



Geospatial Information and the Sustainable Development Goals in Mexico

UNSC Forum on Geospatial Information and Earth Observations: Supporting Official Statistics in Monitoring the SDGs

United Nations
7 March 2016



INSTITUTO NACIONAL
DE ESTADÍSTICA Y GEOGRAFÍA

Rolando Ocampo
Vice-President, INEGI - MEXICO

Contents

- Background
- Institutional setting:
 - National System of Statistical and Geographical Information
 - Lessons learned from monitoring the Millennium Development Goals
 - On strategy
- The role of national geospatial information
- The agenda 2030 and the Sustainable Development Goals
- Conclusions



Background



INSTITUTO NACIONAL
DE ESTADÍSTICA Y GEOGRAFÍA

The UN-GGIM Vision

Agenda

Aims

- Reduce gaps between countries
- Allow for global and regional decision-making
- Articulate mandate by Governments
- High level coordination
- National and Global policy frameworks
- Geospatial capacity building
- Address global issues as a community

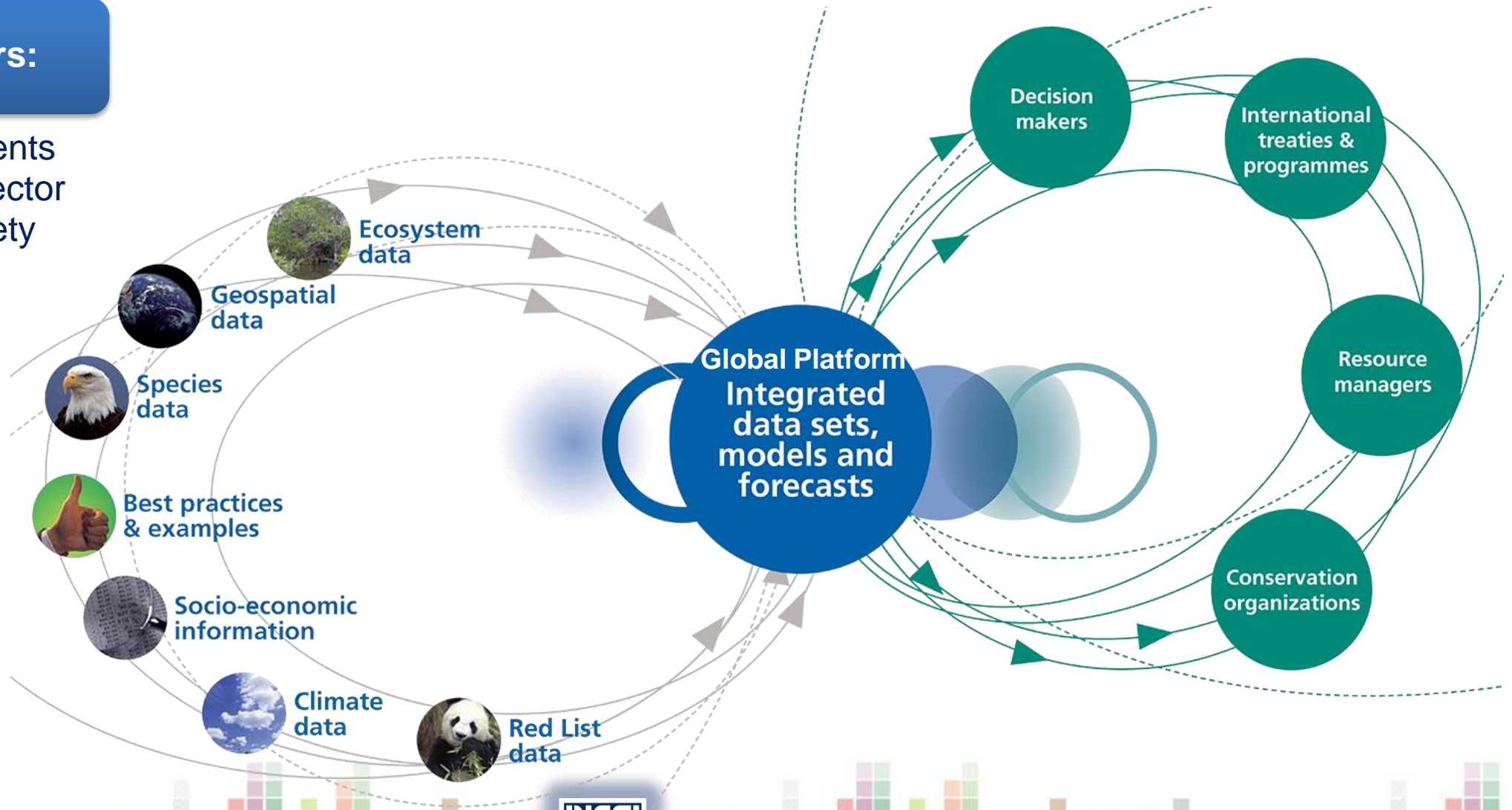


-  Global geodetic reference frame.
-  Global map for sustainable development.
-  Legal and policy frameworks.
-  Standards and Technical Specifications.
-  Integration of geospatial and statistical information.
-  Land Administration and Management
-  2030 Agenda for Sustainable Development
-  Geospatial Information and Services for Disasters

The GEO Vision

Data Providers:

- Governments
- Private Sector
- Civil Society
- Academia





I. Experience of Mexico



INSTITUTO NACIONAL
DE ESTADÍSTICA Y GEOGRAFÍA

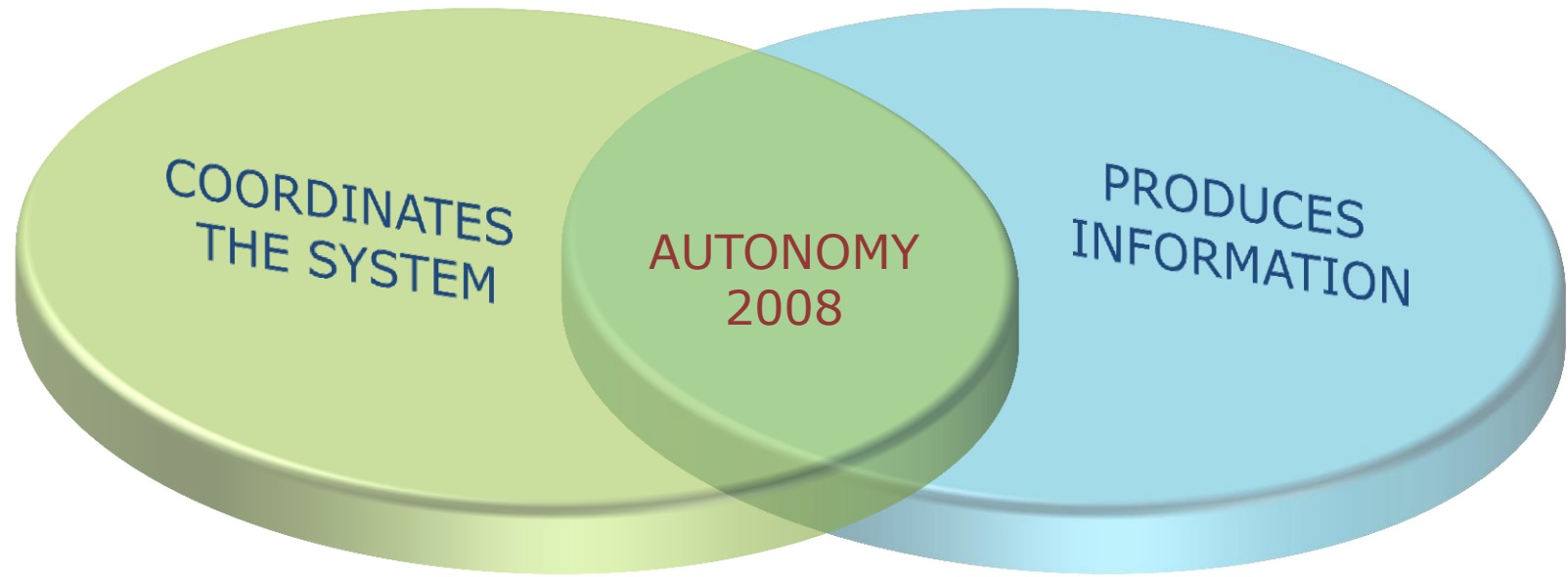
National Institute of Statistics and Geography INEGI

3 Key Elements

Geospatial and Statistical
Information in a single
Institution since 1983

Autonomous since 2008

Coordinates National System
of Statistical and Geographic
Information (SNIEG)



The National Statistical and Geographical Information System in Mexico



National Information Subsystems

Specialized Technical Committees



Lessons learned from monitoring the Millennium Development Goals

Technical Committee on MDG (now SDG) Indicators

President of the Committee

MÉXICO
PRESIDENCIA DE LA REPÚBLICA



Technical Secretary



Rapporteur



Members

SALUD
SECRETARÍA DE SALUD



SEP
SECRETARÍA DE EDUCACIÓN PÚBLICA



SEMARNAT
SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES



SRE
SECRETARÍA DE RELACIONES EXTERIORES



SEDESOL
SECRETARÍA DE DESARROLLO SOCIAL



STPS
SECRETARÍA DEL TRABAJO Y PREVISIÓN SOCIAL



SEDATU
SECRETARÍA DE DESARROLLO AGROARIO, TERRITORIAL Y URBANO



Invited Institutions



Geographical coverage of the MDGs indicators

Total	National	By State	By State and Municipality	Urban and rural
80	26	52	17	7

UN agreed MDG indicators: 48

National adjustments

Beyond the MDGs: 22

Reformulated: 10

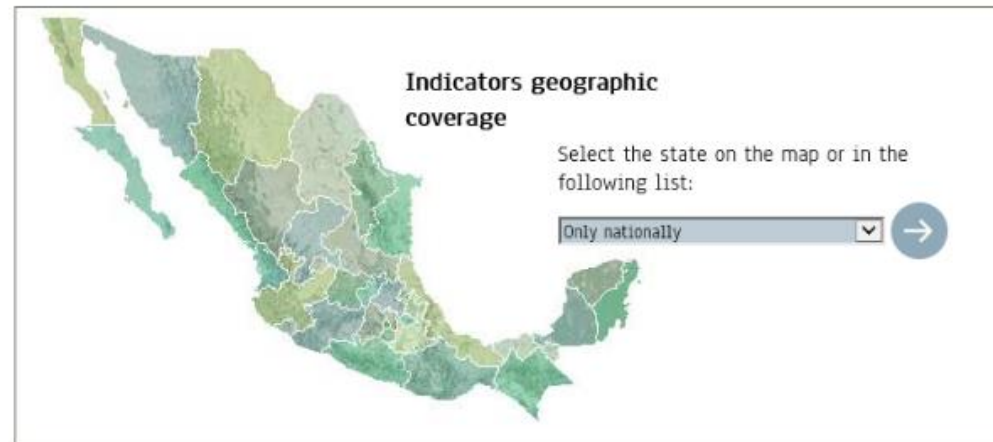
TOTAL FOR MEXICO: 80

A consolidated web platform for MDG monitoring

- Open Access
- Coordinated by INEGI
- Compiles information from all State agencies and institutions
- Data and metadata available
- Calendar for periodic updating
- Transparency in monitoring



The screenshot shows the SIODM (Sistema Integrado de Observación y Monitoreo de los Objetivos de Desarrollo del Milenio) web platform. The header includes the SIODM logo, the text 'MILLENNIUM DEVELOPMENT GOALS', the Mexican government logo 'MÉXICO GOBIERNO DE LA REPÚBLICA', and the INEGI logo 'INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA'. A navigation menu contains 'INDICATORS | CALENDAR | CONTACT | ESPAÑOL |' with a map icon. A search bar is present with a magnifying glass icon and a search button. Below the header, a main heading reads 'Consult municipality indicators, comparative summaries and thematic maps by municipalities.' A large text block describes the MDGs: 'Global effort to eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child and maternal mortality; improve reproductive health; combat HIV / AIDS, malaria and other diseases; ensure environmental sustainability; and develop a global partnership for development.' To the right of this text is a photograph of a smiling young boy holding a piece of bread.



The screenshot shows the 'Indicators geographic coverage' interface. It features a map of Mexico with state boundaries. To the right of the map, the text reads 'Indicators geographic coverage' and 'Select the state on the map or in the following list:'. Below this is a dropdown menu with 'Only nationally' selected and a right-pointing arrow button.

- Data at state and municipal levels for certain indicators



Target 7.C. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation

7.8. Proportion of population with regular access to an improved drinking water source - Reformulated

Indicator Metadata Historical series Data for calculations Map   

1990 - 2010
(Percentage)

State	2010		
	Total	Non rural	Rural
Estados Unidos Mexicanos	90.9	95.6	75.7
Aguascalientes	98.8	99.7	95.3
Baja California	95.9	97.6	74.5
Baja California Sur	92.6	94.4	80.6
Campeche	90.0	92.4	83.0
Coahuila de Zaragoza	98.3	99.2	90.4
Colima	98.6	99.5	91.3
Chiapas	77.3	87.5	67.5
Chihuahua	94.6	98.3	74.2
Distrito Federal	97.7	97.9	44.9
Durango	93.9	99.3	82.1
Guanajuato	94.4	97.0	88.4
Guerrero	69.8	81.1	54.2
Hidalgo	90.7	96.9	83.9
Jalisco	95.8	97.4	85.3
Mexico	94.0	96.2	79.5
Michoacan de Ocampo	91.6	95.4	83.5
Morelos	91.5	95.4	71.0
Nayarit	92.4	96.7	82.8
Nuevo Leon	96.6	97.8	73.7
Oaxaca	76.1	85.5	67.7
Puebla	87.2	90.5	78.9
Queretaro	94.7	98.2	86.6

Aguascalientes			
Municipality	2010		
	Total	Non rural	Rural
Aguascalientes	99.1	NA	NA
Asientos	97.8	NA	NA
Calvillo	98.1	NA	NA
Cosio	99.5	NA	NA
Jesus Maria	98.3	NA	NA
Pabellon de Arteaga	98.4	NA	NA
Rincon de Romos	98.5	NA	NA
San Jose de Gracia	97.1	NA	NA
Tepezala	99.1	NA	NA
El Llano	98.0	NA	NA
San Francisco de los Romo	99.2	NA	NA

Note: In the 1990 Census and the 1995 Count in the variable Availability of Running Water "from another household" was not captured.
The rural communities of less than 2500 inhabitants and those of non rural 2500 and more inhabitants are considered.

NA Does not apply.

Source: INEGI Censo General de Población y Vivienda (varios años) y Conteo de Población y Vivienda (varios años).

7. ENSURE ENVIRONMENTAL SUSTAINABILITY

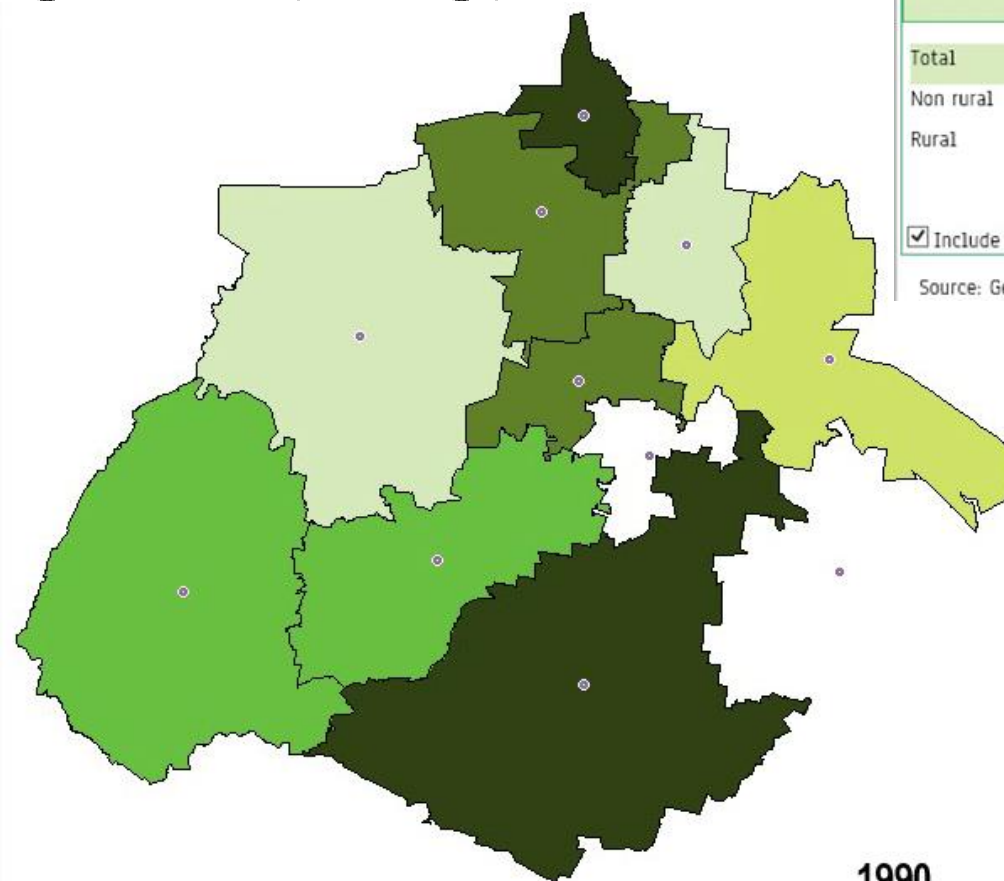
MDG 7. ENSURE ENVIRONMENTAL SUSTAINABILITY

Target 7.C. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation

7.8. Proportion of population with regular access to an improved drinking water source - **Reformulated**

Example of geo-referenced data showing progress for MDG indicator 7.8 by municipality, over time

Aguascalientes (Percentage)



Indicator/classification	Range
Total	From 95.5 to 96.7
Non rural	From 93.2 to less than 95.5
Rural	From 92.1 to less than 93.2
	From 90.9 to less than 92.1
	From 85.1 to less than 90.9

Include municipality data.

Source: Geostatistical boundary. MGN Ver. 5.0 - Population and Housing Census, 2010

1990

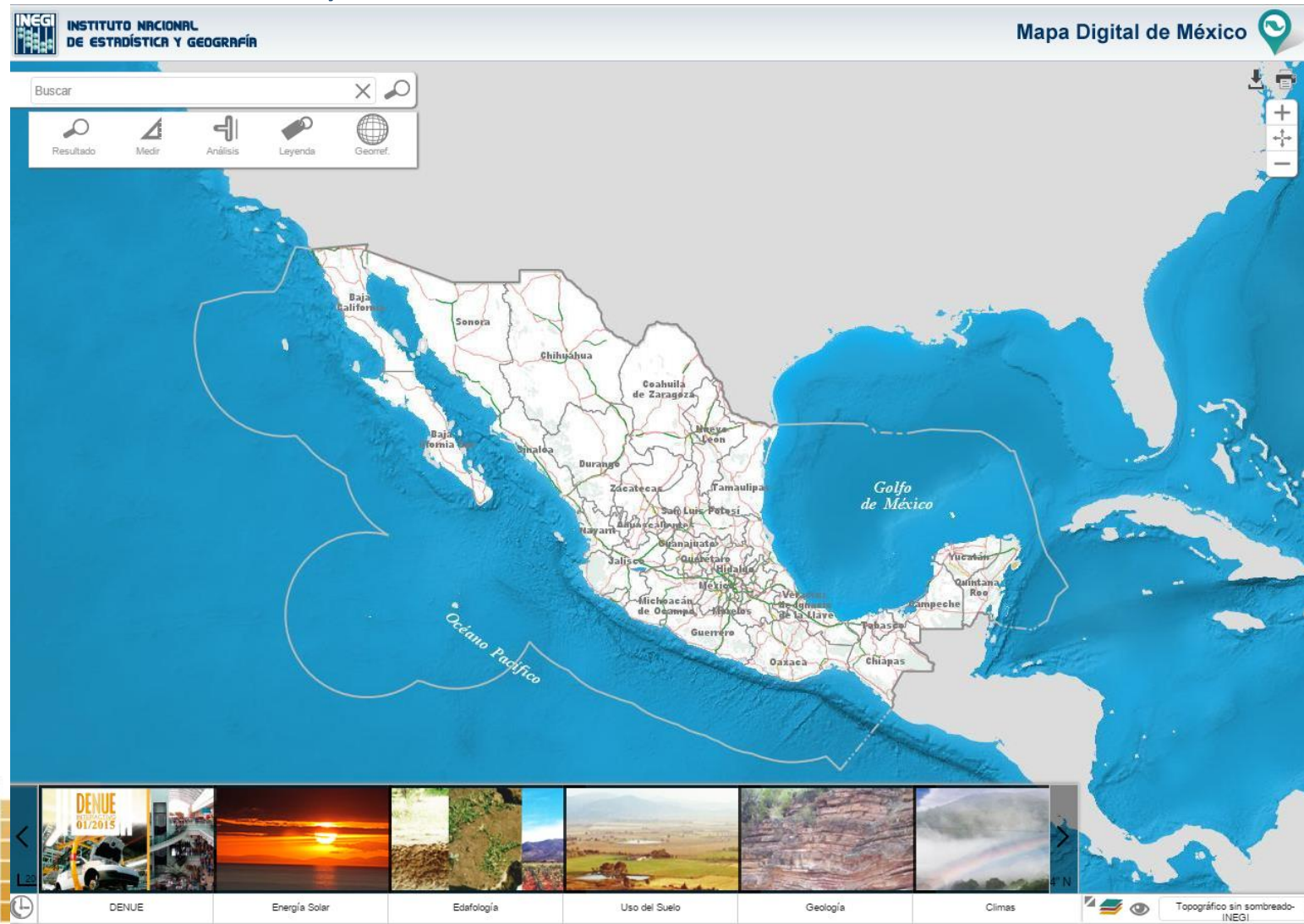


II. The role of national geospatial information



Digital Map of Mexico

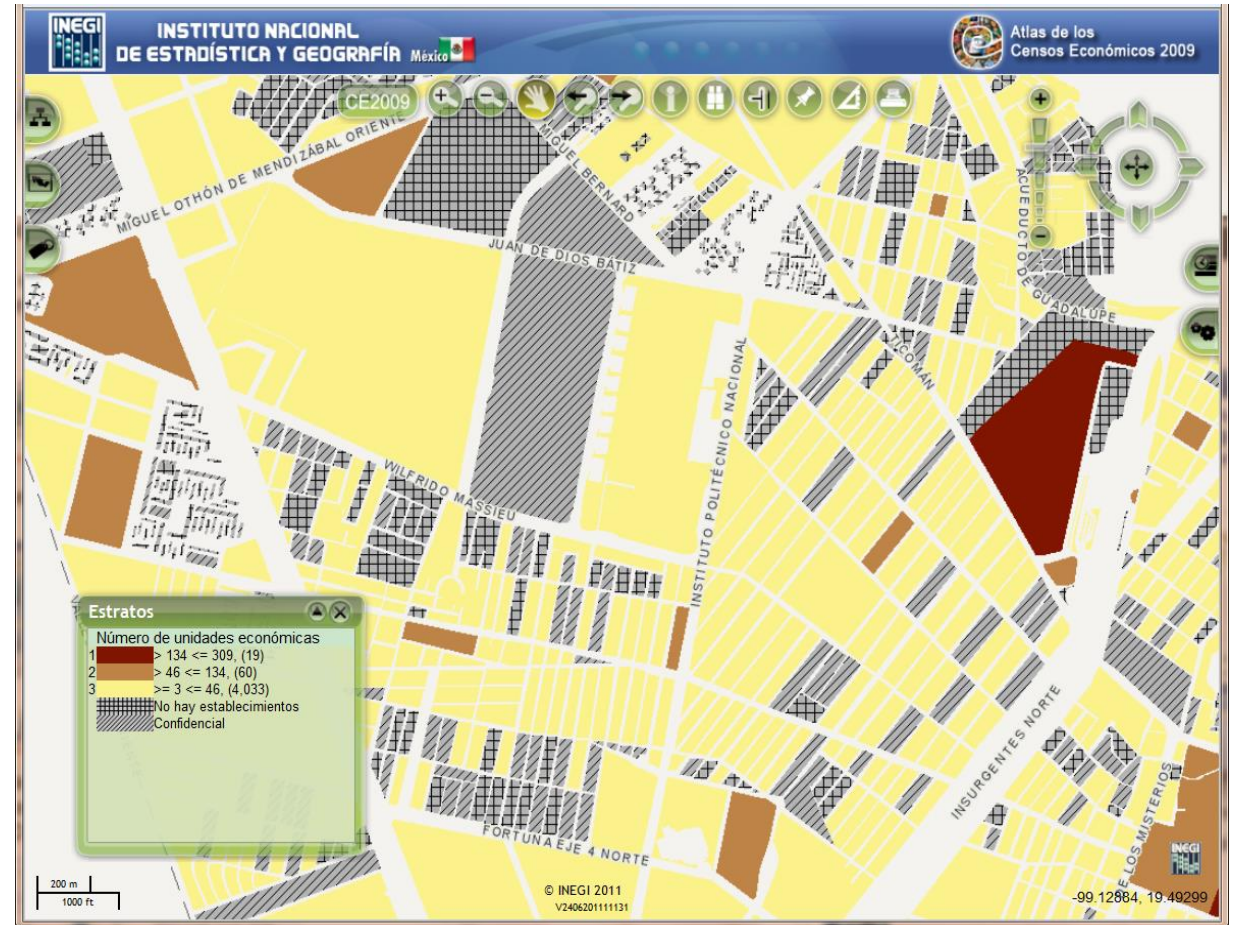
Open-source geomatic platform that allows the visualization and analysis of geographic and geo-referenced statistical information. It contains 208 vector data layers, with more than 71 million geographic objects and 4 raster layers covering the entire country.



Economic Census Atlas



Total economic units by state



Total economic units by block in Mexico City's center

DENUE (Business Register)

INEGI INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA

Inicio | Contacto | INEGI Móvil | Síguenos: RSS | Twitter | Facebook | YouTube

Directorio Estadístico Nacional de Unidades Económicas

Introduzca su búsqueda:

Actividad económica Tamaño del establecimiento Área geográfica Variables adicionales

Presentación

El Directorio Estadístico Nacional de Unidades Económicas ofrece información sobre la identificación y ubicación de todos los establecimientos activos en el territorio nacional, de acuerdo a los datos recabados durante la Actualización de Unidades Económicas 2013.

Por ello, constituye una herramienta fundamental para la toma de decisiones en los ámbitos público y privado.

Derivado de esta actualización, se incorporaron 36 mil 268 unidades económicas y se dieron de baja 27 mil 13 que se encontraron cerradas. Así, de las 4 millones 400 mil 943 unidades económicas que estaban registradas en la versión anterior del Directorio, ahora se presentan 4 millones 410 mil 198.

Ahora se presenta una mejora en el sistema de consulta con la versión del DENUE interactivo 10/2013, en donde los informantes registrados o personal autorizado pueden actualizar la información en línea; además de publicar información de tipo comercial, con lo que es posible generar valor agregado a la información de cada uno de los establecimientos.

[Ver más](#)

Mapa de Guadalajara: Muestra una densa distribución de unidades económicas representadas por puntos multicolores (rojo, verde, azul, amarillo) sobre un mapa de Google Maps. Se ven calles como Avenida de la Bandera y Avenida de la Libertad. Coordenadas: 20°38'35.71" N 103°17'11.18" O, elevación 1566 m.

Economic units in Guadalajara

Área geográfica Variables adicionales

Ir a INV Todas las unidades

Información general Información comercial Más información

ID:	6105627
Nombre de la unidad económica:	ENTREGAS PUNTUALES S DE RL DE CV
Razón social:	ENTREGAS PUNTUALES S DE RL DE CV
Código de la clase de actividad:	482110
Nombre de la clase de actividad:	SERVICIOS DE MENSAJERÍA Y PAQUETERÍA FORÁNEA
Personal ocupado (estrato):	11 A 30 PERSONAS
Tipo de vialidad:	CALLE
Nombre de la vialidad:	DOCTOR R. MICHEL
Número exterior o km:	1214
Edificio, piso o nivel:	
Número o letra interior:	
Tipo del asentamiento humano:	COLONIA
Nombre del asentamiento humano:	SAN CARLOS
Tipo del Corredor Industrial:	

Mapa de Guadalajara: Muestra el mismo mapa de unidades económicas, pero con un pop-up de información detallada para una unidad específica. Coordenadas: 20°38'59.12" N 103°20'30.66" O, elevación 1548 m.

Data for one economic unit

Big Data for the environment

Modelling meteorological data to identify climate change trends
(national and subnational) over the last century

Mapping of 5454 individual meteorological stations, with temperature and rainfall data from the last 100 years

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



Gender Atlas

Official Launch in March 2016

**46 Gender-related indicators
(geo-referenced)**

10 main areas:

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

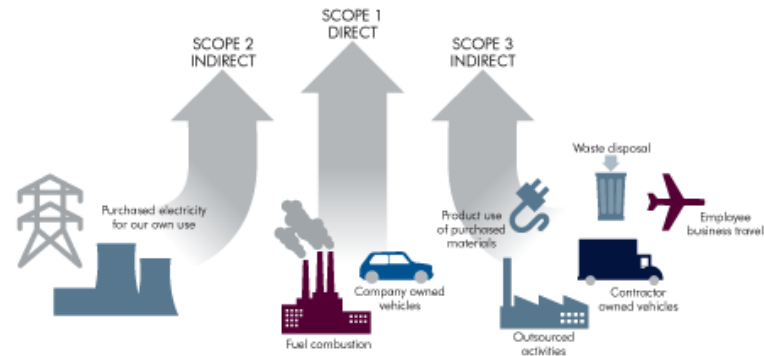


ANNUAL OPERATION CERTIFICATE (COA Web)

- 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:

- 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 tonnes or more of CO2 or equivalent compounds
- Greenhouse Gases (GHG)
(transport, agricultural, trade & services, etc).

- Reporting is compulsory and free of charge;
- Information is validated and updated in real time
- Reporting fields include standardized physical addresses



ANNUAL OPERATION CERTIFICATE (COA Web)

- All information about the location of the industries is geo-referenced, considering Technical Geographic Standards (Geographic Addresses)

The image displays three screenshots of the COA Web interface, illustrating the geo-referencing process for industrial locations. Each screenshot shows a map and a corresponding data entry form.

Top Left Screenshot: Shows a map of Mexico with the Gulf of Mexico. The form below it includes fields for:
- Latitud Norte: [grados] [minutos] [segundos]
- Longitud Oeste: [grados] [minutos] [segundos]
- Altura en metros sobre el nivel del mar: []
- Tipo de la vialidad: [Seleccionar...] Nombre de vialidad: [] Número exterior: []
- Número exterior anterior: [] Número interior: []
- Tipo de asentamiento humano: [Seleccionar...] Nombre del asentamiento humano: []

Top Right Screenshot: Shows a map of Aguascalientes. The form below it includes:
- Latitud Norte: [grados] [minutos] [segundos]
- Longitud Oeste: [grados] [minutos] [segundos]
- Altura en metros sobre el nivel del mar: []
- Tipo de la vialidad: [Seleccionar...] Nombre de vialidad: [] Número exterior: []
- Número exterior anterior: [] Número interior: []
- Tipo de asentamiento humano: [Seleccionar...] Nombre del asentamiento humano: []

Bottom Center Screenshot: Shows a detailed map of a residential area. The form below it includes:
- Latitud Norte: [grados] [minutos] [segundos]
- Longitud Oeste: [grados] [minutos] [segundos]
- Altura en metros sobre el nivel del mar: []
- Tipo de la vialidad: [Seleccionar...] Nombre de vialidad: [] Número exterior: []
- Número exterior anterior: [] Número interior: []
- Tipo de asentamiento humano: [Seleccionar...] Nombre del asentamiento humano: []

At the bottom of the interface, there are two buttons: "Aceptar" and "Cancelar".

GEO-STATISTICAL INTEGRATION to MONITOR NATIONAL PRIORITIES & SDGs

Satellite Imagery	Other sources	National Uses	SDG / other applications
<p>High resolution (2.5 m)</p> <p>SPOT ERMEX</p> <p>Very high resolution (0.5 m)</p> <p>GEOEYE EVISMAR</p>	<p>Population Census</p> <p>National Housing Inventory</p> <p>Economic Census</p> <p>Technical Standard on addresses</p> <p>COA-Web</p> <p><i>In situ validation</i></p>	<p>Geo-statistical framework</p> <p>Updating of: Topographic charts</p> <p>Visualization of: Population, Economic, Housing, Gender, Health, Education & public services</p> <p>Urban & rural development</p> <p>Water and sanitation</p> <p>Infrastructure</p> <p>GHG emissions/hzd waste</p>	<ol style="list-style-type: none"> 1. No poverty 2. Zero hunger 3. Health and well-being 4. Quality education 5. Gender equality 6. Water and sanitation 7. Affordable & clean energy 8. Decent work & economic growth 9. Industry & infrastructure 10. Reduced Inequalities 11. Sustainable cities & communities 12. Life on land
<p>Medium resolution (5-30m)</p> <p>RAPIDEYE LANDSAT</p>	<p>Natural resources & topographic charts</p> <p>Forestry & water data</p> <p><i>In situ validation</i></p>	<p>Land Use & Vegetation map series</p> <p>Deforestation, land use changes</p> <p>Monitoring crops</p>	<ol style="list-style-type: none"> 2. Zero hunger 16. Clean water and sanitation 13. Climate action 14. Life below water 15. Life on land
<p>Low resolution (250 m)</p> <p>MODIS</p>	<p>Topographic maps</p> <p>Land use & vegetation</p>	<p>Disaster monitoring</p> <p>Fires, large flooding</p>	<p>Sendai Framework</p> <p>Climate action</p>
<p>Radar</p> <p>RADARSAT</p>		<p>Disaster monitoring</p> <p>Flooding, digital models in foggy areas</p>	<p>Sendai Framework</p> <p>Climate action</p>

Examples of disaggregated
Geospatial data that can be used to build
indicators





INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA

National Housing Inventory 2015

Aguascalientes, Total population per block



2005

Fechas de imágenes: 6/20/2008 / 21°53'49.21" N 102°18'25.18" O elevación 1871 m alt. ojo 3.43 km

Google earth
Condiciones de uso



INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA

Available Street Lighting

Disponibilidad de alumbrado público

- Dispone
- No dispone
- No especificado
- No aplica
- Conjunto habitacional



2005

Fechas de imágenes: 6/20/2008 8 21°54'25.47" N 102°17'55.22" O, elevación, 1882 m alt. ojo 5.54 km



Condiciones de uso



Available Wheelchair Ramps

INSTITUTO NACIONAL DE ESTADÍSTICA Y GEOGRAFÍA

Disponibilidad de rampa para silla de ruedas

- Dispone
- No dispone
- No especificado
- No aplica
- Conjunto habitacional

1001 m



Condiciones de uso



III. Agenda 2030 and the Sustainable Development Goals





The current list of indicators SDG was analyzed in the national context, according to the following criteria:

- **Possibility of being georeferenced**
- **Level of disaggregation**
- **Identification of the information producer**
- **Possibility of derivation from the processing of remote sensing imagery**

According to INEGI's experience in geospatial information, some SDG indicators can be spatially referenced, as follows...

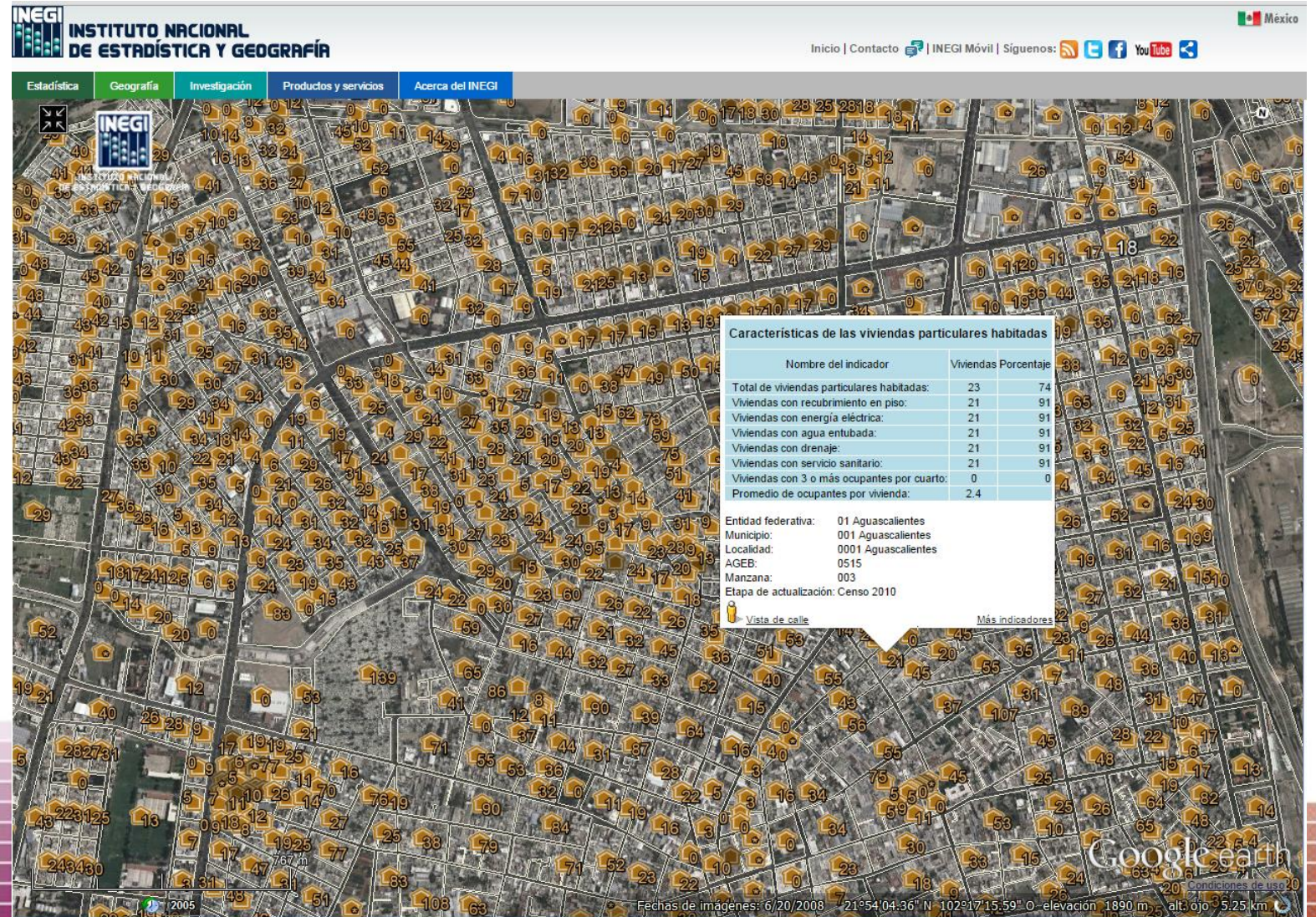
SDG 1 - No poverty

Target 4: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance.

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

Use of the geo-referenced National Housing Inventory

Visualized within the Digital Map of Mexico

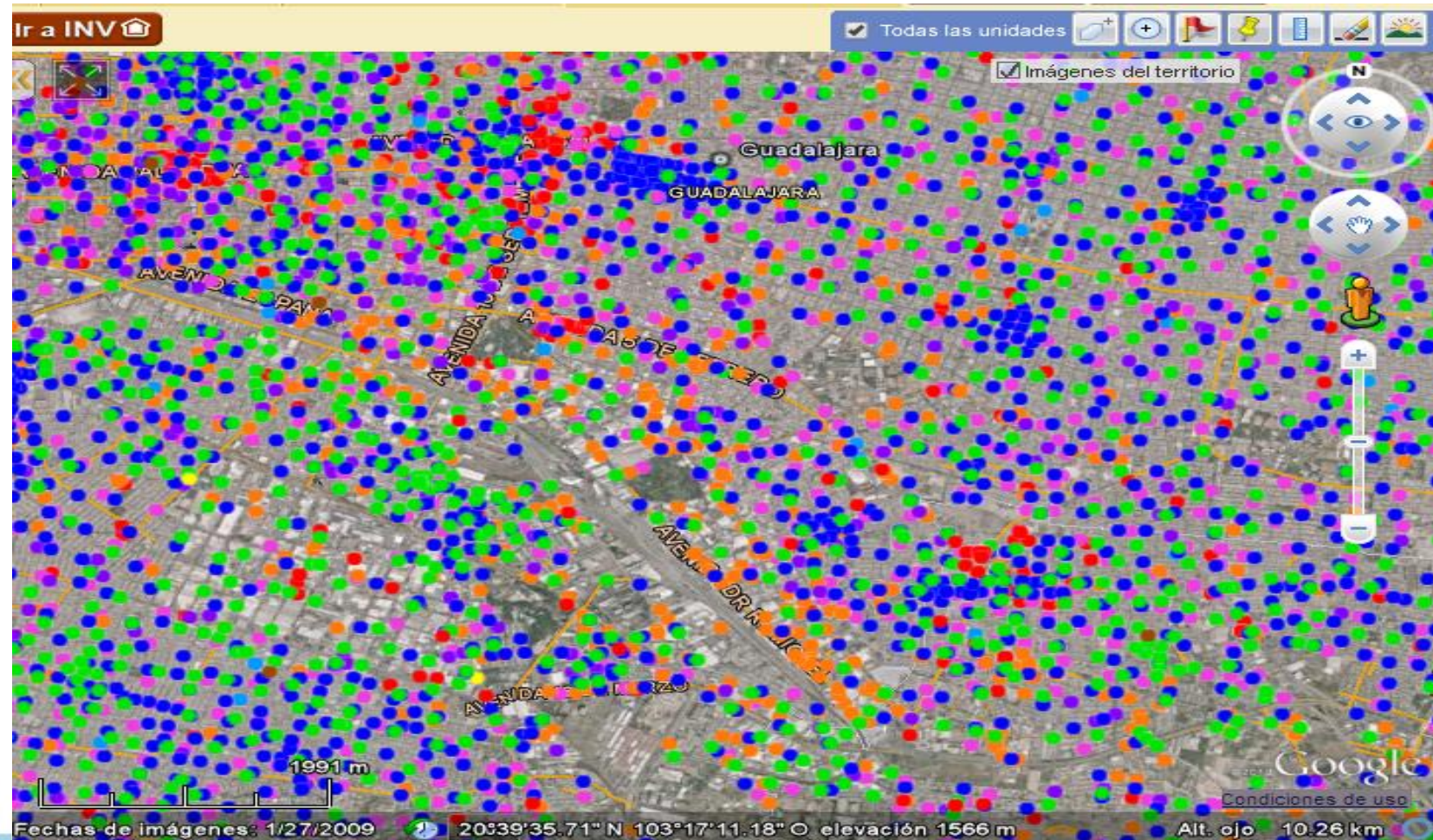


SDG 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Target 8.3 : Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

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

National Employment Survey
visualized within the
Digital Map of Mexico

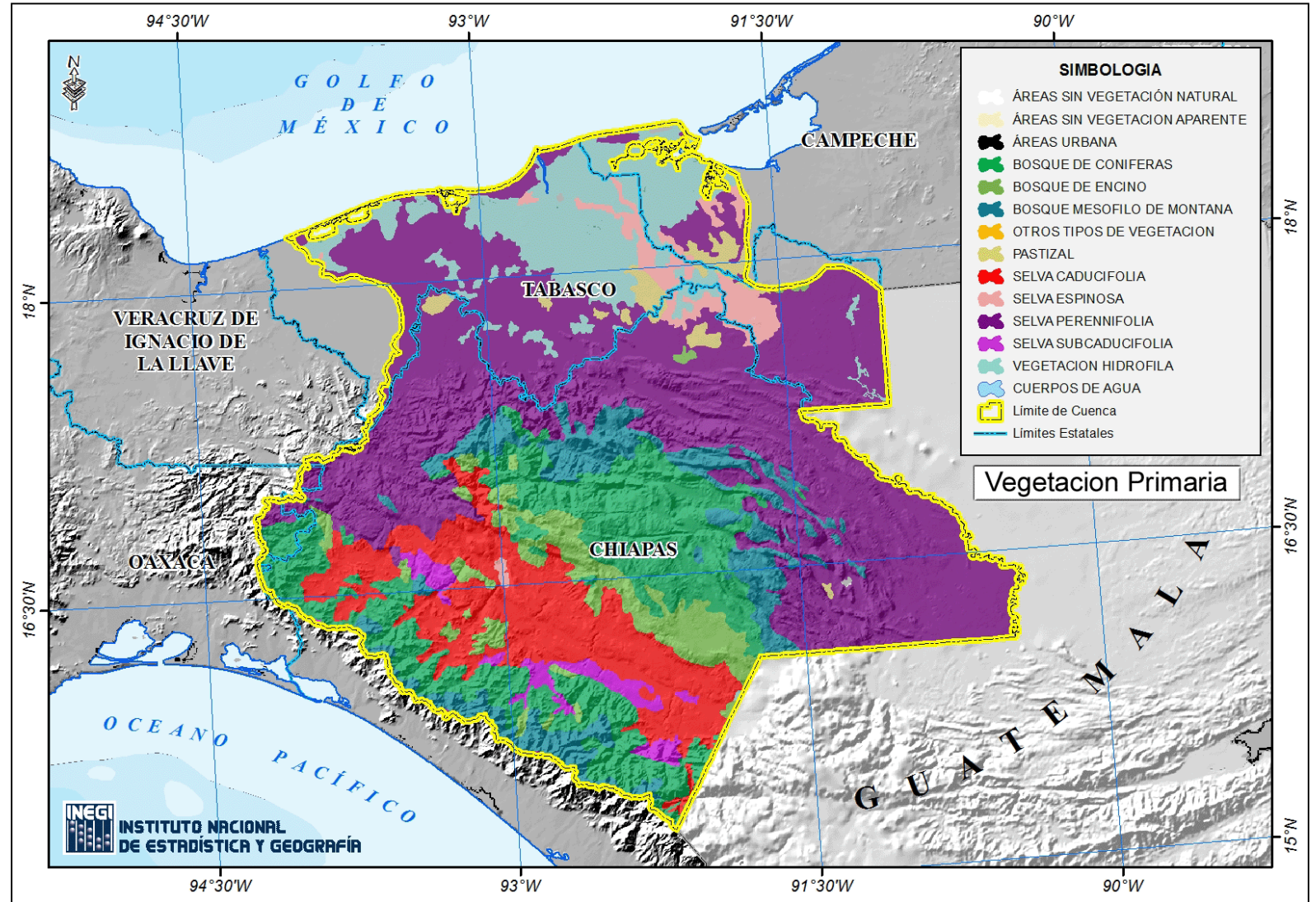


SDG 15. Life on land

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 15.2.1 Progress towards sustainable forest management

Cuenca Grijalva-Usumacinta



Use of INEGI's
Land Use and Vegetation
Map Series
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).

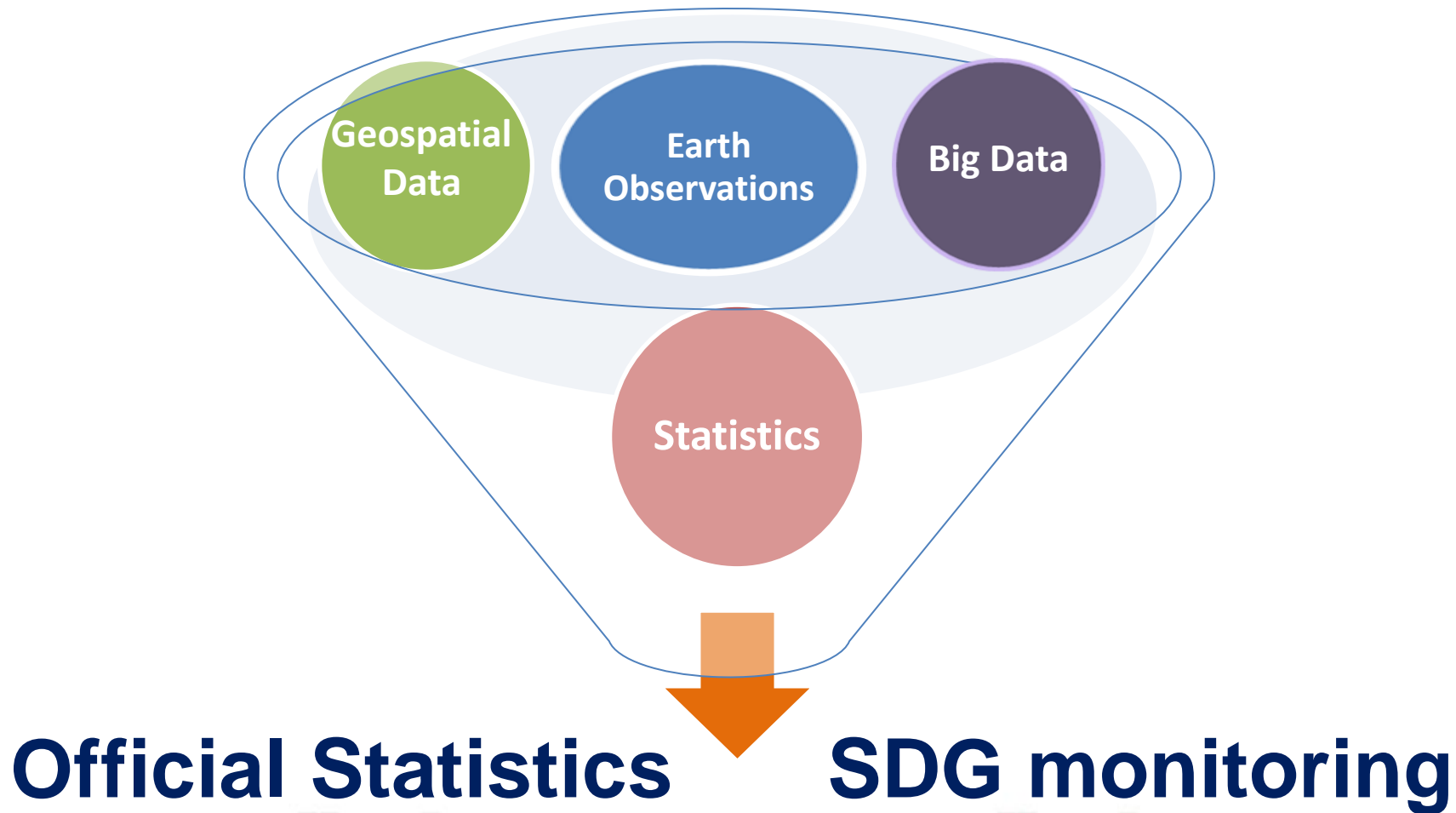




IV. Conclusions



Integration of various sources of information in support of official statistics and monitoring of global goals



Conclusions

- Geospatial Information, Earth Observations, Big Data and Statistics can and should be integrated in support of national priorities and global goals.
- Geospatial information facilitates the monitoring of social, economic and environmental indicators to support, design and monitoring of public policies.
- Powerful synergies emerge in the production and use of geography and statistics.
- Integration facilitates location & assessment of SDGs progress over time.





Geospatial Information and the Sustainable Development Goals in Mexico



INSTITUTO NACIONAL
DE ESTADÍSTICA Y GEOGRAFÍA

March, 2016