

Module 3.1 National data organization and management

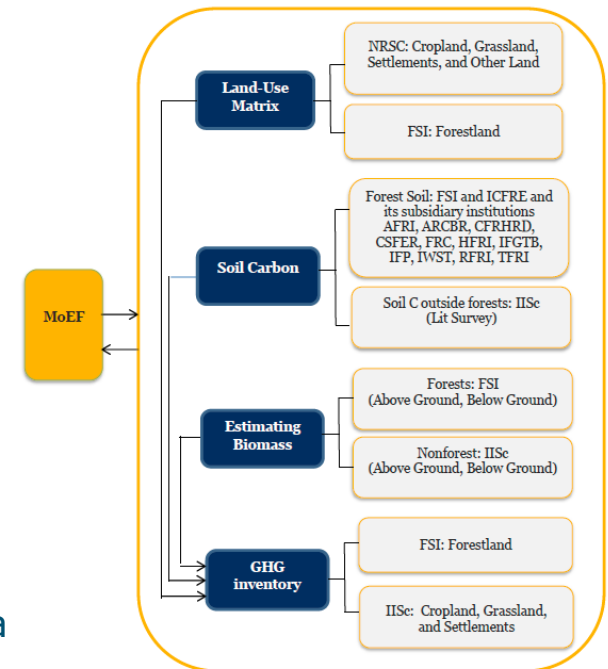
Module developers:

Erika Romijn, Wageningen University

Veronique De Sy, Wageningen University

After the course the participants should be able to:

- Explain the importance of having a clear and stable institutional set-up
- Describe the different types of roles and responsibilities that agencies may have in organizing and managing data
- Understand the procedures on how to ensure IPCC reporting principles when collecting and managing data associated with MRV and carbon accounting



WRI analysis: Work allocation and implementation arrangements for developing the LULUCF GHG emissions inventory in India

V1, May 2015

Background material

- Hewson, Steininger, and Pesmajoglou, eds. 2013. *REDD+ Measurement, Reporting and Verification (MRV) Manual*.
- Cheung et al. 2014. "Building National Forest and Land-Use Information Systems."
- Cromptvoets et al. 2008. *A Multi-View Framework to Assess SDIs*.
- EPA National System Templates: Building Sustainable National Inventory Management Systems.
- Mora et al. 2012. *Capacity Development in National Forest Monitoring*.
- Herold and Skutsch. 2009. "Measurement, Reporting and Verification for REDD+: Objectives, Capacities and Institutions." In *Realising REDD+: National strategy and policy options*, ed. A. Angelsen.
- Eelderink, Cromptvoets, and de Man. 2008. "Towards Key Variables To Assess National Spatial Data Infrastructures (NSDIs) in Developing Countries." In *A Multi-view Framework to Assess SDI*, ed. Cromptvoets et al.



Outline of lecture

1. Institutional framework

2. Data management



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Importance of institutional framework for MRV and data management

- To have different actors and sectors work together for efficiency and long-term sustainability
- To clearly define roles and responsibilities of involved agencies and stakeholders
- To improve coordination among ministries, subnational governments, and other agencies
- To improve efficiency and long-term sustainability
- To coordinate decision making and activities across political levels



Clear and stable institutional arrangements

- Institutional framework is important for best practices such as documenting and archiving
- Institutional memory requires documentation so other parties understand the nature of the data
- Benefits of institutional arrangements:
 - The inventory team knows who is providing data
 - If responsibility is clearly communicated to data providers, sector leads can be confident that data is available
 - Institutional memory is created if continuity exists in the arrangements
 - Appropriate agencies and experts are identified early on in the process



Requirements for institutional framework for MRV

- **Coordination:** High-level national coordination and cooperation mechanism to:
 - Link forest carbon MRV and national policy for REDD+
 - Specify and oversee roles and responsibilities
- **Measurement and monitoring** protocols and technical units for acquiring and analysing data
- **Reporting** unit for collecting data in central database -> national estimates, international reporting, etc.
- **Verification** framework



Recommended institutions for MRV

- A national coordination and steering body or advisory board, including a national carbon registry
 - A central carbon monitoring, estimation, reporting, and verification authority, including forest carbon measurement units
 - Spatial data infrastructure and/or forest and land-use information system
- Actual institutional arrangements depend on national circumstances
- *EPA template* can be used to summarize existing institutional arrangements and identify gaps and ways of improvements (see next section)



Some options for institutional arrangements

- Actual institutional arrangements depend on national circumstances:
 - Centralized vs. decentralized
 - In-sourced vs. out-sourced
 - Single agency vs. multiagency
 - Integrated vs. separate

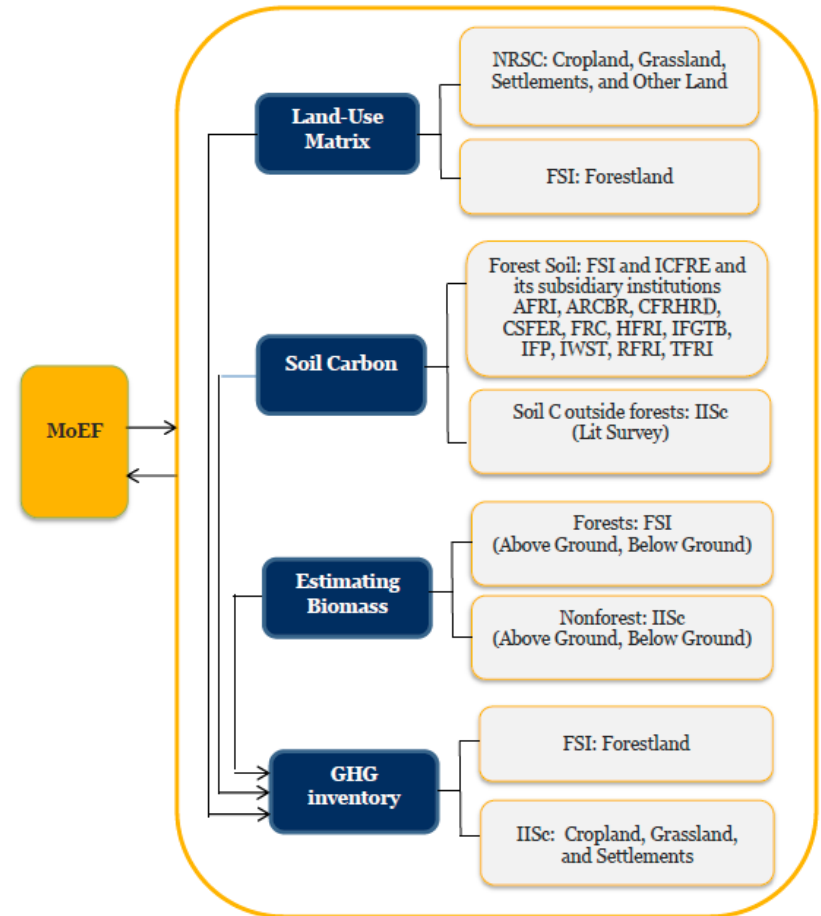
Source: Hewson, Steininger, and Pesmajoglou 2013, ch. 2.4.



Example of institutional arrangement in India

Work allocation and implementation arrangements for developing the LULUCF GHG emissions inventory in India

Source: Bhattacharya 2012
(WRI MAPT case studies).



Recommendations for institutional arrangements: Data management system

- Have high-level commitment from government
- Involve all relevant agencies
- Establish long-term financial support
- Invest in maintaining human capital (technical staff, institutional memory)
- Build subnational capacity and coordination
- Establish policy framework: e.g., to formalize data sharing and communication, legal arrangements, partnership agreements, access rights, etc.



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Importance of a national data organization and building a data management system

- Importance of national data organization and management:
 - Provide input to support policies and decisions
 - Improve coordination among ministries, subnational governments, and other agencies
- Developing a data management system:
 - Data integration (spatial and nonspatial data from multiple sources)
 - Data access
 - Data sharing among ministries and agencies



Concept of spatial data infrastructure

- Framework to facilitate and coordinate exchange and sharing of spatial data
- Enabling platform that links people to data

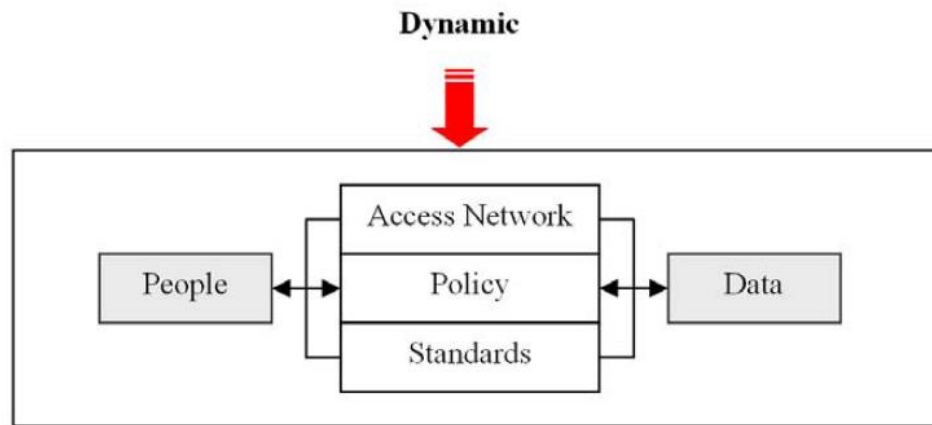


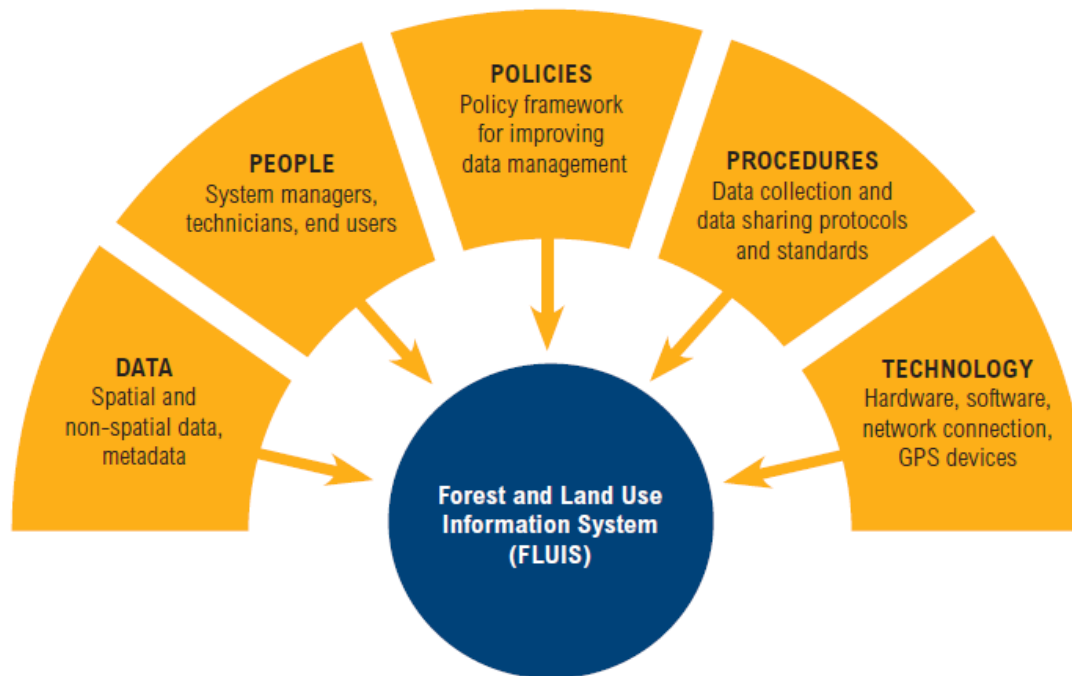
Figure 1.1: SDI nature and Components

Source: Cromptoets et al. 2008.



Forest and land-use information systems (FLUIS)

- Data management system for storing, organizing, and integrating large amounts of forest and land-use data from multiple sources

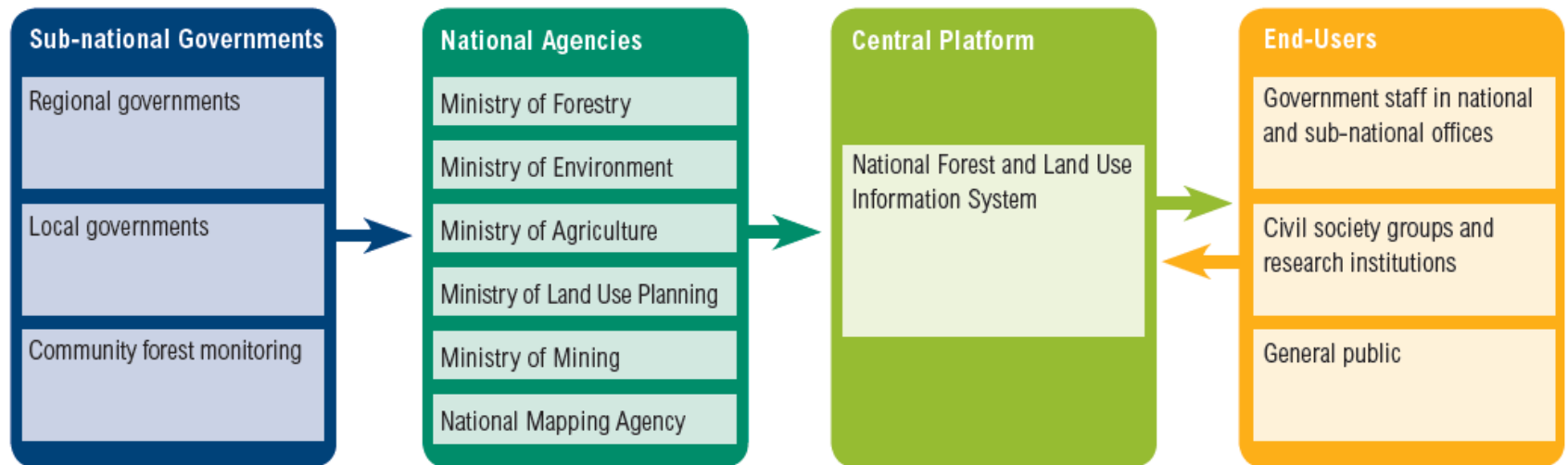


Components of a FLUIS

Source: Cheung et al. 2014 .



FLUIS: Sample flow of data from data collectors to end-users



Source: Cheung et al. 2014.

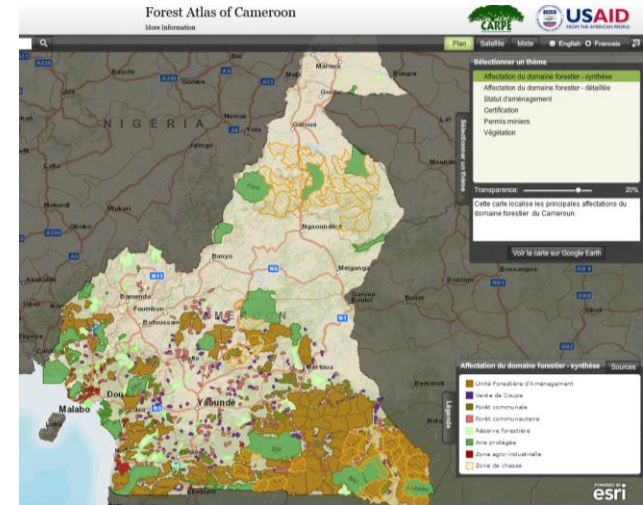


Examples of FLUIS: Cameroon & Indonesia

■ Cameroons Interactive Forest Atlas.

<http://cmr.forest-atlas.org/#l=en>

- Living forest information system
- Web-based tool built on GIS platform with map-viewing application

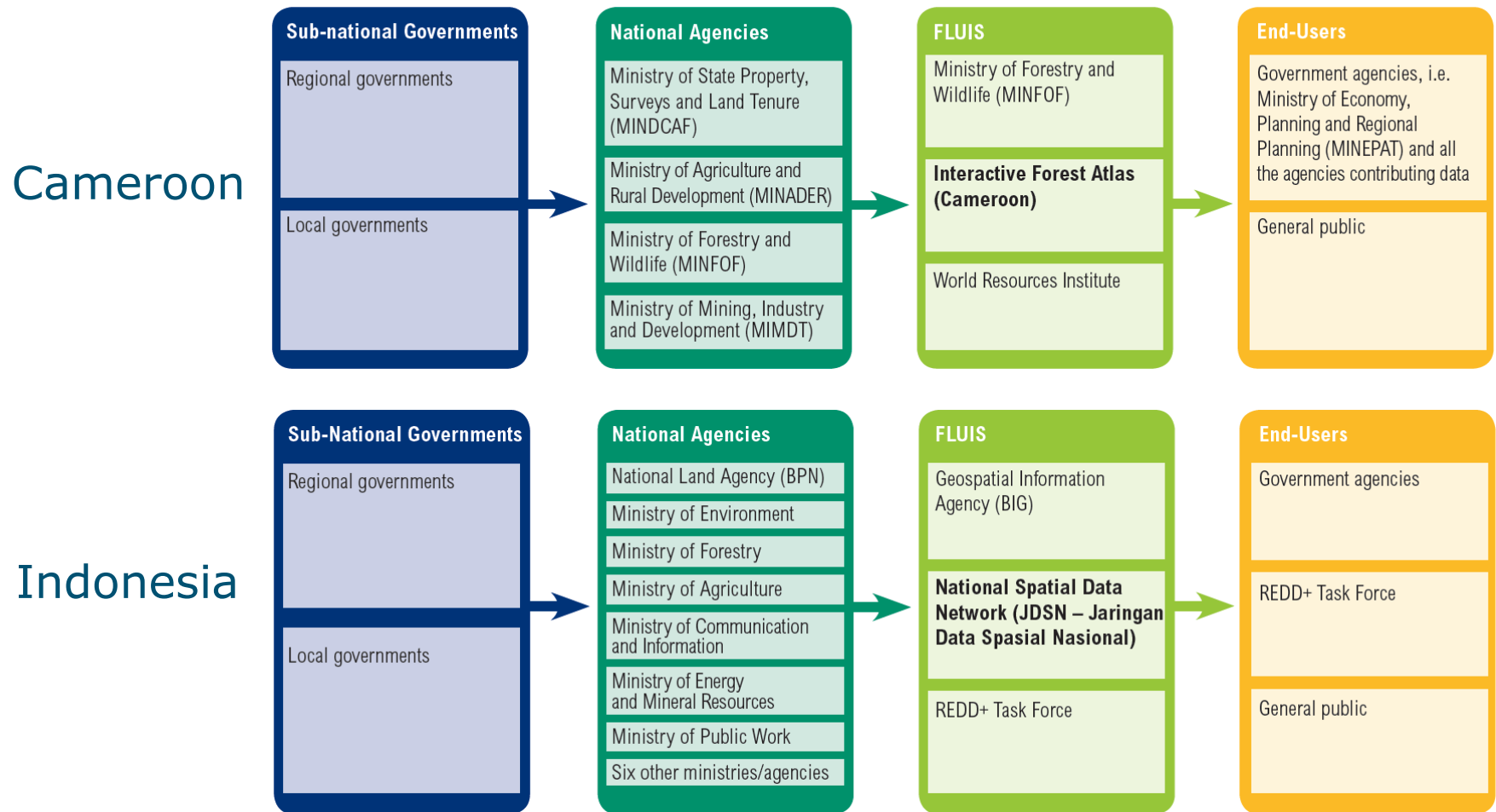


■ Indonesia's One Map policy

- One set of authoritative maps
- Web-based portal with ArcGIS server for sharing of maps, geodatabases and tools



Examples of national spatial data networks



Data management needs for preparing a national GHG inventory (1/3)

Data collection and data management should comply with five IPCC principles: *transparency, completeness, consistency, comparability, accuracy* (See Module 1.1 and Module 3.3 for more details)

Data collection and assimilation

- Collecting AD and collecting data to develop EF:
 - Ensure quality of data through planning, preparation, and management of inventory activities
 - Use national standards and best practice for measuring forest area and carbon stock (See Modules 2.1 and 2.2 on AD and 2.3 and 2.5 on EF)



Data management needs for preparing a national GHG inventory (2/3)

Data assimilation and processing:

- Processing of data into a suitable format for estimating anthropogenic GHG emissions and removals
- Estimating anthropogenic GHG emissions by sources and removals by sinks
- Implementing uncertainty assessments



Data management needs for preparing a national GHG inventory (3/3)

Data management in the context of MRV and carbon accounting:

- Organization of MRV data into a reporting format
- Implementing quality assurance / quality control procedures for national and subnational MRV (see next slide)
- Verification of data

Data archiving:

- Archive all relevant data, information, methods, explanations:
 - Database management process for archiving, storing, and retrieving information (using a FLUIS)



Developing capacities for data collection and management

- Ensure sufficient capacity and train staff for all aspects of data collection, processing, and storing
- Establish procedures and systems for collecting and archiving information: *use of special software (e.g., ALU)*
- Develop standard operating procedures (SOP):
 - To include user friendly documentation for nontechnical users
 - To enable the entire process to perform forest-area change assessment (remote sensing image processing and analysis and mapping change using GIS) and to develop emission factors (e.g., using appropriate allometric equations)
 - For field data collection
 - For community measurement and monitoring (CMRV)



Quality assurance / Quality control

- QC procedures for key categories have a significant contribution to the total emissions/removals in terms of:
 - Absolute level (all inventory activities that account for 95% of the total GHG emissions)
 - Trend
 - Uncertainty in emissions and removals
 - QC for categories in which significant methodological and/or data revisions have occurred
 - In accordance with guidance provided by IPCC
- For more information, see section 5.4 of IPCC (2003) GPG-LULUCF.



National System Templates from the U.S. Environmental Protection Agency (EPA)

EPA provides templates to document and organize different components of the national inventory system:

- *Template 1: Institutional arrangement*
- *Template 2: Methods and Data Documentation* (documenting and reporting origin of methodologies, activity datasets, and EFs)
- *Template 3: Description of QA/QC Procedures*
- *Template 4: Description of Archiving System*
- *Template 5: Key Category Analysis* (indicates most important GHG emissions by sources and removals by sinks)



EPA Template 2: “Methods and Data Documentation”

Step-by-Step Instructions

STEP 1: Provide source/sink category information

STEP 2: Identify method choice and description

STEP 3: List activity data

STEP 4: List emission factors

STEP 5: List uncertainty estimates (optional)

STEP 6: Provide any additional information

STEP 7: Provide improvements to this analysis

- Table templates to fill in for each of the steps
- Table below:
Example for Step 3:
“List activity data”

Type of Activity Data	Activity Data Value(s)	Activity Data Units	Year (s) of Data	Reference	Other Information (e.g., date obtained and data source or contact information)	Category QA/QC Procedure Adequate / Inadequate / Unknown	Are all data entered correctly into models, spreadsheets, etc.? Yes / No (List Corrective Action)	Checks with Comparable Data (e.g., At international level, IPCC defaults). Explain and show results.
...

Source: EPA Template 2,
Methods and Data Documentation.



In summary

- Clear and stable institutional set-up and clearly defined roles and responsibilities are important for preparation of GHG estimation for the LULUCF sector.
- Recommended institutions include a national coordination and steering body or advisory board; a central carbon monitoring, estimation, reporting, and verification authority; and a spatial data infrastructure and/or forest and land-use information system (FLUIS).
- A FLUIS is a data management system for storing, organizing, and integrating large amounts of forest and land-use data from multiple sources and connects data collectors with end-users.
- Data management needs include collection, assimilation, processing, estimation, uncertainty assessment, QA/QC, verification, and archiving.



Recommended modules as follow-up

- **Module 3.2** to continue with guidance on developing REDD+ reference levels and **Module 3.3** to learn more about reporting REDD+ performance using IPCC (2003) guidelines and guidance



References

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