

Honduras - Honduras Forest and Tree Inventory 2005-2006

**Department of Forest Management and Development, Forest Conservation
Institute (Departamento de Manejo y Desarrollo Forestal, Instituto de
Conservación Forestal)**

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Identification

SURVEY ID NUMBER

HND_2005_2006_ENF_v01_M_v01_A_ESS

TITLE

Honduras Forest and Tree Inventory 2005-2006

TRANSLATED TITLE

Inventario de Bosques y Árboles Honduras 2005-2006

COUNTRY

Name	Country code
Honduras	HND

STUDY TYPE

Forest resource survey

ABSTRACT

The National Forestry Assessment process has created a methodology and a baseline that contributes to the organization and generation of strategic information. The objective of the National Forestry Assessment is to establish a system for evaluating forests at the national level to generate information that supports sustainable forest management with the following features:

- A. For the first time, an information survey is proposed with a multipurpose and integrated focus that improves the quality and quantity of information.
- B. Forests are considered within a mosaic of other productive uses, allowing their integration into the territorial planning and improving sustainable forest management.
- C. Considers measuring trees outside the forest, as of paramount importance for the planning of agroforestry systems.
- D. Gives values of the criteria and indicators for the evaluation of the implementation of forest policies and laws.
- E. Inventory data can be used to update forest cover and current land use maps, potential use capacity maps, land use conflict, socioeconomic maps, etc.
- F. It allows the formulation of economic and geographical projections and models of the whole country.

The field data collection was carried out using a multidisciplinary and comprehensive methodology, in which the information was analyzed to assess:

- i) the dynamics of the agricultural frontier;
- ii) the sustainable management of natural forests;
- iii) the strengthening of forest productivity;
- iv) the promotion of investment and management of plantations and agroforestry systems;
- v) the integration of environmental services into sustainable forest management;
- vi) the conservation of biodiversity in forest ecosystems; and
- vii) the economic contribution of forests to society.

KIND OF DATA

Sample survey data [ssd]

UNIT OF ANALYSIS

Fields/plots

Scope

NOTES

The main criteria defined for the NFI drive its scope. These are:

1. Forest cover and areas outside forest
2. Productive functions of forest ecosystems
3. Health and vitality of forests and non-tree ecosystems

4. Status of forest plantations and agroforestry systems
5. Maintenance and enhancement of the multiple social, economic and cultural benefits of forest ecosystems
6. Contribution of forest ecosystems to environmental services
7. Biological diversity of forest ecosystems

For each, indicators were defined associated with the measured variables.

TOPICS

Topic
Biomass Stock Measurement
Non-Timber Forest Products
Biodiversity

KEYWORDS

Keyword
Forest
Carbon
Tree Biomass
Tree Volume
Deadwood
Land Use
Canopy Cover
Tree Biodiversity
Forest Production
Land Cover
Forest Fire Evidence
Non-Timber Forest Products
Forest Pests

Coverage

GEOGRAPHIC COVERAGE

National coverage

UNIVERSE

Tree population throughout the country, inside and outside the forests.

Producers and sponsors

PRIMARY INVESTIGATORS

Name	Affiliation
Department of Forest Management and Development, Forest Conservation Institute (Departamento de Manejo y Desarrollo Forestal, Instituto de Conservación Forestal)	Forest Conservation Institute (ICF, Instituto de Conservación Forestal) - Rio Platano Biosphere Reserve Project (Proyecto Reserva de la Biosfera Rio Platano)

PRODUCERS

Name	Abbreviation	Affiliation	Role
Food and Agriculture Organization of the United Nations	FAO	United Nations	
United States Forest Service	USFS		Contribution: Rio Platano Biosphere Reserve Project (Proyecto Reserva de la Biosfera Rio Platano)
State Forestry Administration-Honduran Forestry Development Corporation (Administración Forestal del Estado-Corporación Hondureña de Desarrollo Forestal)			Contribution: Forest Conservation Institute (ICF, Instituto de Conservación Forestal) - Rio Platano Biosphere Reserve Project (Proyecto Reserva de la Biosfera Rio Platano)

FUNDING AGENCY/SPONSOR

Name	Abbreviation
Food and Agriculture Organization of the United Nations	FAO
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Sampling

SAMPLING PROCEDURE

The NFI involves the collection of biophysical, socioeconomic, and environmental data from forests and non-forest areas. Across the total area of the country (112 490 km²), a systematic grid of 339 primary sampling units was traced every 10 minutes in latitude and 10 minutes in longitude, and primary sampling units were distributed in a chessboard pattern. The statistical design was a systematic cluster sampling, non-stratified (probability proportional to size). Each primary sampling unit (cluster) was composed of four secondary sampling units (plots), following FAO's National Forest Monitoring and Assessment (NFMA) plot design system (see attached document "Resultados del Inventario Nacional de Bosques y Árboles 2005-2006"). Plots were rectangular (20 x 250 m in shape, corresponding to 0.5 ha), distributed along the sides of a 500 x 500 m square. The first plot was located in the southwest corner with northwards direction. The second was in the northwest corner with an eastward direction. The two remaining plots were in the northeast and southeast corner following southward and westward directions, respectively.

Each plot had a nested structure with three types of subplots and three measuring points systematically distributed, where each subplot size configuration depended on the resource to measure. In the whole plot, all trees greater than or equal to 20 cm Diameter at Breast Height (DBH) or those greater than or equal to 10 cm DBH were measured whether they were in forest or in non-forest, respectively. The first nested subplots (10 x 20 m: 200 m²) were used to measure, only if the land use was forest, trees with DBH greater than or equal to 10 cm and lower than 20 cm. The second level subplots were circular (radius = 3.99 m: 50 m²) and measured trees, only in forest, with DBH lower than 10 cm and total height greater than or equal to 1.3 m. Finally there were 3 soil and litter measuring locations, both in forest and non-forest in 0.5 x 0.5 m squares. Three line intercept transects per Secondary Sampling Unit (SSU) for dead wood greater than or equal to 10 cm and 3 for deadwood lower than 10 cm in diameter had lengths of 20 m and 10 each, respectively.

DEVIATIONS FROM THE SAMPLE DESIGN

Missing data resulted primarily from elevated costs and access constraints.

RESPONSE RATE

Originally a systematic square grid with 339 PSUs had been envisioned. However, because of budget constraints, the grid was halved in intensity, totaling 170 PSUs. Out of the original 170 PSUs designed to be sampled, 156 were finally selected. 13 PSUs in the area of the Reserva Nacional del Río Plátano (RBRP) and Río Patuca and one outside were not enumerated due to elevated costs in the first case and lack of access permissions. However, 25 more were added later to cover a total of 181 PSUs. First, two PSUs in the Rio Platano area that belonged to the grid of 170 PSUs were substituted for another two from the more intense, grid of 339 PSUs located immediately to the west. Then, the other 11 Rio Platano PSUs from the grid of 170 PSUs were finally enumerated, all 13 thanks to extra funds available. Second, the PSU missed initially as it lacked access permission was finally granted a permit. Then, another 11 PSUs belonging to the intense grid of 339 PSUs were added, located mostly in the dense forest areas within Atlántida and Olancho departments. Because of the misalignments between the original 339 and the reduced 170 PSU design and the final number of 181 plots measured, it is difficult to define

a robust response rate. Nevertheless, analyses can consider a full response rate with respect to the grid of 170 PSUs (with a likely small bias).

WEIGHTING

Sample weights were determined according to area expansion factors (with respect to a reference of 2 ha total area per Primary Sampling Unit (PSU)). Each PSU consists of four Secondary Sampling Units (SSUs). Hence they are given as:

- Weight of whole plot land use and measured trees and stumps in forest with DBH greater than or equal to 20 cm or trees and stumps with DBH greater than or equal to 10 cm in areas outside the forest: $2 \text{ ha} / (0.5 \text{ ha} \times 4 \text{ SSU/PSU}) = 1$
- Weight of trees in forest with DBH between 10 and 20 cm: $2 \text{ ha} / (0.02 \text{ ha} \times 12 \text{ subplots/PSU}) = 8.33$
- Weight of regeneration, trees with DBH < 10 cm and height greater than 1.3 meters: $2 \text{ ha} / (0.005 \text{ ha} \times 12 \text{ subplots/PSU}) = 33.33$
- Weight of litter in PSU: $2 \text{ ha} / (0.000025 \text{ ha} \times 12 \text{ subplots/PSU}) = 6666.67$
- Weight of downed dead wood greater than or equal to 10 cm in diameter: estimated using the line-intersect sampling formula, with 12 transects of 20 m established per PSU.
- Weight of downed dead wood < 10 cm in diameter: estimated using the line-intersect sampling formula, with 12 transects of 10 m established per PSU.

Data collection

DATES OF DATA COLLECTION

Start	End
2005-11	2006-05

DATA COLLECTION MODE

Field Measurement [field]

DATA COLLECTION NOTES

Several capacity building exercises were done. First, two workshops were developed, with the participation of technical specialists in different disciplines, belonging to public institutions and development projects financed with international funds. In the first workshop, the methodology was presented and the criteria, indicators, variables and verifiers were analyzed, (see "Manual para el Levantamiento de Campo" in attached documentation) that would be evaluated during the execution of the NFI. In the second workshop, the terms and definitions of the Land Use Classification (CUT, Clasificación de Uso de la Tierra) and forest types or classes were reconciled.

Subsequently, five training workshops were planned for national consultants and contracted field supervisors, as well as State Forestry Administration - Honduran Forestry Development Corporation (AFE-COHDEFOR, Administración Forestal del Estado - Corporación Hondureña de Desarrollo Forestal) personnel. A total of 85 people nationwide were trained in the use of the survey methodology, of which 50 are independent technicians, 30 technicians from AFE-COHDEFOR, one municipal technician and four students. 18 technicians also received training in a 3-day workshop on information processing and analysis.

The field technical teams were composed of at least four people: one team leader (responsible forester), one assistant and two operators. At least one of the members was required to have experience for the common identification of the trees. In addition, at least one of the operators had to be from the area, to facilitate the location and request for permits.

Technical personnel of the Technical Unit for National Forest Evaluation (UTENF, Unidad Técnica de Evaluación Nacional Forestal) traveled to various regions of the country to provide field guidance during the first survey of each Sampling Unit (UM, Unidad de Muestreo) to previously selected consultants. This monitoring would serve, in addition to clarifying doubts to the consultants, supervising in general the activities, measurements and data records in the forms, and evaluating their technical criteria, mainly in terms of classification of land use and forest types. Because not all regions and consultants started at the same time, this activity lasted from November 2005 to May 2006, covering a total of 32 Management Units (MUs) (20 percent). In parallel, from December 2005 to July 2006, supervisions were carried out on 17 MUs (10 percent) selected for doubts that arose during the cabinet reviews or randomly chosen to verify the work carried out. In the first case, the information of the parcels that presented bias was verified in the field and in the second the parcels to visit were previously selected in the office. Back at the work headquarters, a report of the tour was prepared specifying the problems encountered, which were communicated to the consultants for their correction.

For the review and approval of the field information received at the central headquarters, the following quality control

mechanisms were used:

1. Preparation of a control sheet to record the entry of the information received.
2. Once the information had been registered and considered received, a UTENF technician was responsible for verifying that the data were consistent across the report, the field forms, and the database. Once the information was reviewed, the field forms were scanned in order to have a backup copy in case of loss, since the originals were sent back to the consultants to make the requested corrections.
3. Initially, if the information received presented inconsistencies, the documentation was returned to the consultant for correction, for the first or second time. As this practice became common, it was decided that, once most of a consultant's MUs had been completed, the consultants would travel to the UTENF headquarters in Tegucigalpa. There, together with the supervisors, they would review and enter all the information into the database to ensure it was fully verified and reliable. After this the information was accepted and filled.
4. Finally, each sampling unit was digitized and geo-referenced, in order to perform geographic analysis.

Further information can be found in the attached field manual in the Downloads section.

Data Processing

DATA EDITING

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Data Appraisal

ESTIMATES OF SAMPLING ERROR

All the estimates included the estimation error, which is the limit of the estimator with a confidence level of 95 percent ($\alpha/2$) expressed as a percentage of the mean.

Due to the budget constraints that triggered a halving of the originally planned 339 PSUs, errors in the analysis were high and it was not clear in the results document how the addition and substitution of new 25 sample plots would play a role since these new plots likely impose biases in the design. Data are provided here without responsibility whatsoever on the error estimation procedures developed by the user.

Results considered sampling error at a 95 percent confidence level.

Access policy

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CONFIDENTIALITY

Due to Honduras' Transparency and Access to Public Information Act (Article 3 #7) and for security reasons and property disputes prominent in the country, all personal and contact information regarding ownership of the land where the survey plots are located is completely anonymized. The users shall not take any action with the purpose of identifying any individual entity (i.e. person, household, enterprise, etc.) in the micro dataset(s). If such a disclosure is made inadvertently, no use will be made of the information, and it will be reported immediately to FAO.

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- The users shall not take any action with the purpose of identifying any individual entity (i.e. person, household, enterprise, etc.) in the micro dataset(s). If such a disclosure is made inadvertently, no use will be made of the information, and it will be reported immediately to FAO;
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CITATION REQUIREMENTS

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Metadata production

DDI DOCUMENT ID

DDI_HND_2005_2006_ENF_v01_M_v01_A_ESS_FAO

PRODUCERS

Name	Abbreviation	Affiliation	Role
Statistics Division	ESS	Food and Agriculture Organization of the United Nations	Metadata producer

Data Dictionary

Data file	Cases	Variables
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