

## **CHAPTER 2**

### **LAND COVER IN MEXICO**

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#### **ABSTRACT**

This document presented information and statistics related to the current land cover situation in Mexico, based on the analysis of the Series III land use and vegetation information (2002-2005) created by the Instituto Nacional de Estadística, Geografía, e Informatics (INEGI). Based on the objective to facilitate interpretation, the information has been divided into nine classes: Grassland, Forest, Tropical Rainforest, Xeric Shrubland, Other vegetation types, Agriculture, Areas without apparent vegetation, Water Bodies, and Human Settlements.

#### **INTRODUCTION**

Due to its geologic evolution and geographic location, Mexico's territory is characterized by contrasting topographic landscapes, variety of climatic regimes, soils and vegetation: ranking it in the top 10 countries with the greatest biological diversity on the planet.

In this context, the geographic information is an essential key for natural resources management of the country, and it should be part of the valuable process that transforms data into knowledge for intelligent decision making.

This document shows a national panorama of the actual state of the land cover of the country that permits the visualization of the current natural resources of Mexico, their distribution and surface extent.

## INFORMATION ON LAND COVER

### *Preceding*

During more than 30 years, The National Institute of Statistics, Geography and Informatics (INEGI) has produced and revised three compatible and comparable versions of the cartographic series of major natural resources features and their national distribution and the principal land uses that are found in Mexico. These cartographic series are:

- Series I (80's decade)
- Series II (90's decade)
- Series III (2002-2005)

The information presented in this document is based on the land use and vegetation information, series III, scale 1:250,000 that correspond to the 2002-2005 period.

### *Classification system*

From this information source, a conceptual and special generalization was developed that should provide a national vision of the land cover. With this purpose 9 major classes were defined:

- Grassland
- Forest
- Tropical Forest
- Xeric Shrubland
- Other vegetation types
- Agriculture
- Areas without apparent vegetation
- Water Bodies
- Human Settlements

Once this information was generalized, it was reprojected from Lambert Conformal conic projection to Albers Equal Area conic projection to assure the most accurate surface measurements of the Mexican land cover.

Below are the definitions, the number of hectares, and the cartographical representation of each of the 9 classes.

### *Grassland*

This class is characterized by the predominance of grasses and graminoids. They are present throughout the entire country, with the majority extensions located on semiarid zones (natural grasslands), or warm climate (cultivated grasslands). Grasslands are most common in level plains or where the topography is slightly undulating, and with less frequency in steep slopes. The main variants of this kind of vegetation are: Natural Grassland, Induced Grassland, and Cultivated Grassland.

### *Area*

*31,179,402 ha*

### *Forest*

This class is characterized by the presence of northern arboreal vegetation, principally from temperate and semi-cold weather regions. It is typical of mountain regions of the country. Based on their physiological and ecological characteristics, this forest class has diversified into a great number of vegetation types. These include: Coniferous Forest, Fir Forest, Pine forest), Oak Forest and Mountain Cloud Forest. Also included are areas that have been modified by diverse activities, where the forest has been altered or degraded (Secondary Forest Vegetation), and the cultivated forest.

### *Area*

*33,920,909 ha*

### *Tropical Forest*

This class is characterized by southern arboreal vegetation, generally found on warm, humid, sub-humid, and sub-dry climates. Commonly present are woody vines, climber vines and epiphytic plants. Besides the primary tropical forest, this class includes areas modified by different activities where the tropical forest is found altered or degraded (Secondary tropical forest vegetation).

*Area*

32,832,640 ha<sup>2</sup>

*Xeric Shrubland*

Xeric vegetation (from the Greek word: dry), is vegetation adapted to live under dry environmental conditions. This class is mainly constituted by shrub and sub-arboreal vegetation that usually present ramifications from the base of the stem and have variable heights, almost always less than 4 meters. It has a broad range, but is mainly distributed in arid and semi arid zones of the country. These types of vegetation include deciduous and evergreen vegetation, inert, semi inert and thorny vegetation forms.

*Area*

57,452,179 ha

*Other types of vegetation*

In this class are included vegetation types that do not correspond to the above mentioned groups, due to specific edaphic, and geographic location features. The following are types of vegetation including on this category:

- Hydrophilic vegetation: Vegetation developed in lowland and swampy regions of the lake bodies, lagoons and coastal zones. Include mangroves, popal, tulares and petenes.
- Riparian vegetation: This includes vegetation that occurs along the margins of rivers and creeks.
- Palm Communities: Associations of unbreached trunk plants that belong to the Palmae family.
- Coastal Dunes Vegetation: Vegetation communities that are established along the coast, and are characterized by the presence of small succulent plants. They are important in preventing erosion by holding the sand in place.
- Mesquite Communities: Vegetation communities dominated mainly by mesquite.

*Area*

5,657,280 ha

*Agriculture*

Mexico is not only characterized by its high biologic diversity. The same ecologic factors that promote this diversity also favor a great mosaic of diverse agro-ecosystems.

This class considers the concepts related to the agricultural land use by humans. The classification considers first the availability of water for crops and perennial crops.

The reported types of agriculture are the following:

- **Irrigated Agriculture:** In this type of agriculture supplementary water is delivered (by pumping or gravity force) to the crops throughout the agricultural cycle. Based on the types of crops the most representative are: Irrigation crops of the El Bajío region, the Sonora agricultural valleys, Sinaloa, Tamaulipas, and the Mexicali valley.
- **Rainfed Agriculture:** In this type of agriculture the development of the crops depends on rain.

*Area*

30,715,897 ha

*Areas without apparent vegetation*

This class includes barren lands, littoral deposits, dunes and riverbanks with or without vegetation that cannot be considered on any other vegetation class.

*Area*

954,149 ha

*Water Bodies*

This class includes all the natural water bodies (rivers, lakes, lagoons), and artificial water bodies (dams, dirt canals, canals) based on the Topographic Map scale 1:250,000, series II.

*Area*

2,475,285 ha

*Human Settlements*

This class includes urban polygons based on the Topographic Maps of 1:250,000-scale. In addition the human settlements, which are areas with urban growth, and suburbs that were adjacent to urban polygons as revised by the land use and vegetation map series III. (2002-2005).

In both cases satellite imagery interpretation was used to update the information.

*Area*

1,249,763 ha

**NATIONAL PANORAMA**

From this generalization of the land cover classes, we can obtain the results of the current national panorama of land cover in Mexico for the 2002-2005 time period: showing their spatial locations and coverage of the major group components.

**CONCLUSIONS**

The management of the data by known information sources and methodologies provides the highest level of confidence for its use.

This information is an important indicator of the land cover condition in our country, and allows the users to acquire trustable data of spatial location and area of each of these land cover types.

The information generalized by only one entity avoids duplicate efforts and erroneous figures that only create confusion and ambiguity when making decisions for the sustainable management of the national territory.

<b>Group</b>	<b>Subgroup</b>	<b>Total by group (ha)</b>
Grassland	Natural Grassland Induced Grassland Cultivated Grassland	31,179,402
Forest	Natural Forest Cultivated Forest	33,920,909
Tropical Forest	Evergreen Rainforest Sub deciduous Rainforest Deciduous Rainforest Thorny Rainforest	32,832,640
Xeric Shrubland	Xeric Shrubland	57,452,176
Other Vegetation Types	Hydrophilic vegetation Gallery vegetation Palm Communities Coastal dunes vegetations Mesquite Communities	5,657,280
Area without apparent vegetation	Areas without apparent vegetation Areas without vegetation	954,149
Human settlements	Human settlements	1,249,763
Water Bodies	Internal Water Bodies	2,475,285
Agriculture	Temporal Agriculture Irrigated Agriculture	30,715,897
<b>TOTAL</b>		<b>196,437,500</b>

Table 1. Land Cover Statistics. Land Use and Vegetation series III, Scale 1:250 000 National Statistics. Primary, Secondary and Induced vegetation conditions are included.

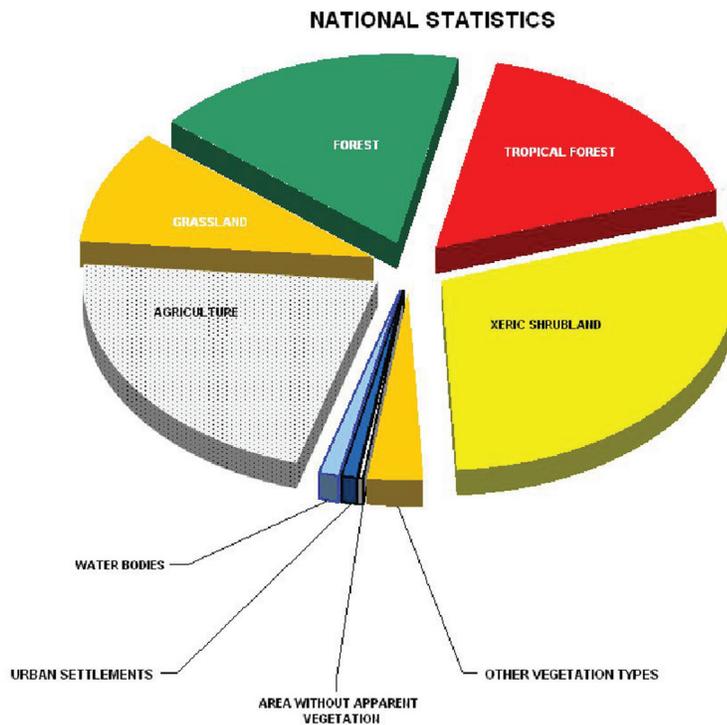


Figure 1. National Distribution of Vegetation Land Cover in Mexico

## REFERENCES

- INEGI. 2005. Conjunto de datos vectoriales. de Uso del Suelo y Vegetación escala 1:250 000, Serie III. México.
- INEGI. 2005. Guía para la interpretación de la cartografía. Uso del Suelo y Vegetación. México.
- INEGI. 2005. Documento metodológico para la generación. De la Información de Uso del Suelo y Vegetación. Serie III. México.

## Notes

<sup>1</sup> Includes primary forest and areas with secondary forest vegetation, and cultivated forest.

<sup>2</sup> Includes primary rainforest and areas with secondary rainforest vegetation.