

GIZ Webinar on
Tracking NDC achievements
New accounting perspective
27/07/2017

Tracking Mitigation actions:
the Land use sector

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Outline

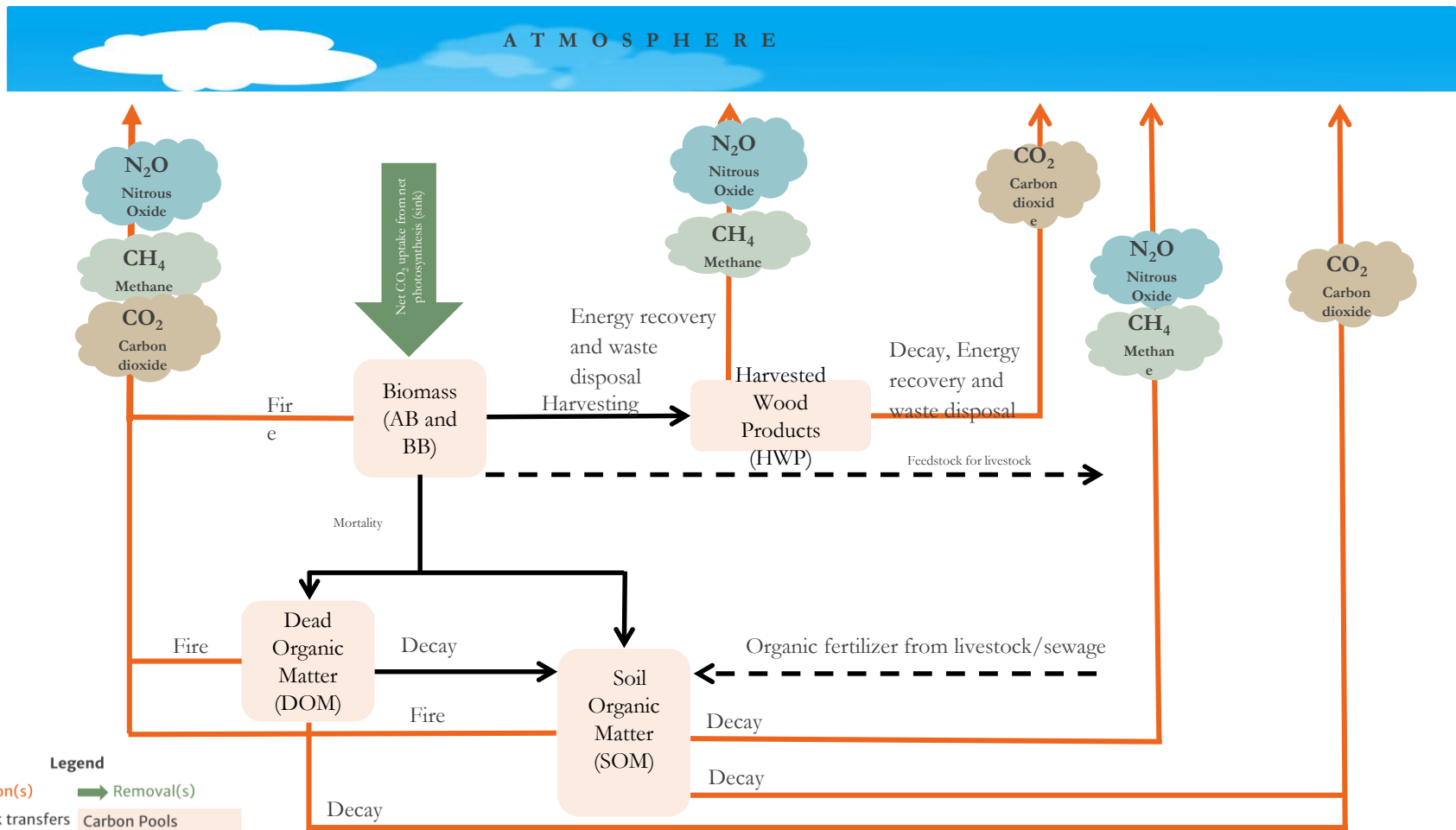
- The **land use** sector **sources** and **sinks**
- The **land use** sector **mitigation actions**
- Using the **national GHG inventory** for reporting **mitigation actions** and their **results**
- How mitigation actions and their results are identified and tracked within the national GHG inventory
 - *Dealing with limits of mitigation actions in coverage of sinks and sources and in their lifetime*
 - *Dealing with characteristics of the land use sector:*
 - *Legacy*
 - *Interannual variability*
 - *Dealing with leakage*
 - *Dealing with non-permanence*

The Land use sector:

Includes all **Terrestrial carbon pools**, and

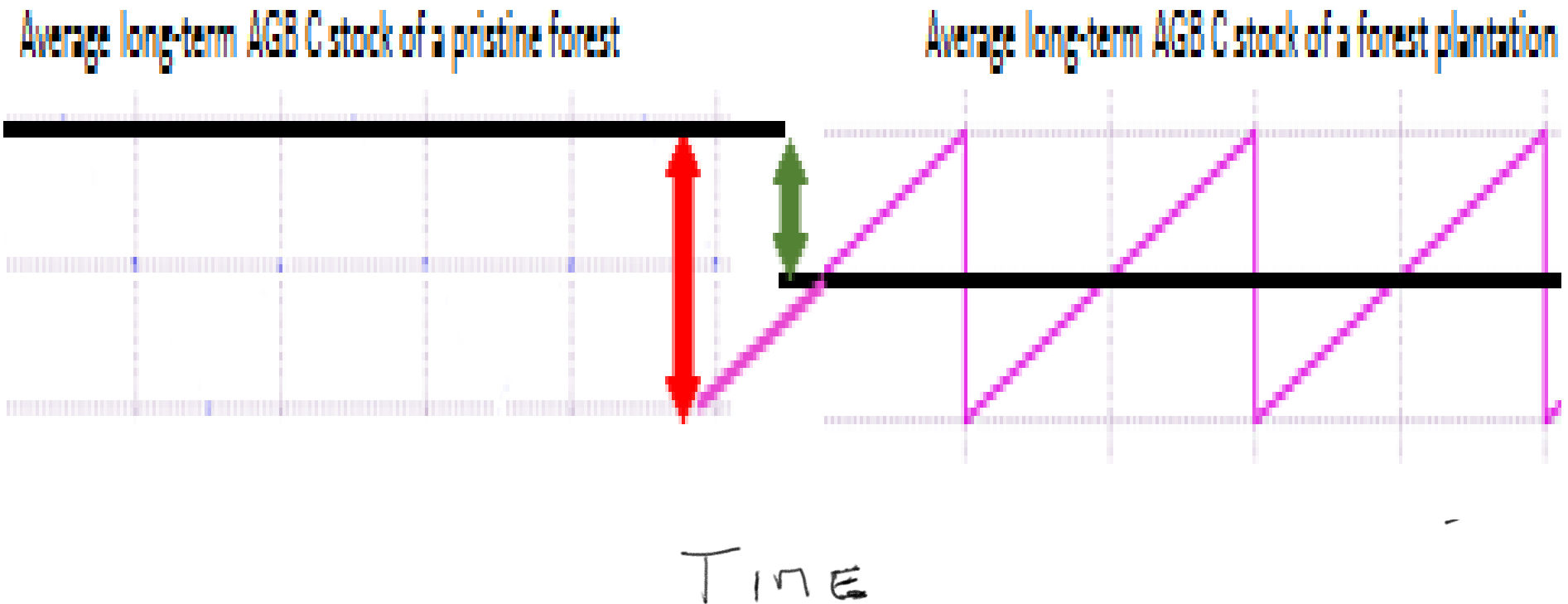
All **sources of GHG** and all **sinks of CO₂**

associated with the direct and indirect impact of **human activities**



A concept

Long term average C stock at equilibrium



C stock level contained across time in a C pool in a land averaged across a time period, under constant management system of practices

The Land use sector: GHG sources

Land subject to **activities that decrease long term C stocks** (*i.e. C stock losses – oxidation of organic matter*) in:

- **woody biomass, dead wood, litter** and **soil organic matter** in
 - ✓ **Forest, savannah and shrublands**, *subject to e.g.*
 1. conversion of primary forest to secondary forest
 2. conversion of natural forest to tree plantation
 3. overexploitation of forest and other woody lands
 4. worsening of disturbance regime (drought and associated fires)
 - ✓ **Agroforestry systems** *subject to e.g.*
 1. conversion to annual crops
 2. Overexploitation
 - ✓ **Deforested lands**
- **Harvested wood products** by
 - ✓ incentivizing the **use of wood for energy** in alternative to HWP
- **soil organic matter** in
 - ✓ **Drained peatlands**
 - ✓ **Agricultural lands** subject to degradation by overexploitation

The Land use sector: CO₂ sinks

Land subject to **activities that increase long term C stocks** (*i.e. C stock gains – accumulation of organic matter*) in:

- **woody biomass, dead wood, litter** and **soil organic matter** in
 - ✓ **Revegetated land** (*afforested lands, agroforestry on previously non-forested lands, land where woody vegetation is first established*)
 - ✓ **Forest, savannah, agroforestry systems and shrublands**, *subject to e.g.*
 1. conversion to conservation areas
 2. lengthening of harvesting cycles
 3. weakening of disturbance regime (fires)
- **Harvested wood products** by
 - ✓ incentivizing the **use of wood for long lasting HWP** in alternative to other uses
- **soil organic matter** in
 - ✓ **rewetted peatlands** (*although a source of CH₄ is established*)

The Land use sector: Mitigation actions

Consequently, **mitigation actions** in the land use sector are those that:

- **avoid long term C stock losses** (including conservation of current C stocks) **i.e. reduce/avoid sources**

Mitigation actions that avoid biomass C stock losses may be seen as low hanging fruits within the mitigation portfolio since biomass C stock losses occur suddenly (*e.g. the biomass removed from a deforested land is mostly oxidized in one or few years*)

This kind of mitigation actions is usually associated with conservation and sustainable management of natural resources, so that it brings along significant environmental non-carbon benefits (*especially on biodiversity and water regime/ availability*)

The Land use sector: Mitigation actions

Consequently, **mitigation actions** in the land use sector are those that:

- **allow long term C stock gains** (*including conservation of current sinks*) *i.e.* *conserve/establish sinks*

Mitigation actions that allow long term C stock increase needs time to achieve their total climate benefit, since C accumulation is a slow process

Mitigation actions that increase the long term C stock need to be associated with sustainable landscape management to avoid conflicts with current uses/management system of practices of land, and to represent an additional source of income

Mitigation actions that increase the long term C stock may originate from policies for landscape restoration, so ensuring significant environmental non-carbon benefits (*especially on biodiversity and water regime/availability*)

The Land use sector: Tracking mitigation actions

Mitigation actions are part of the common effort countries are putting in place as **Paris Agreement (PA) contributions** for mitigating climate change.

The GHG inventory (GHGI) reporting, is the basis for tracking countries' performance under the PA's framework

Therefore, **mitigation actions need to be identified within the GHGI** to track their contribution to the country's effort under the PA's framework

However, Mitigation actions likely have:

- limited time frame
- partial coverage of national GHG emissions and removals (*that are part of the socio-economic and environmental system of any country*)
- limited coverage of sources/sinks categories in the national GHGI

Identifying mitigation actions within the GHGI

The monitoring and reporting system associated with the mitigation action may have a limited timeline compared with the national GHGI monitoring and reporting system.

A **Mitigation action** may range from a **partial coverage** to a **full coverage** of a land category, since it may impact:

- One or more C pools;
- One or more GHGI categories/subcategories (e.g. *deforestation to cropland is just a subcategory of the GHGI category Land converted to cropland*)
- The entire area of the GHGI category/subcategory within the country's boundaries (*national*) or only a portion of it (*subnational*)

Identifying mitigation actions within the GHGI

Therefore, it is necessary to identify the boundaries of the mitigation action as:

1. GHGI category coverage; *including, for each GHGI category, identification of:*
 - C pools
 - Subcategories
2. Spatial coverage; as subdivisions of the GHGI category
3. Temporal coverage

Note that from partial coverage of a GHGI category and/or of the national territory arises the issue of leakage (displacement of emissions) to the area, pools, subcategories, subdivisions excluded.

Note that from the temporal limit may arise the issue of permanence of achieved mitigation results; however, the stratification of the activity within the GHGI ensures that subsequent emissions and removals will be reported and accounted for under the PA framework once they will occur

Stratifying mitigation actions within the GHGI

To allow the identification within the GHGI, each mitigation action is stratified within the GHGI; which means to report it as:

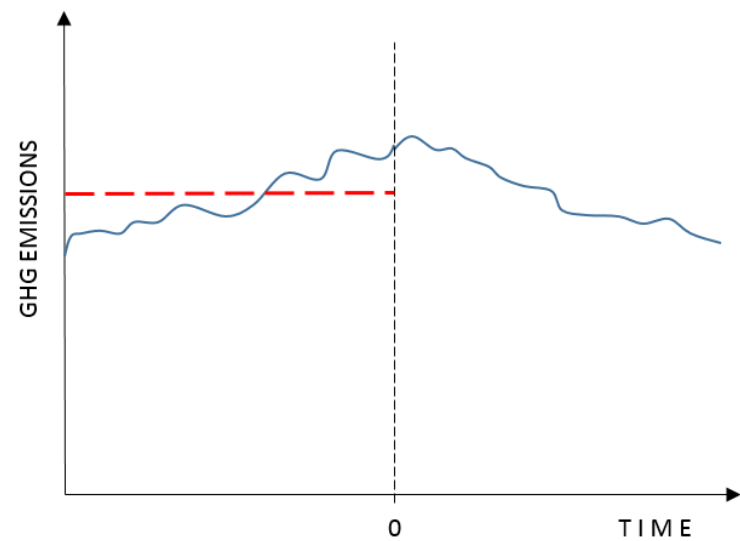
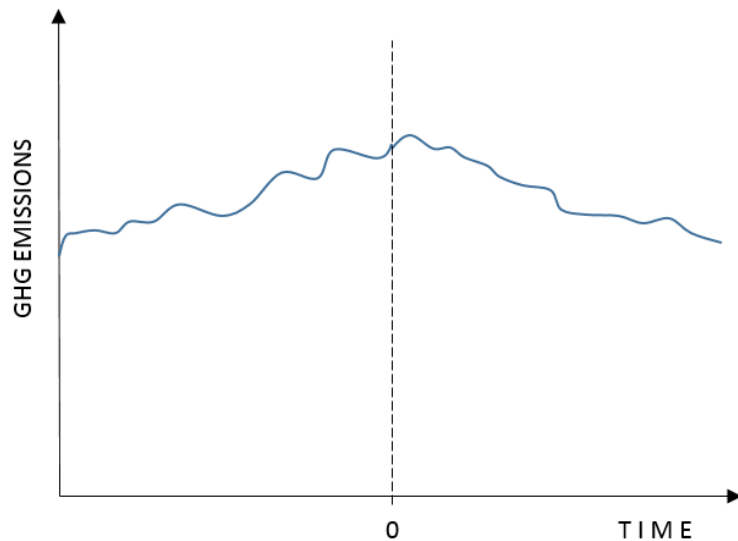
- A. One or more subdivisions of the GHGI category
- B. One or more GHG categories
- C. Combination of A and B

E.g. REDD-*plus* activities stratification within the GHGI:

IPCC Category/Subcategories	REDD- <i>plus</i> Activity
Forest land converted to other land uses	<ul style="list-style-type: none">• Reducing emissions from deforestation
Forest land remaining forest land	<ul style="list-style-type: none">• Reducing emissions from forest degradation• Sustainable management of forests• Conservation of forest carbon stocks• Enhancement of forest carbon stocks (within existing forests)
Other land uses converted to forest land	<ul style="list-style-type: none">• Enhancement of forest carbon stocks (through afforestation/reforestation)

Tracking mitigation actions across GHGI's time series

Once a **mitigation action** is stratified within the GHGI is possible to track its contribution across the GHGI time series and consequently to **assess** its **results as the trend**, from the year of implementation (*base year*), in the annual total GHG emissions and removals associated with the action.



To avoid the impact of inter-annual variability (*which under extraordinary circumstances may be the predominant driver of emissions in the land use sector*) the starting point (*reference level*) is better set as the average of an historical period

Land use sector: Tracking mitigation actions

The land use sector has **two peculiarities** that need to be addressed when tracking results of mitigation actions across time.

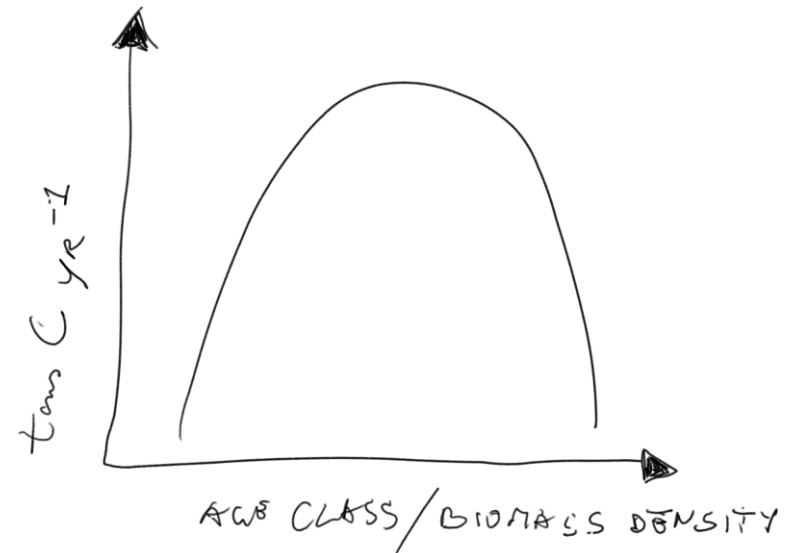
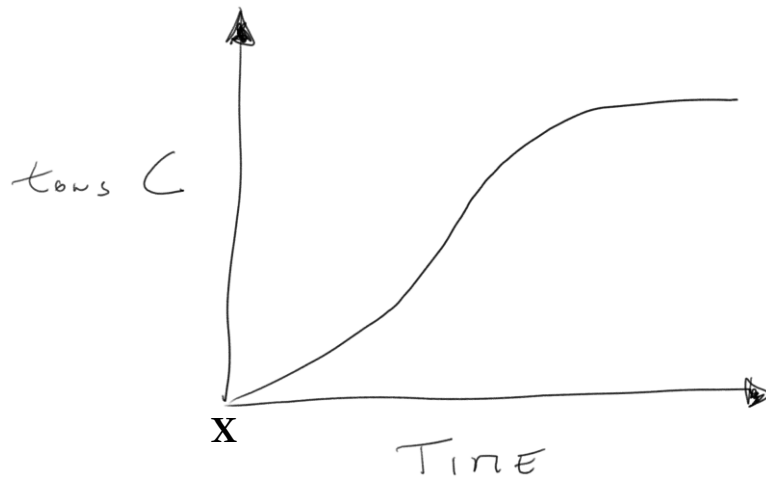
1. The so-called **legacy effect**, which indicates emissions and removals that continue after an action (e.g. harvesting/planting) or disturbance (e.g. fires) occurs, which are nevertheless direct consequence of such action or disturbance.
2. The so-called **interannual variability** of **natural disturbances** (e.g. drought, fires) whose interaction with human activities determines GHG emissions and removals from land (*i.e. natural disturbances determine an associated average background level of emissions and removals*).

Under **extraordinary circumstances** their contribution on the annual GHG budget may significantly divert from the average, becoming also **predominant on** the contribution of **human activities**.

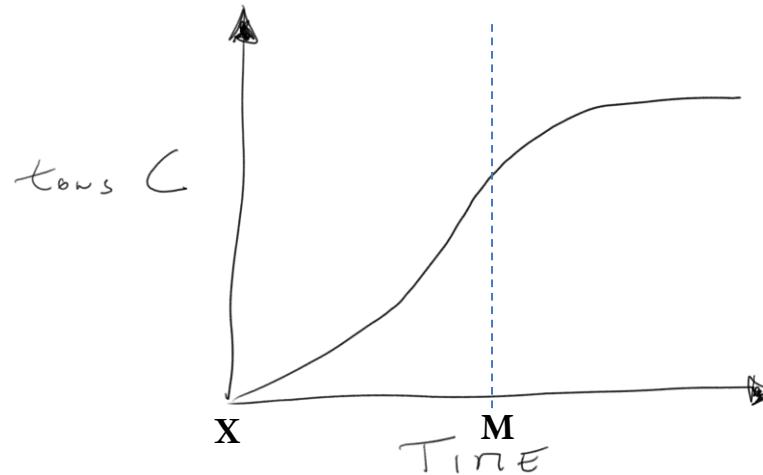
Tracking mitigation actions: Legacy effect

An activity implemented in a year X impacts level and dynamic of C stocks in a land also over a number of years subsequent to the activity's implementation

Same applies to the impact of disturbances (e.g. fires)



Tracking mitigation actions: Dealing with legacy



Legacy may go beyond the implementation/monitoring period of the mitigation action.

This means that:

1. Results accounted for the mitigation action may be a partial quantification of the actual impacts of the action across time
2. A different treatment of lagged emissions and removals in the historical period, used as reference level, compared to that in the accounting period likely result in accounting for differences that are not the result of the implementation of the mitigation action.

Tracking mitigation actions: Dealing with legacy

To deal with **1.** (*partial accounting*):

- ✓ The GHGI remain liable for accounting the remaining legacy effect
- ✓ Accounting may be based on C stock differences in the long-term average C stock levels of the land (*i.e. after and before the implementation of the management action*)

To deal with **2.** (*contribution*):

- ✓ Symmetry in contribution of legacy between historical (*base/reference*) period and accounting period must be ensured.
 - ✓ **Legacy emissions and removals may be projected** when past management and disturbances are known and continuity of management system and disturbance regime is assumed
 - ✓ Also Accounting for long term averages addresses this

In the GHGI, supplementary information on how legacy has been dealt is needed, to show consistency among reported GHG fluxes and accounted quantities for mitigation actions

Tracking mitigation actions: interannual variability

Without considering “geological” events (*asteroids, volcanoes, tsunamis, etc*), terrestrial C stocks are impacted by disturbances associated with water availability and temperature path (*i.e. evapotranspiration balance*).

Both variables have a natural interannual variability across time, although their long term averages allow to define climate types.

Under average climate conditions management activities and natural disturbances (*fires, drought, windthrow*) are at equilibrium with the expected climate variability (*e.g. fire suppression system, irrigation*).

However, extremes in variability may cause disturbances going out of control and their impact on the GHG balance of land being predominant on that of management activities (*extreme occurrence of disturbances*).

Climate change is impacting both frequency and intensity of extremes, so adding importance to the treatment of inter-annual variability

Tracking mitigation actions: impact of extremes in interannual variability

IPCC provides in its *2013 IPCC KP Supplement* a method to track the impact in the GHG inventory of extremes occurrences of disturbances.

The method requires to:

1. Define the type of disturbance that may be subject to climate extremes (*fires, drought windstorm, pests*)
2. Identify the impact of extremes on disturbances (*through statistical analysis of GHGI estimates*)
3. Quantify the long term average impact of disturbances (*the one at equilibrium with management practices*)

Tracking mitigation actions: Dealing with interannual variability

The IPCC methods then allows:

- To average out GHG emissions and removals associated with extreme occurrences of disturbances from GHGI estimates (*i.e. CO₂ emissions and CO₂ removals excluded must equal across time*)
- To exclude the impact of extremes in interannual variability from the GHG budget of mitigation actions on land (managed land)

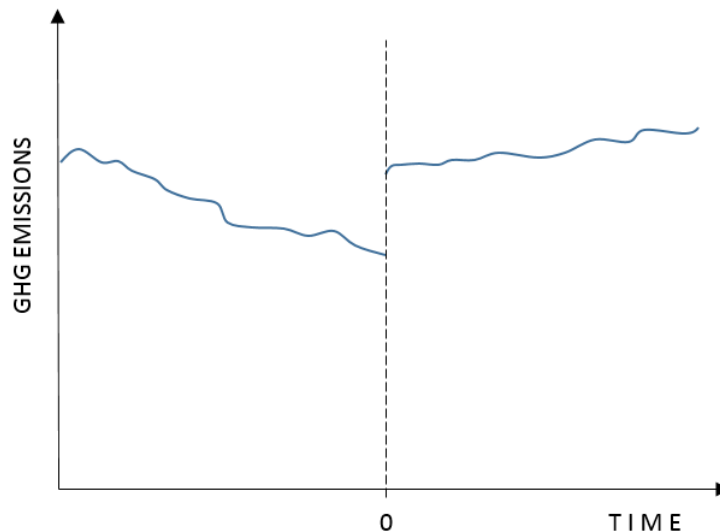
Supplementary information on how interannual variability has been dealt would be needed in the GHGI to show consistency among reported GHG fluxes and accounted quantities for mitigation actions

Tracking mitigation actions: Dealing with leakage

When a mitigation action does not cover the entire country or the entire source/sink category (e.g. *only a type of managed forest land*) then emissions may be simply shifted from the portion covered to the portion uncovered

If the portion covered and that one uncovered are reported as two separate subdivisions of the GHGI sink/source category

A discontinuity (and/or a change) in the trend of GHG fluxes in the subdivision not included in the mitigation action likely indicates a displacement of emissions



Tracking mitigation actions: Dealing with non-permanence

Results, e.g. C stocks accumulation in an afforested land, may be lost after the end of the mitigation action (e.g. when subsidies stop).

Which means that benefits achieved by the implementation of the mitigation action can be lost (e.g. the land is reverted to feed crops)

Consequently, although accounted as a permanent achievement, the result of a mitigation action would actually only be temporary

However, **reporting mitigation actions as a stratification of the GHGI ensures that** any future reversal of **achieved results** will be reported within the GHGI, so that **their permanent accounting is ensured.**

Tracking mitigation actions: non-carbon impacts

GHGIs do not track non-carbon benefits (*although afforestation/ reforestation of degraded lands as well as forest conservation have many other positive impacts, as on biodiversity and water quality and availability*)

Additional information need therefore to be collected according with any reporting requirement set by the mitigation action stakeholders. Such requirements likely includes:

- Impacts on biodiversity
- Impacts on rights to land access, including on access to resident resources (*e.g. water, fuelwood, feed*)

It is efficient to make the data collection and analysis of non-carbon benefits part of the national institutional arrangements for the enhanced transparency framework (*GHGI monitoring and reporting system*)

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Thank you

Questions? Comment?