Mexico - Mexico's National Forest and Soils Inventory 2004-2009

Comisión Nacional Forestal, Gerencia de Sistema Nacional de Monitoreo Forestal

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Identification

SURVEY ID NUMBER
MEX_2004-2009_INFyS_v01_EN_M_v01_A_ESS

TITLE
Mexico's National Forest and Soils Inventory 2004-2009

COUNTRY

Name	Country code
Mexico	MEX

STUDY TYPE
Forest resource survey

SERIES INFORMATION
National Forest Inventory 2000

ABSTRACT
The National Forest and Soil Inventory 2004-2009 includes field information on the conditions of the terrain and the species of trees, shrubs and herbs by type of vegetation of all plant communities in the national territory.

The design of the INFyS is based on the classification system of the Land Use and Vegetation Charter (series I and III) at a scale of 1:250,000 prepared every five years by the National Institute of Statistical and Geographic Information (INEGI) and the design and technology was approved with Canada and the United States so Mexico is able to report the status of forest resources both nationally and internationally.

KIND OF DATA
Sample survey data [ssd]

UNIT OF ANALYSIS
Fields/plots

Scope

NOTES
The design of the INFyS is due to the generation of data at the national level, as well as support to federal entities in the generation of state forest inventories. In addition, in accordance with the General Law of Sustainable Forest Development, the INFyS included the measurement of the dynamics of change, so the field sampling design allowed the annual remeasurement of one fifth of the total conglomerates established at the national level, in this way, coverage of the national territory is achieved every five years.

The methodology contemplates obtaining periodic data that contributes to obtaining parameters of interest for the evaluation of the country's forest resources as:
a) Volumetric stocks
b) Increase in volume of coniferous roundwood
c) Damage to standing trees
d) Soil degradation indicators
e) Estimation of aerial biomass
f) Estimation of organic carbon in soil
g) Surface forest fuel load (Mg/ha)
h) Structure and composition of forest fuel beds

TOPICS

Topic
Forest inventory

Forest assessment
Forest survey
Timber production

KEYWORDS

Keyword
forest resources
forest ecosystem
forest land cover
forest area
forest vegetation
tree-species diversity
forest type
mangroves
forest health
forest growth
forest soils
biomass
carbon stocks
volume
timber
deadwood
canopy cover
forest regenaration
land use
land-use change
wildfires

Coverage

GEOGRAPHIC COVERAGE
National coverage

UNIVERSE
INFyS is a land-based survey that covers all types of forests and other forest lands in the country. The target population of INFyS includes all naturally occurring forest vegetation in the country, comprising temperate and tropical forests, and vegetation in arid and semi-arid zones, palm groves, mangroves, hydrophilic communities, and other forest areas.

Producers and sponsors

PRIMARY INVESTIGATORS

Name
Comisión Nacional Forestal

Gerencia de Sistema Nacional de Monitoreo Forestal

PRODUCERS

Name
Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias
United States Forest Service
The Canadian forest Service
Finnish Forest Research Institute

FUNDING AGENCY/SPONSOR

Name	Abbreviation
Secretaría de Medio Ambiente y Recursos Naturales	SEMARNAT
Comisión Nacional Forestal	CONAFOR

Sampling

SAMPLING PROCEDURE

The INFyS uses a systematic-stratified sampling design in two stages, in which 26,220 primary sampling plots (clusters) are located. The country was divided into quadrangular regions (5×5 km panels), which allowed obtaining a consistent distribution of the total number of clusters over the national territory. Clusters or primary sampling units (UMP) are composed of four secondary sampling units (UMS) or sites. The equidistance between clusters varies according to the type of vegetation in question: 5×5 km for temperate, sub-humid and humid forests; 10×10 km for semi-arid forest vegetation types; and 20×20 km for arid forest vegetation types. The 2.5×2.5 km national sampling grid allows for the implementation of state and/or municipal forest inventories in greater detail.

For forests, each UMP is a circular plot of one hectare (56.42 m radius), with four secondary sampling units (UMS) geometrically arranged in an inverted "Y" shape with respect to the north. UMS 1 is also the center of the UMP and UMS 2, 3 and 4 are peripheral. The distance from the center of UMS 1 to each of the other UMS is 45.14 m. The azimuth for locating sites 2, 3, and 4 from the center of site 1 is 0°, 120, and 240° respectively. For jungles, each UMS is a rectangular plot of 40×10 m.

Within the cluster, measurements and observations are made on the different elements of the vegetation and soil. Secondary sampling units (UMS) have a nested design with sampling subsites of different dimensions, according to the object of study. In UMS, specific information such as the diameter of the tree at breast height (dbh) and the height, species, damage, and severity of the tree; and other dasometric characteristics are included for trees with dbh equal to or greater than 7.5 cm. In the case of vegetation in arid zones, data are recorded on larger individuals (with a height equal to or greater than 25 cm, except for globose life forms where the threshold is 10 cm in height). In the center of each UMS, a circular subplot of 12.56 square meters is established to collect data on trees with dbh less than 7.5 cm and height greater than or equal to 25 cm. Finally, in the center of each UMS, a plot of 1 square meter (1×1 m) is established to collect information on shrubs and other non-tree species, such as grasses, ferns and lichens; Data on soil condition, the presence of organic matter, dead wood and erosion are also recorded. A full description of the field methodology for data collection can be found at:
https://old-snigf.cnf.gob.mx/wp-content/uploads/Resultados%20Hist%C3%B3ricos%20INFyS/2004-2009/Anexos/Anexo%208%20manual%20y%20procedimientos%20para%20el%20muestreo%20de%20campo.pdf

DEVIATIONS FROM THE SAMPLE DESIGN

The UMP were labeled as initial if the information was recorded in the field in its original location, however, when the location conditions of the site do not allow exact positioning and a displacement over latitude or longitude is required, it is labeled as replacement. If labeled as a replacement, it must be located within a distance of no more than 450 m, within the same plant community and never reported as without plant cover.

RESPONSE RATE

Between 2004 and 2009, 79% of the clusters in the national sampling grid were sampled. The clusters that were not sampled were mainly because they were inaccessible; the owners did not grant permission for security reasons, among others (e.g. possession of the property, land or social conflicts).

WEIGHTING

The ratio estimator statistical method is utilized to estimate key forest indicators (such as volume, biomass, carbon stocks, basal area, and tree density, among others), as outlined in Velasco et al. (2003), available at http://cienciasforestales.inifap.gob.mx/index.php/forestales/article/view/882. This method offers data on a per-hectare basis for relevant indicators, using the ratio of two sampled values to estimate a population parameter. In the context of forest inventories, this technique commonly involves using the proportion of sampling units containing a specific attribute of interest (e.g., trees, volume, or basal area) to estimate the total proportion of the population possessing that attribute; information on confidence intervals and the relative sampling error is also provided by this statistical method.
Forest indicators are calculated at the national level by weighin, taking into account the area of each stratum. This ensures that the indicators accurately represent the composition and variability of the entire forest resource across the country.

Data Collection

DATES OF DATA COLLECTION

Start	End
2004-08-10	2007-12-19

DATA COLLECTION MODE

Field measurement [field]

Data Processing

DATA EDITING

Cluster sampling was carried out by companies external to the institution. CONAFOR requires companies to have permanent internal supervision of their personnel in terms of the physical collection of field data and in the capture phase, in such a way that conceptual errors are minimal or non-existent.

CONAFOR also implemented external supervision, which consisted of hiring a company that built 10% of the sampled sites. CONAFOR carried out a statistical analysis of the data from the supervised conglomerates, comparing the parameters obtained with the data from the supervisory company with the data collected previously.

Upon receipt of the information, CONAFOR reviewed and compared the information collected on paper and the same information digitized through a “capture client” prior to being incorporated into the INFyS database. Finally, debugging processes have been applied that allowed the estimation error to be reduced.

Data Appraisal

ESTIMATES OF SAMPLING ERROR

The quantitative data analysis provides important dasometric indicators such as tree density, crown cover, above-ground biomass, carbon stocks, and timber volume. Statistical methods are used to generate reports for these indicators. The estimation of these relevant indicators is based on the ratio estimator (ER) approach, a statistical methodological approach developed to improve the accuracy of average values of relevant forest indicators based on the sampled area (Velasco, et. al., 2003; available at http://cienciasforestales.inifap.gob.mx/index.php/forestales/article/view/882

DATA APPRAISAL

Some issues were encountered during data collection. The main problems included the inaccessibility of primary sampling units, leading to biased estimations of indicators. Errors in field data collection included mainly misidentification of tree species by scientific names, inconsistencies between tree height and diameter, and mislabeling of vegetation types.

Access policy

CONTACTS

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CONFIDENTIALITY

Personal data provided by contacts in the field are confidential and therefore classified as reserved and these are not provided to any person who requests information about the INFyS. The Policy for the Management of Confidentiality in Statistical and Geographic Information (PGCIEG) establishes the general measures that must be implemented to manage the statistical confidentiality of the data provided by the System Informants (SI) under the National Statistical and Geographic Information System (SNIEG). The PGCIEG is mandatory for all State Units responsible for the generation and management of Information of National Interest (IIN), under the SNIEG criteria. PGCIEG is available at https://dof.gob.mx/nota_detalle.php?codigo=5634105&fecha=29/10/2021#gsc.tab=0. CONAFOR is mandated to implement the PCMSIG, as it is the institution responsible for INFyS implementation which was determined as IIN, by an agreement published on May 28, 2014, in the Official Gazette of the Federation, available at https://www.dof.gob.mx/nota_detalle.php?codigo=5346488&fecha=28/05/2014#gsc.tab=0. The PCIEG sets out measures to ensure the confidentiality of the data provided by the system's informants. The policy aims to protect the privacy of informants and ensure that the individual information they provide is kept confidential and used solely for statistical and geographic purposes.

ACCESS CONDITIONS

Data available from an external repository

CITATION REQUIREMENTS

"CONAFOR, (year of consultation). Database of the National Forest and Soils Inventory 2004-2009, Mexico"

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DISCLAIMER

As an authorized end user of the INFYS database, you agree to the following terms:
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Metadata production

DDI DOCUMENT ID

DDI_MEX_2004-2009_INFyS_v01_EN_M_v01_A_ESS_FAO

PRODUCERS

Name	Affiliation	Role
Dissemination and Outreach Team, Statistics Division	Food and Agriculture Organization	Metadata adapted for FAM

DDI DOCUMENT VERSION

MEX_2004-2009_INFyS_v01_EN_M_v01_A_ESS_v01

Data Dictionary

Data file	Cases	Variables