Earth Observations and Geospatial Information for the Monitoring of the Sustainable Development Goals

Course/Workshop for Members of the Caribbean Project and the Americas

UN-GGIM 8

“Experience of Mexico using spatial data for SDG´s indicators”

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DE ESTADÍSTICA Y GEOGRAFÍA

Content

- Introduction
- National System of Statistical and Geographical Information
- Lessons learned from the Millennium Development Goals
- Adoption of the 2030 Agenda by Mexico
- Geospatial data that can be used to build and complement indicators
- Dissemination of the results
- Conclusion

The Challenge

"The work on global geospatial information management in recent years has confirmed that **one of the key challenges is better integration of geospatial and statistical information** as a basis for solid, evidence-based decision making."

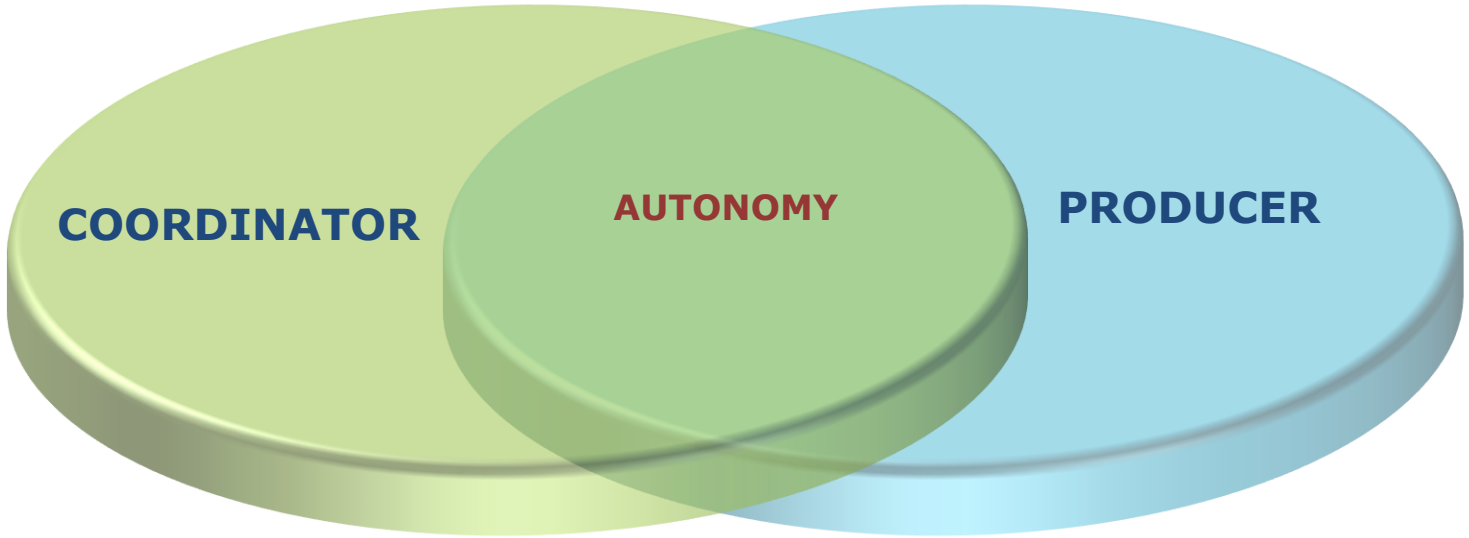
UN Under Secretary-General
Wu Hongbo
Economic and Social Council of the United Nations, 2012

National System of Statistical and Geographical Information (SNIEG)

The National Institute of Statistics and Geography

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

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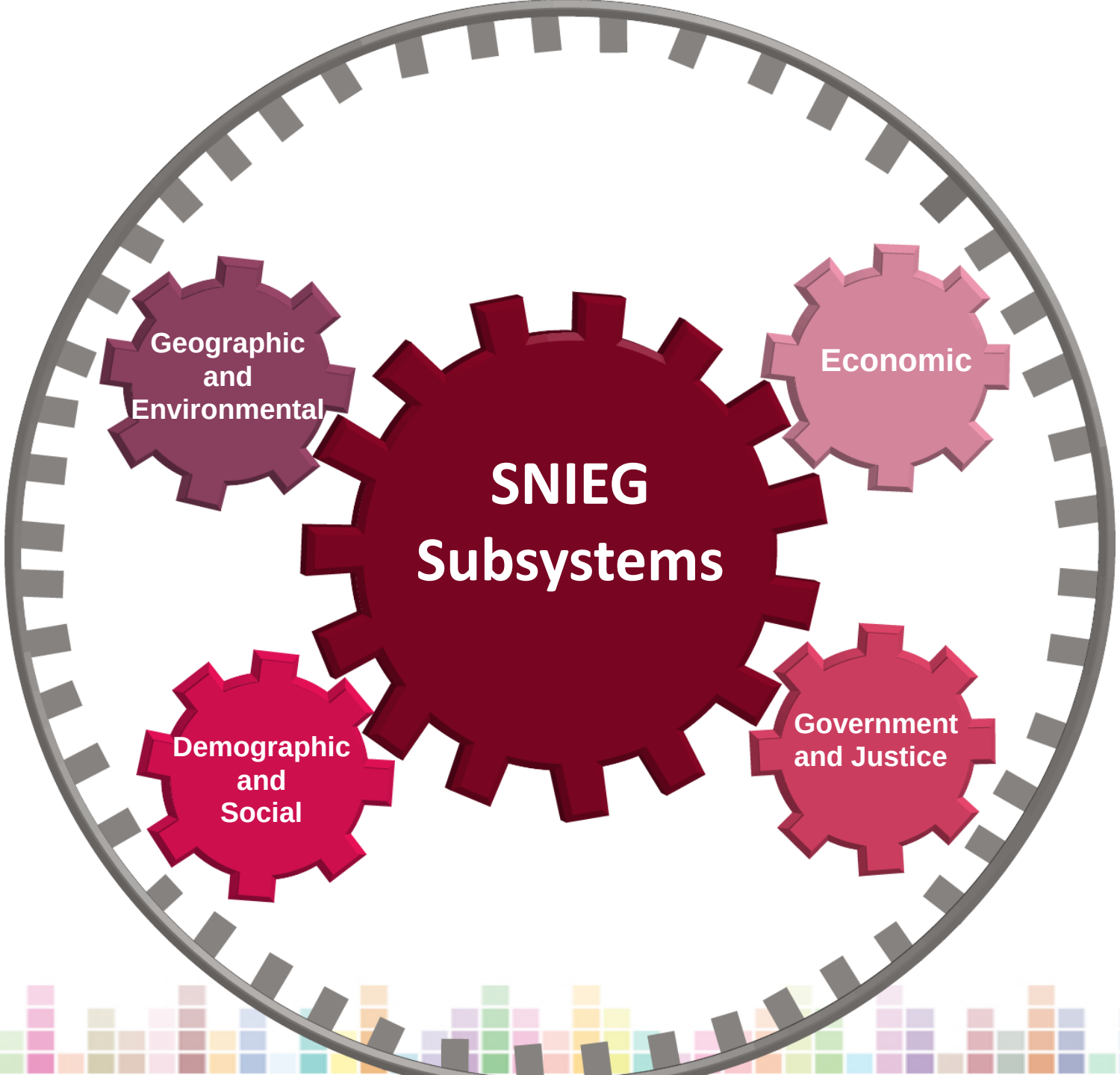
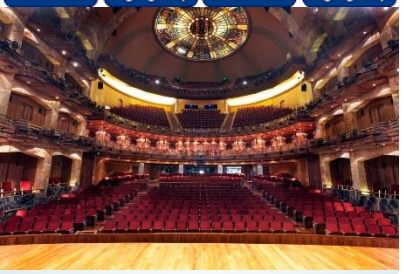
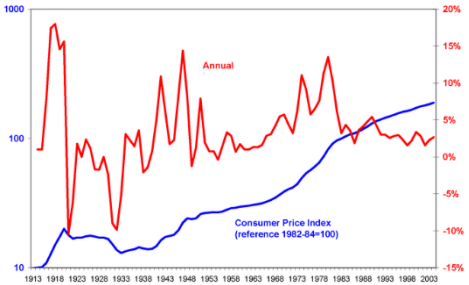

Geographic and Environmental
Economic
SNIEG Subsystems
Demographic and Social
Government and Justice



Demographic and Social

- Labor and Social Welfare
- Social Development
- Population and population dynamics
- Health Sector
- Housing
- Education Sector
- Sustainable Development Goals
- Gender Information
- Cultural Information
- Disability Information
- Youth Information
- Physical Culture and Sports



Economic

- National Directory of Economic Units
- Agriculture and Fisheries
- Tourism
- Macro economic Stats and National Accounts
- Foreign Trade Statistics
- Science, Technology and Innovation
- Financial and Operating Transport Sector
- Price Index Statistics
- Economic Information of Industrial Sector
- Infrastructure Transport Sector
- Information Society

Government Information

Justice Administration Information

State Prosecution Information

Public Security (Crime)

Social Prevention of Violence and Crime

Open Data

Government, Public Security & Justice

Geographic and Environmental

Emissions, Waste and Hazardous Substances

Land Use, Vegetation and Forest Resources

Climate Change

Basic Geographical Information

Cadastral and Registration Information

Water

Rural and Urban Development

Energy Sector Information

Lessons learned from the Millennium Development Goals

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

Adoption of the 2030 Agenda by Mexico

National Council of the 2030 Agenda

Chair of the committee

CTEODS

Technical Secretariat

Sistema Nacional de Información Estadística y Geográfica

Technical Committee on SDG Indicators

President of the Committee

MÉXICO
PRESIDENCIA DE LA REPÚBLICA

Technical Secretary

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The Specialized Technical Committee on SDGS

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20 Ministries:

- ✓ Environment
- ✓ Finance
- ✓ Labor
- ✓ Energy

Source: http://www.htcampus.com/article/skills-required-group-discussion-1213/

Working groups

Results from working groups

Global framework indicators

Total	Total for Mexico	Total analyzed	Total agreed	Total published
232	169	122	89	64

Indicators published

Framework	Count
Total	**115**
Global	**64**
National	**51**

Geospatial data that can be used to build and complement indicators

Background

- **INEGI** has produced Geospatia Data about the Natural Resources of Mexico for several decades.
  - Soil: 3 versions, using International Soil Classifications Systems
  - Geology
  - Water: surface and groundwater
  - Land Use and Vegetation: 6 versions.
  - National Datasets, 1:250,000 scale

INDICATOR 9.1.1

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

Tier III

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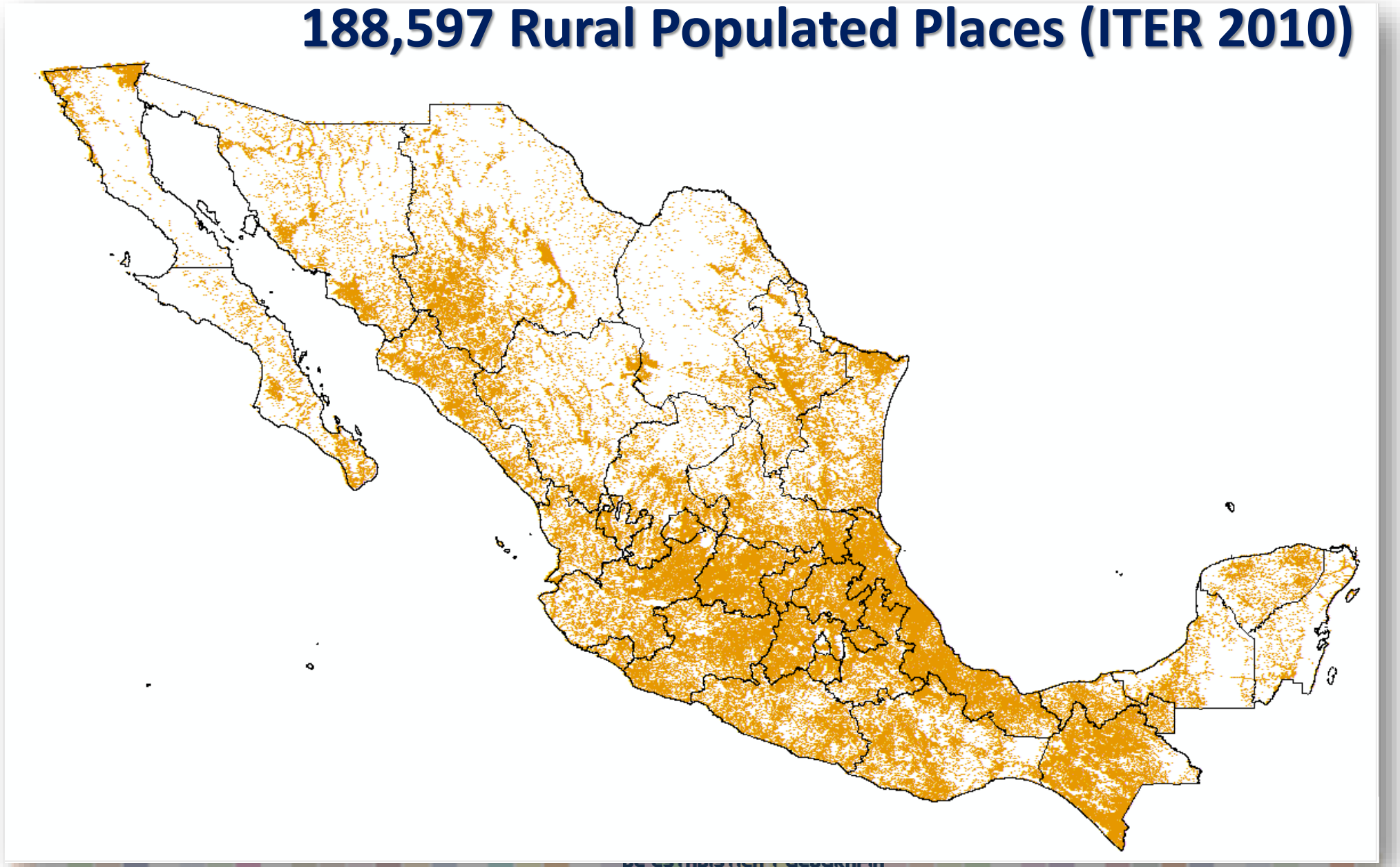
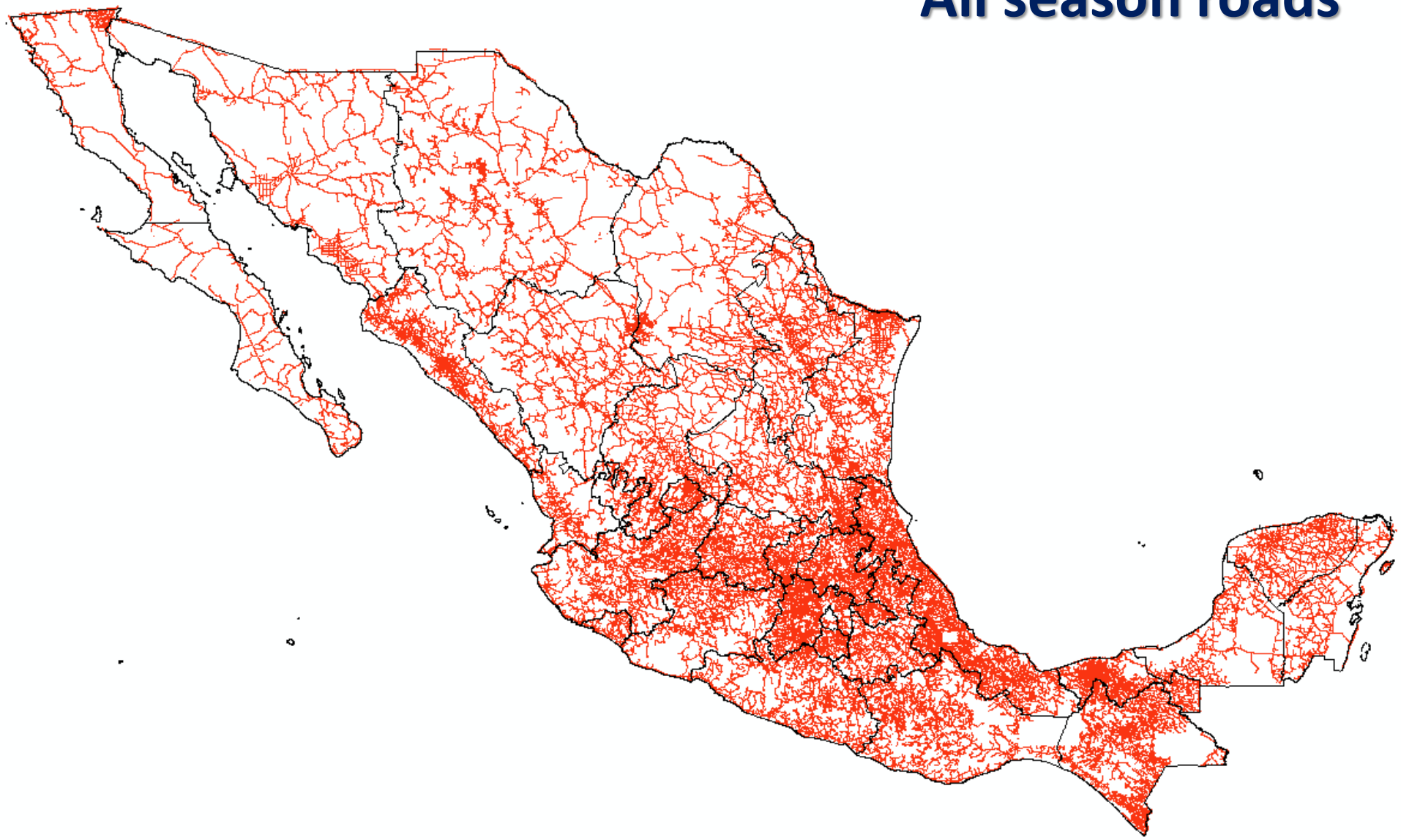
Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, to support economic development and human well-being with a focus on affordable and equitable access for all.

- 9.1.1 Proportion of the rural population who live within 2km of an all-season road.
  - Statistical data: Census Data (ITER 2010) for each population center, with total population, and other census variables, and longitude, latitude for geospatial purposes (192,244 places).
    - Select populated places with 2,500 and less inhabitants as rural.
  - Geospatial data: National Topographic Data Set 1:50,000.
    - Transportation Layer.
    - Paved highways and gravel roads as all season roads.

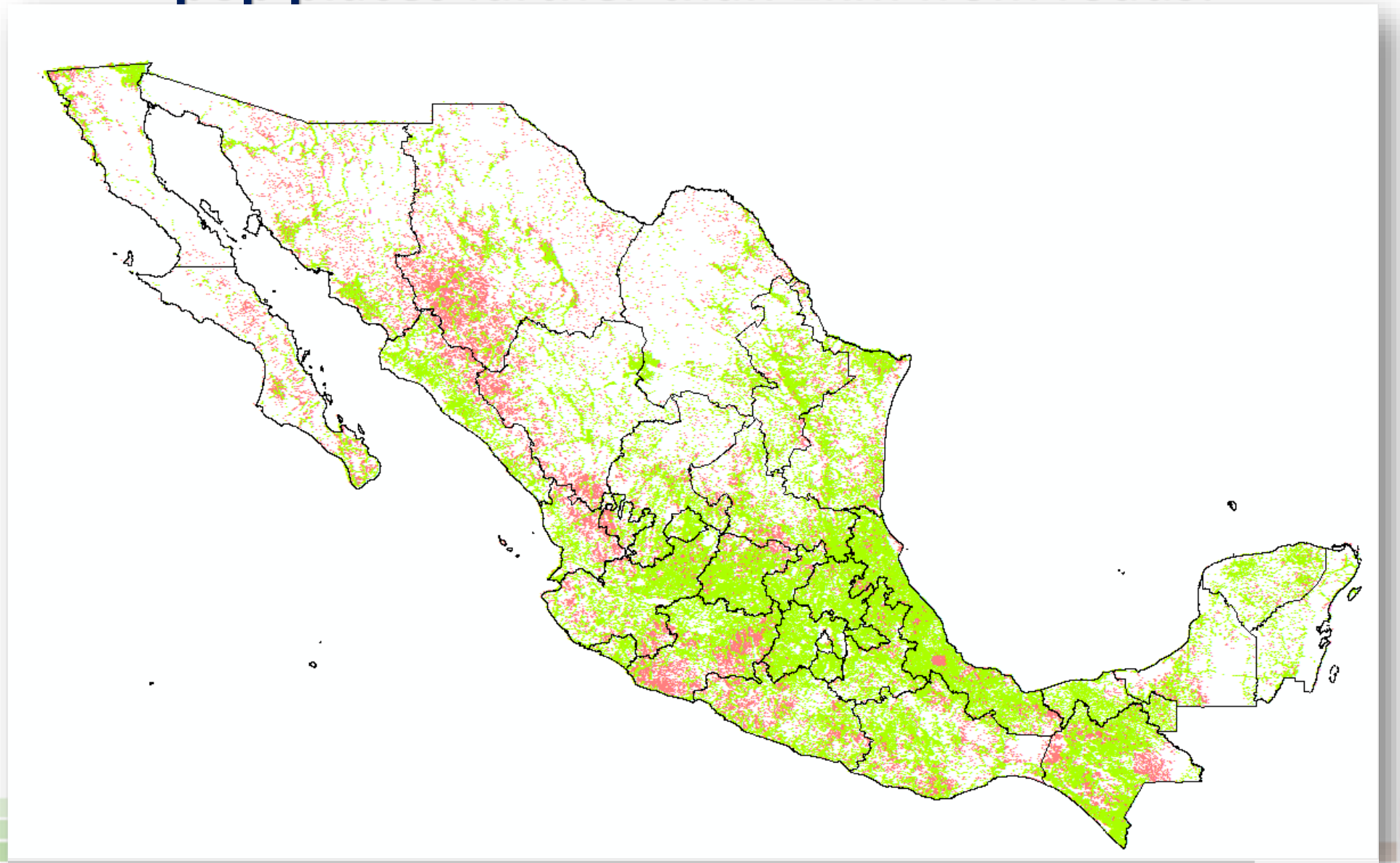
188,597 Rural Populated Places (ITER 2010)



All season roads



Result: Green pop places within 2km of road, pink, pop places farther than 2km from roads.



Obtain total population for each class (within 2km, farther than 2km)

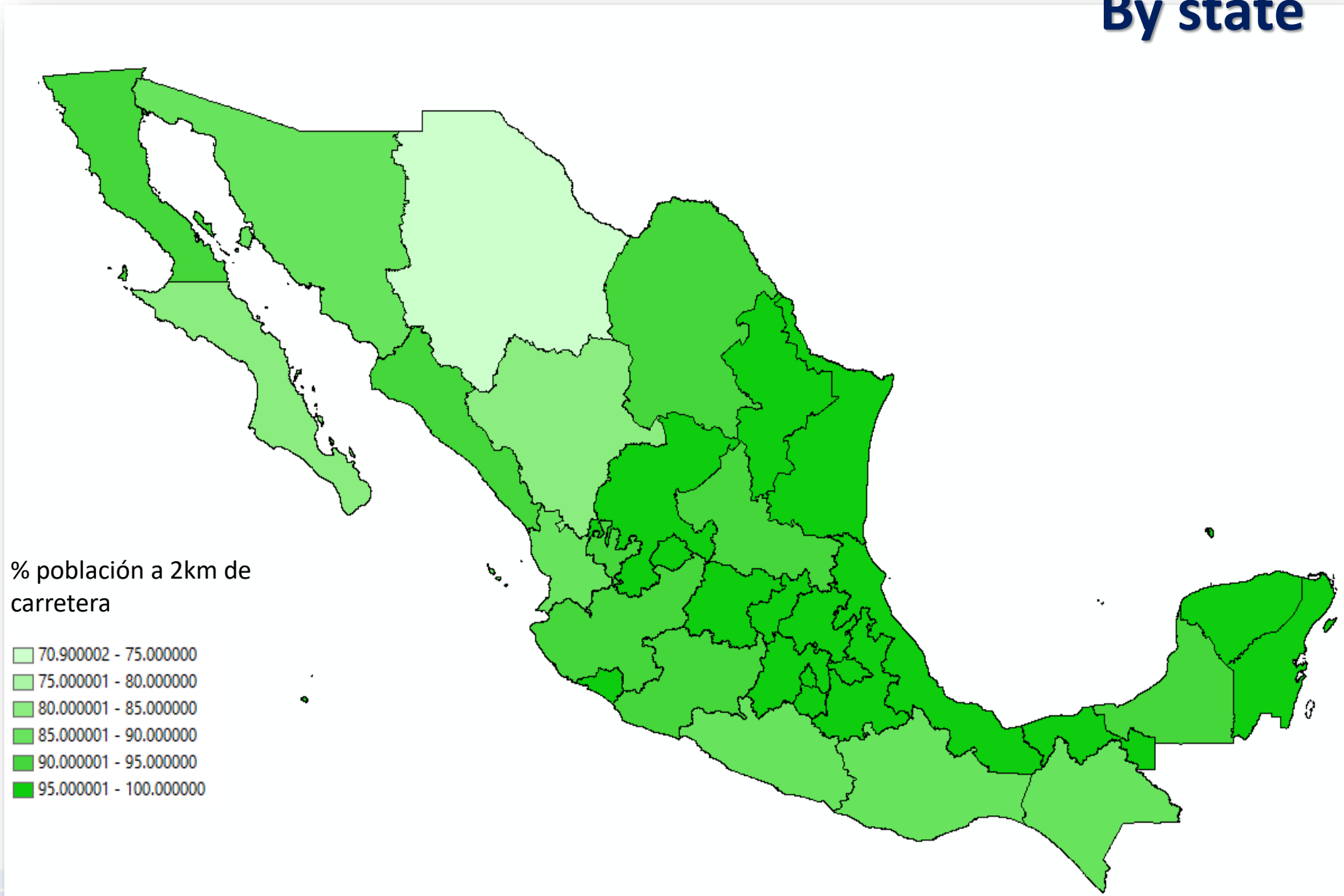
- National
- By state

Rural population within 2Km of an all season road (National, and State)			
State	Rural population within 2km of road	Total Rural Population	Proportion (as %) of population within 2km of road
National	24,259,295	26,059,128	**93.1**
Aguascalientes	228,934	229,907	**99.6**
Baja California	219,355	243,196	**90.2**
Baja California Sur	73,469	88,308	**83.2**
Campeche	196,571	209,032	**94.0**
Coahuila	260,790	275,003	**94.8**
Colima	72,540	73,016	**99.3**
Chiapas	2,131,638	2,459,382	**86.7**
Chihuahua	366,551	517,269	**70.9**
Ciudad de México	40,687	40,687	**100.0**
Durango	427,687	508,499	**84.1**
Guanajuato	1,590,087	1,653,668	**96.2**
Guerrero	1,259,310	1,416,920	**88.9**
Hidalgo	1,247,993	1,273,778	**98.0**
Jalisco	926,187	985,248	**94.0**
México	1,956,414	1,976,017	**99.0**
Michoacán	1,246,190	1,362,688	**91.5**
Morelos	285,369	286,889	**99.5**
Nayarit	297,297	336,945	**88.2**
Nuevo León	239,483	247,333	**96.8**
Oaxaca	1,737,581	2,002,757	**86.8**
Puebla	1,563,986	1,633,943	**95.7**
Quérétaro	527,405	540,664	**97.5**
Quintana Roo	152,584	157,058	**97.2**
San Luis Potosí	872,814	935,008	**93.3**
Sinaloa	702,073	751,994	**93.4**
Sonora	320,686	372,252	**86.1**
Tabasco	943,984	954,075	**98.9**
Tamaulipas	386,563	398,945	**96.9**
Tlaxcala	232,159	235,696	**98.5**
Veracruz	2,866,657	2,976,060	**96.3**
Yucatán	310,569	312,821	**99.3**
Zacatecas	577,965	604,070	**95.7**

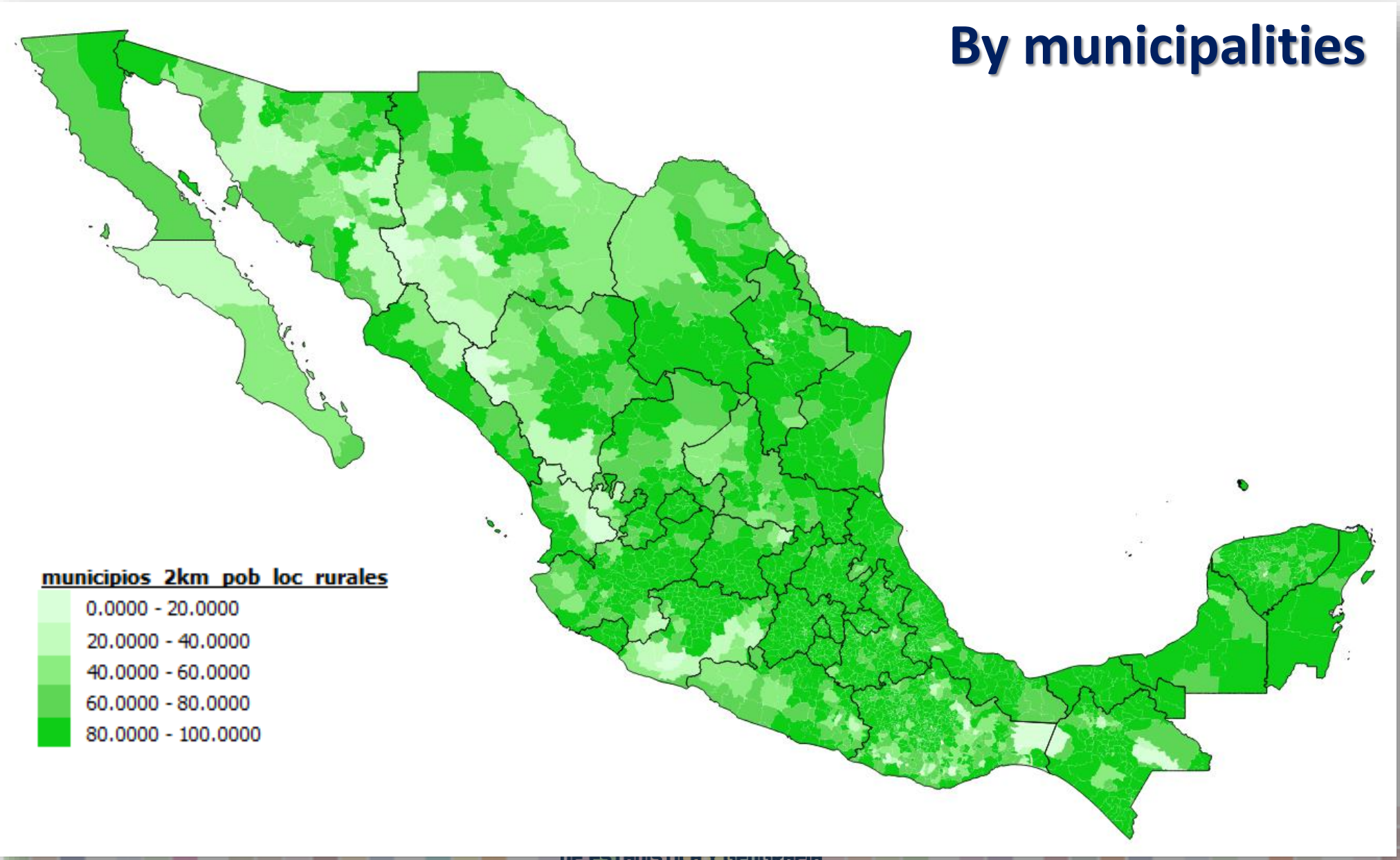
Total population for each class (within 2km, farther than 2km)

- National
- By state
- By municipality

By state


% población a 2km de carretera
70.900002 - 75.000000
75.000001 - 80.000000
80.000001 - 85.000000
85.000001 - 90.000000
90.000001 - 95.000000
95.000001 - 100.000000

By municipalities



15.1.1 Forest area as a proportion of total land area

Tier I

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Target 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.

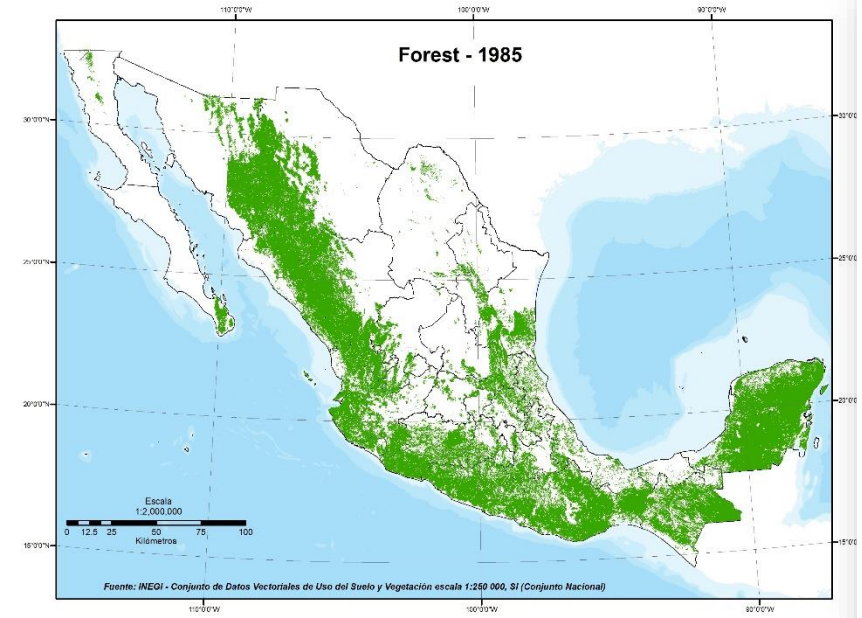
- 15.1.1 Forest area as a proportion of total land area (Tier I)
  - This target can be derived totally from geospatial information.
  - Five map series of Vegetation and Land Use have been developed for Mexico
  - 57 Vegetation types, including Temperate Forests, Tropical Forests, Grasslands, Shrublands, Mangroves and others.
  - Other categories: Agricultural land, urban – builtop areas.

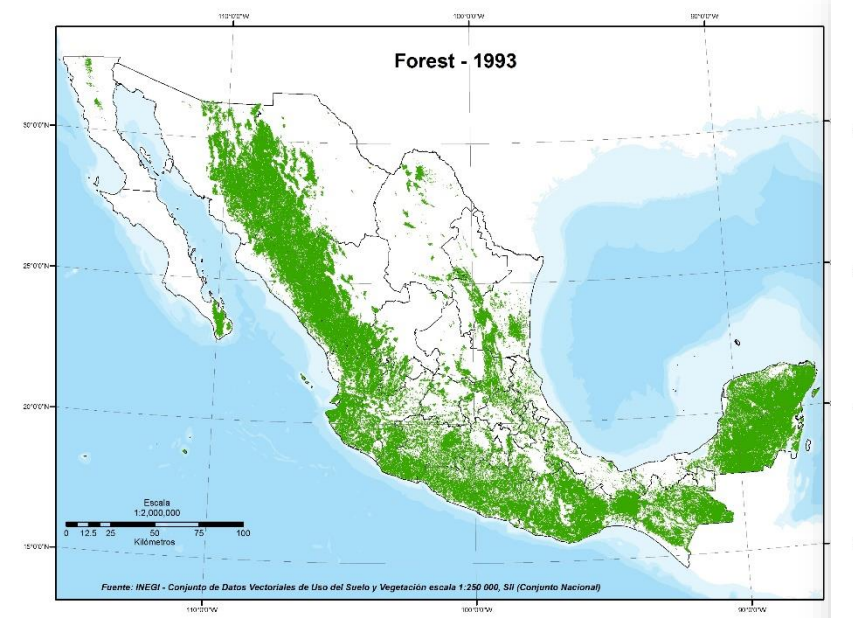
Methodology

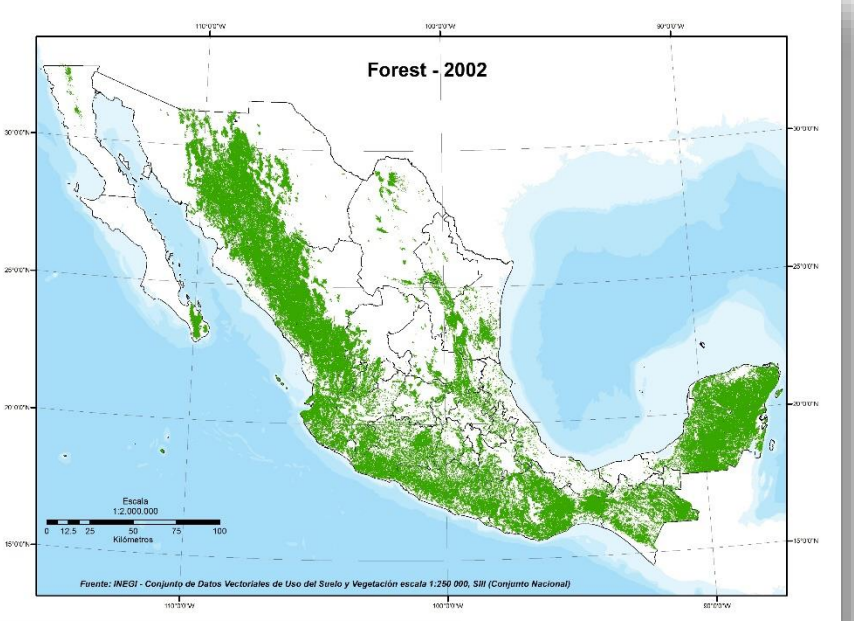
- For the target, all forested classes are grouped for each map series.
- Includes primary and secondary growth forests.
- An appropiate map projection for area calculation is used (Albers Equiarea).
- Each forest polygon has area (m2) as one attribute.
- Sum area for all forest polygons.
- Forest area as a proportion of total land area is calculated as the percentaje of forest area obtained vs. total country area.

Results

Forest area as a proportion of total land area.				
1985	1993	2002	2007	2011
36.8%	35.4%	34.5%	34.1%	33.7%


Forest - 1985
Escala
1:2,000,000
0 12.5 25 50 75 100
Kilómetros
Fuente: INEGI - Conjunto de Datos Vectoriales de Uso del Suelo y Vegetación escala 1:250 000, SI (Conjunto Nacional)


Forest - 1993
Escala
1:2,000,000
0 12.5 25 50 75 100
Kilómetros
Fuente: INEGI - Conjunto de Datos Vectoriales de Uso del Suelo y Vegetación escala 1:250 000, SII (Conjunto Nacional)


Forest - 2002
Escala
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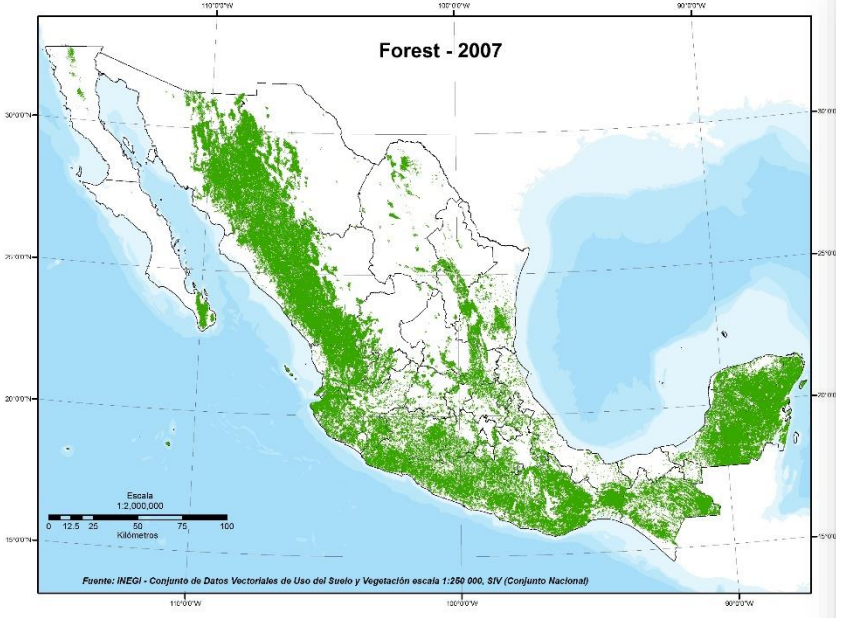
Kilómetros
Fuente: INEGI - Conjunto de Datos Vectoriales de Uso del Suelo y Vegetación escala 1:250 000, SIII (Conjunto Nacional)


Forest - 2007
Escala
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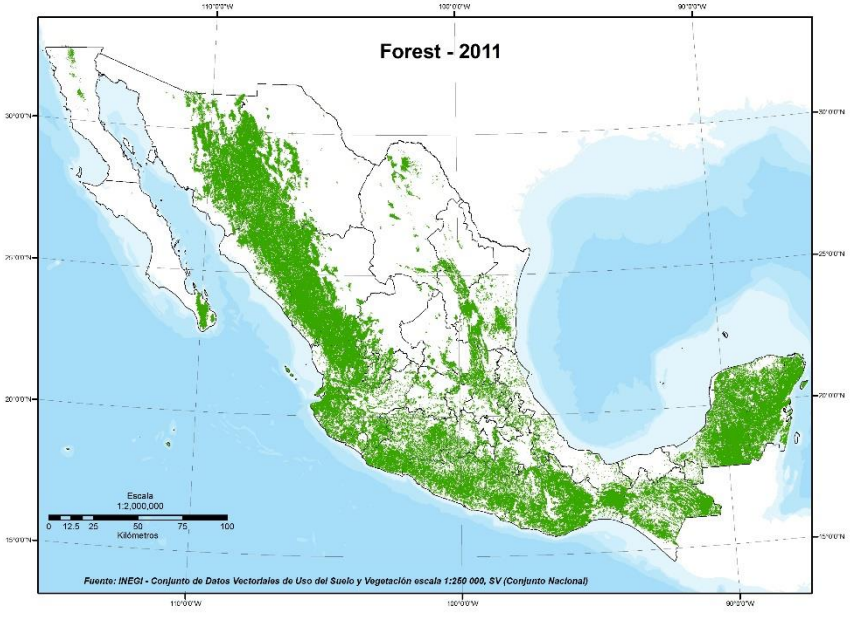
Kilómetros
Fuente: INEGI - Conjunto de Datos Vectoriales de Uso del Suelo y Vegetación escala 1:250 000, SIV (Conjunto Nacional)


Forest - 2011
Escala
1:2,000,000
0 12.5 25 50 75 100
Kilómetros
Fuente: INEGI - Conjunto de Datos Vectoriales de Uso del Suelo y Vegetación escala 1:250 000, SV (Conjunto Nacional)

Mexico's Open Data Cube project

- **INEGI** has initiated a face-to-face collaboration with **Geoscience Australia** to detail a local implementation of the Datacube in Mexico

- **Goal**
  - ✓ Implement Open Data Cube's open source technology, and adopt it in INEGI's processes related to satellite images
    - ➢ The technology includes a platform for the storage, organization, management and analysis of satellite images

Expected benefits

- ✓ Exploitation of the true potential of satellite images
- ✓ Promote more timely and accessible information
- ✓ More varied Geospatial and Statistical data about Natural Resources and the Environment
- ✓ Encourage exchange of data analysis methodologies

Mexico's Open Data Cube project

Forests

15.3.1 Proportion of land that is degraded over total land area (II)

Farming

2.4.1 Proportion of agricultural area under productive and sustainable agriculture (III)

Wetlands

6.6.1 Change in the extent of water-related ecosystems over time (II)

Urban growth

11.3.1 Ratio of land consumption rate to population growth rate (II)

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Challenges and opportunities

- Growing availability of Remote Sensing data
- Technologic progress:
  - Big Data.
  - More processing power
  - Machine Learning
- Advances in concepts about:
  - Water
  - Soils
  - Vegetation, Plant Ecology
- Open Data Cube

Open Data Cube applications underway at Geoscience Australia

WOFS, Water observation from space: % of time that a pixel is covered with water:

- Permanent water bodies
- Flooded areas, water bodies during the rainy season, seasonal water bodies
- New dams.

Land cover change:

- Fractional cover
- NDVI
- Urban Growth

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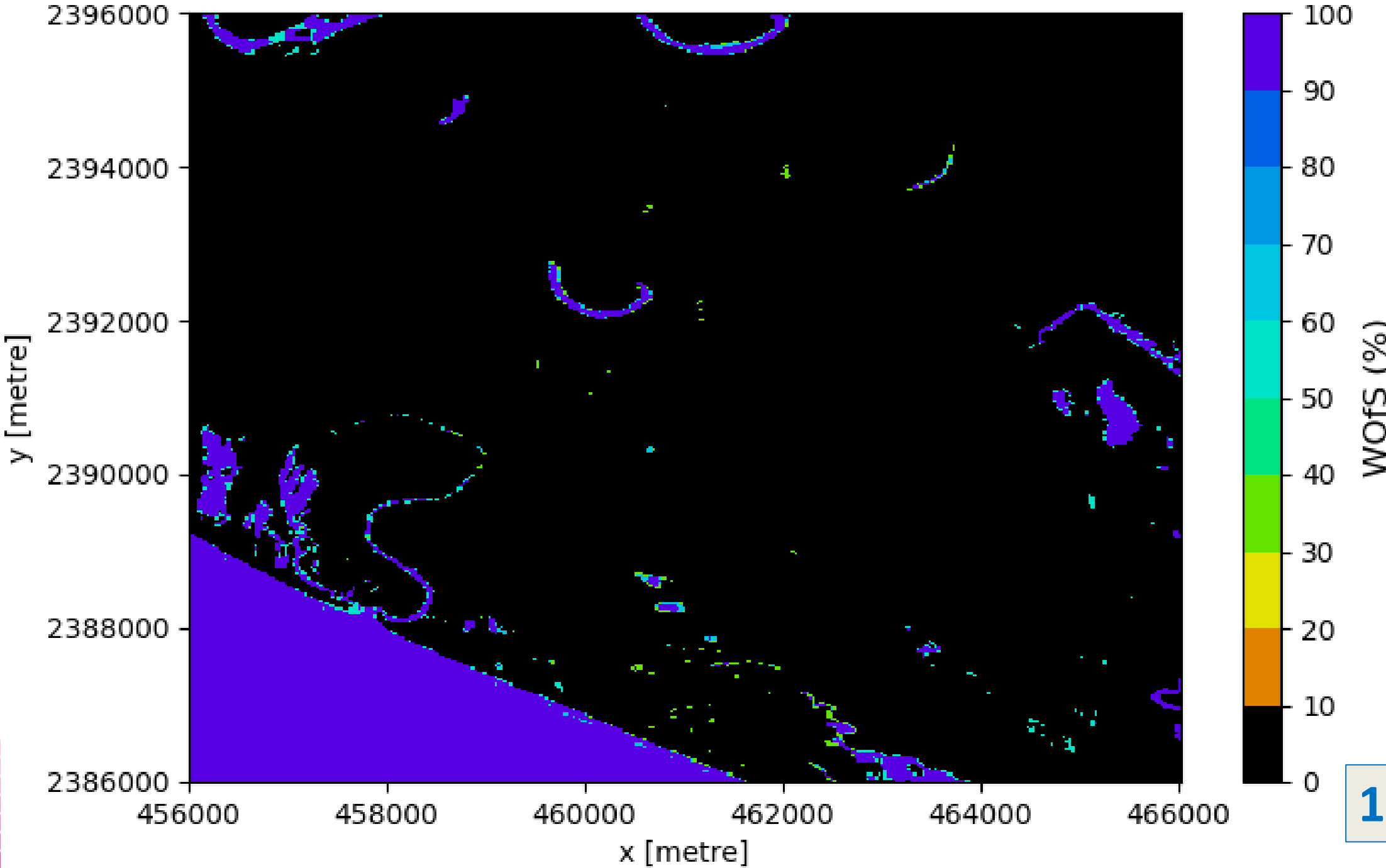
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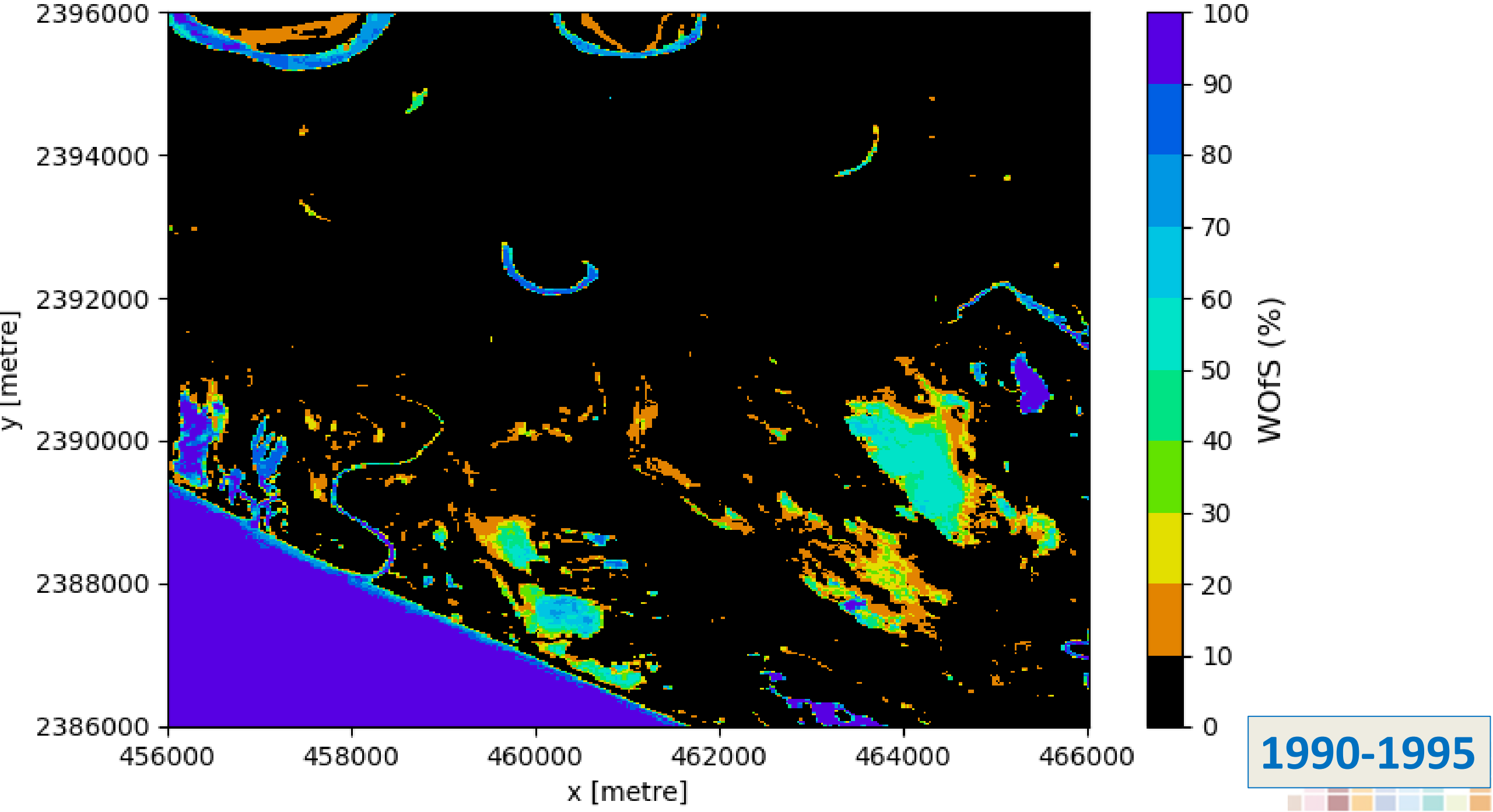
WOfS (%)

1986-1990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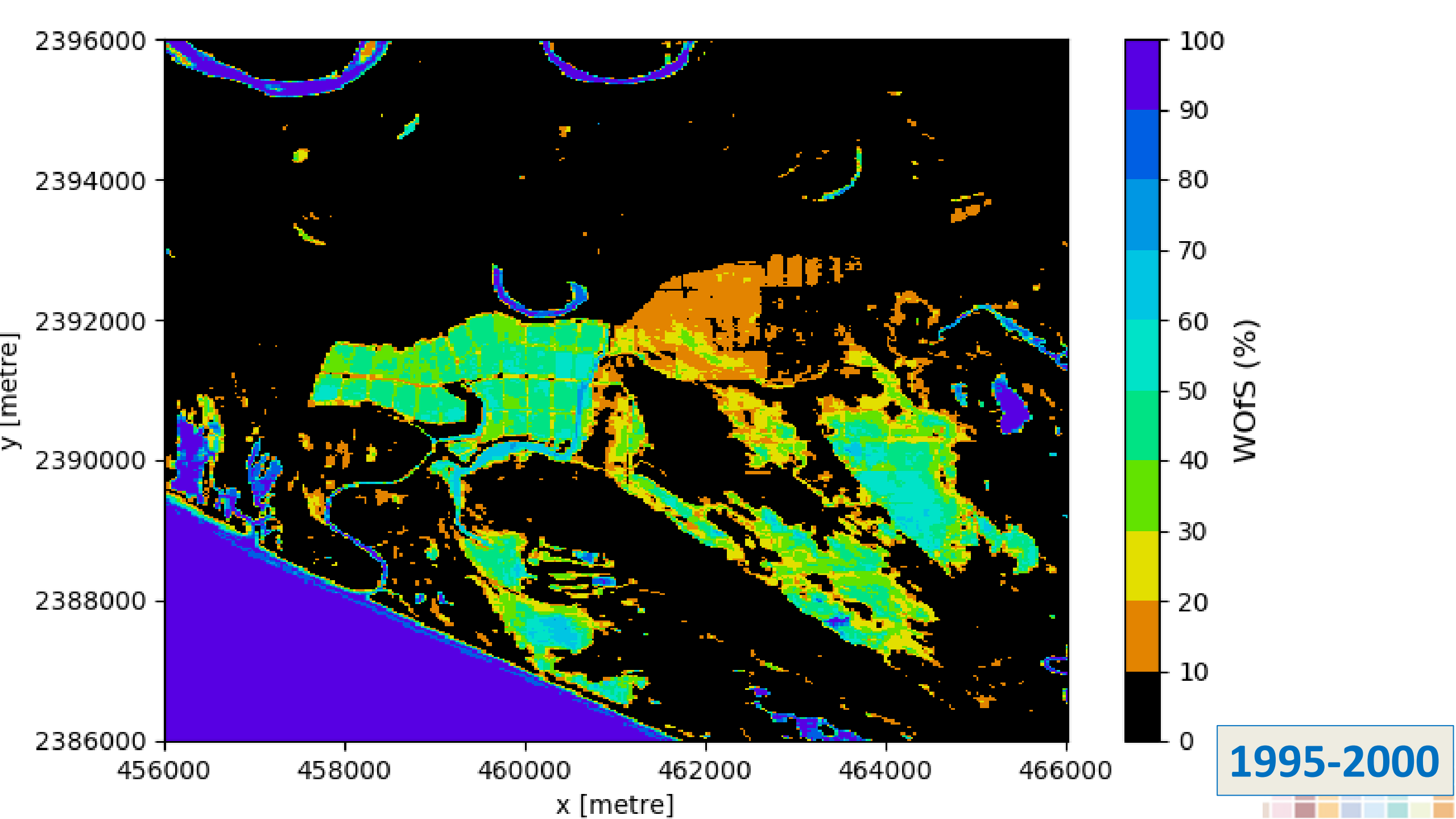
WOfS (%)
1990-1995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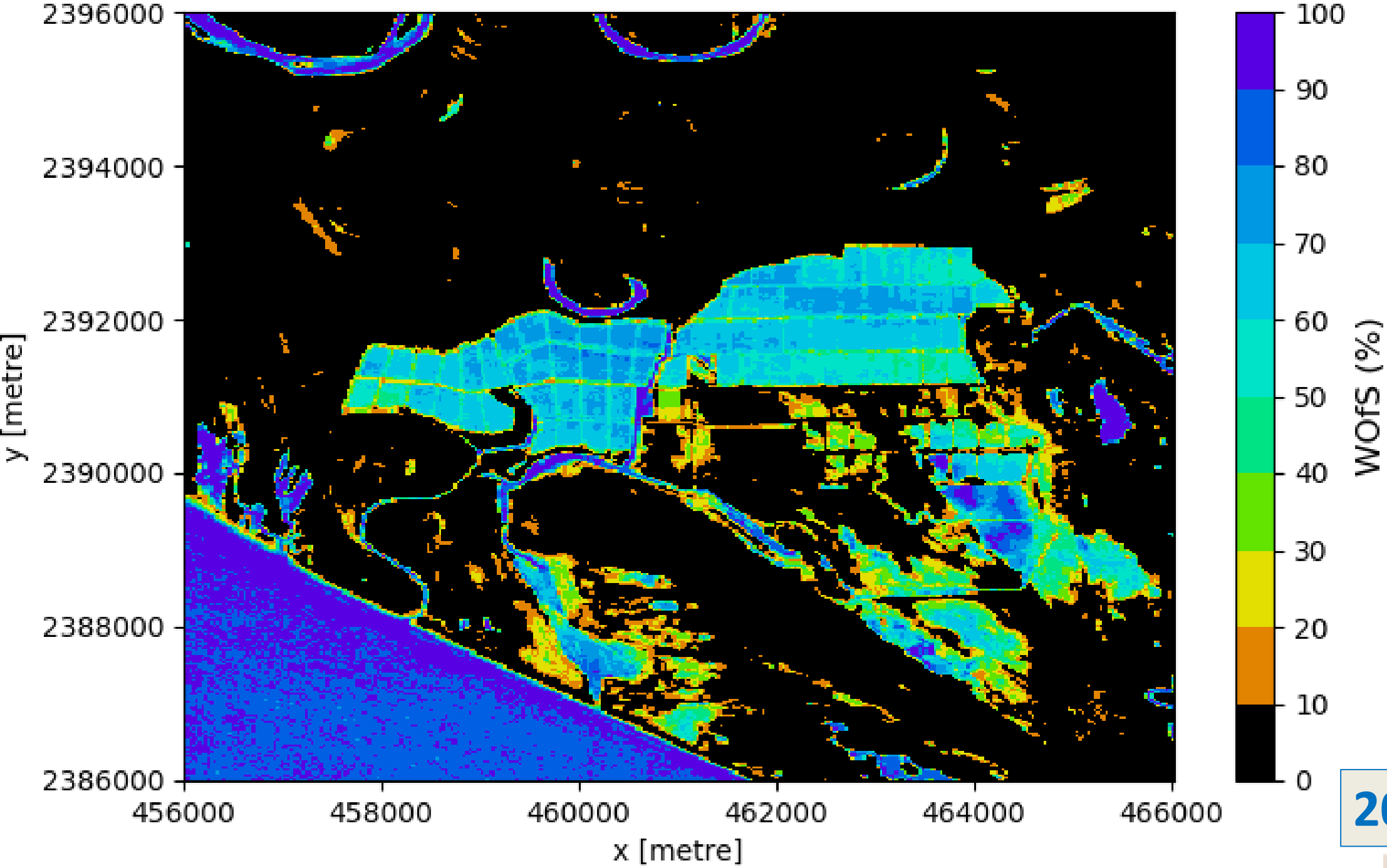
WOfS (%)
1995-2000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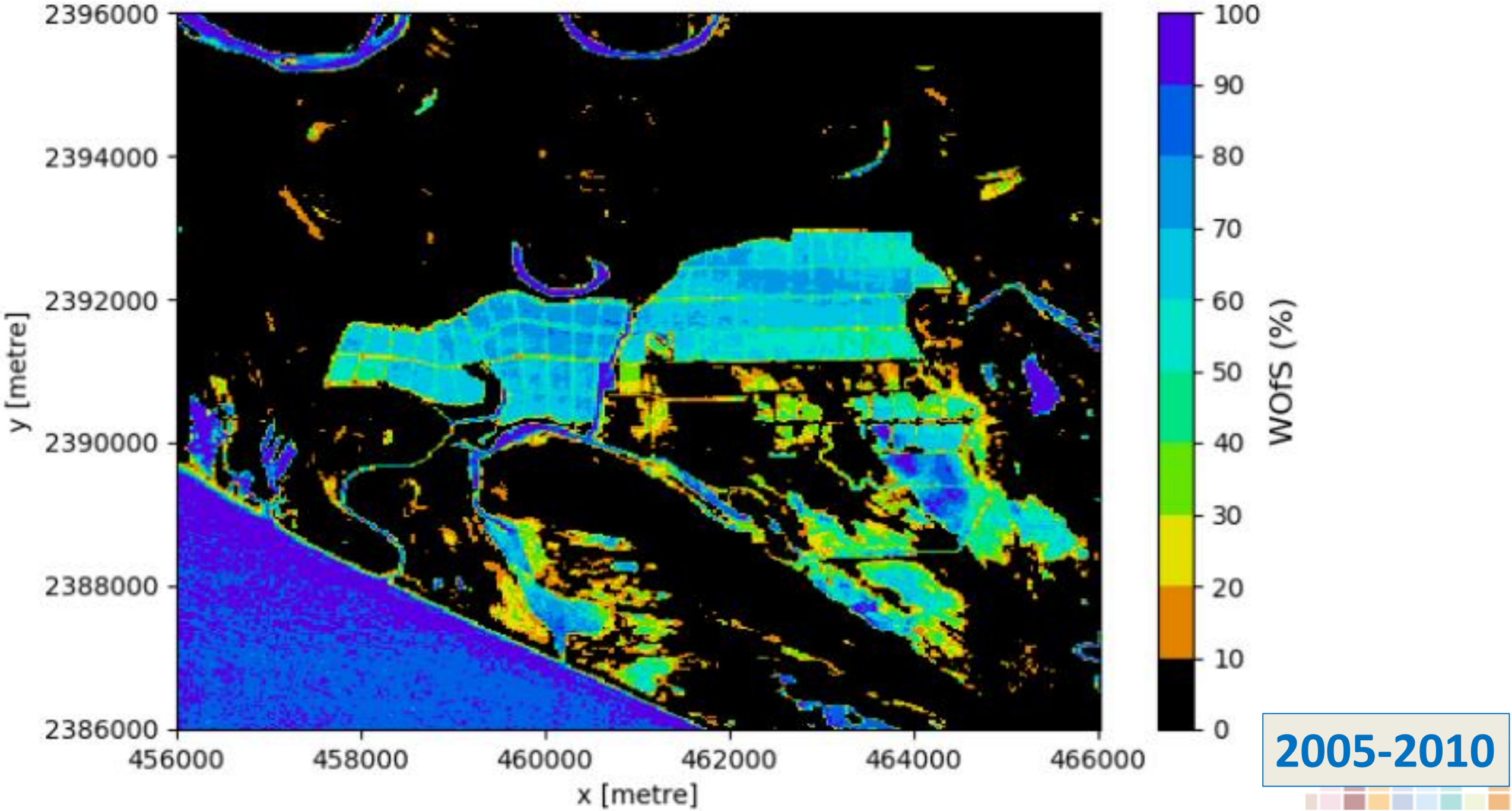
WOfS (%)

2000-2005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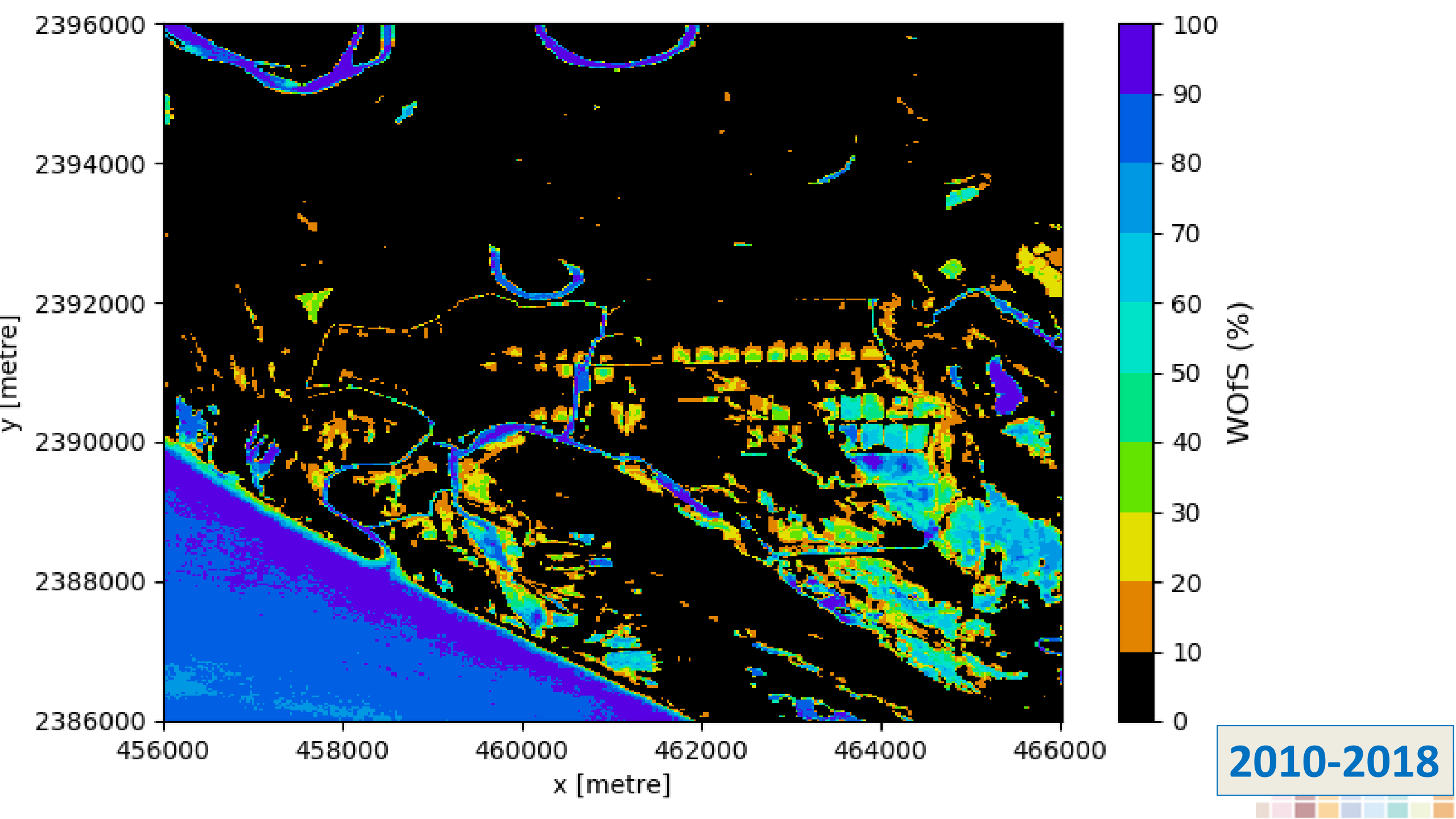
WOfS (%)
2005-2010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WOfS (%)
2010-2018

Dissemination of the results


SUSTAINABLE
DEVELOPMENT
GOALS
ABOUT THIS
MÉXICO
GOBIERNO DE LA REPÚBLICA
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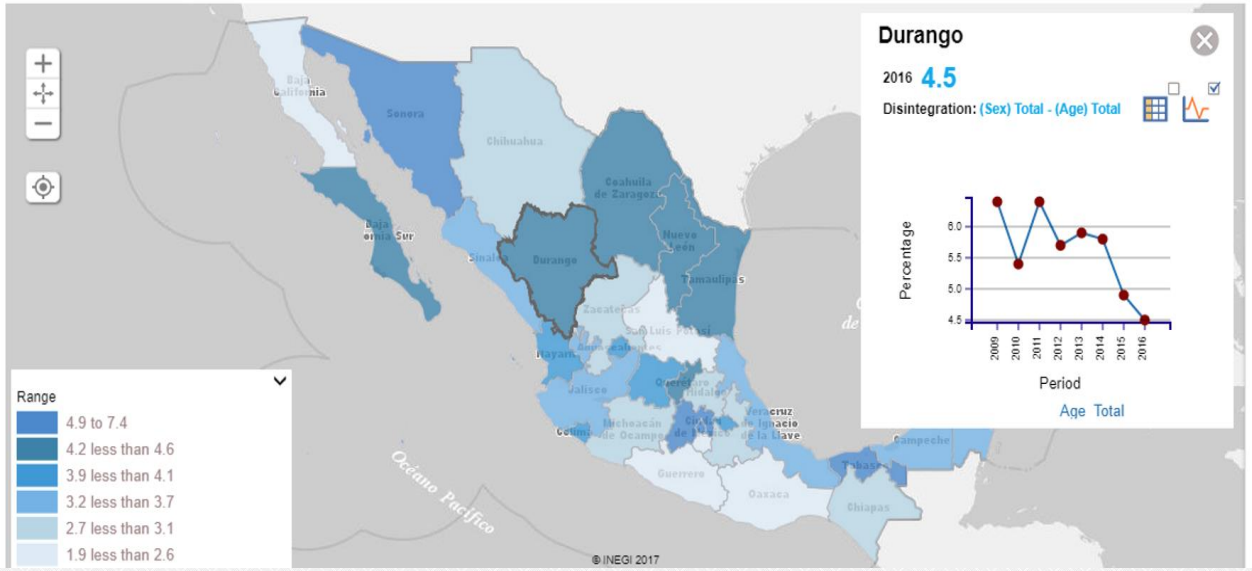
Map Graph Data

Period: 2016 Disintegration: Select

(Sex) Total - (Age) Total



8.5.2. Unemployment rate, by sex, age and persons with disabilities G E

Indicator | Metadata | Data for calculations

Map Graph Data

Period: 2016 Disintegration: Select State(s) selected(s) Select

(Sex) Total - (Age) Total

8.5.2. Unemployment rate, by sex, age and persons with disabilities G E

Indicator | Metadata | Data for calcul

Map Graph Data

(Percentage) Temporary Coverage: 1995-201

State	2016										
	Total				Men				Women		
	Total	From 15 to 24 years old	From 25 to 64 years old	65 years and older	Total	From 15 to 24 years old	From 25 to 64 years old	65 years and older	Total	From 15 to 24 years old	From 25 to 64 years old
Estados Unidos Mexicanos	3.9	7.7	3.2	1.0	3.8	7.2	3.2	1.2	3.9	8.8	3.1
Aguascalientes	4.0	7.9	3.1	0.3	4.1	7.8	3.2	0.4	3.7	8.0	2.8
Baja California	2.6	5.5	2.0	1.8	2.6	5.1	2.1	2.3	2.6	6.3	1.8
Baja California Sur	4.6	10.6	3.4	1.6	4.2	9.9	3.1	1.6	5.1	11.9	4.0

Goal	Promote sustained, inclusive and sustainable economic growth, full and productive employment and de all
Target	By 2030, achieve full and productive employment and decent work for all women and men, including fo and persons with disabilities, and equal pay for work of equal value
Indicator's name	Unemployment rate, by sex, age and persons with disabilities
Definition	Proportion of the unemployed people, with respect to the Economically Active Population.
Type of indicator:	Global
Algorithm	$TD_t = \left(\frac{D_t}{PEA_t}\right) 100$

Meaning of the abbreviations:

TD_t Unemployment rate in the year t

D_t Unemployed population in the year t

PEA_t Economically active population in the year t

Narrative description of the	The unemployment rate refers to the number of unemployed people, expressed as a percentage of the t

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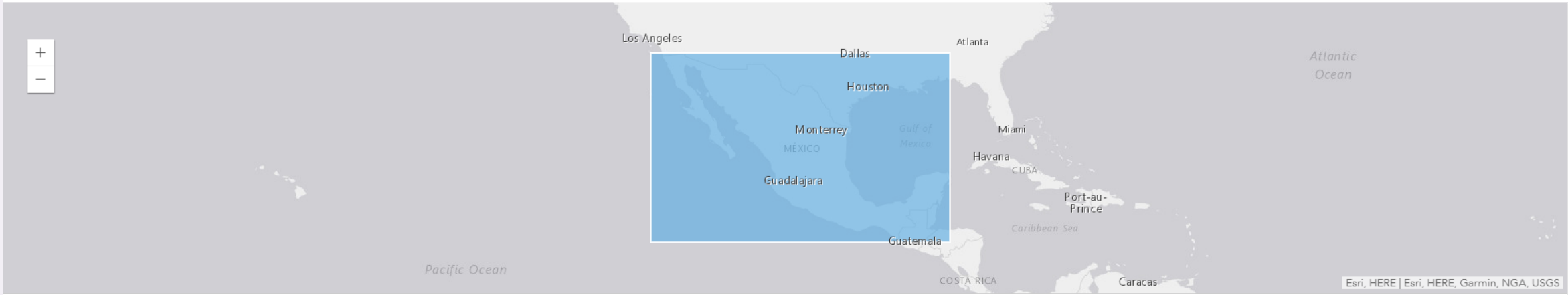
Aplicaciones | Cronómetro Cubo Ru | Rubik's Cube Timer - | WhatsApp Web | EarthExplorer | LandsatLook Viewer | Portal del Inventario | Portal de Suelos Serie | Links de Sitio y Aplic | Link de Portal for Arc | Links Sentinel 2 | Survey123 | Importado de Interne | Otros favoritos

SUSTAINABLE DEVELOPMENT GOALS

Busca



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 mortality ratio

Licencia personalizada 6/10/2017 Dataset espacial 32 filas

Explore la API de este dataset completando los campos siguientes. Los campos rellenarán la dirección URL de la consulta y el resultado aparecerá en el cuadro JSON que se muestra a continuación. Si desea obtener más información sobre la API, consulte la documentación completa de la API REST.

Favorito Descargar API

Dataset completo
Geoservicio
https://services8.arcgis.com/wvXN
GeoJSON
https://opendata.arcgis.com/datas

Dirección

```
https://services8
rcgis/rest/servi
ver/0/query?whe
f=json
```

Consulta

Parámetro	Valor
Donde	No hay filtros activos +
Fuera de los campos	☑ OBJECTID ☑ Entidad ☑ y_1990 ☑ y_1991 ☑ y_1992 ☑ y_1993 ☑ y_1994 ☑ y_1995 ☑ y_1996 ☑ y_1997 ☑ y_1998 ☑ y_1999 ☑ y_2000 ☑ y_2001 ☑ y_2002 ☑ y_2003 ☑ y_2004 ☑ y_2005 ☑ y_2006 ☑ y_2007 ☑ y_2008 ☑ y_2009 ☑ y_2010 ☑ y_2011 ☑ y_2012 ☑ y_2013 ☑ y_2014 ☑ y_2015 ☑ Shape__Area ☑ Shape__Length Campos que se deben incluir en el conjunto de resultados devuelto.

Entradas espaciales

Welcome to the Open SDG Data Hub

To fully implement and monitor progress on the Sustainable Development Goals, decision makers everywhere need data and statistics that are accurate, timely, sufficiently disaggregated, relevant, accessible and easy to use. The Open SDG Data Hub promotes the exploration, analysis, and use of authoritative SDG data sources for evidence-based decision-making and advocacy. Its goal is to enable data providers, managers and users to discover, understand, and communicate patterns and interrelationships in the wealth of SDG data and statistics that are now available.

17 Goals to Transform Our World

> Two years ago, world leaders adopted the ambitious **2030 Agenda for Sustainable Development**, with seventeen Sustainable Development Goals at its heart. The Agenda is our shared plan to transform the world in fifteen years and, crucially, to build lives of dignity for all.
>
> **António Guterres**
> Secretary-General of the United Nations

Featured Open Data Sites by Country

Ireland Phillipines Mexico State of Palestine

Conclusions

- Geospatial Information, Earth Observations, Big Data and Statistics can be integrated in support of national priorities and global goals;
- Integration facilitates location & assessment of public policy and SDGs progress over time;
- The 2030 Agenda demands consolidation of National Statistical and Geospatial System.

Everything happens somewhere

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