

NATIONAL INVENTORY SYSTEM IN AGRICULTURE OF THE SLOVAK REPUBLIC



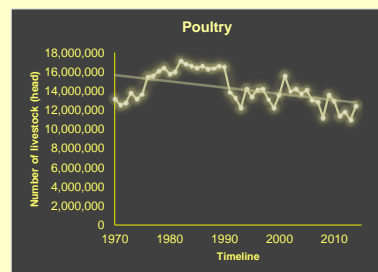
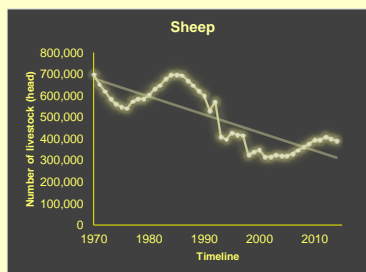
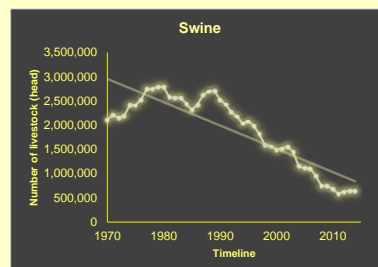
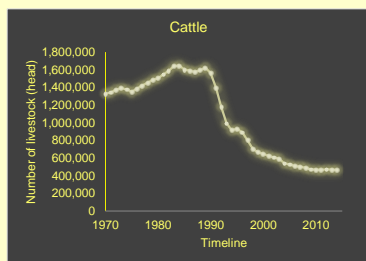
TAIEX WORKSHOP, ZAGREB, JUNE 21, 2016
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National Circumstances

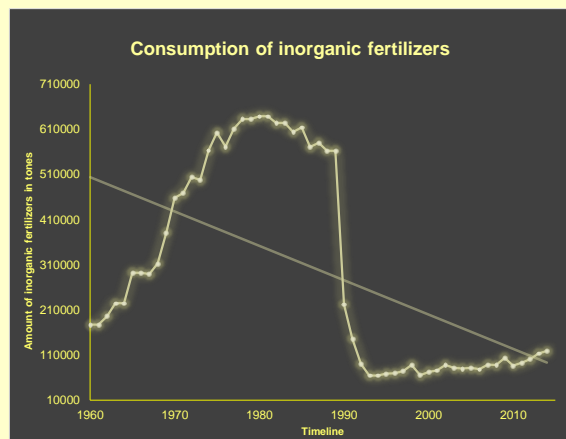
- **Established: 1. January 1993**
- **Political systems: Parliamentary democracy**
- **Area: 49 035 km²**
- **Population: 5 426 252 (as of 31. December 2015)**
- **Population density: 110.61/km²**
- **Slovakia is a member of the European Union, Eurozone, Schengen Area, NATO, United Nation, the OECD and the WTO.**
- **Neighboring countries: Austria, Czech Republic, Poland, Ukraine and Hungary.**



History of Agriculture in the Slovak Republic



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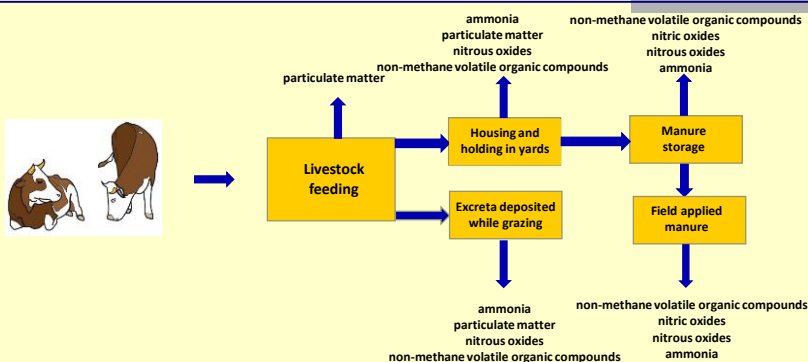


KEY MESSAGE: 1

Follow national circumstance

Analyze past trends

Pollution from Agriculture



Agriculture produce about 27% of total methane and more than 80% of total nitrous oxide emissions. Share of ammonia emissions is more than 90%.

Especially, intensive farming of animals is the most loading activity. Key categories are emissions from animals house boundary and storage and spreading of manure and slurry on the soil.

KEY MESSAGE: 2

Do prioritization

Make key category analyses

Do inventory consistent across GHG and air pollutants

Data Suppliers and Providers

- Ministry of the Agriculture and Rural Development of the Slovak Republic:
 - concepts, strategies, plans...mostly for projections
- Statistical Office of the Slovak Republic:
 - number of the livestock, milk yield
 - Data is available on 30/6 each year
- National Agricultural and Food Center – Research Institute for Animal Production
 - Emissions of methane from enteric fermentation, Emissions of methane and ammonia from manure management
- Central Controlling and Testing Institute in Agriculture
 - amount of synthetic and organic fertilizers applied on soil, sewage sludge
- Research Institute for Soil Protection
 - information on soils, plant production, liming and urea application on the soil

KEY MESSAGE: 3

Create robust National System in Agriculture

Institutionalize your system

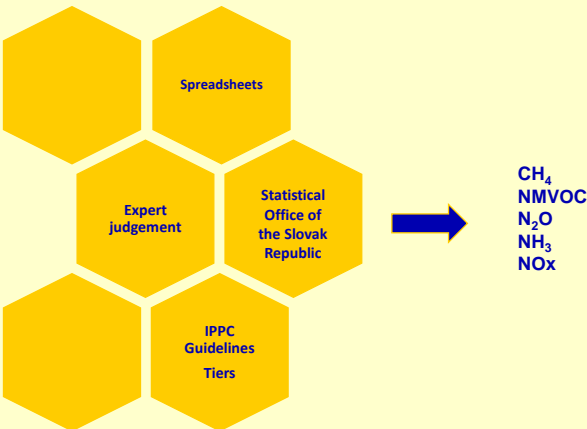
Involve different institutions/experts

Train new expert „in house“ – important for good reporting

Process of Inventory Preparation and Review



Basic Tools for Emission Estimates in Agriculture



The Latest Slovak Improvements

Methane from Enteric Fermentation	Methane from Manure Management Systems	N ₂ O from Manure Management Systems	N ₂ O from Managed Soils
Gross energy intake	Percentage of average waste manure systems	Nitrogen excretion rate	Manure applied to the soils
Methane conversion factor	Volatile solid excretion rates	Percentage of average waste manure systems	Manure applied to the soils by grazing
Digestibility			Sewage sludge



Improvement Plan in Agriculture



SLOVENSKÝ HYDROMETEOROLOGICKÝ ÚSTAV
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Odbor Monitorovanie emísií a kvality ovzdušia

PLÁN ZLEPŠENIA (IMPROVEMENT PLAN), EFFORT SHARING DECISION REVIEW 2016

SEKTOR: Poľnohospodárstvo (Agriculture)

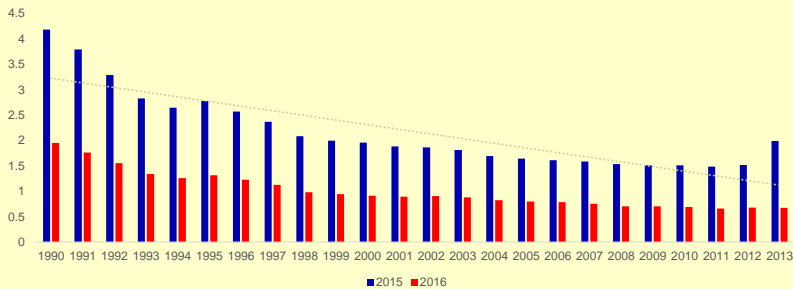
NIR 2016: inventory years 1990 – 2014

CRF Category ESD number	Potential Problem	Priority level (High, Medium, Low)	Potential Improvement	Evidence of Implementation	Implemented Name/Date	QA/QC check Name/Date
General, 3.A, 3.B	Inconsistencies in methodology for 2014 and the time series 1990 – 2013		Improvements in consistency of time series, based on new data provided by the SLU SR.			
SK-3A.1	CH ₄ emissions from cattle - enteric fermentation: New changes of dividing to dairy and non-dairy cattle can caused irregularities in the time series	High	Cattle category will be recalculated for time series 1990-2013.	Plan in NIR 2017		
SK-3A.2 SK-3.B.1.2 SK-3B-2016- 007	CH ₄ emissions from sheep: Irregularities in the time series have been identified. The time series was judged to be of type "single outlier". One year (2014) where the value is out of the general trend. Note that the identified year not always correspond to the years which appear to be "irregular".	High	Sheep category will be recalculated; detail explanation will be provided in NIR 2017.	Plan in NIR 2017		
SK-3.B.1.1	CH ₄ emissions from cattle - manure management: New changes of dividing to dairy and non-dairy cattle can caused irregularities in the time series	High	Recalculation is planned for the time series 1990- 2013.	Plan in NIR 2017		
3.B.2.2 SK-3B-2016- 009	Nitrogen excretion rate (NRATE) for sheep: Irregularities in the time series have been identified. Years flagged: 2014. The time series was judged to be	High	NRATE parameters for sheep will be reviewed for 1990-2013.	Plan in NIR 2017		

F-IPISNE/G2-0602



Impact of Improvements



N₂O emissions in GHG inventory after recalculation and implementation of improvements. Comparison of old methodology (2015) and new methodology (2016)

KEY MESSAGE: 4

- Prepare improvement plans
- Plan future inventory in manageable way
- Asses reached improvements
- Recalculate back to base year
- Use consistent data and methodology for time series



Example of Review Process

Our estimation of Ym parameter for cattle – based on national circumstance and expert judgment: **Ym = 0.058**

	Bratislava	Trnava	Trenčín	Nitra	Žilina	Banská Bystrica	Prešov	Košice	SR spolu
Dairy Cattle - high producing	5 124	25 696	14 097	24 155	23 474	20 224	20 320	9 993	143 083
Body weight (kg)	600	600	600	600	595	599	593	597	597,86
Milk yield kg/deň	24	22	19	21	15	14	15	14	17,74
DE (%)	70	70	70	70	65	65	65	60	67,06
Ym*100	0,055	0,055	0,055	0,055	0,060	0,060	0,060	0,065	0,058
GE (MJ/head/day)	327	314	299	303	290	286	290	317	300,21
EF (kg CH4/ks/r)	118	113	108	109	114	113	114	135	113,99
Emission CH4 (Gg/rok)	1	3	2	3	3	2	2	1	16,31

Ym parameter was based on the digestibility of feed and milk production and daily gain in different regions.

Ym parameter IPCC 2006 GL:

TABLE 10.12 CATTLE/BUFFALO CH ₄ CONVERSION FACTORS (Y _m)	
Livestock category	Y _m ^a
Feedlot fed Cattle ^a	3.0% ± 1.0%
Dairy Cows (Cattle and Buffalo) and their young	6.5% ± 1.0%
Other Cattle and Buffaloes that are primarily fed low quality crop residues and by-products	6.5% ± 1.0%
Other Cattle or Buffalo – grazing	6.5% ± 1.0%
^a When fed diets contain 90 percent or more concentrates.	
^b The ± values represent the range.	
Source: IPCC Expert Group.	



Example of Review Process

Correction of Ym based on review and strictly following IPCC 2006 GL:

Ym = 0.068

	Bratislava	Trnava	Trenčín	Nitra	Žilina	Banská Bystrica	Prešov	Košice	SR total
Dairy Cattle - high producing	5 124,00	25 696,00	14 087,00	24 155,00	23 474,00	20 224,00	20 320,00	9 993,00	143 083,00
Body weight (kg)	600,00	600,00	600,00	600,00	594,91	599,33	592,80	597,26	597,86
Milk yield l/day	22,99	21,24	18,82	20,08	14,26	13,97	14,55	13,58	17,21
DE (%)	70,00	70,00	70,00	70,00	65,00	65,00	65,00	65,00	67,41
Ym*100	0,065	0,065	0,065	0,065	0,070	0,070	0,070	0,070	0,068
GE (MJ/head/day)	326,52	314,03	296,99	303,49	290,38	286,32	290,04	281,61	297,75
EF (kg CH4/head/year)	139,20	133,88	127,47	129,38	133,32	131,46	133,16	129,29	131,82
Emissions CH4 (Gg/year)	0,71	3,44	1,80	3,13	3,13	2,66	2,71	1,29	18,86
Emissions CH4 (t/year)	713,29	3 440,14	1 796,91	3 125,27	3 129,51	2 658,56	2 705,91	1 292,00	18 861,59

Conclusion: accepted review proposal, prepare improvement plan for Ym based on national study in the next submission.

KEY MESSAGE: 5

Do quality assurance (during inventory preparation)

Do quality control (after finishing inventory)

Prepare experts for review

Do good documentation/references/national study

Do careful archiving

Thank you for your attention

SLOVENSKÝ HYDROMETEOROLOGICKÝ ÚSTAV
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