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# **Building National Inventory Capacity: U.S. Government and UNFCCC Efforts**

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# Characterizing US Government Efforts on GHG Inventory Capacity Building

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- Collaborative effort: US EPA, US AID, UNFCCC
- Technical expertise for GHG inventories already exists in developing countries
  - Small teams with multiple responsibilities and limited resources;
  - Incomplete or non-existent data;
  - Lack of country-specific emission factors;
  - Insufficient documentation of methods and data sources used in previous inventories; and
  - Difficulties retaining capacity and expertise developed during the preparation of the first National Communications
- Priorities should be determined by developing countries rather than donors

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# U.S. EPA Approach to building GHG Inventory Management Capacity

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- **Component I: Build sustainable national inventory systems within each country**
- **Activities:**
  - Key source analyses
  - Description of institutional arrangements
  - Source-by-source background document
  - Inventory improvement plan
  - QA/QC & archiving system

- **Component II: Improve GHG estimates**
- Source/sink categories (examples):
  - Forest C
  - Soil C
  - Soil N<sub>2</sub>O
  - Landfills
- Evaluate current methods and activity data
- Assist in applying the chosen methods

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# Tools for GHG Inventory Development

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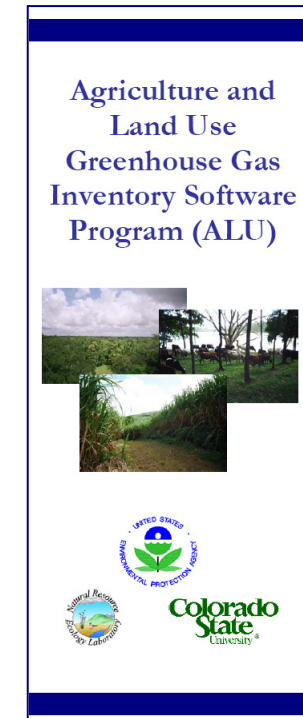
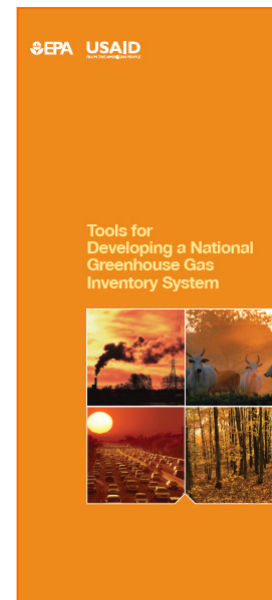
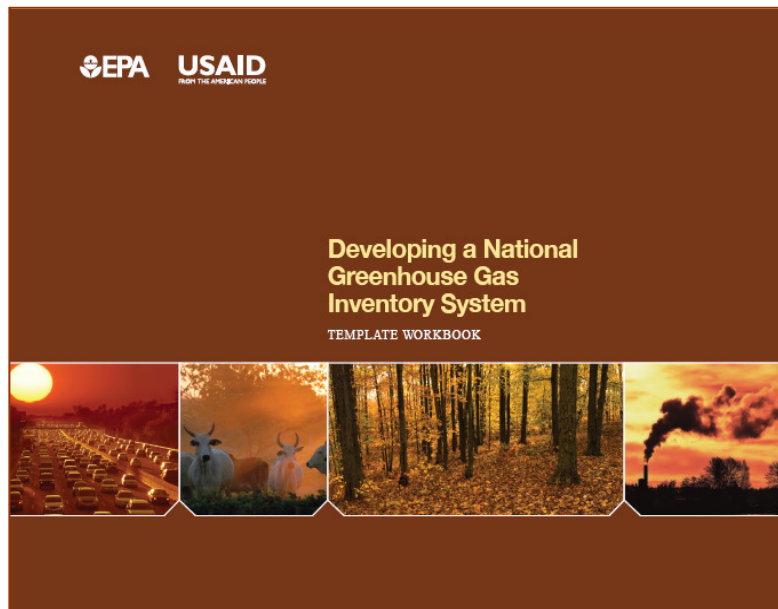
Two complementary sets of tools for National GHG inventories:

- **National System Templates** to document and institutionalize the inventory management process.
  - Establishing institutional arrangements, QA/QC, archiving, etc.
- **Targeted data collection strategies and software tools** to assist developing countries application of higher tier IPCC methods in key sectors

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# EPA Tools for GHG Inventory Development

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# Past and Current GHG Inventory Improvement Projects

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**South East Asia:** Regional GHG inventory improvement project in collaboration with UNFCCC, Japan and other regional experts



**China:** Initiated cooperative activities with NDRC, Step 1 translation of existing tools

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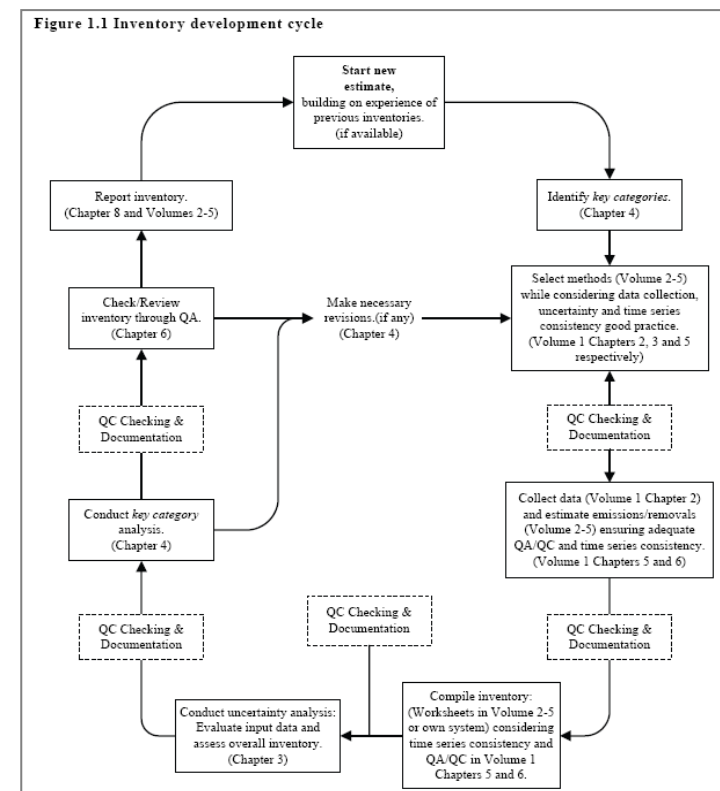
# Component I: Inventory Management Systems

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# Inventory Preparation Process

Step-by-step process, ideally becomes a cyclical process:

- Inventory Planning
  - Assign roles/responsibilities
  - Review of methodologies (read, become familiar with IPCC Guidance)
  - Data assessment
- Inventory Compilation
  - Data collection
  - Uncertainty assessment
  - Estimation of GHG emissions
  - Key source category analysis
  - Documentation and reporting
- Review, QA/QC
- Archiving of calculations and report



Process establishes National GHG Inventory system



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# Template Approach to Building Inventory Management Capacity

## *Introduction*

**Chapter 1 - Identification of Key Sources**

1

**Chapter 2 - Documentation of Institutional Arrangements**

2

**Chapter 3 - Source-by-Source background document (methods and data)**

3

**Chapter 4 - Description of Archiving system**

4

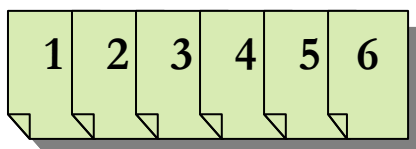
**Chapter 5 - Description of QA/QC procedures**

5

**Chapter 6 - National Inventory Improvement plan**

6

**The preparation of the report will be as useful as the report itself:**



- **Preparation of National Communication**
- **Background for future GHG inventories**
- **Priorities for future capacity building projects**

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# Why use templates?

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- Focus on documenting essential information in a concise format and avoids unnecessarily long written reports;
- Standardize tasks, allowing countries within regions to compare and contrast results;
- Accommodate varying levels of national capacity;
- Provide an objective and efficient system for identifying priorities for future improvements;
- Serve as instruction manuals for future inventory teams
- Create transparency in a country's national system
- Adapt to regional, national circumstances

**Goal: Build sustainable National  
GHG Inventory Management  
systems**

**LOW TECH!  
IMPORTANT!**

- A country can prepare a GHG inventory at regular intervals (annually, every 2 years etc.)
- All information used to prepare the inventory is archived
- Roles and responsibilities are understood
- Experts can come and go but the inventory does not suffer
- Inventory quality improves over time
- The GHG inventory meets the needs of policy-makers, researchers, and the public



**Inventory Coordinators use  
EPA Templates and Tools**

1. Key Source  
Analysis Report



2. Description of  
Institutional  
Arrangements

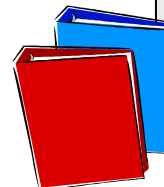
3. Source by Source  
Documentation of  
Data and Methods for  
Key Sources

4. & 5. Description of  
Archiving Systems and  
QA/QC



6. National Inventory  
Improvement Plan  
...Priorities and  
Projects for  
Improvements

Country  
Preliminary  
GHG Inventory  
System Report  
2009



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## Component II: GHG Estimation

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# Central America Phase II

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- Improve land-use/cover maps in Central America
  - Collect ground - reference data to improve GIS maps for Nicaragua, Honduras, Costa Rica, El Salvador and Guatemala.
  - Designate IPCC Land-Use Categories: Forest land, Cropland, Grassland, Wetlands, Settlements, and Other Land
- Process
  - Review existing land-use/cover maps
  - Develop a plan for collecting ground-reference data
  - Collect ground-reference data
  - Update maps using ground-reference data
  - Ensure compatibility of revised maps with ALU Tool

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## Completed Activities: August 2009 to December 2009

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- Finalized approach to utilizing ground-based reference data to improve existing maps
- Updated existing maps
- Assessed accuracy of “improved” maps
- Ensured compatibility of “improved” maps with ALU tool
- Finalized collection of available forest C factors and incorporate into ALU tool

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## Completed/Ongoing Activities: August 2009 to December 2009

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- Conducted workshop at CATIE in October 2009 with country focal points and other key contacts
  - Reviewed process by which the maps were created
  - Provided overview of how to import maps into ALU and utilize to develop GHG Inventory
  - Discussed outreach options to make “improved” maps, forest C factors, and ALU tool available and accessible to target audience (Central American GHG inventory compilers)
- Continue outreach to increase awareness of “improved” maps and forest C factors (e.g., CATHALAC/SERVIR, CCAD, Environment Ministries)

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## Expected results by 2010

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- Improved map for 2000 and a change detection product for 2009 for each country
  - Maps to be made available electronically and/or housed on server
- Central American GHG Inventory experts trained on use of maps with ALU Tool
  - Improvements to GHG estimates for Agriculture and LULUCF for their National Communications
- Report on updated forest C factors
  - Data to be incorporated into ALU



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# ALU Tool Description

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- Greenhouse Gas Inventory Software Program
  - Developed for LULUCF and Agricultural Sectors
  - Based on IPCC methods (96 GL and GPG)
    - Emphasis on incorporation of good practices
  - Accommodates IPCC Tier 1 and 2 methods
- User-interface guiding compiler through inventory process
  - Activity data entry
  - Emission factor assignment
  - Emission calculation

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## ALU Tool Description (cont.)

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- Data management capability
  - Activity data, factor files, emission results
  - Utilize GIS-based data on land use and land use change derived from remote sensing imagery – *Option*
  - Develop enhanced livestock characterization - *Option*
- Digital archive of all data and results
  - Self-contained database with activity data, documentation references and results
  - Institutional memory for long-term sustainability of GHG inventory

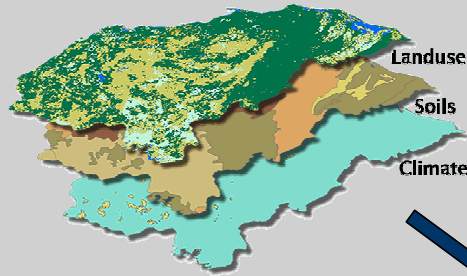
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## ALU Tool Description (cont.)

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- Support reporting to the UNFCCC through capacity-building project
- Use of ALU for REDD:
  - estimate national or regional baseline for evaluating REDD Projects
  - facilitating REDD calculations with region-specific C factors
  - Data improvements and capacity-building achieved through REDD can also improve national GHG inventories

# Inventory Framework: ALU Tool



**GIS Spatial Data:**  
Land Use/Cover,  
Soils and Climate



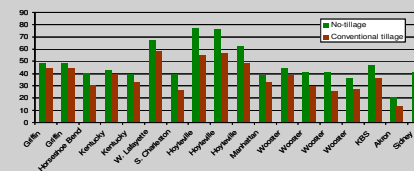
	A	B	C	D
1	<b>Biomass C - Summary</b>			
2	Reporting Year: 2007			
3	Session Name: Inventory			
4	Version Time Stamp: 5/2/2007 4:47:38 PM			
		Sub-Sources	Net Change in Woody Biomass C Stock (Gg)	Net CO <sub>2</sub> Emissions (Gg)
6	Source			
7	Biomass C	Composts	5.53	5.53
8		Grasslands/Pastures	-0.31	-3.19
9		Forelands	92.29	335.96
10		Forest Conversion to Other Uses	-21.30	207.40
11		Soil Carbon	-21.90	-84.00
		<b>Total</b>	<b>65.99</b>	<b>302.83</b>

\*Stock changes for biomass C related to biomass harvesting and harvesting were computed using the volume method approach produced in PCF. GPP: 2002 to harvesting in forestland. Note that removals for harvesting could also be registered in area if the data were available on an area basis (instead of volume).

A complex table with multiple columns and rows, representing management activity data. The table is organized into sections with headers like 'GENERAL LAND USE INFORMATION FROM LOCAL AGRICULTURE FORESTRY INVENTORY' and 'GENERAL LAND USE INFORMATION FROM LOCAL AGRICULTURE FORESTRY INVENTORY'. It contains various numerical and categorical data points.

**Management Activity Data:**  
National Agriculture and Forestry  
Statistics

**Emission Factors:**  
IPCC Defaults or Country-Specific



Session: **Example**

Add Notes

Year: **2007**

Please Select a Specific Computation:

Status: Computation:

+	Deforestation Biomass C Losses
---	--------------------------------

Equation:

$$DF = A * Bw * (1 + R) * CF$$

**Abbreviation Legend:**

DF = Deforestation Biomass C Losses (tonnes C)  
 A = Area Deforested (ha)  
 Bw = Aboveground Biomass Stock (tonnes d.m./ha)  
 CF = C Fraction (tonnes C/tonnes d.m./ha)  
 R = R:S ratio (unitless)

Data OK:  
No Errors

Data Not  
OK: Reset

Export  
Data

Strata/Factors and Results for:

Climate:	Soil:	LU Category:	LU Subcategory:	Age Range:	A:	Bw:	CF:	R:	DF:
TRW	LAM	FC	TBEF	>= to 20	2875	347	0.5	0.42	708314

Acronym Key

Module 3 QA/QC: **Complete**

Finish

Cancel

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## Implementing Lessons

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- Targeted efforts to improving inventory inputs should be complemented with parallel focus on building sustainable National Systems and institutional arrangements
- Informing countries of expected end-of-project situation and products to be delivered
- Consultations are important before even organizing scoping efforts
  - Important to have commitment and interest from countries

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## Implementing Lessons (cont.)

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- Important to have Regional and bilateral assistance in projects
  - Regional meetings facilitate exchange of expertise, inventory management strategies
  - Bilateral assistance important as each countries circumstances and priorities are unique
- Direct assistance/resources to countries to complement GEF resources is important
  - Should have at least 1 in-country staff member with 50-100% time dedicated to project
- Tools developed by EPA do not solve the problem of resources but can help address lack of staff continuity

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# Looking Forward

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- ALU software enhancements
  - Mitigation module
  - Uncertainty analysis
- Guidance manual on enhancing quality of land use maps
- Scoping to extend program into new geographic area
- Eastern Himalayas REDD+ capacity building initiative



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Thank you!/Questions?