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Reporting Tool Design

Abstract:

The purpose of this document is to provide the design framework and decision process for processing FLINT generic database outputs into UNFCCC AFOLU Land Use Category reporting formats. The document identifies the key requirements set out in the IPCC 2006 Guidelines and 2019 Refinement. A stepwise decision tree and process is documented that is designed to classify fluxes and land areas according to the main UNFCCC land use categories, as well as separating into land converted and land remaining. The design has accommodated specific classification requirements, such as allowing for temporary destocking of forests (due to forest harvesting) and cropland fallow to ensure consistent reporting of lands. All contributions are welcomed to further enhance the tool design.

UNFCCC AFOLU Reporting Tool

Policy and reporting requirements for reporting system

The initial step in producing reports from the FLINT naturally focuses on outputs that are consistent with the requirements of the UNFCCC National Inventory as part of National Communications and Biennial Update Reporting (BUR). The Enhanced Transparency Framework agreed at Katowice outlines the requirement for each country to use the 2006 IPCC Guidelines and any subsequent revision or refinement as agreed by the CMA. This may mean that in the near term the 2019 Refinement shall also be used by each country. The purpose of this document is to design the workflow for AFOLU under the 2006 Guidelines, however, for the AFOLU sector the 2019 Refinement does not change the land use categories, but does provide useful clarifying information that can assist with land use classification. This requires emissions and removals and carbon stock changes to be disaggregated by standard IPCC Land Use and Land Use Change categories, as well as standard IPCC carbon pools or non-CO2 emission sources.

The Common Reporting Format tables agreed at SUBSTA39 provide a useful template for reporting emissions for AFOLU. While these tables are currently only mandatory for Annex I Parties National Inventories, they provide a consistent and pragmatic reporting structure for non-Annex I Parties reporting under the 2006 IPCC Guidelines as a requirement of the enhanced transparency framework.

Land Use Classification

Land use classification is an important consideration for greenhouse gas estimation for the land sector because it forms the basis for disaggregating the reporting and accounting of greenhouse gas emissions and removals under international and domestic policies.
UNFCCC annual greenhouse gas inventories disaggregate land into six land use categories (Forest Land, Cropland, Grassland, Wetlands, Settlements, Other Land) which are further subdivided into land remaining in that category and land converted to that category.

The existence of different land use classifications and accounting policies means that it is desirable to have the flexibility to report greenhouse gas emissions in different ways. In the most flexible scenario, it would be desirable to perform FLINT simulations which were completely free of policy and reporting requirements and instead provide outputs that contain all the information necessary to create the reporting needed for all relevant (and potentially future) policies.
The reporting of land use categories is greatly simplified in IPCC Approach 1 and 2 systems, while spatially explicit Approach 3 systems allow for a much richer tracking and disaggregation of land use and land use change through space and time. As such spatially explicit Approach 3 systems have the ability to support reporting under multiple policies.

To make the functionality for reporting generic so that it can be applied in different country contexts, the output database of the FLINT has been designed to capture the necessary information required to determine land use classification (eg land cover change and event information). The downside is that the resulting output DB is relatively large, and therefore managing query speeds and providing enough system resources to run the Reporting Tool is important.

Land Use Classification policy rules to be applied

There are a number of policy rules that need to be considered when applying a Land Use Classification for IPCC Land Use Categories. This section aims to draw out the key principles for land use classification.

There are 6 land-use categories that are considered to be the top-level categories for representing land-use areas, while sub-divisions provide disaggregation that is relevant to emissions estimation (IPCC 2019). Countries apply the land use classification using country specific definitions that fit within the land use classification. For example, while the Forest Land category definition under the IPCC is based on structural threshold definitions, the thresholds themselves are determined by the country.The 6 land use categories are:

I. Forest Land

This category includes all land with woody vegetation consistent with thresholds used to define Forest Land in the national greenhouse gas inventory. It also includes systems with a vegetation structure that currently fall below, but in situ could potentially reach the threshold values used by a country to define the Forest Land category.

II. Cropland

This category includes cropped land, including rice fields, and agro-forestry systems where the vegetation structure falls below the thresholds used for the Forest Land category.

III. Grassland

This category includes rangelands and pasture land that are not considered Cropland. It also includes systems with woody vegetation and other non-grass vegetation such as herbs and bushes that fall below the threshold values used in the Forest Land category. The category also includes all grassland from wild lands to recreational areas as well as agricultural and silvi-pastural systems, consistent with national definitions.

IV. Wetlands

This category includes areas of peat extraction and land that is covered or saturated by water for all or part of the year (peatlands and other wetland types) and that does not fall into the Forest Land, Cropland, Grassland or Settlements categories. It includes reservoirs as a managed sub-division and natural rivers and lakes as unmanaged sub-divisions. Further definitions of wetlands sub-divisions are provided in the IPCC Wetland Supplement (IPCC 2014).

V. Settlements

This category includes all developed land, including transportation infrastructure and human settlements of any size, unless they are already included under other categories. This should be consistent with national definitions.

VI. Other Land

This category includes bare soil, rock, ice, and all land areas that do not fall into any of the other five categories. It allows the total of identified land areas to match the national area, where data are available.

Tracking land ‘remaining’ and ‘converted’

The full application of the guidelines requires the estimation of land-use conversions between data collection intervals. Using Approach 3 spatially explicit methods such as in FLINT, the tracking of land-use conversions is possible. This makes it possible to report land according to the end land use for the data collection period, while also being able to identify the land use at the start of the collection period. For example, Forest Land converted to Cropland. Further to just tracking land use change between periods, Approach 3 spatially explicit can enable the tracking of land through time (over multiple periods) which supports the IPCC guidance to further subdivide the land use classification according to land that is remaining and land converted (Table 1).

Table 1 - Land Use and Land Use Conversion categories

Land Use	Land Use Conversion
Forest Land	FF = Forest Land remaining Forest Land

	LF = Land converted to Forest Land
Grassland	GG = Grassland remaining Grassland LG = Land converted to Grassland
Cropland	CC = Cropland remaining Cropland LC = Land converted to Cropland
Wetlands	WW = Wetlands remaining Wetlands LW = Land converted to Wetlands
Settlements	SS = Settlements remaining Settlements LS = Land converted to Settlements
Other Land	OO = Other Land remaining Other Land LO = Land converted to Other Land

The 2019 refinement provides the following guidance in relation to land remaining and land converted:

"In preparation for the greenhouse gas emission and removal estimations described elsewhere in this Volume, this area should be further sub-divided into the area that has remained in the land-use category and area that has been affected by a land-use conversion (i.e., the land converted to a different land-use category) in the previous Y years (where Y is the time period during which C pools are expected to reach equilibrium (the IPCC default is 20 years, based on soil C pools typical time to equilibrium after land-use conversion).
Therefore, under the default assumption in every inventory year, the area converted to a land-use category should be added to the category "land converted to" and the same area removed from the land remaining in the land-use category. The area of land that entered that "land converted to" category, 21 years ago (if using the default 20 year period), should be removed and added to the category "land remaining land". For example, in Table 3.5 if data indicated that four of the 56 Mha in the Grassland category had been converted from Forest Land 21 years ago, then four Mha of land should be moved from the category Land Converted to Grassland to the category Grassland Remaining Grassland in this annual inventory." 2019 Refinement Vol4 Chap3 pp3.16

Stratifying land use categories

The next step, once land has been assigned to land-use and land-use conversion categories, is to assign further stratifications if desirable.

"Once land-use and land-use conversion areas have been established, it is necessary to consider the capacity and need for further stratification. ...Stratification is the process of disaggregating a land-use category (e.g. Forest Land, Cropland, Grassland) into logical,

typically homogenous, sub-divisions (e.g. tropical/dry forest, crop types, improved or unimproved pastures)." 2019 Refinement Vol4 Chap 3 pp3.27

Stratification is a country specific exercise, and is something that needs to be carefully managed. Stratification can help to improve transparency, but it can also create a large volume of sub-categories which can be difficult to interpret. Nonetheless, this is a country specific decision and should be supported by the Reporting Tool functionality.

Temporarily destocked forest

Areas of land that are temporarily destocked (temporary loss of forest cover) are included under Forest Land, on the basis that the land is continually managed as a forest, even if cover is temporarily lost due to human actions or natural disturbances. Given that this is a rule specifically for temporary destocking, it is necessary to be able to define the period of time beyond which the destocking can no longer be considered temporary, and is actually a land use change.

Cropland Fallow

Cropland also includes land that is temporarily used for forage or grazing and/or set aside to fallow. Fallow is land that is temporarily rested for one or more years before being cultivated again. Fallow practices are common and can range from bare ground to cover crops, forage crops and temporary pasture.

In both instances the land is considered to remain classified as cropland, as the cropland management is the dominant land use and has the greatest influence on carbon stocks.

Other land use classification considerations

Managed and unmanaged land is considered in the IPCC guidelines. Without delving into the history of the classification of managed vs unmanaged land, with respect to reporting land areas and emissions and removals, managed land and the emissions and removals are included under greenhouse gas inventory reporting, while unmanaged land and its emissions and removals are only reported as an information item, and the reporting of emissions and removals is not mandatory for unmanaged land.
Within the current implementations of FLINT there is no tracking of managed and unmanaged land. For the purpose of the reporting tool it is assumed that the land being simulated is managed and therefore the land classification is based only on managed land. Future iterations of the tool may be adapted to incorporate managed and unmanaged land reporting if relevant.

Finally, this design document does not address the classification of land with respect to the Inter Annual Variability (IAV) provisions of the 2019 Refinement (see Section 2.6, Chapter 2, Volume 4). The identification of land subject to Interannual Variability is a country specific approach and therefore designing a generic approach to IAV is difficult and considered beyond the scope of this first version of the tool.

Land Use Decision Process for FLINT

The land use decision process has been developed based on the requirements of the land use policy requirements described above. This is used to assign a UNFCCC land use category for each year for each flux and its associated land area. The decisions of which IPCC land use category to assign are made based upon the Vegetation History Dimension (VegHistoryDim) and it's associated dimensions in the FLINT Flux database.

The VegHistoryDim contains information on the vegetation type (VegType) for each year of the simulation, including the initial type. The VegType is associated with an IPCC cover type which is used in the land use decision process, to decide which land use category to assign for each year.

The land use decision process has been designed to support the following classification issues noted in the above section:

- It must support all of the IPCC land use categories and their sub-classifications of land use 'remaining' land use and land use 'converted to' land use
    - Forest land
    - Cropland
    - Grassland
    - Settlements
    - Wetlands
    - Other land
- It must be able to re-classify 'converted to' land as 'remaining' land after a defined period of time. This is called the 'Remaining Period'.
    - For example, if the remaining period was set to 20 years, then a piece of land that was Forest land converted to cropland, would be classified as Cropland remaining cropland after a period of 20 years of being classified as Forest land converted to cropland
- Allow for temporary destocking of a forest for harvesting to be classified as forest land, rather than as a land use change or conversion. This concept has been expanded to all land cover types and is referred to as the 'Conversion Period'.
- Allow land that is cropped, but also subject to fallow periods or periods of grazing to be classified as cropland

Detailed Decision Process

Figure 1 is a flowchart of the decision process required to be able to assign land use classifications for all land use types. The flowchart is an operational adaptation of Figure 3A.6.1 of the IPCC 2019 Refinement. The decision process can be used for a subset of landuses at a time or can be used for all land-uses simultaneously. The steps below should be read in conjunction with the flowchart. To identify the land use classification, start at step 1 and follow the directions until a land use category is assigned:

1. Is this the initial timestep? Yes – Go to 2, No Go to 7
2. Is the cover type Grassland No - Go to 3, Yes - Go to 4
3. Classify as land remaining land of the initial cover type
4. Does the cover type become Cropland within the Cropland to grassland conversion period without becoming any other cover type? Yes - Go to 5, No - Go to 6
5. Classify as Cropland Remaining Cropland
6. Classify as land remaining land of the initial cover type
7. Based upon the cover type of the current step and the land use class of every previous step, has the cover type changed since the initial timestep? No – Got to 8, Yes – Go to 9
8. Classify as land remaining land of the initial land use type
9. Does the current cover type remain the same for longer than the 'land conversion' period of the previous land use (look forward in the cover time-series and back through the assigned land use time-series)? Yes – Go to 10, No – Go to 13
10. Looking at the current cover type and back through the time-series of land use, has the cover type remained the same for longer than the 'land remaining' period? Yes - Go to 11, No - Go to 12
11. Classify as land remaining land of the current cover type
12. Classify as land converted to land of the current cover type
13. Looking at the cover types for the current and the next step, as well as the land use class for the previous step, do the cover types include both cropland and grassland and exclude all other cover types? Yes – Go to 14, No – Go to 19
14. Has this been the case since the initial year or is there only cropland and grassland land cover types for a period longer than the land conversion period (looking both forwards and backwards from the current year)? No - Go to 15, Yes - Go to 16
15. Is the length of time to the end of the time-series less than the land conversion period? Yes - Got to 16, No - Got to 17
16. Classify as Unconfirmed land (of the previous land use) converted to Cropland
17. Has this been the case since the initial time-step or for a period longer than the 'land remaining' period? Yes - Go to 18, No - Go to 19
18. Classify as Cropland remaining cropland
19. Classify as land (previous land use) converted to cropland
20. Is the length of time to the end of the simulation less than the land conversion period for the previous land use? Yes - Go to 21, No - Go to 22
21. Classify as Unconfirmed land (previous land use) converted to land (current cover type)
22. Did the cover type change back to a previous land use before the end of its land conversion period? Yes - Go to 23, No - Go to 24
23. classify as land remaining land (of the previous land use)
24. classify as land (previous land use) converted to land (current cover type)

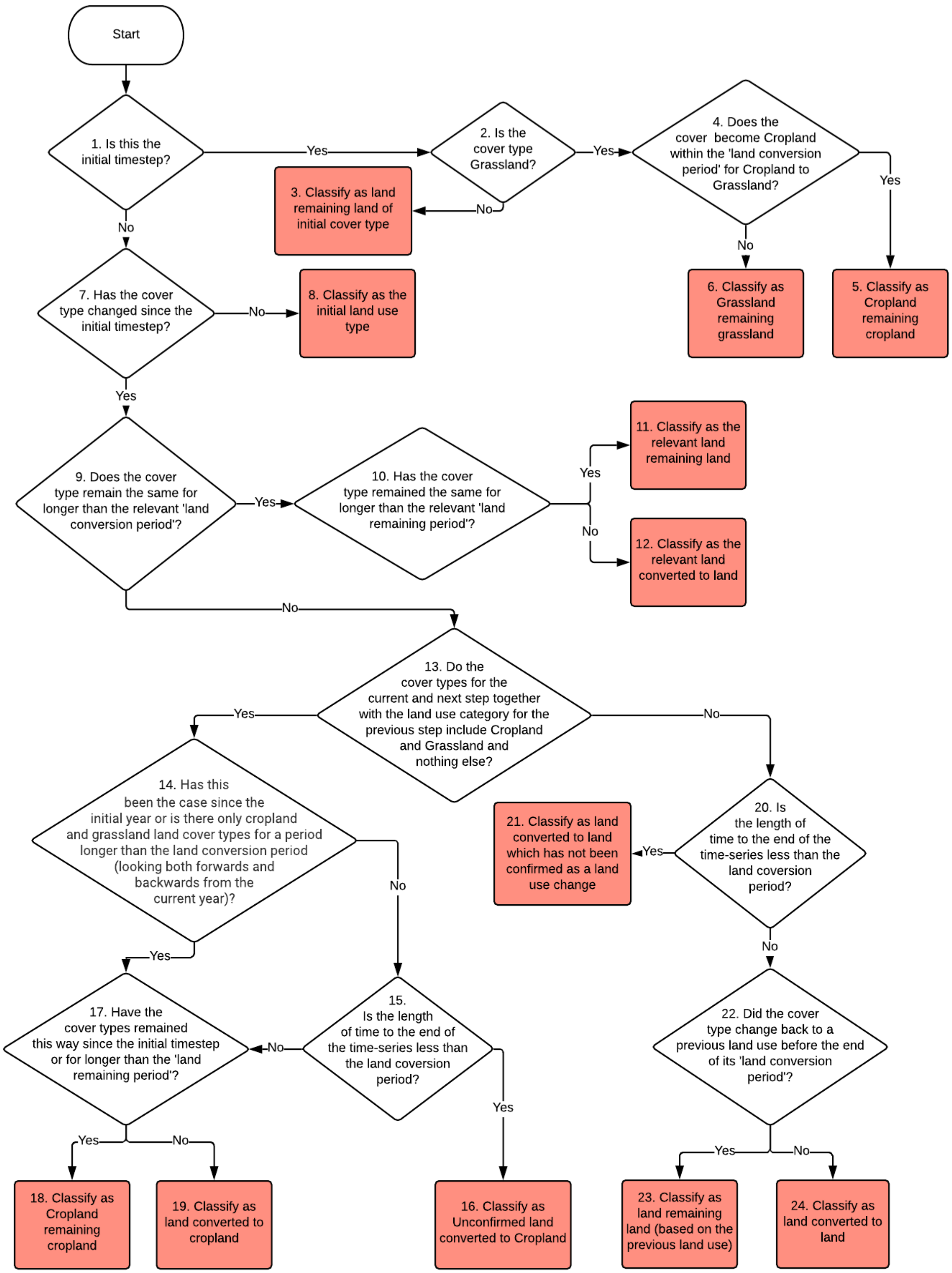

Figure 1 Decision Flowchart for classifying land according to UNFCCC land use categories.

Conversion and remaining periods

As noted above two concepts of Conversion period and remaining period have been introduced. These time periods are country specific decisions (even though some default periods are provided by the IPCC) and therefore the Reporting Tool has a table that enables these periods to be configured by the country. The table below is an example of conversion and remaining periods for different types of conversions. As suggested by the table, it is likely that many land cover type changes will instantly result in a land use change. The remaining period of 20 years is consistent with the IPCC default period.

Previous Land Cover	Remaining/Conversion	Current Land Cover	Conversion Period	Remaining Period
Cropland	converted to	Forest land	0	20
Cropland	converted to	Grassland	10	20
Cropland	converted to	Settlement	0	20
Cropland	converted to	Wetland	0	20
Forest land	converted to	Cropland	3	20
Forest land	converted to	Grassland	3	20
Forest land	converted to	Settlement	0	20
Forest land	converted to	Wetland	0	20
Grassland	converted to	Forest land	0	20
Grassland	converted to	Cropland	0	20
Grassland	converted to	Settlement	0	20
Grassland	converted to	Wetland	0	20
Other land	converted to	Forest land	0	20
Other land	converted to	Cropland	0	20
Other land	converted to	Grassland	0	20
Other land	converted to	Settlement	0	20
Other land	converted to	Wetland	0	20
Settlement	converted to	Forest land	0	20

Settlement	converted to	Cropland	0	20
Settlement	converted to	Grassland	0	20
Settlement	converted to	Wetland	0	20
Wetland	converted to	Forest land	0	20
Wetland	converted to	Cropland	0	20
Wetland	converted to	Grassland	0	20
Wetland	converted to	Settlement	0	20
Cropland	remaining	Cropland	NA	NA
Forest land	remaining	Forest land	NA	NA
Grassland	remaining	Grassland	NA	NA
Other land	remaining	Other land	NA	NA
Settlement	remaining	Settlement	NA	NA
Wetland	remaining	Wetland	NA	NA

Vegetation type mapping table for land and emissions allocation

Country specific species or vegetation types need to be mapped to the correct land use classes. They also need to be assigned other relevant attributes to allow for correct reporting and accounting. A vegetation type to IPCC Cover Type table has been included to allow countries to map their local Vegetation Types to IPCC Cover Types. The table below provides an example. There are five attributes that are required:

1. IPCC category: this attributes a vegetation type to an IPCC Land Use category, Forest land, Cropland, Grassland, Wetlands, Settlements, Other land (users should refer to the IPCC guidance when considering how to attribute a vegetation type to an IPCC land use category).
2. Multiple species: if the land use is multiple species (such as agroforestry or orchards) where to place the land use, for example does it meet the countries structural definition of forest?
3. Natural system: to allow tracking of natural to non-natural systems. This is particularly relevant to conversion of natural forest to plantations and is likely to be most relevant for reporting under the REDD+ (not currently being addressed here)
4. Woody: this allows for separation of woody perennial crops from annual or non-woody perennials. These have different reporting rules applied in the 2006 GL

id	Vegetation type (examples)	IPCCCoverType	NaturalSys	Woody
1	Maize	C	No	No
2	Wheat	C	No	No
3	Native Pasture	G	Yes	No
4	Native Forest	F	Yes	Yes
5	Eucalypt Plantation	F	No	Yes
6	Acacia Plantation	F	No	Yes
7	Cypress Plantation	F	No	Yes
8	Pinus Plantation	F	No	Yes
9	Casuarina Plantation	F	No	Yes
10	Vitex Plantation	F	No	Yes
11	Douglas Fir	F	No	Yes
12	Improved Pasture	G	No	No
13	Oil Palm	C	No	No
14	Apple Orchard	C or F	No	Yes
15	Dam	W	No	No
16	Rice	C	No	No
17	Natural Shrubs	G	Yes	Yes
18	Bare Rock	O	Yes	No
19	Roading	S	No	No

IPCC carbon pools

The IPCC lists 5 carbon pools (although in practice 6 pools are reported due to the split of soil carbon into mineral and organic soil). The FLINT tracks the pools from all modules, and therefore the FLINT pools can vary depending upon the modules that are attached. These need to be mapped to the IPCC pools to allow the Reporting tool to aggregate to the appropriate IPCC pool. Below is an example table. This also includes user definable pool summaries.

Module	Module pool	IPCC pool
Forest growth	Stemwood	AGB
	Bark	AGB
	Branch	AGB
	Foliage	AGB
	Fine roots	BGB
	Coarse roots	BGB
Ag growth	Stalk	AGB
	Grain	AGB
	Fruit	AGB
	Roots	BGB
Decomposition	Standing deadwood	Deadwood
	Downed deadwood	Deadwood
	Dead coarse roots	Deadwood
	Fine litter	Litter
	Dead fine roots	Litter
	Mulched wood	Litter
Soil mineral	DPM	Soil (mineral)
	RPM	Soil (mineral)
	Bio-F	Soil (mineral)
	Bio-S	Soil (mineral)
	Hum	Soil (mineral)

	Inert	Soil (mineral)
Peat soils	Pool 1	Soil (organic)
	Pool 2	Soil (organic)
	Pool 3	Soil (organic)
Products	Sawn timber	HWP
	Pulp and paper	HWP
	Fruit	Non-HWP

FLINT Flux Database

The FLINT Flux database is primarily concerned with capturing 'facts' regarding fluxes between pools within the FLINT. The Flux database is a Star Schema database with a central 'Fact' Table that contains flux values which are associated with attributes in a series of 'Dimension' tables. Fact and Dimension tables are linked via a dimension id. . An entity relationship diagram for the database is shown in Figure 2.

An important design feature of the Flux database is that it provides flexibility to support queries/reporting against known policies (e.g. UNFCCC AFOLU and LULUCF emission sources), and is also designed to support queries for possible future policies and questions. For example, queries aimed at analysing trends and patterns at finer levels of aggregation than existing reporting requirements. The fundamental information that the database needs to capture are related to location, pools (carbon pools, and potentially nitrogen and water pools), land use/land use change, type of flux, timing and the flux value.

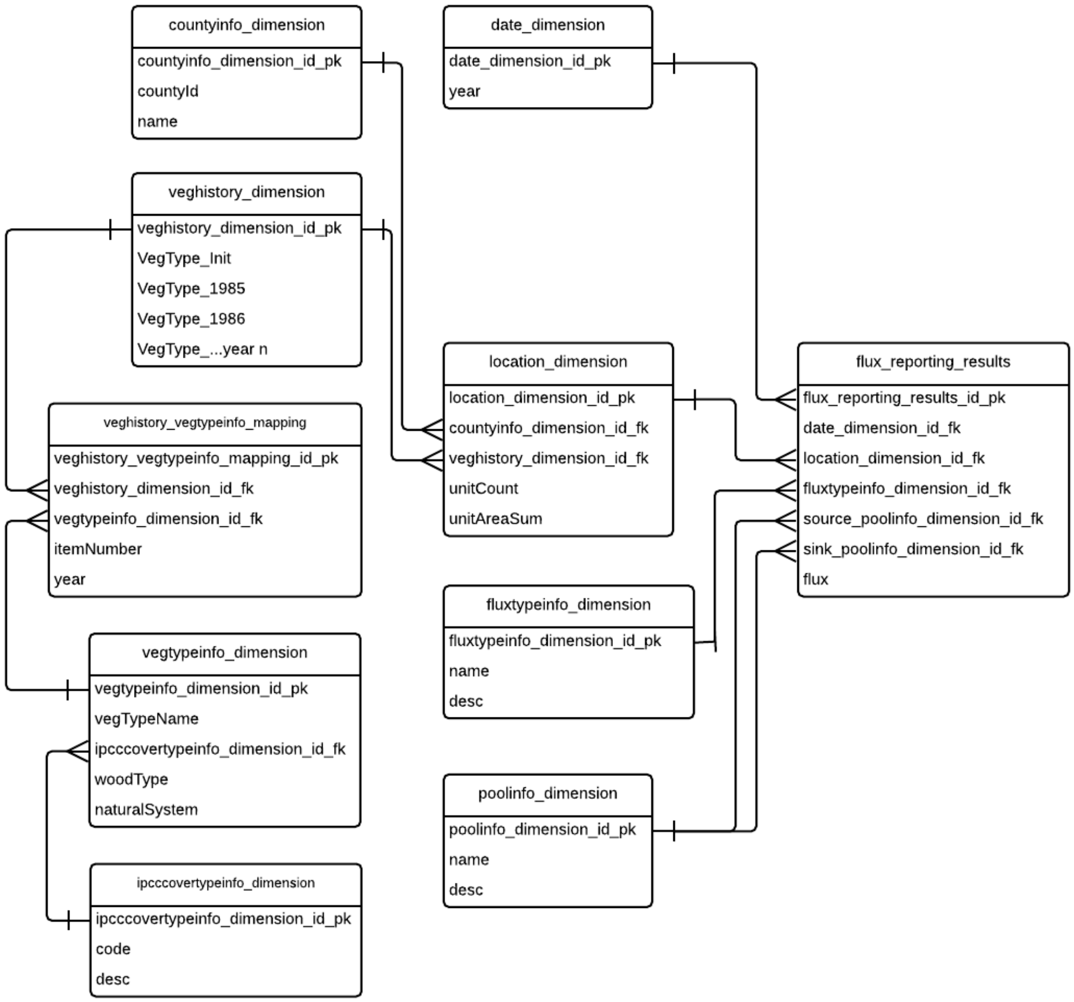

Figure 2. Example FLINT Database Schema

FluxFacts

The FluxFact table consists of 'records' which have flux fact attributes as well as attributes that link to the dimension tables through unique dimension identifiers. The flux facts include a flux value which is always positive (because it represents the movement of mass from one pool (StartPool) to another (EndPool)). In addition the flux facts have attributes of StartPool and EndPool, which identifies the source pool of the flux and the destination pool of the flux. The StartPool and EndPool can be used to determine how a flux is related to the IPCC carbon stock changes and non-CO2 emissions. An example of how the fluxes can be aggregated to IPCC emissions can be found.

Date dimension

The date dimension table contains information on the timing of the simulation steps associated with the FluxFacts. The number of date attributes can potentially be as high as the finest time-step scale of the simulation, however, practically this may not be feasible due to database size. For Version 1 the date dimension will be restricted to either monthly or yearly aggregation to manage database size.

An example of the date dimension table for Version 1 is below:

id	step	substep	Year	Month
1	1	1	2000	1
2	1	2	2000	2
3	1	3	2000	3
4	1	4	2000	4
5	1	5	2000	5
6	1	6	2000	6
7	1	7	2000	7
8	1	8	2000	8
9	1	9	2000	9
10	1	10	2000	10
11	1	11	2000	11
12	1	12	2000	12
13	2	1	2001	1
14	2	2	2001	2
15	2	3	2001	3
16	2	4	2001	4
17	2	5	2001	5

18	2	6	2001	6
19	2	7	2001	7
20	2	8	2001	8

Location dimension

The location dimension table captures the spatial location information for the FluxFacts. This table is populated by both the spatial location data provided to the FLINT for the simulation, as well as the time-series of Vegetation types. For Version 1 the number of location attributes should be relatively limited, for example it could just include a single Administrative boundary such as 'County' and the VegHistoryId. To ensure that the calculation of area is infallible, the area calculation will be stored as an attribute of the Location dimension table (SimUnitAreaSum). By doing this all fluxes will be able to be attributed to a single unique location, thereby removing the risk of double counting area that would exist if area were an attribute of the Flux. As such in the database, all Fluxes will be assigned a location id which has a unique combination of Administrative boundary eg 'County' and 'VegHistoryId'. This means that all fluxes that occur on a Simulation Unit will be able to be aggregated with fluxes from other Simulation Units that have the same VegHistory within an Administrative boundary. An example of the layout of Location table is below:

id	Sub-national boundary	VegHistoryId	SimUnitCount	SimUnitAreaSum
7	NSW	108	125	31.25
17	Victoria	120	23	5.75
27	Queensland	72	70	17.5
37	Western Australia	100	85	21.25
43	Northern Territory	148	150	37.5
3	South Australia	28	10	2.5

13	ACT	16	41	10.25
23	Tasmania	80	4	1

VegHistory dimension

The VegHistory dimension table is important because it allows FluxFacts to be assigned a land use classification that takes into account the land-use history. This dimension table enables the Approach 3 capability of the FLINT to be implemented in the output database and used in the Reporting Tool. The VegHistory dimension table consists of records with unique combinations of the Vegetation type that was present at the end step of each year of the simulation. The VegType name is linked via a unique id to the dimension table to manage data size. It is important that only the VegType present at the annual end step is recorded, because a finer time-scale granularity would result in a large amount of unique VegHistory records. In addition, the VegType at initialization will also need to be captured. This means that the VegHistory dimension table will have n+1 attribute fields where n = the number of years of the simulation. The first table below is a mock-up of a VegHistory table, showing a VegType code for each year of each unique row. This is linked to the second table which is the VegType table. The VegType table contains additional information that are taken from user defined input to the FLINT simulation. That is the user needs to define for each VegType, its IPCCCoverType (F=Forest land, C=Cropland, G=Grassland, W=Wetland, S=Settlements, O=Other land), if it is a Natural System (NaturalSys = Yes or No), and if its Woodiness status (Woody = Yes or No).

id	Initial	Year 1	Year 2	Year 3	Year 4	Year 5	Year…	Year n
1	4	4	4	1	1	1	1	1
2	3	3	3	3	3	3	3	3
3	1	1	1	3	3	3	3	3
4	5	5	1	1	1	5	5	5

id	VegType	IPCCCoverType	NaturalSys	Woody
1	Maize	C	No	No

2	Wheat	C	No	No
3	Native Pasture	G	Yes	No
4	Indigenous Forest	F	Yes	Yes
5	Eucalypt Plantation	F	No	Yes
6	Acacia Plantation	F	No	Yes
7	Cypress Plantation	F	No	Yes
8	Pinus Plantation	F	No	Yes
9	Casuarina Plantation	F	No	Yes
10	Vitex Plantation	F	No	Yes
11	Douglas Fir	F	No	Yes
12	Improved Pasture	G	No	No
13	Oil Palm	C	No	No
14	Apple Orchard	C or F	No	Yes
15	Dam	W	No	No
16	Rice	C	No	No
17	Natural Shrubs	G	Yes	Yes
18	Bare Rock	O	Yes	No
19	Roading	S	No	No

FluxType

The FluxType dimension aims to capture the cause of the flux. This information is used to attribute the flux to certain pools and classifications in different reporting outputs. For example, UNFCCC land use classifications and emission sources. The flux type is a dimension that will need to be derived from disturbance events or normal processes of turnover and primary production. This may require some user definitions into the input database by defining disturbance events as being of one of the particular flux types. An example of the layout and potential types of attribute values for the FluxType table is below:

id	FluxType	Description (not used in the DB)
1	Wildfire	Fluxes that are the result of a wildfire disturbance event. This can include emissions to the atmospehre as well as transfers between pools and can include carbon and other non-carbon greenhouse gases
2	Controlled burning	Fluxes that are the result of a controlled burning disturbance. This can include emissions to the atmospehre as well as transfers between pools
3	NPP	Net primary production - the mass of photosynthate remaining after taking into account loss due to autotrophic respiration
4	Harvest	Fluxes that are the result of a harvest event where all trees are harvested which can be fluxes between onsite pools or can be fluxes to offsite pools
5	Decomposition	Fluxes due to the decay of organic matter in dead organic matter and soil
6	Turnover	Fluxes due to normal processes of leaf, bark, and branch shedding and movement through debris and soil carbon pools due to decay
7	Plough	Fluxes from a tillage disturbance on crop and grass

8	Thin	Fluxes that are the result of a thin event where not all trees are harvested or felled which can be fluxes between onsite pools or can be fluxes to offsite pools
9	Plant trees	When tree seedlings are planted there is a small carbon flux from offsite to tree pools
10	Plant crops	When crops are sown or planted there is a carbon flux from offsite to crop pools
11	N fertiliser	A flux that is the result of nitrogen fertiliser application
12	Pest	Fluxes due to pest attack, for example transfer of leaves to the fine litter pools.
13	Windthrow	fluxes dur to tree death due to being blown over by wind
14	Lime application	carbon fluxes associated with lime and dolomite application
15	Grazing	fluxes between plant pools due to animal grazing
16	Irrigation	H20 fluxes due to irrigation
17	Herbicide	fluxes due to plant death from herbicide application
18	Manure	Fluxes from the application of manure from offsite
19	Heavy roll	flux of carbon due to chopper rolling
20	Wetland drainage	flux of N due to wetland drainage and rewetting
21	Rice	special case where CH4 is transmitted through the stem
22	Cattle Grazing	carbon fluxes due to cattle grazing
23	Sheep Grazing	carbon fluxes due to sheep grazing

24	Goat Grazing	carbon fluxes due to goat grazing

Fluxes and UNFCCC emissions

The FluxFact table in the Flux database captures where a Flux came from (StartPool) and where it went to (EndPool). This makes it possible to assign the flux to one of the IPCC carbon stock change pools as well as the non-CO2 emissions. The table below indicates how a flux fact should be treated (added, subtracted, or ignored) for UNFCCC reporting variables (simplified IPCC carbon stock change and emissions pools). A flux is always positive (because it represents a movement of mass from one pool to another) and as such it will either need to be added (where it is a flux into the pool in question) or subtracted (where it is a flux from the pool in question).

FluxFact Start and End Pool Combinations	Net carbon stock change in living biomass (kt C)	Net carbon stock change in dead organic matter (kt C)	Net carbon stock change in mineral soils (kt C)	Net carbon stock change in organic soils (kt C)	CH4 (controlled burning and wildfire) (kt CH4)	N2O (controlled burning and wildfire) (kg N2O)
AgDeadFineRoots:SoilBioF	NA	subtract	add	add	NA	NA
AgDeadFineRoots:SoilBioS	NA	subtract	add	add	NA	NA
AgDeadFineRoots:SoilDPM	NA	subtract	add	add	NA	NA
AgDeadFineRoots:SoilHUM	NA	subtract	add	add	NA	NA
AgDeadFineRoots:SoilIOM	NA	subtract	add	add	NA	NA
AgDeadFineRoots:SoilRPM	NA	subtract	add	add	NA	NA
AgFineLitter:Atmosphere CH4	NA	NA	NA	NA	add	NA

AgFineLitter:Atmosphere N2O	NA	NA	NA	NA	NA	add
AgFineLitter:AtmosphereCO2	NA	subtract	NA	NA	NA	NA
AgFineLitter:Soil BioF	NA	subtract	add	add	NA	NA
AgFineLitter:Soil BioS	NA	subtract	add	add	NA	NA
AgFineLitter:Soil DPM	NA	subtract	add	add	NA	NA
AgFineLitter:Soil HUM	NA	subtract	add	add	NA	NA
AgFineLitter:Soil IOM	NA	subtract	add	add	NA	NA
AgFineLitter:Soil RPM	NA	subtract	add	add	NA	NA
AgOffSiteProduct:AgOffSiteProduct	NA	NA	NA	NA	NA	NA
AgStalkLitter:AgFineLitter	NA	NA	NA	NA	NA	NA
AgStalkLitter:Atmosphere CH4	NA	NA	NA	NA	add	NA
AgStalkLitter:Atmosphere N2O	NA	NA	NA	NA	NA	add

AgStalkLitter:AtmosphereCO2	NA	subtract	NA	NA	NA	NA
AtmosphereCO2:CropFineRoot	add	NA	NA	NA	NA	NA
AtmosphereCO2:CropGrain	add	NA	NA	NA	NA	NA
AtmosphereCO2:CropLeaf	add	NA	NA	NA	NA	NA
AtmosphereCO2:CropStalk	add	NA	NA	NA	NA	NA
AtmosphereCO2:GrassFineRoot	add	NA	NA	NA	NA	NA
AtmosphereCO2:GrassGrain	add	NA	NA	NA	NA	NA
AtmosphereCO2:GrassLeaf	add	NA	NA	NA	NA	NA
AtmosphereCO2:GrassStalk	add	NA	NA	NA	NA	NA
AtmosphereCO2:TreeBark	add	NA	NA	NA	NA	NA
AtmosphereCO2:TreeBranch	add	NA	NA	NA	NA	NA
AtmosphereCO2:TreeCoarseRoot	add	NA	NA	NA	NA	NA

AtmosphereCO2:TreeFineRoot	add	NA	NA	NA	NA	NA
AtmosphereCO2:TreeFoliage	add	NA	NA	NA	NA	NA
AtmosphereCO2:TreeStem	add	NA	NA	NA	NA	NA
BioChar:SoilDPM	NA	NA	add	add	NA	NA
BioChar:SoilIOM	NA	NA	add	add	NA	NA
BioChar:SoilRPM	NA	NA	add	add	NA	NA
Biofuel:Atmosphere CH4	NA	NA	NA	NA	NA	NA
Biofuel:Atmosphere N2O	NA	NA	NA	NA	NA	NA
Biofuel:AtmosphereCO2	NA	NA	NA	NA	NA	NA
CropAnimalProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
CropAnimalProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
CropAnimalProduct:Atmosphere CO2	NA	NA	NA	NA	NA	NA

CropBGFProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
CropBGFProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
CropBGFProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
CropBiofuel:Atmosphere CH4	NA	NA	NA	NA	NA	NA
CropBiofuel:Atmosphere N2O	NA	NA	NA	NA	NA	NA
CropBiofuel:AtmosphereCO2	NA	NA	NA	NA	NA	NA
CropFineRoot:AgDeadFineRoots	subtract	add	NA	NA	NA	NA
CropFineRoot:CropBiofuel	subtract	NA	NA	NA	NA	NA
CropFineRoot:CropRootProduct	subtract	NA	NA	NA	NA	NA
CropGrain:AgFineLitter	subtract	add	NA	NA	NA	NA
CropGrain:Atmosphere CH4	NA	NA	NA	NA	add	NA

CropGrain:Atmosphere N2O	NA	NA	NA	NA	NA	add
CropGrain:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
CropGrain:CropAnimalProduct	subtract	NA	NA	NA	NA	NA
CropGrain:CropBGFProduct	subtract	NA	NA	NA	NA	NA
CropGrain:CropBiofuel	subtract	NA	NA	NA	NA	NA
CropLeaf:AgFineLitter	subtract	add	NA	NA	NA	NA
CropLeaf:Atmosphere CH4	NA	NA	NA	NA	add	NA
CropLeaf:Atmosphere N2O	NA	NA	NA	NA	NA	add
CropLeaf:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
CropLeaf:CropAnimalProduct	subtract	NA	NA	NA	NA	NA
CropLeaf:CropBiofuel	subtract	NA	NA	NA	NA	NA
CropLeaf:CropLeafProduct	subtract	NA	NA	NA	NA	NA

CropLeafProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
CropLeafProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
CropLeafProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
CropRootProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
CropRootProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
CropRootProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
CropStalk:AgStalkLitter	subtract	add	NA	NA	NA	NA
CropStalk:Atmosphere CH4	NA	NA	NA	NA	add	NA
CropStalk:Atmosphere N2O	subtract	NA	NA	NA	NA	add
CropStalk:AtmosphereCO2	subtract	NA	NA	NA	NA	NA

CropStalk:CropAnimalProduct	subtract	NA	NA	NA	NA	NA
CropStalk:CropBiofuel	subtract	NA	NA	NA	NA	NA
CropStalk:CropStalkProduct	subtract	NA	NA	NA	NA	NA
CropStalkProduct:AtmosphereCH4	NA	NA	NA	NA	NA	NA
CropStalkProduct:AtmosphereN2O	NA	NA	NA	NA	NA	NA
CropStalkProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
Deadwood:TreeCoarseLitter	NA	NA	NA	NA	NA	NA
Deadwood:TreeFineLitter	NA	NA	NA	NA	NA	NA
DownDeadwood:AtmosphereCH4	NA	NA	NA	NA	add	NA
DownDeadwood:AtmosphereN2O	NA	NA	NA	NA	NA	add

DownDeadwood:AtmosphereCO2	NA	subtract	NA	NA	NA	NA
DownDeadwood:Biofuel	NA	subtract	NA	NA	NA	NA
DownDeadwood:SoilBioF	NA	subtract	add	add	NA	NA
DownDeadwood:SoilBioS	NA	subtract	add	add	NA	NA
DownDeadwood:SoilDPM	NA	subtract	add	add	NA	NA
DownDeadwood:SoilHUM	NA	subtract	add	add	NA	NA
DownDeadwood:SoilIOM	NA	subtract	add	add	NA	NA
DownDeadwood:SoilRPM	NA	subtract	add	add	NA	NA
GrassAnimalProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
GrassAnimalProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
GrassAnimalProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA

GrassBGFProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
GrassBGFProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
GrassBGFProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
GrassBiofuel:Atmosphere CH4	NA	NA	NA	NA	NA	NA
GrassBiofuel:Atmosphere N2O	NA	NA	NA	NA	NA	NA
GrassBiofuel:AtmosphereCO2	NA	NA	NA	NA	NA	NA
GrassFineRoot:AgDeadFineRoots	subtract	add	NA	NA	NA	NA
GrassFineRoot:GrassBiofuel	subtract	NA	NA	NA	NA	NA
GrassFineRoot:GrassRootProduct	subtract	NA	NA	NA	NA	NA
GrassGrain:AgFineLitter	subtract	add	NA	NA	NA	NA
GrassGrain:Atmosphere CH4	NA	NA	NA	NA	add	NA

GrassGrain:Atmosphere N2O	NA	NA	NA	NA	NA	add
GrassGrain:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
GrassGrain:GrassAnimalProduct	subtract	NA	NA	NA	NA	NA
GrassGrain:GrassBGFProduct	subtract	NA	NA	NA	NA	NA
GrassGrain:GrassBiofuel	subtract	NA	NA	NA	NA	NA
GrassLeaf:AgFineLitter	subtract	add	NA	NA	NA	NA
GrassLeaf:Atmosphere CH4	NA	NA	NA	NA	add	NA
GrassLeaf:Atmosphere N2O	NA	NA	NA	NA	NA	add
GrassLeaf:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
GrassLeaf:GrassAnimalProduct	subtract	NA	NA	NA	NA	NA
GrassLeaf:GrassBiofuel	subtract	NA	NA	NA	NA	NA
GrassLeaf:GrassLeafProduct	subtract	NA	NA	NA	NA	NA

GrassLeafProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
GrassLeafProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
GrassLeafProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
GrassRootProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
GrassRootProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
GrassRootProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
GrassStalk:AgStalkLitter	subtract	add	NA	NA	NA	NA
GrassStalk:Atmosphere CH4	NA	NA	NA	NA	add	NA
GrassStalk:Atmosphere N2O	subtract	NA	NA	NA	NA	add
GrassStalk:AtmosphereCO2	subtract	NA	NA	NA	NA	NA

GrassStalk:GrassAnimalProduct	subtract	NA	NA	NA	NA	NA
GrassStalk:GrassBiofuel	subtract	NA	NA	NA	NA	NA
GrassStalk:GrassStalkProduct	subtract	NA	NA	NA	NA	NA
GrassStalkProduct:Atmosphere CH4	NA	NA	NA	NA	NA	NA
GrassStalkProduct:Atmosphere N2O	NA	NA	NA	NA	NA	NA
GrassStalkProduct:AtmosphereCO2	NA	NA	NA	NA	NA	NA
Manure:SoilBioF	NA	NA	add	add	NA	NA
Manure:SoilBioS	NA	NA	add	add	NA	NA
Manure:SoilDPM	NA	NA	add	add	NA	NA
Manure:SoilHUM	NA	NA	add	add	NA	NA
Manure:SoilIOM	NA	NA	add	add	NA	NA
Manure:SoilRPM	NA	NA	add	add	NA	NA
Paper:Atmosphere CH4	NA	NA	NA	NA	NA	NA

Paper:Atmosphere N2O	NA	NA	NA	NA	NA	NA
Paper:AtmosphereCO2	NA	NA	NA	NA	NA	NA
Paper:Biofuel	NA	NA	NA	NA	NA	NA
Paper:Paper	NA	NA	NA	NA	NA	NA
Sawnwood:Atmosphere CH4	NA	NA	NA	NA	NA	NA
Sawnwood:Atmosphere N2O	NA	NA	NA	NA	NA	NA
Sawnwood:AtmosphereCO2	NA	NA	NA	NA	NA	NA
Sawnwood:Biofuel	NA	NA	NA	NA	NA	NA
Sawnwood:Paper	NA	NA	NA	NA	NA	NA
Sawnwood:WoodPanels	NA	NA	NA	NA	NA	NA
SoilBioF:Atmosphere CH4	NA	NA	NA	NA	add	NA
SoilBioF:Atmosphere N2O	NA	NA	NA	NA	NA	add
SoilBioF:AtmosphereCO2	NA	NA	subtract	subtract	NA	NA

SoilBioS:Atmosphere CH4	NA	NA	NA	NA	add	NA
SoilBioS:Atmosphere N2O	NA	NA	NA	NA	NA	add
SoilBioS:AtmosphereCO2	NA	NA	subtract	subtract	NA	NA
SoilDPM:Atmosphere CH4	NA	NA	NA	NA	add	NA
SoilDPM:Atmosphere N2O	NA	NA	NA	NA	NA	add
SoilDPM:AtmosphereCO2	NA	NA	subtract	subtract	NA	NA
SoilHUM:Atmosphere CH4	NA	NA	NA	NA	add	NA
SoilHUM:Atmosphere N2O	NA	NA	NA	NA	NA	add
SoilHUM:AtmosphereCO2	NA	NA	subtract	subtract	NA	NA
SoilHUM:SoilBioF	NA	NA	NA	NA	NA	NA
SoilHUM:SoilBioS	NA	NA	NA	NA	NA	NA
SoilIOM:Atmosphere CH4	NA	NA	NA	NA	add	NA

SoilIOM:Atmosphere N2O	NA	NA	NA	NA	NA	add
SoilIOM:AtmosphereCO2	NA	NA	subtract	subtract	NA	NA
SoilRPM:Atmosphere CH4	NA	NA	NA	NA	add	NA
SoilRPM:Atmosphere N2O	NA	NA	NA	NA	NA	add
SoilRPM:AtmosphereCO2	NA	NA	subtract	subtract	NA	NA
SoilRPM:SoilBioF	NA	NA	NA	NA	NA	NA
SoilRPM:SoilBioS	NA	NA	NA	NA	NA	NA
SoilRPM:SoilHUM	NA	NA	NA	NA	NA	NA
StandingDeadwood:Atmosphere CH4	NA	NA	NA	NA	add	NA
StandingDeadwood:Atmosphere N2O	NA	NA	NA	NA	NA	add
StandingDeadwood:Atmosphere CO2	NA	subtract	NA	NA	NA	NA

StandingDeadwood:Biofuel	NA	subtract	NA	NA	NA	NA
StandingDeadwood:Paper	NA	subtract	NA	NA	NA	NA
StandingDeadwood:Sawnwood	NA	subtract	NA	NA	NA	NA
StandingDeadwood:SoilBioF	NA	subtract	add	add	NA	NA
StandingDeadwood:SoilBioS	NA	subtract	add	add	NA	NA
StandingDeadwood:SoilDPM	NA	subtract	add	add	NA	NA
StandingDeadwood:SoilHUM	NA	subtract	add	add	NA	NA
StandingDeadwood:SoilIOM	NA	subtract	add	add	NA	NA
StandingDeadwood:SoilRPM	NA	subtract	add	add	NA	NA
StandingDeadwood:TreeCoarseLitter	NA	NA	NA	NA	NA	NA
StandingDeadwood:TreeFineLitter	NA	NA	NA	NA	NA	NA

StandingDeadwood:WoodPanels	NA	subtract	NA	NA	NA	NA
TreeBark:Atmosphere CH4	NA	NA	NA	NA	add	NA
TreeBark:Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeBark:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
TreeBark:Biofuel	subtract	NA	NA	NA	NA	NA
TreeBark:TreeFineLitter	subtract	add	NA	NA	NA	NA
TreeBranch:Atmosphere CH4	NA	NA	NA	NA	add	NA
TreeBranch:Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeBranch:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
TreeBranch:Biofuel	subtract	NA	NA	NA	NA	NA
TreeBranch:Deadwood	subtract	add	NA	NA	NA	NA
TreeBranch:TreeCoarseLitter	subtract	add	NA	NA	NA	NA

TreeCoarseLitter:Atmosphere CH4	NA	NA	NA	NA	add	NA
TreeCoarseLitter:Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeCoarseLitter:AtmosphereCO2	NA	subtract	NA	NA	NA	NA
TreeCoarseLitter:SoilBioF	NA	subtract	add	add	NA	NA
TreeCoarseLitter:SoilBioS	NA	subtract	add	add	NA	NA
TreeCoarseLitter:SoilDPM	NA	subtract	add	add	NA	NA
TreeCoarseLitter:SoilHUM	NA	subtract	add	add	NA	NA
TreeCoarseLitter:SoilIOM	NA	subtract	add	add	NA	NA
TreeCoarseLitter:SoilRPM	NA	subtract	add	add	NA	NA
TreeCoarseLitter:TreeFineLitter	NA	NA	NA	NA	NA	NA
TreeCoarseRoot:Atmosphere CH4	NA	NA	NA	NA	add	NA

TreeCoarseRoot: Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeCoarseRoot: AtmosphereCO2	subtract	NA	NA	NA	NA	NA
TreeCoarseRoot: TreeDeadCoarse Root	subtract	add	NA	NA	NA	NA
TreeDeadCoarse Root:Atmospher e CH4	NA	NA	NA	NA	add	NA
TreeDeadCoarse Root:Atmospher e N2O	NA	NA	NA	NA	NA	add
TreeDeadCoarse Root:Atmospher eCO2	NA	subtract	NA	NA	NA	NA
TreeDeadCoarse Root:Biofuel	subtract	NA	NA	NA	NA	NA
TreeDeadCoarse Root:SoilBioF	NA	subtract	add	add	NA	NA
TreeDeadCoarse Root:SoilBioS	NA	subtract	add	add	NA	NA
TreeDeadCoarse Root:SoilDPM	NA	subtract	add	add	NA	NA

TreeDeadCoarseRoot:SoilHUM	NA	subtract	add	add	NA	NA
TreeDeadCoarseRoot:SoilIOM	NA	subtract	add	add	NA	NA
TreeDeadCoarseRoot:SoilRPM	NA	subtract	add	add	NA	NA
TreeDeadFineRoot:AtmosphereCH4	NA	NA	NA	NA	add	NA
TreeDeadFineRoot:AtmosphereN2O	NA	NA	NA	NA	NA	add
TreeDeadFineRoot:AtmosphereCO2	NA	subtract	NA	NA	NA	NA
TreeDeadFineRoot:SoilBioF	NA	subtract	add	add	NA	NA
TreeDeadFineRoot:SoilBioS	NA	subtract	add	add	NA	NA
TreeDeadFineRoot:SoilDPM	NA	subtract	add	add	NA	NA
TreeDeadFineRoot:SoilHUM	NA	subtract	add	add	NA	NA
TreeDeadFineRoot:SoilIOM	NA	subtract	add	add	NA	NA

TreeDeadFineRoot:SoilRPM	NA	subtract	add	add	NA	NA
TreeFineLitter:Atmosphere CH4	NA	NA	NA	NA	add	NA
TreeFineLitter:Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeFineLitter:AtmosphereCO2	NA	subtract	NA	NA	NA	NA
TreeFineLitter:Biofuel	subtract	NA	NA	NA	NA	NA
TreeFineLitter:SoilBioF	NA	subtract	add	add	NA	NA
TreeFineLitter:SoilBioS	NA	subtract	add	add	NA	NA
TreeFineLitter:SoilDPM	NA	subtract	add	add	NA	NA
TreeFineLitter:SoilHUM	NA	subtract	add	add	NA	NA
TreeFineLitter:SoilIOM	NA	subtract	add	add	NA	NA
TreeFineLitter:SoilRPM	NA	subtract	add	add	NA	NA
TreeFineRoot:Atmosphere CH4	NA	NA	NA	NA	add	NA

TreeFineRoot:Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeFineRoot:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
TreeFineRoot:TreeDeadFineRoot	subtract	NA	NA	NA	NA	NA
TreeFoliage:Atmosphere CH4	NA	NA	NA	NA	add	NA
TreeFoliage:Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeFoliage:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
TreeFoliage:Biofuel	subtract	NA	NA	NA	NA	NA
TreeFoliage:TreeFineLitter	subtract	add	NA	NA	NA	NA
TreePlanting:TreeBark	add	NA	NA	NA	NA	NA
TreePlanting:TreeBranch	add	NA	NA	NA	NA	NA
TreePlanting:TreeCoarseRoot	add	NA	NA	NA	NA	NA
TreePlanting:TreeFineRoot	add	NA	NA	NA	NA	NA

TreePlanting:TreeFoliage	add	NA	NA	NA	NA	NA
TreePlanting:TreeStem	add	NA	NA	NA	NA	NA
TreeStem:Atmosphere CH4	NA	NA	NA	NA	add	NA
TreeStem:Atmosphere N2O	NA	NA	NA	NA	NA	add
TreeStem:AtmosphereCO2	subtract	NA	NA	NA	NA	NA
TreeStem:Biofuel	subtract	NA	NA	NA	NA	NA
TreeStem:DownDeadwood	subtract	add	NA	NA	NA	NA
TreeStem:Paper	subtract	NA	NA	NA	NA	NA
TreeStem:Sawnwood	subtract	NA	NA	NA	NA	NA
TreeStem:StandingDeadwood	subtract	add	NA	NA	NA	NA
TreeStem:TreeCoarseLitter	subtract	add	NA	NA	NA	NA
TreeStem:WoodPanels	subtract	NA	NA	NA	NA	NA
WoodPanels:Atmosphere CH4	NA	NA	NA	NA	NA	NA

WoodPanels:Atmosphere N2O	NA	NA	NA	NA	NA	NA
WoodPanels:AtmosphereCO2	NA	NA	NA	NA	NA	NA
WoodPanels:Biofuel	NA	NA	NA	NA	NA	NA
WoodPanels:Paper	NA	NA	NA	NA	NA	NA
Key:	NA	This flux fact is not relevant to the UNFCCC Variable				
	add	This flux fact 'value' is relevant to the UNFCCC and can be 'added' to the aggregation total				
	subtract	This flux fact 'value' is relevant to the UNFCCC and can be 'subracted' from the aggregation total				