UK PACT

Climate change and the Climate Change Act

GHG Inventory training (Session 4)



28 July 2026

Agenda

1. **Progress with Waste sector data collection**
2. **Types of inventories**
3. **Bottom-up data collection for Agriculture**
4. **Data collection for Land emissions**
5. **Homework**
6. **Next session and way forward**

1

Progress with waste sector data collection

RECAP: Bottom-up activity data for Waste – Homework Exercise

- Go to https://sawic.dffe.gov.za/SAWIC/sawissearchregistrations, search for disposal sites in your municipality
- Contact waste department and see if there are any missing
- Go to https://sawic.dffe.gov.za/SAWIC/sawisstatisticsreport, search for statistics on general and hazardous waste disposal in your municipality
- Contact all site owners and ask for:
  - Waste disposed in a year in each landfill
  - By type of waste if they have it
  - Type of landfill site (as different landfills have different EF) – managed, unmanaged, open dumping
- Cross check totals with SAWIC
- If there is a gap/difference, try and identify which sites don't collect data - these might be the ones contributing to the difference:
  - Communicate with these site managers to collect the data for filling in the SAWIC Excel spreadsheet
  - Use the spreadsheet to calculate waste disposed per year per landfill type
- Add up total waste disposed in municipality and per type of of disposal site
- *Prepare a few slides for next session to demonstrate your progress*

Progress on waste sector data collection

Presentations by champions

Discussion on challenges



2

Types of inventories

Types of emission inventories

- Emissions that are within the control of the municipality (**Own-control emissions**):
  - These are emissions for which the municipality/district or province is directly accountable and can reduce through operational decisions
    - This will be different for each municipality/district/province as each have their own building, vehicles, etc



Carbon footprint



For more information, visit www.ukpact.co.uk

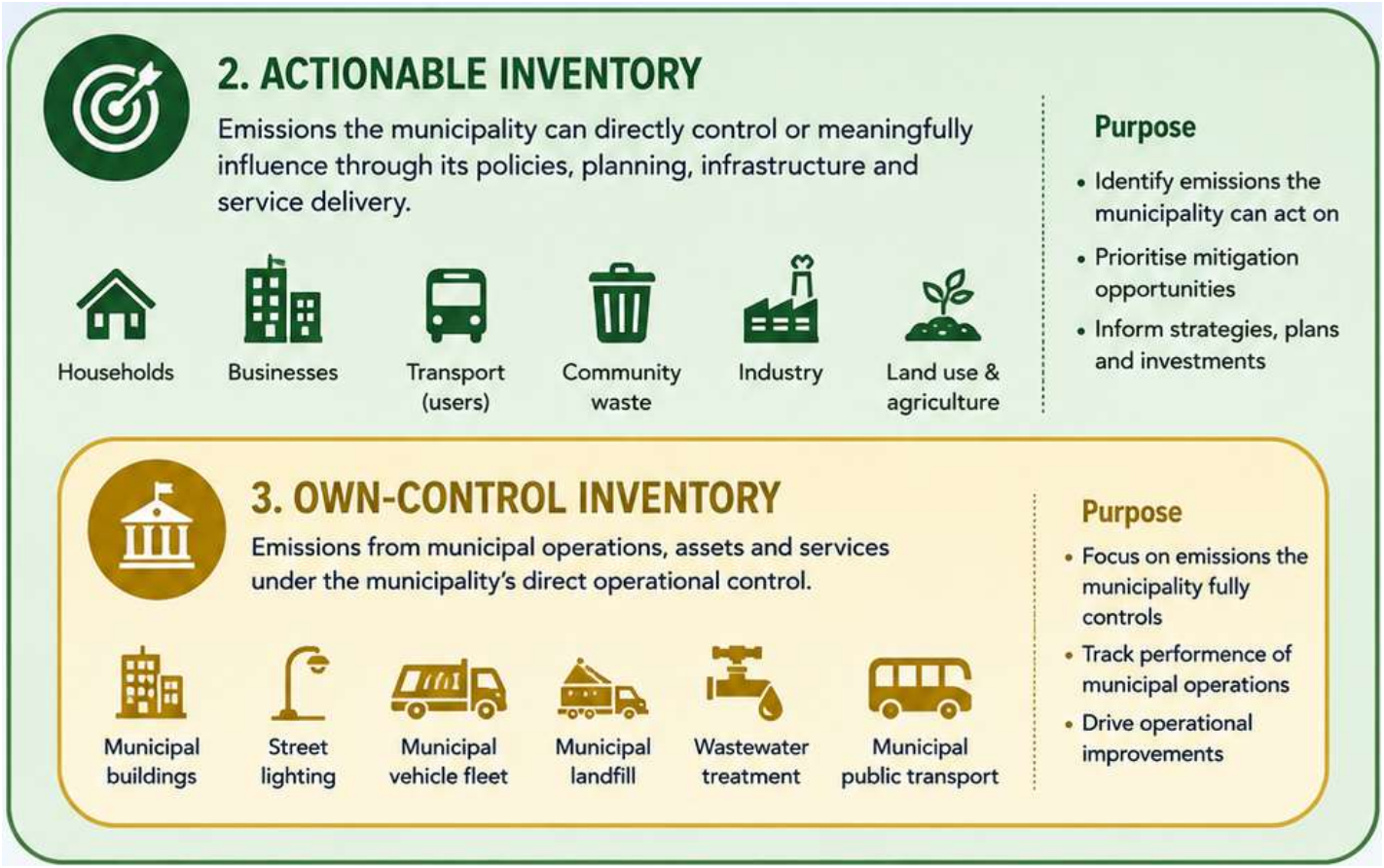
Types of emission inventories

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  - These are emissions for which the municipality/district or province is directly accountable and can reduce through operational decisions
    - This will be different for each municipality/district/province as each have their own building, vehicles, etc

- Emissions that can be directly or indirectly influenced by the municipality (**Actionable emissions**):
  - These emissions represent the broader community emissions where the municipality plays an enabling, regulatory and coordinating role.
  - These are essential for achieving municipal climate goals but require collaboration with residents, businesses, utilities and other levels of government.
  - Provides a practical basis for prioritising mitigation actions and tracking impacts of municipal interventions

Types of emission inventories

Own-control emissions are a subset of the actionable inventory



For more information, visit www.ukpact.co.uk

Types of emission inventories

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  - Provides a practical basis for prioritising mitigation actions and tracking impacts of municipal interventions

- Emission that are produced within the boundary of the municipality (**Reporting emissions**):
  - These the total GHG emissions occurring within a municipality boundary regardless of who owns, controls or is responsible for the emission sources.
  - Municipalities participating in international reporting initiatives, such a C40, would require this type of inventory.

Types of emission inventories



- As the reporting inventory is broad and covers all activities the reporting inventory for each municipality in a district can be added to form the district inventory.
- In turn the district reporting inventories can be added to form the provincial inventory.



For more information, visit www.ukpact.co.uk

How does this relate to data collection?

- Need to decide upfront what inventory you need to develop:
  - This will be based on your objectives
  - Will also determine the type of data you will collect and where the resources will be focussed
- Data collection may be different for the three inventories:
  - Own-control inventory:
    - Bottom-up data collection is required as it is very localised data and relates to the number of building, vehicles, facilities, etc that a municipality owns
  - Actionable inventory:
    - Bottom-up data is more appropriate as the more accurate the estimates the better it is for tracking impacts of municipal interventions
    - Top-down data can, however, be used if there is a lack of data
  - Reporting inventory:
    - Same as for actionable inventory
    - Top-down approach can be used for categories that are not actionable as more resources should be placed on the actionable categories



3

Bottom-up data collection for agriculture

Livestock



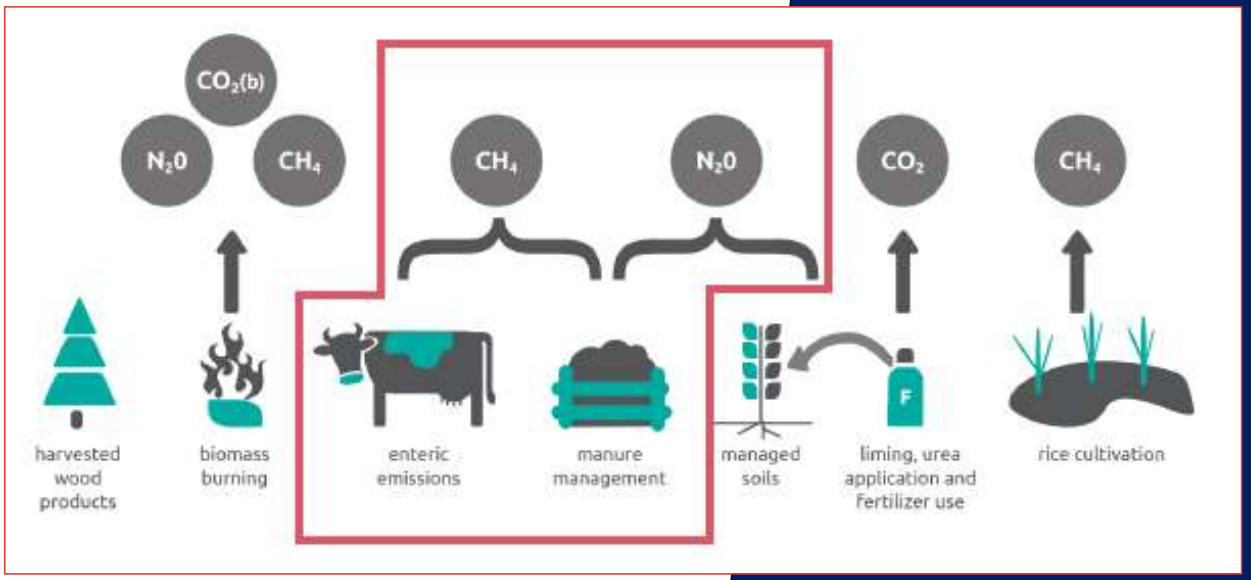
RECAP: Livestock emissions

Livestock production emits:

- CH_4 from enteric fermentation
- CH_4 and N_2O through management of their manure

Activity data:

- Livestock population
- Manure management



Livestock population data

PROCESS FOR COMPLETING THIS WORKSHEET

- **FOR OWN-CONTROL EMISSION INVENTORY:** Complete the section under yellow heading.
- **FOR ACTIONABLE AND/OR REPORTING EMISSION INVENTORY:** Complete the section under the green heading.
- **STEP 1:** Input activity data and select sub-category from the drop-down list in the light blue cells.
- **STEP 2:** Document the source of the activity data in the light green cells.

ACTIVITY DATA

Main livestock category	Sub-category *(Based on the type of data you have (i.e. total population data or disaggregated data) select the required sub-categories from the dropdown lists in the blue cells.)*	Annual average livestock population (Head) *(Enter the associated population data)*	Livestock population data source reference *(Please write down where the livestock population data was obtained from, incorportaing as much detail as possible (e.g. report name, links, table or page numbers))*
Data for government owned livestock within the jurisdiction			
Cattle			
Sheep			
Goats			
Pigs			
Poultry			
Horses	Total horse population		
Mules & asses	Total mule & ass population		
Data for all livestock within the jurisdiction			

DC Template - Livestock | Manure management background | AFOLU - Managed soils | AFOL

Ready | Accessibility: Investigate

Own-control section

Actionable or Reporting section



For more information, visit www.ukpact.co.uk

Livestock population data

AFOLU: Livestock data collection template

Jurisdiction	MP Province
Year	2015

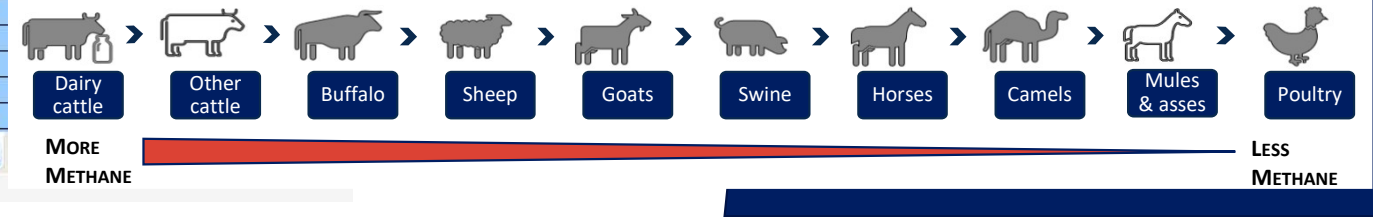
ACTIVITY DATA

Main livestock category	Sub-category (Based on the type of data you have (i.e. total population data or disaggregated data) select the required sub-categories from the dropdown lists in the blue cells.)	Annual average livestock population (Head) (Enter the associated population data)	Livestock population data source reference (Please write down where the livestock population data was obtained from, incorportaing as much detail as possible (e.g. report name, links, table or page numbers))
Data for government owned livestock within the jurisdiction			
Cattle			
Sheep			
Goats			
Pigs			
Poultry			

Total cattle
Total dairy cattle
Total non-dairy cattle
Commercial non-dairy cattle
Commercial feedlot cattle
Communal/subsistence non-dairy cattle

IPPU | AFOLU - Livestock | DC Template - Livestock

Ready | Accessibility: Investigate

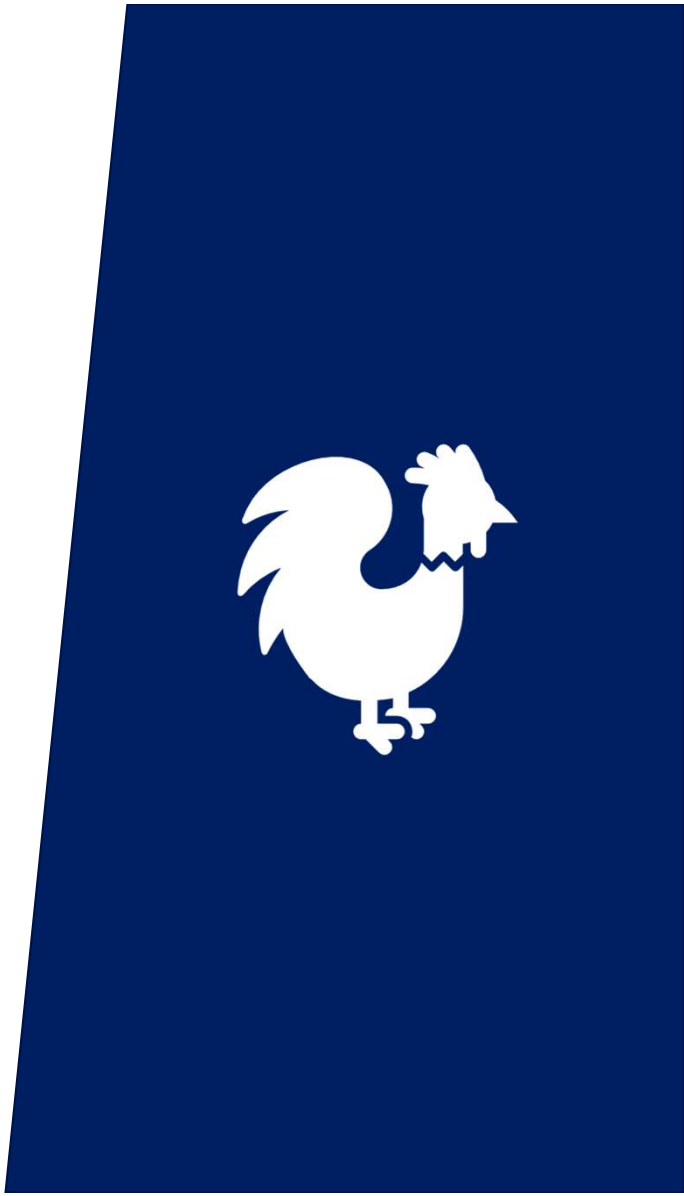


Example of input data

	ACTIVITY DATA			
16	**Main livestock category**	**Sub-category** *(Based on the type of data you have (i.e. total population data or disaggregated data) select the required sub-categories from the dropdown lists in the blue cells.)*	**Annual average livestock population (Head)** *(Enter the associated population data)*	**Livestock population data source reference** *(Please write down where the livestock population data was obtained from, incorportaing as much detail as possible (e.g. report name, links, table or page numbers))*
18	**Data for government owned livestock within the jurisdiction**			
19	Cattle	Total dairy cattle	15.00	*Provincial census data, 2025, Report 54, Table 22*
20		Total non-dairy cattle	23.00	*Provincial census data, 2025, Report 54, Table 21*
21				
22				
23				
24	Sheep			
25				
26	Goats			
27				
28	Pigs			
29				
30	Poultry	Layer chickens		
31		Broiler chickens (Census data)		
32		Broiler chickens (Total chickens produced)		
33				
34	Horses	Total horse population		
35	Mules & asses	Total mule & ass population		
36				
37	**Data for all livestock within the jurisdiction**			
38		Total dairy cattle	530.00	*Provincial census data, 2025, Report 54, Table 22*
39				

Wastewater treatment | Waste background calculations | IPPU | AFOLU - Livestock | DC Template -

Ready | Accessibility: Investigate



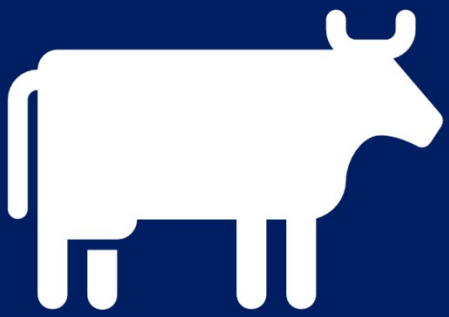
Bottom-up data collection for livestock

Sources of livestock population data:

- Provincial department:
  - Annual livestock censuses
  - Veterinary service databases
  - Animal health records
- District and municipality data
  - Can this be obtained from province or are there other sources?

Questions:

- Is population data collected for all livestock?
- How is the data collected and how often?
- What detail is included:
  - Dairy and beef cattle recorded separately?
  - Layers and broilers for poultry?
  - What other detail is included (age, breed, commercial or communal)?



Manure management data

AFOLU: Livestock data collection template

Jurisdiction	MP Province
Year	2015

ACTIVITY DATA

Main livestock category	Sub-category (Based on the type of data you have (i.e. total population data or disaggregated data) select the required sub-categories from the dropdown lists in the blue cells.)	Annual average livestock population (Head) (Enter the associated population data)	Livestock population data source reference (Please write down where the livestock population data was obtained from, incorporating as much detail as possible (e.g. report name, links, table or page numbers))	Manure management data (Please enter the percentage manure that is allocated to each manure management system for each selected livestock type. A detailed description of the types of manure management systems are given below. The total across the row should equal 100 (see CHECK column). If data is not available the GHG inventory tool will apply the National GHG Inventory data as a default.)																	CHECK (The sum across the row must equal 100. When this row is green the row is complete.)
				Solid Storage	Pit storage below animal	Dry Lot	Liquid/ Slurry	Uncovered anaerobic Lagoon	Cattle and swine deep bedding	Composting in vessel	Composting static pile	Composting intensive windrow	Composting passive windrow	Poultry manure with litter	Poultry manure without	Anaerobic Digester	Aerobic treatment	Burned for fuel	Daily spread	Pasure, Range & Paddock	
Data for government owned livestock within the jurisdiction																					
Cattle																					0.00
Sheep																					0.00
Goats																					0.00
Pigs																					0.00
Poultry																					0.00

Total cattle
Total dairy cattle
Total non-dairy cattle
Commercial non-dairy cattle
Commercial feedlot cattle
Communal/subsistence non-dairy cattle

IPPU | AFOLU - Livestock | DC Template - Livestock | Manure management background | AFOLU - Managed soils | AFOLU - Biomass burning

Accessibility: Investigate

For more information, visit www.ukpact.co.uk

Manure management data

Manure management system	Manure management system description
Solid Storage	*The storage of manure, typically for a period of several months, in unconfined piles or stacks.Manure is able to be stacked due to the presence of a sufficient amount of bedding material orloss of moisture by evaporation.*
Pit storage below animal confinement	*Collection and storage of manure usually with little or no added water typically below a slatted floor in an enclosed animal confinement facility, usually for periods less than one year.*
Dry Lot	*A paved or unpaved open confinement area without any significant vegetative cover where accumulating manure may be removed periodically.*
Liquid/ Slurry	*Manure is stored as excreted or with some minimal addition of water in either tanks or earthen ponds outside the animal housing, usually for periods less than one year.*
Uncovered anaerobic Lagoon	*A type of liquid storage system designed and operated to combine waste stabilization and storage. Lagoon supernatant is usually used to remove manure from the associated confinement facilities to the lagoon.*
Cattle and swine deep bedding	*As manure accumulates, bedding is continually added to absorb moisture over a production cycle and possibly for as long as 6 to 12 months. This manure management system also is known as a bedded pack manure management system and may be combined with a dry lot or pasture.*
Composting in vessel	*Composting, typically in an enclosed channel, with forced aeration and continuous mixing.*
Composting static pile	*Composting in piles with forced aeration but no mixing.*
Composting intensive windrow	*Composting in windrows with regular (at least daily) turning for mixing and aeration.*
Composting passive windrow	*Composting in windrows with infrequent turning for mixing and aeration.*
Poultry manure with litter	*Similar to cattle and swine deep bedding except usually not combined with a dry lot or pasture. Typically used for all poultry breeder flocks and for the production of meat type chickens (broilers) and other fowl.*
Poultry manure without litter	*May be similar to open pits in enclosed animal confinement facilities or may be designed and operated to dry the manure as it accumulates. The latter is known as a high-rise manure management system and is a form of passive windrow composting when designed and operated properly.*
Anaerobic Digester	*Animal excreta with or without straw are collected and anaerobically digested in a large containment vessel or covered lagoon.*
Aerobic treatment	*The biological oxidation of manure collected as a liquid with either forced or natural aeration. Natural aeration is limited to aerobic and facultative ponds and wetland systems and is due primarily to photosynthesis. Hence, these systems typically become anoxic during periods without sunlight. Composting is the biological oxidation of a solid waste.*
Burned for fuel	*The dung and urine are excreted on fields. The sun dried dung cakes are burned for fuel.*
Daily spread	*Manure is routinely removed from a confinement facility and is applied to cropland or pasture within 24 hours of excretion.*
Pasure, Range & Paddock	*The manure from pasture and range grazing animals is allowed to lie as deposited, and is not managed.*

Example of manure management data

Manure management data

(Please enter the percentage manure that is allocated to each manure management system for each selected livestock type. A detailed description of the types of manure management systems are given below. The total across the row should equal 100 (see CHECK column). If data is not available the GHG inventory tool will apply the National GHG Inventory data as a default.)

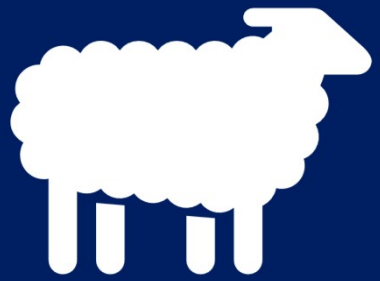
	Solid Storage	Pit storage below animal	Dry Lot	Liquid/ Slurry	Uncovered anaerobic Lagoon	Cattle and swine deep bedding	Composting in vessel	Composting static pile	Composting intensive windrow	Composting passive windrow	Poultry manure with litter	Poultry manure without litter	Anaerobic Digester	Aerobic treatment	Burned for fuel	Daily spread	Pasure, Range & Paddock	CHECK (The sum across the row must equal 100. When this row is green the row is complete.)	Manure management data source reference (Please write down where the manure management data was obtained from, incorportaing as much detail as possible (e.g. report name, links, table or page numbers))
Dairy cattle				50.00	30.00												20.00	100.00	Samuel Malaka, Agriculture extension officer
Non-dairy cattle																	95.00	95.00	Samuel Malaka, Agriculture extension officer
																		0.00	
																		0.00	
																		0.00	
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IPPU | AFOLU - Livestock | DC Template - Livestock | Manure management backgro

Bottom-up data collection for livestock

Sources of manure management data:

- This data is not normally collected so this involves speaking to farmers (both commercial and communal):
  - Agricultural extension officers
  - Community officers
- Ask the question – what do you do with your animal manure?
  - Nothing (left in the field)
  - Collect it and use it for other purpose (fuel, construction)
  - Collect it and spread it on fields as fertiliser
  - Store it or create compost from it
  - Mix it with water to form a slurry
- Manure from different livestock get treated in different ways so need this information for the different livestock type.

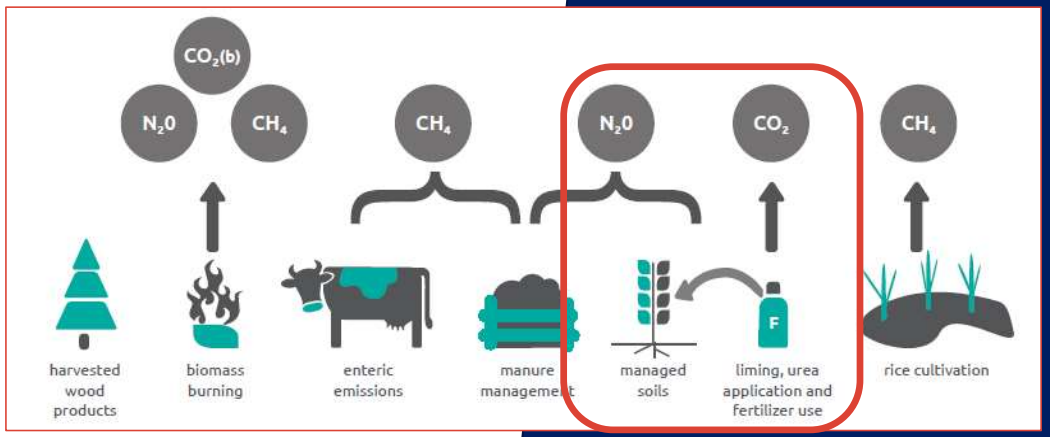


Agricultural lands or managed soils



Agricultural (managed) soils

- Emissions in managed soils are direct and indirect N_2O emissions and these occur due to the input of nitrogen to soils
- N input can take the form of:
  - Synthetic fertiliser
  - Organic fertilisers which include animal manure, compost, crop residues
  - Animal urine and dung deposits on the soil also leads to nitrogen inputs
- Other emissions are CO_2 from the application of lime or urea



For more information, visit www.ukpact.co.uk

Data collection for managed soils

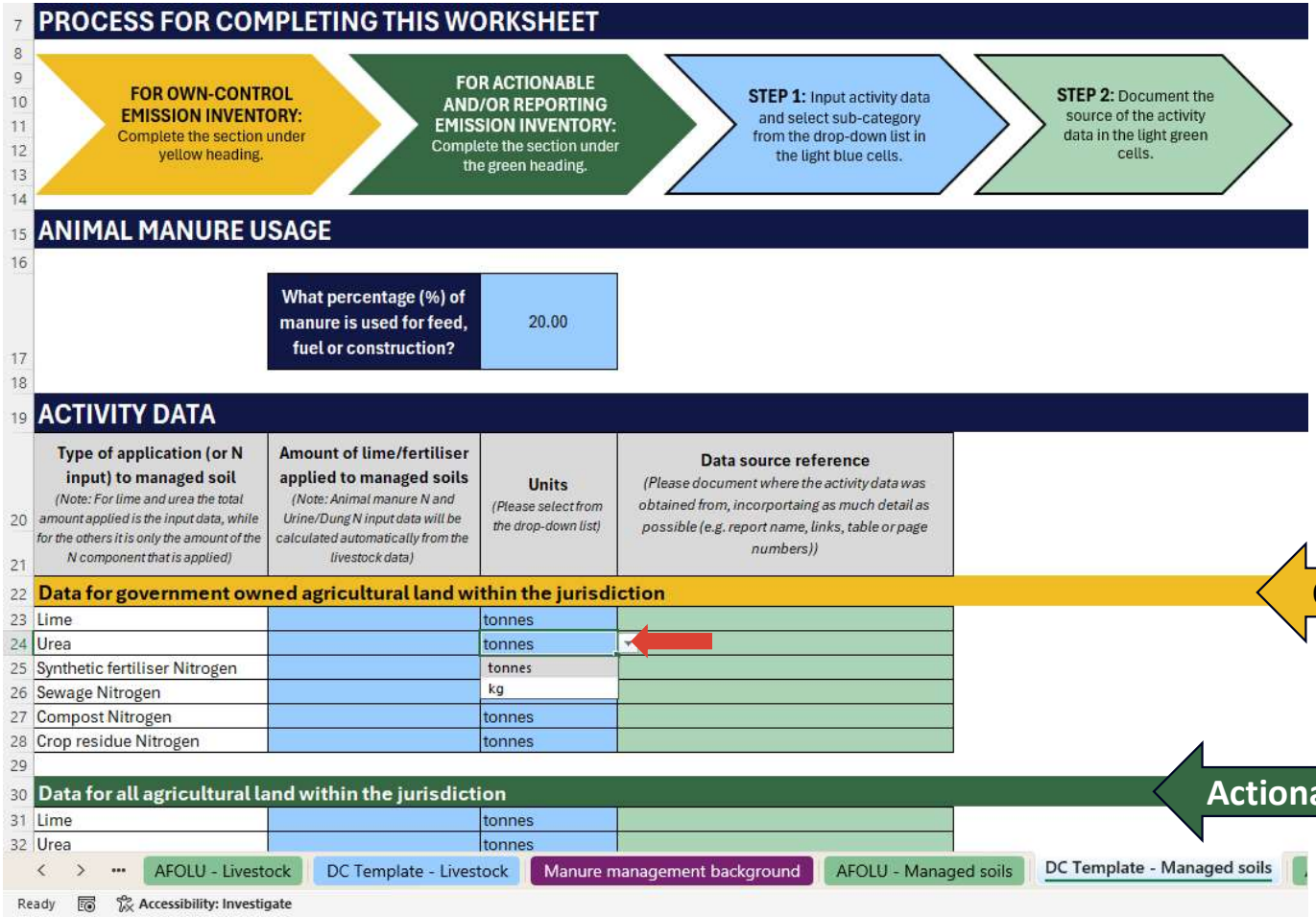
- Activity data for this category would be the amount of fertilisers or manure or lime applied to the agricultural fields
  - Note that nitrogen inputs in the form of manure and urine/dung inputs from livestock in the fields can be calculated automatically from the livestock data
  - Usually quite a significant component of the nitrogen inputs to managed soils

- For an own-control emission inventory this would be the nitrogen applied to agriculture land owned by the government in that jurisdiction
  - This is likely very small and so it not a focus category for an own-control inventory
- For Actionable and Reporting emission inventories it is an important category but data is challenging to collect
  - Data sources could be fertiliser sales data or information gathered from farmers
  - Can be estimated from crop type if data is lacking

- Data collection template is provided but is not a priority area at this stage



Data collection template for managed soils



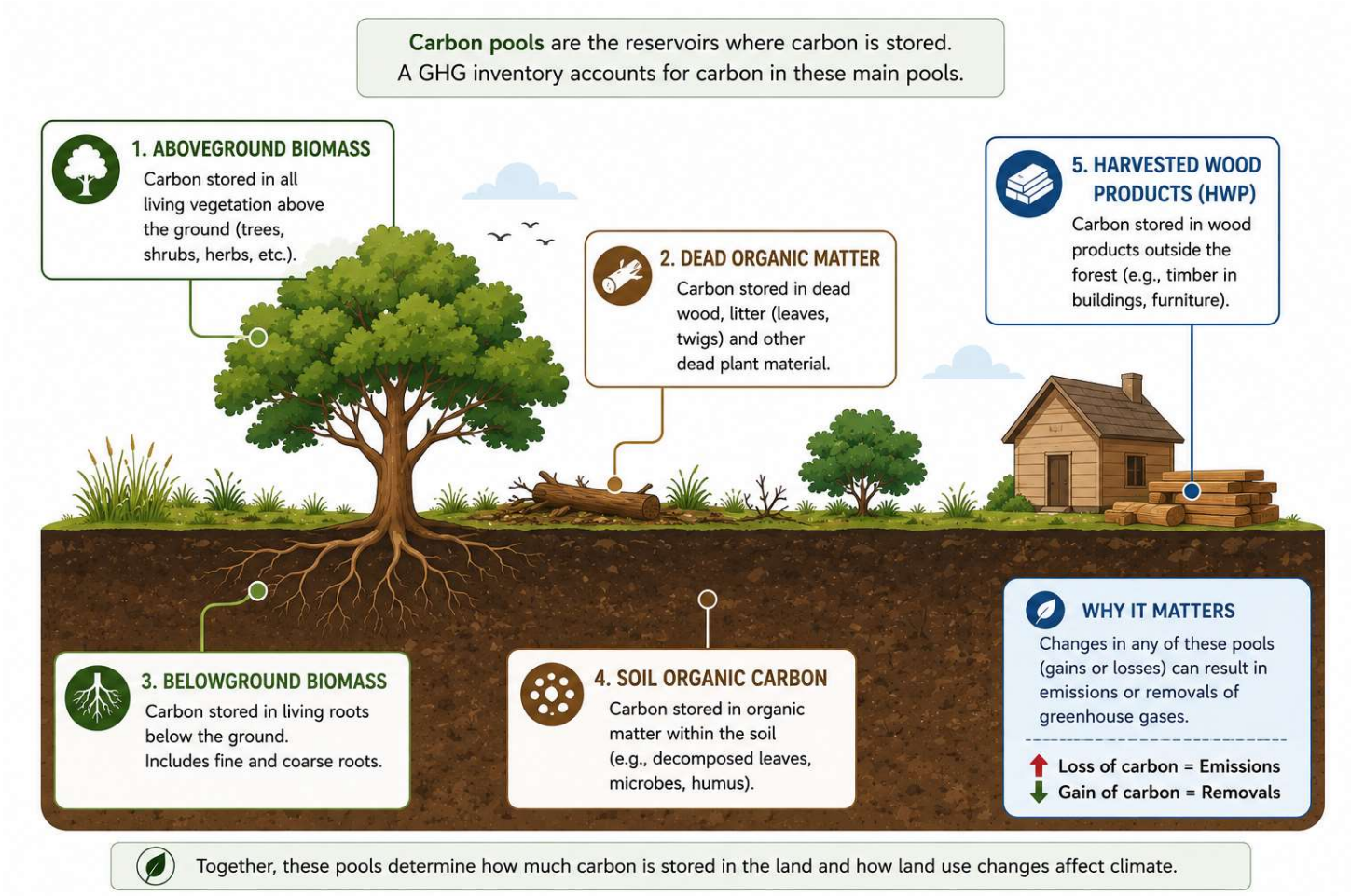
Own-control section

Actionable or Reporting section

4

Introduction to land sector

Land sector emissions

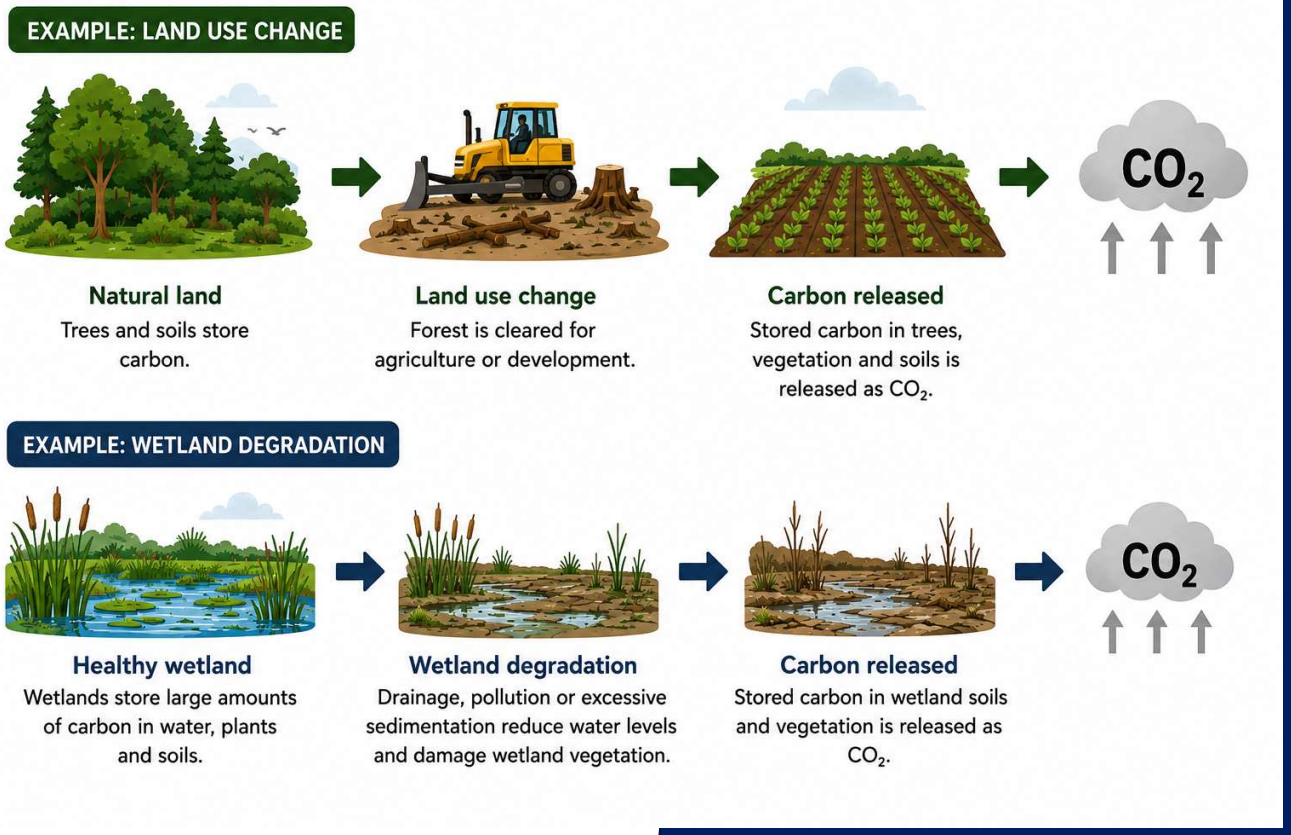


For more information, visit www.ukpact.co.uk

Activity data for land

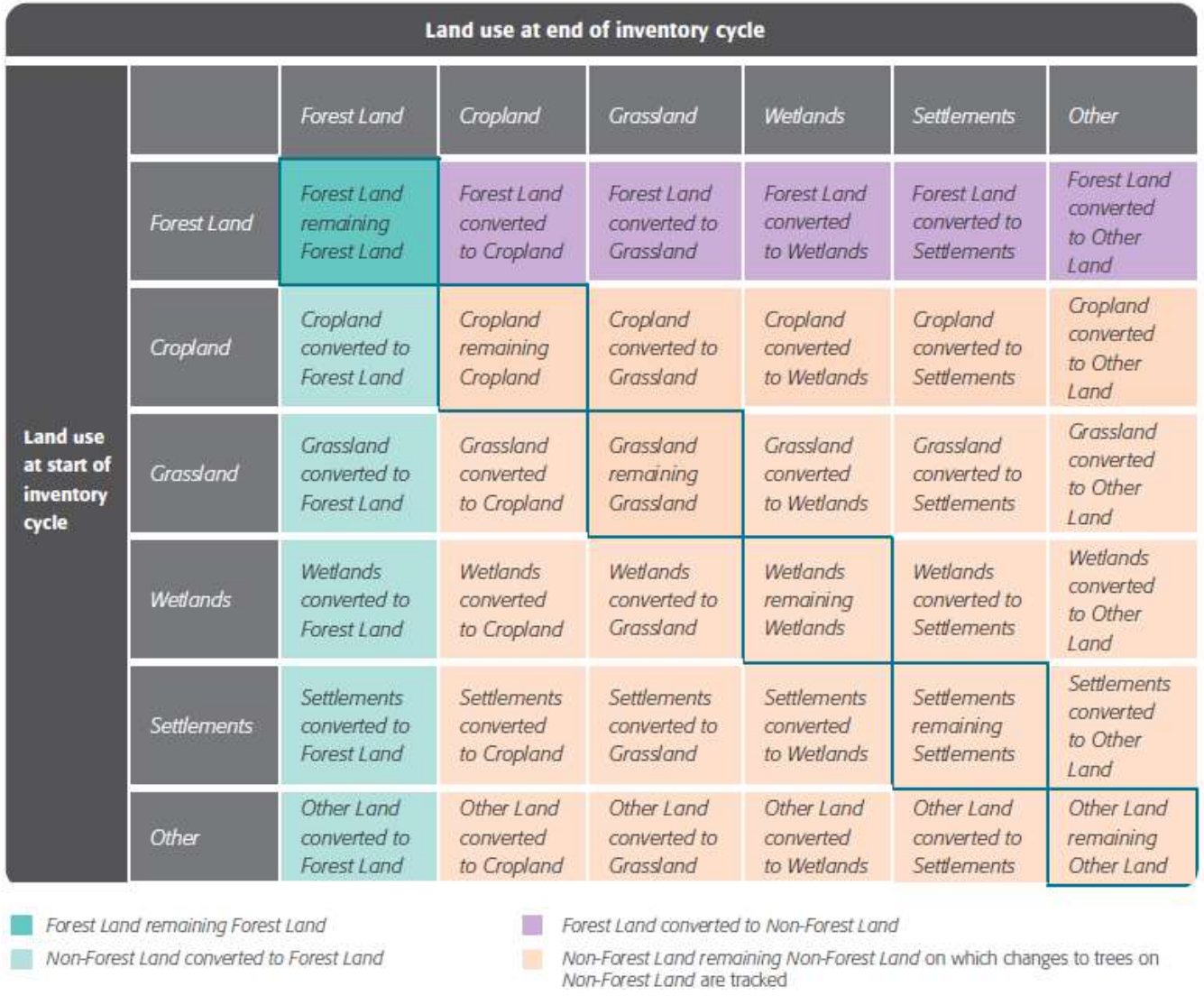
- Activity data for land is the land area that undergoes change
  - The carbon stocks (biomass, soils) that are lost are the emission factors

- Where could you get this data?



For more information, visit www.ukpact.co.uk

Land use change matrix



For more information, visit www.ukpact.co.uk

Data collection template for land areas

AFOLU: Land area data collection template

PROCESS FOR COMPLETING THIS WORKSHEET

SELECT APPROACH: Enter data either in a LAND CHANGE MATRIX or just as LAND AREAS PER YEAR (must at least have two years). Go to approriate section.

FOR OWN-CONTROL EMISSION INVENTORY: Complete the section under yellow heading.

FOR ACTIONABLE AND/OR REPORTING EMISSION INVENTORY: Complete the section under the green heading.

STEP 1: Input activity data and select sub-category from the drop-down list in the light blue cells.

STEP 2: Document the source of the activity data in the light green cells.

STEP 3: The yellow cells will be completed automatically.

LAND USE CHANGE MATRIX

Land use change areas for land owned by the government within the jurisdiction

What is the start year of the LU change?	
What is the end year of the LU change?	
Years in inventory cycle	0

0		0									
		Ending land use									
0	Starting land use	Forest land	Degraded forest	Cropland	Grassland	Degraded grassland	Wetland	Degraded wetland	Settlement	Other land	Total
	Forest land										0.00
	Degraded forest										0.00
	Cropland										0.00
	Grassland										0.00
	Degraded grassland										0.00
	Wetland										0.00
	Degraded wetland										0.00

Data source reference
(Please document where the activity da
much detail as possible (e.g. report

Select the units for the area in
drop-d
ha

DC Template - Managed soils | AFOLU - Biomass burning | LU change matrix | DC Template - Land areas | AFOLU - Land use change | Actior

ect destination and press ENTER or choose Paste

For more information, visit www.ukpact.co.uk

Data collection template for land areas

LAND AREAS PER YEAR

Land areas for government owned land in the jurisdiction

	Enter the year below	Enter the year below	Enter the year below	*Add more columns if necessary*
Land type	**Enter the land areas for the above year (ha)**	**Enter the land areas for the above year (ha)**	**Enter the land areas for the above year (ha)**	**Data source reference** *(Please document where the activity data was obtained from, incorportaing as much detail as possible (e.g. report name, links, table or page numbers))*
Forest land				
Degraded forest				
Cropland				
Grassland				
Degraded grassland				
Wetland				
Degraded wetland				
Settlement				
Other land				
Total area (ha)	**0.00**	**0.00**	**0.00**	

Total should be the same for all years (unless boundray has changed).

Land areas for all land within the jurisdiction

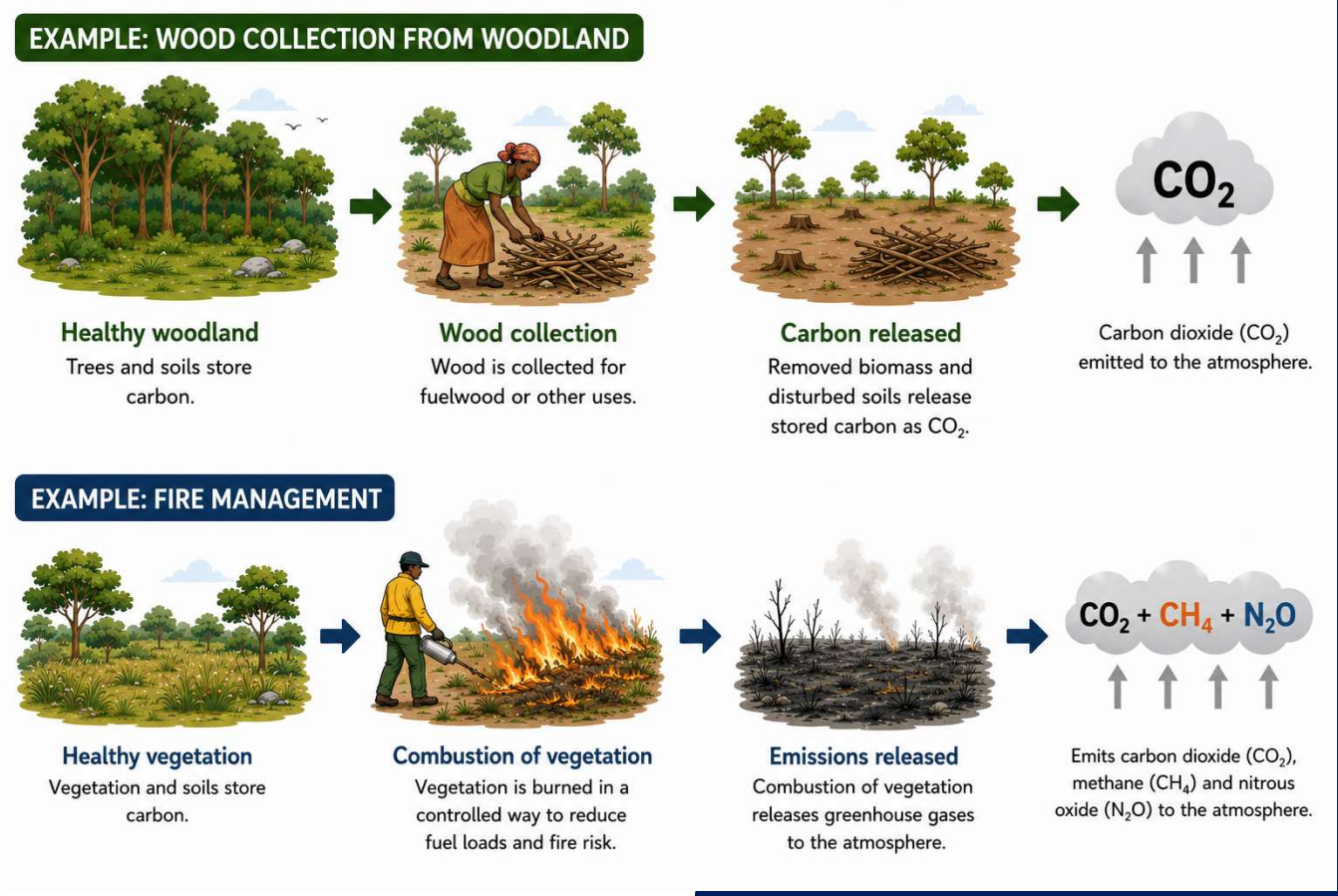
	Enter the year below	Enter the year below	Enter the year below	*Add more columns if necessary*
Land type	**Enter the land areas for the above year (ha)**	**Enter the land areas for the above year (ha)**	**Enter the land areas for the above year (ha)**	**Data source reference** *(Please document where the activity data was obtained from, incorportaing as much detail as possible (e.g. report name, links, table or page numbers))*
Forest land				
Degraded forest				
Cropland				
Grassland				
Degraded grassland				
Wetland				
Degraded wetland				

DC Template - Managed soils | AFOLU - Biomass burning | LU change matrix | DC Template - Land areas | AFOLU - Land use change

Ready | Accessibility: Investigate

Activity data for land

- Losses also occur due to harvesting, wood collection and burning
- Activity data therefore also include the area of land that is burnt, amount of wood harvested, amount of wood collected
  - Burnt area can be controlled and wildfire burnt areas
- Where could you get this data?



Data collection template for fuelwood, wood harvest and burnt area

AFOLU: Land removals data collection template

PROCESS FOR COMPLETING THIS WORKSHEET

FOR OWN-CONTROL EMISSION INVENTORY: Complete the section under yellow heading.

FOR ACTIONABLE AND/OR REPORTING EMISSION INVENTORY: Complete the section under the green heading.

STEP 1: Input activity data and select sub-category from the drop-down list in the light blue cells.

STEP 2: Document the source of the activity data in the light green cells.

STEP 3: The yellow cells will be completed automatically.

LAND REMOVALS ACTIVITY DATA

Removals on land areas owned by government in the jurisdiction

Land type	Volume of wood harvested *(This is wood harvested in forest plantations)*		Amount of fuelwood removed *(This is wood collected for use as fuel)*		Area burnt (controlled fires) *(This is the area that is burnt due to controlled fires. If data cannot separate controlled and wildfires enter the data as a total under wildfires.)*		Area burnt (wildfires) *(This is the area burnt by wildfires.)*		Data source reference *(Please document where the activity data was obtained from, incorporting as much detail as possible (e.g. report name, links, table or page numbers))*
	Value	Units	Value	Units	Value	Units	Value	Units	
Forest land		m3		kg		ha		ha	
Degraded forest		m3		kg		ha		ha	
Cropland		m3		kg		ha		ha	
Grassland		m3		kg		ha		ha	
Degraded grassland		m3		kg		ha		ha	
Wetland		m3		kg		ha		ha	
Degraded wetland		m3		kg		ha		ha	
Settlement		m3		kg		ha		ha	
Other land		m3		kg		ha		ha	

Removals on all land areas within the jurisdiction

	Volume of wood harvested *(This is wood harvested in forest plantations)*	Amount of fuelwood removed *(This is wood collected for use as fuel)*	Area burnt (controlled fires) *(This is the area that is burnt due to controlled fires. If data cannot separate*	Area burnt (wildfires) *(This is the area burnt by wildfires.)*	Data source reference *(Please document where the activity data was obtained from,*

5

Homework

Homework

- Go to the training platform (https://ukpact.lateral.co.za/) and download the agriculture and land data collection templates from todays session
  - These will also be emailed to the champions in the next week
- Livestock:
  - Try to source the livestock population data and manure management data (for own-control and actionable/reportable inventory) from the various agricultural data sources relevant to your jurisdiction for 2025
    - See what data you can find and complete the data collection templates
    - Document the source of the data in the templates
    - Remember to ask the questions mentioned earlier in the presentation to ensure the data set is complete
- Land:
  - Try to source the land area and land removal data required (for own-control and actionable/reportable inventory)
    - For land areas the data could be from years earlier than 2025, but try to get the latest data possible
    - For land removals data for 2025 is required
- Bring your data to the next session and show us your data, tell us about the data sources and any challenges you may have had collecting the data



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Next session and way forward

Next session and way forward

- Next session (session 5) will focus on:
  - Bottom-up data requirements for:
    - Energy
  - Introduction to Transportation
  - Aims to be in the third week of August (between 17th – 21st)

- Plan going forward:
  - Early Aug – session/discussion with provincial champions and inventory compilers
  - 31 August to 2 September – in-person training on tools and compiling inventories
  - Sessions will then continue after in-person training.

- "Open door" sessions:
  - Thursday 6th Aug 11am-12pm
  - Wednesday 12th Aug 2-3pm



UK PACT

THANK YOU

Stay in touch:



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