MEXICO's approach to geographic disaggregation for the SDGs and the 2020 Census

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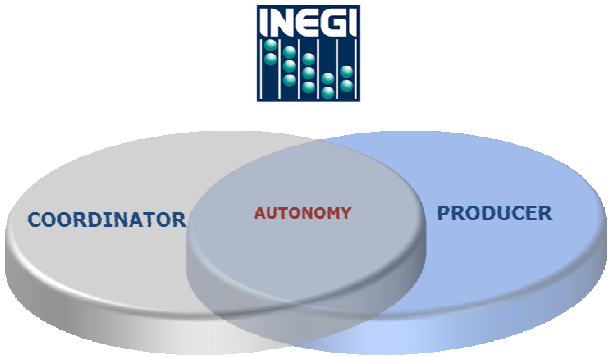
INEGI - México

INEGI and the National System of Statistical and Geographic Information (SNIEG)

Key Elements

- Statistical and Geospatial Information within the same institution, since1983
- Constitutional-level autonomy, since 2008
- Coordination of the National System of Statistical and Geographic Information (SNIEG)



Statistical and Geographical Information of National Interest

Since 2008, INEGI coordinates the SNIEG, which includes all units of the State (Executive, Legislative and Judicial branches, as well as sub-national governments)

INEGI is also responsible for the creation, use and promotion of the **system's statistical and geographic technical standards.**

Geographical data are based on International Geospatial Standards. (http://www.inegi.org.mx/geo/contenidos/normastecnicas/default.aspx).

Background of the National Geostatistical Framework (MGN)

In Mexican censuses prior to 1980, cartography was scarce with a diversity of sources, coverage, scales and update dates.

This did not guarantee geographical coverage, thus giving rise to the creation of a geographic reference framework for the collection of statistical information

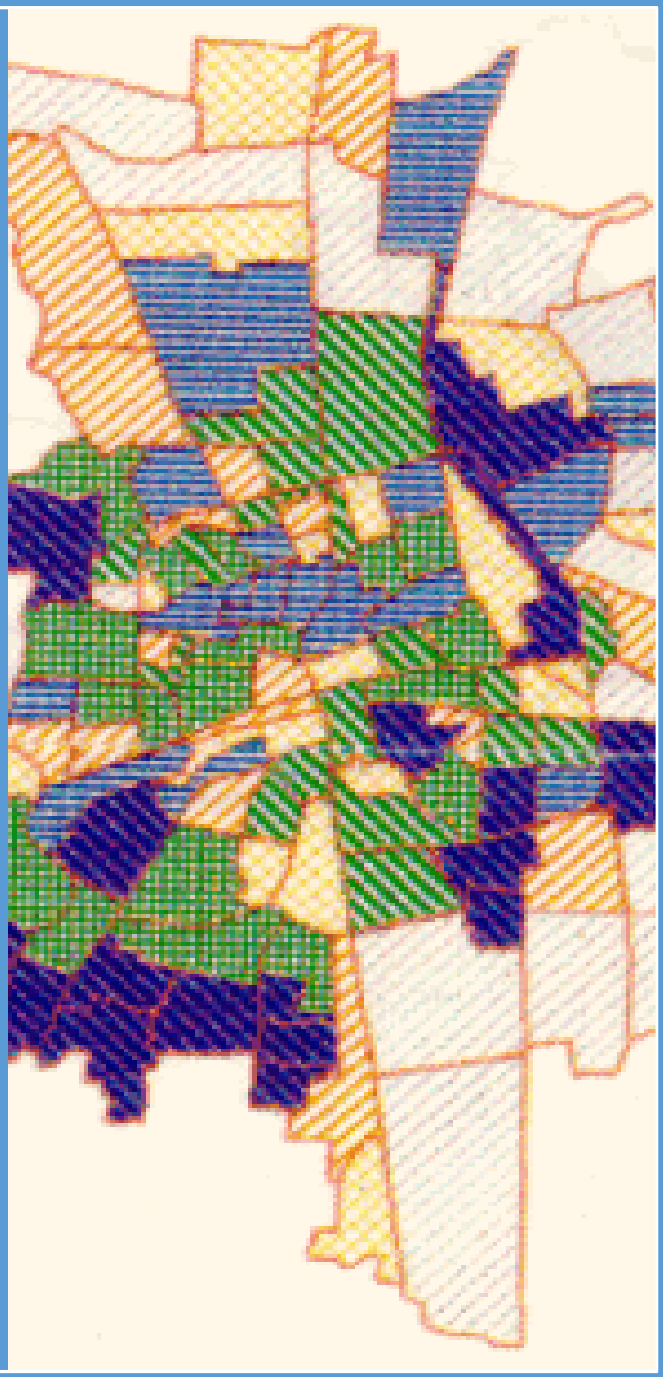
For this reason, INEGI created in 1978 the National Geostatistical Framework (MGN), which is a system that allows to correctly reference the statistical information of censuses and surveys in the corresponding geographic locations.

National Geostatistical Framework (MGN)

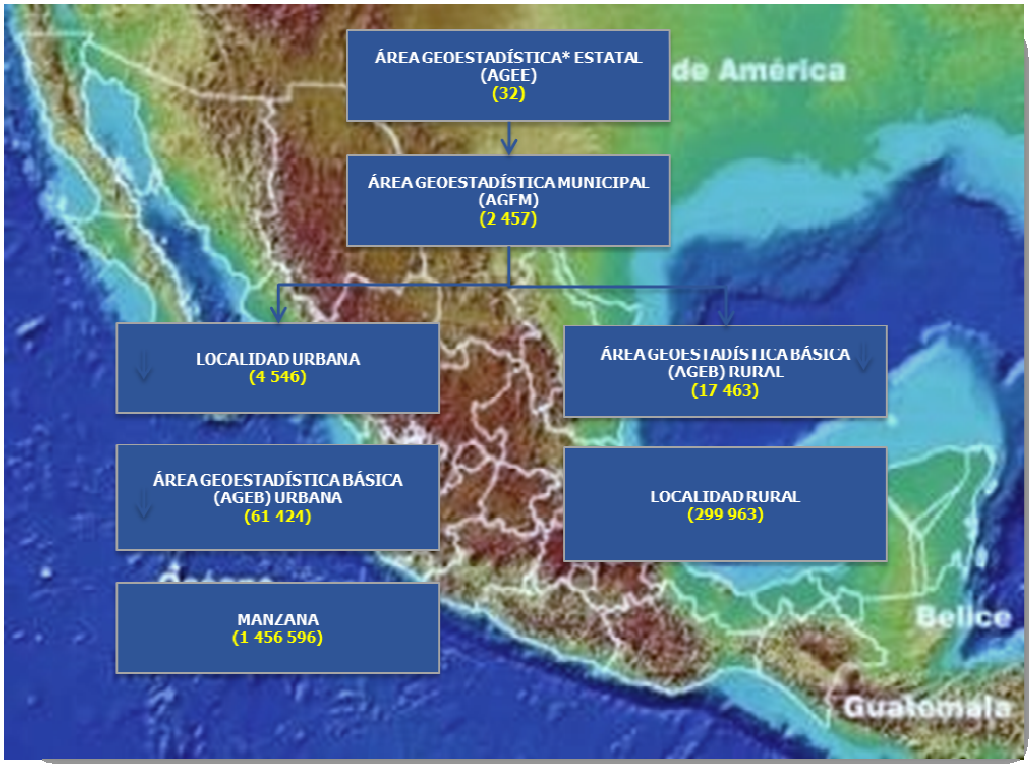
The MGN divides the national territory into areas of easy identification in the field, these units are called Geostatistical Areas and are:

- State (AGEE)
- Municipalities (AGEM)
- Basic (AGEB)

The AGEB constitute the fundamental unit of the framework, which is adjusted as much as possible, to the political-administrative limits of the country. They are also divided by urban and rural.



Levels of the National Geostatistical Framework



The Urban AGEB delimit a part or the total of a locality of 2,500 inhabitants or more, or, a municipal head. These are made up of a set of city blocks.

The Rural AGEBs cover an area of approximately 10,000 hectares, whose land use is predominantly agricultural and in them are localities smaller than 2,500 inhabitants.

Through the linking of information, the entire system can use a single geostatistical framework;

To link statistical and geographic information, updated maps are provided to the divisions of socio-demographic statistics, economic statistics and government/justice statistics;

These maps are resolved at the city block level, and they identify roads, traffic lights, and other landmarks or public services.

These multi-layered maps are used to regularly update the Geo-statistical Framework and the Single Cartographic Database

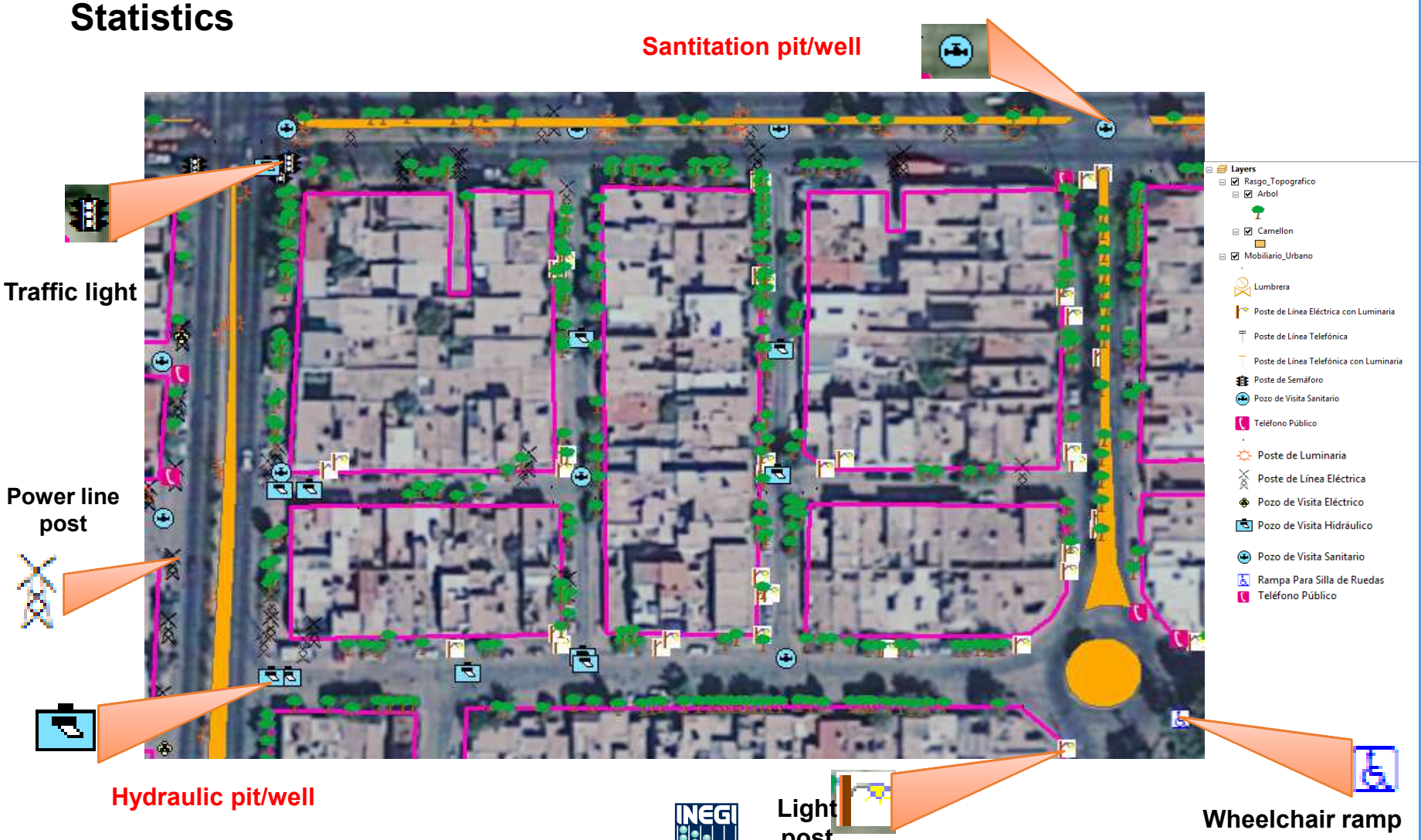
New Urban Cartographic Database

Oriented to update the cartography of urban areas, where 71% of the population is concentrated. It includes 783 formats, at a scale of 1:20,000

*Ciudad de México, Guanajuato, Hidalgo, Estado de México, Michoacán, Morelos, Puebla, Querétaro y Tlaxcala

New Urban Cartographic Database

Urban Cartography for the generation of Urban Statistics



censo agropecuario 2017

Updating trough the Agricultural Census 2017

Data capture using mobile computing devices

Satellite Images
Mapping
Questionnaire
Catalogs
Online validation
Producer directory
Instructions and manuals

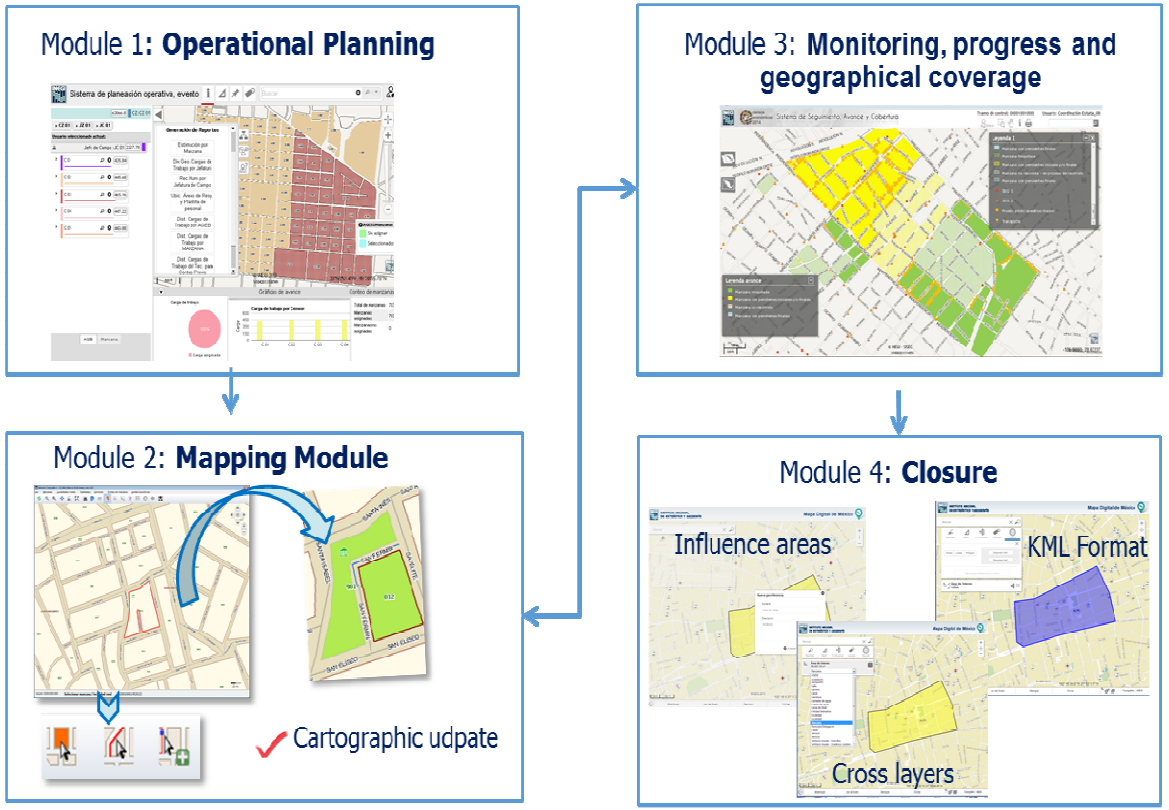
INEGI

ECONOMIC CENSUS (2019)

Census Operational Process

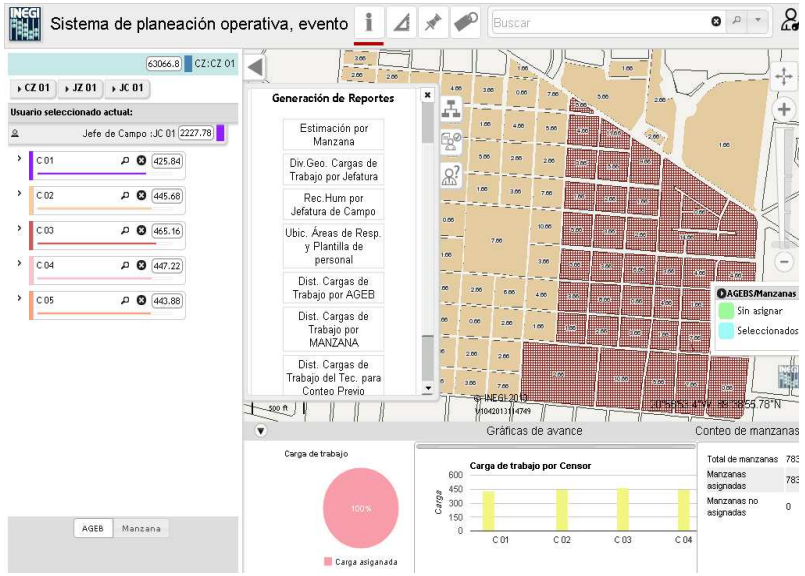
Our **Census Operational Process** has **4 modules**: Operational Planning

1. Operational Planning
2. Mapping Module
3. Monitoring progress and Geographical coverage
4. Closure.



Operational Planning Module

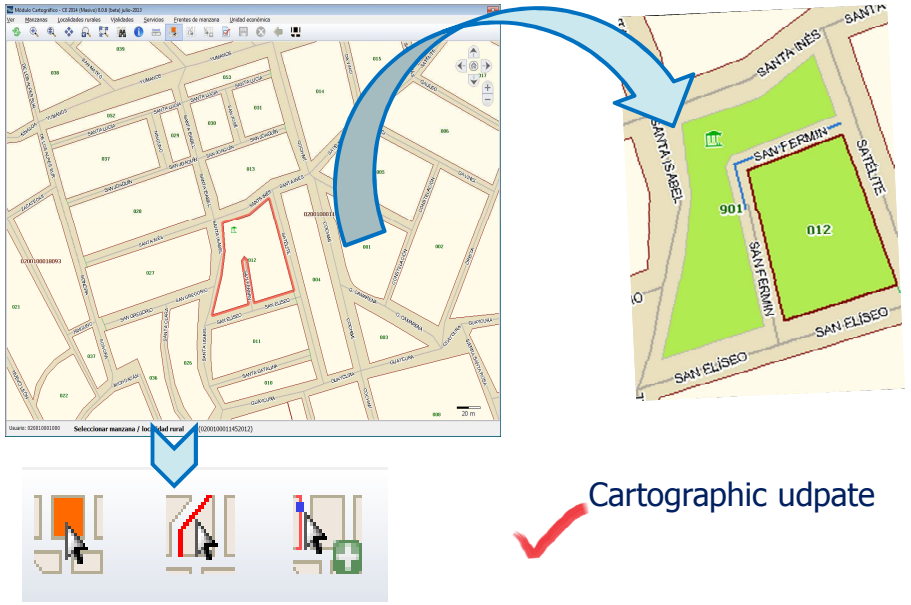
Module 1**: Operational Planning**



1. Based on the Digital Map of Mexico. This web application optimizes the operational planning of the event by assigning control sections of graphic form, and managing operating figures and graphical assignation of weekly work with a systematic visual monitoring of control sections, with a constant data backup every 15 minutes.

Mapping Module

Module 2: **Mapping Module**



2. Some applications of this module are **to create and modify the mapping efficiently,** easily and quickly to collect information in an accurate and complete way (merge or split blocks, roads, rural localities-creation, service-creation, or modifying services).
To allow for the capture of land data, blocks, services, and roads to keep updated those databases that require it.

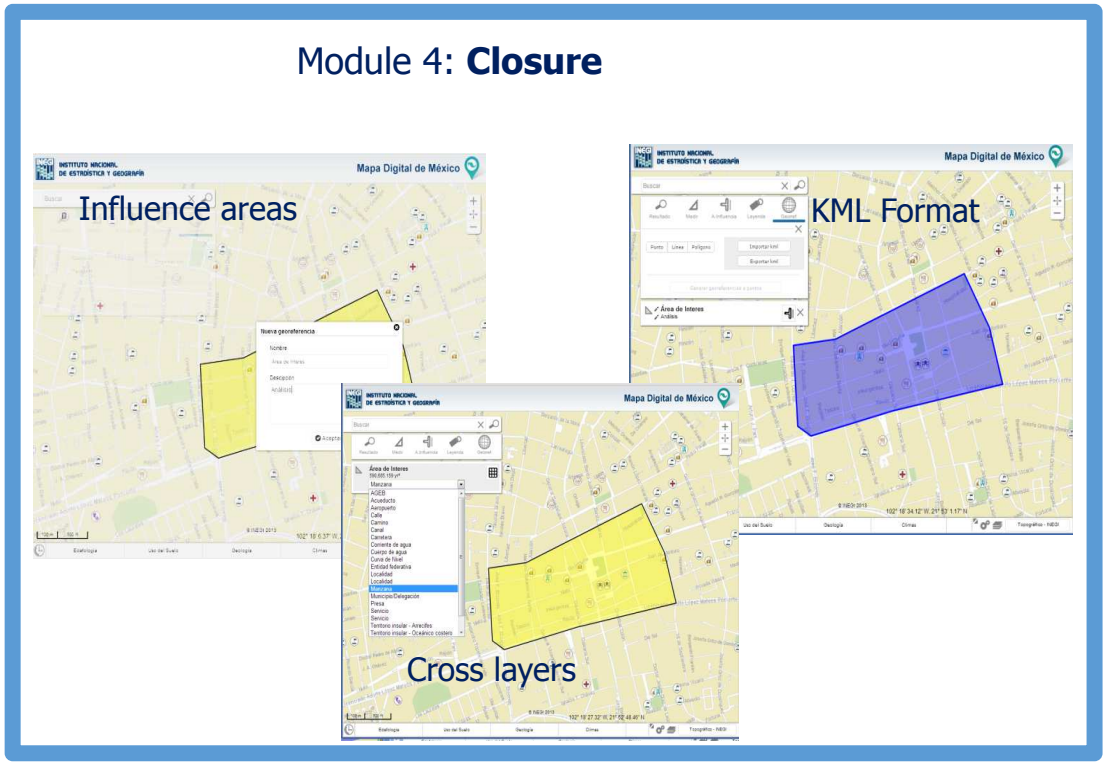
Monitoring, progress and geographical coverage module

Module 3: **Monitoring, progress and geographical coverage**

3. The tracking system is a web application that allows the integration of information and facilitates the monitoring of progress and geographical coverage by using the tools that allow a better analysis of the integrated information.

The packages are integrated consistently, so that once it reaches the central server, the system is updated with a delay of minutes.

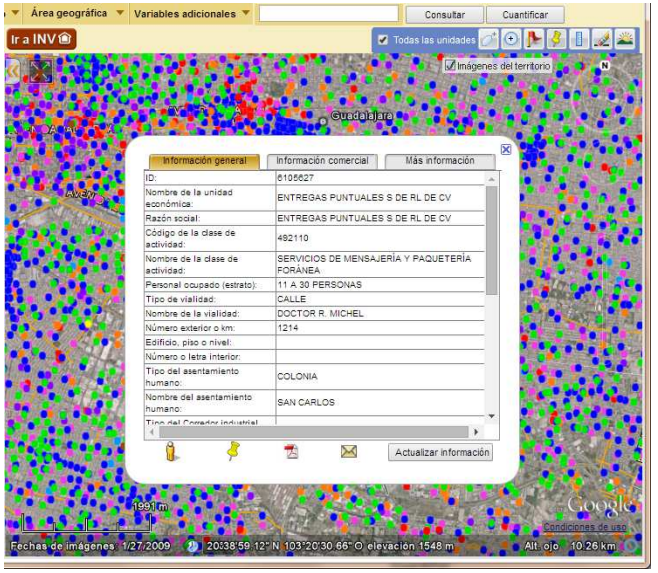
Closure Module



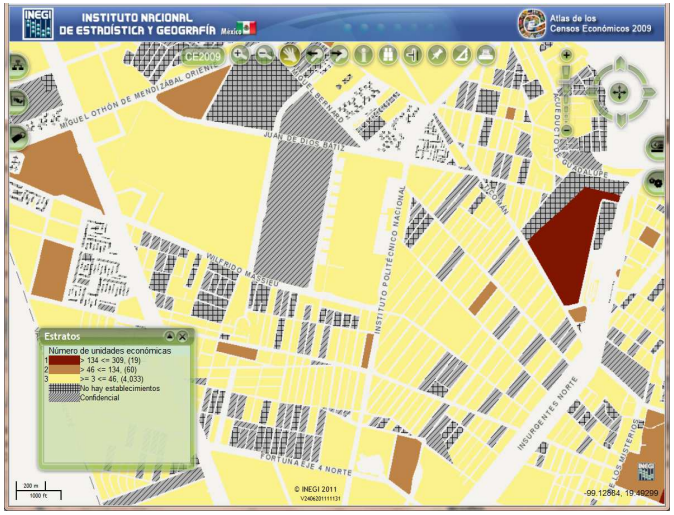
4. **Closure Module**. Spatial Analysis example: You can create influence areas and make crossings with other layers of information and download it on KML and quantify the information in the analysis area.

Economic Census Atlas
National Directory of Economic Units (DENUE)

Total economic units by state



Data from economic units (commercial establishments)



Total economic units, by block (Mexico City)

Censo de Población y Vivienda 2020

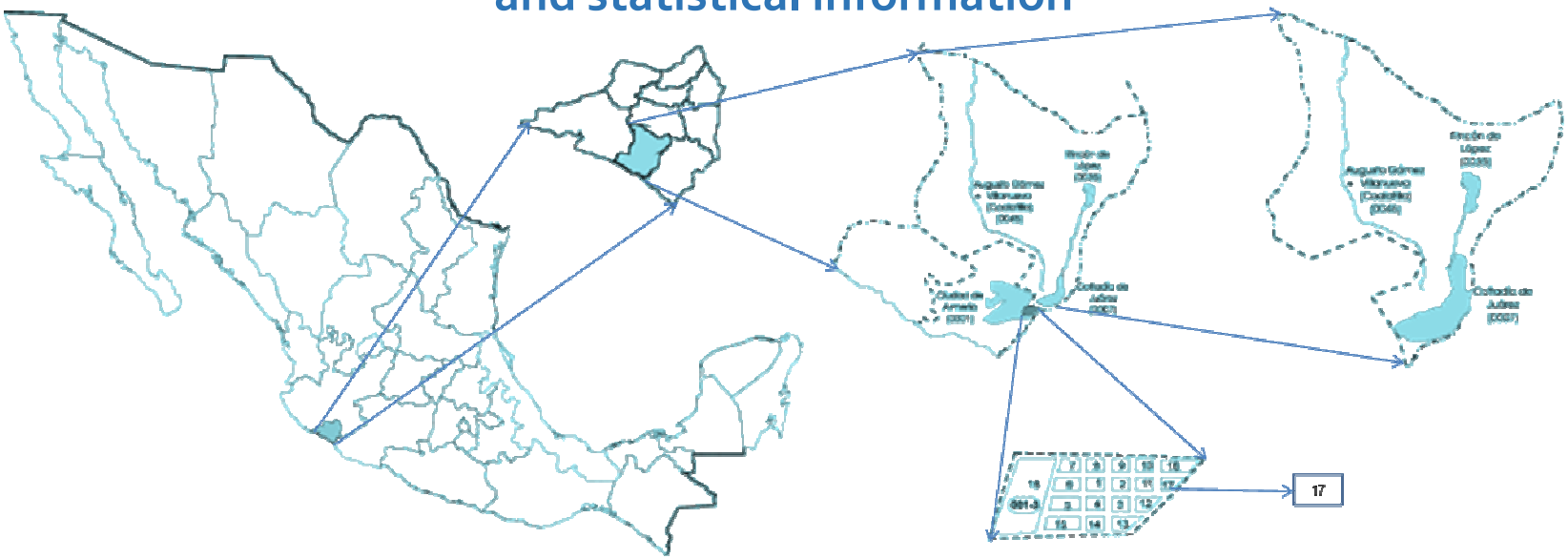
2020 POPULATION AND HOUSING CENSUS

Geo-referencing through the use of GPS in mobile devices

INEGI

Use of cartography in census operations

Traditionally, geo-statistical coding has been used to link geographic and statistical information



Traditionally, INEGI has used cartography to geo-reference census information.

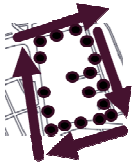
Recently, GPS technology has been successfully used to update economic information, through the Economic Census.

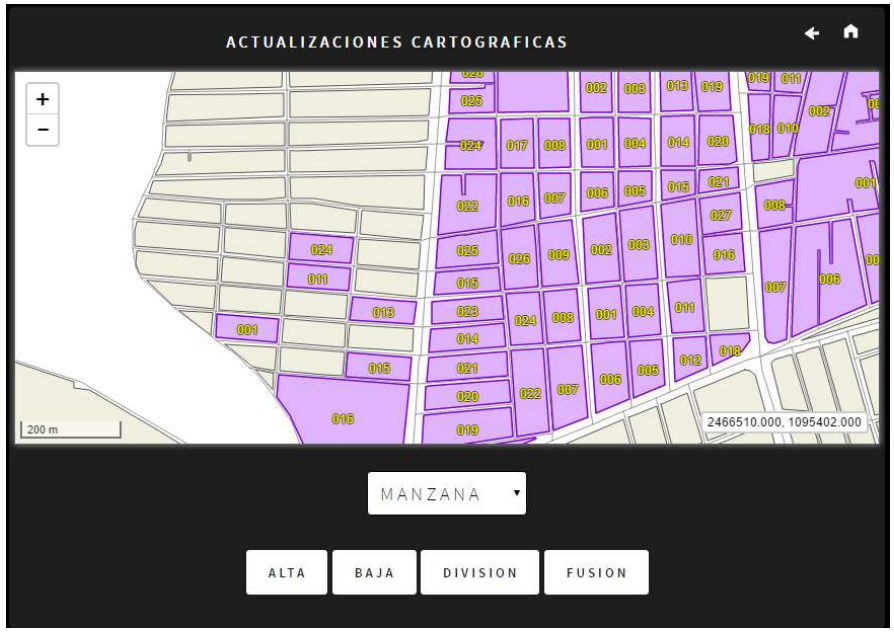
GPS technology will again be tested in 2019, during a trial run for the 2020 Population and Housing Census. The expectation is that the 2020 Census will fully incorporate this technology, for a more effective integration of statistical and geographic information.

Cartographic Updates through the trace of areas with GPS coordinates

Methodology

1. Do a recon test run of assigned routes
2. Identify city blocks through cartographic updates
3. Enable the reading of geographic coordinates through GPS, during the course of the run through the areas and perimeters being updated.





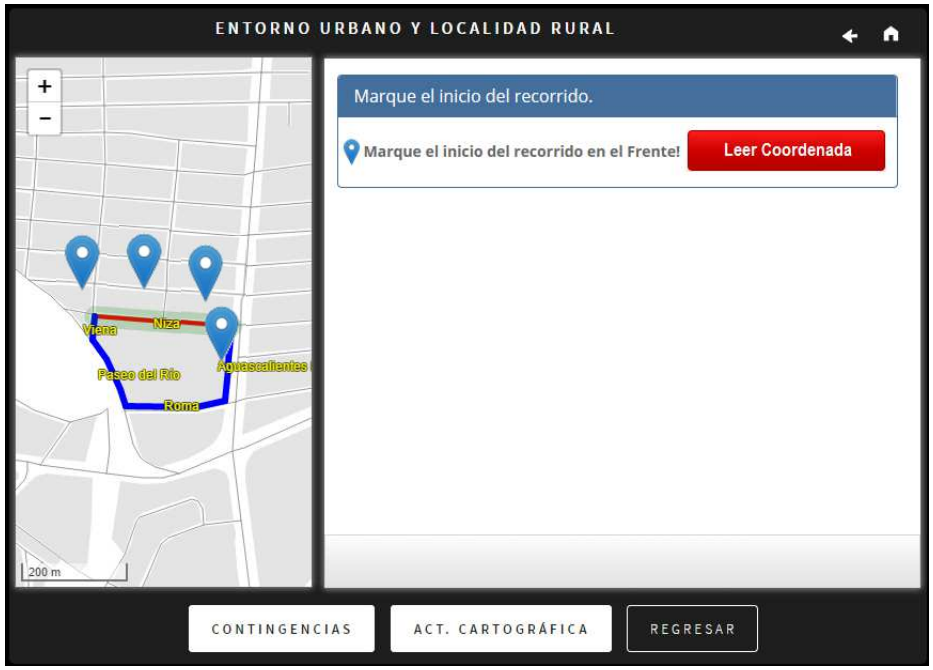
4. Run the routes and mark thecoordinates, for future geographic reference of both surveyors and supervisors

Route run and validation using GPS coordinates

5. The supervisor goes through route, registering the questionnaire and the GPS coordinates

6. Surveyor then applies questionnaire to each dwelling in route

7. Validation through matching of coordinates and buffers



This method would ensure the capture of all dwellings' coordinates during the course of the surveyor's route.

Cartographic Database

National Geostatistical Framework

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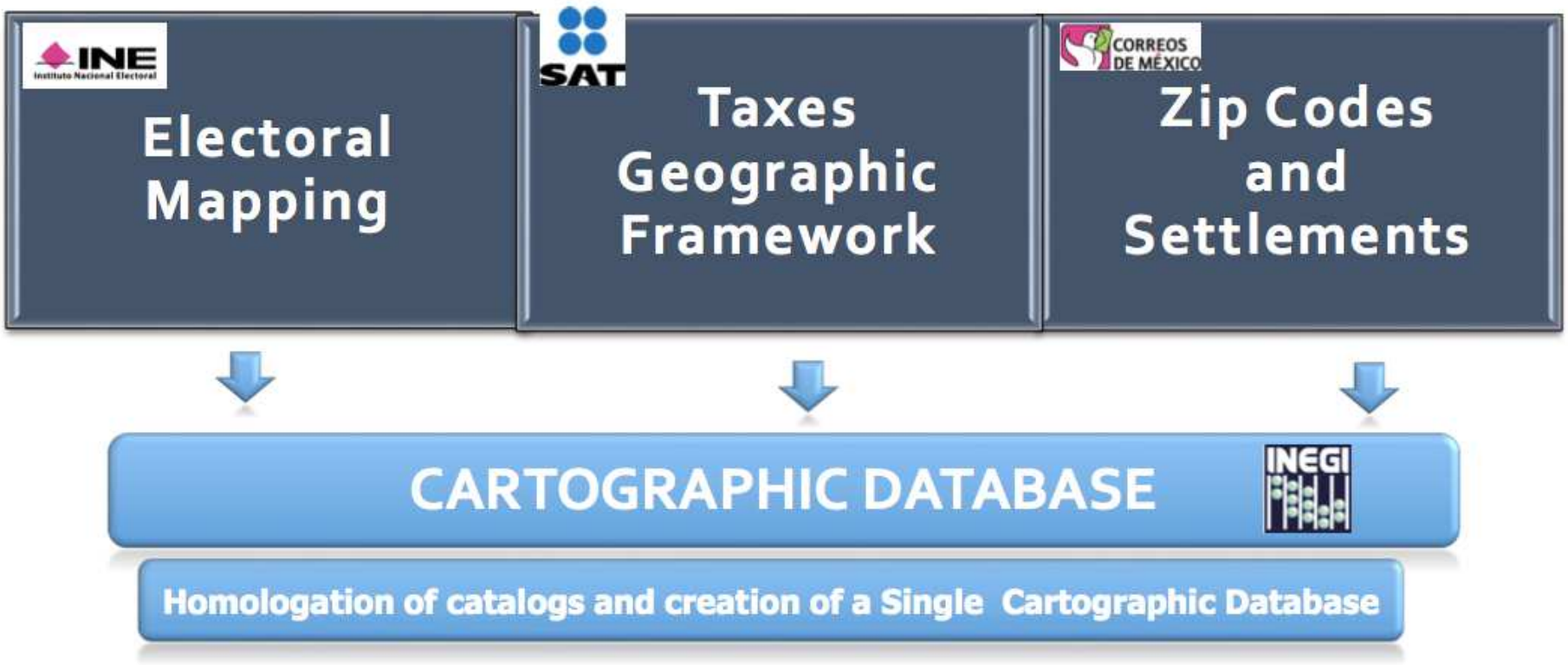
Topographic Map of Mexico

The Cartographic Database concentrates all updates provided by the Federal Government and Institutions to share them.

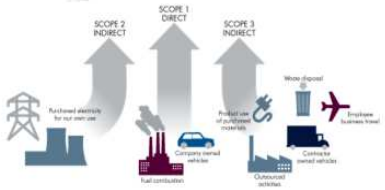


Environmental information

Land Use and Vegetation Map

Annual Operation Certificate COA Web

- An online tool for the official reporting of emissions and pollutant transfers to air, water, soil, land and hazardous materials and waste, from industries and establishments from all productive sector
- Reporting is compulsory and free of charge.
- Information is validated and updated in real time



Big Data for the environment

Modelling meteorological data to identify climate change trends over the last century

Mapping of 5,454 individual meteorological stations, with temperature and rainfall data from the last 100 years

Pilot Project proposed by Mexico within the WG on Big Data for official statistics (Task Team on Satellite Imagery, Remote Sensing and Geospatial Information)

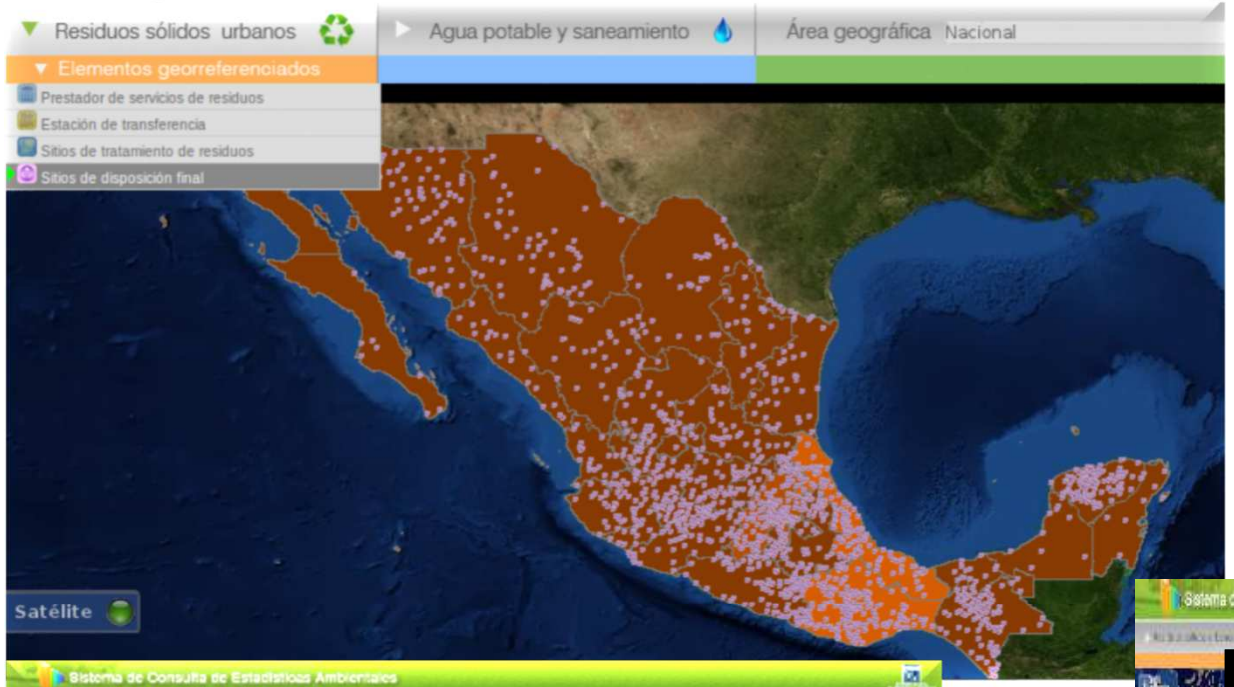
Annual Operation Certificate COA Web

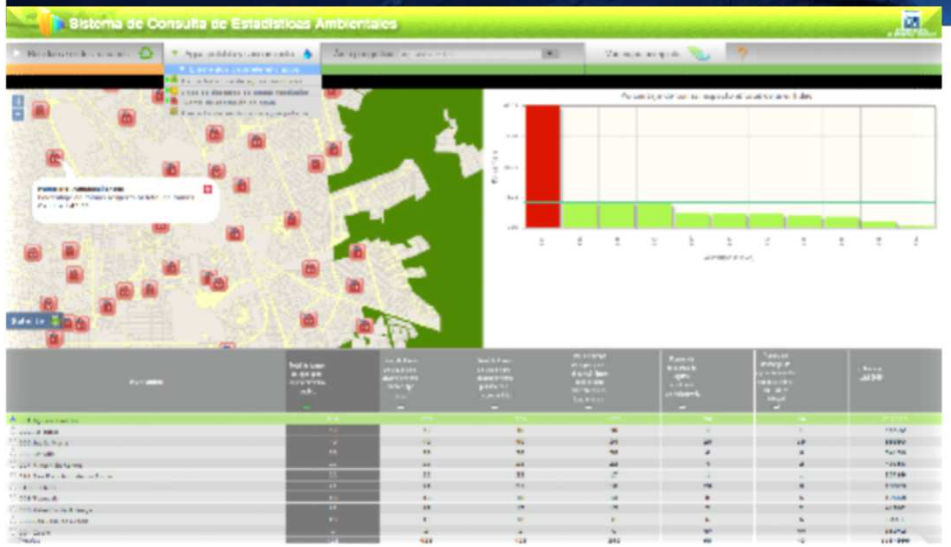
- All information about the location of the industries is geo-referenced, considering Technical Geographic Standards (Geographic Addresses)
- **Currently, COA has a >70% coverage of the industry universe in all of Mexico**

- Chemical, petroleum, automotive, pulp & paper, metal, glass, electric power generation, asbestos, cement, hazardous waste treatment, etc;
- Waste management providers,
- Those discharging wastewater into national water bodies, or
- Those emitting 25,000 tones or more of CO2 or equivalent compounds
- Greenhouse Gases (GHG) Transport, agricultural, trade & services, etc.

Environmental Information

integration of statistics, administrative records, and geospatial information





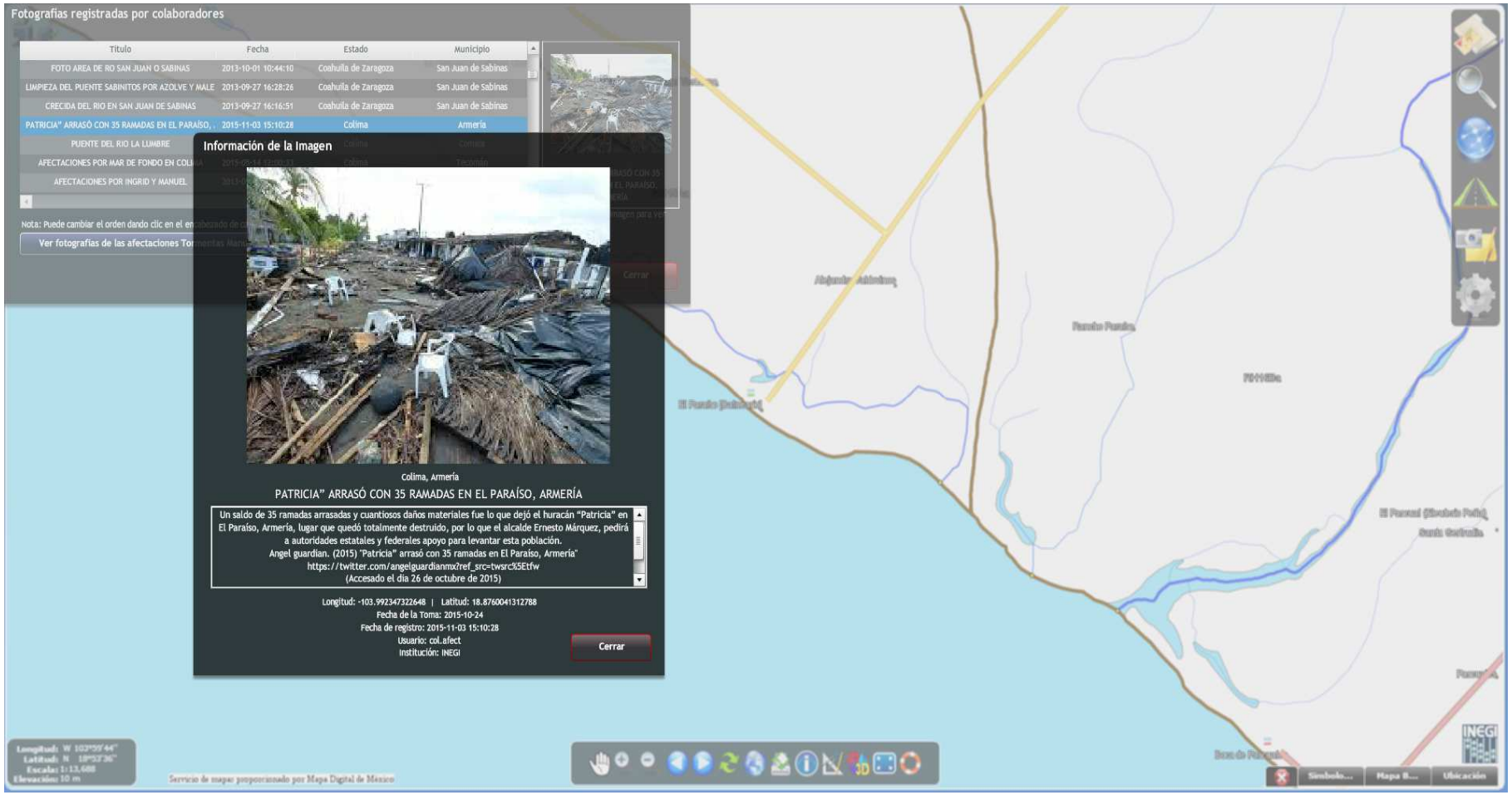
Fotografías de Elementos Georreferenciados

Participatory Cartography

- An interactive, dynamic crowd-sourcing process to channel citizen input for territorial information used to permanently update and improve official cartography.
- Discrepancies or updates in addresses and roadways (numbering, nomenclature, senses, services and status updates during emergencies)
- Inputs: comments, pictures and other formats
- Input is validated by INEGI specialists and uploaded to the Digital Map of Mexico or the Collaborative Disaster Platform.

Damages after Hurricane Patricia (Oct 2015)

http://antares.inegi.org.mx/analisis/red_hidro/siatl/#



Technical Standards

Since 2008, INEGI is responsible for the **creation** of all of the **SNIEG's technical standards**, as well as for **promoting the use** of these technical standards.

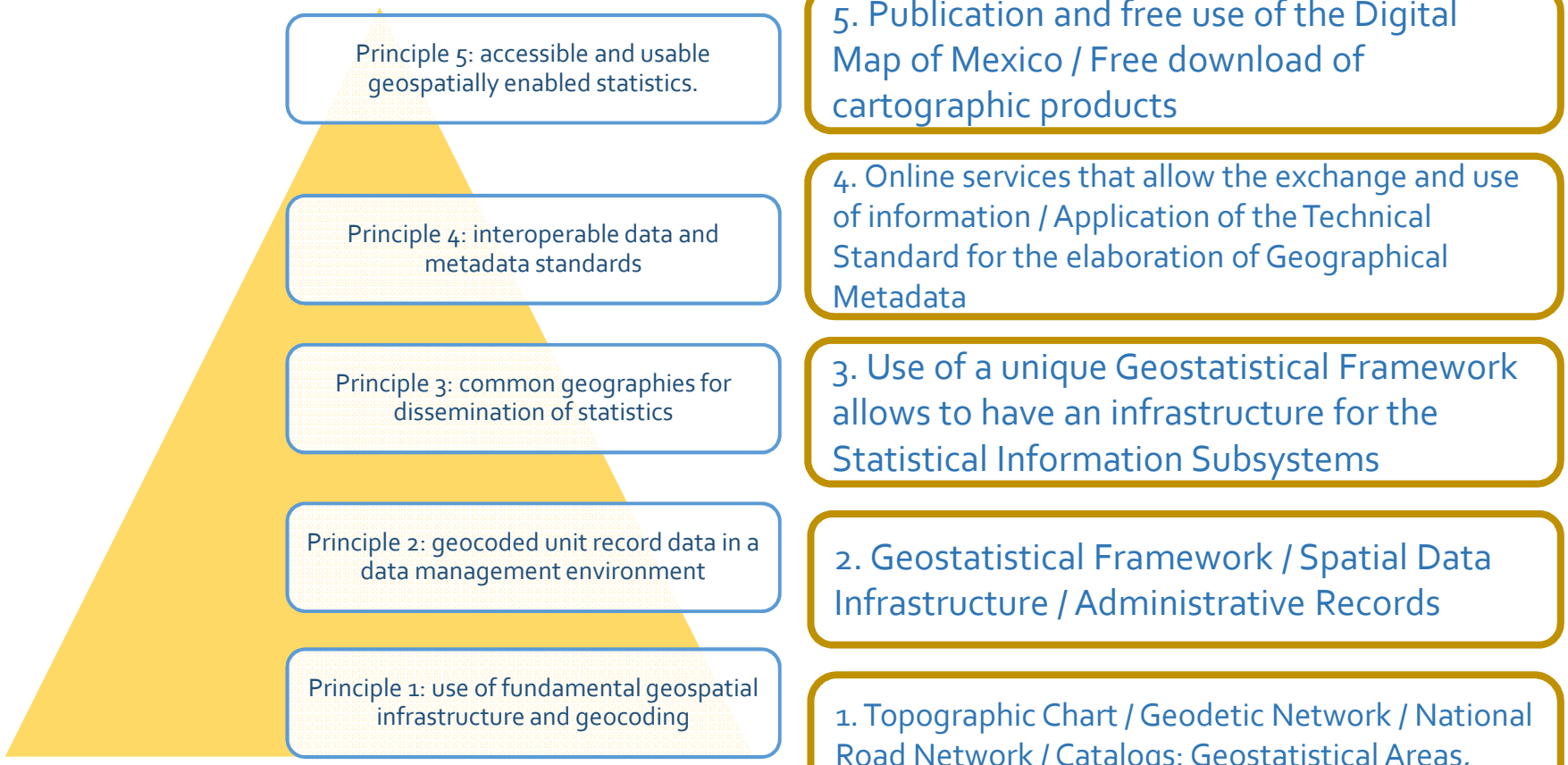
Statistical Technical and normative documents

Technical standard for the generation of basic statistics
Standard process for conducting sample surveys
Planning and administrative control in statistical projects
Standard process for the use of administrative records
Conceptual design for the generation of basic statistics
Design of the sample in survey projects
Capture in sample surveys
Capture in administrative records
Information processing
Presentation of statistical data in tables and graphs
Basic statistics glossary
Technical guide for developing draft sample surveys
Technical guide for developing operating manuals
Design of questionnaires
Presentation of statistical results

Geographic Technical and Normative documents

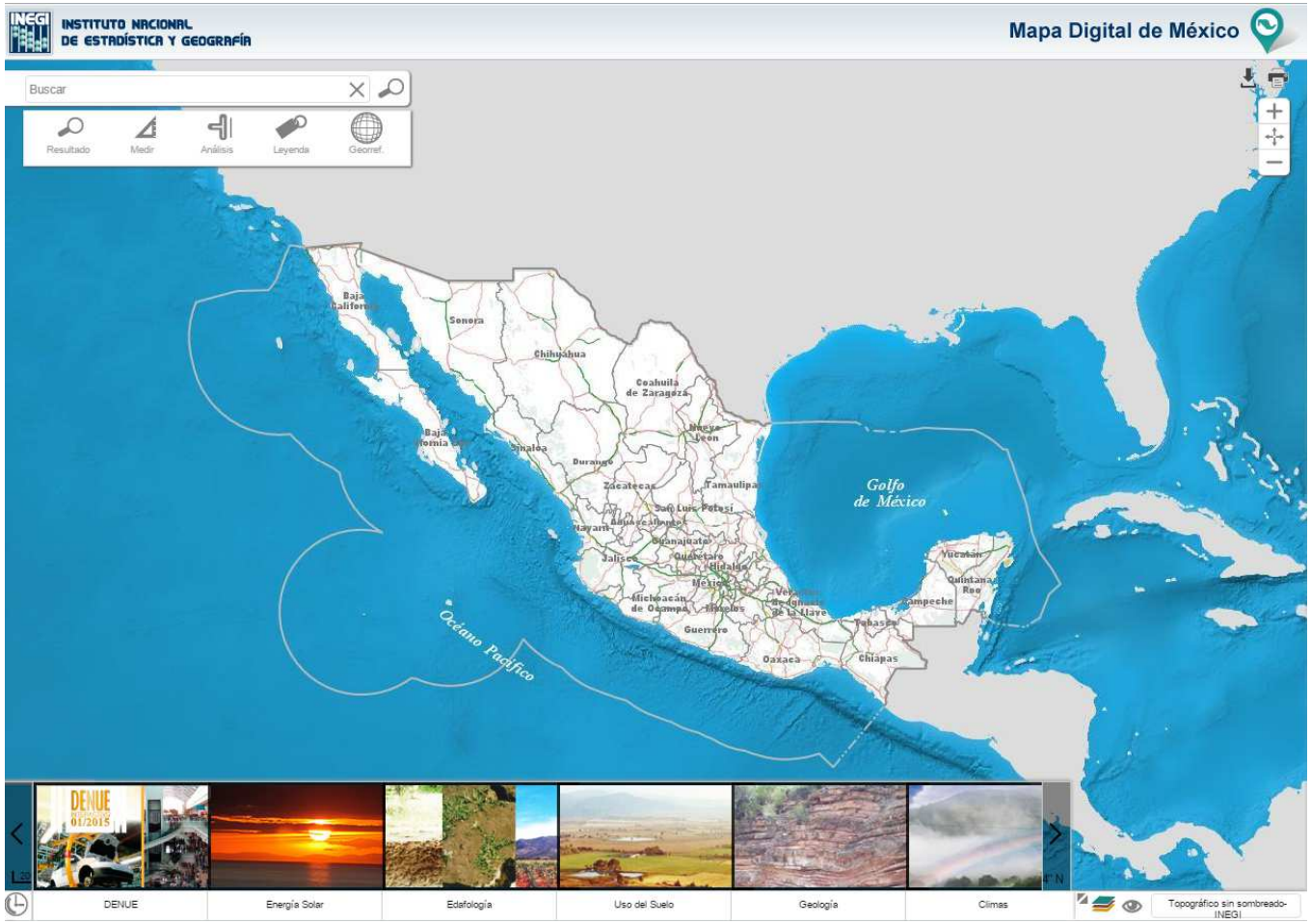
National Geodetic System.
Positional Accuracy Standards.
Geographic Metadata Generation
Generation, capture and integration of cadaster and register data in order to promote their harmonization and homogeneity.
Use of the Catalog of Undersea Feature Generic Terms.
Authorization of aerial surveys and geographic explorations.
Technical Standard for the generation of Digital Elevation Models with geographic purposes.
The Geographic Addresses Standard.
Exchange of Cadastral Information for Statistical and Geographical Purposes
Registration of Continental and Insular geographical names for Statistical and Geographical purposes
Use and updating of the Natural and Induced Vegetation Type Catalog of Mexico for statistical and geographic purposes

The 5 guiding principles of the GSGF are aligned with Mexico's Geostatistical Framework



Digital Map of Mexico

Open-source geomatic platfrom that allows the visualization and analysis of geographic and geo-referenced statistical information. It contains 208 vector data layers, with more than 71 million geographic objects and 4 raster layers covering the entire country.



National Gender Atlas

46 Gender-related indicators (geo-referenced)

10 main areas:

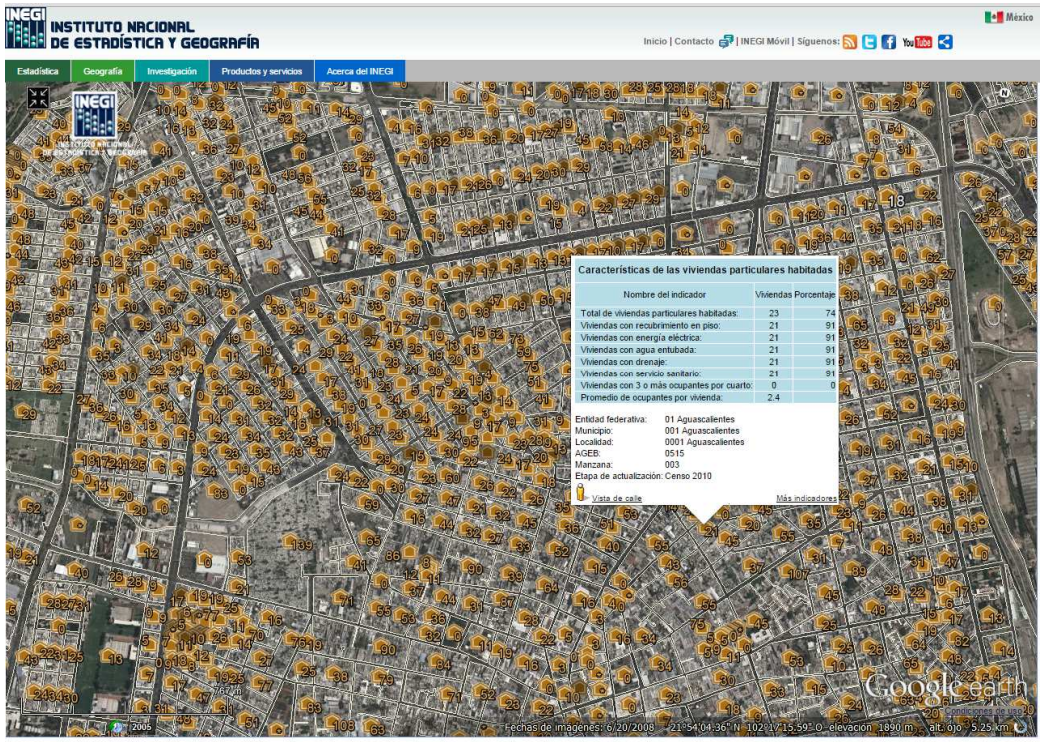
- General population
- Education
- Health
- Labor
- Decision making
- Use of time
- Poverty
- Entrepreneurship
- Violence
- % Indigenous population

ECLAC – UN-Women –INEGI

Plans to scale it to the regional level – Latin America and the Caribbean

SDG 1 - No poverty

Indicator 1.4.1 Proportion of the population living in households with acces to basic services

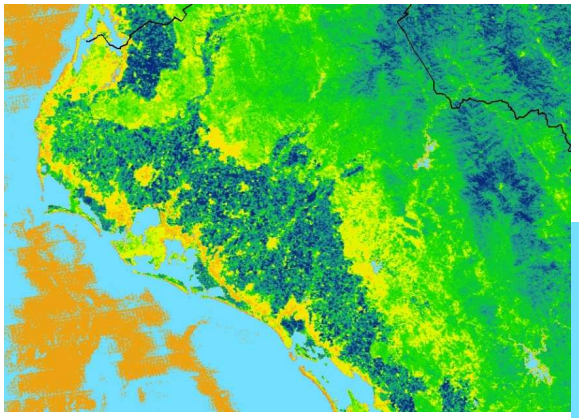


Source:
National Housing Inventory (geo-referenced)

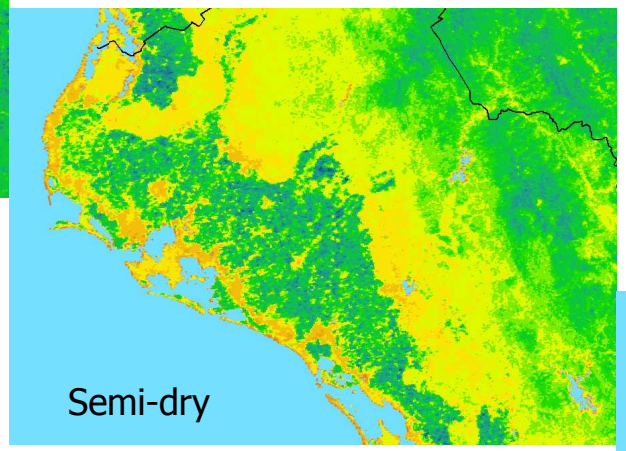
Visualized within the Digital Map of Mexico

SDG 2. End hunger and achieve food security

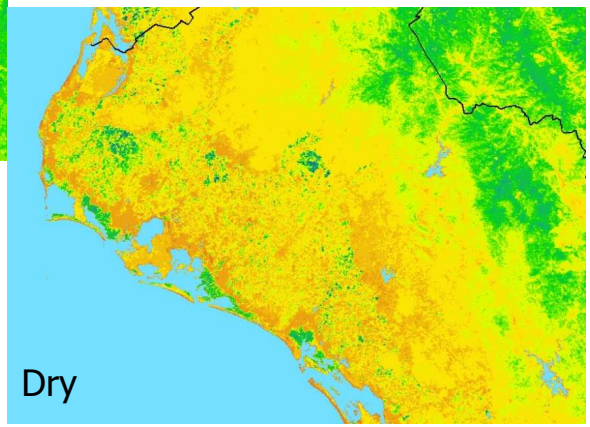
Indicator 2.3.1 Volume of production per labour unit



Vigorous



Semi-dry



Dry

- Agua
- Nubes
- Nubes, suelos
- Vegetación seca y escasa
- Vegetación seca
- Vegetación semiseca
- Vegetación, cultivos verdes
- Vegetación, cultivos vigorosos

Weekly crop monitoring During a drought using satellite imagery

Sinaloa, Mexico

Socio-economic & gender-related indicators

Indicator	Geographic coverage	Source	Disaggregation
1. Percentage of population performing unpaid work 2. Average number of hours devoted to unpaid work • e.g. Domestic, care for children, elderly or disabled	National, states and municipality	Population census Economic census Inter-census surveys Gender Atlas	Age / age groups Gender Location Type of activity/care

$$PPTNR_s = \frac{100 * PTNR_s}{TP_s}$$

Linked to SDG indicators

5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location (tier II)

Gender-related Indicators

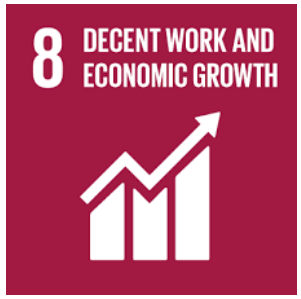
Indicator	Geographic coverage	Source	Disaggregation
1. Prevalence of violence (physical or sexual) against women • Total • Age-specific, childhood, throughout life	National, states and municipality	Population census Inter-census surveys Administrative records Gender Atlas	Age Gender Location Marital status

Linked to SDG indicators:

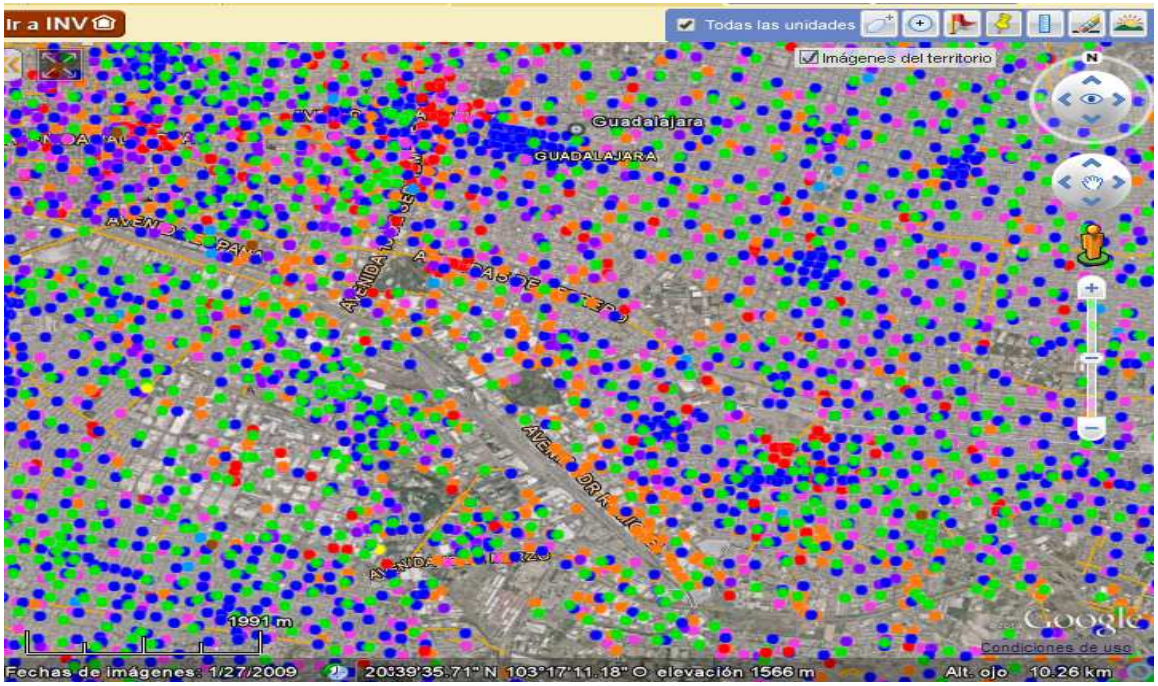
- ***5.2.1*** Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age (tier II)
- ***5.2.2*** Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence (tier II)

SDG 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Indicator 8.3.1 Share of informal employment in non-agriculture employment by gender



Sources:
National Employment Survey visualized within the Digital Map of Mexico

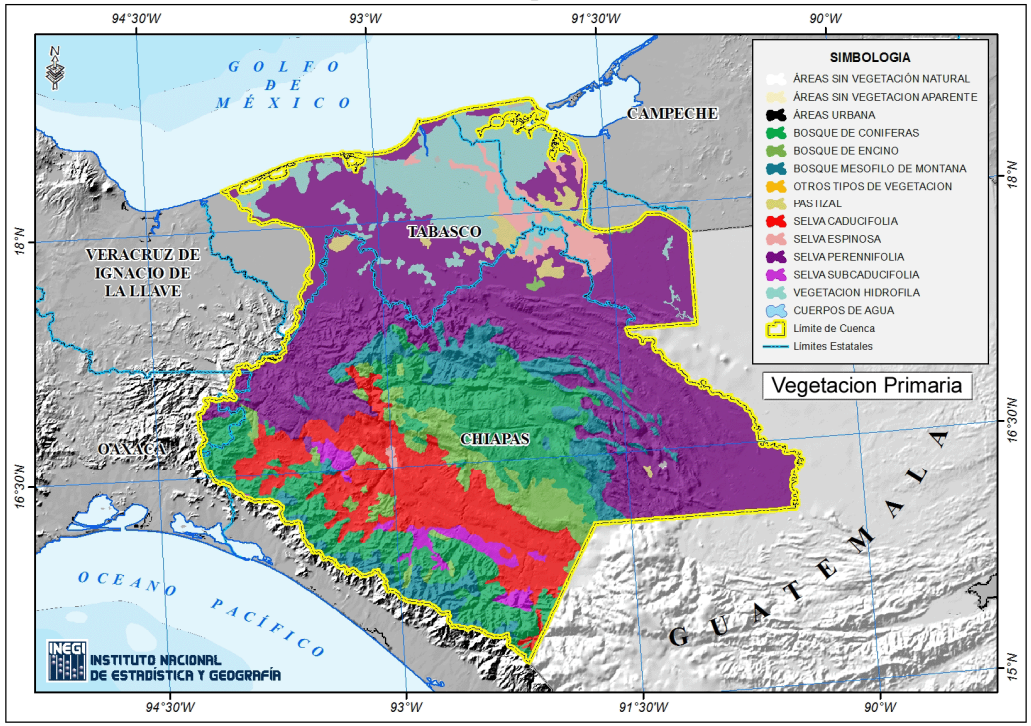


SDG 15. Life on land

Indicator 15.1.2 Forest area as a percentage of total land area

Indicator 15.2.1 Progress towards sustainable forest management

Cuenca Grijalva-Usumacinta



Source:

INEGI's Land Use and Vegetation Map Series
Visualized in the Digital Map of Mexico (various scales available)

SDG 15. Life on land

Target 2: By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

Indicator 15.2.2 Net permanent forest loss

Changes in tropical broadleaf evergreen forest can be estimated

Marqués de Comillas, Chiapas
Satellite images (from 2006 and 2013).

Indicator	Geographic coverage	Source	Disaggregation	National Results	
				2013	2015
1. Percentage of the population aged 18 and over that have been victims of corruption *(Population aged 18 and over who were victims of corruption in at least one procedure, payment or service made personally / Population of 18 years and over who performed at least one procedure, payment or request for service personally with a public official) x 100*	**National and by federal entity (states)**	**National Survey of Quality and Government Impact**	**Geo-referenced**	**12.1**	**12.6**

These indicators measure experiences with acts of **corruption** in the interaction with **public officials**

SDG Indicator 16.5.1

Proportion of persons who had at least one contact with a public official, and who paid a bribe to a public official, or were asked for a bribe by those public officials, during the previous 12 months

Link to public policy:
National Anti-Corruption System

SNIEG
Sistema Nacional de Información Estadística y Geográfica

Government & Justice Indicators

Indicator	Geographic coverage	Source	Disaggregation	National Results	
				2013	2015
2. Percentage of population aged 18 and over satisfied with basic public services, by type of service. *(Population aged 18 and over who is satisfied with basic public services / Population aged 18 and over who live in urban areas of 100,000 people and more) x 100*	**National** **by State**	**National Survey of Quality and Government Impact (ENCIG)**	**Garbage collection**	**67.3**	**61.0**
			Drinking water	**57.6**	**51.7**
			Public parks and gardens	**40.1**	**38.0**
			Street lighting	**35.3**	**33.0**
			Streets and avenues	**21.8**	**20.7**

This indicator is associated with measuring **quality in the provision of basic public services** at the municipal level

SDG Indicator 16.6.2

Proportion of the population satisfied with their last experience of public services

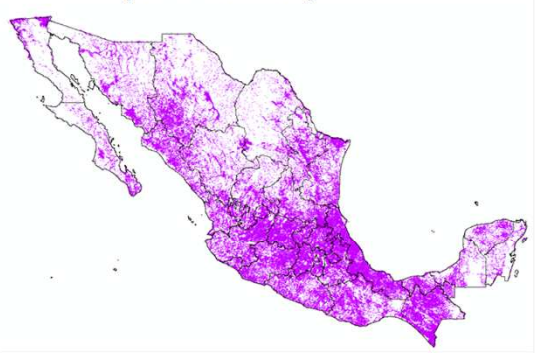
Note: Based on the upcoming ENCIG results, a drainage and sewer service indicator will be included.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

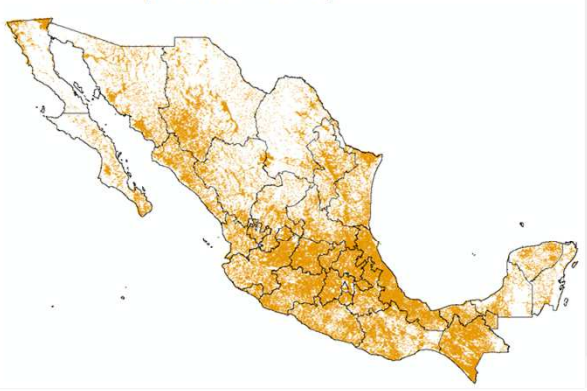
Calculation of indicator 9.1.1 using statistical and geospatial sources

Indicator 9.1.1
Proportion of the rural population who live within 2km of an all-season road

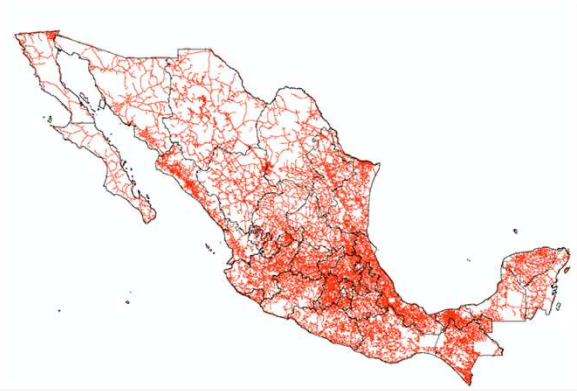
Total Populated Places
(Census 2010)



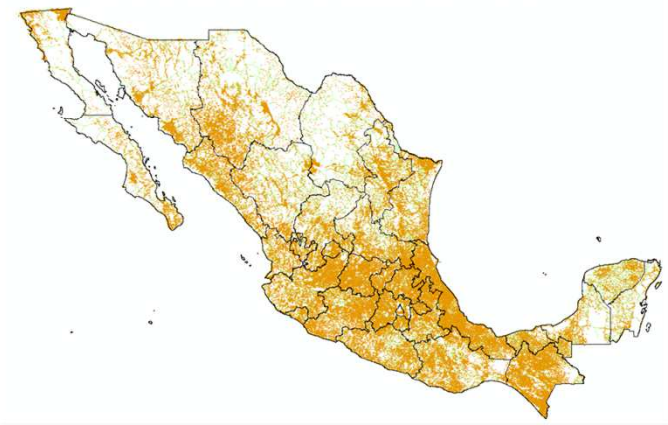
188,597 Rural Populated Places
(Census 2010)



All-season roads
(National Road Atlas)

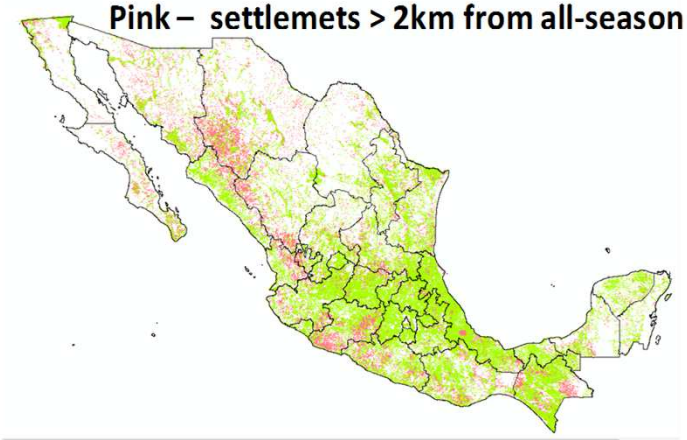


Rural settlements inside
a 2-km buffer from all-season roads



National Topographic Data Set 1:50,000.

Results:
Green – settlements < 2km of all-season roads
Pink – settlemets > 2km from all-season roads

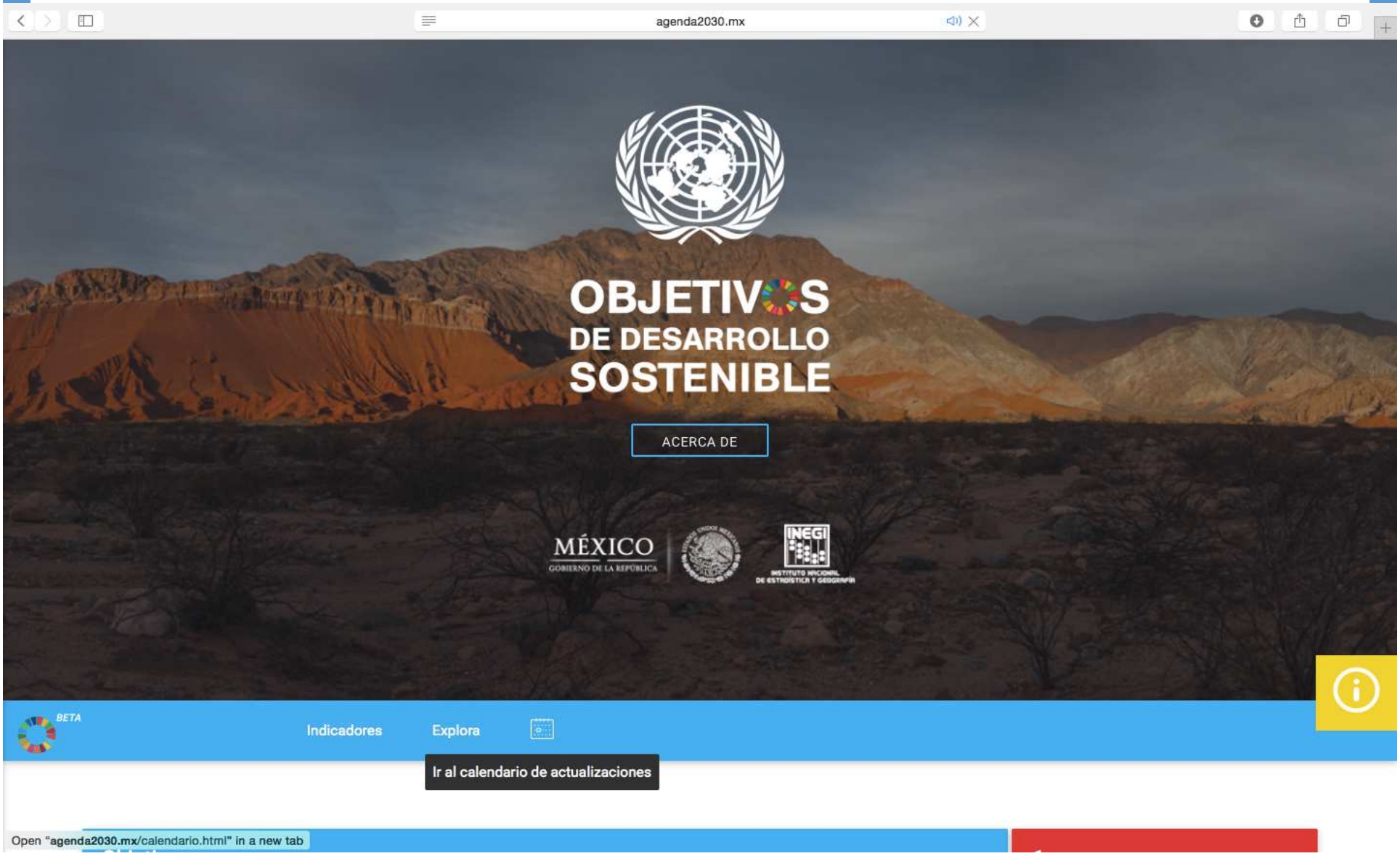


The National Council for Sustainable Development and Agenda 2030

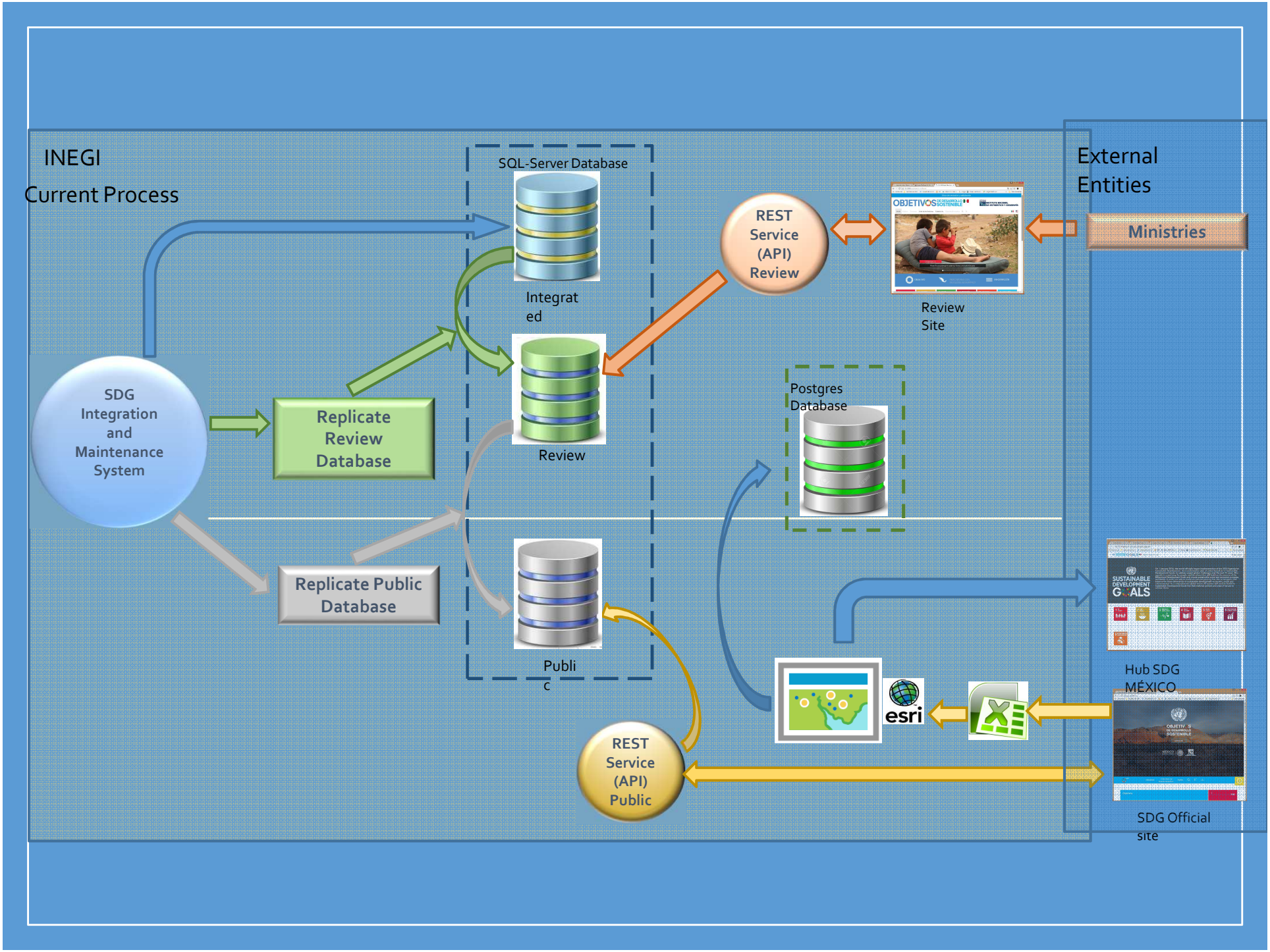
- Created by Executive Decree, and formally installed on April 26, 2017
- Conceived as a State-wide, **long-term commitment** at the highest level, transcending individual administrations
- It includes 18 line ministries, state and local governments, Congress, the private sector, academia and civil society;
- Decree includes modifications to the ***National Development Planning Law***, as well as to the ***2018 national budget***, in order to include provisions for SDG implementation.

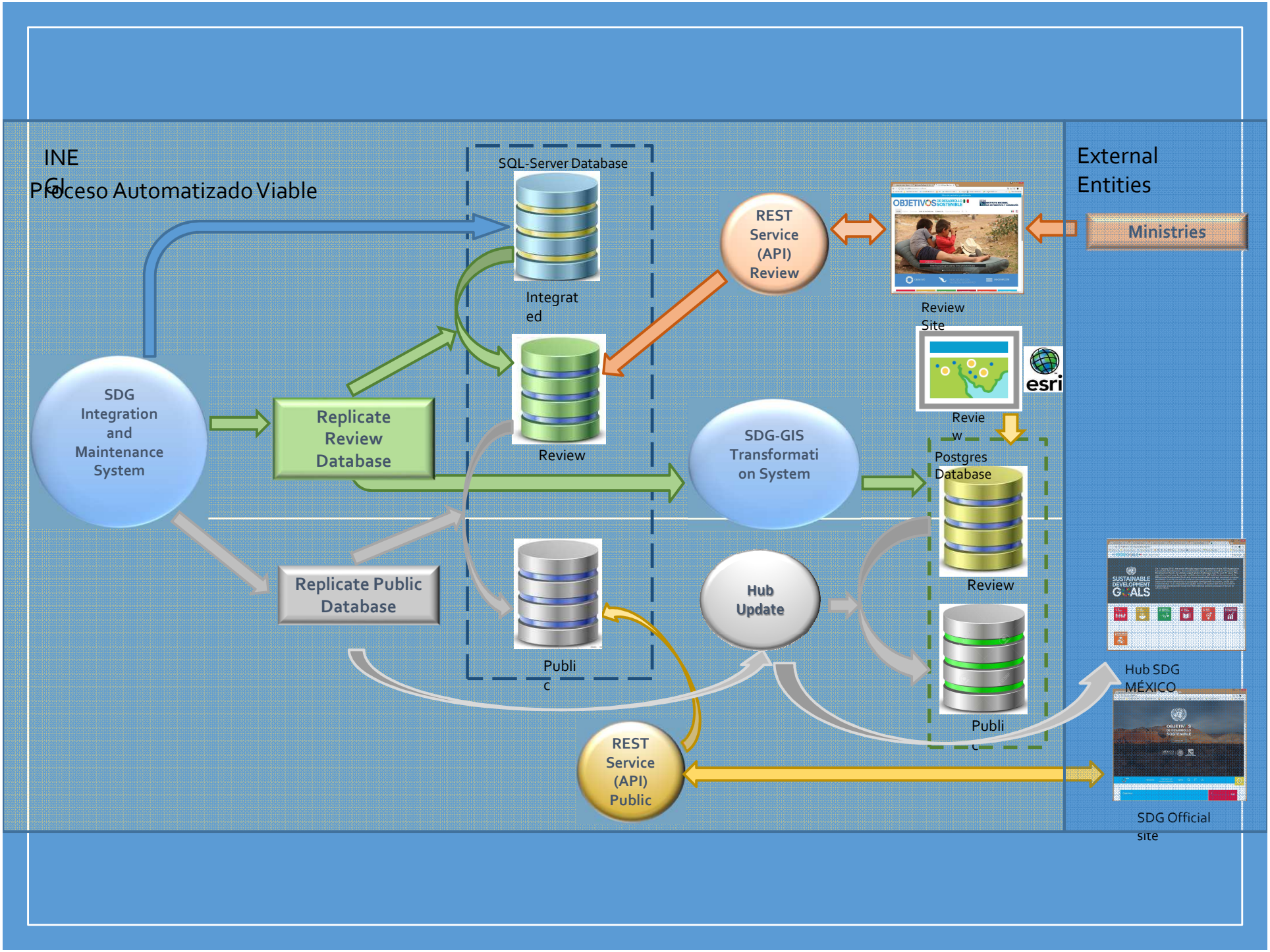
National Online Platform for the SDGs

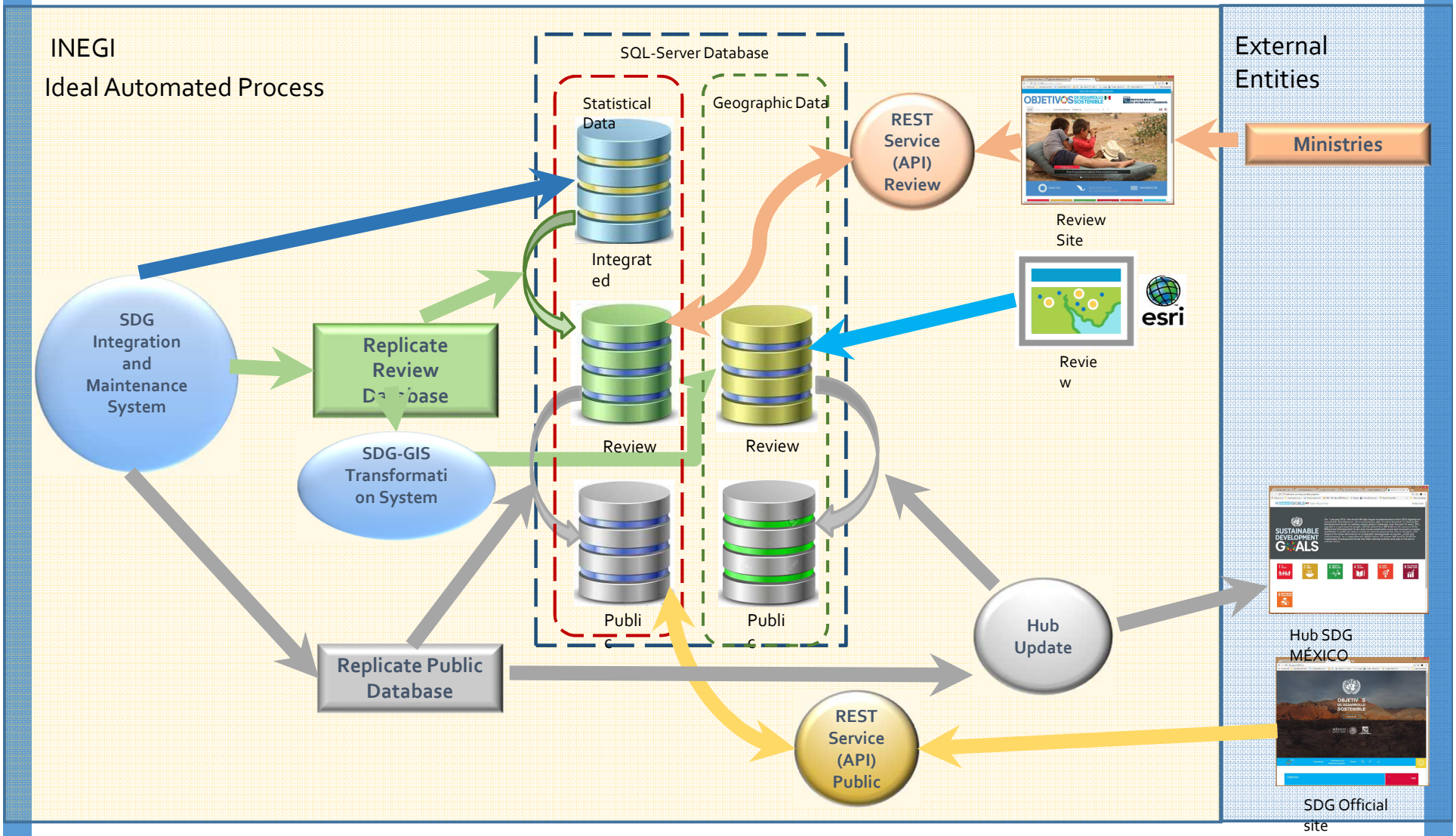
http://agenda2030.mx/

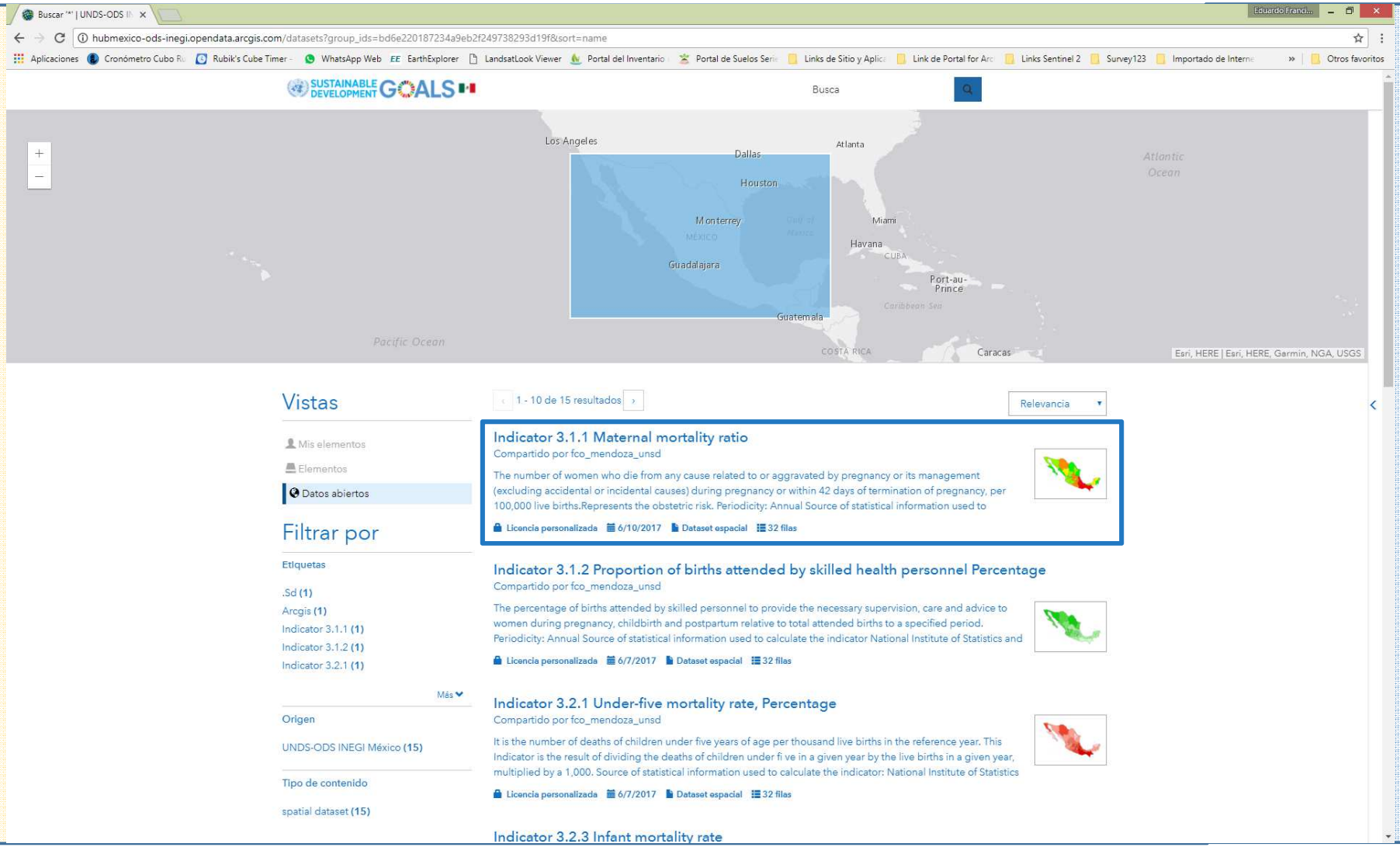


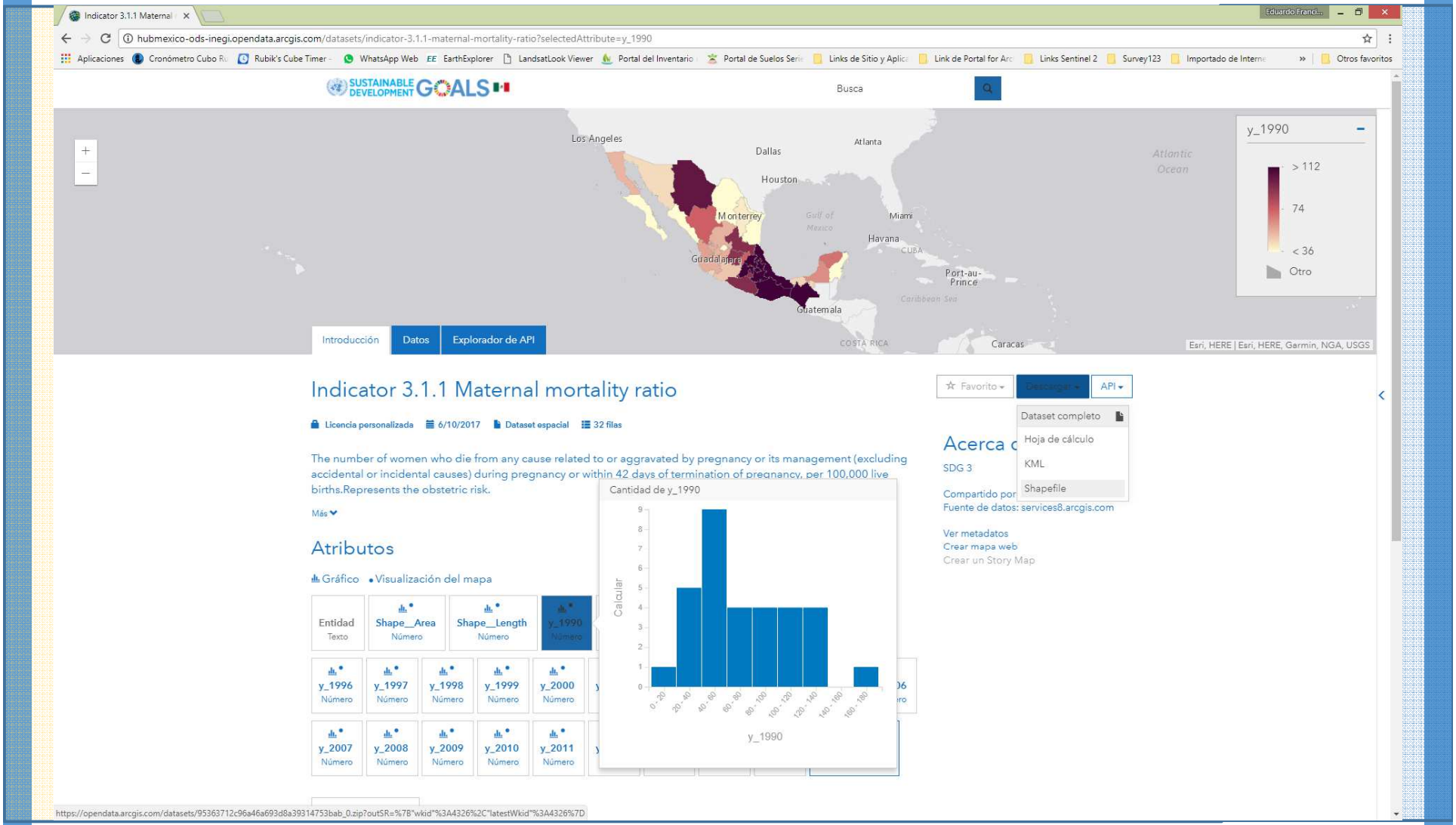

UNDS-ODS INEGI Méxic
hubmexico-ods-inegi.opendata.arcgis.com
SUSTAINABLE DEVELOPMENT GOALS
On 1 January 2016, the world officially began implementation of the 2030 Agenda for Sustainable Development–the transformative plan of action based on 17 Sustainable Development Goals–to address urgent global challenges over the next 15 years. This agenda is a road map for people and the planet that will build on the success of the Millennium Development Goals and ensure sustainable social and economic progress worldwide. It seeks not only to eradicate extreme poverty, but also to integrate and balance the three dimensions of sustainable development–economic, social and environmental–in a comprehensive global vision. All nations will need to build the Sustainable Development Goals into their national policies and plans if we are to achieve them.
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES
SUSTAINABLE DEVELOPMENT GOALS
INEGI

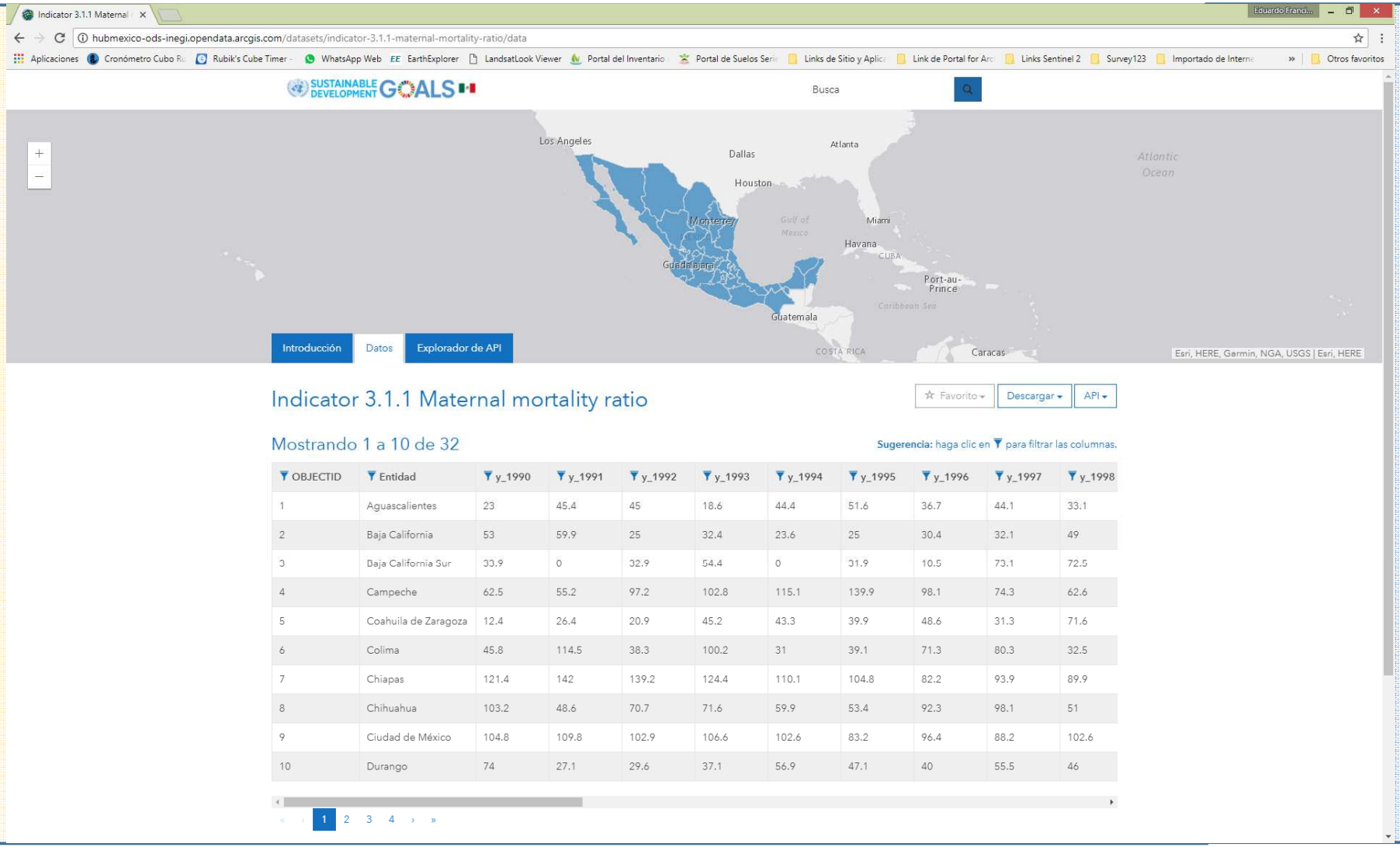

INEGI
Current Process
SQL-Server Database
Integrated
Review
Public
SDG Integration and Maintenance System
Replicate Review Database
Replicate Public Database
REST Service (API) Review
REST Service (API) Public
Postgres Database
External Entities
Ministries
Review Site
Hub SDG MÉXICO
SDG Official site
esri


INE
GI
Proceso Automatizado Viable
SQL-Server Database
Integrated
Review
Public
SDG Integration and Maintenance System
Replicate Review Database
Replicate Public Database
SDG-GIS Transformation System
Hub Update
REST Service (API) Review
REST Service (API) Public
External Entities
Ministries
Review Site
Review
Postgres Database
Review
Public
esri
Hub SDG MÉXICO
SDG Official site


INEGI
Ideal Automated Process
SQL-Server Database
Statistical Data
Geographic Data
Integrated
Review
Review
Public
Public
SDG Integration and Maintenance System
Replicate Review Database
SDG-GIS Transformation System
Replicate Public Database
REST Service (API) Review
Review Site
Review
esri
Ministries
External Entities
Hub Update
REST Service (API) Public
Hub SDG MÉXICO
SDG Official site


hubmexico-ods-inegi.opendata.arcgis.com/datasets?group_ids=bd6e220187234a9eb2f249738293d19f&sort=name
SUSTAINABLE DEVELOPMENT GOALS
Busca
Los Angeles
Dallas
Atlanta
Houston
Monterrey
Miami
Havana
Guadalajara
Port-au-Prince
Guatemala
Caracas
Atlantic Ocean
Pacific Ocean
Esri, HERE | Esri, HERE, Garmin, NGA, USGS
Vistas
Mis elementos
Elementos
Datos abiertos
Filtrar por
Etiquetas
.Sd (1)
Arcgis (1)
Indicator 3.1.1 (1)
Indicator 3.1.2 (1)
Indicator 3.2.1 (1)
Más
Origen
UNDS-ODS INEGI México (15)
Tipo de contenido
spatial dataset (15)
1 - 10 de 15 resultados
Relevancia
Indicator 3.1.1 Maternal mortality ratio
Compartido por fco_mendoza_unsd
The number of women who die from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy or within 42 days of termination of pregnancy, per 100,000 live births.Represents the obstetric risk. Periodicity: Annual Source of statistical information used to
Licencia personalizada 6/10/2017 Dataset espacial 32 filas
Indicator 3.1.2 Proportion of births attended by skilled health personnel Percentage
Compartido por fco_mendoza_unsd
The percentage of births attended by skilled personnel to provide the necessary supervision, care and advice to women during pregnancy, childbirth and postpartum relative to total attended births to a specified period. Periodicity: Annual Source of statistical information used to calculate the indicator National Institute of Statistics and
Licencia personalizada 6/7/2017 Dataset espacial 32 filas
Indicator 3.2.1 Under-five mortality rate, Percentage
Compartido por fco_mendoza_unsd
It is the number of deaths of children under five years of age per thousand live births in the reference year. This Indicator is the result of dividing the deaths of children under fi ve in a given year by the live births in a given year, multiplied by a 1,000. Source of statistical information used to calculate the indicator: National Institute of Statistics
Licencia personalizada 6/7/2017 Dataset espacial 32 filas
Indicator 3.2.3 Infant mortality rate


Indicator 3.1.1 Maternal
hubmexico-ods-inegi.opendata.arcgis.com/datasets/indicator-3.1.1-maternal-mortality-ratio?selectedAttribute=y_1990
SUSTAINABLE DEVELOPMENT GOALS
Busca
Los Angeles
Dallas
Atlanta
Houston
Monterrey
Gulf of Mexico
Miami
Havana
CUBA
Guadalajara
Port-au-Prince
Caribbean Sea
Guatemala
COSTA RICA
Caracas
Atlantic Ocean
y_1990
> 112
74
< 36
Otro
Esri, HERE | Esri, HERE, Garmin, NGA, USGS
Introducción
Datos
Explorador de API
Indicator 3.1.1 Maternal mortality ratio
Licencia personalizada
6/10/2017
Dataset espacial
32 filas
The number of women who die from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy or within 42 days of termination of pregnancy, per 100,000 live births.Represents the obstetric risk.
Más
Favorito
Descargar
API
Dataset completo
Hoja de cálculo
KML
Shapefile
Acerca d
SDG 3
Compartido por
Fuente de datos: services8.arcgis.com
Ver metadatos
Crear mapa web
Crear un Story Map
Atributos
Gráfico
Visualización del mapa
Entidad
Texto
Shape__Area
Número
Shape__Length
Número
y_1990
Número
y_1996
y_1997
y_1998
y_1999
y_2000
y_2007
y_2008
y_2009
y_2010
y_2011
Cantidad de y_1990
Calcular
y_1990
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
100 - 120
120 - 140
140 - 160
160 - 180
https://opendata.arcgis.com/datasets/95363712c96a46a693d8a39314753bab_0.zip?outSR=%7B"wkid"%3A4326%2C"latestWkid"%3A4326%7D



OBJECTID	Entidad	y_1990	y_1991	y_1992	y_1993	y_1994	y_1995	y_1996	y_1997	y_1998
1	Aguascalientes	23	45.4	45	18.6	44.4	51.6	36.7	44.1	33.1
2	Baja California	53	59.9	25	32.4	23.6	25	30.4	32.1	49
3	Baja California Sur	33.9	0	32.9	54.4	0	31.9	10.5	73.1	72.5
4	Campeche	62.5	55.2	97.2	102.8	115.1	139.9	98.1	74.3	62.6
5	Coahuila de Zaragoza	12.4	26.4	20.9	45.2	43.3	39.9	48.6	31.3	71.6
6	Colima	45.8	114.5	38.3	100.2	31	39.1	71.3	80.3	32.5
7	Chiapas	121.4	142	139.2	124.4	110.1	104.8	82.2	93.9	89.9
8	Chihuahua	103.2	48.6	70.7	71.6	59.9	53.4	92.3	98.1	51
9	Ciudad de México	104.8	109.8	102.9	106.6	102.6	83.2	96.4	88.2	102.6
10	Durango	74	27.1	29.6	37.1	56.9	47.1	40	55.5	46

Main challenges

- Budgetary issues. Most information comes from census and surveys; immense human and financial resources are needed to make them representative across a heterogeneous country, and at the state and municipal levels;

- Need to improve and integrate administrative records; many gaps, harmonization and digitalization issues remain;

- Need to make geospatial dimension really cross-cutting, to support the four dimensions of Sustainable Development, as well as throughout SDG reporting.

Conclusions

- Having statistics and geography in a single national institution has allowed Mexico for a better integration and use of complementary information systems;
- With the associated tools from this integration, it is possible to geo-reference relevant statistics;
- Integration determines location of economic and social inequalities, overall needs, as well as risks and damages from natural disasters;
- The use of integrated geographic and statistical data allows for better design and monitoring of public policies and internationally-agreed goals—such as the SDGs.