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Livestock Emissions & Abatement Research Network

WORKSHOP ON GHG EMISSIONS
IN LIVESTOCK GRAZING SYSTEMS
Montevideo, 21-24 July, 2008

Uruguay's GHG Inventory: Development of Tier-2 Methods for Livestock Emissions

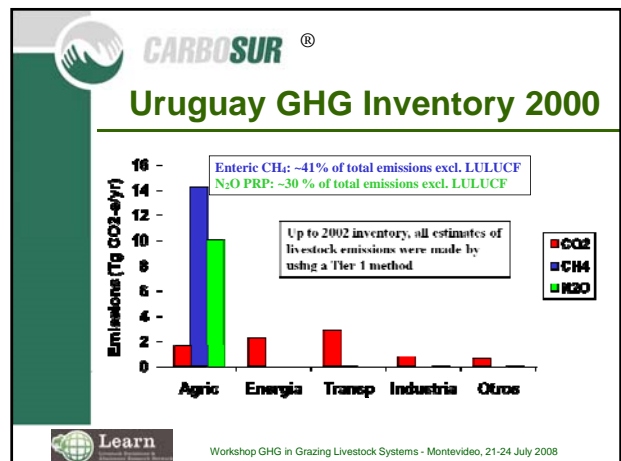
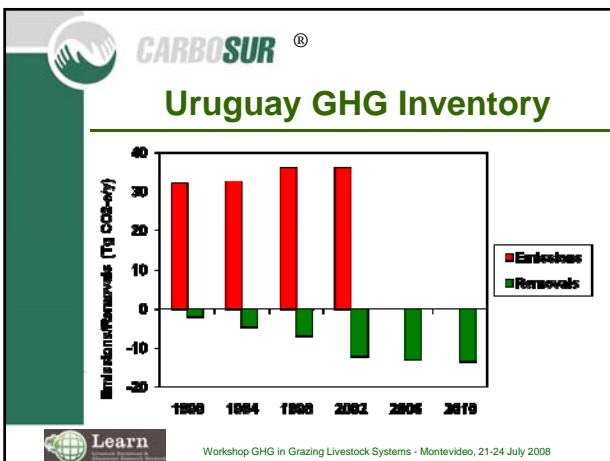
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Outline

- Trends in Emissions
- Key categories
- Improvements to the inventory:
 - Development of country-specific EF for enteric fermentation
 - Improved activity data for N excretion rates

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Resources for Tier-2 Method

- Soils map at 1:60,000 scale (CONEAT) with a livestock productivity index associated to each CONEAT soil unit
- Agricultural census (every 10 years)
- Permanent record of animal stocks and movements. Agricultural statistics including number of animals per censal unit, species and category; land use and management; yield of products; etc. are published annually.
- Large databases of farm production records (Plan Agropecuario, FUCREA, etc.) and pasture quality (INIA)
- Knowledge from 50+ years of research of grazing-based production systems (soils, animal nutrition, agronomy)
- **Almost no experience with measurement of GHG emissions**

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Tier-2 Methods: Defined Regions

Deep agricultural soils, mixed dairy/beef/sheep, crop/pasture rotations, 7-38% of improved pastures, high productivity (up to 400 kg meat/ha/yr)

Basaltic soils, mixed beef/sheep, low productivity native grasses, <5% improved pastures, high vulnerability to climate variability

Sandy soils, slightly hilly landscape, beef/sheep, 9% improved pastures, relatively high summer productivity, low in winter

Granitic soils, mostly beef, 14-25% improved pasture, medium to high productivity potential

Low lands, rice-pasture rotations, beef, relatively high productivity (0.5 kg of daily weight gain)

Deep agricultural soils, intensive dairy/beef systems, 50% improved pastures, high productivity

Hilly area, beef/sheep, 8% improved pasture, medium to high vulnerability to climate variability

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Tier-2 Methods: Regional EFs for Enteric CH₄ Enhanced Livestock Characterization (Beef Cattle)

Category	Zone 1	Zone 2	Zone3	Zone 4	Zone 5	Zone 6	Zone 7	Total
Bulls	45	18	8	61	30	18	9	171
Pregnant cows	967	453	204	1472	683	408	287	4021
Non-pregnant cows	107	41	14	170	72	61	31	454
Steers (+3 yr)	169	59	217	194	1178	48	30	581
Steers (2-3 yr)	220	70	34	300	137	137	62	889
Steers (1-2 yr)	263	92	55	391	172	208	90	1178
Heifers (+2 yr)	131	58	26	187	96	63	41	544
Heifers (1-2 yr)	302	132	60	447	205	155	78	1246
Calves	572	246	123	909	401	332	204	2542
Total	2776	1169	545	4130	1913	1430	832	11627

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Tier-2 Methods: Regional EFs for Enteric CH₄ Estimated Emission Factors (Beef Cattle)

Category	Zone 1	Zone 2	Zone3	Zone 4	Zone 5	Zone 6	Zone 7
Bulls	86	86	87	91	89	89	91
Pregnant cows	60	63	66	65	63	68	76
Non-pregnant cows	69	80	80	85	77	83	85
Steers (+3 yr)	95	86	92	95	95	93	91
Steers (2-3 yr)	73	74	81	78	76	78	78
Steers (1-2 yr)	46	55	60	59	52	58	59
Heifers (+2 yr)	63	63	63	66	64	65	66
Heifers (1-2 yr)	45	46	46	49	47	49	49
Calves	32	37	37	39	36	38	37
Weighted avg.	55	58	59	61	58	57	63

IPCC default: 49 kg CH₄/head/year



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Tier-2 Methods: Regional EFs for Enteric CH₄
Enhanced Livestock Characterization (Beef Cattle)

Zone	N _{ex} (kg head ⁻¹ yr ⁻¹)
1	48
2	46
3	52
4	53
5	51
6	53
7	55
Weighted avg.	50

IPCC default: 40 kg N/head/year