SEMARNAT
SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES

Executive Summary

State of the Environment Report

MEXICO

2015

Compendium of Environment Statistics, Key Environmental Indicators, Environmental Performance Indicators and Green Growth Indicators

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COMPENDIUM OF ENVIRONMENT STATISTICS, KEY ENVIRONMENTAL INDICATORS, ENVIRONMENTAL PERFORMANCE INDICATORS AND GREEN GROWTH INDICATORS
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PNUD México

The United Nations Development Programme (UNDP), through the UNDP-SEMARNAT projects "Espacios públicos de concertación social para procesos de desarrollo sustentable local" and "Construcción de ciudadanía y espacios de participación para el desarrollo sustentable", provided partial support for this work in order to increase the amount and improve the quality and accessibility of environmental information in Mexico.

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Abbreviations

AMM	Monterrey Metropolitan Zone
ANP	Protected Natural Areas
BAU	Business as usual
BOD5	5-day Biochemical Oxygen Demand
CNA	National Water Commission
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COD	Chemical Oxygen Demand
CONABIO	National Commission for the Knowledge and Use of Biodiversity
CONAFOR	National Forestry Commission
CONAGUA	National Water Commission
CONANP	National Commission for Protected Natural Areas
CONAPO	National Population Council
CONEVAL	National Council for the Evaluation of Social Development Policy
CP	Agricultural Post-graduate School
DGEIA	Direction General for Environmental Information and Statistics
DGGIMAR	Direction General for the Integrated Management of Hazardous Waste and Activities
GDP	Gross Domestic Product
GHG	Greenhouse Gas
HW	Hazardous Waste
INAH	National Institute for Anthropology and History
***i*NDC**	Intended Nationally Determined Contributions
IMT	Mexican Institute for Transport
INECC	National Institute for Ecology and Climate Change
INEGI	National Institute for Statistics and Geography
LULUCF	Land-use, land-use change and forestry
MSW	Municipal Solid Waste
Mt	Megatonnes
NASA	National Aeronautics and Space Administration
NO_2	Nitrogen Dioxide
O_3	Ozone
PACE	Programme of Action for Species Conservation
PECC	Special Programme for Climate Change

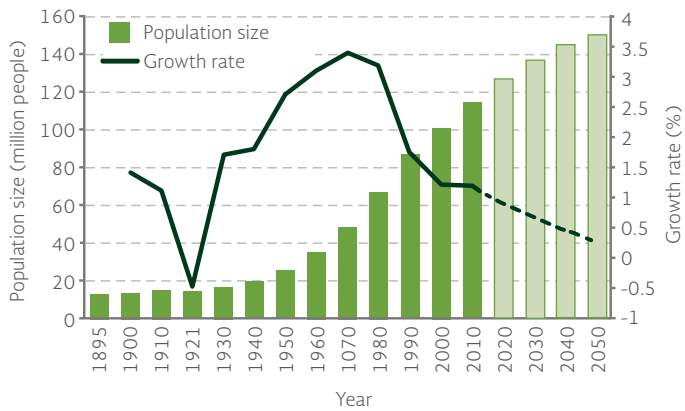
PGRP	National Registry of Hazardous Waste Generators
PM10	Particulate matter 10 micrometers or less in diameter
PM2.5	Particulate matter 2.5 micrometers or less in diameter
Procer	Programme for the Conservation of Species at Risk
ProAire	Management Programme to Improve Air Quality
Pronafor	National Forestry Programme
PSA-CABSA	Environmental ServicesProgramme for Carbon Capture, Biodiversity Conservation and Agroforestry Systems
REPDA	Public Registry of Water Rights
SAO	Ozone Depleting Substances
SARH	Ministry of Agriculture and Water Resources
SCT	Ministry of Transport and Communications
SEDESOL	Ministry of Social Development
SEMARNAP	Ministry of the Environment, Natural Resources and Fisheries
SEMARNAT	Ministry of the Environment and Natural Resources
SINA	National System of Water Resources Information
SO_2	Sulphur Dioxide
SST	Total Suspended Solids
TCRDED	Total Cost of Resource Depletion and Environmental Degradation
UACh	Autonomous University of Chapingo
UMA	Wildlife Conservation Management Units
UNAM	Mexico National Autonomous University
UNFAO	Food and Agriculture Organization of the United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WWF	World Wildlife Fund
ZMG	Guadalajara Metropolitan Zone
ZML	Leon Metropolitan Zone
ZMM	Monterrey Metropolitan Zone
ZMO	Oaxaca Metropolitan Zone
ZMQ	Queretaro Metropolitan Zone
ZMSLP	San Luis Potosi Metropolitan Zone
ZMT	Tijuana Metropolitan Zone
ZMVM	Mexico City Metropolitan Zone
ZMVT	Toluca Metropolitan Zone

Population and the environment

Population size has been one the driving forces most frequently mentioned to account for overexploitation of natural resources and environmental degradation. However, it is recognized that population growth per se is not the only factor determining the extent of stress exerted on the environment and natural resources. The society's economic consumption capacity is also a major driver, as is the technical efficiency with which resources are used in the production of goods. Other variables such as inequality, urbanization level and the regulatory and institutional framework also affect the dynamics of environmental stress drivers.

- The Mexican population is still growing, with a trend towards an increasing concentration in urban areas. In 2015 the population reached 119.9 million people. In the same year, the 59 metropolitan areas harbored 68.1 million inhabitants (56.98% of the population at a national level). The country's population is expected to continue growing up to 150.8 million by 2050.

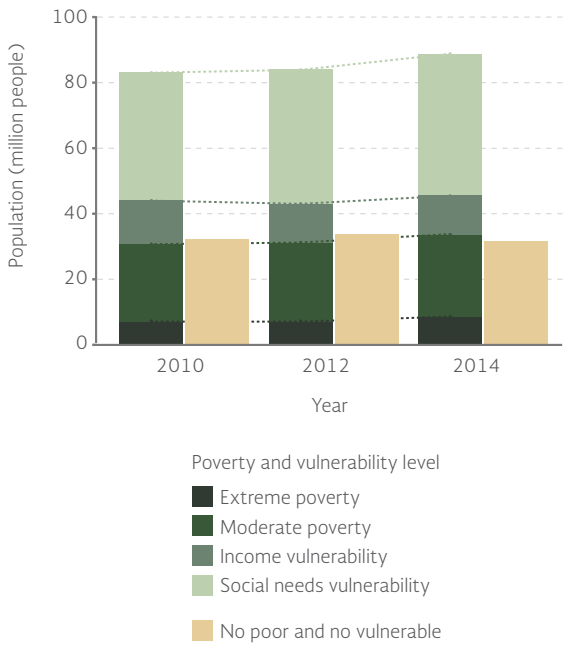
1 *Population size and growth rate in Mexico, 1895 - 2050*[1]



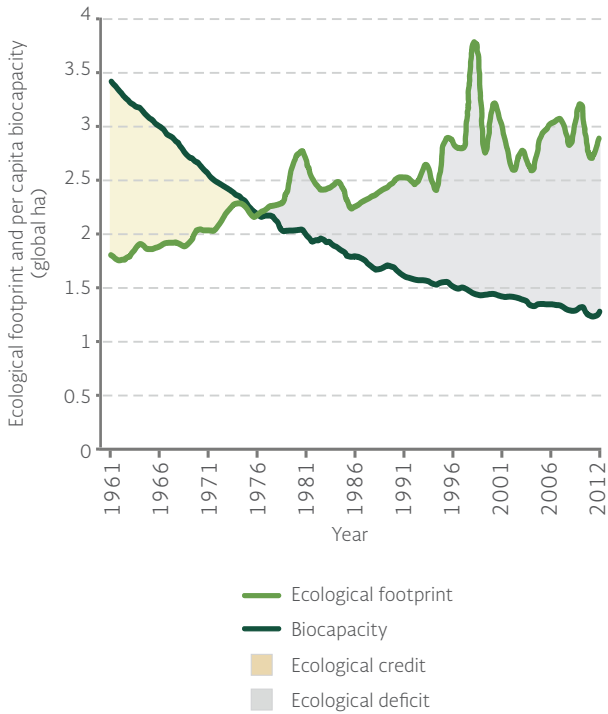
Note:
[1] Dashed lines and light-coloured bars denote projections.

- A high percentage of the population live in poverty, especially in rural areas. In 2014 there were 55.34 million poor people, i.e., 46.2% of the population of that year; 11.44 million of them, i.e, 9.5% of the Mexican population, were living in extreme poverty.

2 *Population per poverty and vulnerability levels in Mexico, 2010 - 2014*



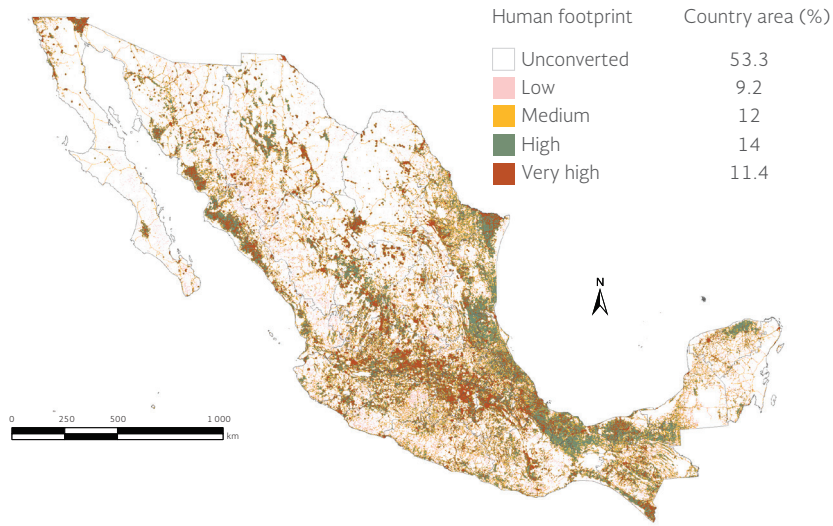
3 *Ecological footprint and per capita biocapacity in Mexico, 1961 - 2012*



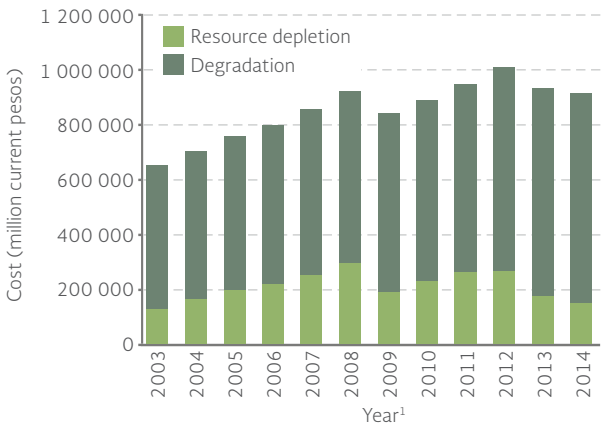
- Mexico's ecological footprint in 2012 was 2.9 global hectares per person, while the country's biocapacity was only 1.3 global hectares, representing a deficit of 1.6 global hectares. The major component of the Mexican ecological footprint is the surface area required to absorb the amount of CO_2 emitted from burning fossil fuels (which accounts for 60.2% of the ecological footprint).

4 | *Human footprint in Mexico*

By 2011, there was no visible impact of human activities on 53.3% of the country's area. By contrast, 11.4% of the territory showed a substantial human footprint, particularly concentrated in parts of the central and southeastern states as well as in the northwest coastal zone facing the Gulf of California.



5 | *Total cost of resource depletion and environmental degradation (TCRDED) in Mexico, 2003 - 2014*



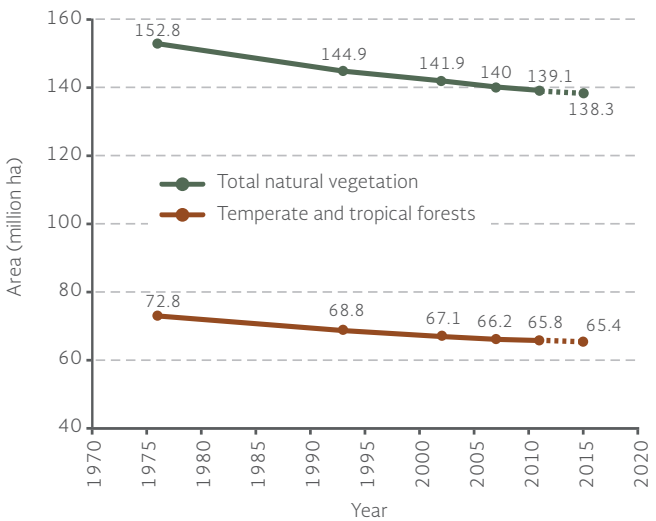
Note:
[1] Figures for 2013 and onwards are preliminary .

The total costs of resource depletion and environmental degradation (TCRDED) dropped from 1 003 billion pesos to 911 billion pesos between 2012 and 2014, i.e. a 9.2% decrease. TCRDED amounted to 5.3% of GDP in 2014. Degradation costs accounted for 83.5% of TCRDED in 2014 (those derived from air pollution being the most important ones). The depletion of hydrocarbons represented 70% of the total costs of resource depletion, followed by the depletion of water (20%) and forest (10%) resources.

Terrestrial ecosystems

Mexico harbours a wide diversity of natural communities across its mainland and insular territory. However, since the mid-twentieth century, intense degradation processes and loss of terrestrial ecosystems have been taking place. In order to prevent and, if possible, revert this situation, several public policies for the conservation of the remnant natural vegetation cover, restoration of ecosystems and sustainable use of natural resources have been implemented.

6 | *Changes in the area covered by all natural vegetation types[1] and by temperate and tropical forests[2], 1976[3] - 2015[4]*



- By 2011, approximately 71.7% (almost 140 million ha) of the country's area was still covered by natural plant communities with varying degrees of conservation. Projections based on the average change rate indicate that in 2015 the area covered by natural vegetation decreased to just over 138 million hectares (approximately 71% of the country's total area).

Notes:

[1] Includes temperate forests, mountain cloud forests, humid and subhumid tropical forests, mangrove forests, shrublands, natural grassland, hydrophylous vegetation, halophytic vegetation, gypsum vegetation and other types of vegetation.

[2] Estimated using the formula $r = (((s_2/s_1)^{(1/t)}) \times 100)-100$, where r is the rate, s_2 and s_1 are the areas covered at the end and the start of the period, respectively, and t is the length of the period.

[3] Values assigned for the year 1976 were obtained from aerial photographs recorded over the course of the 1970's decade.

[4] Dashed lines denote projections for the period 2011 - 2015. Projections were obtained from the mean change rate in land use between INEGI's Series IV and V.

- The loss and degradation of natural vegetation still persists, albeit at a slower pace than in the past. Between 2007 and 2011, some 214 thousand hectares of natural vegetation were lost every year, significantly less than the 490 thousand hectares per year recorded between 1976 and 1993. Projections show that between 2011 and 2015, the rate of natural vegetation loss was in the order of 121 thousand hectares per year.

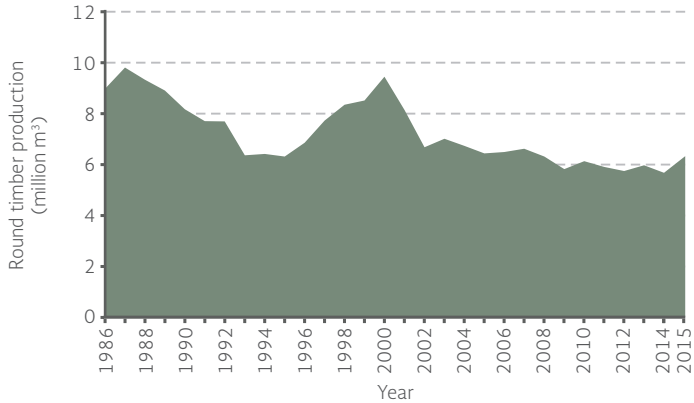
- The latest estimate of countrywide deforestation reported by Mexico to UNFAO, the net deforestation rate between 2000 and 2010 was 136 thousand hectares per year, whereas 92 thousand hectares per year were reported for the period 2010-2015. This shows a significant reduction in the area that is annually deforested in Mexico.

- Tropical forests are the ecosystems with the highest conversion rate in Mexico. Between 2007 and 2011 some 97 thousand hectares were converted to other land uses every year on average, and 35 thousand hectares were subjected to degradation processes. Temperate forests lost about 21 thousand hectares over the same period of time, at a rate of about 5 300 hectares annually, and 1 500 hectares were degraded.

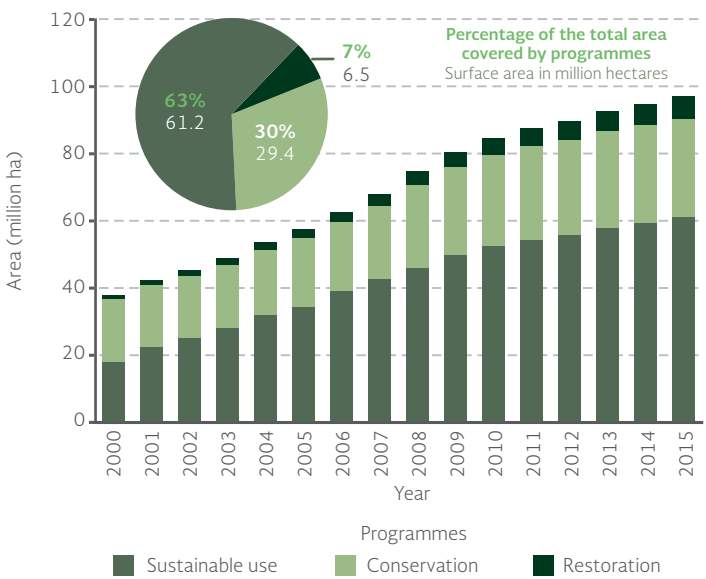
- The areas devoted to agriculture and livestock ranching continue to expand, although at a slower pace. Between 2007 and 2011, the area dedicated to these activities increased by about 124 thousand hectares per year, a significant reduction compared to the 368 thousand hectares per year estimated for the period 1976-1993. The advance of the agricultural frontier has been faster than the conversion to pastureland: 81% of the increase in the area devoted to agriculture and livestock ranching from 2007 to 2011 was due to the change in land use to agriculture.

- Between 1986 and 2015, the mean annual production of round timber was 7.2 million cubic meters, but it has been steadily declining over the past 15 years. The mean production during 2000-2015 was about 17% lower than the average recorded between 1986 and 1999.

7 *Timber production in Mexico, 1986 - 2015*



8 *Area covered by programmes aimed to the conservation, sustainable use or restoration of terrestrial ecosystems, 2000 - 2015*[1]



- The federal policy instruments focused on conservation (Protected Natural Areas and others), sustainable use (for example, Environmental Management Units) and restoration (reforestation and others) of terrestrial ecosystems have covered, a total cumulative area of 97 million hectares until 2015 (about 50% of the country's mainland area).

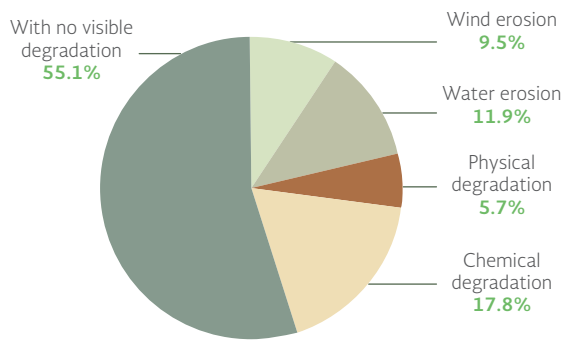
Note:
[1] There exists partial overlap between the programmes; by this fact, the actual total area covered by the three types of programmes could by lower than the total area mentioned in the text.

Soils

Soil is a key element that sustains life on Earth. Besides providing physical support and habitat for vegetation, infrastructure and biodiversity, it is an essential component for the functioning of any ecosystem. Soil, like forests, water, and even mineral deposits, is a finite resource that is part of the natural strategic capital of any country. However, despite supporting many agricultural economies in the world, it is under an increasing degradation stress as a result of population growth and unsustainable global production and consumption patterns.

- Results from the latest soil degradation assessment for Mexico reveal that in 2002, 44.9% of soils had been degraded to some extent. Chemical degradation was the process that affected the largest area (34 million hectares, 17.8% of the country's area), followed by hydric erosion (22.7 million hectares, 11.9%), wind erosion (18.1 million hectares, 9.5%), and, finally, physical degradation (10.8 million ha, 5.7%).

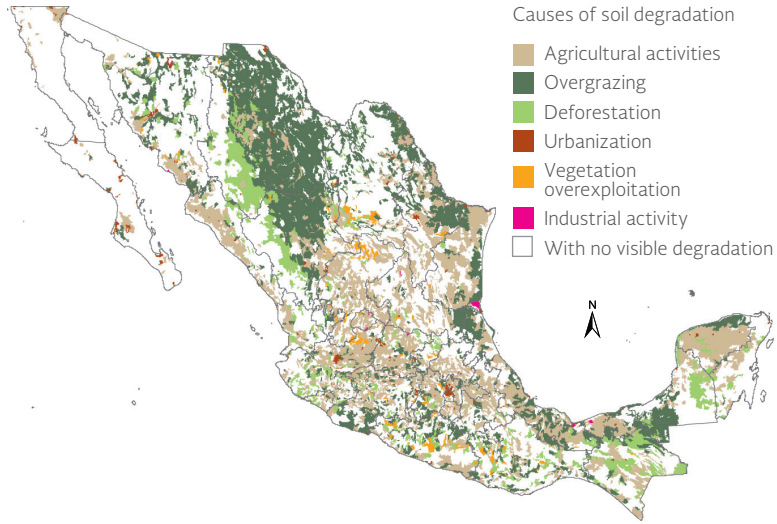
9 | *Relative area affected by soil degradation processes in Mexico, 2002*[2]



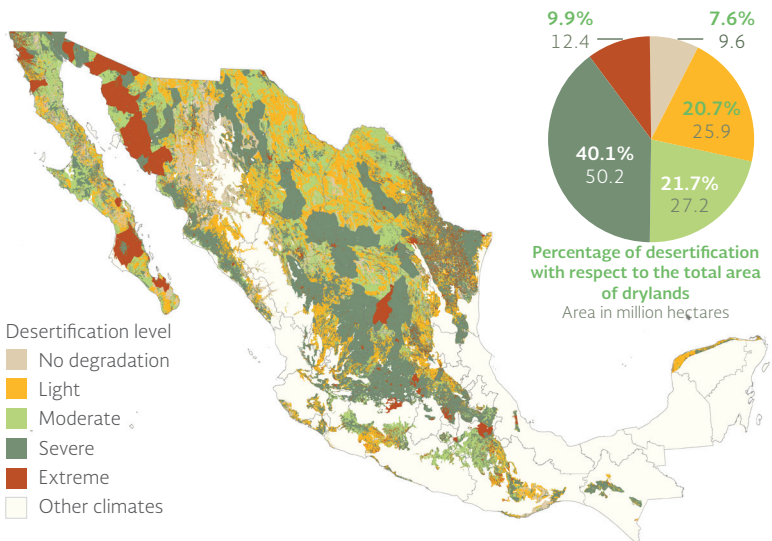
Notes:
[1] Percentages do not add to 100% due to rounding errors.
[2] The country's total area considered was: 1 909 818.5 km² and does not include water bodies, human settlements, urban areas, zones without vegetation and islands.

10 | *Main causes of soil degradation in Mexico, 2002*

- About 77.4% of the country's degraded soils were associated with agriculture and livestock ranching (38.7% each); 16.4%, with deforestation and vegetation removal. The rest of the country's degraded soils (about 5.3 million ha, 6.1% of the total degraded area) were due to urbanization, overexploitation of vegetation and industrial activities.



11 | *Desertification level in Mexican drylands*[1]

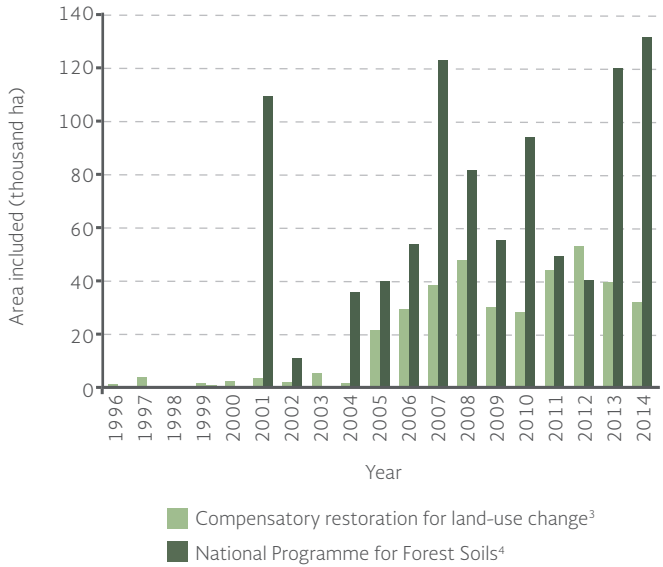


- Mexico possesses about 125.3 million hectares of drylands (65% of the country's area). According to the Land Degradation and Desertification Baseline assessment (2013), about 92.4% of the country's drylands (125.3 million hectares, 64% of the country's area) show evidence of some degree of desertification: 9.9% extreme, 40.1% severe, and 42.4% slight or moderate.

Note:
[1] Delimitation based on the Aridity Index calculated using the Penman's method.

- The surface area included in the government's programmes for Environmental Compensation for Land Use Change in Forest Lands and the National Forestry Programme, both implemented by the National Forestry Commission (CONAFOR), was 163 100 hectares in 2014, or 0.2% of the country's area affected by soil degradation (85.7 million hectares).

12 *Area under institutional soil conservation and restoration programmes , 1996 - 2014*[1,2]



Notes:

[1] Data are not available for all the years reported for all the programmes because each programme's operation depends on the design and agreement on the allocation of resources. Budgetary resources for the period 2001–2006 were devoted to the "Soil conservation and restoration strategy" under the National Forestry Programme. For the period 2007–2012, the resources were allocated to the "Soil conservation" and "Soil restoration" lines under the ProÁrbol programme. The 2013 resources were allocated to Component III "Conservation and Restoration" of the Pronafor programme. The 2014 funds were devoted to Component III "Productive reconversion and forest restoration" under the Pronafor programme.

[2] Surface areas reported are not cumulative across years as producers might enter, withdraw or renew their participation in the programme, according to their interest or compliance with the programme's requirements.

[3] Surface area that has to be compensated for because of the total or partial removal of vegetation from forested lands to be converted to non-forest activities.

[4] Aimed to support actions and projects for the recovery of forest coverage and the conservation or restoration of soils located in watersheds with forested or potentially forested lands with some level of degradation.

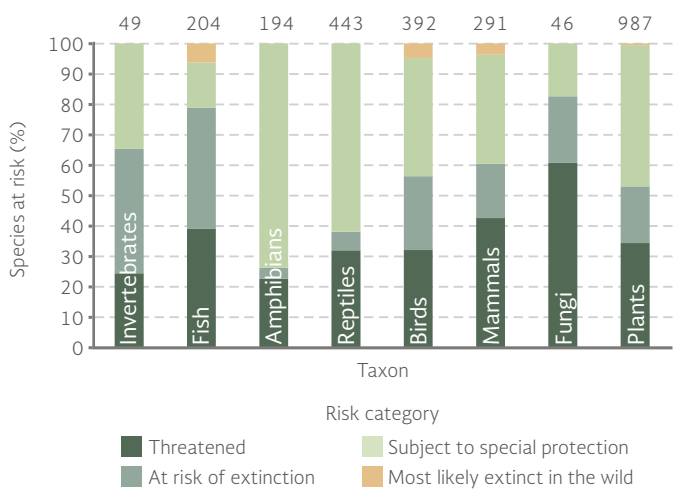
Biodiversity

Biodiversity loss of is one of the major environmental challenges that man currently faces. Human activities have radically altered the structure and functioning of ecosystems. In some instances, this has led many species to become endangered of extinction and has compromised several of the environmental services supplied by ecosystems.

For many countries, including Mexico, biodiversity loss is particularly important because they are home to the major centres of biological diversity on Earth: The 15 mega-diverse countries jointly concentrate between 60% and 70% of the global biodiversity.

- According to the Mexican standard NOM-059-SEMARNAT-2010, 51.3% (443 species) of the reptile species known in Mexico are facing some risk of extinction, followed by 51.6% (194 species) of amphibians, 51.6% (291) of mammals, and 34.1% (392 species) of birds. The lowest numbers of species at risk are found in fish (7.4%, 204 species) and vascular plants (3.4%, 987 species).

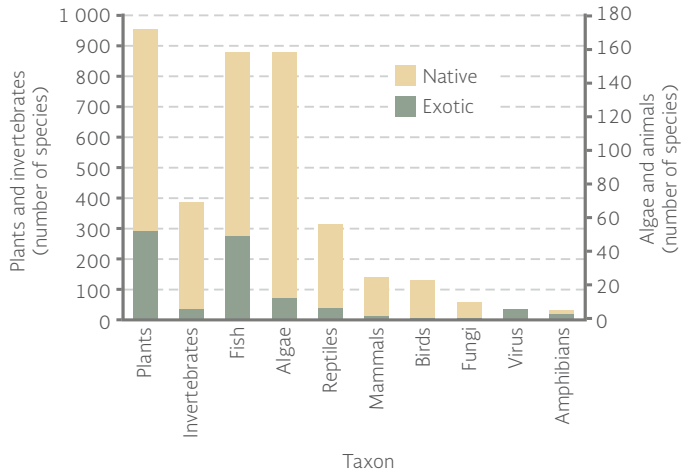
13 | *Distribution of species per risk[1] category for the major taxa, according to Mexican standard NOM-059-SEMARNAT-2010*



Note:
[1] Figures on the bars are the total number of at-risk species in each taxon, as per the standard NOM-059-SEMARNAT-2010.

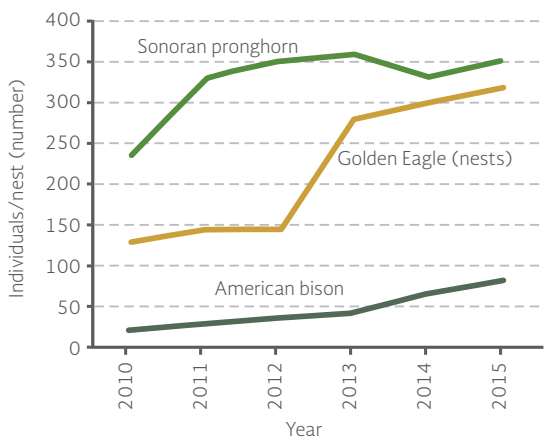
According to the National Commission for the Knowledge and Use of Biodiversity (CONABIO), some 1 789 native and non-native invasive species had been reported in 2015 in the country, as follows: 53.7%, plants (960 species); 21.7%, invertebrates (388 species); 8.8%, fish and algae (158 species each); and 3.1%, reptiles (56 species). At the same time, other 157 non-native species have been reported as posing a potential risk of being introduced to the country, although not yet reported in Mexico; these include the giant African snail (*Achatina fulica*) and the giant hogweed (*Heracleum mantegazzianum*).

14 | *Native and exotic invasive species present in Mexico[1], 2015*



Note:
[1] Native species are Mexican species that have been translocated and become invasive. Exotic species are species non-native from Mexico.

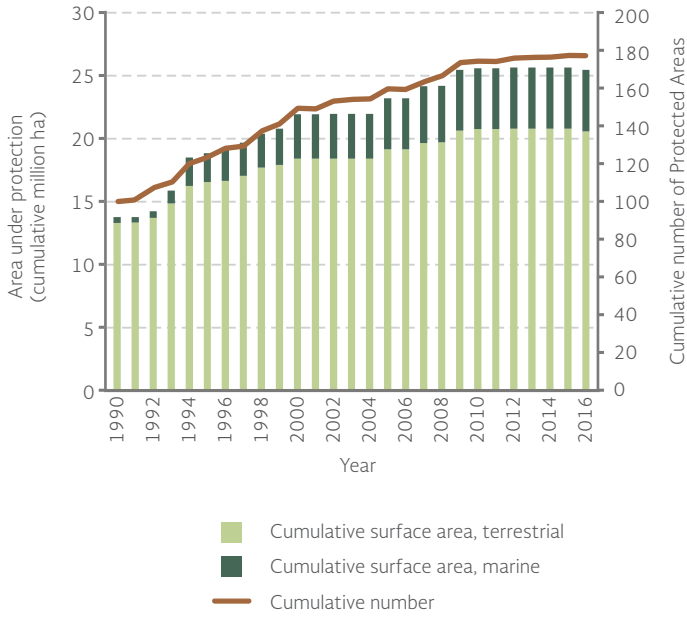
15 | *Population size of select species included in the PROCER programme*



The Programme for the Conservation of Species at Risk (PROCER) aims to the recovery of species at risk. For each of the species included in PROCER, a Programme of Action for Species Conservation (PACE) is designed and executed, including strategies, activities and specific actions for the short-, mid- and long-term conservation, protection and recovery of wildlife populations. Currently, 45 species at risk are covered by PROCER, including sea turtles, jaguar, California condor and vaquita. Some of the major achievements of PROCER are the recovery of wild populations of the Mexican wolf, the golden eagle, the American bison and the Sonoran pronghorn.

- By July 2016, the federal Protected Areas covered just over 12% of the country area, encompassing most of the country's ecosystems. Mexico's 177 federal protected areas cover 25.43 million hectares, 20.57 million in terrestrial areas and just over 4.86 million in marine areas.

16 | *Historic development of federal Protected Areas in Mexico, 1990 - 2016*[1]

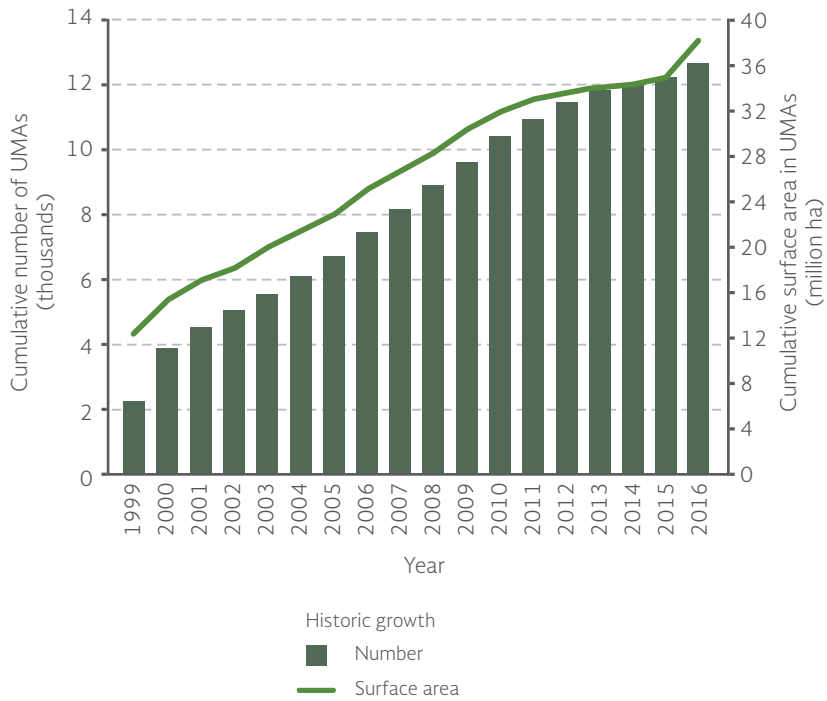


Note:
[1] Preliminary data as of the 30th of June.

- Mexico's payment for environmental services programmes (Programme for Environmental Hydrological Services, PHES, and the Environmental Services Programme for Carbon Sequestration, Biodiversity Conservation and Agroforestry Systems, PSA-CABSA, in Spanish) comprised some 4.91 million hectares in December 2015. These programmes mainly benefit temperate, mountain cloud and tropical forests.

- By June 2016, 12,649 Wildlife Conservation Management Units (UMAs in Spanish) were in operation, encompassing over 38.01 million hectares (about 19.3% of the country's area). Among the UMAs in operation, 9 893 were devoted to free-ranging management and 2 756 to intensive management.

17 *Historic development of the Wildlife Conservation Management Units (UMAs) in Mexico, 1999 - 2016*[1]



Note:
[1] Preliminary data as of the 30th of June.

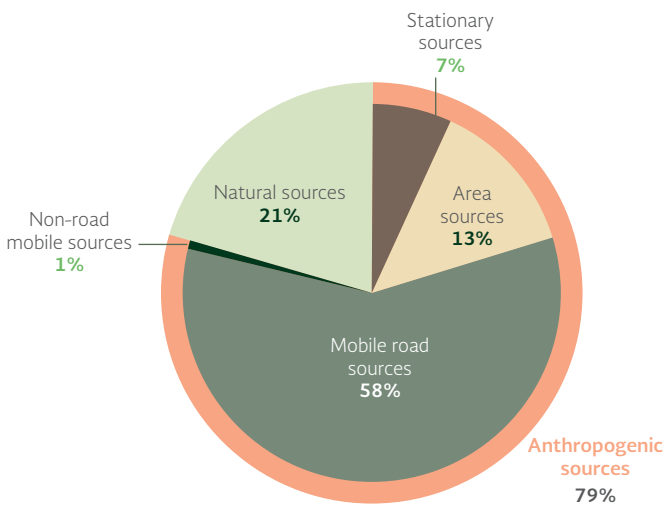
Atmosphere

A huge amount of substances derived from human activities are continuously released to the atmosphere. Although some of those may break down in the atmosphere, are deposited (on land or oceans) or become incorporated into biogeochemical cycles, the increasing emissions of pollutants have caused some of the major environmental problems we face today: depletion of the stratospheric ozone layer, climate change and poor air quality in urban areas.

AIR QUALITY

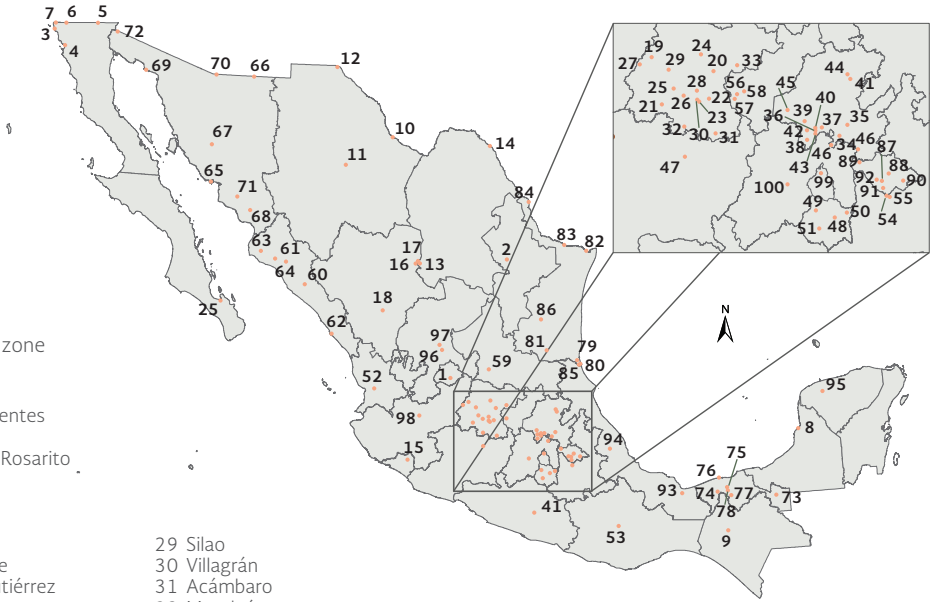
- According to the latest National Emissions Inventory, some 59 million tonnes of pollutants were emitted in 2008 at a national level. Emissions from natural sources accounted for 21% of the pollutants and those from anthropogenic sources for the remaining 79%. The largest volume of anthropogenic pollutants was emitted by mobile road sources (58%), followed by area sources (13%), stationary sources (7%) and non-road mobile sources (1%).

18 *Countrywide pollutants emissions per type of source*



- Until 2015, equipment for measuring air pollutants had been installed in 29 Mexican states, with a total of 243 monitoring stations.

19 | *Metropolitan zones or towns with air quality monitoring equipment in place, 2015*[1]



Metropolitan zone or town

1 Aguascalientes
2 AMM
3 Playas de Rosarito
4 Ensenada
5 Mexicali
6 Tecate
7 Tijuana
8 Campeche
9 Tuxtla Gutiérrez
10 Ojinaga
11 Chihuahua
12 Juárez
13 Torreón
14 Acuña
15 Villa de Álvarez
16 Lerdo
17 Gómez Palacio
18 Durango
19 León
20 San Miguel de Allende
21 Abasolo
22 Celaya
23 Cortazar
24 Dolores Hidalgo
25 Irapuato
26 Salamanca
27 San Francisco del Rincón
28 Juventino Rosas
29 Silao
30 Villagrán
31 Acámbaro
32 Moroleón
33 San José Iturbide
34 Zapotlán de Juárez
35 Pachuca de Soto
36 Atitalaquia
37 Ajacuba
38 Tepeji del Río de Ocampo
39 Tepetitlán
40 Tlaxcoapan
41 Xochicoatlán
42 Tula de Allende
43 Atotonilco de Tula
44 Lolotla
45 Huichapan
46 Tepeapulco
47 Morelia
48 Cuautla
49 Cuernavaca
50 Ocuituco
51 Zacatepec de Hidalgo
52 Tepic
53 Oaxaca de Juárez
54 Cuautlancingo
55 Puebla
56 Querétaro
57 Corregidora
58 El Marqués
59 San Luis Potosí
60 Culiacán
61 Guasave
62 Mazatlán
63 Ahome
64 Salvador Alvarado
65 Guaymas
66 Agua Prieta
67 Hermosillo
68 Navojoa
69 Puerto Peñasco
70 Nogales
71 Cajeme
72 San Luis Río Colorado
73 Balancán
74 Huimanguillo
75 Nacajuca
76 Paraíso
77 Teapa
78 Centro
79 Altamira
80 Ciudad Madero
81 El Mante
82 Matamoros
83 Reynosa
84 Nuevo Laredo
85 Tampico
86 Ciudad Victoria
87 Tlaxcala
88 Apizaco
89 Calpulalpan
90 Huamantla
91 Santa Cruz Quilehtla
92 Ixtacuixtla de Mariano Matamoros
93 Minatitlán
94 Xalapa
95 Mérida
96 Guadalupe
97 Zacatecas
98 ZMG
99 ZMVM
100 ZMVT

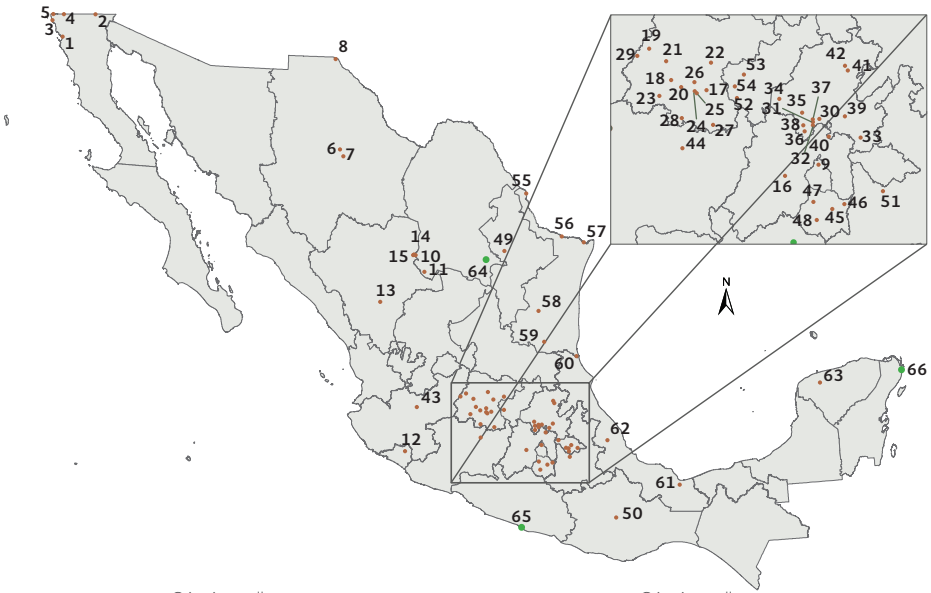
Note:
[1] Data as of October 2015.

20 | *Compliance with air quality standards in metropolitan zones and towns in Mexico, 2014*

- Metropolitan zone or town **with** monitoring equipment in place
- Locality with over 500 thousand inhabitants **without** monitoring equipment in place

Compliance with air quality standards

- In compliance
- Not in compliance
- Not applicable
- Monitoring equipment for this pollutant is not available
- Invalid data



Criterion pollutant

	PM_{10}	$PM_{2.5}$	O_3	SO_2	NO_2	CO	
Baja California							1 Ensenada
							2 Mexicali
							3 Rosarito
							4 Tecate
							5 Tijuana
Chihuahua							6 Chihuahua estatal
							7 Chihuahua municipal
							8 Ciudad Juárez
Cd. México							9 ZMVM
Coahuila							10 Torreón estatal
							11 Torreón municipal
Colima							12 Colima
Durango							13 Durango
							14 Gómez Palacio
Edo. Mex.							15 Lerdo
							16 ZMVT
							17 Celaya
Guanajuato							18 Irapuato
							19 León
							20 Salamanca
							21 Silao
							22 San Miguel de Allende
							23 Abasolo
							24 Villagrán
							25 Cortazar
							26 Juventino Rosas
							27 Acámbaro

Criterion pollutant

	PM_{10}	$PM_{2.5}$	O_3	SO_2	NO_2	CO	
Guanajuato							28 Moroleón
							29 San Fco. del Rincón
							30 Ajacuba
Hidalgo							31 Atitalaquia
							32 Atotonilco
							33 Tepeapulco
							34 Huichapan
							35 Tepetitlán
							36 Tepeji del Río
							37 Tlaxcoapan
							38 Tula de Allende
							39 Pachuca
							40 Tizayuca
							41 Xochicoatlán
							42 Lolotla
Jalisco							43 ZMG
Michoacán							44 Morelia
							45 Cuautla
Morelos							46 Ocuituco
							47 Cuernavaca
							48 Zacatepec

Criterion pollutant

	PM_{10}	$PM_{2.5}$	O_3	SO_2	NO_2	CO	
Nuevo León							49 AMM
Oaxaca							50 Oaxaca
Puebla							51 Puebla
							52 Corregidora
Querétaro							53 El Marqués
							54 Querétaro
							55 Nuevo Laredo
							56 Reynosa
Tamaulipas							57 Matamoros
							58 Victoria
							59 El Mante
							60 Tampico
Veracruz							61 Minatitlán
							62 Xalapa
Yucatán							63 Mérida
Coahuila							64 Saltillo
Guerrero							65 Acapulco de Juárez
Quintana Roo							66 Benito Juárez

- In 2014, the Mexican cities that failed to meet air quality standards for up to three criteria pollutants (PM_{10}, $PM_{2.5}$ and O_3) were AMM (Nuevo Leon State), ZMG (Jalisco State), ZMVT (State of Mexico), MCMA (Mexico City, State of Mexico and Hidalgo State), Mexicali (Baja California State), Torreón and Lerdo (Coahuila State), Salamanca (Guanajuato State), Tepeapulco and Huichapan (Hidalgo State), Puebla City (Puebla State) and Minatitlán and Xalapa (Veracruz State).

- Management Programmes to Improve Air Quality (ProAire) include specific actions to reduce and control emissions, focusing on the major emission sources. In June 2016 fourteen ProAire were in operation and six others under development. The ProAire currently in operation benefit some 66.7 million people.

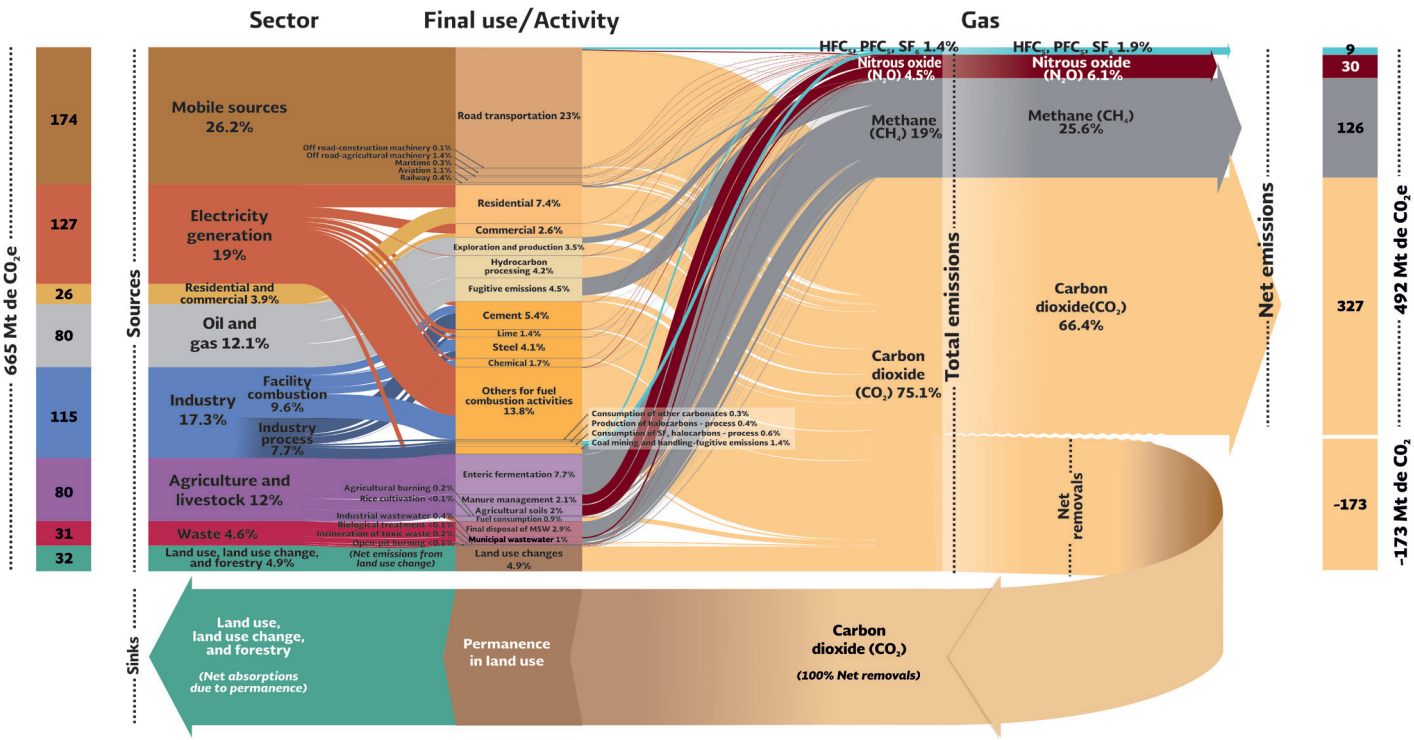
21 | *ProAire programmes in place or under development, 2016*

Towns or metropolitan zones

1 Chihuahua
2 Colima
3 Durango
4 Hidalgo (2014-2023)
5 Jalisco (2011-2020)
6 Mexicali (2011-2020)
7 Michoacán (2015-2024)
8 Nogales
9 Nuevo León
10 Puebla (2012-2020)
11 Salamanca-Celaya-Irapuato (2014-2022)
12 Tlaxcala (2014-2023)
13 Veracruz
14 ZML (2013-2022)
15 ZMO (2014-2023)
16 ZMQ-San Juan del Río (2014-2023)
17 ZMSLP-Soledad de Graciano Sánchez (2013-2021)
18 ZMT (2012-2020)
19 ZMVM (2011-2020)
20 ZMVT (2012-2017)

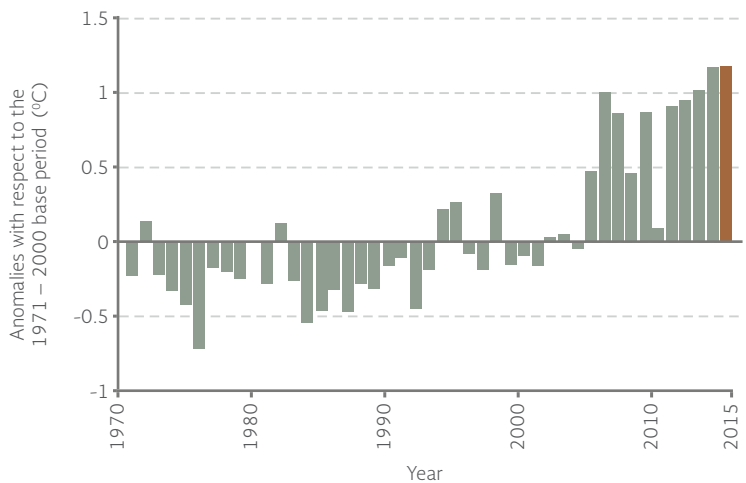
According to the 2013 National Greenhouse Gas Emissions Inventory, total emissions in the country amounted to 665 Mt CO_2e. Mobile sources, particularly road transport (26.2%), and power generation (19%) were the sectors that most contributed to total emissions. Second in importance were the industrial (17.3%), oil and gas (12.1%) and agriculture (12%) sectors. As for black carbon, in 2013 a total of 125.1 Gg were generated in the country. Mobile sources were the sector that contributed the most (37.8%), followed by industry (28.3%), mainly from bagasse burning in sugar mills, and the residential and trade (15.2%) sectors.

22 | *Countrywide emissions of greenhouse gases per sector, 2013*



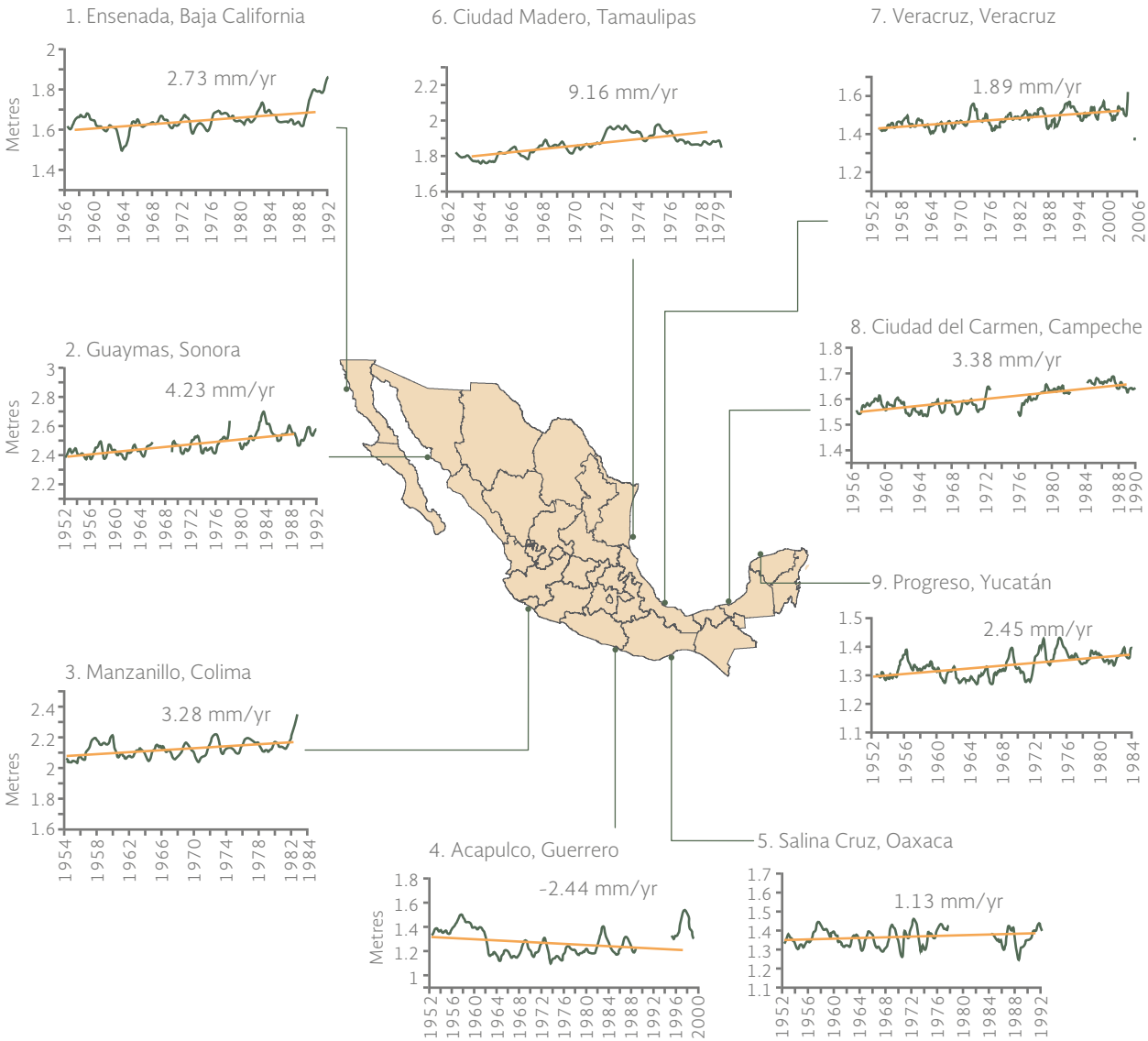
- Like other countries, Mexico is already facing the impacts of climate change. The most important changes recently observed in the country include a temperature increase (0.85 °C on average over the last fifty years) and the rise in the sea level (which has reached between 1.79 and 9.16 mm/year in some parts of the Gulf of Mexico, and between 4.23 and 3.28 in the Pacific), as well as several impacts on biodiversity and changes in the patterns of extreme weather events.

23 | *Annual temperature anomalies, 1971 - 2015*[1]



Note:
[1] The brown-coloured bar denotes the estimated anomaly for 2015.

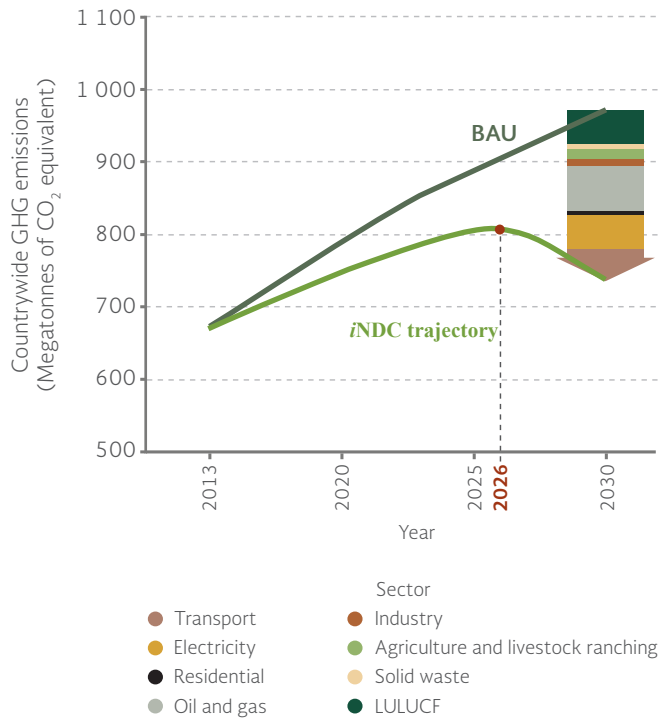
24 | *Sea level variations at select Mexican coastal locations*



- Mexico stands out for its efforts to address global climate change. The passing and adoption of the General Law for Climate Change (2012), the National Climate Change Strategy Vision 10-20-40 and the Special Programme for Climate Change (PECC 2014-2018) are among the main examples.

  In March 2015, the Mexican government submitted its Intended Nationally Determined Contribution (*i*NDC) for the period 2020-2030 to the United Nations Framework Convention on Climate Change. The mitigation goal for 2030 is to achieve a 22% reduction in GHG emissions and a 51% reduction in black carbon. It is anticipated that by 2024, 35% of the country's energy generation will come from clean sources, and 43% by 2030. With regard to adaptation to climate change, the key goals are to achieve a 50% reduction in the number of vulnerable municipalities (160 municipalities) and a zero deforestation rate by 2030, as well as to install early warning and risk management systems at the three levels of government.

25 *Countrywide GHG emissions under the BAU scenario and reductions committed in the iNDC, 2013 - 2030*



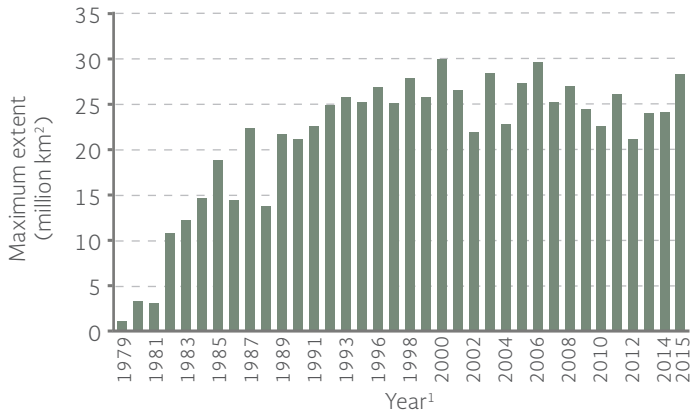
- Mexico signed the Paris[1] Agreement, a binding agreement in which all UNFCCC member countries participate and which, under the principle of equity and common but differentiated responsibilities, and according to their respective capabilities and in light of the different national circumstances, mainly seeks to: 1) contain the temperature increase well below 2 °C above pre-industrial levels, continuing the efforts to limit the increase to 1.5 °C; and 2) reach a global peak in greenhouse gas emissions as soon as possible and, thereafter, reduce them rapidly during the second half of this century.

[1] Mexican Senate ratified the COP21 agreement on September 2016.

STRATOSPHERIC OZONE

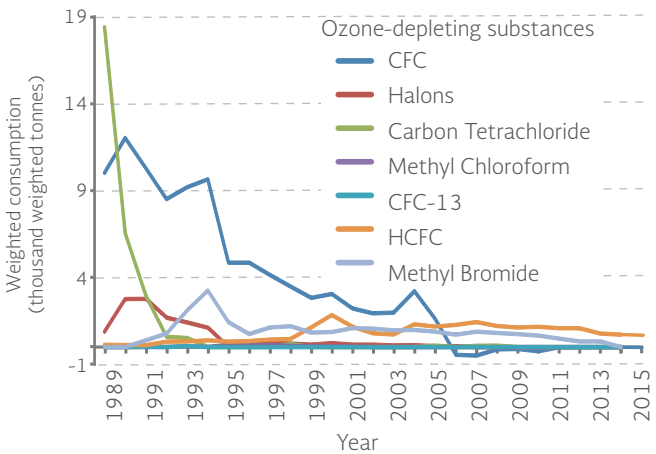
- The maximum extension reached by the ozone hole in 2015 was 28.2 million square kilometers, or about 1.9 times the surface of Antarctica.

26 | *Maximum extent of the Ozone hole, 1979 - 2015*[1]



Note:
[1] No data available for the year 1995.

27 | *Weighted[1] countrywide consumption of Ozone-depleting substances, 1989 - 2015*



Note:
[1] Consumption is calculated as the sum of production plus imports minus exports. Consumption figures are negative when exports exceed production. Net consumption is weighted by the Ozone depletion potential of each substance.

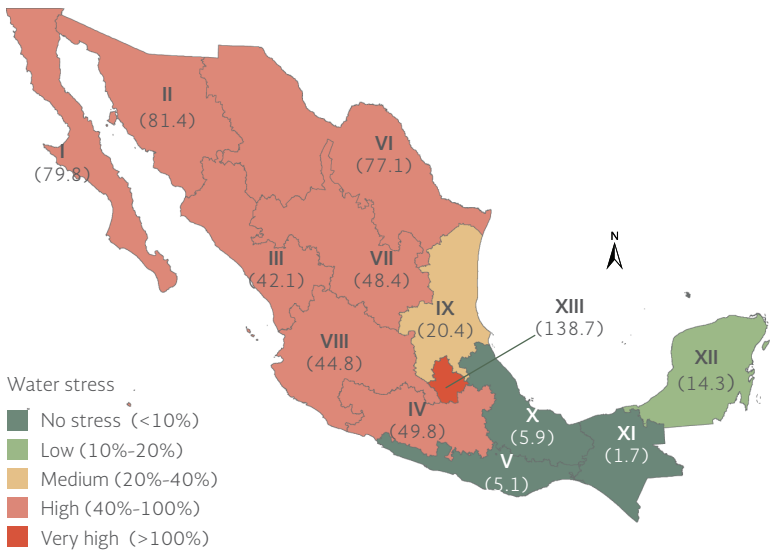
- In Mexico, the consumption of ozone-depleting substances (SAO) decreased by around 98% between 1989 and 2015 (from 29 thousand to 610.2 tons).

Water resources

Human activities are important direct and indirect stressors of the hydrological cycle. In a world characterized by a growing population with increasing economic means that allows greater access to more goods and services, the need to produce more food and energy and to supply larger volumes of water for the population and productive activities has significantly increased its demand and stresses its quality in natural reservoirs. The production and consumption of goods and services has increased not only the demand for water, but also wastewater generation, a significant proportion of which is discharged untreated into surface water bodies.

In 2015, 19.2% of Mexico's renewable water resources were classified as bearing low stress; however 62.5% of the country´s area was under high or very high stress. The per-capita water availability has declined significantly: By 2015 it had decreased to only 20.8% of the availability recorded in 1950.

28 | *Water stress per hydrologic[1] management region, 2015[2]*

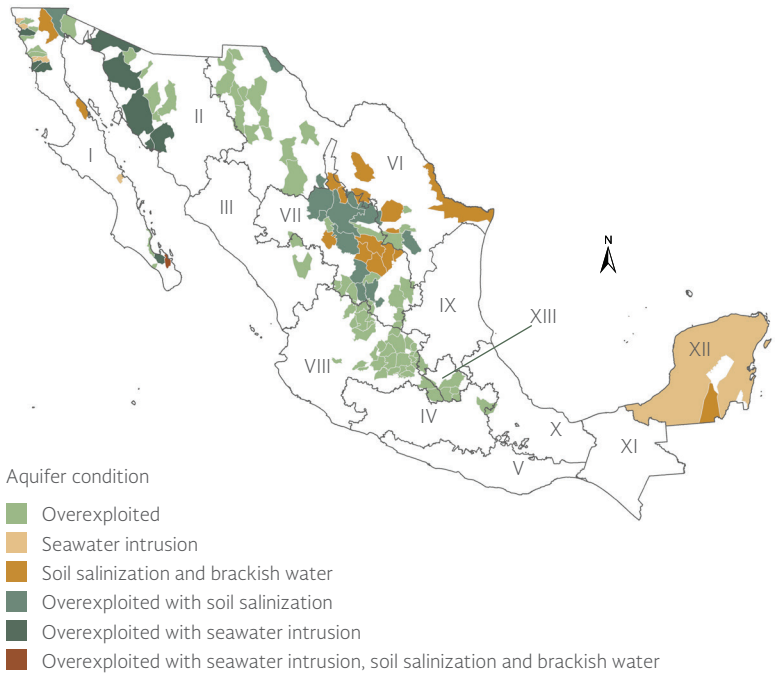


Hydrologic management regions (RHA):
I Península de Baja California, II Noroeste, III Pacífico Norte, IV Balsas, V Pacífico Sur, VI Río Bravo, VII Cuencas Centrales del Norte, VIII Lerma-Santiago-Pacífico, IX Golfo Norte, X Golfo Centro, XI Frontera Sur, XII Península de Yucatán, XIII Aguas del Valle de México.

Notes:
[1] Water stress is an indicator of the long-term sustainability of the use of water resources. It is calculated as the amount of water resources withdrawn for consumptive uses expressed as a percentage of the mean renewable water resources.
[2] Figures in parentheses are the water stress values.

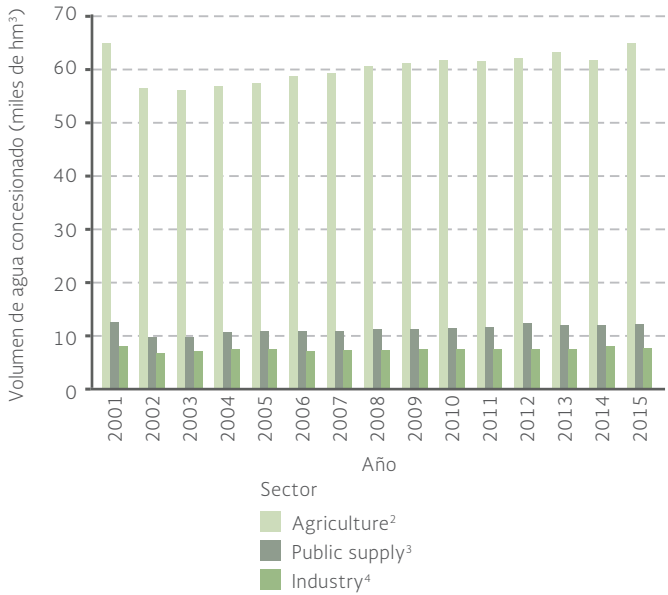
- Mexico faces serious and growing aquifer overexploitation issues. Thirty two of the country's aquifers were overexploited in 1975, but this figure grew to 105 in 2015 (16% of the 653 aquifers recorded in Mexico), most of them located in the central and southwest hydrological regions and the Baja California peninsula.

29 | *Condition of Mexican aquifers, 2015*



Hydrologic management regions (RHA):
I Península de Baja California, II Noroeste, III Pacífico Norte, IV Balsas, V Pacífico Sur, VI Río Bravo, VII Cuencas Centrales del Norte, VIII Lerma-Santiago-Pacífico, IX Golfo Norte, X Golfo Centro, XI Frontera Sur, XII Península de Yucatán, XIII Aguas del Valle de México.

30 | *Volume of water under concession[1] per sector, 2001 - 2015*

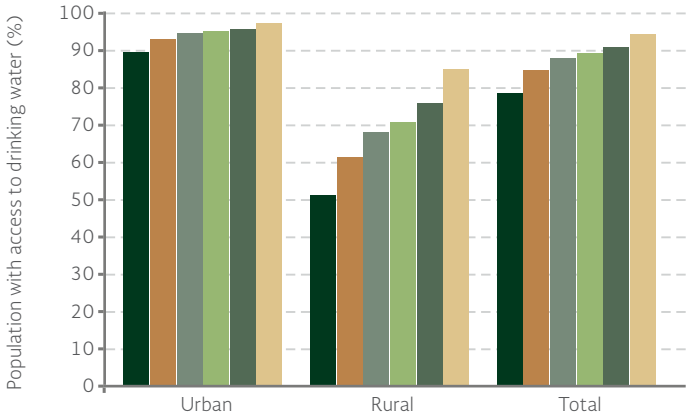


Notes:
[1] The volume under concession is linked to the location of the concession title rather than to the site where water is used.
[2] Agricultural uses include agriculture, livestock ranching, aquaculture, multiple use and other uses as per the REPDA classification.
[3] Public supply includes urban public use and residential use, as per the REPDA classification.
[4] Industrial uses include industry, agroindustry, services and commercial use as per the REPDA classification, in addition to water used for electricity generation (in thermal power plants, but not in hydro power plants in which the use of water is not consumptive).

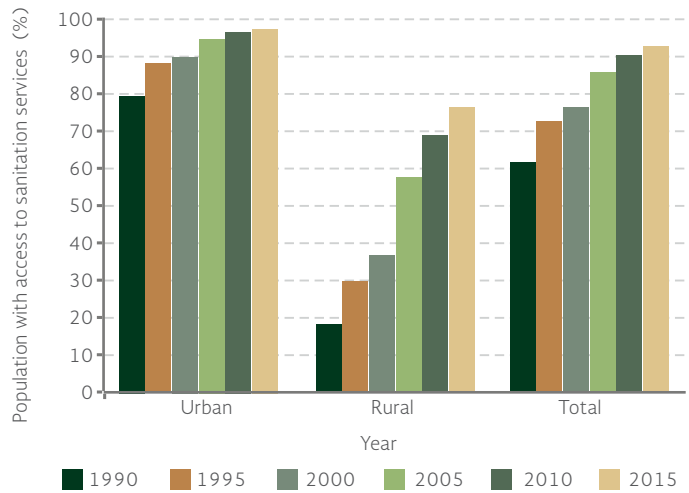
- Agriculture is the sector that imposes the greatest pressure on Mexico's water resources, compared to the industrial and household sectors. In 2015, about 76.3% of the water conceded was allocated to agricultural activities, followed by public supply (14.6%), and industrial uses and electric power generation (which jointly accounted for just over 9.1%).

- A high percentage of the sites where surface water quality is monitored complies with water pollution regulations. In 2015, 92.5%, 67.6% and 93.3% of the sites included in the monitoring network for surface water quality showed values below the maximum limits set in the standards for biochemical oxygen demand (BOD_5), chemical oxygen demand (COD) and total suspended solids (TSS), respectively.

31 | *Coverage of drinking water supply services, 1990 - 2015*



| *Coverage of sanitation services[2], 1990 - 2015*

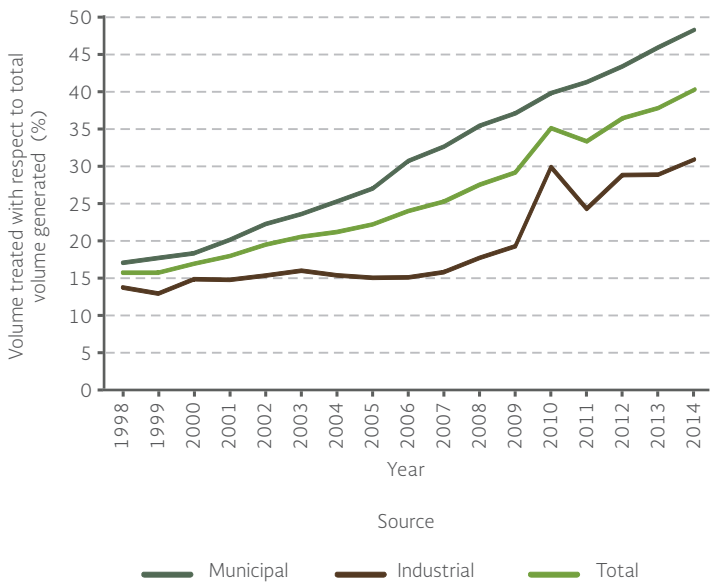


Notes:
[1] Includes all the occupants of inhabited private houses with access to piped water in the house or in the plot, to water from a public faucet or from another house, as a percentage of the total number of occupants of inhabited private houses in rural or non-rural zones.
[2] Includes discharges to a sewer, septic tank or improved-pit aerated latrine.

- Drinking water supply and sanitation services have increased significantly their nationwide coverage, but with gaps in rural areas. In 2015 drinking water supply and sanitation services reached 95.3% and 92.8% of the country's total population, respectively; however, their coverage was 97.79% and 97.39% of the population in urban areas, and 86.9% and 77.5% of the rural population.

- Wastewater treatment is still insufficient in Mexico. Although the volume of municipal wastewater that was treated compared to the total volume generated in 2014 was 155% higher than that in 1998, it only accounted for 49% of the wastewater generated that year. Only about 31% of the volume of industrial wastewater generated in 2014 was treated.

32 | *Wastewater treatment with respect to the total volume generated, 1998 - 2014*

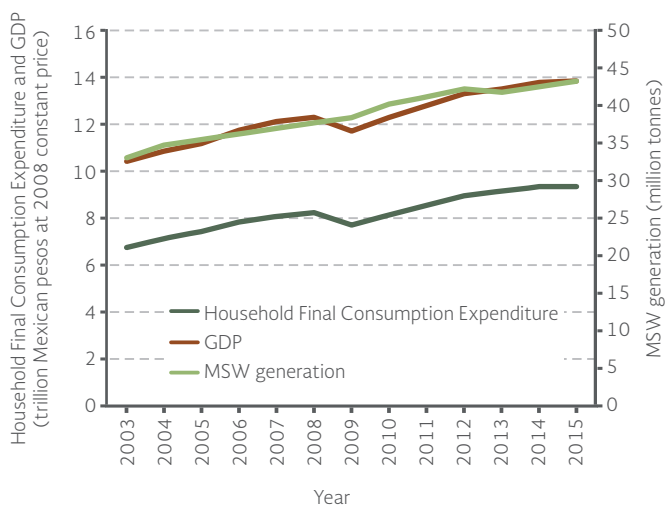


Solid waste and hazardous waste

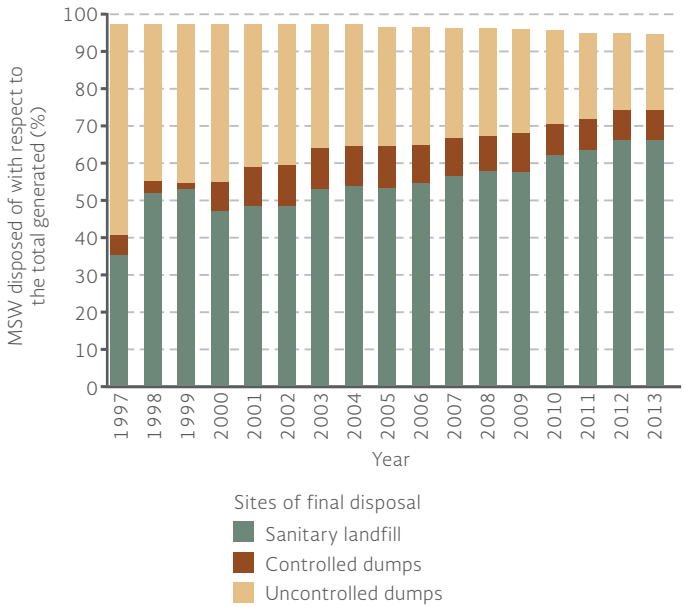
The generation and management of solid waste have important consequences for the environment and public health. Integrated waste management seeks to reduce the generation and achieve the proper disposal of solid waste; in addition, it can also contribute to reduce the extraction of resources and the consumption of water and energy needed to produce them, as well as the emission of greenhouse gases. All this is accompanied by major economic, social and environmental benefits.

- In 2015, the average estimated generation of Municipal Solid Waste (MSW) in Mexico was 1.2 kg per capita, for a total generation of 53.1 million tons countrywide; this is a 61.2% increase with respect to the generation recorded in 2003. MSW generation in Mexico is strongly correlated with private final consumption expenditure and GDP.

33 *Estimated MSW generation, Gross Domestic Product (GDP) and Household Final Consumption Expenditure, 2003 - 2015*



34 | *Final disposal of MSW with respect to the total generated[1], 1997 - 2013*



Note:
[1] The percentages do not add up to 100% because a small fraction of MSW is recycled before disposal.

- In 2013, 74.5% of the total MSW generated in the country was disposed of in landfills and controlled dumps. This is an 82.7% increase compared to 1997, when only 40.7% of the total MSW were properly disposed of. In 2013, 21% of the MSW generated was disposed of in uncontrolled dumps and the remaining 5% was recycled.

- According to the Ministry of the Environment (SEMARNAT), the 93 355 companies registered in its National Registry of Hazardous Waste Generators (PGRP) produced 2.19 million tons of hazardous waste (HW) between 2004 and 2014. The industries that contributed the highest amounts of HW were the chemical (15.7% of the total amount generated), automotive (14.4%), metallurgy (14.1%) and the petroleum and petrochemical (10.3%) industries.

- Between 1999 and 2014, the facilities licensed to manage HW in Mexico had an installed capacity of just over 21.07 million tons, 46.4% of which corresponded to treatment, 45% to recycling, 5% to confinement, 2.5% to reuse and 1.1% to incineration.

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Climate change

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