System of Environmental Economic Accounting

Guidance Note on Issue B3:

Treatment of carbon flows in the SEEA CF

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1. Human-induced flows

Can we provide a general definition for human-induced flows, i.e. flows that occur within the environment but are human-induced, and indicate how these can be accounted for in the PSUTs?

Definition: *physical flows that are caused directly by human activity but occur within the environment rather than flowing between the economy and the environment.*

Examples of human induced flows: Carbon Emissions and carbon uptake related to land use, land use change and forestry, Carbon Dioxide Removal (CDR), Secondary Fine Particle Air Pollution, Transboundary flows

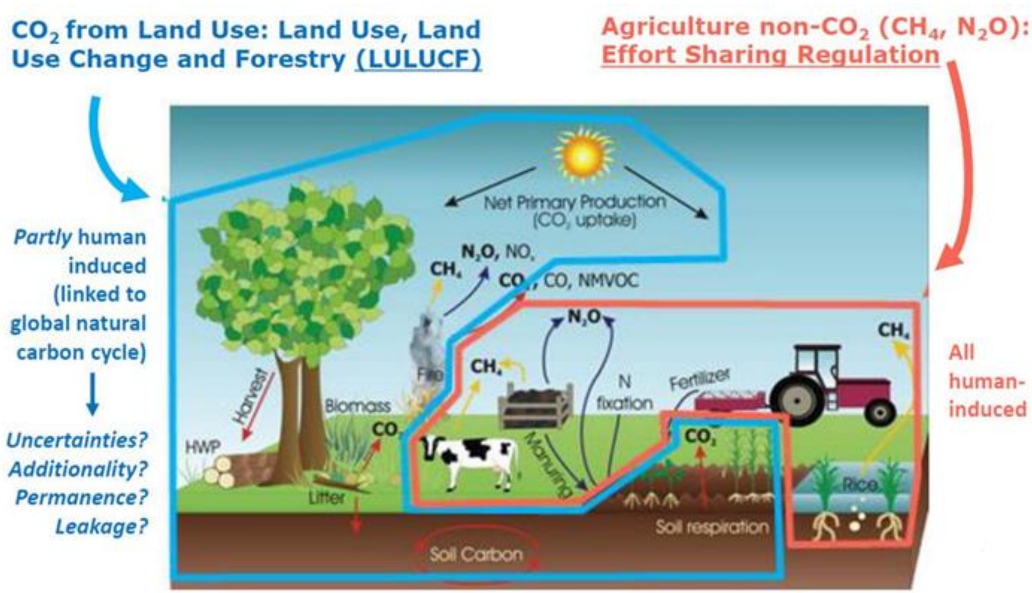
Accounting for human induced flows

Supply	Industries						Human-Induced Flows in the environment		
	Agriculture	Utilities	Manufacturing	Transportation	Gov't	Households	Particle-Forming Reactions	Imports	Total
Primary PM 2.5	70	100	40	120	35	40		20	425
Secondary PM 2.5							500	50	550
SO2	0	130	60	50	0	0		15	255
NOx	0	100	60	200	50	150		70	630
NH3	350	2	2	6	5	15		160	540
VOCs	80	15	250	75	80	200		60	760

Use	Human-Induced Flows in the environment		Environment	
	Particle-Forming Reactions	Exports	Atmosphere	Total
Primary PM 2.5		42	383	425
Secondary PM 2.5		55	495	550
SO2	100	25	130	255
NOx	200	60	370	630
NH3	200	55	285	540
VOCs	300	75	385	760

2. LULUCF emissions and removals

Can LULUCF related carbon emissions and carbon uptake flows be included in SEEA CF, i.e. in the air emission accounts (AEA), and if yes, how should these flows be accounted for?



Should LULUCF emissions and removals be included in the scope of the SEEA AEA ?

Pro

- The scope of IPCC emissions includes all **anthropogenic emissions**, i.e. ***caused by human activities***
- Anthropogenic' land-related GHG fluxes are defined as **all those occurring on 'managed land → basically, same scope as economic activities SNA/ SEEA context**
- Flows are highly policy relevant.

Contra

- Flows occurring within the environment are **out of scope** of PSUT
- IPCC guidelines for LULUCF use **a very broad interpretation for land management**
- including LULUCF related flows would **'blur' the boundary between the economy and the environment**

Accounting options

1. **Exclude (by convention) all land use related emissions and uptake in SEEA CF** air emission accounts.
2. **Include LULUCF related emissions and uptake in SEEA CF air emission accounts as <u>emissions from</u> and <u>uptake into the economy → </u>*allocation to industry***
3. **Include LULUCF related emissions and uptake in the SEEA CF air emission accounts as human-induced flows in nature → *no allocation to industry***

A **key difference** between option 2 and 3 is that for option 2 the flows are recorded as between the economy and the environment whereas for option 3 these are recorded as flows within the environment

Issue: how to allocate emissions/ uptake related to land use change ?

- To the old land use(r)
- To the new land use(r)
- To the sector active in the actual land conversion

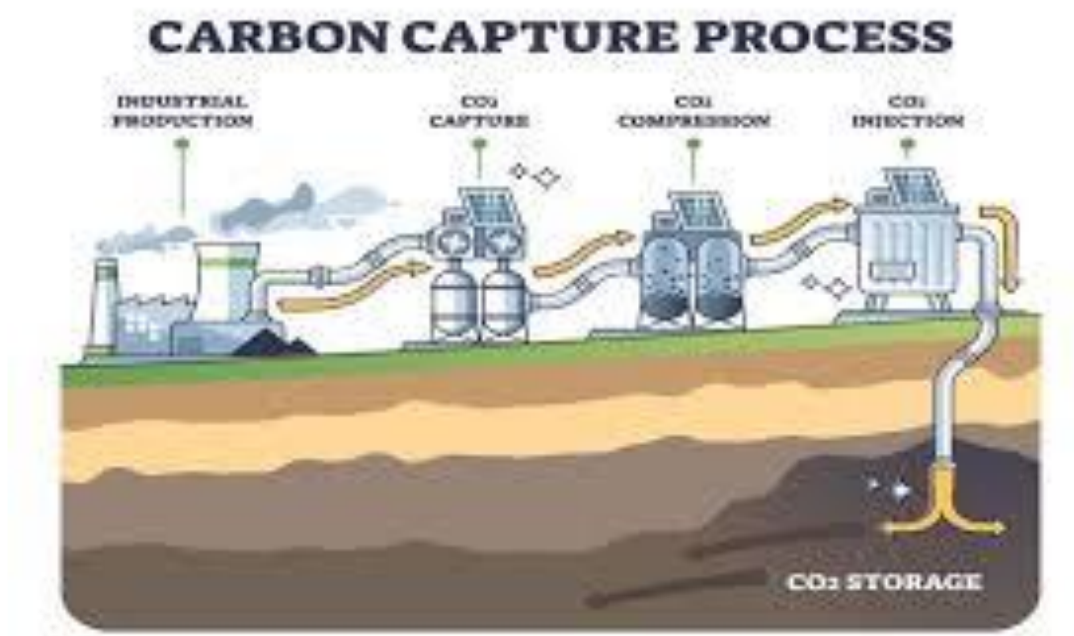
3. Extension of the description of the air emissions accounts

Can we provide a more elaborate description of the use table for the AEA and indicate what flows should be recorded here? Can a bridge table be added to the text of the SEEA CF?

Recording of

- Carbon Capture and Storage (CCS)
- Carbon Capture and Utilization (CCU)
- Carbon Dioxide Removal (CDR) → includes long-term carbon sequestration in biomass
- LULUCF related flows

Issue: Storage of carbon underground (CCS)



Allocation in the use table:

- ISIC 39, or
- Accumulation, or
- Environment (geological formations)

Feedback/input from the LG and TT

- General support to include human induced flows in the PSUTs
- General support to include LULUCF related flow in the air emission accounts
- Slight preference for accounting option 2 for its policy relevance and value added, but also considered a pragmatic combination of options 2 and 3 to address cases where allocation is unclear or difficult.
- When included further elaboration is needed on the interpretation and use of these figures
- Support to include a more elaborate use table for the air emission accounts

Draft recommendations (1)

- **To add the category of Human induced flows** in the environment to the PSUTs, based on the definition provided
- **To describe (in short) the examples described in the GN.** It should be made clear that in this regard the PSUTs do not have to be comprehensive, as the focus should be on recording only those flows that are considered highly policy relevant.
- Human-induced flows in the environment can be accounted for by **adding a sector-level category to the columns of the PSUTs** in both the supply and use table, with further disaggregation representing the different processes or pathways by which these flows occur.

Draft recommendations (2)

- LULUCF related flows should be included in the PSUTs of the SEEA CF air emission accounts.
- Carbon emissions and uptake related to land use in principle are anthropogenic in origin and (thus) the direct result of economic activities. As such these flows could be considered as emissions and natural inputs as defined in SEEA CF.
- Carbon emissions and uptake related to land use change are always a direct result of an economic activity and thus should be included in the AEA. Harvested wood products (HWP) represents a product flow and thus should not be recorded in the AEA.
- The preferred accounting option for LULUC related flows is to record these flows as emissions from and uptake into the economy in the AEA (option 2 described in the Guidance note).
- Flows related to land use change are to be allocated to…..

Draft recommendations (3)

- A description of the use table for the air emission accounts should be further developed and elaborated in the updated SEEA CF.
- Storing of carbon in deep geological formations should be allocated to……. in the use table
- It is recommended to add a description of a bridge table to the SEEA CF for greenhouse gasses.

Questions (1)

1. Do you agree with the inclusion of LULUCF related carbon emissions and carbon uptake flows in SEEA CF, and more particularly in the air emission accounts?
2. If yes, what option do you prefer with regard to the inclusion of carbon flows related to LULUCF in the SEEA CF? How does a mix of option 2 and 3 look like ?
3. How do we allocate emissions / uptake related to land use change ?

Questions (2)

4. Do you agree with a more extensive description of a use table for the AEA and the examples identified? Are there other examples here that need to be described for the use table?
5. Should storage of carbon underground be described as a flow within the economy or a flow to the environment ?
6. Is there a need to further clarify the definition of the environment - economy boundary, also with regard to economic/ environmental assets ?

THANK YOU

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Option 2

CO_2 Emissions	Economy (ISIC sections/divisions)							
Supply	Crop and animal production, hunting and related service activities	Forestry and logging	Manufacturing	Construction	Public administration and defence; compulsory social security	Households	Environment	**Total**
Combustion	110	20	580		90	250		**1050**
Fossil fuel								
Biomass								
Non-Combustion								
Total excluding LULUCF	**110**	**20**	**580**		**90**	**250**		**1050**
Land Use	80	30			15		400	**525**
Forest land remaining forest land (FL)		30						
Other type of land use (OL)								
Land Use Change	25			35	5		45	110
Newly converted forest land (OL-FL)								
Forest land converted to other type of land use (FL-OL)								
Other lands converted in other lands (OL-OL)	*25*			*35*	*5*		*45*	**110**
Total including LULUCF	**215**	**50**	**580**	**35**	**110**	**250**	**445**	**1685**

CO_2 Removals	Economy (ISIC sections/divisions)							
Use	Crop and animal production, hunting and related service activities	Forestry and logging	Manufacturing	Construction	Public administration and defence; compulsory social security	Households	Environment	**Total**
Total excluding LULUCF							1050	**1050**
Land Use		400					125	**525**
Forest land remaining forest land (FL)		400						
Other type of land use (OL)								
Land Use Change		45					65	**110**
Newly converted forest land (OL-FL)		45						
Forest land converted to other type of land use (FL-OL)								
Other lands converted in other lands (OL-OL)								
Total including LULUCF	0	445	0	0	0	0	1240	**1685**
Net emissions	215	-395	580	35	110	250	-795	

Option 3

CO_2 Emissions	Economy (ISIC sections/divisions)						Total excluding LULUCF	Environment						Total including LULUCF
								Human induced flows						
Supply	Crop and animal production, hunting and related service activities	Forestry and logging	Manufacturing	Construction	Public administration and defence; compulsory social security	Households		*Forest land remaining forest land (FL)*	*Other type of land use (OL)*	*Newly converted forest land (OL-FL)*	*Forest land converted to other type of land use (FL-OL)*	*Other lands converted in other lands (OL-OL)*	Atmosphere	
Combustion	110	20	580		90	250	1050							1050
Fossil fuel														
Biomass														
Non-Combustion														
Land Use								30	95				400	525
Land Use Change												65	45	110
Total	110	20	580	0	90	250	1050	30	95			65	445	1685

CO_2 Removals	Economy (ISIC sections/divisions)						Total excluding LULUCF	Environment						Total including LULUCF
								Human induced flows						
Use	Crop and animal production, hunting and related service activities	Forestry and logging	Manufacturing	Construction	Public administration and defence; compulsory social security	Households		*Forest land remaining forest land (FL-FL)*	*Other type of land use (OL)*	*Newly converted forest land (OL-FL)*	*Forest land converted to other type of land use (FL-OL)*	*Other lands converted in other lands (OL-OL)*	Atmosphere	
Combustion & Non-Combustion													1050	1050
Land Use								400					125	525
Land Use Change										45			65	110
Total								400		45			1240	1685

	Advantages	Disadvantages
Option 1	• No changes with respect to the SEEA 2012 needed	• No recording in SEEA of these anthropogenic flows • No recording in SEEA of these policy relevant flows
Option 2	• Inclusion of these policy relevant flows in the AEA • Recognition of these anthropogenic flows as flows to and from the economy • Consistency with IPCC • Allocation to economic activities	• Economy-environment boundary becomes less transparent (?) • Alignment with LULUCF causes possibly too wide a scope to be included • Difficulties to allocate to economic activities
Option 3	• Inclusion of these policy relevant flows in the AEA • Recording of these flows as they actually occur • No apparent change in the economy-	• Status of these human-induced flows may be unclear to user of the data • No allocation to economic activities • Emissions related to land use change not recorded as emissions from economic