



ASSESSMENT OF GHG INVENTORIES IN AGRICULTURE – CASE STUDY SERBIA

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TOTAL EMISSIONS AND GHG EMISSIONS BY SECTORS FOR 1990, 2010-2013.

SEPA finished GHG inventories for the period 1990 – 2014.

In FBUR available 1990, 2010-2013

In SNC (planned for 2016) will be available whole period.

Source and sink category	1990	2010	2011	2012	2013	Change 2010- 2013
Emissions	CO₂ equivalents (Gg)					%
Energy	65,730.38	51,004.86	53,919.72	48,671.48	49,661.06	-2.6
Industrial processes	4,871.13	4,201.66	4,482.80	2,662.35	3,031.42	-27.9
AFOLU sector (Agriculture and other Land Use)	9,078.22	6,466.23	6,459.43	6,378.09	6,620.96	2.4
Waste	3,839.77	3,140.90	3,165.05	3,246.97	3,207.45	2.1
Total emissions excl. removals	83,519.50	64,813.65	68,027.00	60,958.89	62,520.88	-3.
Removals	CO₂ equivalents (Gg)					%
AFOLU sector (Forestry)	-16,855.36	-16,558.87	-16,733.17	-16,733.17	-15,737.06	-5.0
Total emissions incl. removals	66,664.14	48,254.78	51,293.83	44,225.72	46,783.83	-3.0

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METHOD AND TIER LEVEL USED FOR CALCULATION

SEPA uses 2006 IPCC Guidelines for National Greenhouse Gas Inventories Chapter 10 - Emissions from livestock and manure management

The current national GHG inventory for period 1990 – 2014 is based on IPCC Tier 1 methodologies.

SEPA uses the 2006 IPCC Inventory software for calculation.

3.A.1 - Enteric Fermentation
3.A.1.a - Cattle
3.A.1.a.i - Dairy Cows
3.A.1.a.ii - Other Cattle
3.A.1.b - Buffalo
3.A.1.c - Sheep
3.A.1.d - Goats
3.A.1.e - Camels
3.A.1.f - Horses
3.A.1.g - Mules and Asses
3.A.1.h - Swine
3.A.1.j - Other (please specify)
3.A.2 - Manure Management
3.A.2.a - Cattle
3.A.2.a.i - Dairy cows
3.A.2.a.ii - Other cattle
3.A.2.b - Buffalo
3.A.2.c - Sheep
3.A.2.d - Goats
3.A.2.e - Camels
3.A.2.f - Horses
3.A.2.g - Mules and Asses
3.A.2.h - Swine
3.A.2.i - Poultry
3.A.2.j - Other (please specify)

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METHOD AND TIERLEVEL USED FOR CALCULATION

	T	N(T)	EF(T)
Region	Species/Livestock Category	Number of Animals (head)	Emission Factor [kg CH ₄ /(head yr)]
► Serbia	Breeding swine	559000	8
	Market swine	1757000	5

	T	N(T)	EF(T)
Region	Species/Livestock Category	Number of Animals (head)	Emission Factor [kg CH ₄ /(head yr)]
► Serbia	Poultry broilers	5948502	0.02
	Poultry layers	10650000	0.02
	Poultry other	384000	0.02
	Poultry turkeys	184562	0.02

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CURRENT SITUATION

Data supplier for 3A and 3B category:

- ✓ Statistical Office Republic of Serbia

Calculation:

- ✓ Environmental Protection Agency

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LIVESTOCK PRODUCTION, BY TYPE AND YEARS FOR THE PERIOD 1990 -2014. YEAR

	Mlečne krave	Druge goveda	Goveda ukupno	Tovne svinje	Krmače	Svinje ukupno	Koke nosilje	Brojleri	Ćurke	Druge živina	Živina ukupno	Kozе	Ovce	Konji
1990	923,000	636,000	1,559,000	933,000	879,000	4,238,000	12,958,000	9,596,000	337,000	514,000	23,405,000	---	2,120,000	54,000
1991	847,000	636,000	1,483,000	1,023,000	708,000	4,263,000	13,587,100	9,646,000	307,000	455,900	23,996,000	---	2,127,000	53,000
1992	776,000	591,000	1,367,000	970,000	649,000	3,752,000	12,183,440	8,420,000	298,000	426,560	21,328,000	---	1,812,000	48,000
1993	792,000	619,000	1,411,000	952,000	671,000	3,998,000	11,468,900	7,709,000	256,000	437,100	19,871,000	165,000	1,884,000	41,000
1994	710,000	518,000	1,228,000	889,000	620,000	3,599,000	11,425,900	6,847,000	228,000	572,100	19,073,000	173,000	1,792,000	42,000
1995	781,000	573,000	1,354,000	1,051,000	652,000	4,086,000	13,977,600	7,411,000	311,000	556,400	22,256,000	228,000	1,852,000	53,000
1996	770,000	565,000	1,335,000	1,237,000	684,000	4,345,000	13,456,700	8,597,000	250,800	501,500	22,806,000	202,000	1,834,000	53,000
1997	769,000	548,600	1,317,600	1,086,000	677,000	4,119,400	13,129,600	8,632,000	201,000	402,500	22,365,100	184,400	1,757,900	52,200
1998	756,000	523,800	1,279,800	1,036,000	648,000	4,057,800	12,939,500	9,130,000	192,100	338,000	22,599,600	181,400	1,644,800	50,900
1999	768,000	514,600	1,282,600	1,064,000	691,000	4,066,000	13,340,100	9,287,000	256,000	395,000	23,278,100	193,200	1,598,100	42,800
2000	754,046	491,954	1,246,000	1,310,695	695,000	3,615,000	11,977,500	7,839,000	187,000	369,000	20,372,500	183,300	1,611,100	36,600
2001	726,000	436,000	1,162,000	1,302,878	619,000	3,587,000	10,886,900	7,836,000	195,000	372,000	19,289,900	179,500	1,489,400	29,500
2002	694,000	434,000	1,128,000	1,292,773	617,000	3,634,274	11,798,100	6,436,000	198,000	372,000	18,804,100	163,900	1,447,600	29,200
2003	625,014	487,150	1,112,164	1,433,278	623,000	3,368,662	10,655,600	6,437,000	207,000	377,000	17,676,600	169,200	1,515,500	24,200
2004	654,737	447,214	1,101,951	1,229,729	552,000	3,164,986	9,134,200	6,435,000	218,000	493,000	16,280,200	155,300	1,585,600	26,200
2005	649,685	429,335	1,079,020	1,201,190	522,000	3,165,000	13,805,000	2,104,000	215,000	507,000	16,631,000	152,000	1,576,000	25,000
2006	607,440	498,548	1,105,988	1,132,605	564,827	3,998,927	13,728,518	2,097,718	263,992	504,976	16,595,204	298,563	1,555,864	19,742
2007	584,286	502,791	1,087,077	886,543	517,000	3,831,894	13,523,757	2,183,759	238,342	475,897	16,421,755	275,037	1,606,156	18,495
2008	541,720	515,715	1,057,435	891,608	466,892	3,594,236	10,112,701	6,435,533	157,388	482,823	17,188,445	283,984	1,605,280	16,831
2009	501,417	500,878	1,002,295	942,612	477,225	3,631,013	14,439,049	7,836,053	172,523	372,988	22,820,613	263,286	1,503,895	14,499
2010	481,803	456,235	938,038	888,155	486,126	3,488,738	11,614,950	8,018,523	150,243	372,394	20,156,110	236,935	1,475,395	13,721
2011	477,223	459,347	936,570	863,972	449,967	3,286,900	11,641,958	7,001,873	129,162	330,418	19,103,411	238,751	1,460,295	11,576
2012	455,285	465,477	920,762	861,181	407,962	3,138,508	10,518,289	7,189,803	144,318	381,750	18,234,160	231,837	1,635,218	11,414
2013	429,025	484,119	913,144	973,320	355,000	3,144,215	7,400,890	8,074,882	111,310	2,272,839	17,859,921	225,073	1,616,219	15,605
2014	436,959	483,109	920,068	1,042,276	346,036	3,235,658	8,626,139	5,948,502	184,562	2,408,161	17,167,364	218,603	1,748,110	15,606

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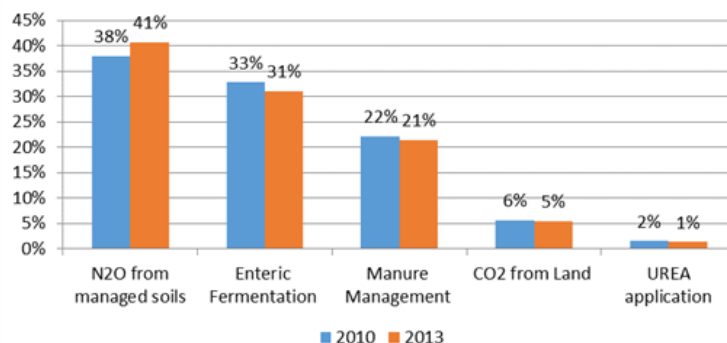
TOTAL EMISSIONS AND GHG EMISSIONS IN THE AFOLU SECTOR, 1990, 2010-2013.

AFOLU sector	1990	2010	2011	2012	2013	Change 2010-2013, %
AFOLU total	-7,777.13	-10,092.64	-10,273.74	-8,415.84	-9,116.10	-9.70%
3.A - Livestock	5,109.26	3,222.84	3,177.80	3,165.19	3,142.50	-2.50%
3.A.1 - Enteric Fermentation	3,554.08	2,118.80	2,106.03	2,095.23	2,058.97	-2.80%
3.A.2 - Manure Management	1,555.19	1,104.04	1,071.78	1,069.96	1,083.53	-1.90%
3.B - Land	-16,560.97	-16,198.52	-16,368.77	-14,430.90	-15,373.89	-5.10%
3.B.1 - Forest land	-16,855.17	-16,558.11	-16,730.18	-14,791.84	-15,735.64	-5.00%
3.B.2 - Cropland	110.04	221.03	222.86	222.38	223.19	1.00%
3.B.3 - Grassland	102.27	5.25	5.25	5.25	5.25	0.00%
3.B.4 - Wetlands	30.44	21.64	21.64	21.64	21.64	0.00%
3.B.5 - Settlements	43.07	110.57	110.57	110.57	110.57	0.00%
3.B.6 - Other Land	8.36	1.1	1.1	1.1	1.1	0.00%
3.C - Aggregate sources and non-CO2 emissions sources on land	3,674.77	2,883.79	2,920.21	2,851.95	3,116.71	8.10%
3.C.1 - Emissions from biomass burning	3.59	1.35	5.46	20	1.51	11.80%
3.C.2 - Liming	0	0	0	0	0	-
3.C.3 - Urea application	32.18	97.48	94.46	91.45	88.44	-9.30%
3.C.4 - Direct N2O Emissions from managed soils	2,452.82	1,882.83	1,917.73	1,833.92	2,062.83	9.60%
3.C.5 - Indirect N2O Emissions from managed soils	785.31	570.56	585.21	583.7	631.86	10.70%
3.C.6 - Indirect N2O Emissions from manure management	400.86	331.58	317.35	322.88	332.08	0.10%
3.C.7 - Rice cultivations	0	0	0	0	0	-
3.C.8 - Other (please specify)	0	0	0	0	0	-
3.D - Other	-0.19	-0.75	-2.99	-2.09	-1.42	87.80%
3.D.1 - Harvested Wood Products	-0.19	-0.75	-2.99	-2.09	-1.42	87.80%
3.D.2 - Other (please specify)	0	0	0	0	0	-

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SHARES OF GHG EMISSIONS FROM THE AFOLU SECTOR IN 2010 AND 2013.



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PLANNED IMPROVEMENTS IN 2016 - 2017

Improvements for AFOLU category:

- ✓ For category 3A and 3B move from Tier 1 to Tier 2.

Other methodological improvements:

- ✓ For category 1A1a move to Tier 3 – key category (All facilities are in PRTR register).
- ✓ Developing emissions for category 1A3e – Other transportation – Need assistance (e.g. Twining)

Technical inventory improvements:

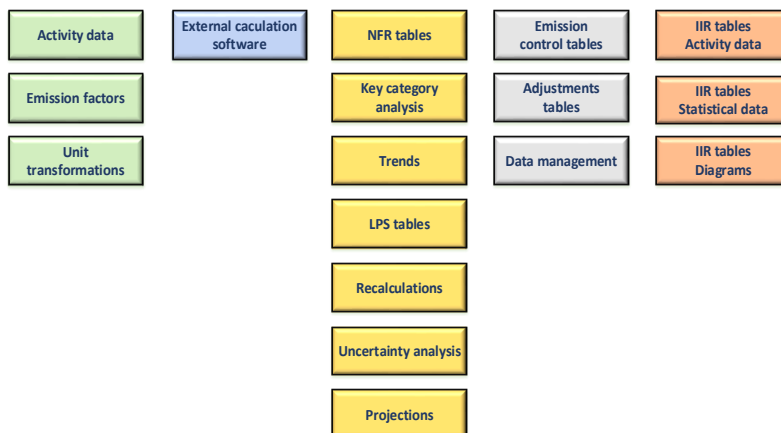
- ✓ Development of own national calculation tools/models instead of using IPCC tool.

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PLANNED IMPROVEMENTS IN 2016 - 2017

CLRTAP SOFTWARE MODULES



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PLANNED IMPROVEMENTS IN 2016 - 2017

Main Pollutants (from MS)		Particulate Matter (from MS)						Other (from MS)		Priority Heavy Metals (from MS)				Other Heavy Metals (from MS)				PM ₁₀ PM _{2.5} (from MS)					
NO _x (a H ₂)	PM ₁₀ (a H ₂)	PM _{2.5} (a H ₂)	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	SO ₂	CO	CS	Fe	Co	As	Cr	Cu	Al	Si	Ca	PM ₁₀ PM _{2.5} (a H ₂)	PM ₁₀ PM _{2.5} (a H ₂)	PM ₁₀ PM _{2.5} (a H ₂)	PM ₁₀ PM _{2.5} (a H ₂)	PM ₁₀ PM _{2.5} (a H ₂)	PM ₁₀ PM _{2.5} (a H ₂)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Data rows follow a similar pattern with numerical values and 'NA' entries.																							

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DOCUMENTS CONCERNING GHG INVENTORY IMPROVEMENT

EU Twinning project

Creation of a monitoring, reporting and verification system for the successful implementation of the EU Emissions Trading System

ACTIVITY

PREPARATION OF NATIONAL GHG INVENTORY REPORT IN LINE WITH THE EU AND UNFCCC REQUIREMENTS

GHG inventory report

Recommendations and suggestions

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DOCUMENTS CONCERNING GHG INVENTORY IMPROVEMENT

EU Twinning project SR 13 IB EN 01

Establishment of a mechanism for implementation of MMR

Funded by the European Union and Republic of Serbia (1,2 million EUR).

The project is implemented by:

- Ministry of Agriculture and Environmental Protection of the Republic of Serbia
- Ministry of Ecology, Sustainable Development and Energy of the Republic of France
- Interprofessional Technical Centre for Studies on Air Pollution (CITEPA)

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DOCUMENTS CONCERNING GHG INVENTORY IMPROVEMENT

EU Twinning project SR 13 IB EN 01

Establishment of a mechanism for implementation of MMR

Main goals of the project:

- The overall objective of the project is to assist Serbia to meet environmental and climate Acquis through institutional building and improvement of environmental reporting infrastructure.
- The purpose of the project is to ensure alignment with EU climate Acquis and fulfillment of the UNFCCC requirements through introduction of a mechanism for monitoring and reporting GHG emissions and for reporting other information relevant to climate change on regular basis.

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DOCUMENTS CONCERNING GHG INVENTORY IMPROVEMENT

ACTIVITY 1.3 “RULES AND PROCEDURE FOR IMPLEMENTING MMR REQUIREMENTS REPORT”

The objective of this document is to describe the rules and procedures to ensure appropriate implementation of the MMR requirements and expected related reporting.

So such description will deal especially with data/product flows as well as timely submission of data and information relevant for climate change issues that are requested within the implementation of the Mechanism for Monitoring and Reporting greenhouse gas emissions regulation (MMR) and the Effort Share Decision (ESD).

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DOCUMENTS CONCERNING GHG INVENTORY IMPROVEMENT

ACTIVITY 1.1.4 “ASSESSMENT REPORT” & ACTIVITY 1.2 “RECOMMENDATION REPORT”

The objective of this report is to provide recommendations based on an assessment synthesis of the existing institutional arrangements and organization, data flows, responsibilities and tasks, and options on how to arrange them for the requirements of the MMR EU regulation No 525/2013 Mechanism for Monitoring and Reporting greenhouse gas emissions, its related implementing regulation No 749/2014, the EU Effort Sharing Decision No 406/2009/EC and in addition the LULUCF Decision No 529/2013/EU.

The conclusions of the assessment represent the recommendations for the Serbian organization to implement the MMR EU requirements.

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DOCUMENTS CONCERNING GHG INVENTORY IMPROVEMENT

ACTIVITY 1.4 “QA/QC PROCEDURES FOR THE NATIONAL INVENTORY SYSTEM”

The objective of quality procedures in the framework of the preparation of national GHG emissions inventory is to satisfy the criteria of transparency, consistency, completeness, accuracy, and traceability, comparability required by UNFCCC, and to meet the deadlines for the MMR requirements submission.

Quality procedures have to cover:

- The requirements on data which have to be transmitted in the framework of MMR;
- The preparation of a National Inventory Report (NIR) in accordance with UNFCCC requirements (e.g. content of the NIR, CRF format, good use of notation keys);
- The development of the relevant procedures for the emission calculations, as methodology choices, references, data collection, processing data, data validation, data archiving;
- The uncertainty estimates.

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THANK YOU FOR YOUR ATTENTION!

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