Conference on Climate Change and Official Statistics

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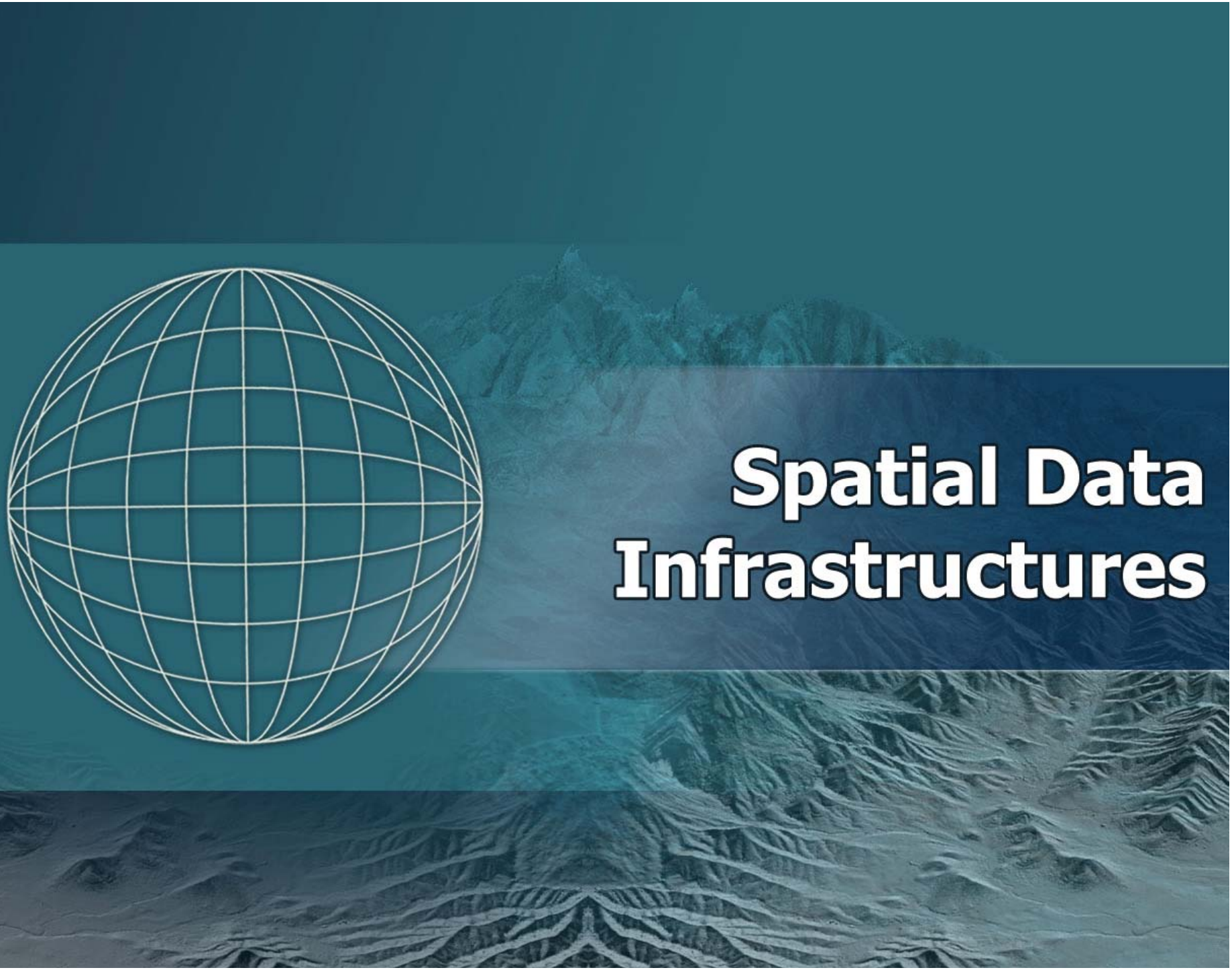
Spatial Data Infrastructures and Climate Change Management

Oslo, Norway 14-16 april 2008

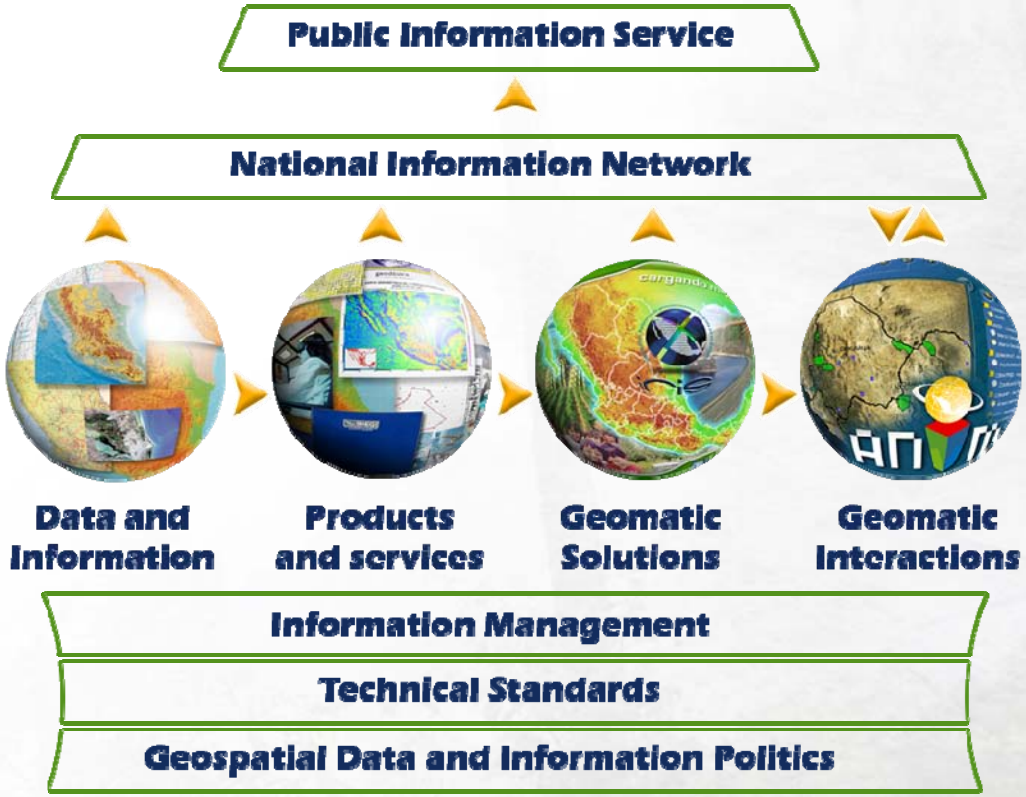
Contents

- Spatial data infrastructures
- National strategy for climate change
- Climate change: A systemic approach
- Mitigation and adaptation actions
- Present and future actions
- UN Framework


Spatial Data
Infrastructures

Spatial Data Infrastructures

A Spatial Data Infrastructure (SDI) is a systemic approach to coordinate the parties involved in the development and use of spatial data of a region. It includes policies, standards, technologies, and human resources that are necessary for efficient compilation, access, distribution and exploitation of geographical information.



Spatial Data Infrastructures

Countries that count with a Spatial Data Infrastructure iniciative documented or with a web page.

América

1. Argentina
2. Belice
3. Bolivia
4. Brasil
5. Canadá
6. Chile
7. Colombia
8. Costa Rica
9. Cuba
10. Ecuador
11. El Salvador
12. Estados Unidos
13. Guatemala
14. Guyana
15. Honduras
16. Jamaica
17. México
18. Nicaragua
19. Panamá
20. Paraguay
21. Perú
22. República Dominicana
23. Uruguay
24. Venezuela

Africa

25. Kenia
26. Kiribati
27. Sudáfrica

Europa

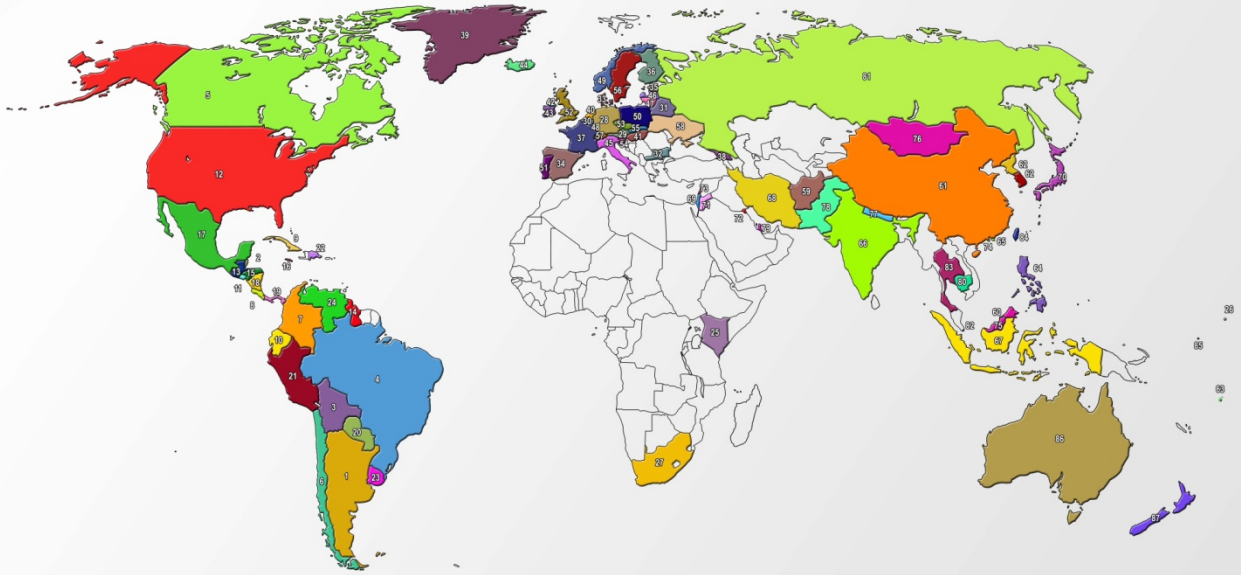
28. Alemania
29. Austria
30. Bélgica
31. Bielorusia
32. Bulgaria
33. Dinamarca
34. España
35. Estonia
36. Finlandia
37. Francia
38. Georgia
39. Groenlandia
40. Holanda
41. Hungría
42. Irlanda
43. Irlanda del Norte
44. Islandia
45. Italia
46. Letonia
47. Lituania
48. Luxemburgo
49. Noruega
50. Polonia
51. Portugal
52. Reino Unido
53. República Checa
54. República de Eslovenia
55. República Eslovaca
56. Suecia
57. Suiza
58. Ucrania

Asia

59. Afganistan
60. Brunei Darussalam
61. China
62. Corea
63. Fiji
64. Filipinas
65. Hong Kong
66. India
67. Indonesia
68. Irán
69. Israel
70. Japón
71. Jordania
72. Kuwait
73. Líbano
74. Macau
75. Malasia
76. Mongolia
77. Nepal
78. Pakistán
79. Qatar
80. Reinio de Cambodia
81. Rusia
82. Singapur
83. Tailandia
84. Taiwan
85. Tuvalu

Australia

86. Australia
87. Nueva Zelanda



Spatial Data Infrastructures

Global Spatial Data Infrastructure
www.gsdi.org/

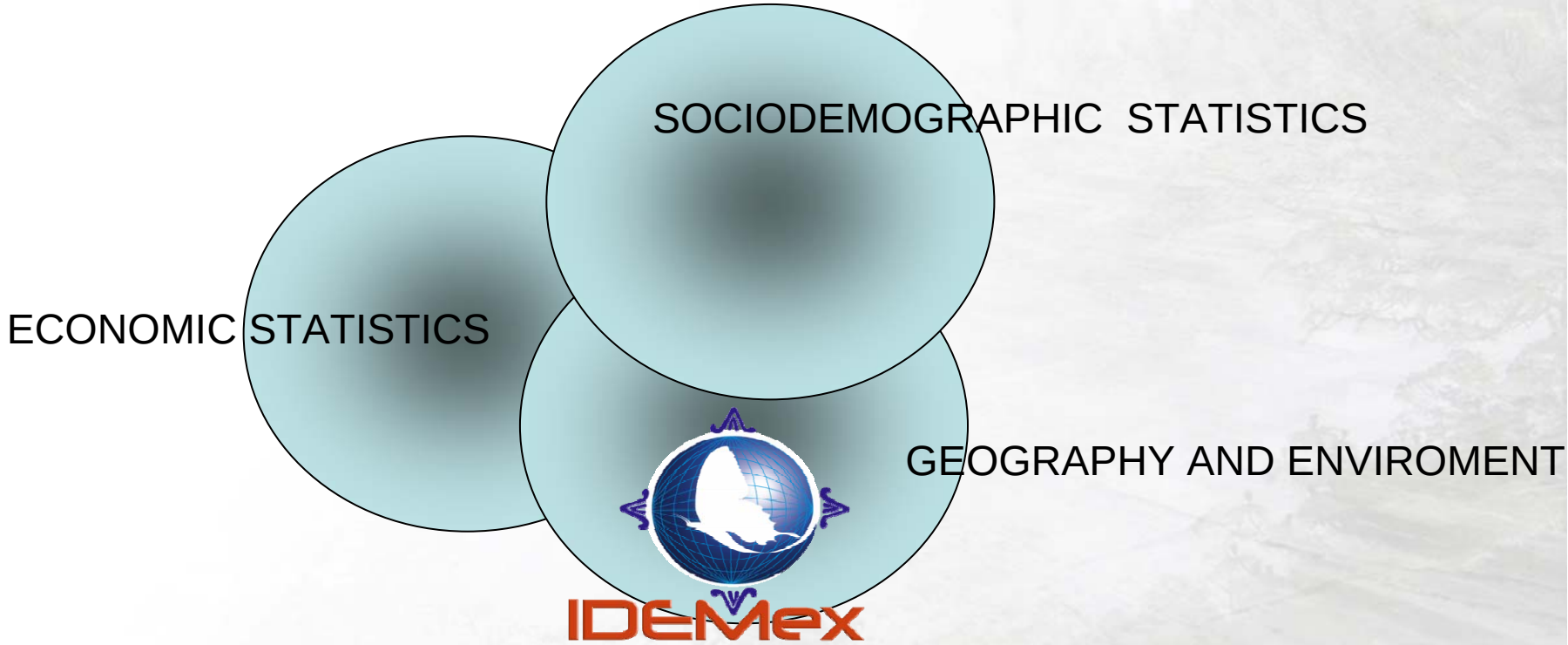
SDI of the Americas
www.cp-idea.org/nuevoSitio/indice.html

SDI of Mexico
www.inegi.gob.mx/geo/contenidos/espanol/IDEMex.pdf?s=geo&c=1352

SDI of the state of Michoacan

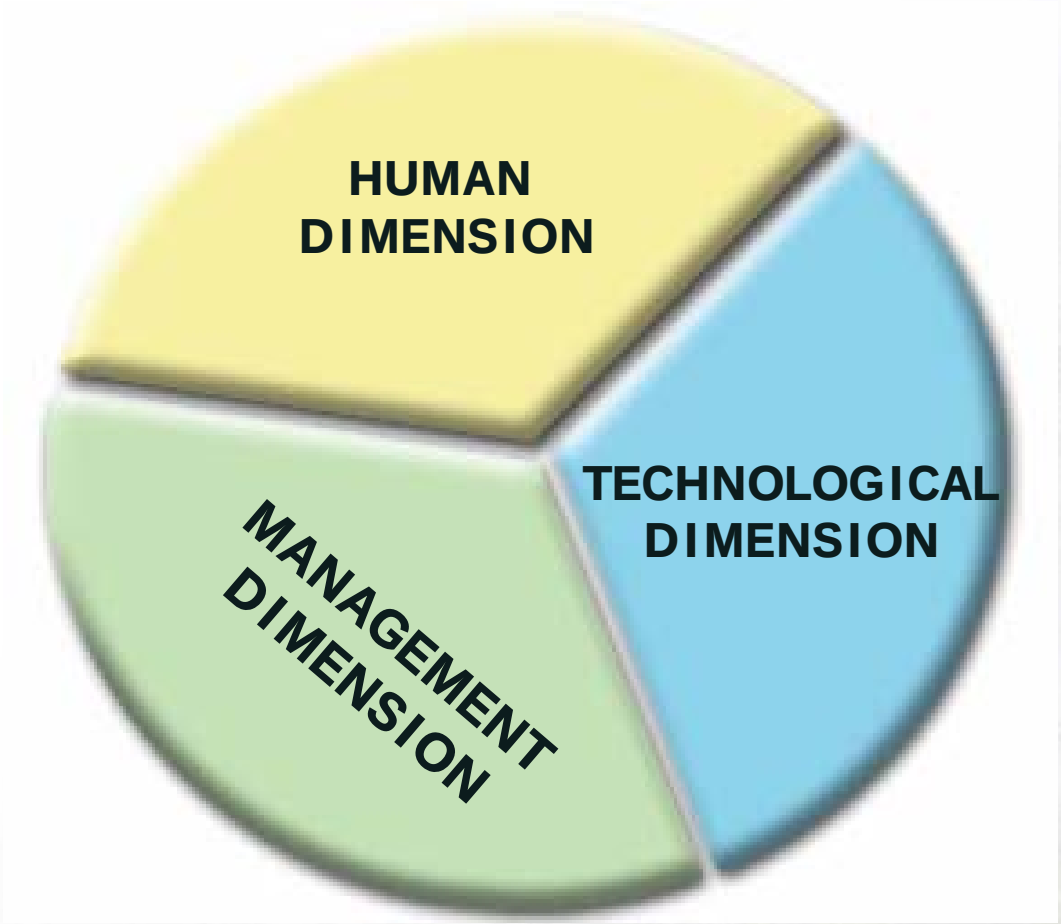
IDEMex, Mexico´s SDI

IDEMex is the geographical part of the geography and enviroment subsystem of the NATIONAL INFORMATION SYSTEM OF GEOGRAPHY AND STATISTICS.



IDEMex, Mexico´s SDI

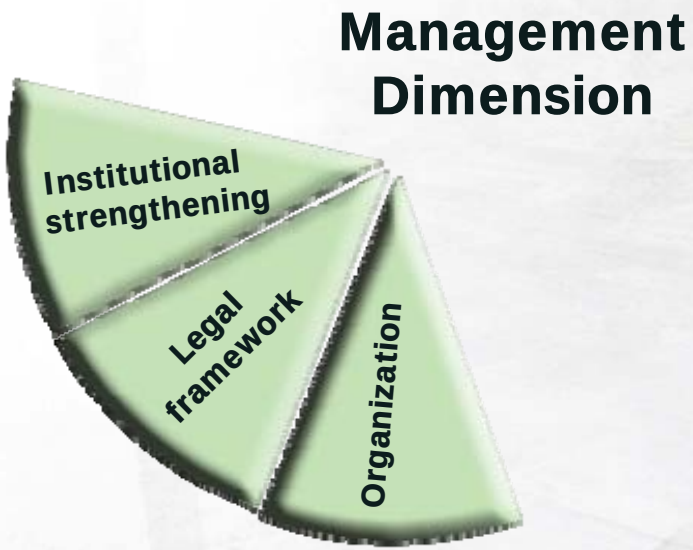
IDEMex is organized in three interconected areas or dimensions



IDEMex, Mexico´s SDI

54 Statistical and Geographical Technical Comitees:

- National: 2
- Sectorial: 18
- Regional: 32
- Special: 2



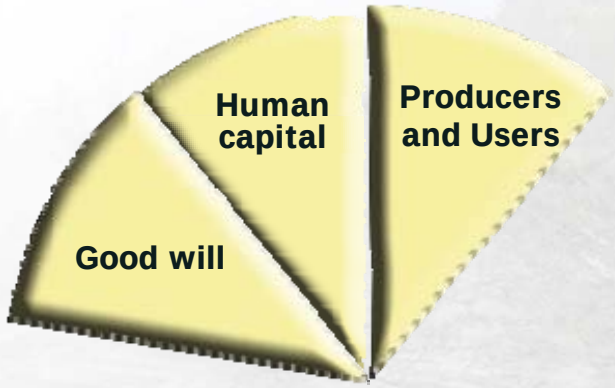
IDEMex, Mexico´s SDI

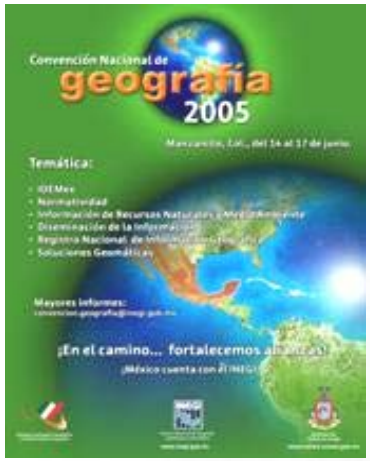
- INEGI
- SEMARNAT (Ministry of Environment)
  - CONANP (National Protected Areas Commission)
  - CONAGUA (National Water Commission)
  - CONAFOR (National Forest Commission)
  - IMTA (Mexican Water Technology Institute)
  - INE (National Ecology Institute)
  - PROFEPA (Environmental Protection Federal Office)
  - CONABIO (National Commission for Biodiversity)
- SGM (Mexican Geological Survey)
- SMN (Mexican Meteorological Survey)
- CENAPRED (National Center for Disaster Prevention)
- Etc.

IDEMex, the Mexican initiative

- Interinstitucional coordination
- National and International Fora
- Strategic alliances

Human Dimension





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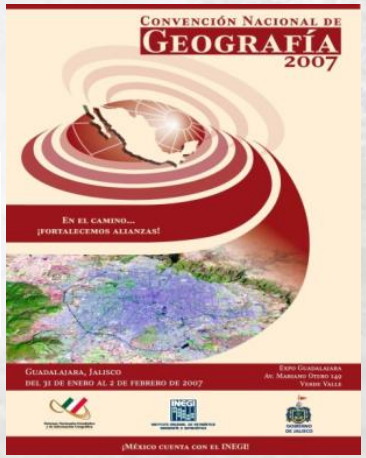
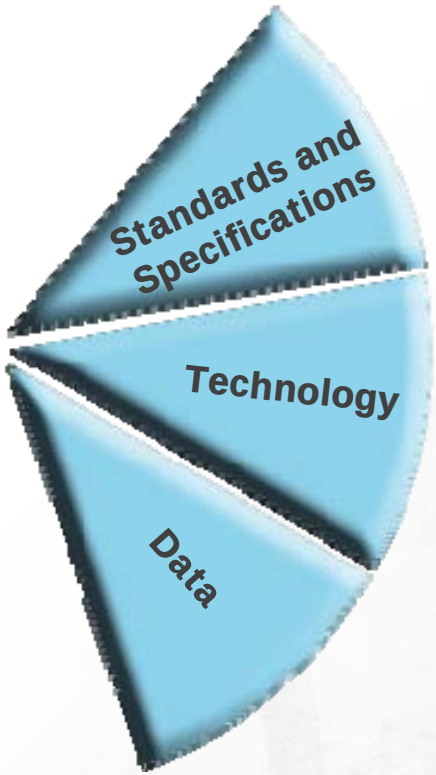


IDEMex, the Mexican initiative

Technical Dimention

- Standards
- Technology
- Data

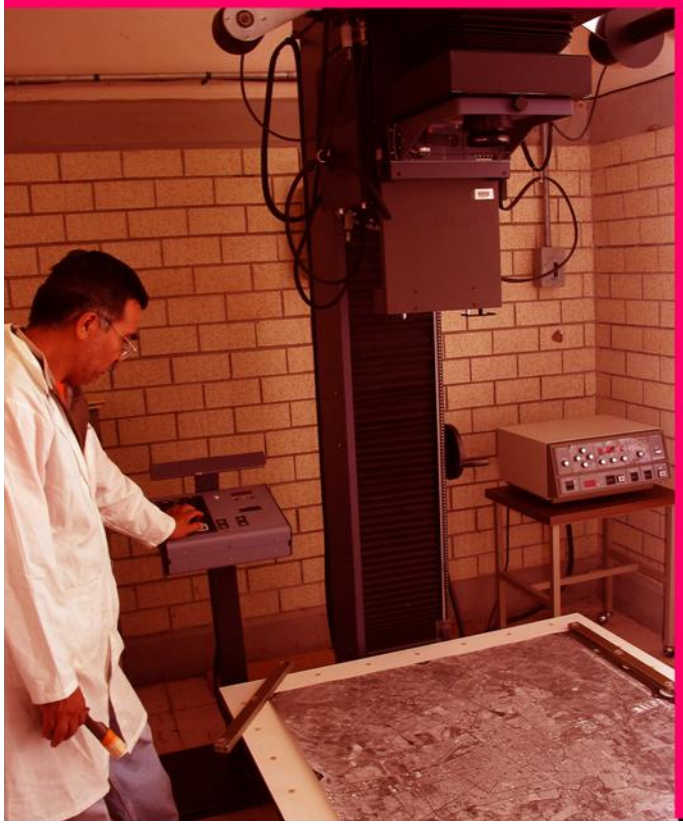


Información Referenciada geoespacialmente Integrada en un Sistema

iris

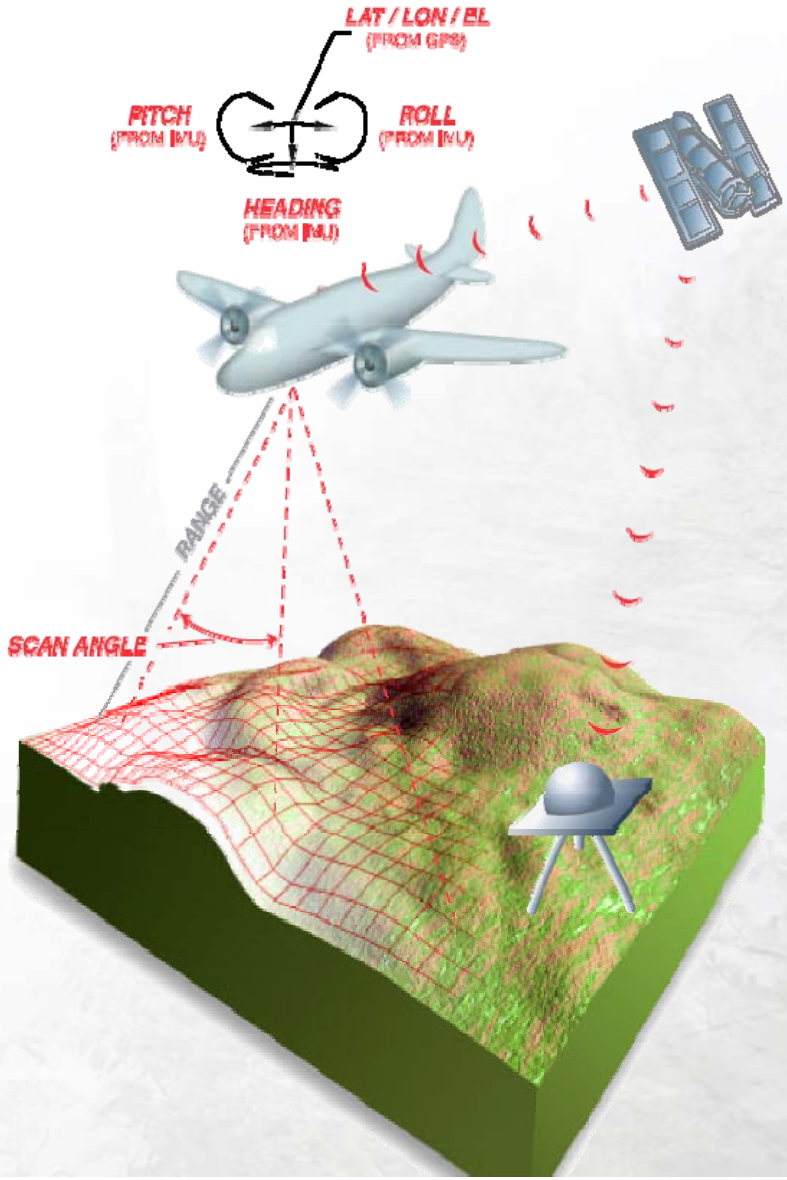
Navegante Geoestadístico de México

15 ecological regions for North-America



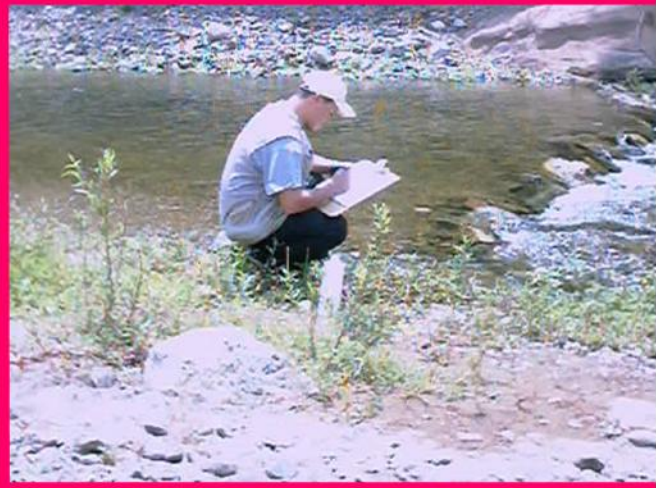

3963

- LIDAR technology









FUJIFILM


Leica

IDEMex, the Mexican initiative

Spatial Data Classification

Added value

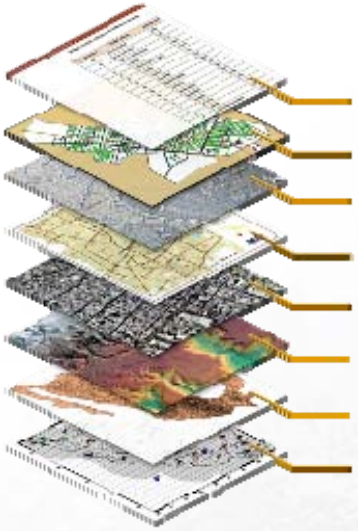
Education,
Tourism,
Mining, Forests, Soils,
Water, Weather, Migration,
Ecology, Disasters,
Waste disposal, Health, Economy,
etc.

Basics

Geostatistical data (Sociodemographic and Economic statitics)

Natural resources (Geology, Soils, Hydrology, Land Use and Vegetation, Physiography, Climatology, Bathymetry, ...)

Fundamentals



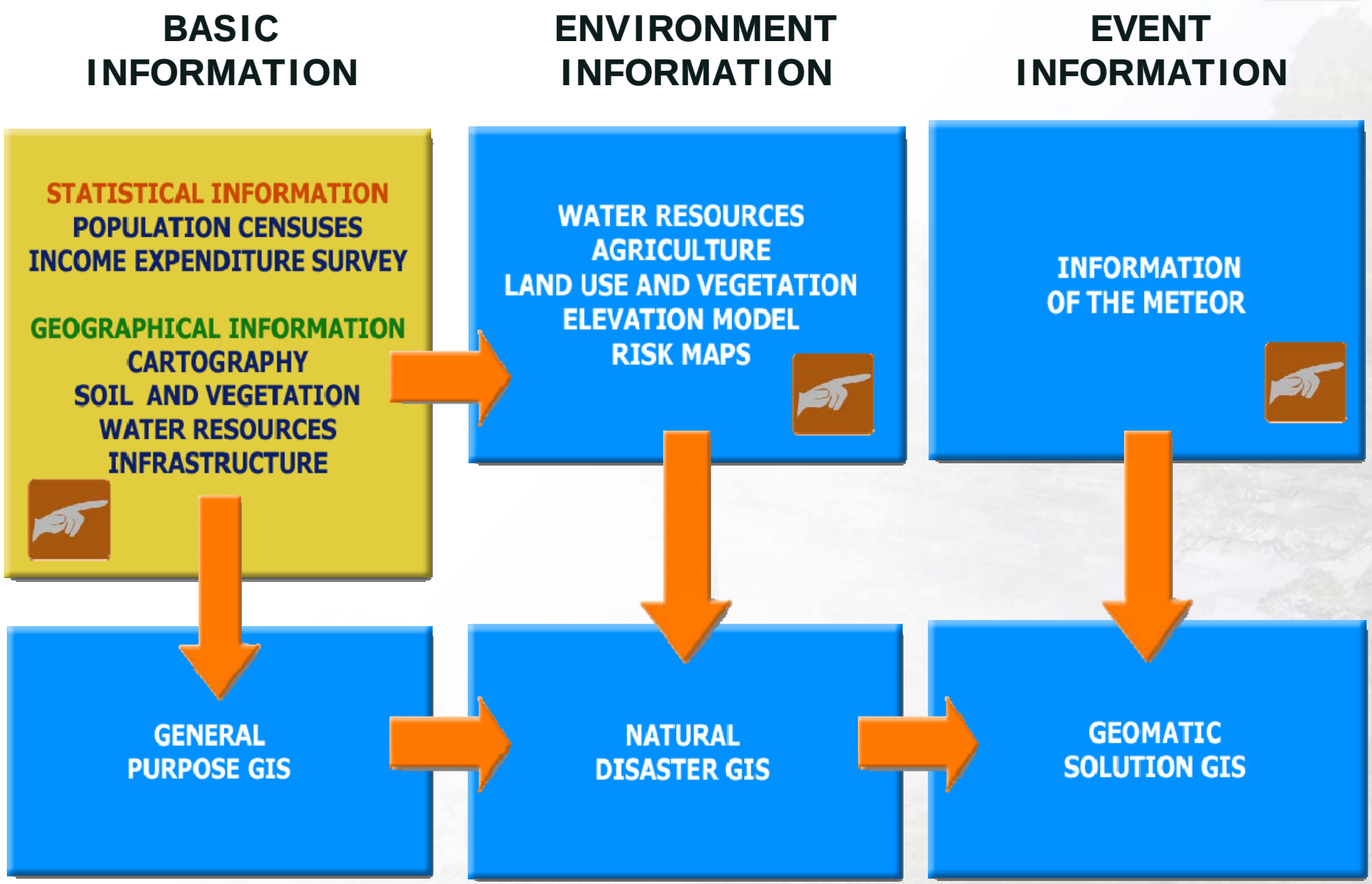
Geographic names
Cadastral data
Hydrographic networks
Transportation routes and Planimetric data
Imagery
Relief data
International, state and intrastate boundaries, geostatistical, etc
Geodetic references

IDEMex, the Mexican initiative

Demographic, social, economic and cartographic information is integrated in Geographical Information Systems.

Censuses

HOW THE DATA IS USED



National Strategy for Climate Change

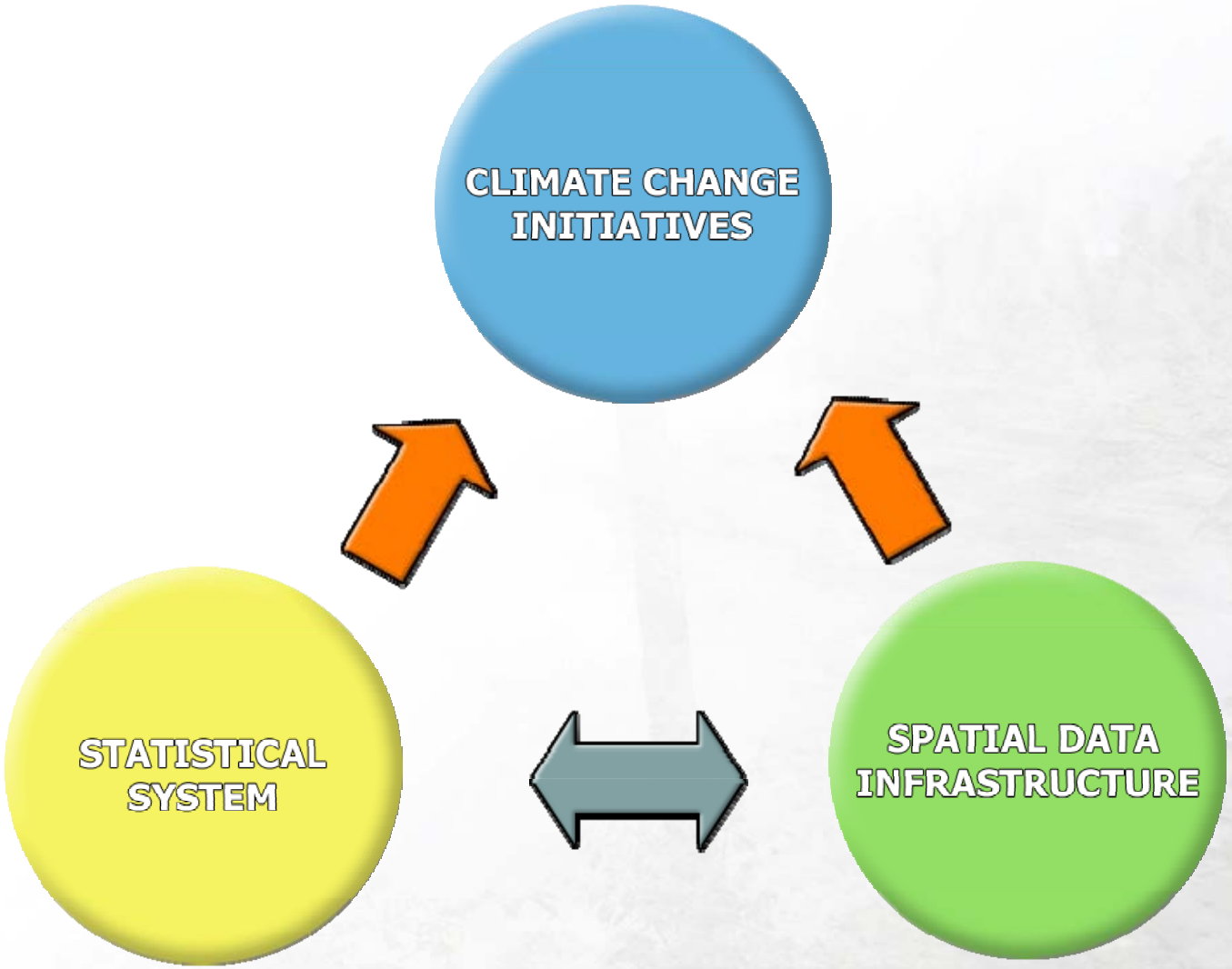
National Strategy for Climate Change

National Strategy for Climate Change

Intersecretarial Commission on Climate Change

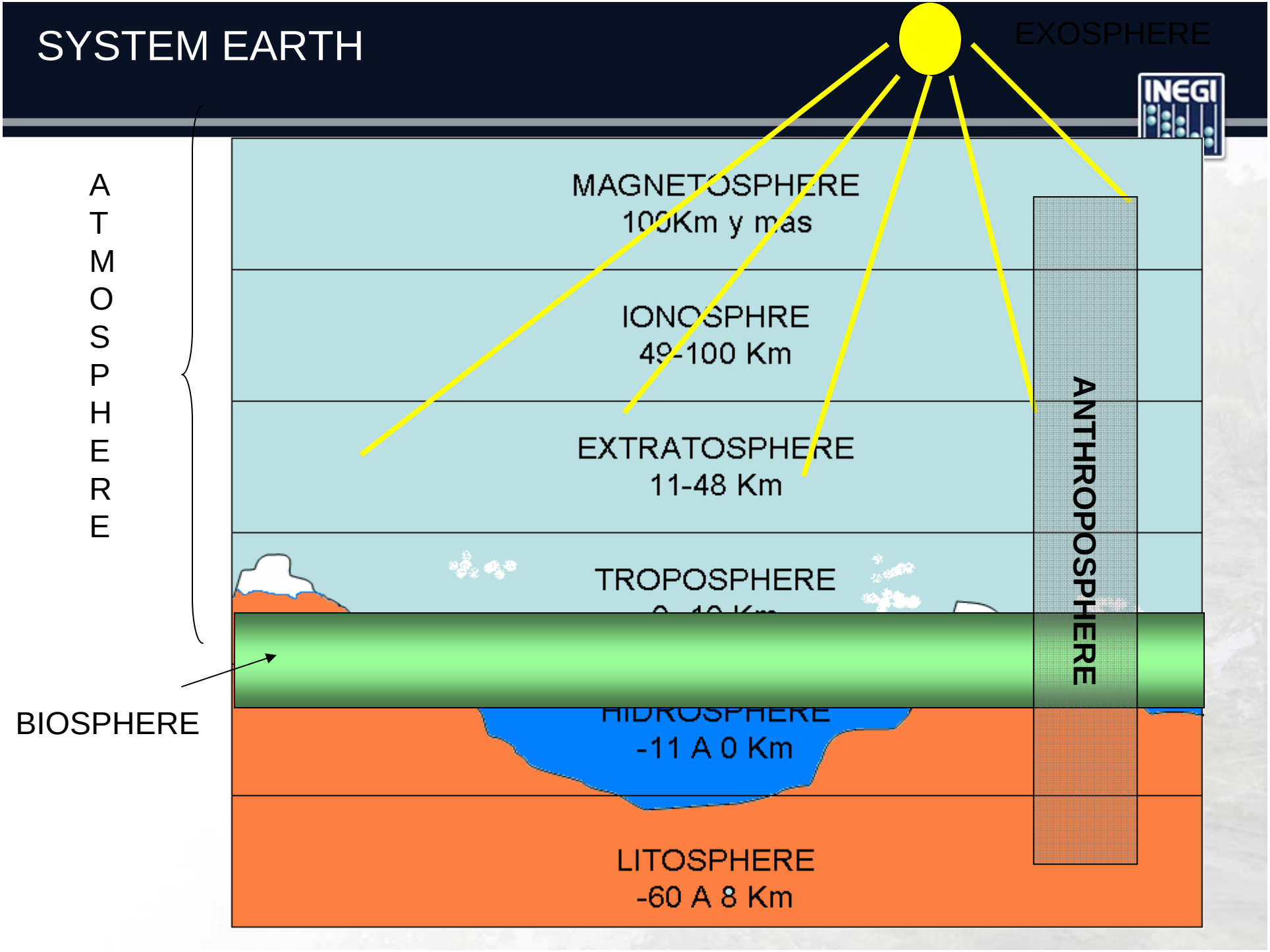
- Mexico´s strategy is based in two sets of actions for:
  - Adaptation
  - Mitigation
- They are in line with the Stern Review.

Challenge

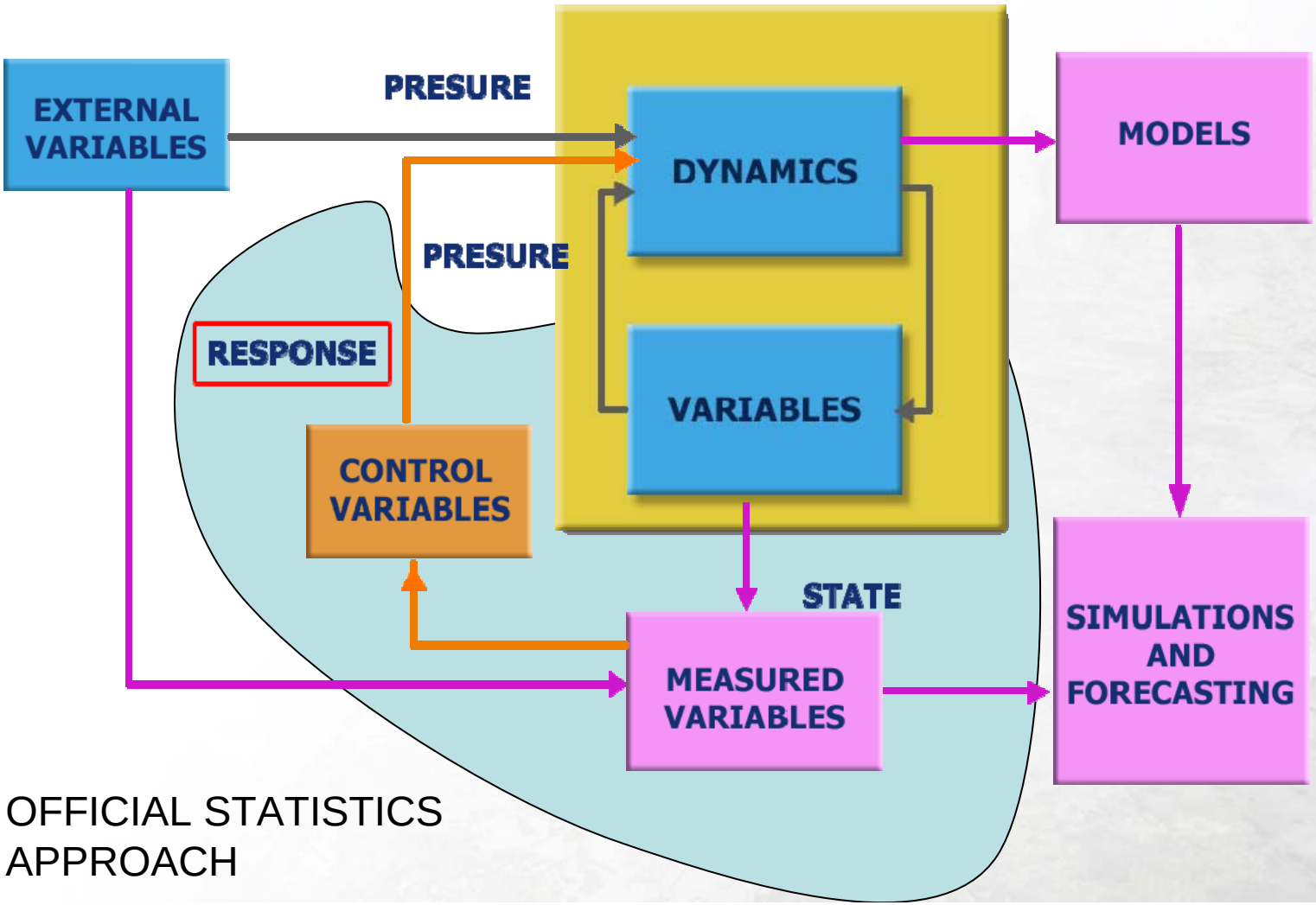

CLIMATE CHANGE INITIATIVES
STATISTICAL SYSTEM
SPATIAL DATA INFRASTRUCTURE


Climate Change:
A Systemic Approach

SYSTEM EARTH



System Earth



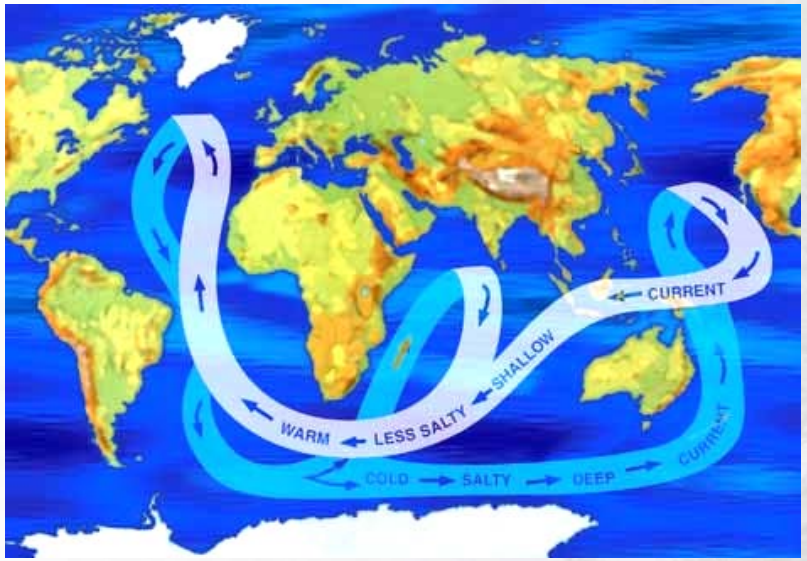
OFFICIAL STATISTICS APPROACH

Models

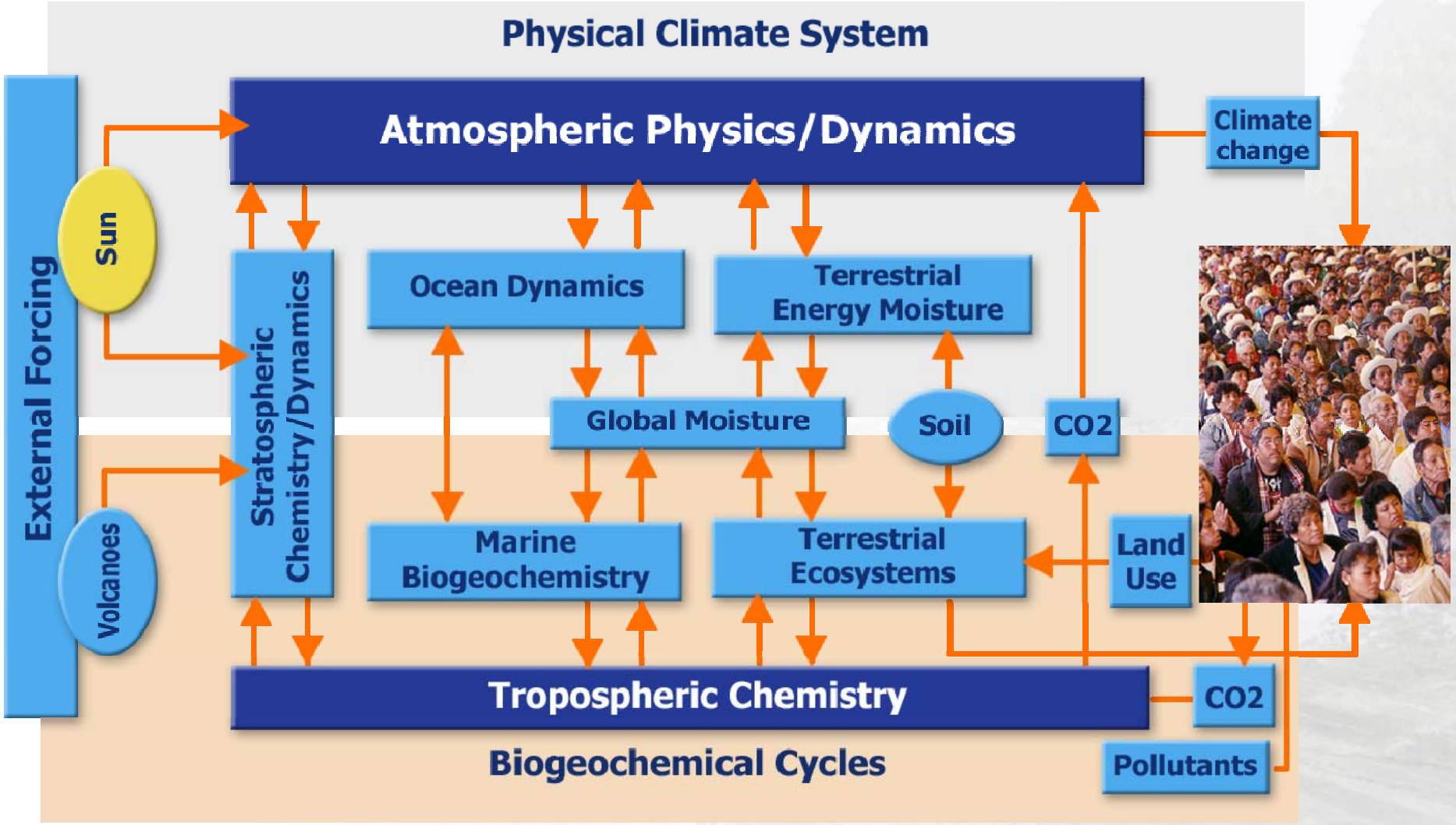
Mathematical models that allow simulation of diverse processes in all spheres have been in a constant improvement during the last 50 years.

It´s important to keep in mind that we are dealing with a very complex system, where the most interesting feature is the nonlinearity of their dynamics and the way they confirm that in the case of climate change everything is related to everything else.

In order to improve our knowledge, better models are required which need more and better information.



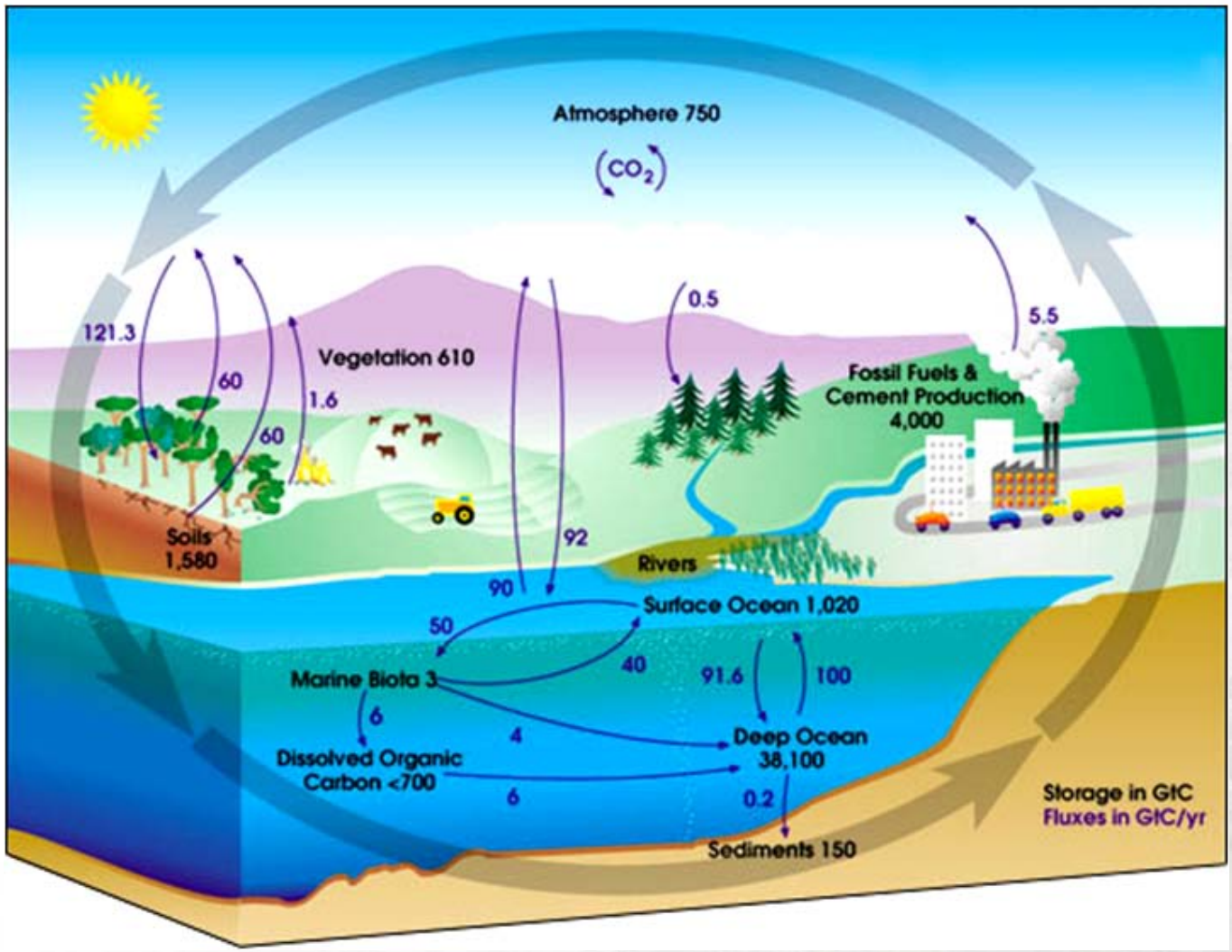
Climate Change System



(from Earth System Science-Overview, NASA, 1986)

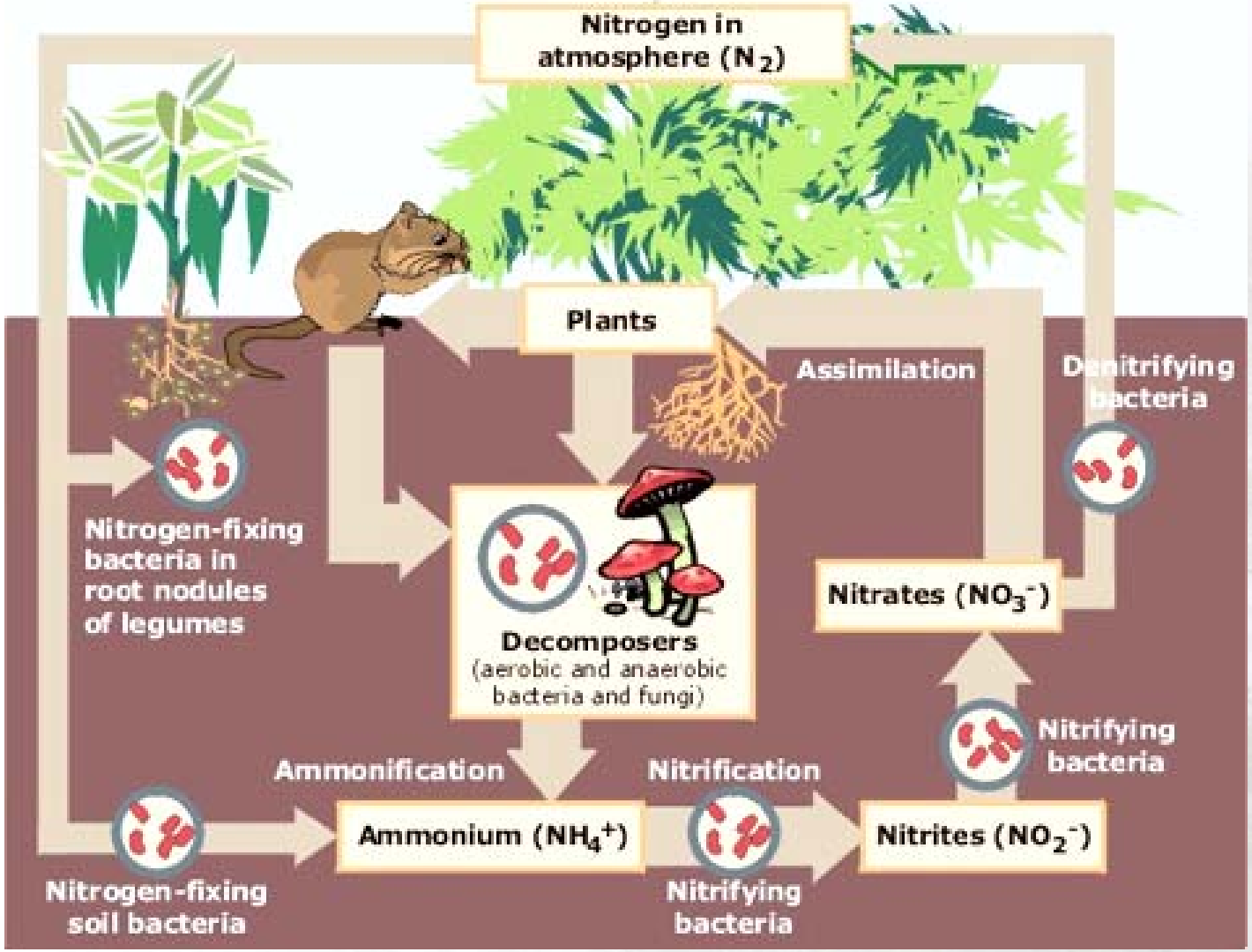
Models

- Carbon cycle



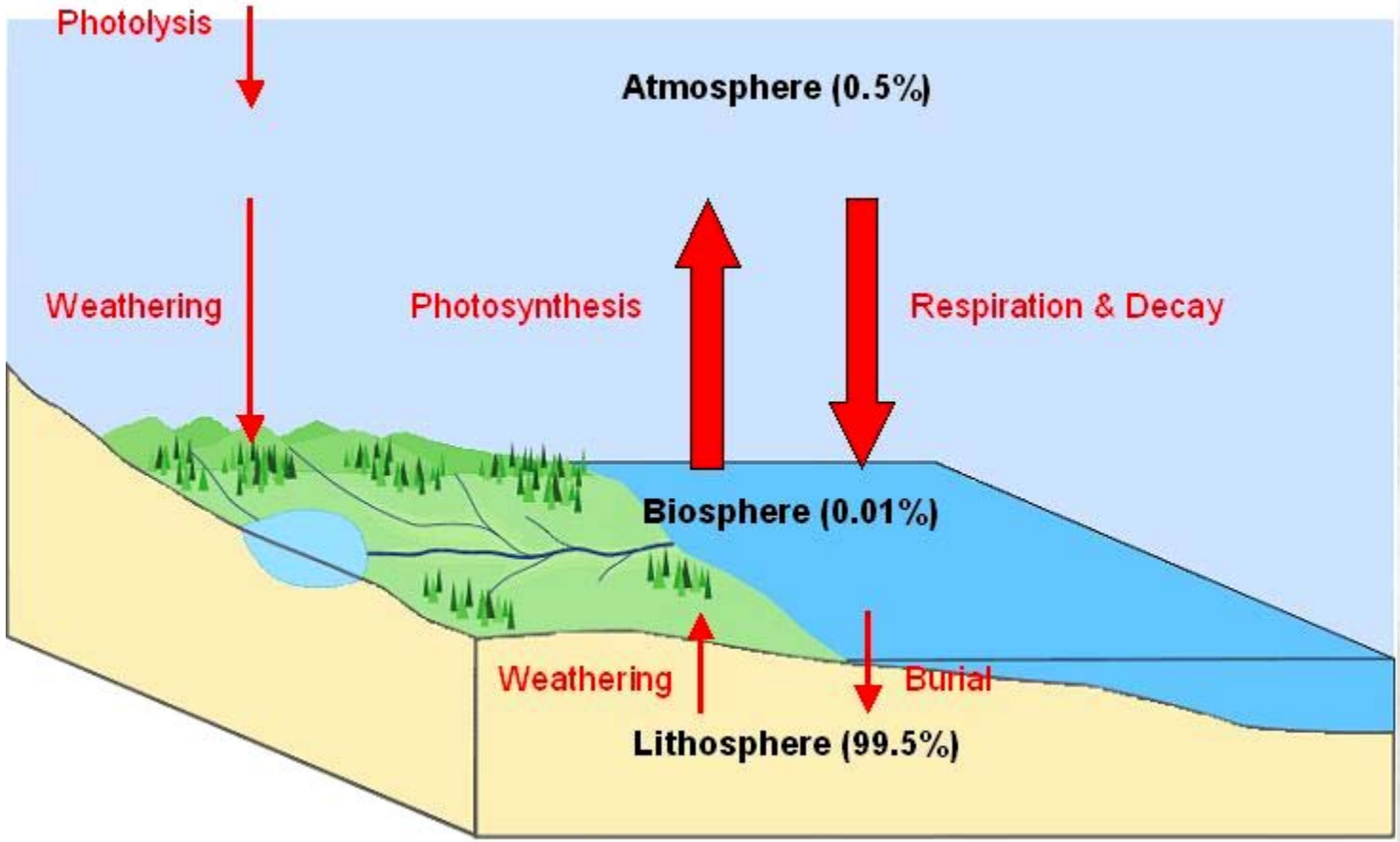
Models

- Nitrogen cycle



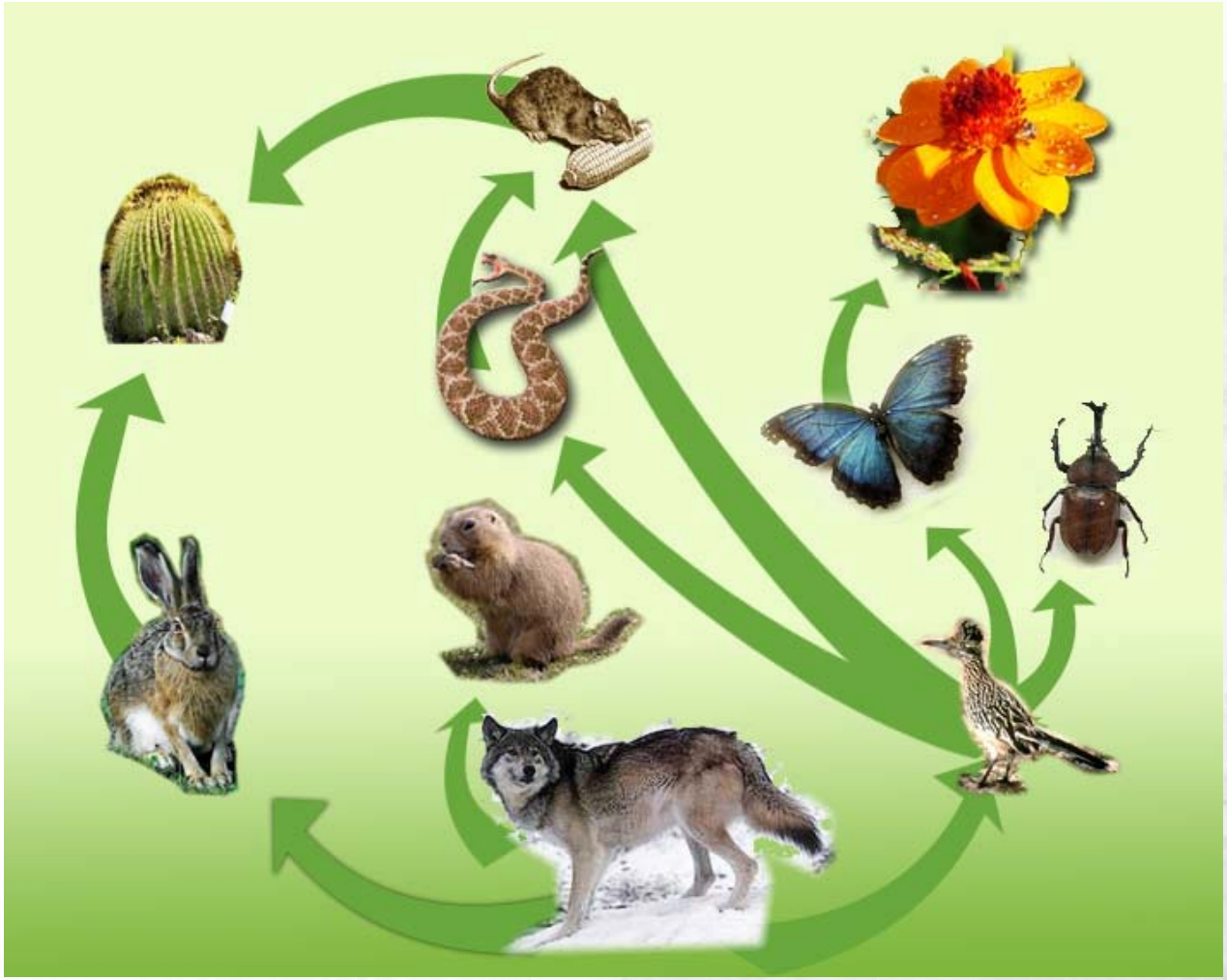
Models

- Oxygen cycle



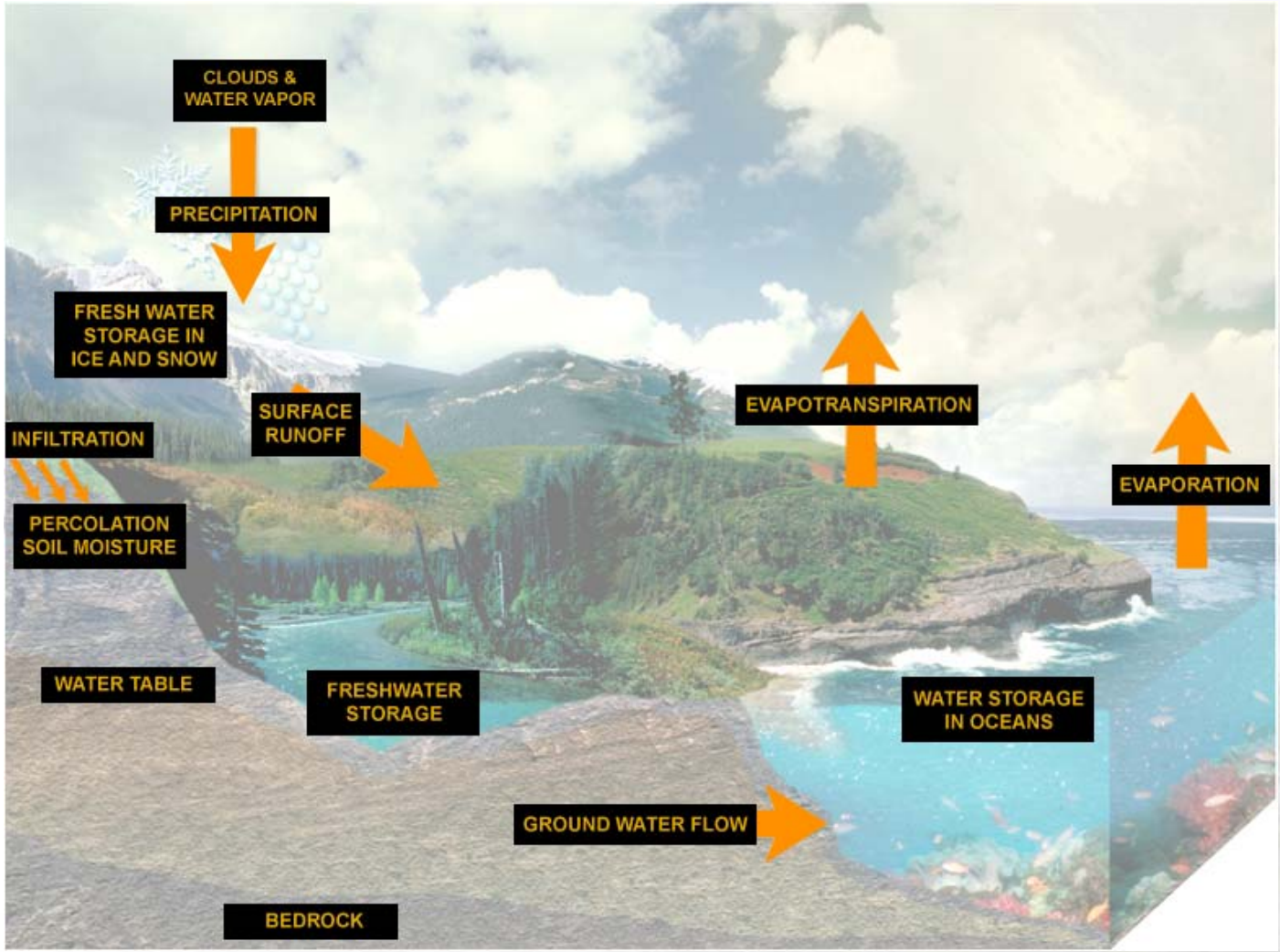
Models

- Ecosystem



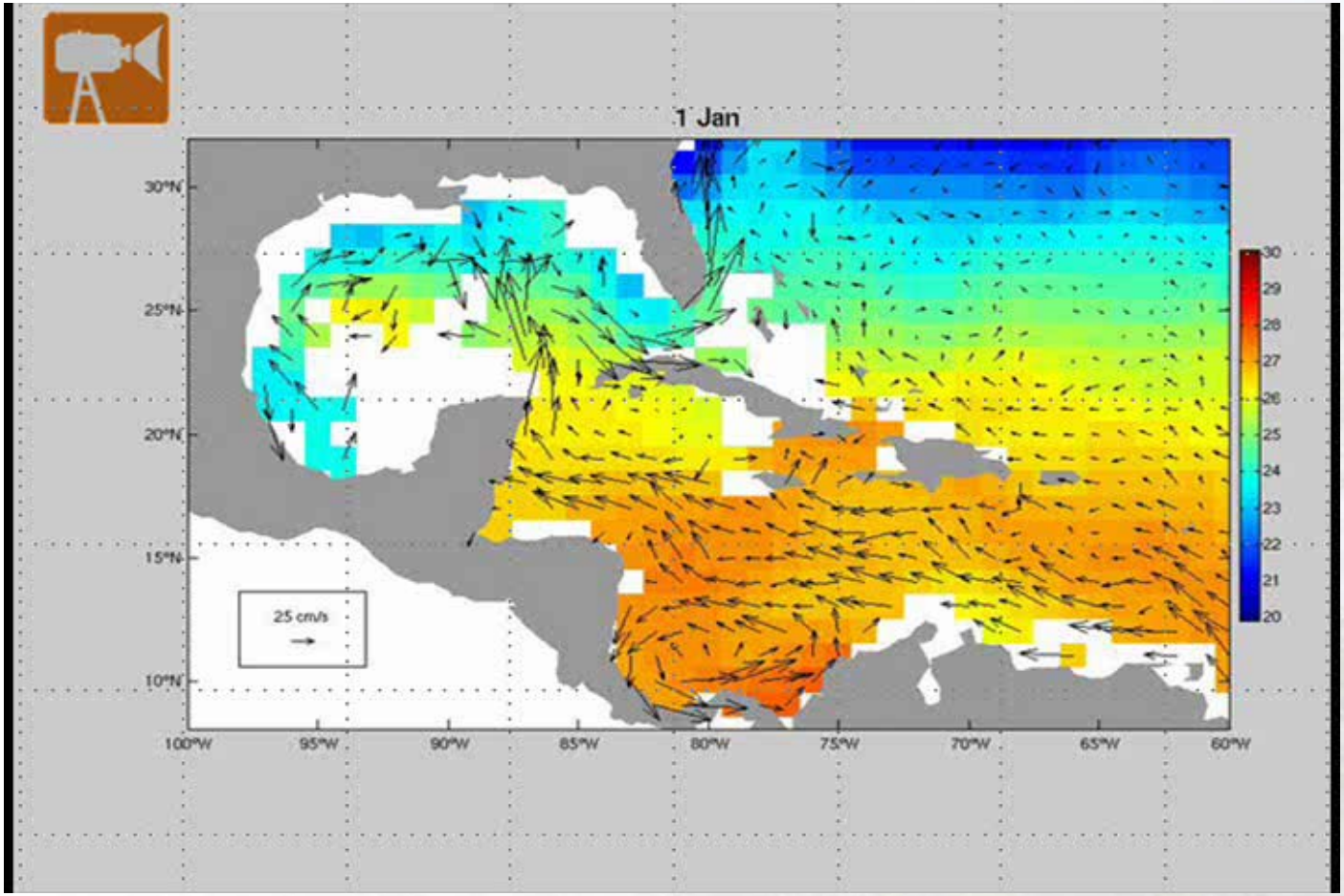
System Earth

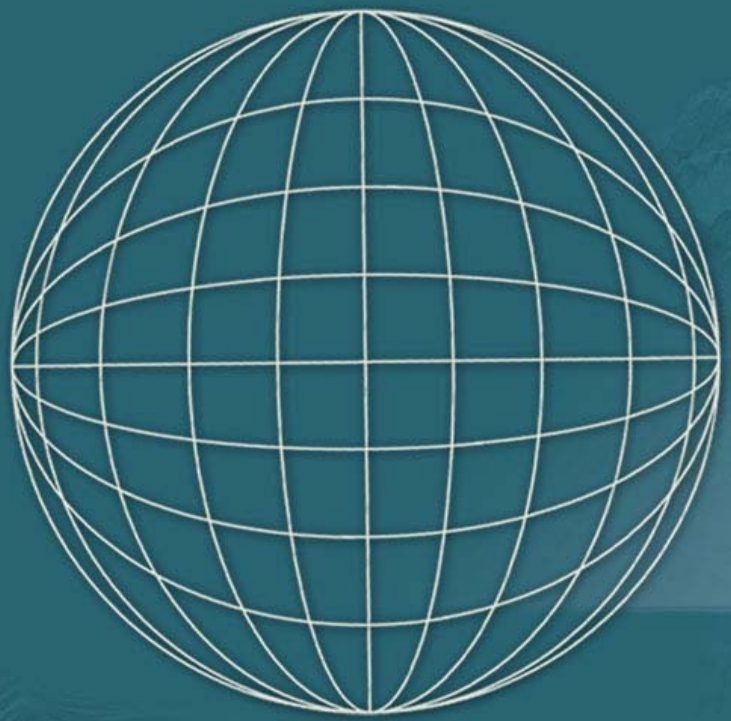
- Water cycle



Models

- Ocean currents distribute heat around the world.





Mitigation and Adaptation Actions

Water and Population

Water availability in Mexico is estimated in 500 billions of m^3

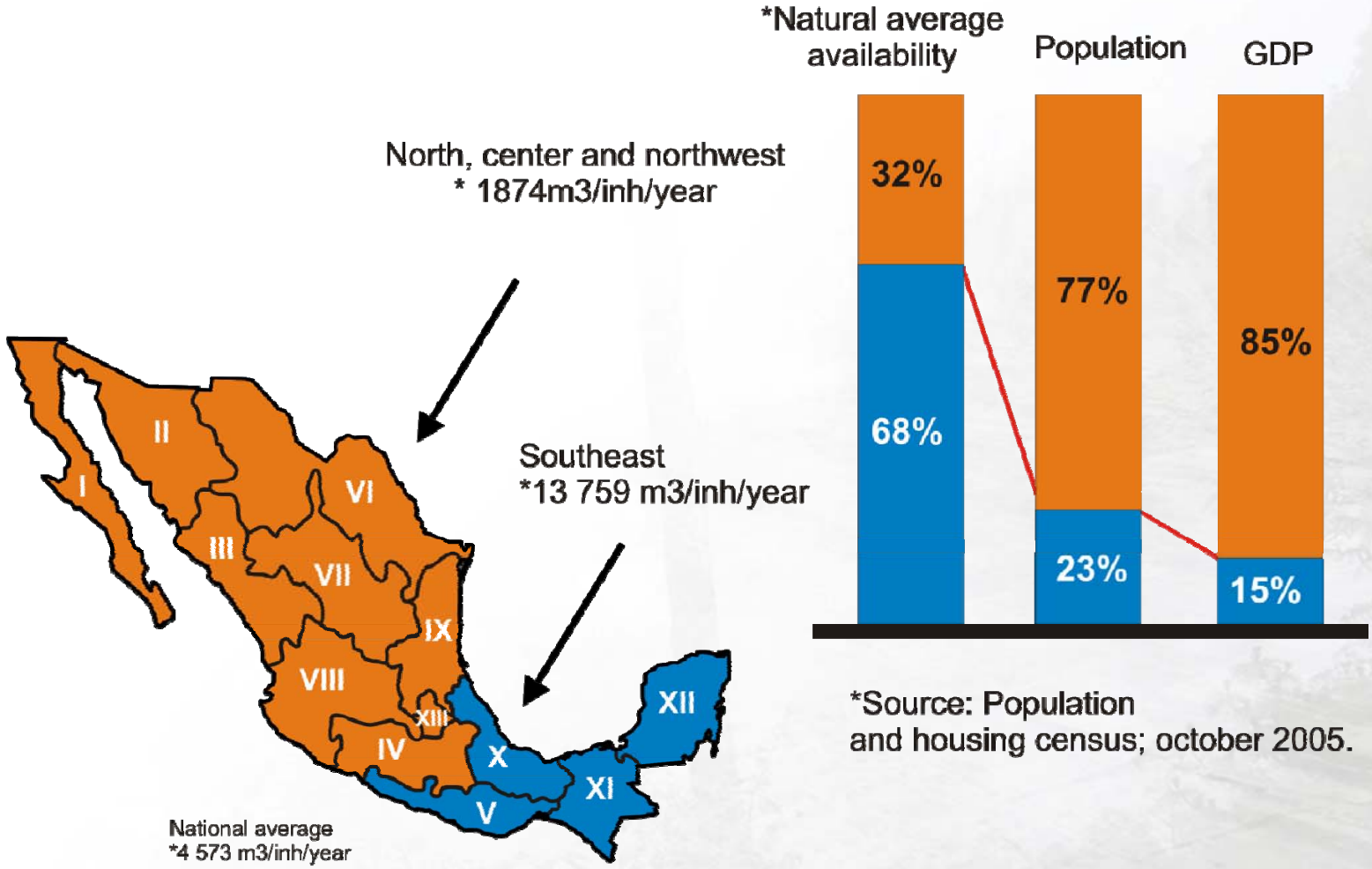
Mexico´s population is around 106 million.

One third of its population is settled higher than 2,000 masl, where just 4% of the annual runoff is generated.

In contrast, less than 25% of the population is in the southeast, where drains 67% of the total and concentrates 80% of the water storage capacity.

WATER AVAILABILITY POPULATION AND GDP

Water availability and development

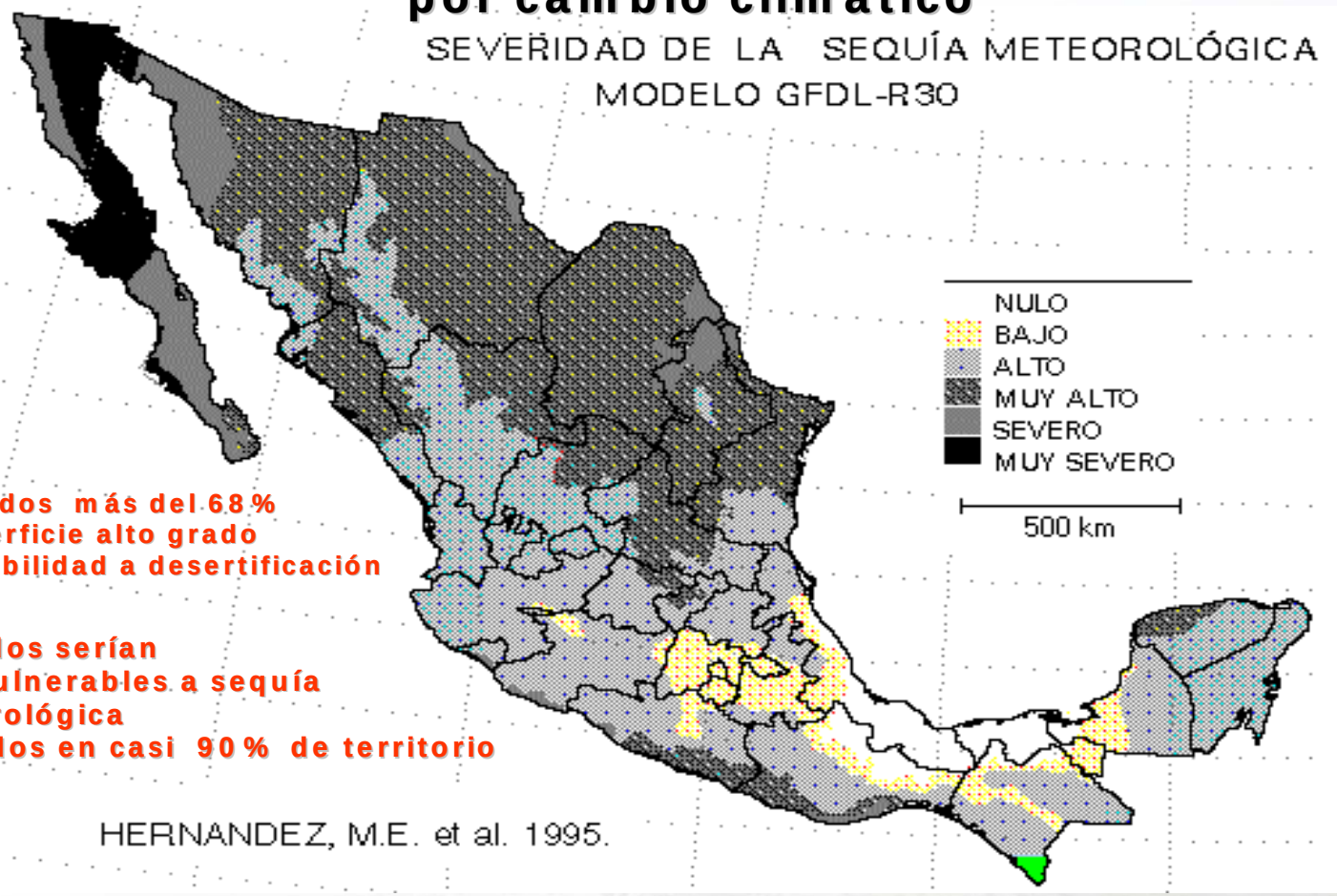


*Source: Population and housing census; october 2005.

Source Information: National Water Comission. CANAGUA

DANGER OF DROUGHTS

Norte de México: vulnerabilidad a la sequía meteorológica por cambio climático

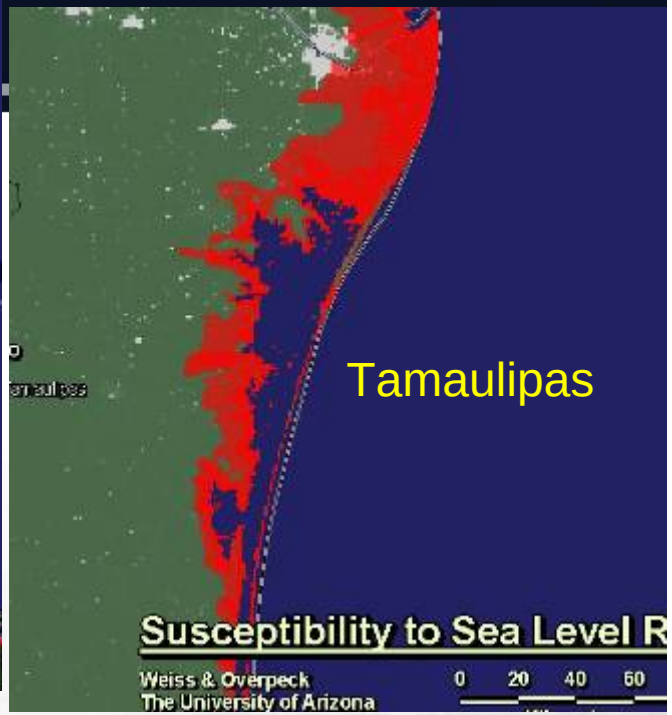


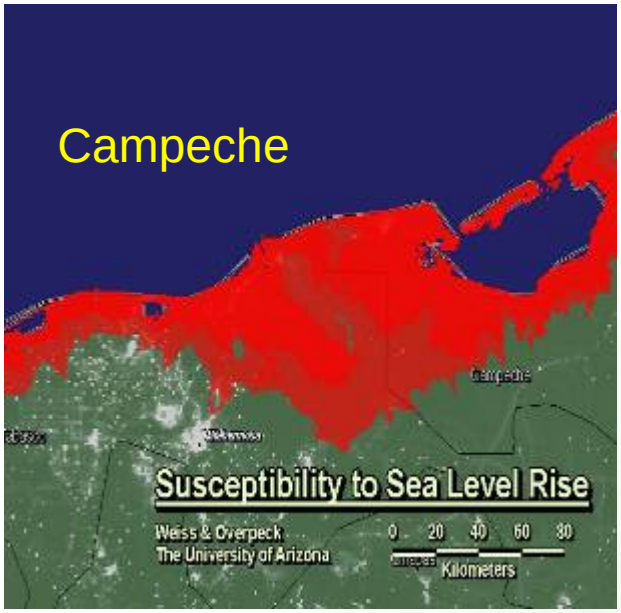
10 estados más del 68% de superficie alto grado vulnerabilidad a desertificación

8 estados serían más vulnerables a sequía meteorológica afectados en casi 90% de territorio

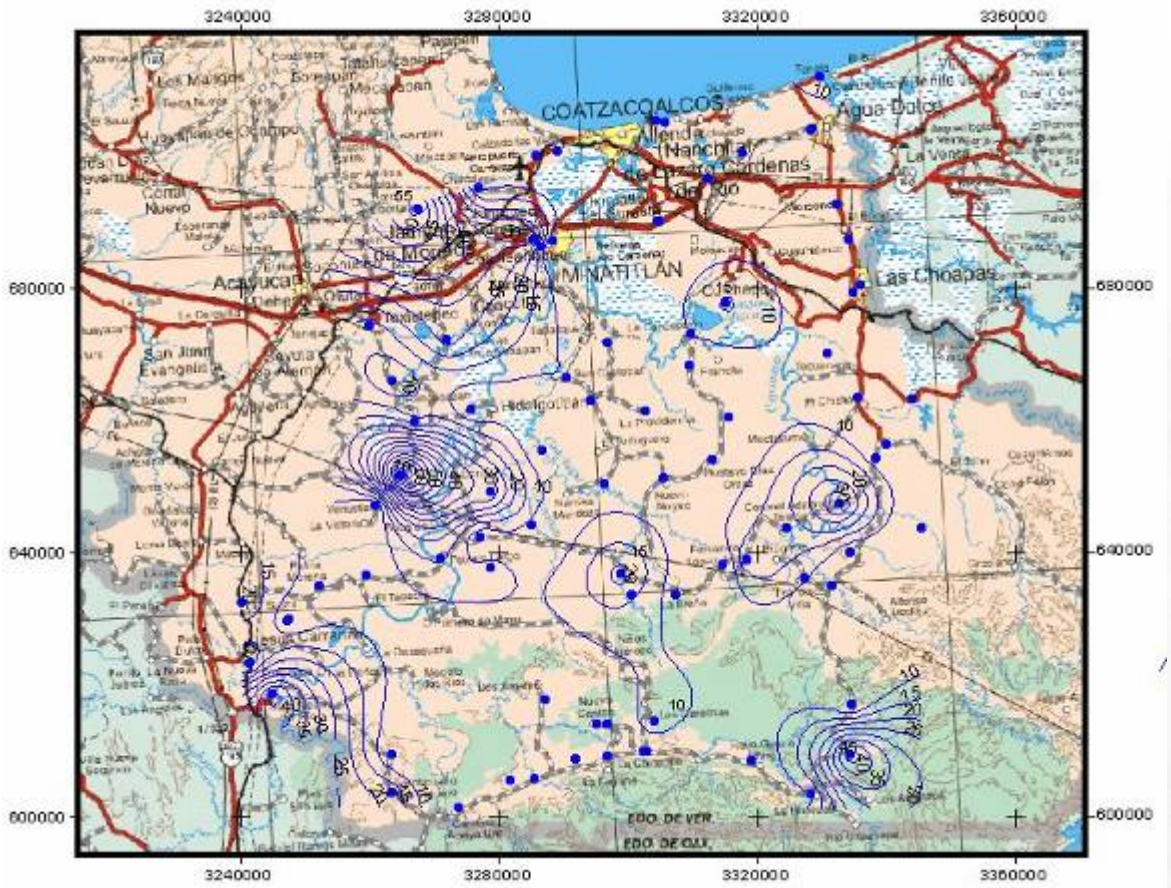
HERNANDEZ, M.E. et al. 1995.

SEA LEVEL RISE





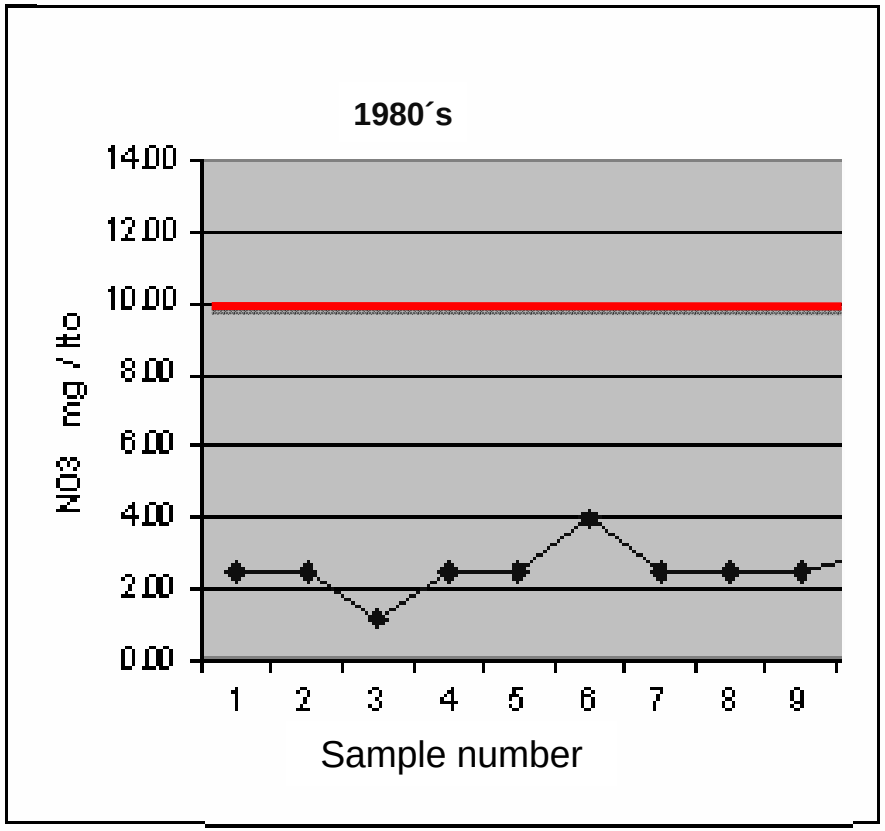
Water Quality

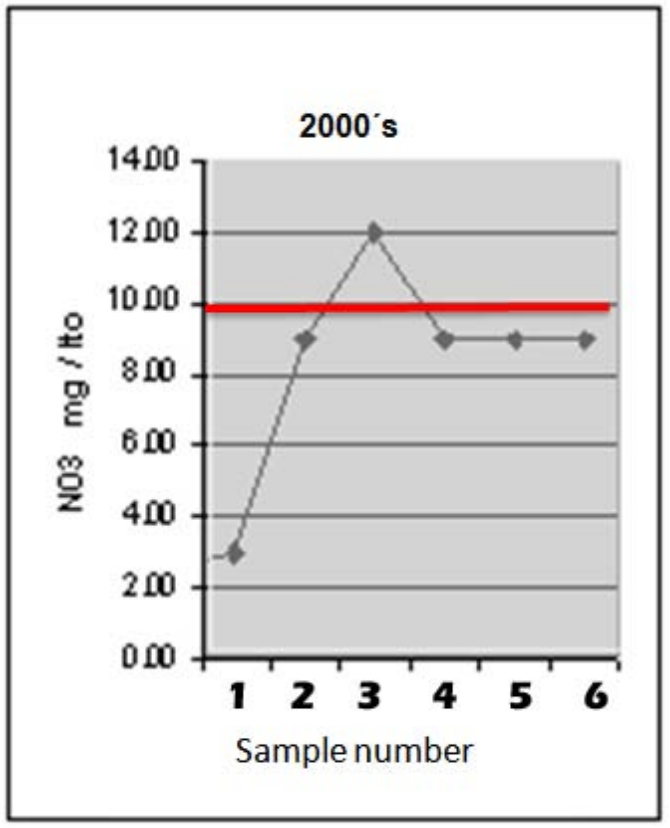


Nitrate is an indirect indicator of the presence of anthropic pollution.

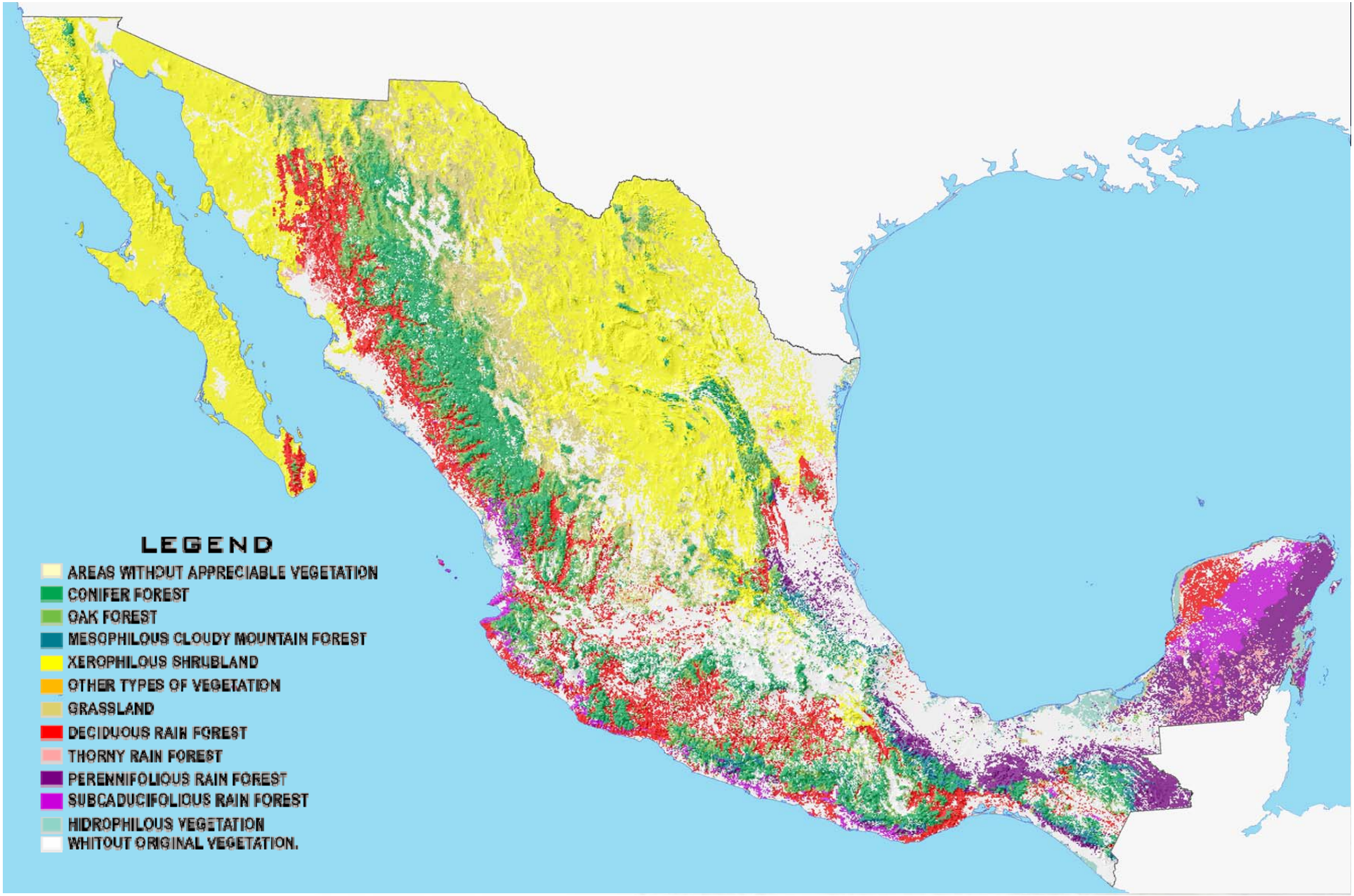
The maximum permissible concentration is 10 mg/lt (NOM-127-SSA-1-1994)

Water Quality



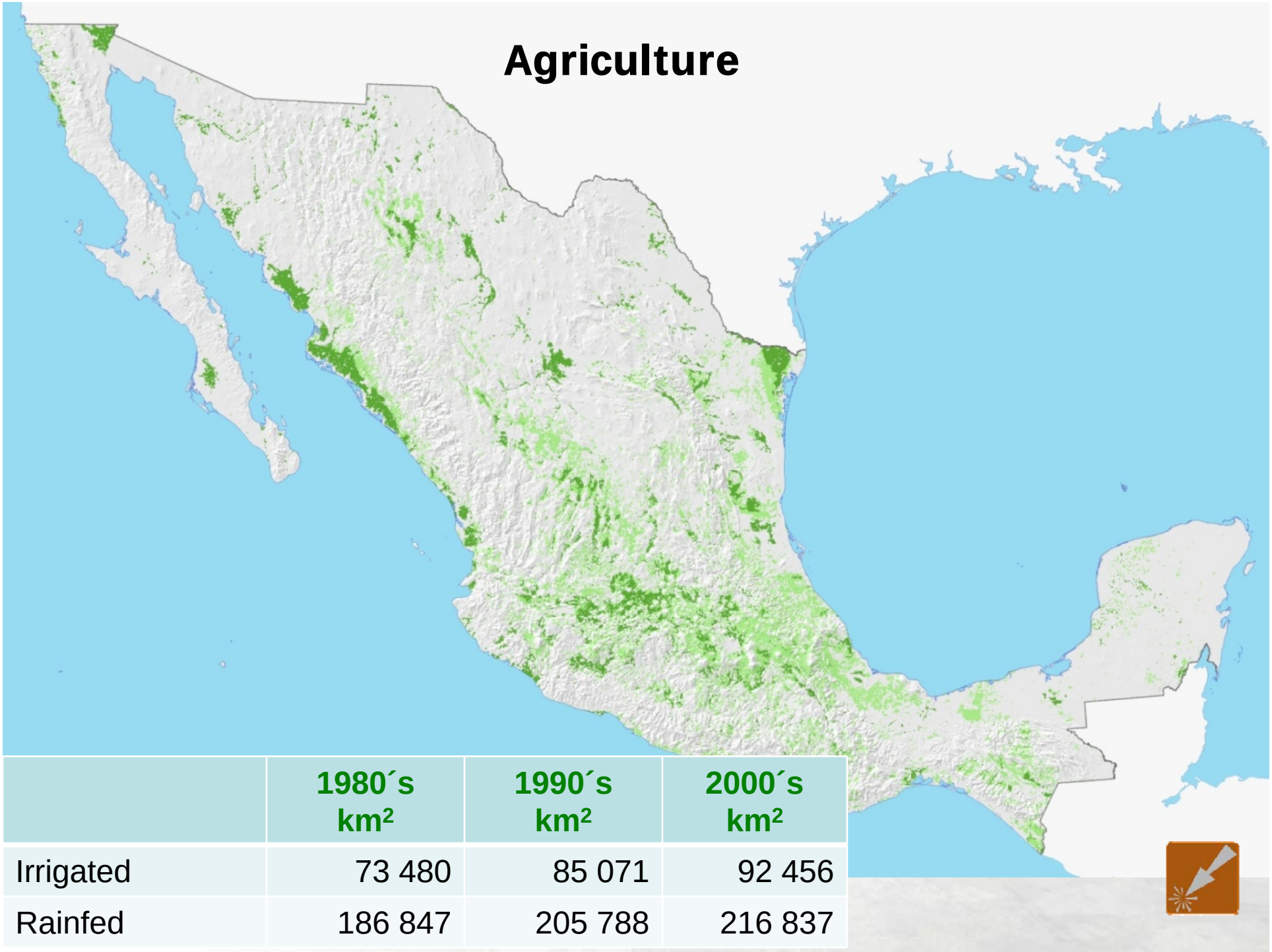


Nitrates concentration from water samples collected on Panuco´s river runof.



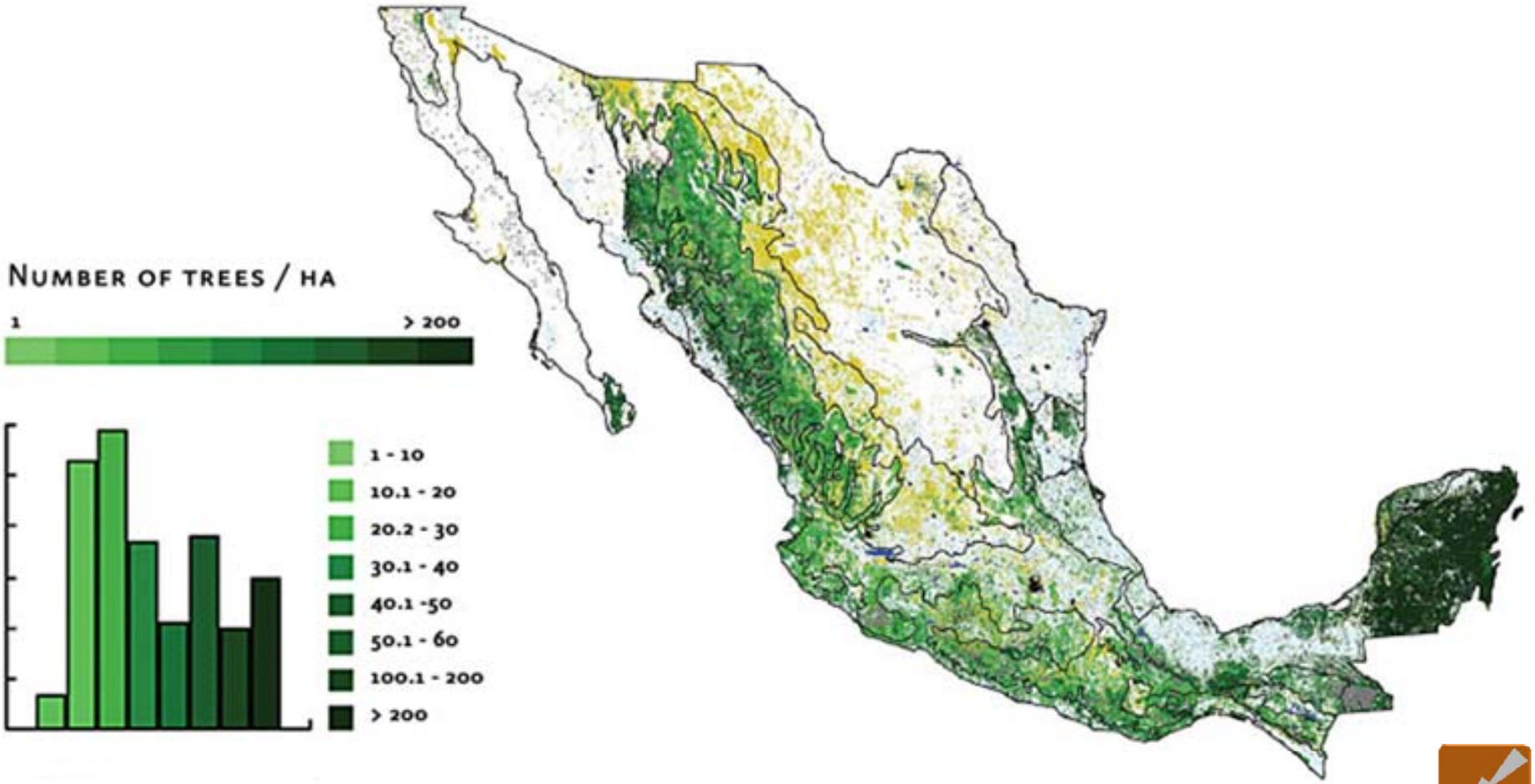
Vegetation map – 2000´s

Agriculture

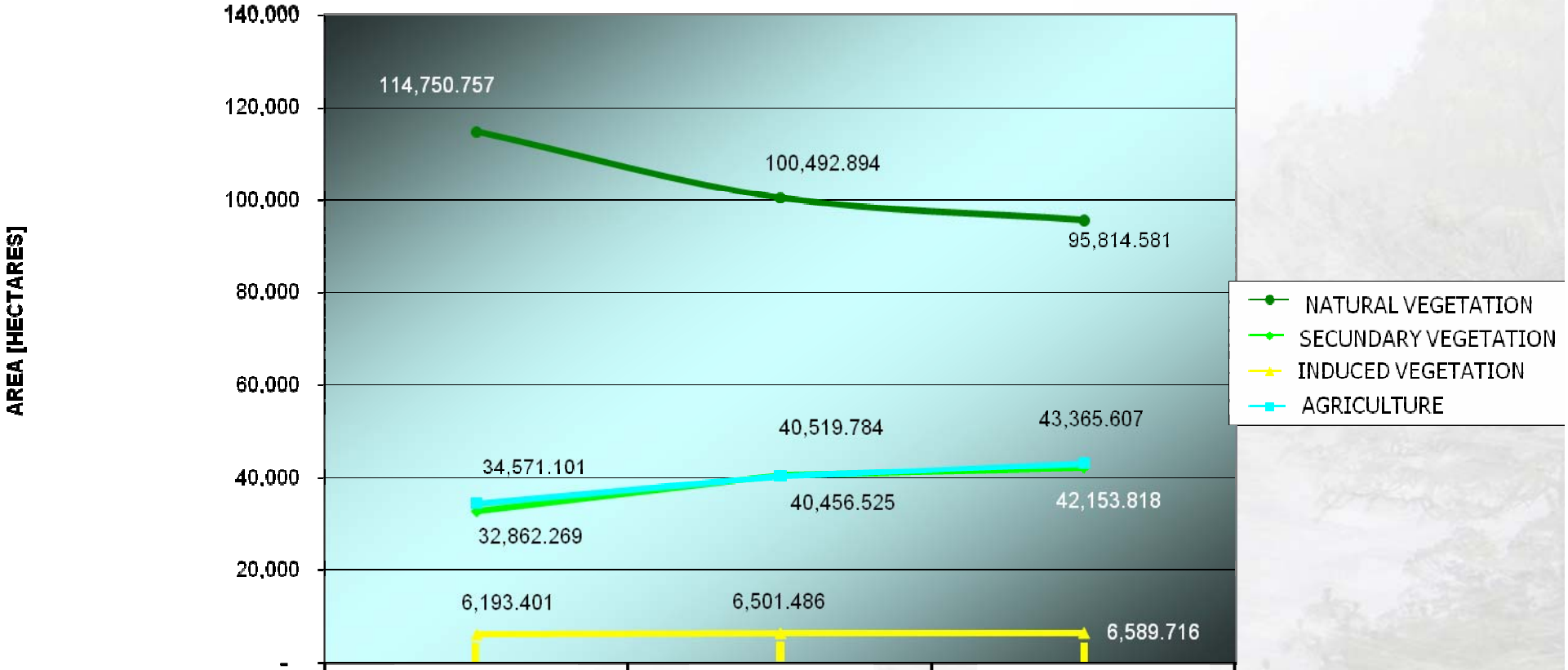


	1980´s km²	1990´s km²	2000´s km²
Irrigated	73 480	85 071	92 456
Rainfed	186 847	205 788	216 837

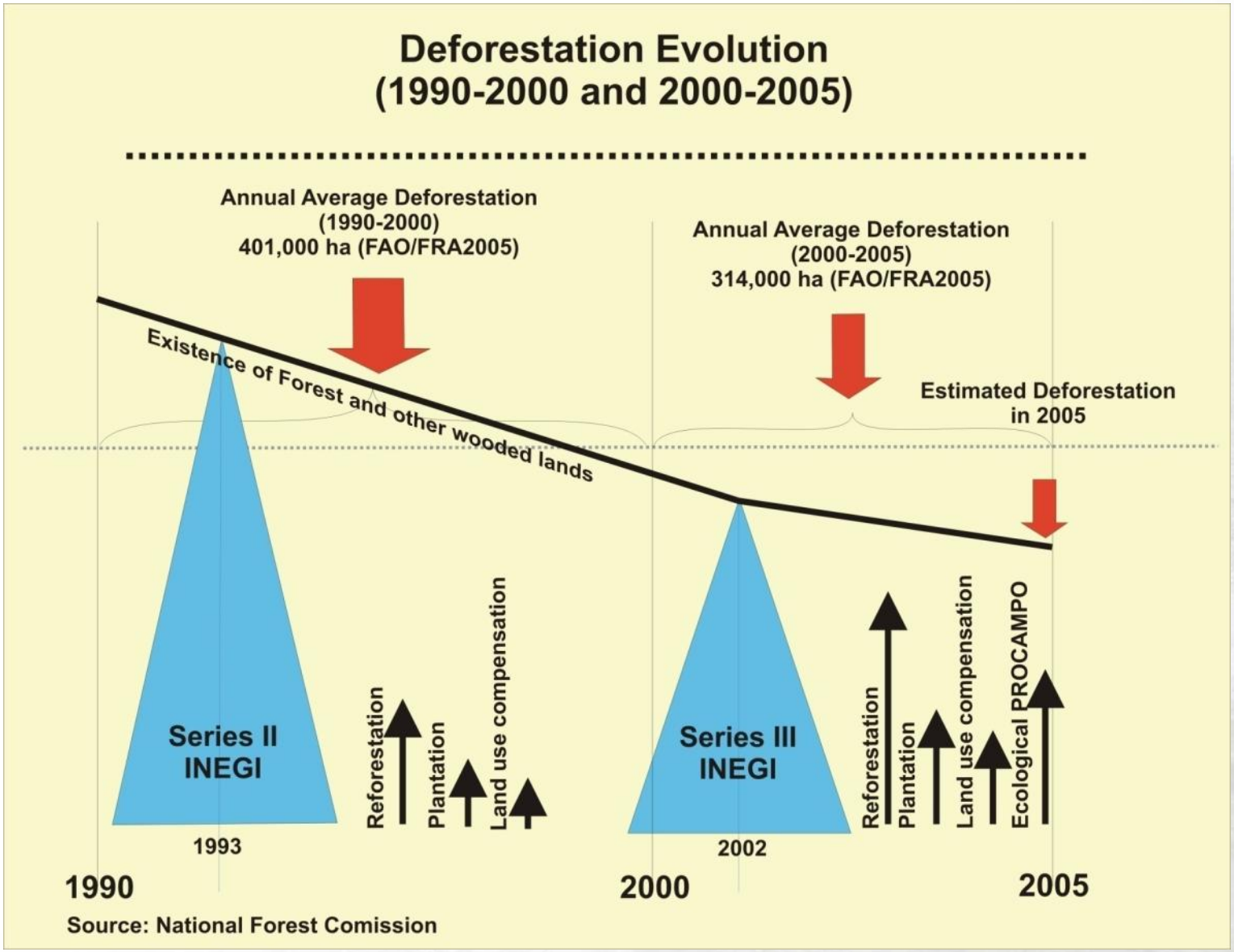
Frequency in reforestation



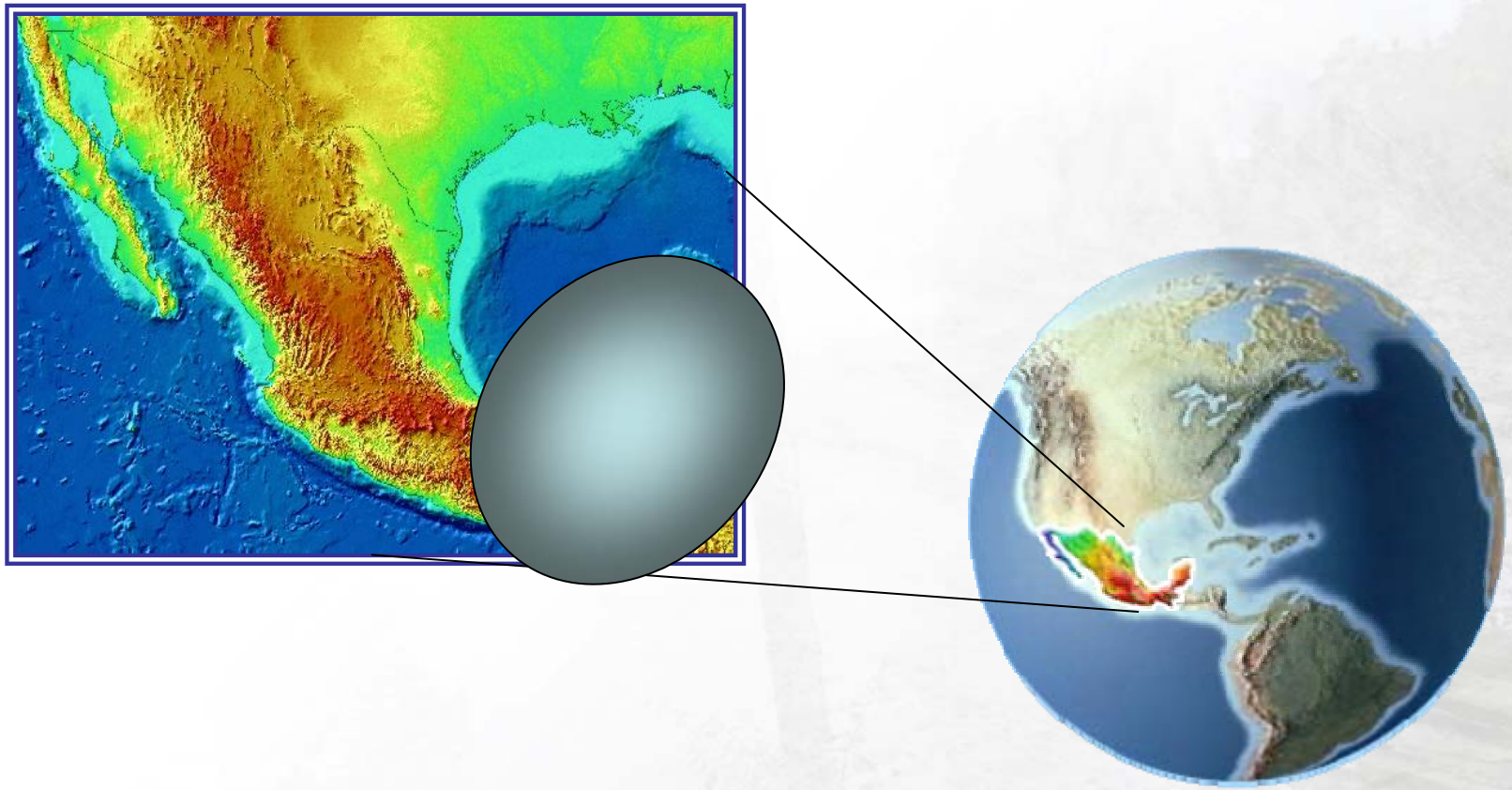
Temporary expression



	SERIES I (80's)	SERIES II (90's)	SERIES III (2002-05)
NATURAL VEGETATION	**114,750,756.572**	**100,492,894.320**	**95,814,581.428**
SECUNDARY VEGETATION	**32,862,269.283**	**40,456,525.324**	**42,153,817.938**
INDUCED VEGETATION	**6,193,400.820**	**6,501,485.954**	**6,589,715.800**
AGRICULTURE	**34,571,101.428**	**40,519,784.005**	**43,365,606.627**

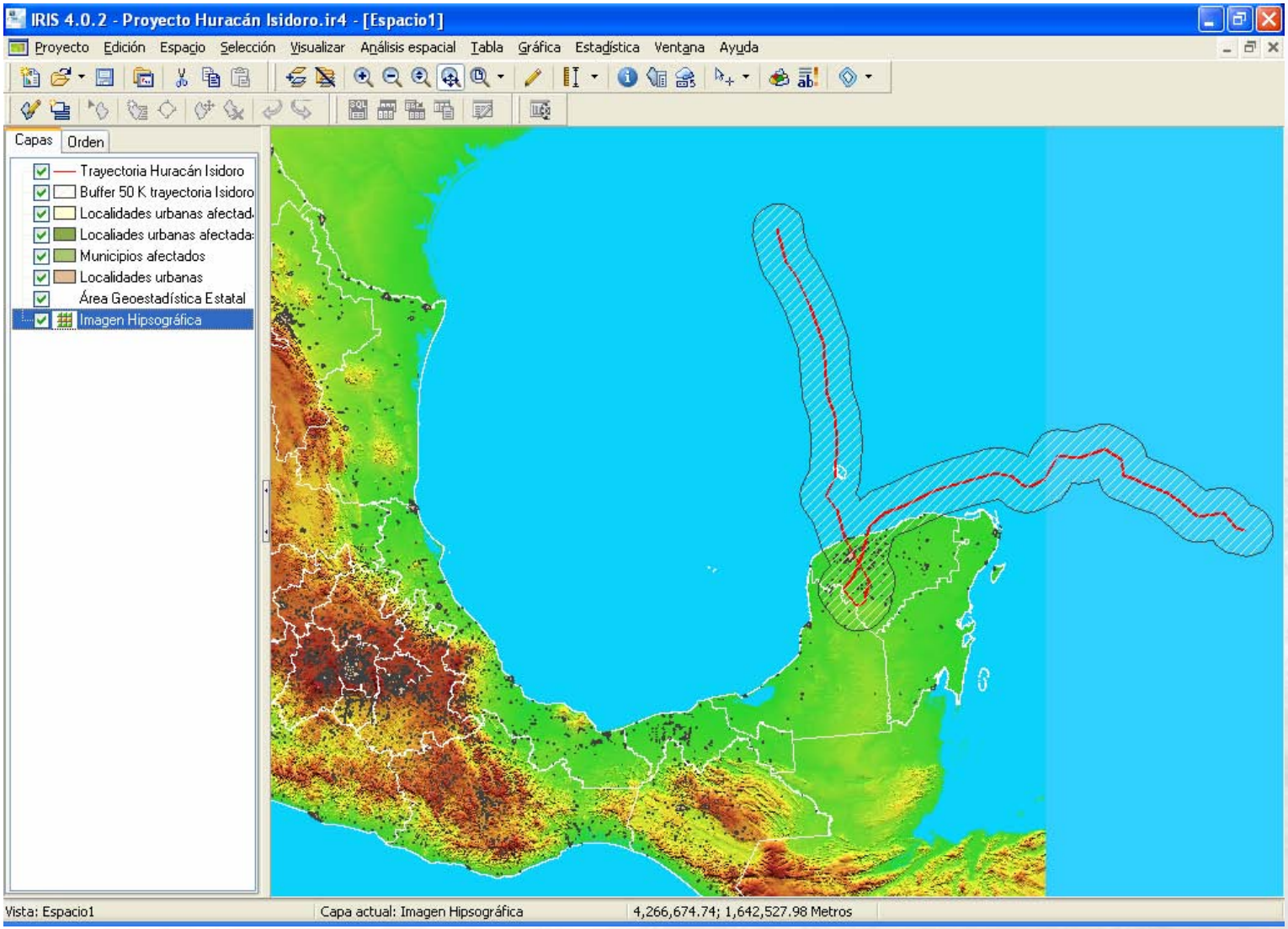

Deforestation Evolution
(1990-2000 and 2000-2005)
Annual Average Deforestation
(1990-2000)
401,000 ha (FAO/FRA2005)
Annual Average Deforestation
(2000-2005)
314,000 ha (FAO/FRA2005)
Existence of Forest and other wooded lands
Estimated Deforestation
in 2005
Series II
INEGI
Reforestation
Plantation
Land use compensation
Series III
INEGI
Reforestation
Plantation
Land use compensation
Ecological PROCAMPO
1993
2002
1990
2000
2005
Source: National Forest Comission

Adaptation to Hidrographyc Anomalies

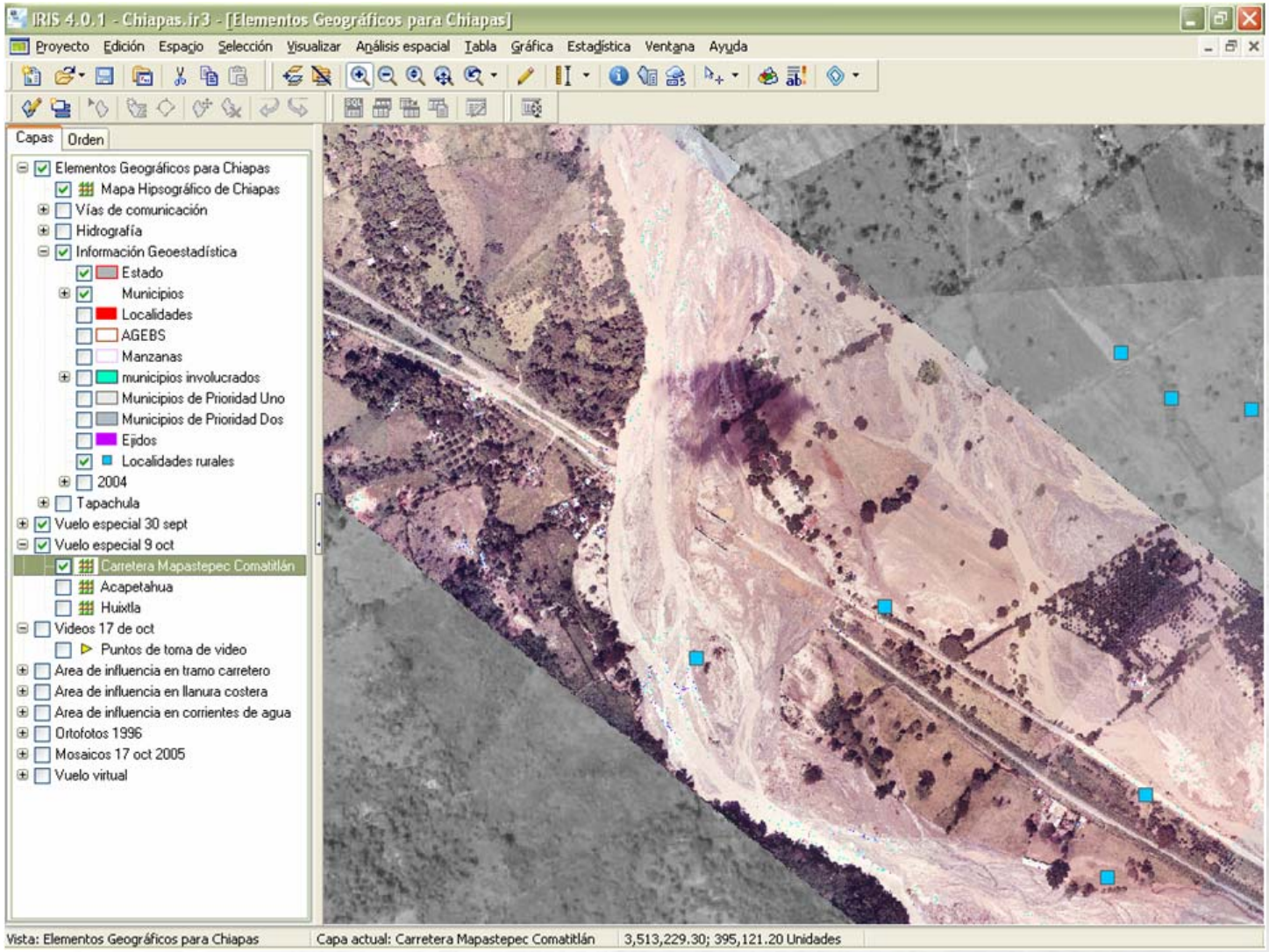


Natural Disasters

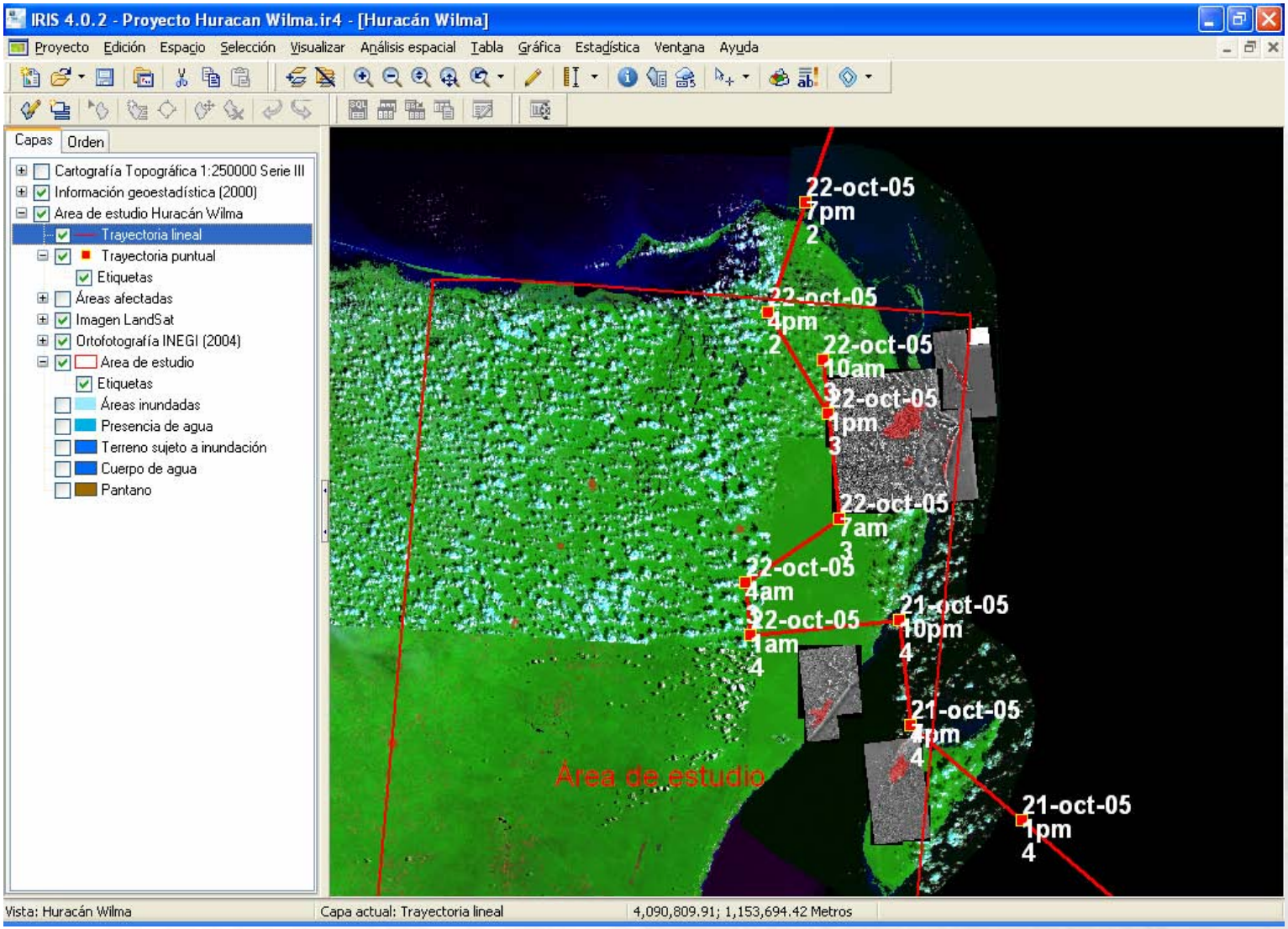
Isidore hurricane, 2005



Stan hurricane, 2005



Wilma hurricane, 2005



Tabasco flooding, 2007

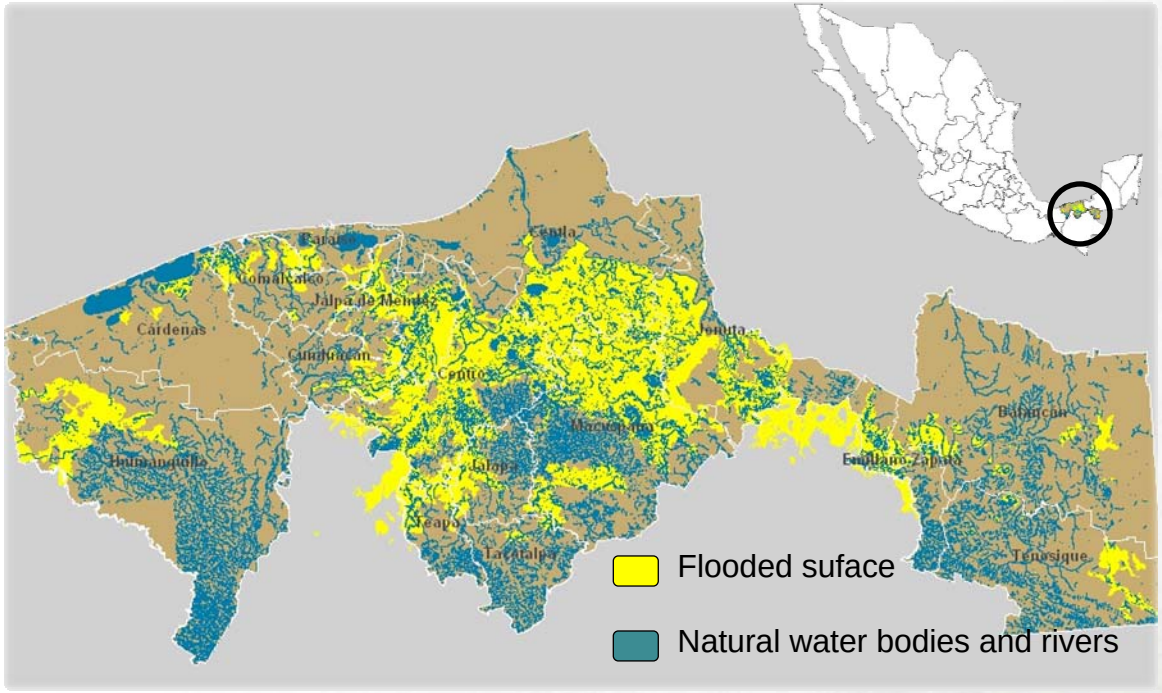
In October 2007, diverse factors as:

- Semi-stationary cold front Number 4,
- Tropical marine Air flow,
- Divergent air flow from the Pacific and
- A field of instability

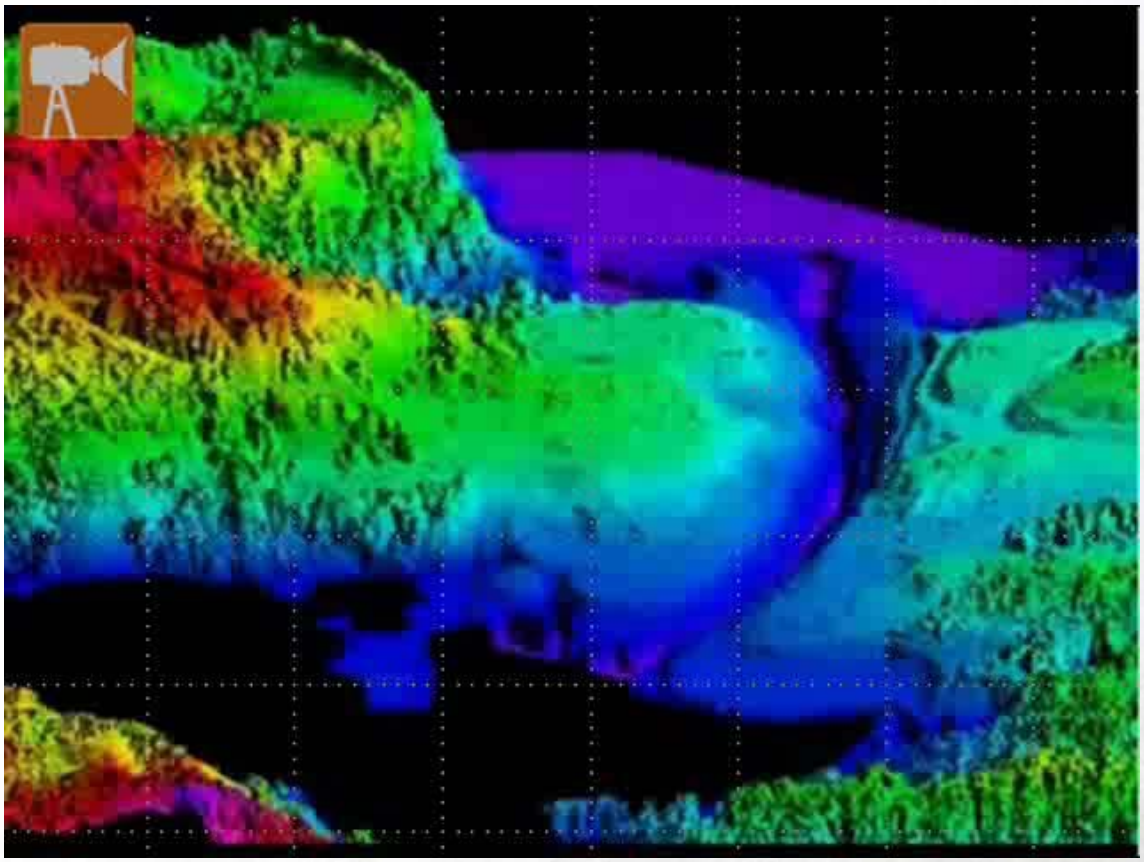
Produced the most intense rains in the Mexican Southeastern ever.

Outcome:

- Total state surface — almost 25 000 km^2
- Flooded surface — 6 293 km^2
- Damaged population — 545 870 inhabitants
- Damaged houses — 134 610 houses
- Damaged economic establishments — 13 088 establishments



This is an example of the LIDAR survey (digital terrain model) made on the Peñitas dam, where an avalanche buried the locality of Juan de Grijalva.



GT-SIGER is a decision support working group formed by several federal agencies and coordinated by CENAPRED and INEGI. It provides opportune geographic and statistical information which is necessary for the detection, assessment and mitigation of disasters.

The following are the main activities that GT-SIGER leads:

- Special photographic and LIDAR flights
- Satellite imagery acquisition, processing and interpretation
- Statistical and geographical data collection
- Information integration into GIS
- Web dissemination of the information


Present and
Future Actions

To maintain updated the geographical information.

To strengthen the institutional participation.

To consolidate the interoperability of the Geography and Environment Subsystem by using our normative framework.

To support the sustainable development with information that leads to intelligent decisions.

Atlas Nacional Interactivo de México

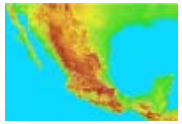
INEGI´s contribution to climate change adaptation

National active geodetic network

Natural resources inventory

Censuses round

software



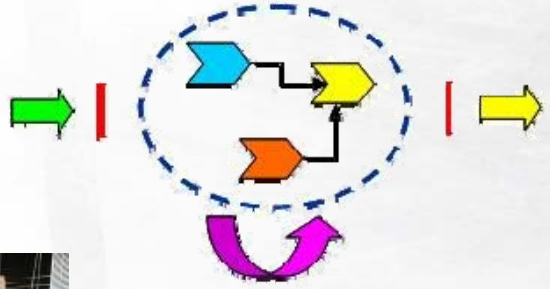
domain

demand / request

hardware

data

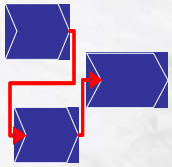
proceedings



output

controls

people



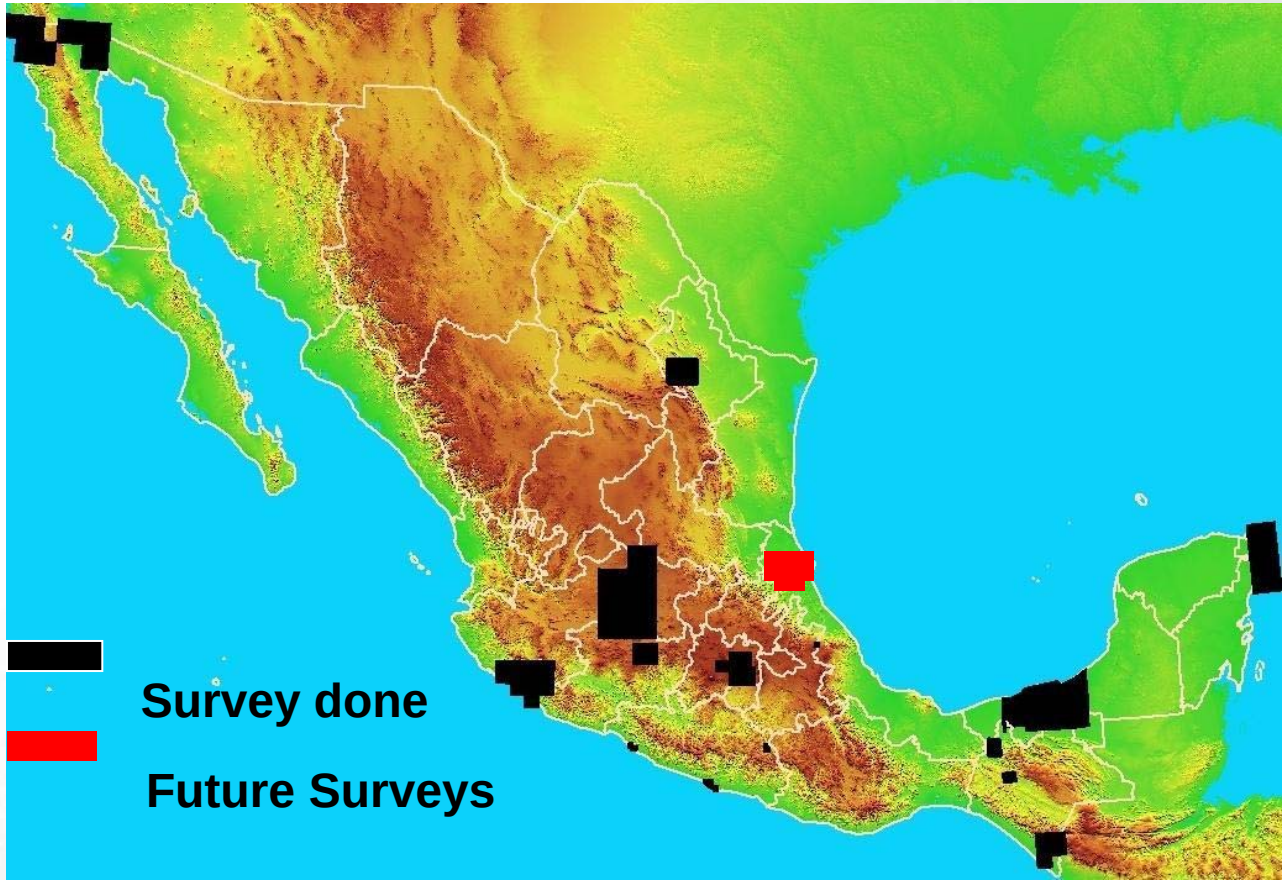
process

feedback

INEGI´s contribution to climate change mitigation

LIDAR survey in:

- **11 critical áreas**
- **Gulf of Mexico Coastal Plain (southern)**
- **Gulf of Mexico Coastal Plain (northern)**




UN Framework

Overview of United Nations activities in relation to climate change

Report of the Secretary-General

- An inclusive and coherent approach to climate change would enable the United Nations system to provide support for the negotiations on an international agreement on an effective post-2012 climate change framework, and provide a multisectorial mechanism through which to deliver on future agreements, as well as improve implementation of existing mandates.

- The United Nations needs to be more than merely the sum of its parts. To provide a solid platform and deliver a sound framework, concrete and meaningful cooperation across the United Nations system should be enhanced.

Overview of United Nations activities in relation to climate change

Report of the Secretary-General

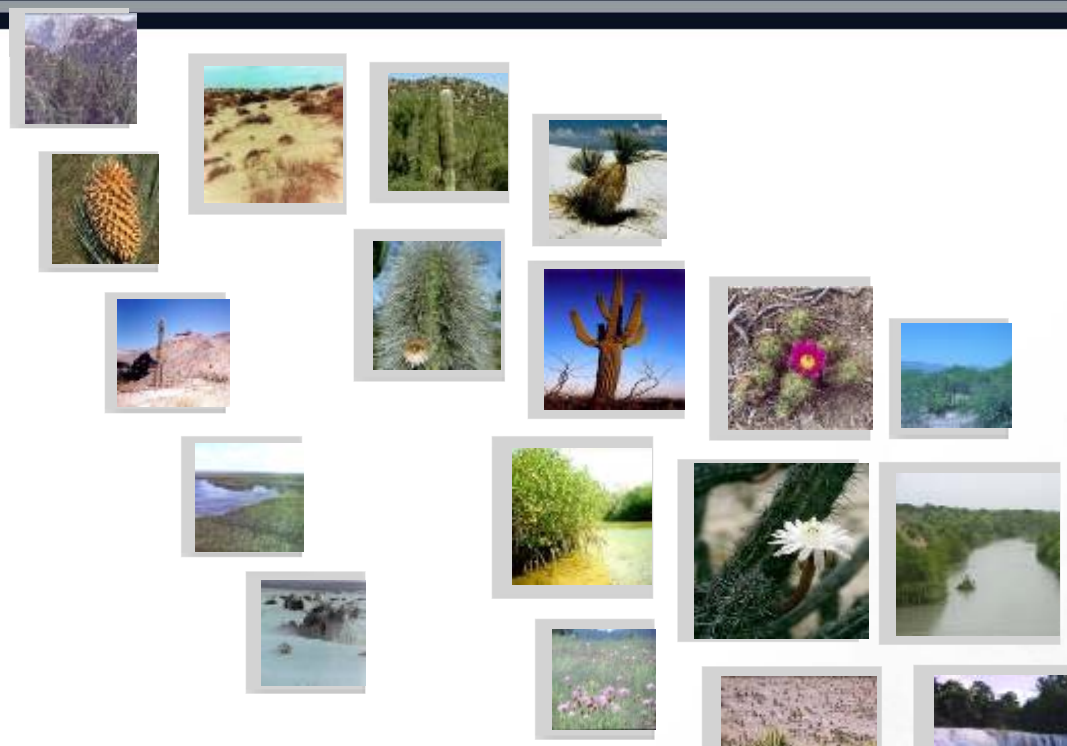
IPCC	UNEP	WMO	UNESCO	UNDP
SBSTA	ICSU	JCOMM	IOC	FAO
EMG	UN-ENERGY	GTOS	GOOS	WFP
EGTT	UN-OCEANS	EMPRES	GCOS	UNICEF
EGIT	IAEA	CLIPS	RCOF	ILO
ITU	UNDG	IFAD	UN-WATER	WHO

ETC…

Overview of United Nations activities in relation to climate change

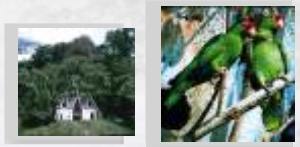
Report of the Secretary-General

WORD	APPEARS	WORD	APPEARS
CLIMATE	300 TIMES APROX.	UNSD	0 TIMES
STATISTICS	0 TIMES	PSR MODEL	0 TIMES
STATISTICAL	0 TIMES	GEOGRAPHY	0 TIMES
UNSC	0 TIMES	CHARTO GRAPHY	0 TIMES



"In the long term, the human being will only be able to survive on Earth, if we understand how to respect the physical, chemical and biological limits that assure our survival as species“

Louisse Lassonde



¡ GRACIAS !

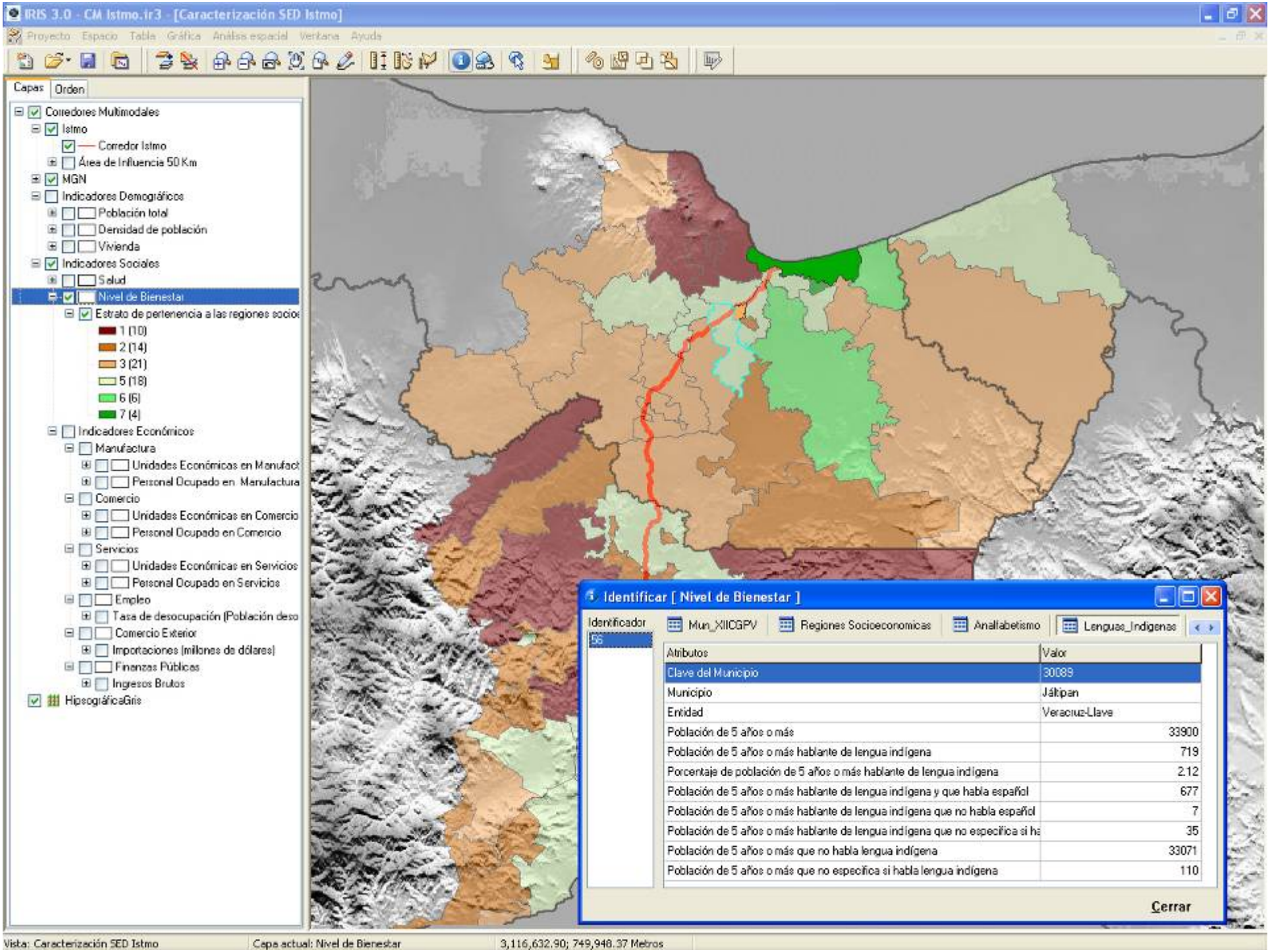
Dr. Gilberto Calvillo Vives

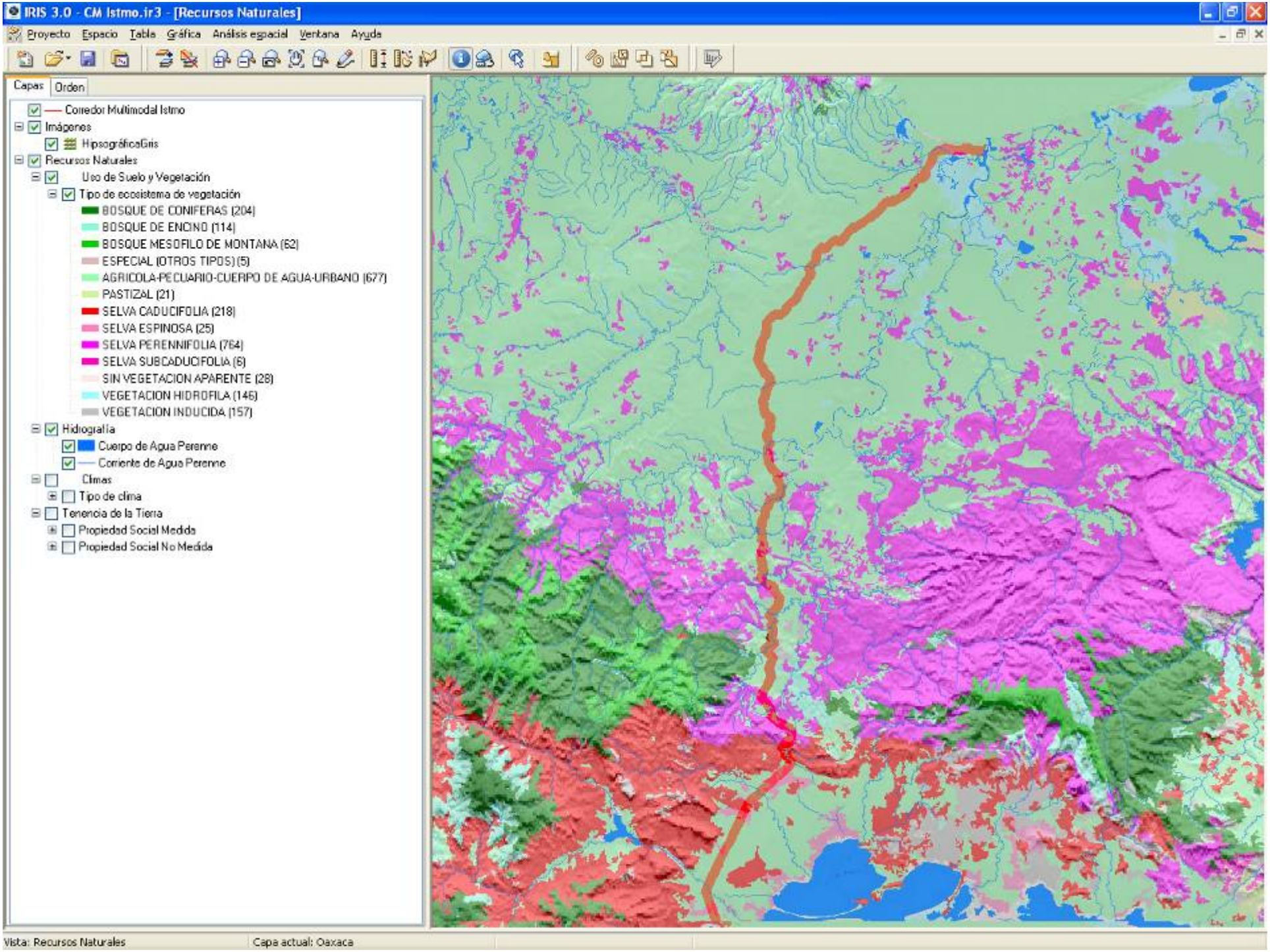
gilberto.calvillo@inegi.gob.mx

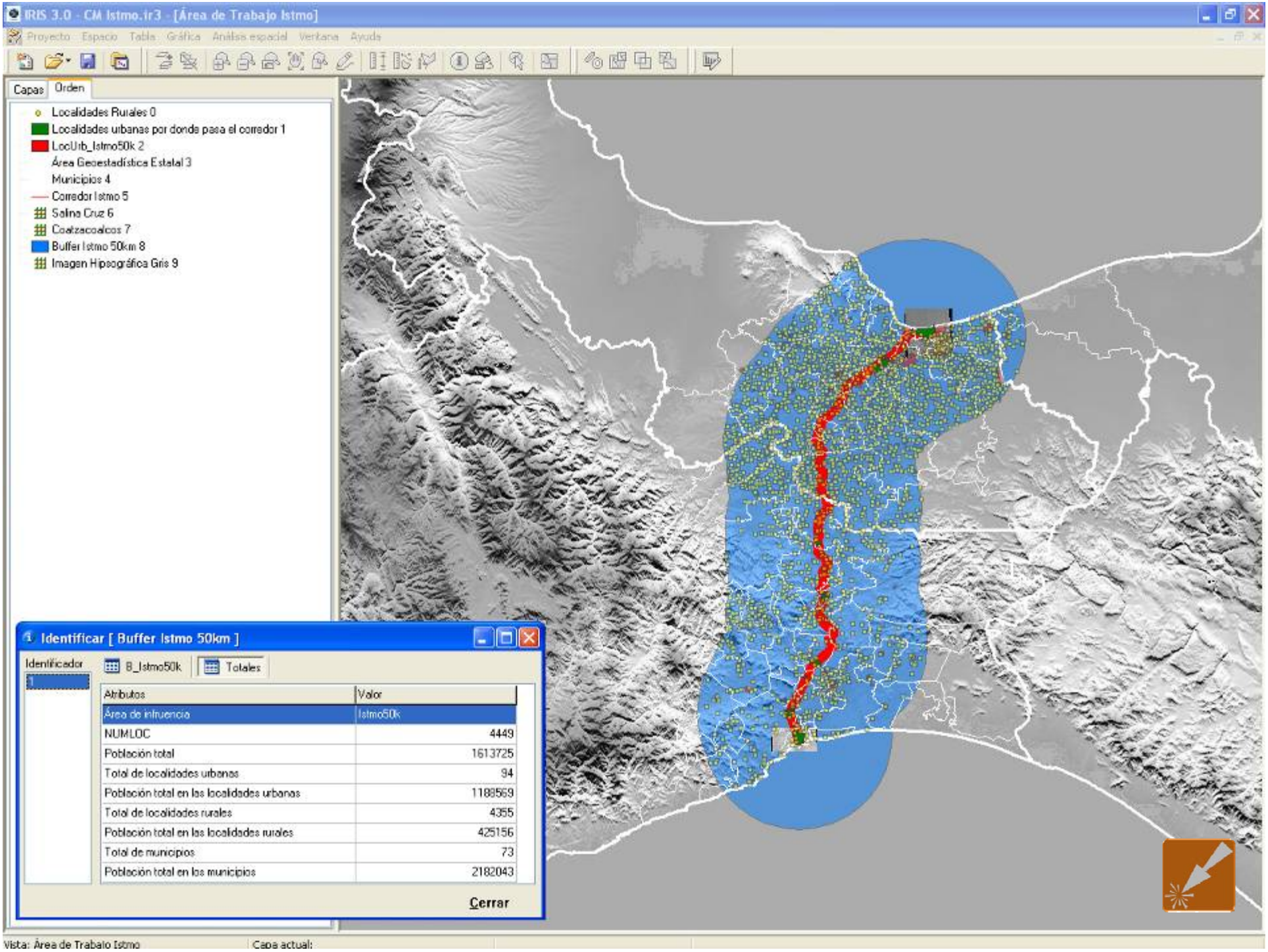
¡ THANK YOU !

Dr. Gilberto Calvillo Vives

gilberto.calvillo@inegi.gob.mx


IRIS 3.0 - CM Istmo.ir3 - [Caracterización SED Istmo]
Proyecto Espacio Tabla Gráfica Análisis espacial Ventana Ayuda
Capas
Orden
Corredores Multimodales
Istmo
Corredor Istmo
Área de Influencia 50 Km
MGN
Indicadores Demográficos
Población total
Densidad de población
Vivienda
Indicadores Sociales
Salud
Nivel de Bienestar
Estrato de pertenencia a las regiones socio
1 (10)
2 (14)
3 (21)
5 (18)
6 (6)
7 (4)
Indicadores Económicos
Manufactura
Unidades Económicas en Manufact
Personal Ocupado en Manufactura
Comercio
Unidades Económicas en Comercio
Personal Ocupado en Comercio
Servicios
Unidades Económicas en Servicios
Personal Ocupado en Servicios
Empleo
Tasa de desocupación (Población deso
Comercio Exterior
Importaciones (millones de dólares)
Finanzas Públicas
Ingresos Brutos
HipsográficaGris
Identificar [Nivel de Bienestar]
Identificador
56
Mun_XIICGPV
Regiones Socioeconomicas
Analfabetismo
Lenguas_Indigenas
Atributos
Valor
Clave del Municipio 30089
Municipio Jáltipan
Entidad Veracruz-Llave
Población de 5 años o más 33900
Población de 5 años o más hablante de lengua indígena 719
Porcentaje de población de 5 años o más hablante de lengua indígena 2.12
Población de 5 años o más hablante de lengua indígena y que habla español 677
Población de 5 años o más hablante de lengua indígena que no habla español 7
Población de 5 años o más hablante de lengua indígena que no especifica si ha 35
Población de 5 años o más que no habla lengua indígena 33071
Población de 5 años o más que no especifica si habla lengua indígena 110
Cerrar
Vista: Caracterización SED Istmo
Capa actual: Nivel de Bienestar
3,116,632.90; 749,948.37 Metros


IRIS 3.0 - CM Istmo.ir3 - [Recursos Naturales]
Proyecto Espacio Tabla Gráfica Análisis espacial Ventana Ayuda
Capas Orden
Corredor Multimodal Istmo
Imágenes
HipsográficaGris
Recursos Naturales
Uso de Suelo y Vegetación
Tipo de ecosistema de vegetación
BOSQUE DE CONIFERAS (204)
BOSQUE DE ENCINO (114)
BOSQUE MESOFILO DE MONTANA (62)
ESPECIAL (OTROS TIPOS) (5)
AGRICOLA-PECUARIO-CUERPO DE AGUA-URBANO (677)
PASTIZAL (21)
SELVA CADUCIFOLIA (218)
SELVA ESPINOSA (25)
SELVA PERENNIFOLIA (764)
SELVA SUBCADUCIFOLIA (6)
SIN VEGETACION APARENTE (28)
VEGETACION HIDROFILA (146)
VEGETACION INDUCIDA (157)
Hidrografía
Cuerpo de Agua Perenne
Corriente de Agua Perenne
Climas
Tipo de clima
Tenencia de la Tierra
Propiedad Social Medida
Propiedad Social No Medida
Vista: Recursos Naturales
Capa actual: Oaxaca


IRIS 3.0 - CM Istmo.ir3 - [Área de Trabajo Istmo]
Proyecto Espacio Tabla Gráfica Análisis espacial Ventana Ayuda
Capas
Orden
Localidades Rurales 0
Localidades urbanas por donde pasa el corredor 1
LocUrb_Istmo50k 2
Área Geoestadística Estatal 3
Municipios 4
Corredor Istmo 5
Salina Cruz 6
Coatzacoalcos 7
Buffer Istmo 50km 8
Imagen Hipsográfica Gris 9
Identificar [Buffer Istmo 50km]
Identificador
1
B_Istmo50k
Totales
Atributos
Valor
Área de intruencia
Istmo50k
NUMLOC
4449
Población total
1613725
Total de localidades urbanas
94
Población total en las localidades urbanas
1188569
Total de localidades rurales
4355
Población total en las localidades rurales
425156
Total de municipios
73
Población total en los municipios
2182043
Cerrar
Vista: Área de Trabajo Istmo
Capa actual:

Basins and hydrographic network

Agriculture

	1980´s km²	1990´s km²	2000´s km²
Irrigated	73 480	85 071	92 456
Rainfed	186 847	205 788	216 837

Frequency in reforestation