

Reply on CC1

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Community comment on "Harmonising the land-use flux estimates of global models and national inventories for 2000–2020" by Giacomo Grassi et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-245-CC2>, 2022

The issue is not just "political".

Methods to deal with terrestrial C pools contributions to atmospheric CO₂ concentration must address 3 fundamental requirements:

1. counts what the atmosphere actually sees as a consequence of human activities. Here is worth noting that:

- the consequences of human activities are direct and indirect, and both in the liability of human actors, and
- it looks not sensible (not just politically) to ask to exclude the indirect effects of human activities from the mathematics that has been set to deal with the most dangerous of the indirect effects of human actions: Global Warming.

2. be verifiable. This is the main challenge that models applied for reporting under the UNFCCC must address

3. symmetrically applies to the 2 sides of the same coin, CO₂ removals and CO₂ emissions

Then, let me note that:

- forest growth is the result of direct and indirect human-induced effects and (largely prevalent over the other two) of natural variables (and their variability, directly or indirectly affected by human actions; e.g. no rain, no forest growth).

- indirect human-induced changes in environmental conditions have impacts on GHG fluxes counted in source categories and sectors other than CO₂ from forests.

Thus, shall NGHGI (not just forest land) be based on a fictitious World with standardized conditions where indirect human-induced effects are factored out?

If so:

- who is going to set such standards? (there are 25 years of scientific discussion among authors of IPCC Guidelines on this subject)

- how GHG fluxes calculated in a fictitious World would be verifiable with actual measurements?

As a very easy example, let's take a forest plantation. Who is going to establish the fraction of C accumulation to be attributed to: 1. directly to the human actions as planting/fertilizing/watering(?), 2. the indirect effects (e.g. N deposition, Global Warming) and 3. natural variables (e.g. rain), or at least their variability. And, more importantly, what a country shall count in its NGHGI in case the forest plantation does not grow as expected by counting the direct human action of planting and fertilizing and watering? shall those directly human-induced removals not realized because of indirectly-human induced causes be anyhow counted in the NGHGI? (indeed indirect effects are asked to be excluded from NGHGI so the remaining portion is the direct-human-induced which can be modeled applying standard (?) conditions) and consequently, shall CO₂ emissions sourced e.g. from fossil fuel combustion be offset by such unrealized direct-human-induced removals?

Would be that what the atmosphere sees as a consequence of human actions (this is the definition of anthropogenic; without distinction between consequences reached within the purpose of the action and any other consequences caused)? Would it be considered a sensible approach?

So, considering the urgency to address global warming and the opportunity that the start of a new IPCC cycle gives, I see it urgent for models used for projections in IPCC products to be evolved for consistency with NGHGIs which, in the end, are the only that apply the guidance for good practice in estimating anthropogenic GHG fluxes as approved by IPCC. IPCC will keep moving its mission to keep enhancing its guidance for estimating anthropogenic GHG fluxes according to advances in scientific knowledge and technical capacity.

Please, do not consider this as a response by the authors (it will be given); please consider it just a personal reflection moved by the urgency to move on this subject.