

# National Forest Assessment of Ecuador 2009-2013

**Government of Ecuador, Ministry of Environment and Energy (MAE, Ministerio de  
Ambiente y Energía)**

report\_generated\_on: November 5, 2025

visit\_data\_catalog\_at: <http://catalog.ihsn.org/>

## Identification

### SURVEY ID NUMBER

ECU\_2009-2013\_ENF-C1\_v01\_M\_v01\_A\_ESS

### TITLE

National Forest Assessment of Ecuador 2009-2013

### SUBTITLE

Round I

### ABBREVIATION OR ACRONYM

ENF-R1 2009-13

### TRANSLATED TITLE

Evaluación Nacional Forestal de Ecuador, Ciclo I

### COUNTRY

Name	Country code
Ecuador	ECU

### STUDY TYPE

Forest Resource Survey

### ABSTRACT

Ecuador's first National Forest Assessment (ENF) is a strategic, integrated, and multi-purpose initiative developed in response to the need for up-to-date and reliable data on the country's forest resources. Its main objective is to provide a comprehensive and continuous assessment of forest ecosystems while also collecting socio-economic information to support evidence-based decision-making and the development, strengthening, and updating of public policies in the forestry sector. In addition, the ENF contributes to the formulation of strategies for sustainable forest management in the country.

The ENF collected integrated information spanning biophysical, environmental, and socio-economic dimensions. The three main components were: the National Forest Inventory (NFI), which collected detailed biophysical data; the biomass and carbon maps, for which carbon was quantified in different components and maps were generated; and the socio-economic component, which involved household and institutional surveys to better understand how local people interact with their natural environment.

For the first time, the resource category 'trees outside forests' was quantified at the national level. By including all land cover classes in its measurement framework, the National Forest Assessment provides a solid basis for monitoring future changes in land use and tree biomass across the landscape. Furthermore, the ENF's remit included the generation of information to facilitate access to international carbon markets.

### KIND OF DATA

Sample survey data [ssd]

### UNIT OF ANALYSIS

Fields/plots

## Scope

### NOTES

The National Forest Assessment (ENF) focused on three main components:

- National Forest Inventory (NFI): The study was designed to suit Ecuador's characteristics, based on bioclimatic criteria and floristic composition.
- Biomass and carbon maps: Carbon was quantified in different components (aboveground and belowground biomass, dead wood, and organic matter) using formulas, and partial carbon maps were generated.
- Socio-economic components: The relationships between forests and households, as well as public and private actors, were

studied. Aspects such as land use, resource utilization, production systems, and organizational structures were included in the analysis.

## TOPICS

Topic
Forest inventory
Forest assessment
Forest survey
Timber production
Biomass stocks
Species diversity
Health of forest ecosystems
Timber forest ecosystems

## KEYWORDS

Keyword
Forest
Volume
Biomass

## Coverage

## GEOGRAPHIC COVERAGE

National coverage

## UNIVERSE

The forests and wooded areas of the nine forest types included in the study covered 13 038 367 hectares of the national territory as of 2012. These include natural forests, forests modified by human activity, mangroves, and flooded palm forests.

## Producers and sponsors

## PRIMARY INVESTIGATORS

Name
Government of Ecuador, Ministry of Environment and Energy (MAE, Ministerio de Ambiente y Energía)

## PRODUCERS

Name	Abbreviation	Role
Food and Agriculture Organization of the United Nations	FAO	Technical advising
Tropical Agricultural Research and Higher Education Center (CATIE, Centro Agronómico Tropical de Investigación y Enseñanza)	CATIE	Data analysis consultancy
National Institute of Agricultural Research (INIAP, Instituto Nacional Autónomo de Investigaciones Agropecuarias)	INIAP	Soil and biomass sample treatments

## FUNDING AGENCY/SPONSOR

Name	Abbreviation
Government of Ecuador	

National Secretariat for Planning and Development (Secretaría Nacional de Planificación y Desarrollo)	SENPLADES
Food and Agriculture Organization of the United Nations	FAO
Ministry of Foreign Affairs of Finland (Utrikesministeriet)	
Reconstruction Credit Institute (Kreditanstalt für Wiederaufbau)	KfK

## Sampling

### SAMPLING PROCEDURE

L-shaped clusters were established, consisting of three subplots oriented to the north, with measurement areas differentiated by forest stratum (forest type). Each forest has a differentiated sampling effort due to site conditions:

- Andean Dry Forest (BSA, Bosque Seco Andino): subplot 3 600 m<sup>2</sup>, cluster 10 800 m<sup>2</sup>
- Seasonally Tropical Dry Forests (BSP, Bosque Seco Pluvioestacional): subplot 3 600 m<sup>2</sup>, cluster 10 800 m<sup>2</sup>
- Montane Evergreen Andean Forest (BSVAM, Bosque Siempreverde Andino Montano): subplot 3 600 m<sup>2</sup>, cluster 10 800 m<sup>2</sup>
- Foothill Evergreen Forest (BSVPM, Bosque Siempreverde Pie Montano): subplot 3 600 m<sup>2</sup>, cluster 10 800 m<sup>2</sup>
- Andean Cloud Forest (BSVCA, Bosque Siempreverde Ceja Andina): subplot 3 600 m<sup>2</sup>, cluster 10 800 m<sup>2</sup>
- Lowland Evergreen Amazonian Forest (BSVTBA, Bosque Siempreverde Tierras Bajas de la Amazonía): subplot 3 600 m<sup>2</sup>, cluster 10 800 m<sup>2</sup>
- Lowland Evergreen Chocó Forest (BSVTBC, Bosque Siempreverde Tierras Bajas del Chocó ): subplot 3 600 m<sup>2</sup>, cluster 10 800 m<sup>2</sup>
- Mangrove (Ma): subplot 2 400 m<sup>2</sup>, cluster 7 200 m<sup>2</sup>
- Moretal (flooded palm forest) (Mo): subplot 2 400 m<sup>2</sup>, cluster 7 200 m<sup>2</sup>

The secondary units nested within the clusters were:

- 20 × 20 m plots for trees with diameter ≥ 10 cm (BSA, BSP, BSVAM, BSVPM, BSVTBA, BSVTBC, Ma, Mo; except in BSVCA, where trees with diameter ≥ 5 cm were measured)
- 60 × 60 m plots for trees with diameter ≥ 20 cm (BSA, BSP, BSVAM, BSVPM, BSVTBA, BSVTBC, Ma, Mo; except in BSVCA, where trees with diameter ≥ 10 cm were measured)
- 50 × 50 cm plots for litter (all strata)
- 3.98 m circular plots for tree regeneration divided in two groups: 30 cm-1.3 m height, and 1.3 m height to diameter &lt; 10 cm (all strata)
- 2 × 2 m plots for understory biomass (BSVAM, BSVPM, BSVCA, BSVTBA, BSVTBC, Ma, Mo) and measurement of bamboo height in BSVCA and BSVAM
- 5 × 5 m plots for understory biomass in BSA and BSP and measurement of Guadua bamboo in BSVTBA, BSVTBC, BSVPM
- 30 m line-intercept transect for coarse woody debris

Source: Methodology for developing the pilot study of the ENF in accordance with the REDD+ mechanism. Available at: [https://enf.ambiente.gob.ec/web\\_enf/?page\\_id=1444](https://enf.ambiente.gob.ec/web_enf/?page_id=1444)

### DEVIATIONS FROM THE SAMPLE DESIGN

A theoretical total of 1 890 sampling subunits was expected. However, due to accessibility issues (rocks, bodies of water in the different sampling units and subunits, and need for entry permits from local communities), only a portion of the plots could be measured: 80 percent of the expected tree sampling units, 70 percent of understory plots, and 60 percent of leaf litter and soil samples.

### RESPONSE RATE

The sampling design included 630 clusters comprising 1 890 subplots. Due to access restrictions or unsuitable site conditions, full coverage of measurements was not achieved. Nonetheless, data collection was completed for 86 percent of the subplots for tree measurements, 57 percent for litter, 30 percent for deadwood, and 63 percent for understory vegetation.

### WEIGHTING

Various expansion factors are applied to convert the values and volumes of carbon stocks per hectare based on the size of the sampling units:

- Dead leaves: 40 000
- Undergrowth: 400 and 2 500 depending on the forest type
- Large trees: 2.77
- Trees less than 20 cm: 25
- Fallen wood: 10 000

Adjustments are made for the effective measurement area, and the size of the forest type is taken into account for the calculations depending on the variable being analyzed.

## Data collection

### DATES OF DATA COLLECTION

Start	End
2009	2013

### DATA COLLECTION MODE

Field measurement [field]

## data\_processing

### DATA EDITING

To detect potential errors, a protocol was developed, which includes the following steps:

- Detection of out-of-range values: For example, in plots where only trees with a diameter at breast height (DBH) greater than 20 cm were supposed to be measured, values below 20 cm were flagged. Another example is the presence of zero values for DBH or height.
- Logical validation checks: A key example of this procedure is the review and correction of inconsistencies between the total height of trees and their commercial height. It should be noted that the commercial height in Ecuador's forests is always lower than the total height by definition.
- Visual detection of outliers in relationships between variables: Graphical techniques, such as scatter plots of DBH versus total height, were used to identify trees with inconsistent relationships between variables, suggesting possible errors in one or both values.
- Harmonization of species (unique identification): Scientific names were reviewed to detect and correct synonyms and typographical errors in genus and species names.
- Identification of statistical outliers. Values for DBH, total height, and commercial height were standardized by species. Any standardized value exceeding an absolute value of 3.5 was considered an outlier and subsequently reviewed and deleted or imputed.

**\*\*STATISTICAL DISCLOSURE CONTROL (SDC)\*\***

Endangered species or with commercial value are omitted from the database.

## data\_appraisal

### ESTIMATES OF SAMPLING ERROR

Sampling errors were estimated for all key variables (e.g., biomass, carbon stocks, tree volume) based on the sampling design. Standard errors and 95 percent confidence intervals were calculated using the sample variance and the number of plots per stratum. Regarding non sampling errors, the errors associated with instrumentation or measurements were mitigated through protocols, manuals, training, support, and monitoring of field teams.

## Access policy

### CONTACTS

Name	Affiliation	Email	URL
Deputy Secretary of Natural Heritage, Glenda Givabel Ortega Sánchez	Ministry of Environment, Water, and Ecological Transition (MAATE, Ministerio del Ambiente, Agua y Transición Ecológica)	glenda.ortega@ambiente.gob.ec	<a href="#">Link</a>

Director of Forests, Rosa Elvira Benavides Castro	Ministry of Environment, Water, and Ecological Transition (MAATE, Ministerio del Ambiente, Agua y Transición Ecológica)	rosa.benavides@ambiente.gob.ec	<a href="#">Link</a>
Monitoring Management Coordinator, Ximena María Herrera Jirón	Ministry of Environment, Water, and Ecological Transition (MAATE, Ministerio del Ambiente, Agua y Transición Ecológica)	ximena.herrera@ambiente.gob.ec	<a href="#">Link</a>
Forest and Wildlife Control Analyst, Miguel Angel Chinchero Lema	Ministry of Environment, Water, and Ecological Transition (MAATE, Ministerio del Ambiente, Agua y Transición Ecológica)	miguel.chinchero@ambiente.gob.ec	<a href="#">Link</a>
Ministry of Environment and Energy (MAE, Ministerio de Ambiente y Energía)	Government of Ecuador	atención.virtual@energiayminas.gob.ec	

## CITATION REQUIREMENTS

MAE. Ministerio de Ambiente y Energía. Evaluación Nacional Forestal ciclo I. 2025.

## Disclaimer and copyrights

## DISCLAIMER

The user of the data acknowledges that the original collector of the data, the authorized distributor of the data, and the relevant funding agency bear no responsibility for use of the data or for interpretations or inferences based upon such uses.

## Metadata production

## DDI DOCUMENT ID

DDI\_ECU\_2009-2013\_ENF-C1\_v01\_M\_v01\_A\_ESS\_FAO

## PRODUCERS

Name	Abbreviation	Affiliation	Role
Ministry of Environment and Energy (Ministerio de Ambiente y Energía)		Government of Ecuador	Metadata producer
Statistics Division		Food and Agriculture Organization of the United Nations	Metadata adapted for FAM
Development Data Group	DECDG	World Bank Group	Metadata adapted for World Bank Microdata Library

## DDI DOCUMENT VERSION

Identical to a metadata (ECU\_2009\_2013\_ENF\_C1\_v01\_M\_v01\_A\_ESS) published on FAO microdata repository (<https://microdata.fao.org/index.php/catalog>). Some of the metadata fields have been edited.

**data\_dictionary**

<b>Data file</b>	<b>Cases</b>	<b>variables</b>
------------------	--------------	------------------

## study\_resources

### questionnaires

#### Questionnaire

---

title Questionnaire  
filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/enf-Formulario1-AccesoConglomerado-2012.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/enf-Formulario1-AccesoConglomerado-2012.pdf)

---

### reports

#### National Forest Assessment

---

title National Forest Assessment  
filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/enf-SistematizacionExperiencia.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/enf-SistematizacionExperiencia.pdf)

---

### technical\_documents

#### Mangrove Field Manual

---

title Mangrove Field Manual  
filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/enf-ManualCampo-moretalesManglares.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/enf-ManualCampo-moretalesManglares.pdf)

---

#### Field Manual

---

title Field Manual  
filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/enf-ManualCampo.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/enf-ManualCampo.pdf)

---

#### Methodology for Conducting the Pilot Study of the National Forest Assessment (NFA) in Line with the REDD+ Mechanism.

---

title Methodology for Conducting the Pilot Study of the National Forest Assessment (NFA) in Line with the REDD+ Mechanism.  
filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/metodologiaEstudioPilotoENF-REDD.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/metodologiaEstudioPilotoENF-REDD.pdf)

---

#### Forest Species of Dry Forests in Ecuador

---

title Forest Species of Dry Forests in Ecuador  
filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/especiesForestalesBosqueSeco.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/especiesForestalesBosqueSeco.pdf)

---

#### Tree Families and Genera in Ecuador

---

title Tree Families and Genera in Ecuador  
filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/familiasGenerosArboreos.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/familiasGenerosArboreos.pdf)

---

## **Methodology for Determining the People - Forest Relationship**

---

title Methodology for Determining the People - Forest Relationship

filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/metodologiaDeterminaRelacionGente-Bosque.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/metodologiaDeterminaRelacionGente-Bosque.pdf)

---

## **Open Foris Collect - Installation and User Manual**

---

title Open Foris Collect - Installation and User Manual

filename [https://enf.ambiente.gob.ec/web\\_enf/documentos/openForisCollect-ManualInstalacionUso.pdf](https://enf.ambiente.gob.ec/web_enf/documentos/openForisCollect-ManualInstalacionUso.pdf)

---