National Strategy of Climate Change in Mexico
Adaptation and Mitigation Actions in Agriculture

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Food and Agriculture Organization
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- **According with the World Bank, Mexico is one of the most vulnerable countries to the Global Climate Change:**
- **68 % of its population, 71% of its economy, and 15% of its territory are exposed to the negative effects related with the climate change.**

- **Climate change is a global challenge that demands a rapid and decisive response from every nation.**
- **In order to face it and to contain its effects, Mexico has the commitment to participate sharing its experience and adopting worldwide initiatives.**
- **Because of its general goal and philosophy, the CCAC is considered a very important organization to Mexico**

Some National and International Actions on Climate Change

Mexico hosted the 16th Conference of Parties (CoP 16) of the United Nations Framwork Convention on Climate Change (UNFCCC) in 2010

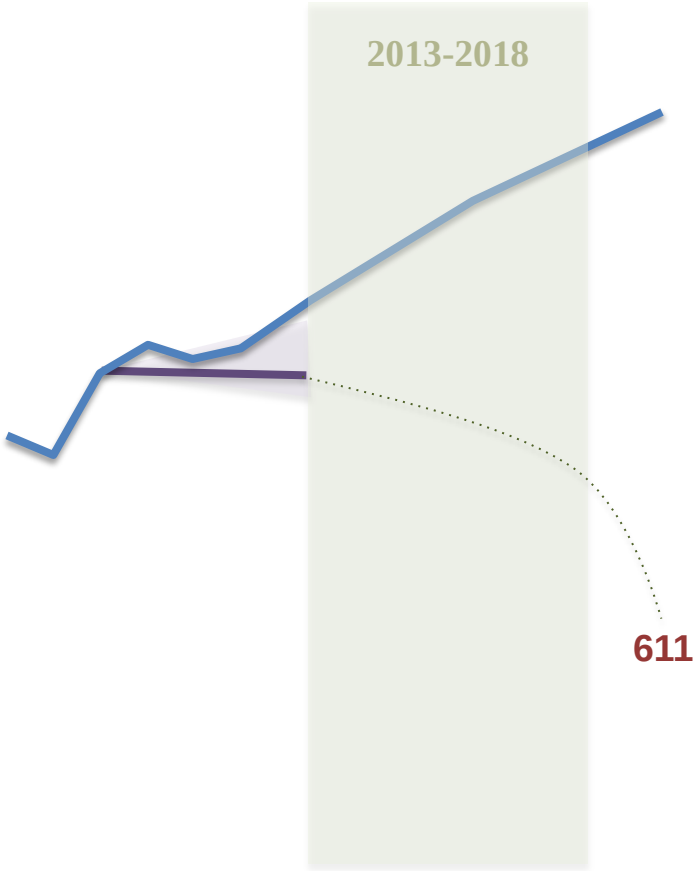
Felipe Calderón, as the Mexican President in turn, promoted the creation of a new Law on Climate Change

GENERAL LAW OF CLIMATE CHANGE

(Octuber 10, 2012)

GOALS

MEXICO PRODUCES 1.4% OF THE GLOBAL $CO_{2(eq)}$ EMISSIONS



2020	Reduce in 30% its GHG emissions (Not only from agrilcutire, but all other sectors)
2024	35% of its energy will be generated by alternative sources
2050	Reduce to 50% its GHG emissions in relation to emissions registered in 2000

One of the first results of the General Law o Climate Change was:

“The National Climate Change Strategy”

Published in June 2013.

ESTADOS UNIDOS MEXICANOS

NATIONAL CLIMATE CHANGE STRATEGY

10-20-40 VISION

FEDERAL GOVERNMENT OF MEXICO

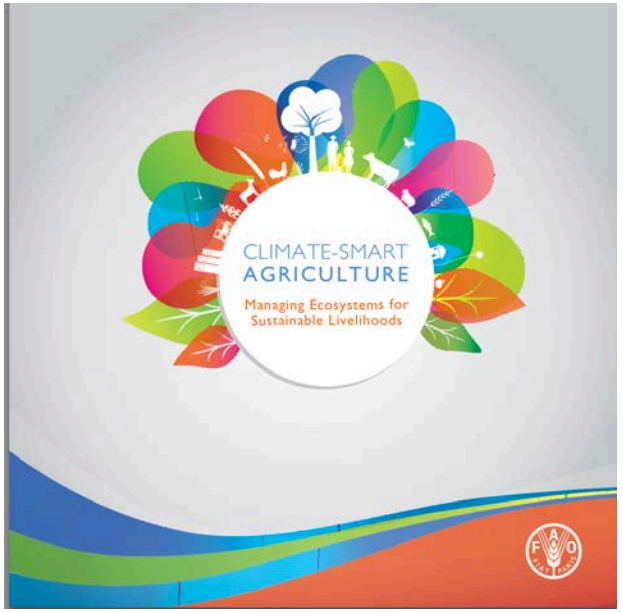
The new President of Mexico, Enrique Peña Nieto, stressed that the measures contained in the National Climate Change Strategy are articulated in eight areas of action:

- **Reducing vulnerability to climate change of Mexicans living at risk and strengthen their resilience .**
- **Reduce the vulnerability of production systems and strategic infrastructure to weather contingencies.**
- **Promoting resilience of ecosystems to climate change impacts .**
- **Accelerate the energy transition to clean energy sources.**
- **Reduce the intensity of energy consumption through efficiency and rationality schemes.**
- **Moving toward models of sustainable cities , smart mobility systems , integrated waste management and building low carbon footprint.**
- **To promote better agricultural and forestry practices , with schemes for Reducing Emissions from Deforestation and Degradation .**
- **Reduce emissions of pollutants "short life " , such as black carbon and methane, to improve the health and welfare of all Mexicans.**

Because of their similarity, the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), is interested in the Climate-Smart Agriculture proposed by the FAO

NATIONAL CLIMATE CHANGE STRATEGY
10-20-40 VISION
FEDERAL GOVERNMENT OF MEXICO

Food Security
Adaptation
Mitigation



Contacts:
FAO.- Alberto Sandoval Uribe, Main Official of Natural Resources and Climate Change, alberto.sandoval@fao.org
SAGARPA.- Lic. Raúl Urteaga Trani, General Coordinator of International Affairs (SAGARPA).

How important are the ruminants?

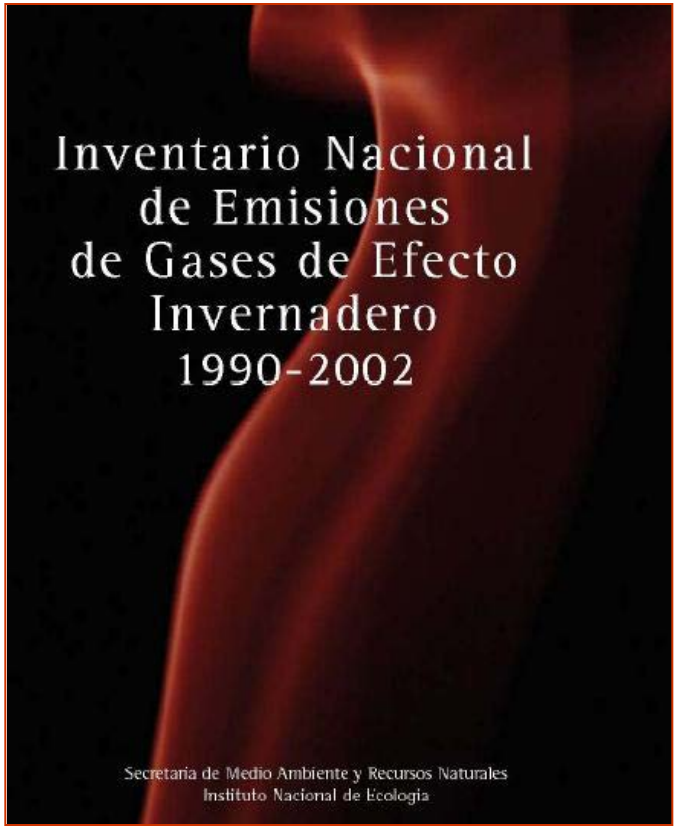
According to the National Inventory of GHG (INEGI, SEMARNAP)

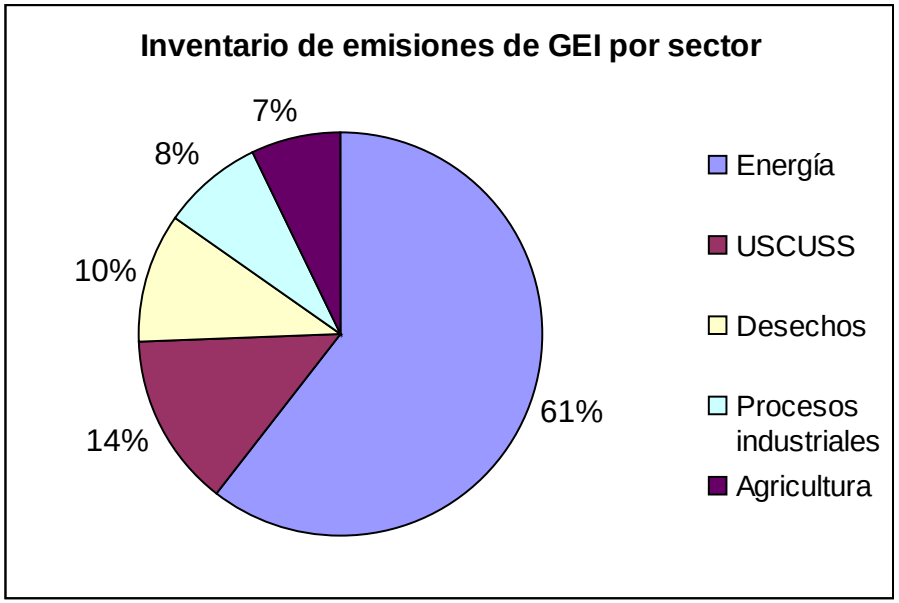
Between 1990 a 2002.

The agriculture sector was responsible of 7% del total de GHG emitted

84% as methane (CH_4)

16% nitrous oxides (N_2O)





From the total GHG emitted in the agricultural sector the ruminants were responsible of 94% of the GHG emited

Cuadro 4.8. Emisiones de metano de la sección ganadera, expresadas en Gg, para el periodo 1990 – 2002 en México.

Emisiones de metano	1990	1992	1994	1996	1998	2000	2002
Ganado bovino - vacas leche	156.19	161.78	170.01	177.90	190.51	217.92	227.55
Ganado bovino - vacas carne	1,551.72	1,508.33	1,459.57	1,384.56	1,415.77	1,377.20	1,414.72
Búfalos	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ovino - borregos	30.04	31.44	33.19	31.78	29.83	31.07	32.98
Cabras	53.75	50.13	52.83	49.26	46.55	44.82	47.01
Camellos	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Caballos	56.81	57.62	58.48	59.39	60.35	61.36	62.41
Mulas y asnos	27.09	26.05	24.95	23.80	22.60	21.35	20.04
Cerdo - porcino	25.76	23.33	27.61	26.10	25.37	26.08	25.62
Aves	1.97	2.00	2.79	3.24	3.42	3.65	4.01
Total	**1,903.33**	**1,860.69**	**1,829.42**	**1,756.04**	**1,794.40**	**1,783.45**	**1,834.35**

National Inventory of GHG 1990-2002 (INE, 2005)

SAGARPA
SECRETARÍA DE AGRICULTURA, GANADERÍA, DESARROLLO RURAL, PESCA Y ALIMENTACIÓN

ESTADOS UNIDOS MEXICANOS

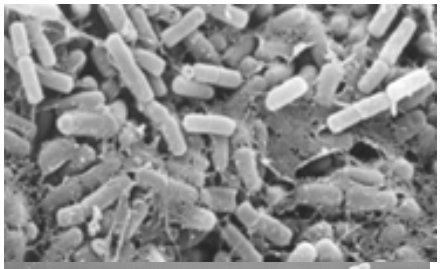
inifap
Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias

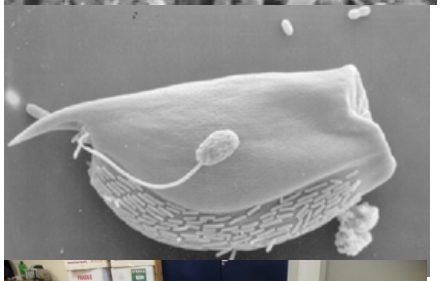
Research in the areas of:

Manure management (anaerobic digestion) Mitigation of methane production in ruminants

Research projects with ruminants (mainly rumen microbiology approaches)

1. Isolation of rumen acetogenic bacteria. These bacteria use CO_2 and H_2 .
2. Rumen defaunation as alternative to reduce methane production.
3. Evaluation of the potential of grasses and legumes to stimulate methane production in the rumen.
4. Isolation and characterization of rumen methanogenic bacteria.





Avances logrados 2009-2012.

Producción de un inoculo de bacterias utilizadoras de formato que compiten con las bacterias metanogénicas por CO_2 y H_2

Muestreo de contenido ruminal en vacas con cánula ruminal y dieta especial

Aislamiento y selección de bacteria ruminal acetogénica en medio anaerobio selectivo

Producción y conservación del inoculo de bacterias acetogénicas por liofilización

“La bacteria disminuye en 60 % la producción de metano”
(Pruebas de laboratorio)

Falta por hacer o en proceso 2013-2014.

Producción y empaquetado del inoculo para evaluación de campo.

Evaluación del inoculo en ovinos en crecimiento

Para finales del año 2014 se planea una patente

Aplicación del desarrollo tecnológico con apoyo de la SAGARPA

1.- Adaptation and evaluation of the efficiency of diferent aerobic biological processes for the treatment of wastewater generated in anaerobic digestion plantas in swine farms, including a cost-benefit analysis.

Four systems are evaluated

- Shallow one-step wetland with laminar flow
- Wetlands with cells in series
- Downflow percolater biofilter
- Downflow vermirreactor biofilter

2.- Treatment of digestates generated through anaerobic digestion and testing trials for forage production under laboratory conditions

- Sedimentation - decantation
- Solid separation with a mesh
- Filtration with sand and gravel
- Biofiltration using a vermifilter

Testing the fitotoxicity of the leachates using germination indexes and growth trial with corn seeds




3.- Assessment of the efficiency of biogas production in small anaerobic digesters and treatment of digestates using an anaerobic thermophilic process of short duration in small livestock production units

- Assessment of the biogas production in 100 small AD
- Type of manure, initial composition, loading rate and frequency and retention time
- Assessment of the biogas burned in cooking
- Treatment of the digestate using the remainding biogas from cooking as a fuel to pasteurize the liquid residuos and to be used as organic fertilizers




Gracias