIAC](#); [NOAA-ESRL](#); [Friedlingstein et al 2019](#); [Ciais et al. 2013](#)

The budget imbalance is the difference between the estimated emissions and sinks.

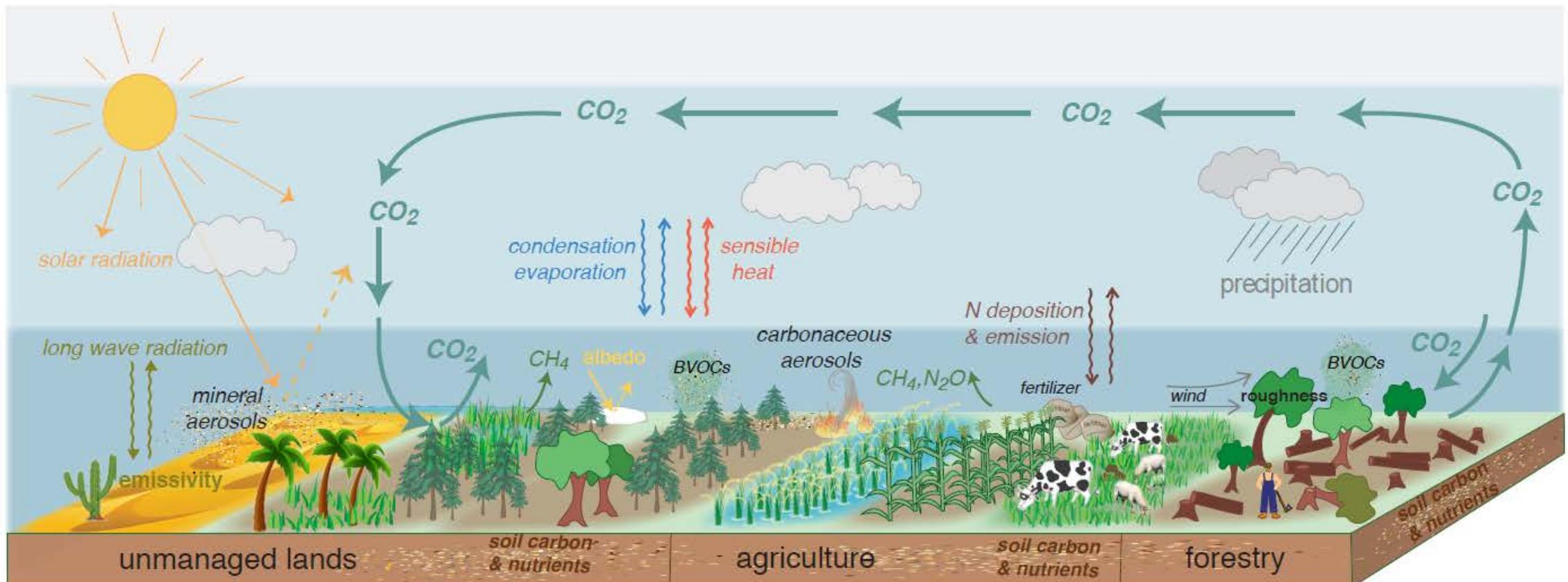
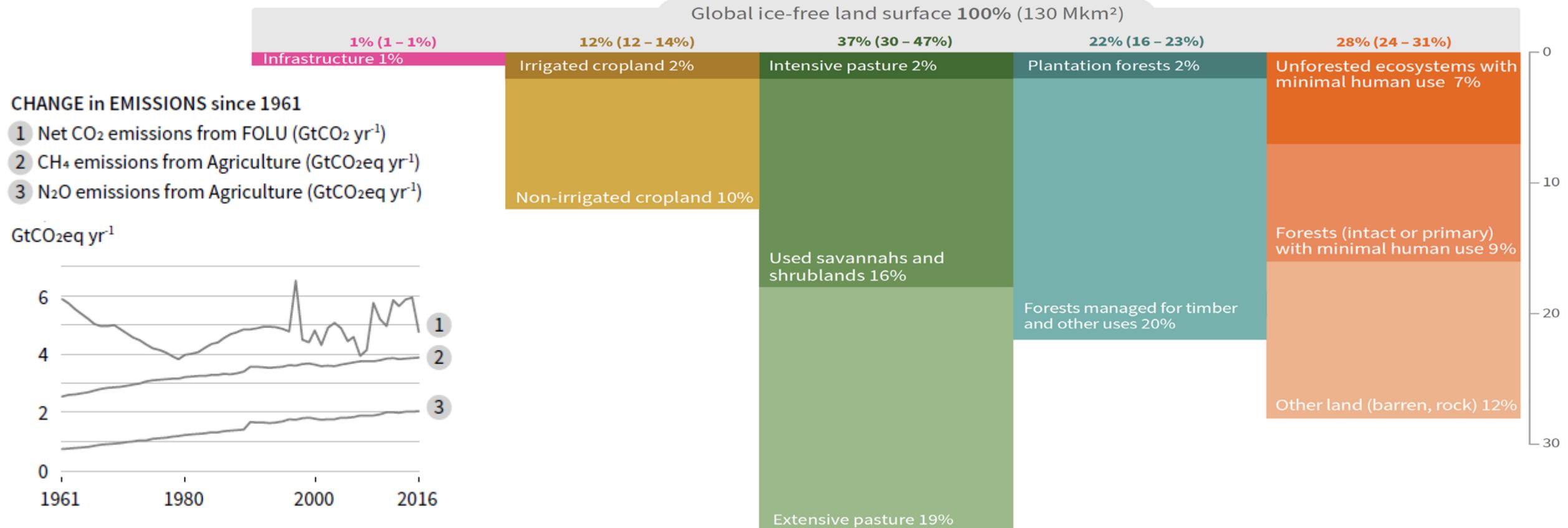
Le emissioni antropogeniche e gli assorbimenti (2009-2018)



Oltre a contenere l'80% della biodiversità terrestre, a fornirci acqua e aria pulita, cibo e bellezza, le foreste svolgono un ruolo chiave nel contenere i cambiamenti climatici in atto.

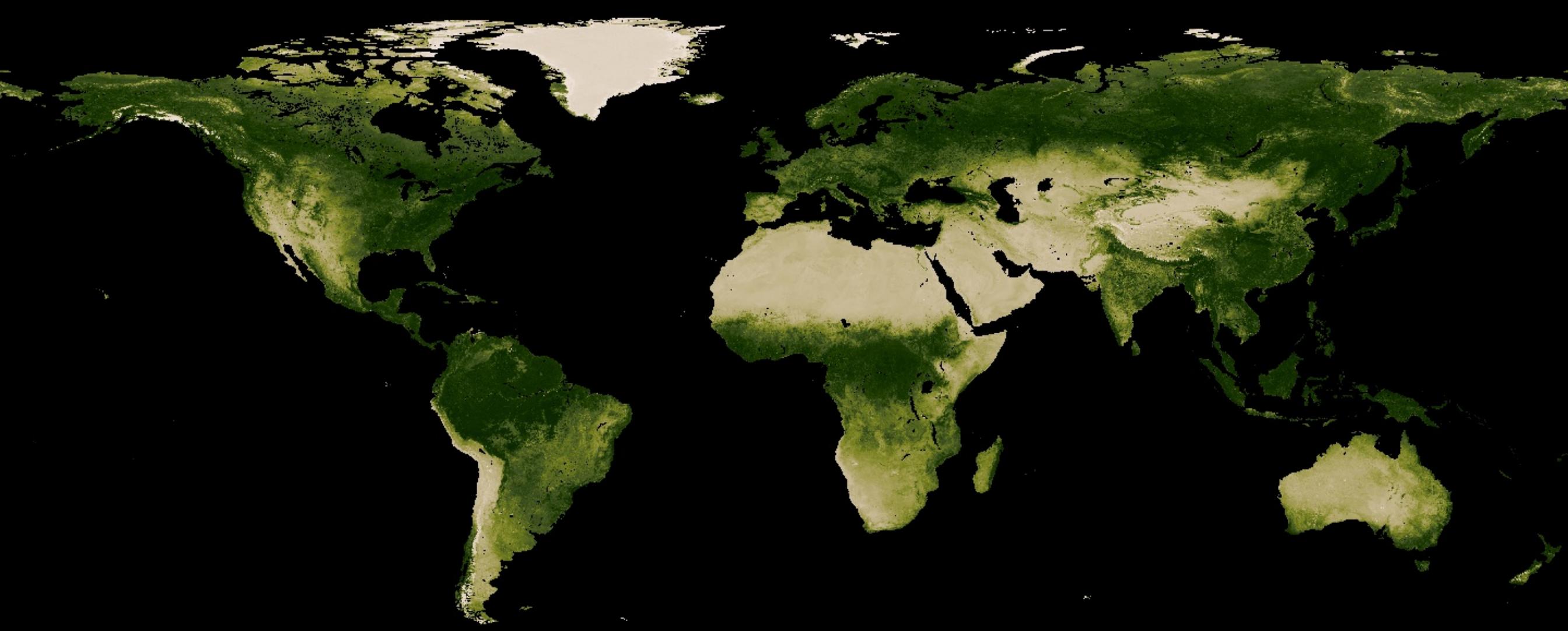
The budget imbalance is the difference between the estimated emissions and sinks (equal to 1.6 GtCO₂/yr)
Fonte: Global Carbon Budget 2019; [CDIAC](#); [NOAA-ESRL](#); [Friedlingstein et al 2019](#); [Ciais et al. 2013](#)

La superficie terrestre libera da ghiacci



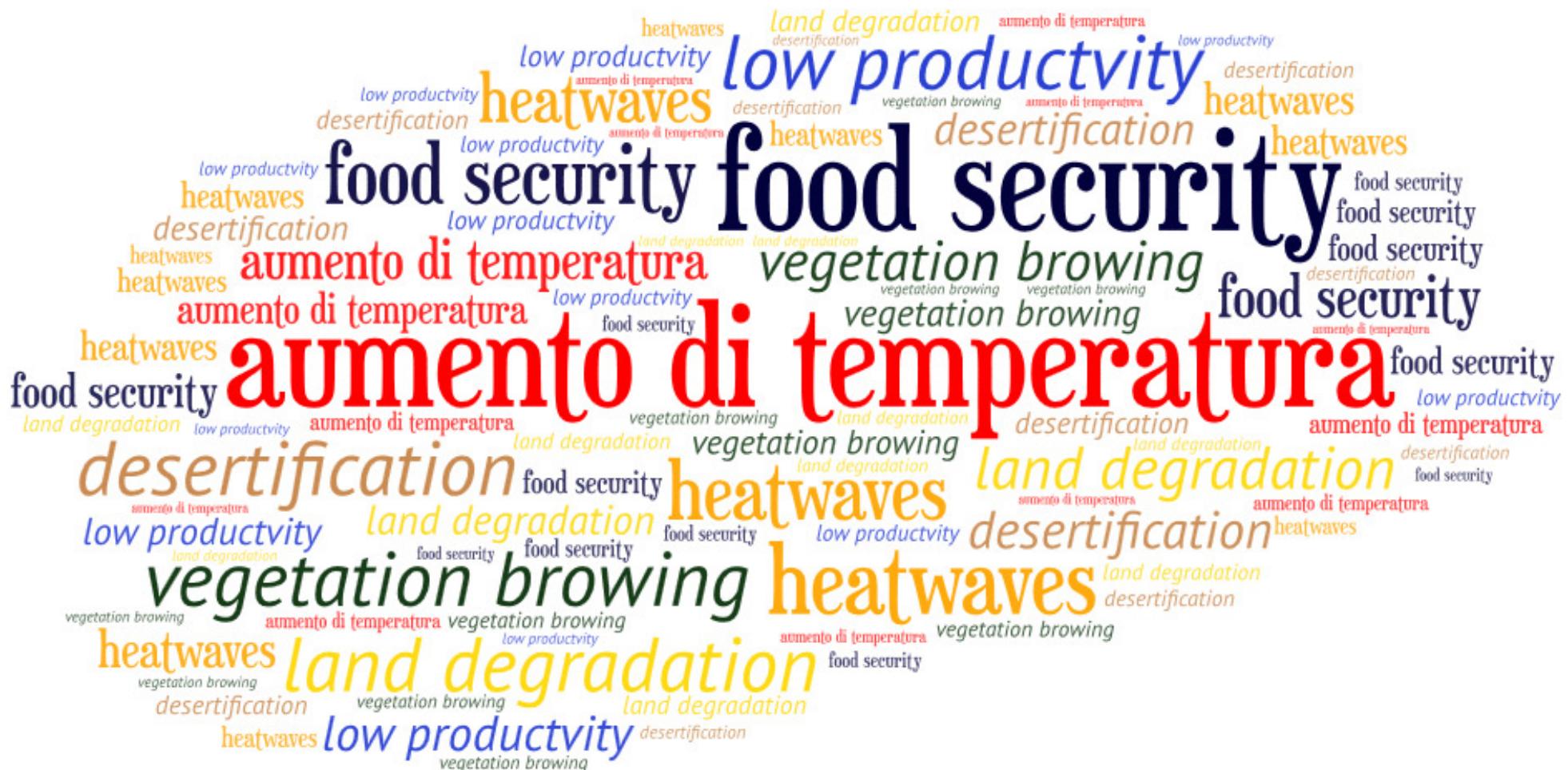
Fonte: IPCC, 2019: Technical Summary, 2019. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

Indice di vegetazione [NDVI] (Luglio 2019 - Terra/MODIS)

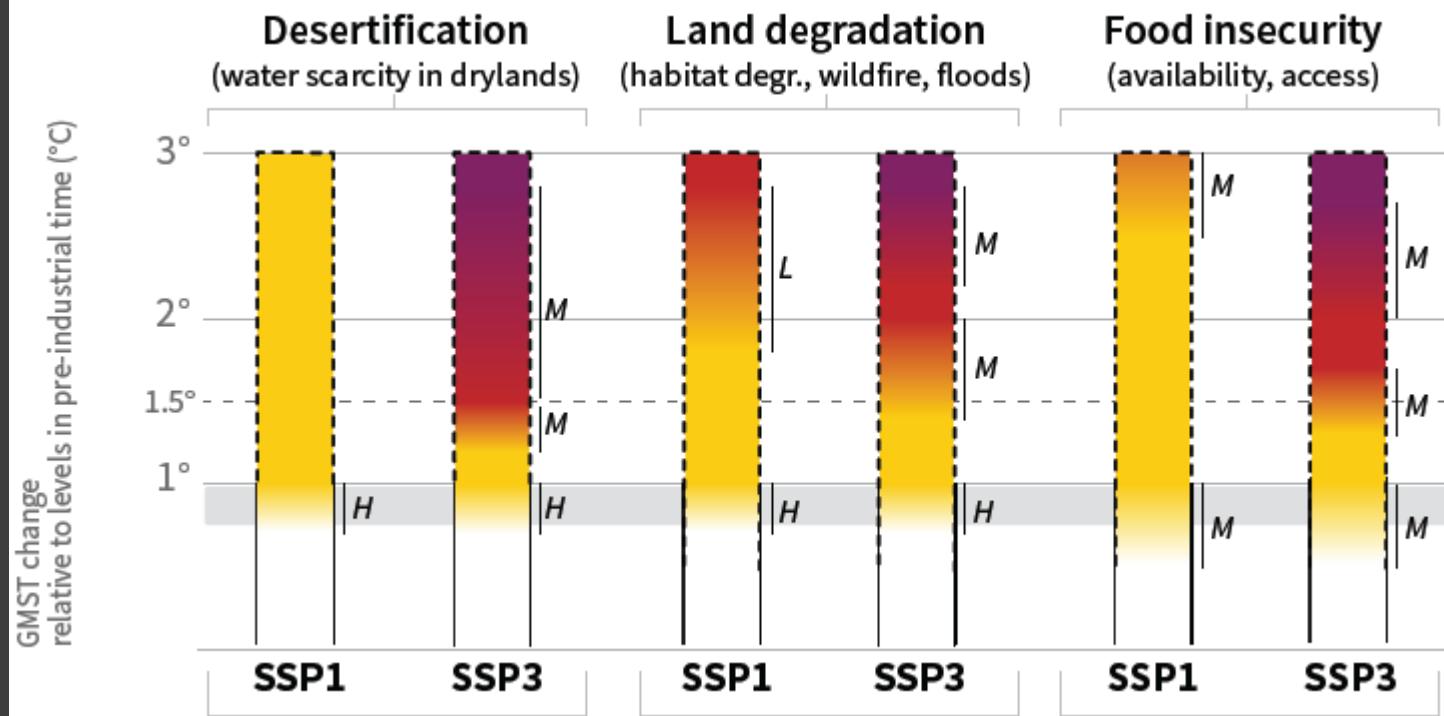


Fonte: Images by Jesse Allen and Reto Stockli, NASA Earth Observatory Group, using data provided by the MODIS Land Science Team

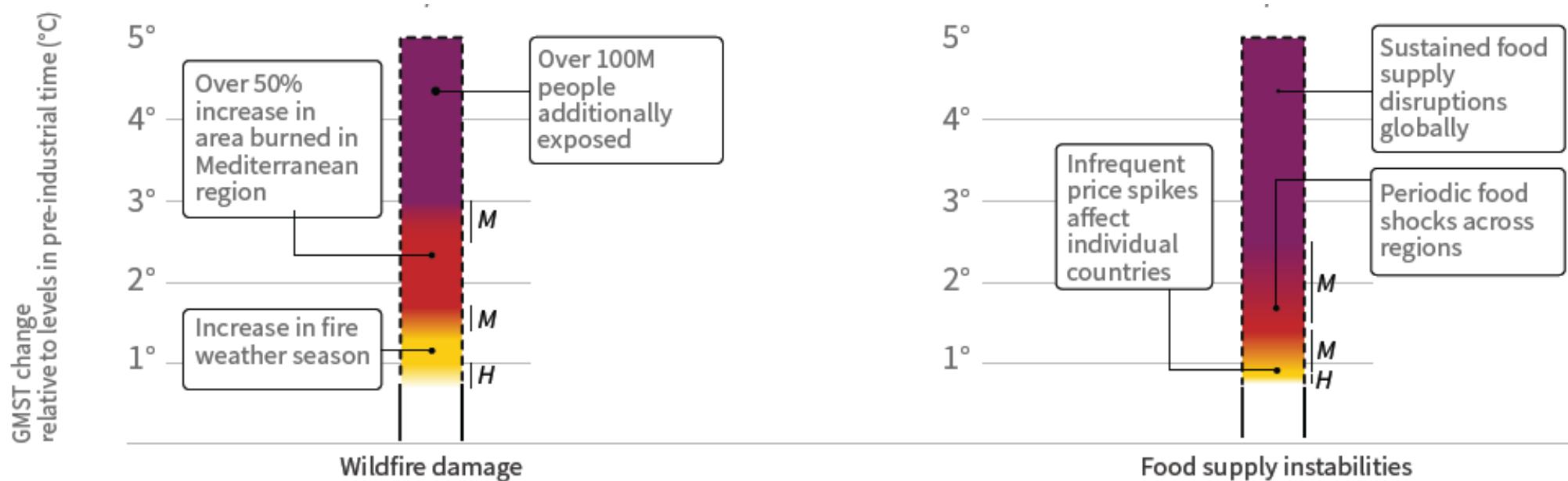
Ecosistemi terrestri e cambiamenti climatici



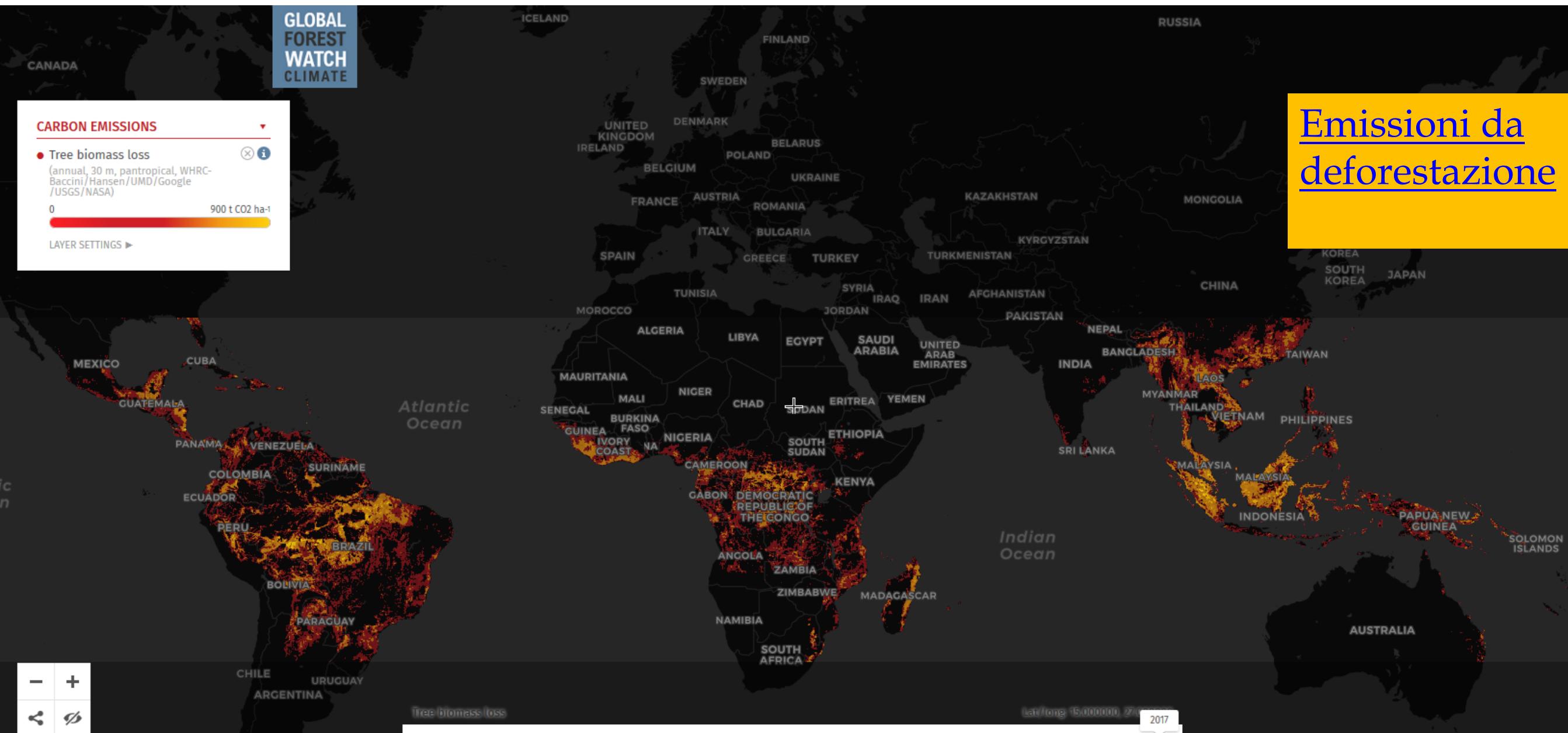
- A.2.1 Since the pre-industrial period (1850–1900) the observed mean land surface air temperature has risen considerably more than the global mean surface (land and ocean) temperature (GMST) (*high confidence*). From 1850–1900 to 2006–2015 mean land surface air temperature has increased by 1.53°C (*very likely* range from 1.38°C to 1.68°C) while GMST increased by 0.87°C (*likely* range from 0.75°C to 0.99°C). (Figure SPM.1) {2.2.1}
- A.2.2 Warming has resulted in an increased frequency, intensity and duration of heat-related events, including heatwaves⁴ in most land regions (*high confidence*). Frequency and intensity of droughts has increased in some regions (including the Mediterranean, west Asia, many parts of South America, much of Africa, and north-eastern Asia) (*medium confidence*) and there has been an increase in the intensity of heavy precipitation events at a global scale (*medium confidence*). {2.2.5, 4.2.3, 5.2}
- A.2.3 Satellite observations¹⁵ have shown vegetation greening¹⁶ over the last three decades in parts of Asia, Europe, South America, central North America, and southeast Australia. Causes of greening include combinations of an extended growing season, nitrogen deposition, Carbon Dioxide (CO₂) fertilisation,¹⁷ and land management (*high confidence*). Vegetation browning⁸ ha been observed in some regions including northern Eurasia, parts of North America, Central Asia and the Congo Basin, largely as a result of water stress (*medium confidence*). Globally, vegetation greening has occurred over a larger area than vegetation browning (*high confidence*). {2.2.3, Box 2.3, 2.2.4, 3.2.1, 3.2.2, 4.3.1, 4.3.2, 4.6.2, 5.2.2}
- A.2.5 In some dryland areas, increased land surface air temperature and evapotranspiration and decreased precipitation amount, in interaction with climate variability and human activities, have contributed to desertification. These areas include Sub-Saharan Africa, parts of East and Central Asia, and Australia. (*medium confidence*) {2.2, 3.2.2, 4.4.1}
- A.2.7 Climate change can exacerbate land degradation processes (*high confidence*) including through increases in rainfall intensity, flooding, drought frequency and severity, heat stress, dry spells, wind, sea-level rise and wave action, and permafrost thaw with outcomes being modulated by land management. Ongoing coastal erosion is intensifying and impinging on more regions with sea-level rise adding to land use pressure in some regions (*medium confidence*). {4.2.1, 4.2.2, 4.2.3, 4.4.1, 4.4.2, 4.9.6, Table 4.1, 7.2.1, 7.2.2}
- A.2.8 Climate change has already affected food security due to warming, changing precipitation patterns, and greater frequency of some extreme events (*high confidence*). Studies that separate out climate change from other factors affecting crop yields have shown that yields of some crops (e.g., maize and wheat) in many lower-latitude regions have been affected negatively by observed climate changes, while in many higher-latitude regions, yields of some crops (e.g., maize, wheat, and sugar beets) have been affected positively over recent decades (*high confidence*). Climate change has resulted in lower animal growth rates and productivity in pastoral systems in Africa (*high confidence*). There is robust evidence that agricultural pests and diseases have already responded to climate change resulting in both increases and decreases of infestations (*high confidence*). Based on indigenous and local knowledge, climate change is affecting food security in drylands particularly those in Africa, and high mountain regions of Asia and South America.²⁰ {5.2.1, 5.2.2, 7.2.2}



Rischi per gli ecosistemi terrestri

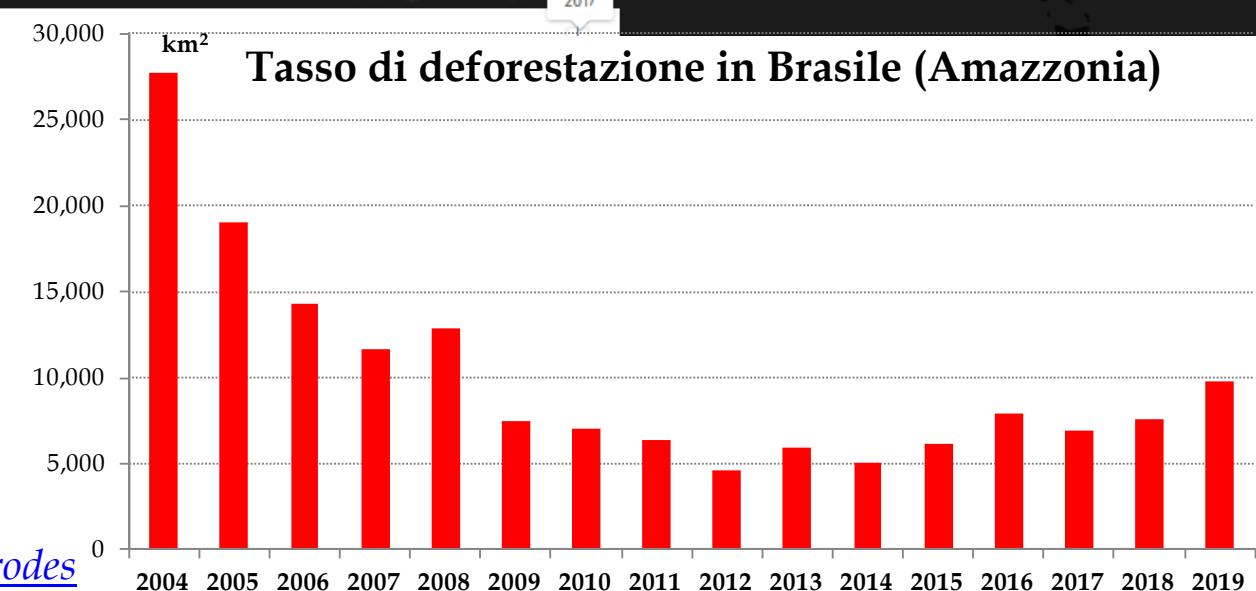


Emissioni da deforestazione (2001-2017)



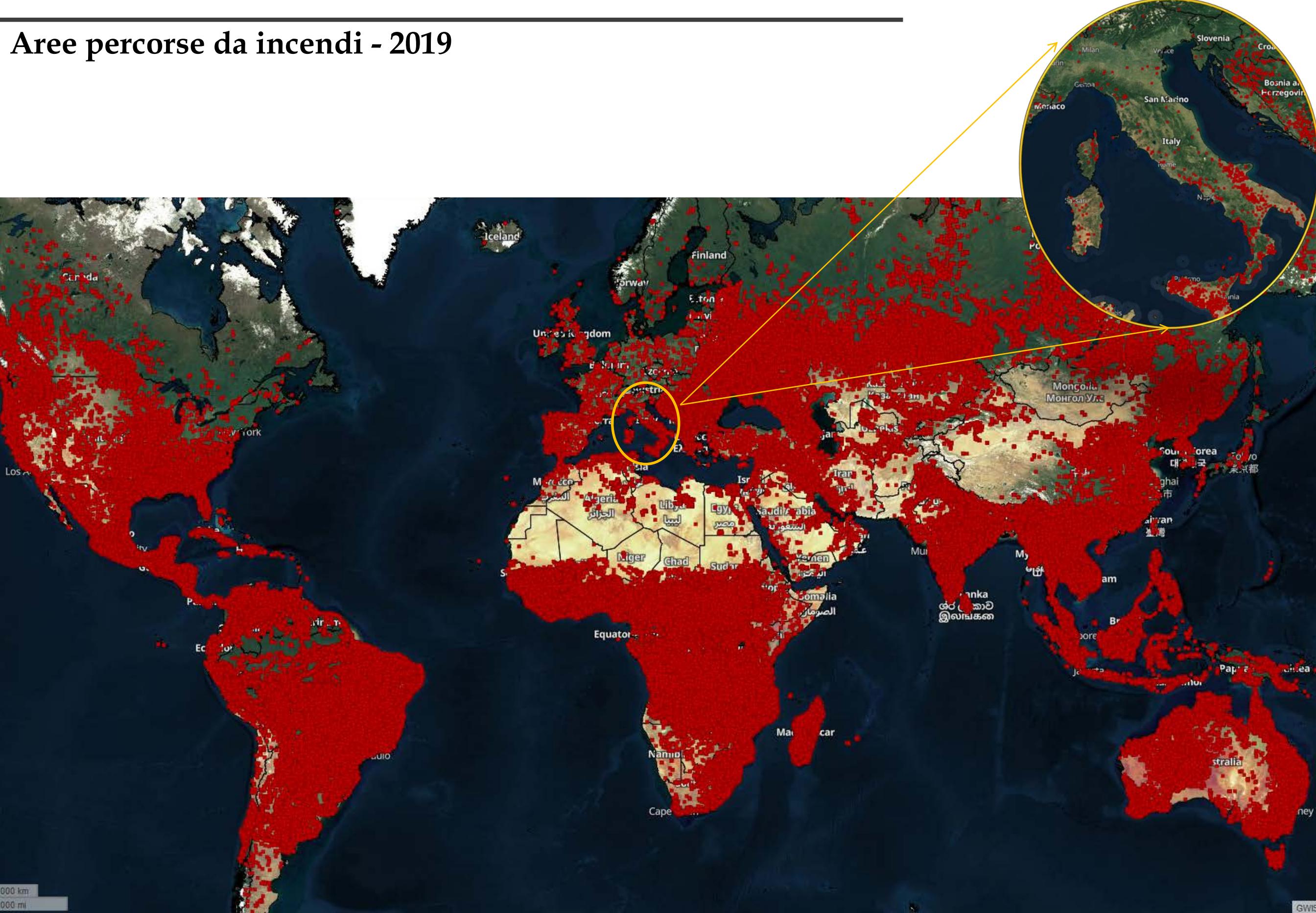
Emissioni da deforestazione

Fonte: <http://climate.globalforestwatch.org>



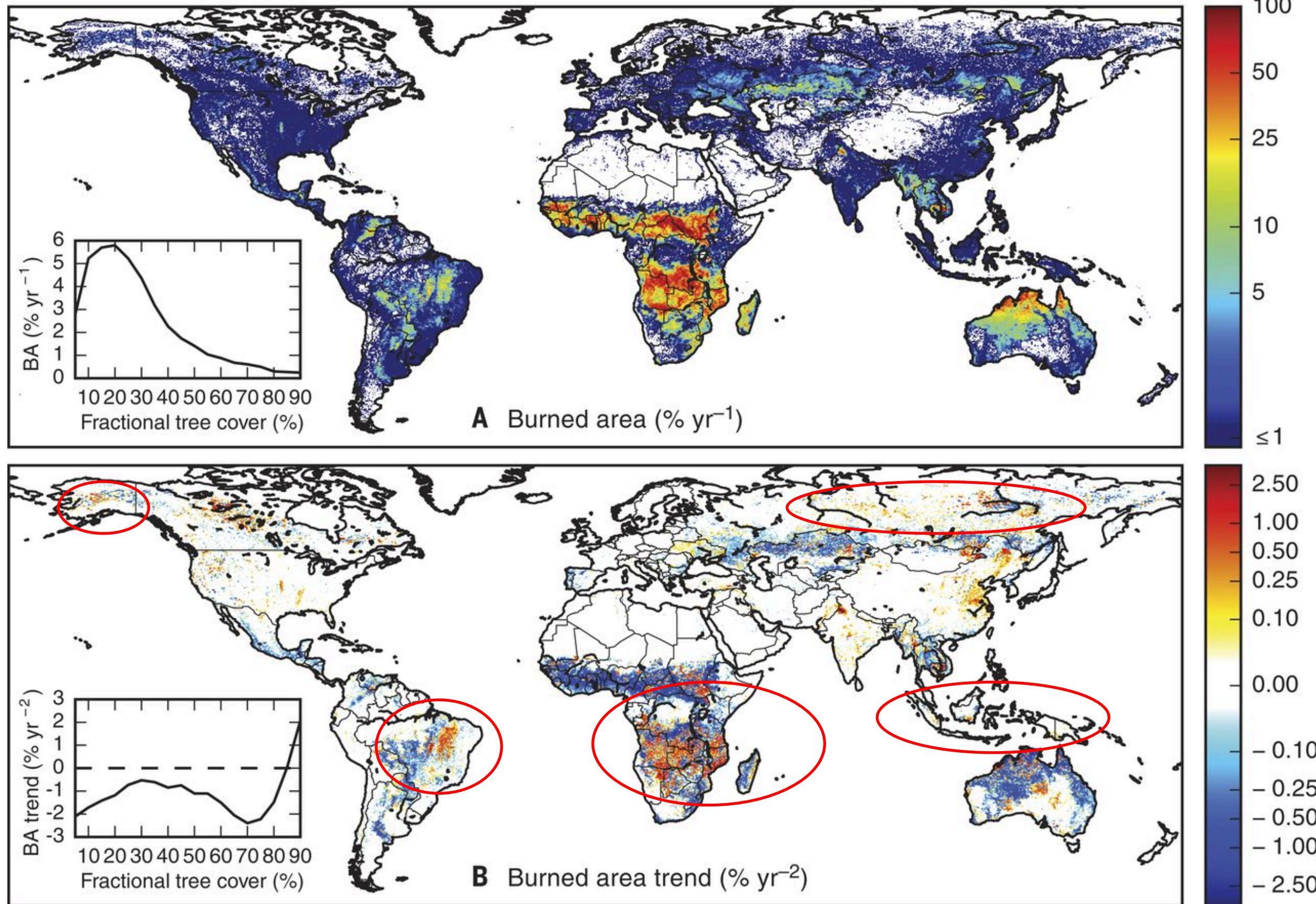
Fonte: PRODES: <http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes>

Aree percorse da incendi - 2019

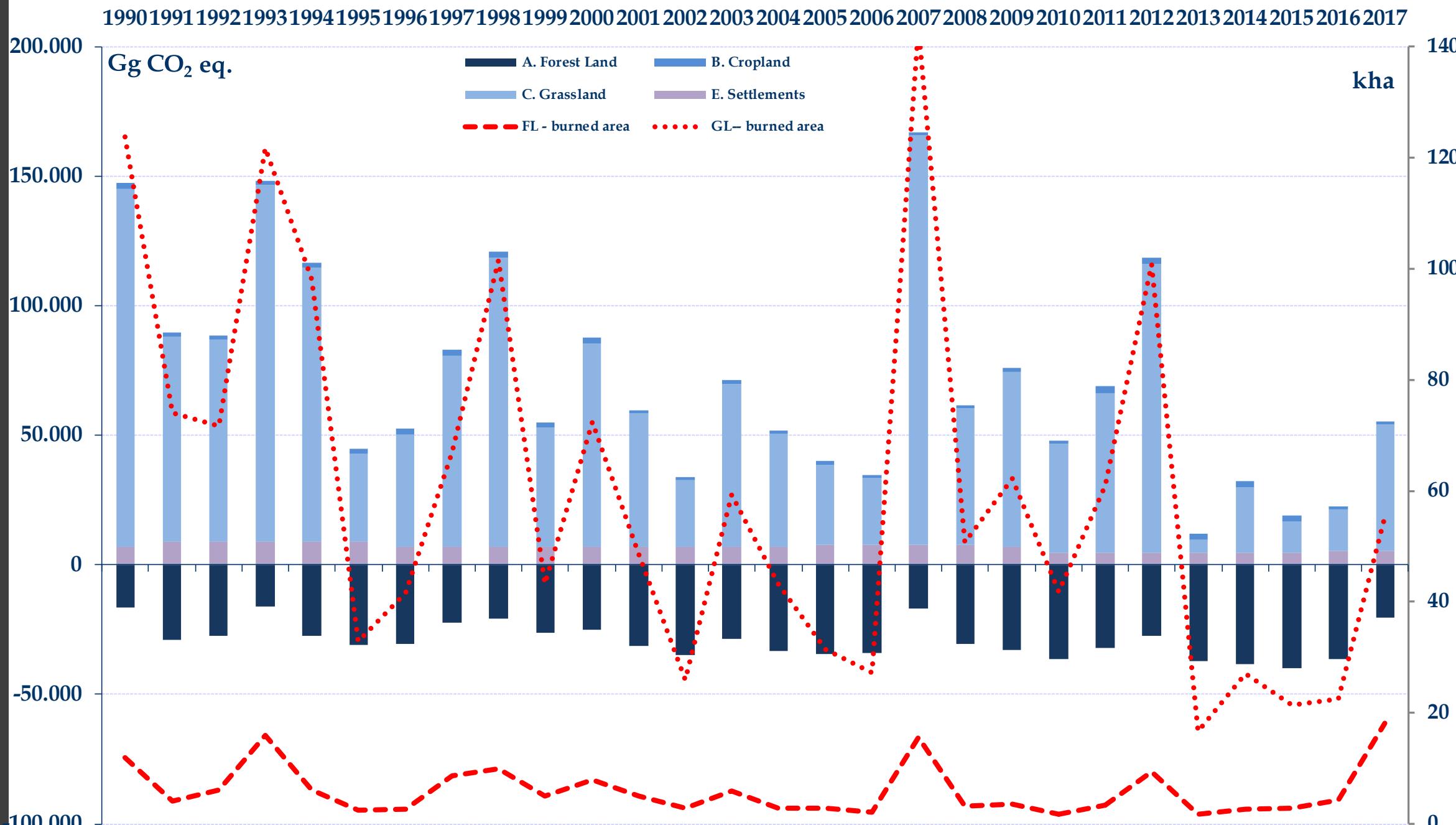


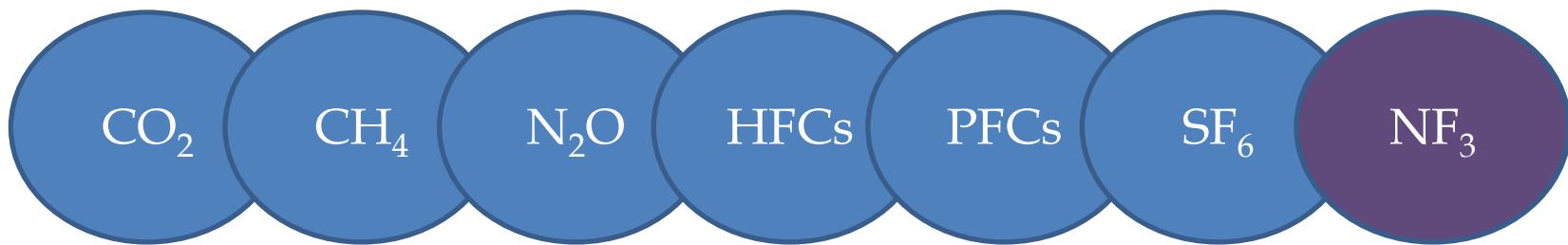
Fonte: Global Wildfire Information System: <https://gwis.jrc.ec.europa.eu>

Aree percorse da incendi: variazioni nel periodo 1998-2015



Gli impatti degli incendi sugli assorbimenti in Italia

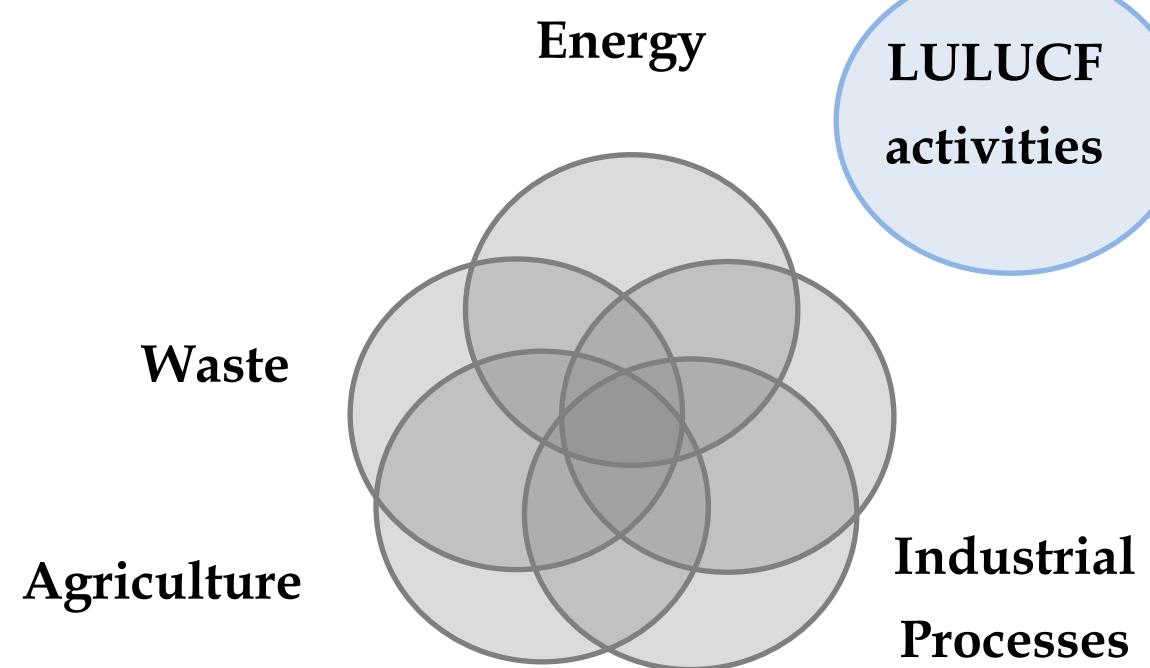




Protocollo di Kyoto: reporting and accounting



*Prima dell'Accordo
di Parigi*



Paesi Annex I

Obiettivi di riduzione

Emissioni totali di gas serra
2008-2012

EU -8%
USA -7%
Japan -6%
Australia +8%

→ -5.2%

Emissioni totali di gas serra
2013-2020

EU -20%
Australia -5%

→ -18%

A. Forest land
1. Forest land remaining forest land
2. Land converted to forest land
B. Cropland
1. Cropland remaining cropland
2. Land converted to cropland
C. Grassland
1. Grassland remaining grassland
2. Land converted to grassland
D. Wetlands
1. Wetlands remaining wetlands
2. Land converted to wetlands
E. Settlements
1. Settlements remaining settlements
2. Land converted to settlements
F. Other land
1. Other land remaining other land
2. Land converted to other land
G. Harvested wood products

A. Article 3.3 activities
A.1. Afforestation and reforestation
A.2. Deforestation
B. Article 3.4 activities
B.1. Forest management
B.2. Cropland management
B.3. Grazing land management

Reporting	Accounting
<i>GHG emissions and removals from</i>	<i>Accounting of GHG emissions and removals towards emissions reduction targets</i>

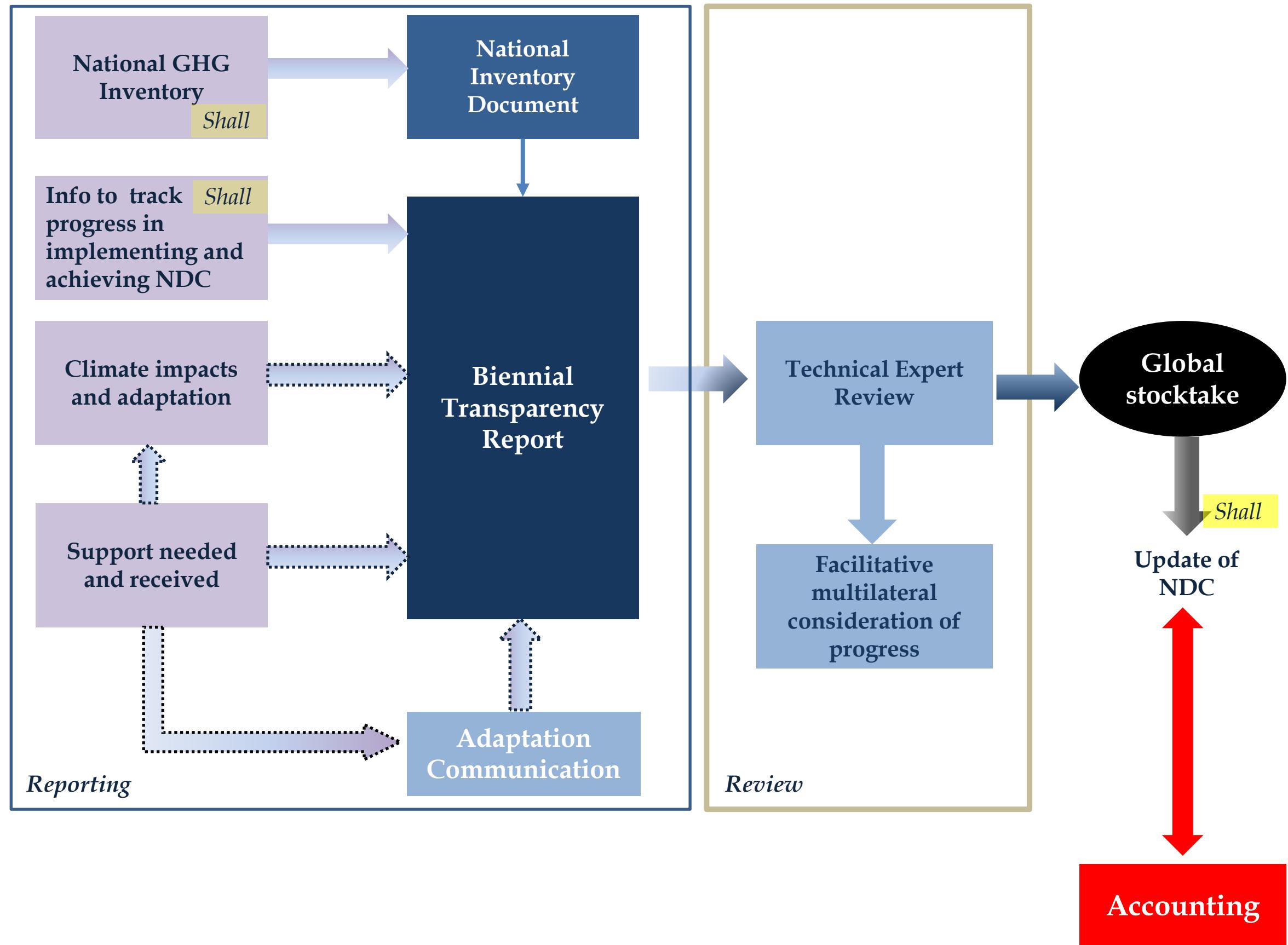
UNFCCC	LULUCF categories	no accounting
Kyoto	<i>Forest Management</i>	Reference level
Protocol	<i>Afforestation-Reforestation-Deforestation Cropland Management, Grazing land Management, Wetlands draining and Net-net accounting rewetting, Revegetation</i>	Gross net

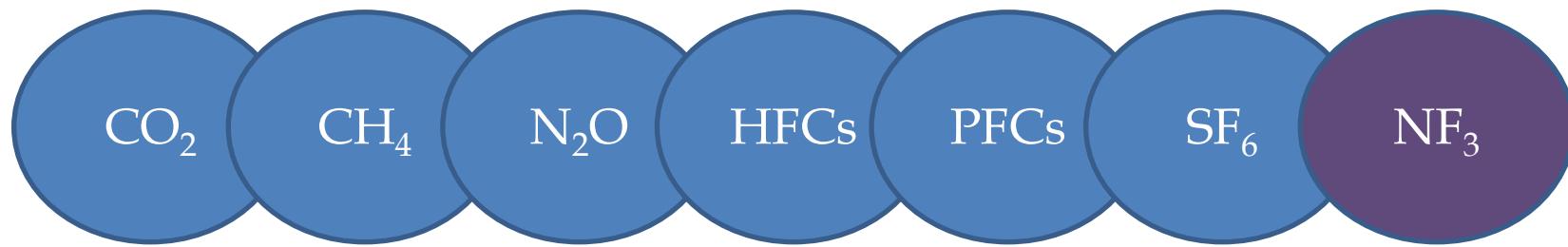
LULUCF
reporting
and
accounting



Prima dell'Accordo
di Parigi

L'accordo di Parigi e il nuovo sistema di trasparenza

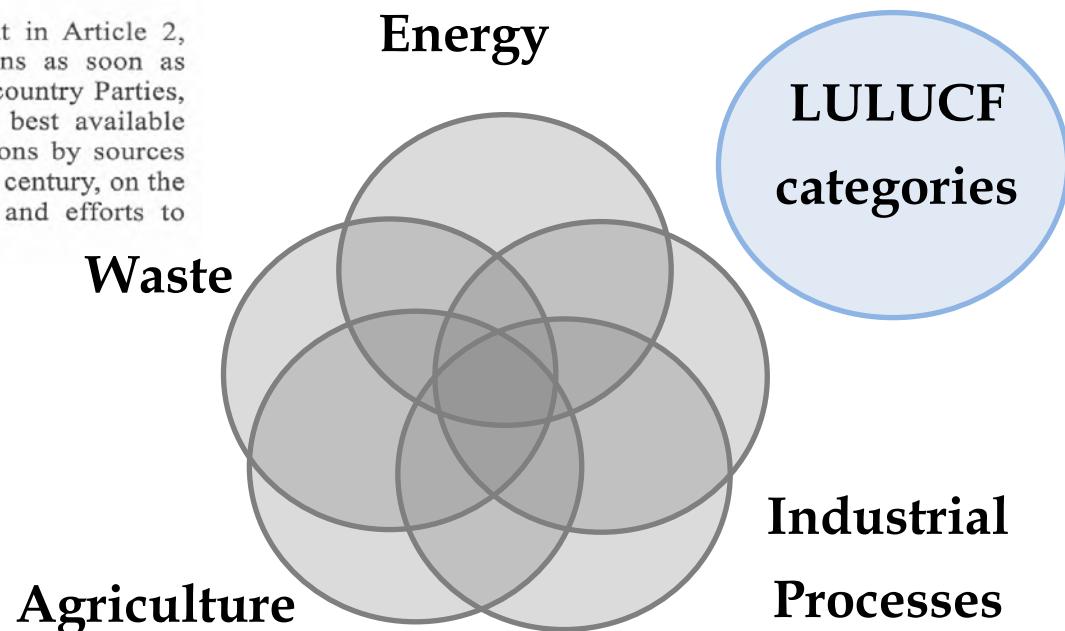




Article 4

1. In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and **removals by sinks** of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.

Reporting



Reporting and accounting per l'Accordo di Parigi



Accounting for Parties' nationally determined contributions (NDC)

→ I paesi contabilizzeranno emissioni ed assorbimenti secondo le **metodologie e le metriche comuni** stabilite dall'IPCC;

Tonnellate di CO₂ equivalente per target “economy wide”

→ I paesi, i cui NDC includono elementi che non possono essere contabilizzati con metodologie IPCC, dovranno fornire informazioni sui metodi utilizzati.

Metriche differenti, a seconda degli elementi inclusi negli NDC (i.e. percentuale di rinnovabili, ettari di afforestazione, efficienza energetica, ecc.)

Accounting

REDD+ è uno strumento che finanzia progetti che mirano a proteggere e ricostituire aree forestali in modo sostenibile, nonché ad attuare altre opere di mitigazione legate al ripristino degli ecosistemi.



- reducing emissions from deforestation
- reducing emissions from forest degradation
- conservation of forest-carbon stocks
- enhancement of forest-carbon stocks
- sustainable management of forests

REDD+

Reducing Emissions
from Deforestation
and Forest
Degradation

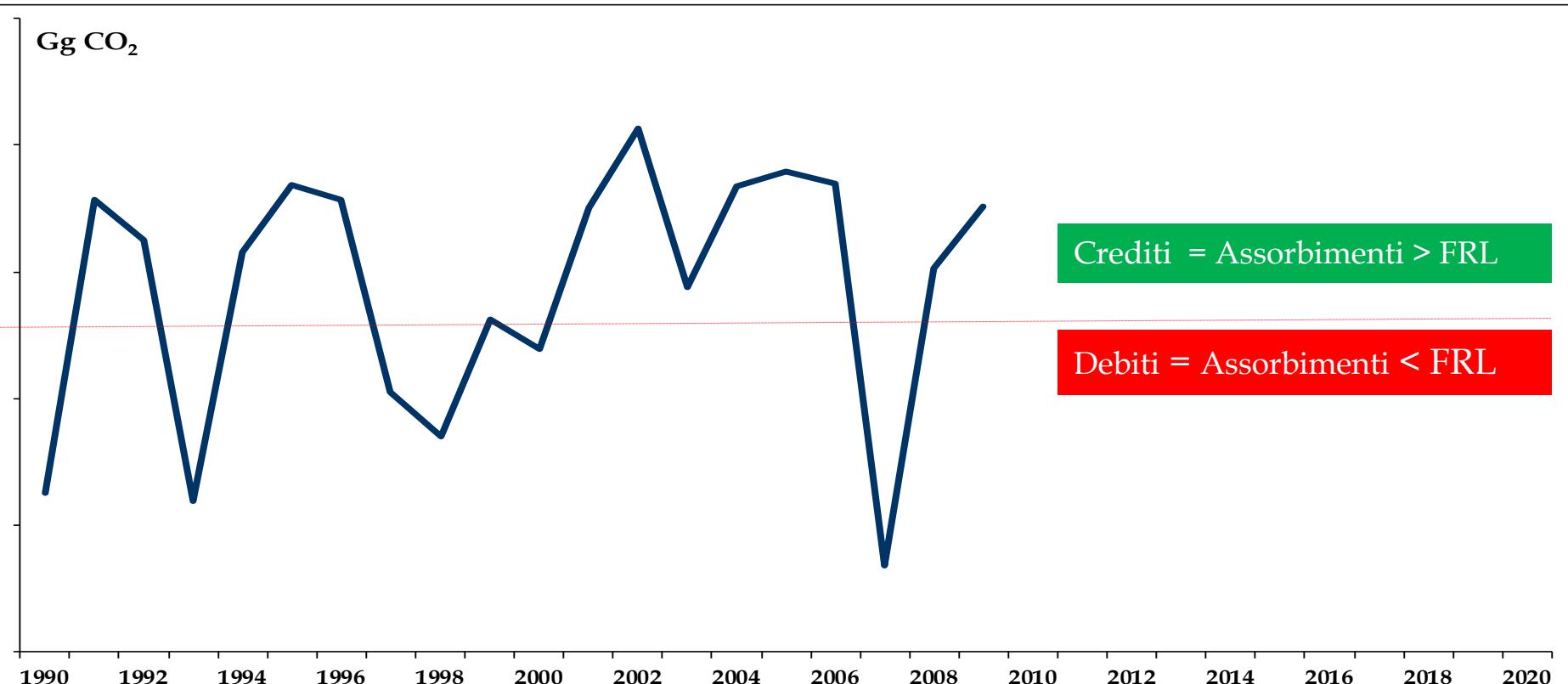


Ogni Paese è chiamato a stabilire un livello di riferimento forestale (FRL), ovvero un livello di emissioni di gas serra che si avrebbero in assenza di misure di mitigazione (in primis misure di contenimento della deforestazione).

Tale FRL, sottoposto a revisione da parte di esperti UNFCCC, viene successivamente valutato nel tempo per verificare il quantitativo di emissioni evitate grazie alle misure e politiche messe in atto a livello nazionale.

REDD+

Reducing Emissions
from Deforestation
and Forest
Degradation



Countries that submitted a proposed forest reference emission level and/or forest reference level

- Argentina
- Bangladesh
- Belize
- Bhutan
- Brazil
- Burkina Faso
- Cambodia
- Chile
- Colombia
- Congo
- Costa Rica
- Côte d'Ivoire
- Democratic Republic of the Congo

- Dominican Republic
- Ecuador
- Equatorial Guinea
- Ethiopia
- Ghana
- Guinea-Bissau
- Guyana
- Honduras
- India
- Indonesia
- Kenya
- Lao People's Democratic Republic
- Liberia

- Madagascar
- Malawi
- Malaysia
- Mexico
- Mongolia
- Mozambique
- Myanmar
- Nepal
- Nicaragua
- Nigeria
- Pakistan
- Panama
- Papua New Guinea

- Paraguay
- Peru
- Solomon Islands
- Sri Lanka
- Sudan
- Suriname
- Togo
- Uganda
- United Republic of Tanzania
- Viet Nam
- Zambia

La submission del FRL e la sua successiva valutazione tecnica rende eleggibile il Paese per richiedere i *result-based payments*. Il paese può includere nella proprio rapporto biennale all'UNFCCC (BUR) un annesso tecnico con i risultati, espressi in tonnellate di CO₂ annui, relativi all'implementazione di attività REDD.

Sulla base di tali rapporti, e conseguenti valutazioni tecniche, i risultati ottenuti dal Paese ricevono il finanziamento.

Country	Date (Year)	Results (t CO ₂ eq/year)	Assessed forest reference level (t CO ₂ eq/year)	Quantities for which payments were received (t CO ₂ eq/year)	Entity paying for results
Brazil	2006	529,930,490.25	1,106,027,616.63	23,911,039.60	Government of Norway (see explanatory note)
				1,388,636.02	Petróleo Brasileiro S.A.
	2007	497,761,219.37	1,106,027,616.63	-	-
	2008	440,022,301.24	1,106,027,616.63	-	-
	2009	741,687,139.44	1,106,027,616.63	28,347,560.00	Government of Norway (see explanatory note)
	2010	761,621,104.20	1,106,027,616.63	3,188,874.00 33,363,022.00 2,475,769.00	Government of Germany - KfW Government of Norway (see explanatory note) Government of Germany - KfW
Brazil	2011	622,451,671.72	907,959,466.33	33,363,022.00	Government of Norway (see explanatory note)
	2012	671,275,311.89	907,959,466.33	32,733,224.00	Government of Norway (see explanatory note)
	2013	606,111,615.42	907,959,466.33	24,746,724.31	Government of Norway (see explanatory note)
	2014	634,367,865.74	907,959,466.33	24,000,000.00	Government of Norway (see explanatory note)
	2015	620,295,262.00	907,959,466.33	19,590,670.23	Government of Norway (see explanatory note)

La COP25 aveva come compito definire i punti finali del “Paris Rulebook”, ed in particolare definire le regole relative ai meccanismi di mercato previsti dall’art. 6, finalizzati alla mitigazione delle emissioni, attraverso progetti e attività.

Il nuovo sistema di meccanismi di mercato andrebbe a sostituire i meccanismi esistenti nell’ambito del Protocollo di Kyoto, incluso il Clean Development Mechanism (CDM).

Nell’ambito del Protocollo di Kyoto era abbastanza semplice immaginare chi vende le quote di emissioni (in genere i paesi sviluppati) e chi le compra (i paesi in via di sviluppo). Nell’ambito dell’Accordo di Parigi, invece, impegni e regole valgono per tutti i paesi. Tutti avranno degli impegni di riduzione delle emissioni, pur potendo decidere i settori, i gas o le attività sulle quali concentrare il proprio sforzo di mitigazione. E quindi ipotizzare un meccanismo di mercato che si possa adattare a regole comuni, ma con impegni differenziati, non è affatto un gioco facile.

Fondamentale, per un corretto funzionamento del meccanismo e per salvaguardare **l’integrità ambientale**, è **evitare un doppio conteggio** da parte di chi compra e da parte di chi vende i crediti.



La revisione al rialzo degli impegni da parte dei paesi, per quanto auspicabile, non era in programma per il 2019. Tutte le Parti si sono già impegnate a presentare contributi determinati a livello nazionale (Nationally determined contributions, NDC) per ridurre le emissioni da ora al 2030 e ad aggiornare quelli già presi entro la fine del prossimo anno.

Il 2020 sarà un anno cruciale per il negoziato sul clima. L’azione globale contro il cambiamento climatico sta avanzando. L’obiettivo di cui tutti discutono è “emissioni nette zero nel 2050”.

Dalla COP25 verso Glasgow 2020



Grazie per
l'attenzione!

