Comisión Nacional de Energía Atómica

UNIVERSIDAD NACIONAL DE SAN MARTÍN

INTA INSTITUTO NACIONAL DE TECNOLOGIA AGROPECUARIA

Ammonia emissions from agriculture sector in Argentina

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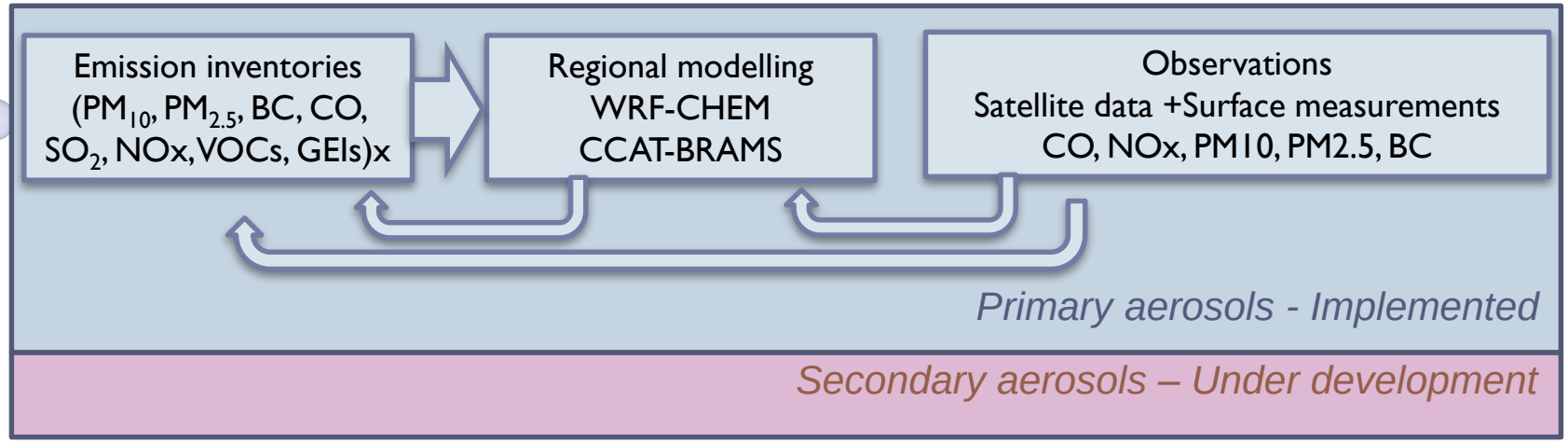
IPCC Expert Meeting on Short-lived Climate Forcers

Geneva, 28-31 May 2018

Atmospheric aerosols research project

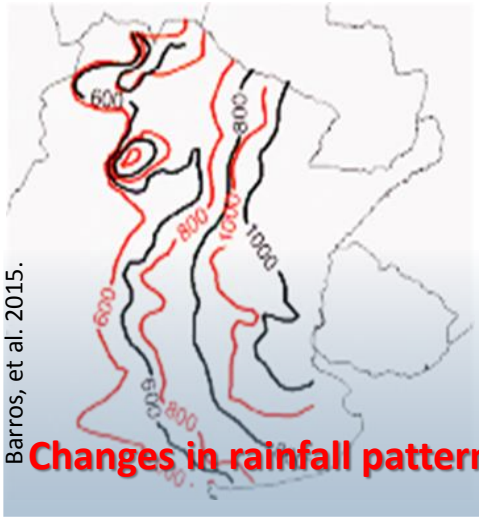


- Agricultural activities constitute the main NH_3 emission sources and Argentina's economy is based on agro-activities.
- No NH_3 emission inventories in Argentina.
- Global inventories does not reflect the important changes that took place in the agricultural practices.

Motivation

Drivers:

Climatic



Barros, et al. 2015.

Changes in rainfall patterns

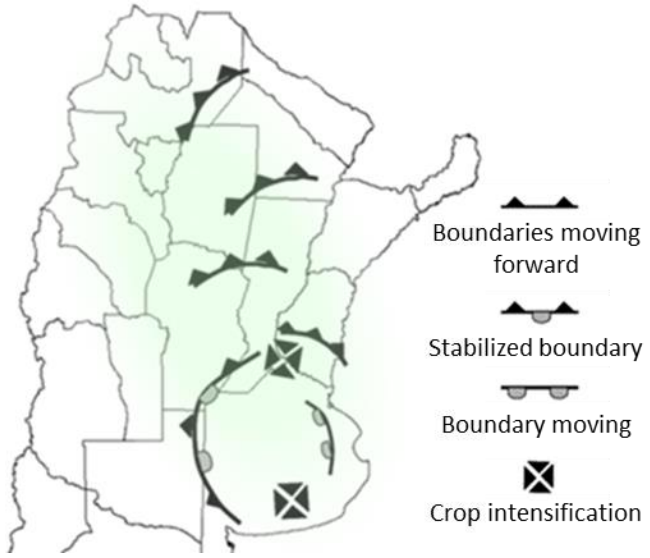
Economic

International markets favor the production of crops over livestock

Technological

"technological asymmetries" between crops

Cultivation expanded from the Pampas to NW and NE



Viglizzo, et al. 2011.

Soybean expanded at the expense of other crops

Relocation in lower performances areas & intensification in feedlots

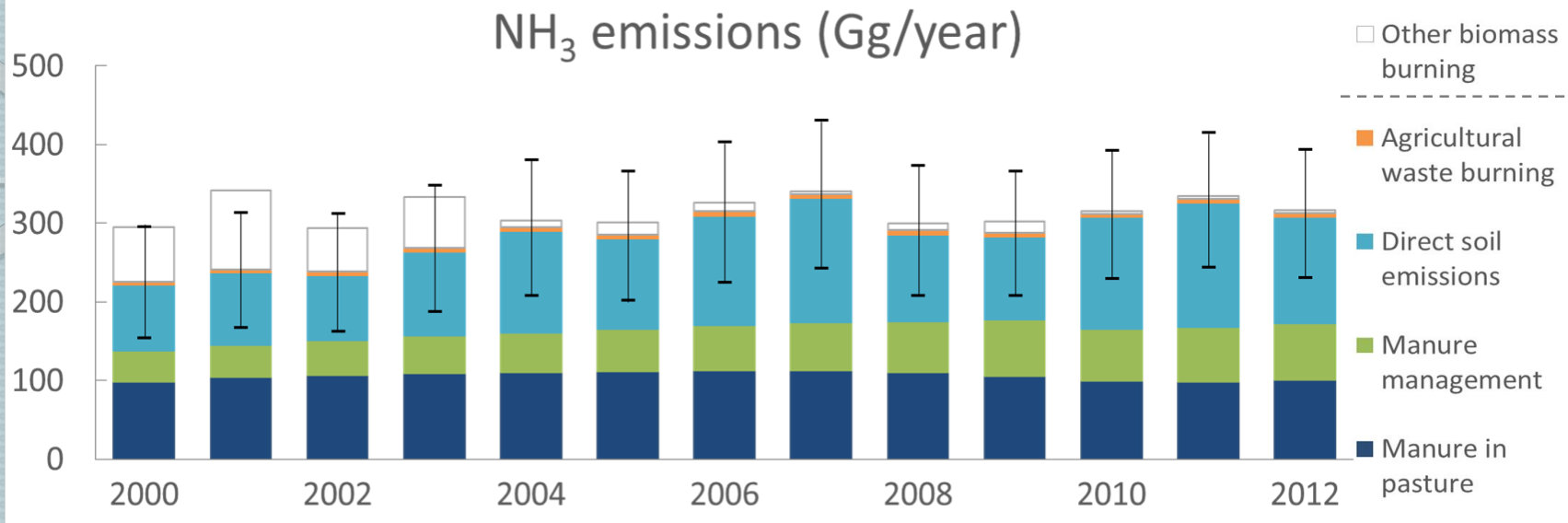
Methodology: IPCC + EMEP

- Time series consistency (2000–2012)
- Spatial disaggregation by district

Activity		Sources of AD		EFs	Approach
		Stock	Parameters		
Livestock	Cattle (beef &dairy)	National Communication for N_2O + Additional data	EMEP & IPCC	EMEP	Tier 2
	Poultry				
	Swine				
	Other Livestock				
Crops	N-fertilizers				
Fires	Sugarcane and flax waste burning				Tier 1
	Other biomass burning	National Forest Fire Statistics			Tier 2

Methodology

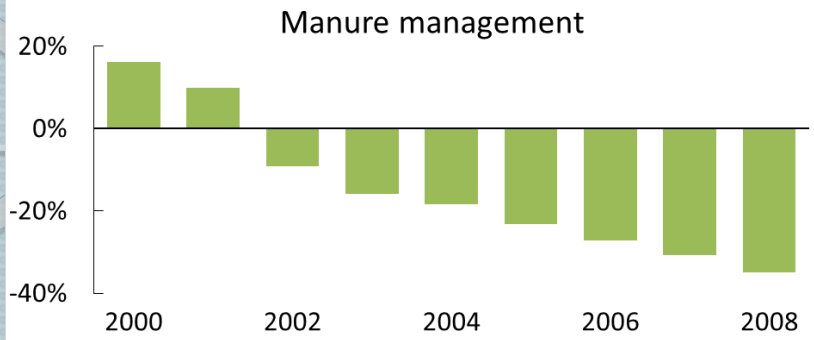
Results I



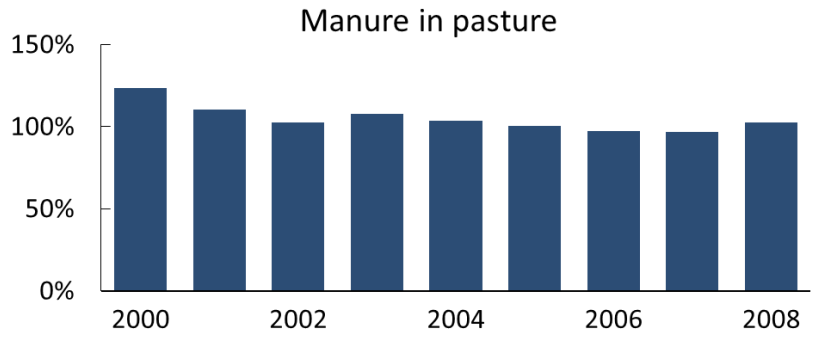
- Emissions from manure-related activities constituted the main source of NH_3, accounting for ~60% of the total (including manure management & manure in pasture), of which almost a half corresponds to beef cattle.

- Crop fertilization with urea was the main single source of NH_3, contributing around 30% of total emissions.

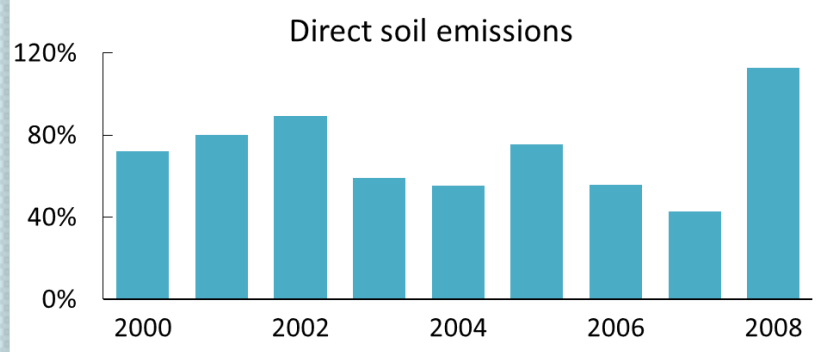
Differences EDGAR – national inventory



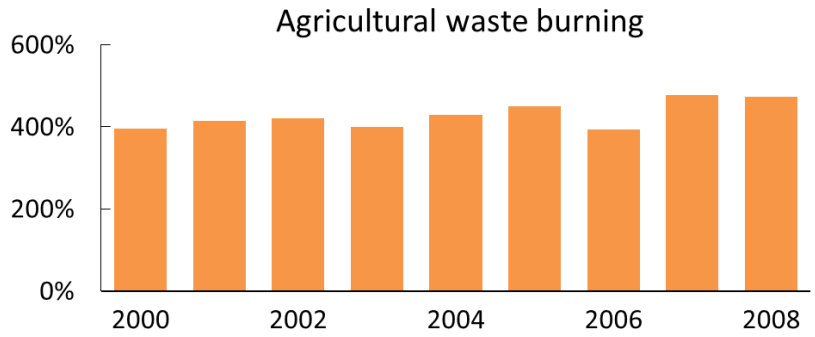
% Feedlot & Poultry AD



Cattle farming practices & Other livestock AD



AD use of fertilizers

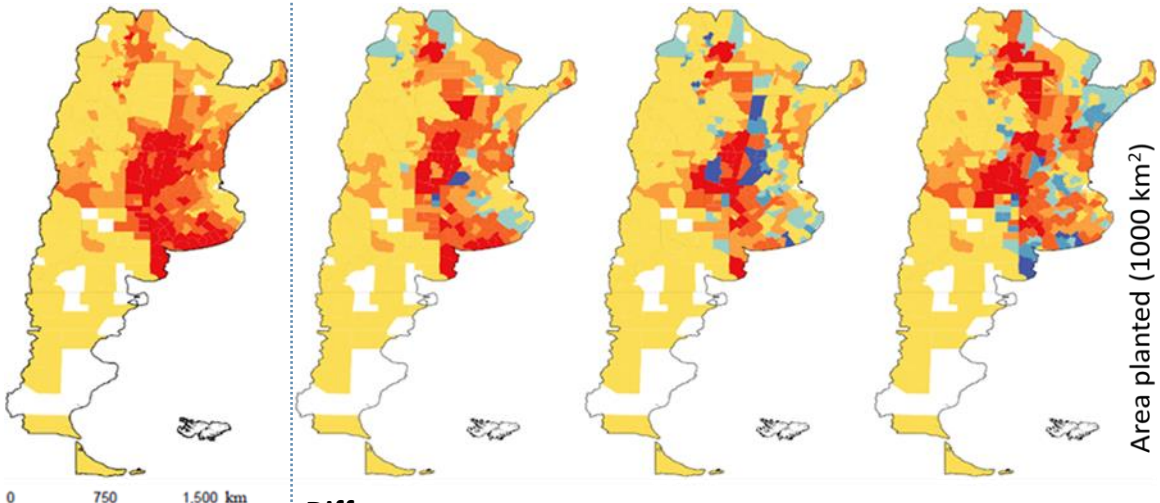


Assignation of fires: in land use and land use changes – agricultural waste burning …. Underestimations in National statistics??

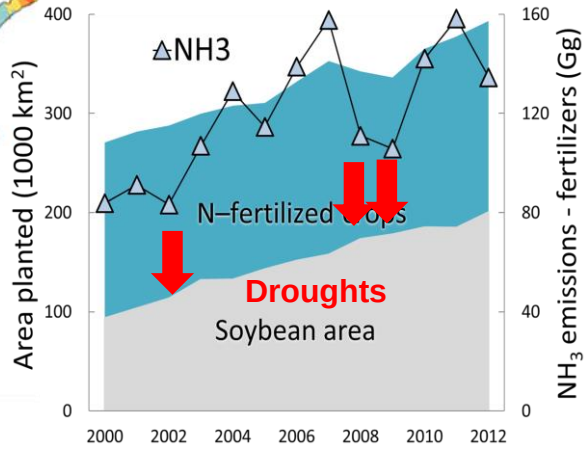
Results II

Results II

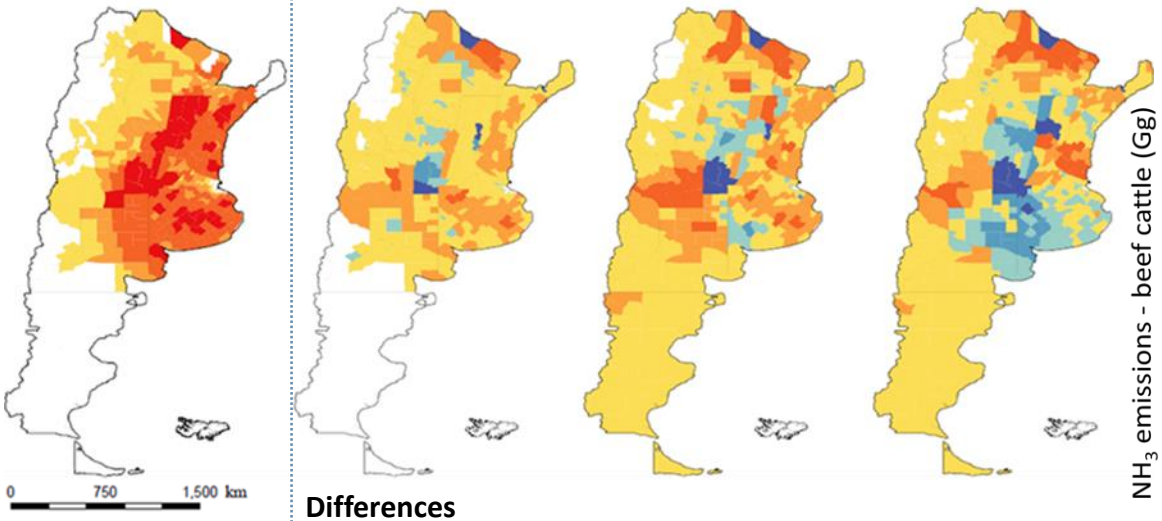
Fertilizers (direct soil emissions)



Emissions 2000 | Differences 2004–2000 | 2008–2000 | 2012–2000



Beef Cattle (manure management + manure in pasture)



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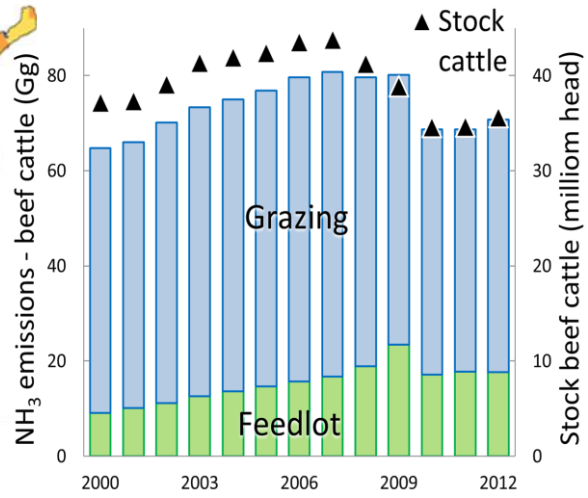


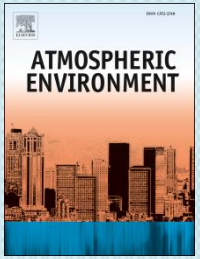
NH3 emissions (Mg): > 500 | 150 - 500 | 50 - 150 | 0.0 - 50 | 0.0 | -50 - 0.0 | -150 - -50 | < -150

Conclusions

- First bottom-up national inventory of NH_3 emissions from agricultural activities 2000–2012
- Additional data (non-key categories) of N_2O AD collected for NC is required to build NH_3 emission inventory.
- Trends in temporal-spatial patterns reflect the influence of the tree main drivers
  - Climate change
  - Market expansion
  - Technological changes
- Relevant differences with EDGAR
  - Activity data: use of fertilizers, poultry, other livestock, % of feedlots, cattle farming practices
  - Allocation: Manure management – Manure in pasture
  - Assignation of fires: land use – land use changes – agricultural waste burning
- Spatial displacement driven by
  - Increase in soybean area planted that led to the displacement of cultivation areas of N-fertilized crops.
  - The intensification of cattle production systems in feedlots.

Previously presented and published in:

GEIA Conference (2017)- Hamburg



- *Ammonia emissions from the agriculture sector in Argentina; 2000–2012*, Castesana, P., Dawidowski, L., Finster, L., Gómez, D., Taboada, M.,Atmospheric Environment (January, 2018)

Thank you