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Ministry of Agriculture Republic of Latvia

The effect of dairy farming system on GHG emission estimations in Latvia pilot farms

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How to deal with EU-Green Deal

Session 88, 04.09.2024, Florence

Climate and policy

https://www.labxchange.org/library/pathway/lx-pathway:793d74a7-f393-4fe1-9943-4662d8a0d651/items/lx-pb:793d74a7-f393-4fe1-9943-4662d8a0d651:html:e7c26031

- Many GHGs, including water vapor (the most important), ozone, carbon dioxide, methane, and nitrous oxide, are naturally present in the atmosphere.
- Other GHGs are synthetic chemicals that are emitted only as a result of human activity. Anthropogenic (human) activities are significantly increasing atmospheric concentrations of many GHGs.

The first climate-neutral continent
by 2050

At least 55% less
net greenhouse gas emissions by 2030, compared to 1990 levels

3 billion
additional trees to be planted in the EU by 2030

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

GHG mitigation measures for livestock

https://www.intelligentliving.co/gene-editing-cows-cut-emissions/

www.CCCFarming.eu project, Galama, 2023

https://dairyexporter.co.nz/3-nop-the-magic-methane-inhibitor/

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Intergovernmental Panel on Climate Change (IPCC)

Task Force on National Greenhouse Gas Inventories

ipcc INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

IPCC web sites

Publications

2019 Refinement

Top | Vol1 GGR | Vol2 Energy | Vol3 IPPU | Vol4 AFOLU | Vol5 Waste

- Home IPCC
- IPCC-TFI Home
- Organization
- Publications
  - 2019 Refinement
  - Wetlands Supplement
  - KP Supplement
  - 2006 IPCC Guidelines
  - GPG-LULUCF
  - Degradation of Forest
  - GPG2000
  - Revised 1996 IPCC Guidelines
  - Technical Bulletins
  - Presentations
  - Support to Inventory Compilers
- Emission Factor Database (EFDB)
- Inventory Software
- Meetings
- FAQs
- Links
- Electronic DIscussion Group (EDG)

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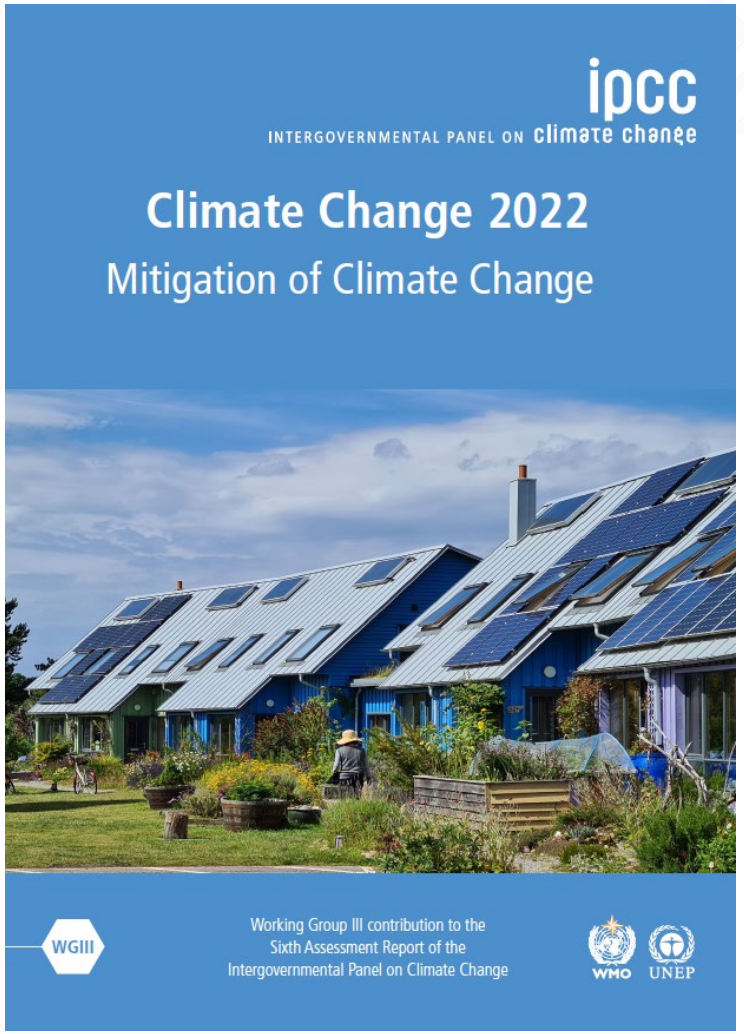
2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Volume 4

Agriculture, Forestry and Other Land Use

Chapter	Chapter Name
-	Cover Page of Volume 4
1	Introduction
2	Generic Methodologies Applicable to Multiple Land-Use Categories
	Appendix 4 Method for Estimating the Change in Mineral Soil Organic Carbon Stocks from Biochar Amendments: Basis for Future Methodological Development
	Box 2.2 Equation 2.25 Spreadsheet (MS-Excel)
3	Consistent Representation of Lands *1
4	Forest Land
5	Cropland
	Tier 2 Steady state soil carbon method Spreadsheet (MS-Excel)
6	Grassland
7	Wetlands
8	Settlements



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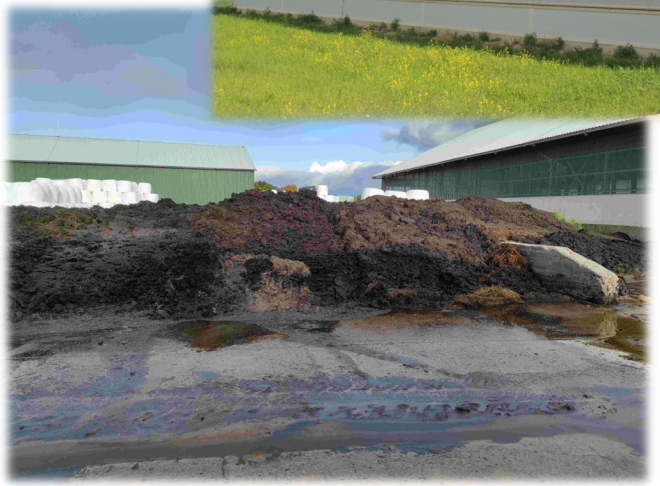
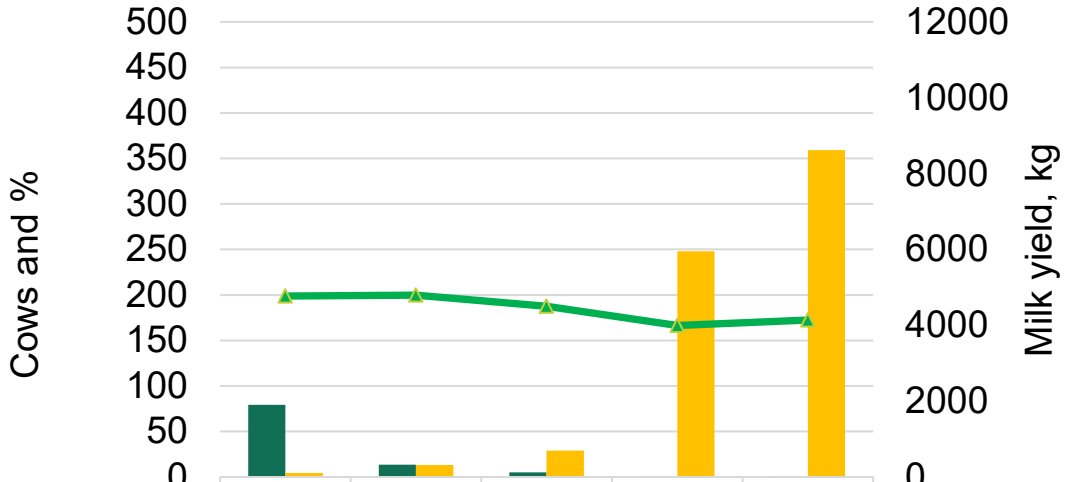
Purpose of the study

Collect reference data based on actual farm characteristics from different Livestock farming systems



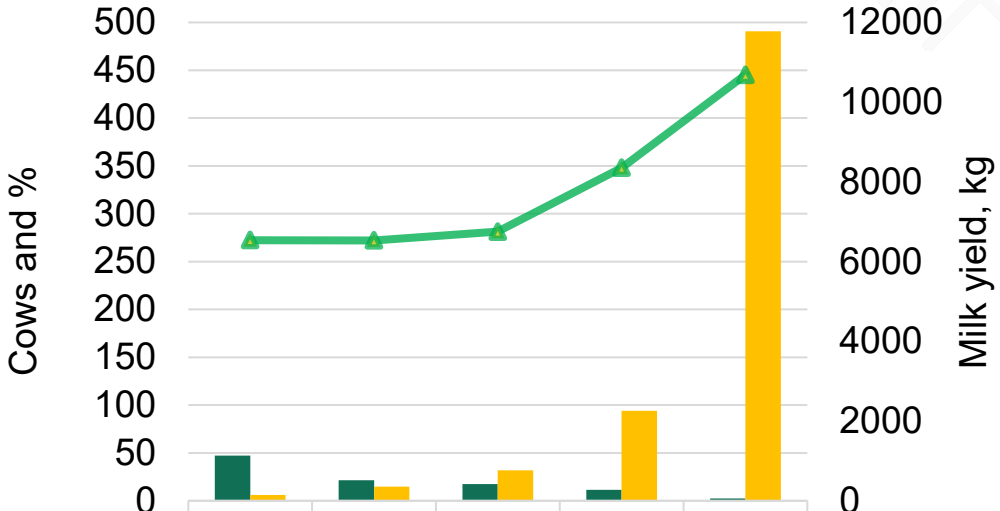
Structure of dairy farms, by average cows number in farm (years 2000 and 2023, under milk recording)

Year **2000**, 4% of total dairy cows



	< 10	10-19	20 - 49	50 – 199	>200
Farms, %	79,4	13,6	5,1	1,0	0,9
Cows per farm, average	4,2	13,2	28,9	248,0	359,3
Milk yield, kg	4773	4795	4505	3995	4140

Year **2023**, 98% of total dairy cows



	< 10	10-19	20 - 49	50 – 199	>200
Farms, %	47,1	21,5	17,5	11,3	2,6
Cows per farm, average	6,0	14,7	32,0	93,9	490,8
Milk yield, kg	6537	6530	6750	8353	10686

Source: Agricultural Data centre Republic of Latvia, 2024

Data set of Reference farms

- **Dairy farms**
  - Conventional farm (A) – 600 dairy cows
  - Organic farm (B) – 43 dairy cows
  - Organic farm (C) – 4 dairy cows
- **Housing technology**
  - Cubicle housing
  - Tie stall, grazing
- **Manure management**
  - Slurry, Biogas
  - Storage on concrete area
  - Accumulation on living area

- **Feeding technology**
  - Total mixed ration (TMR)
  - Portion ration
  - Dry matter intake
- **Productivity**
  - Animal weight gain
  - Milk productivity traits

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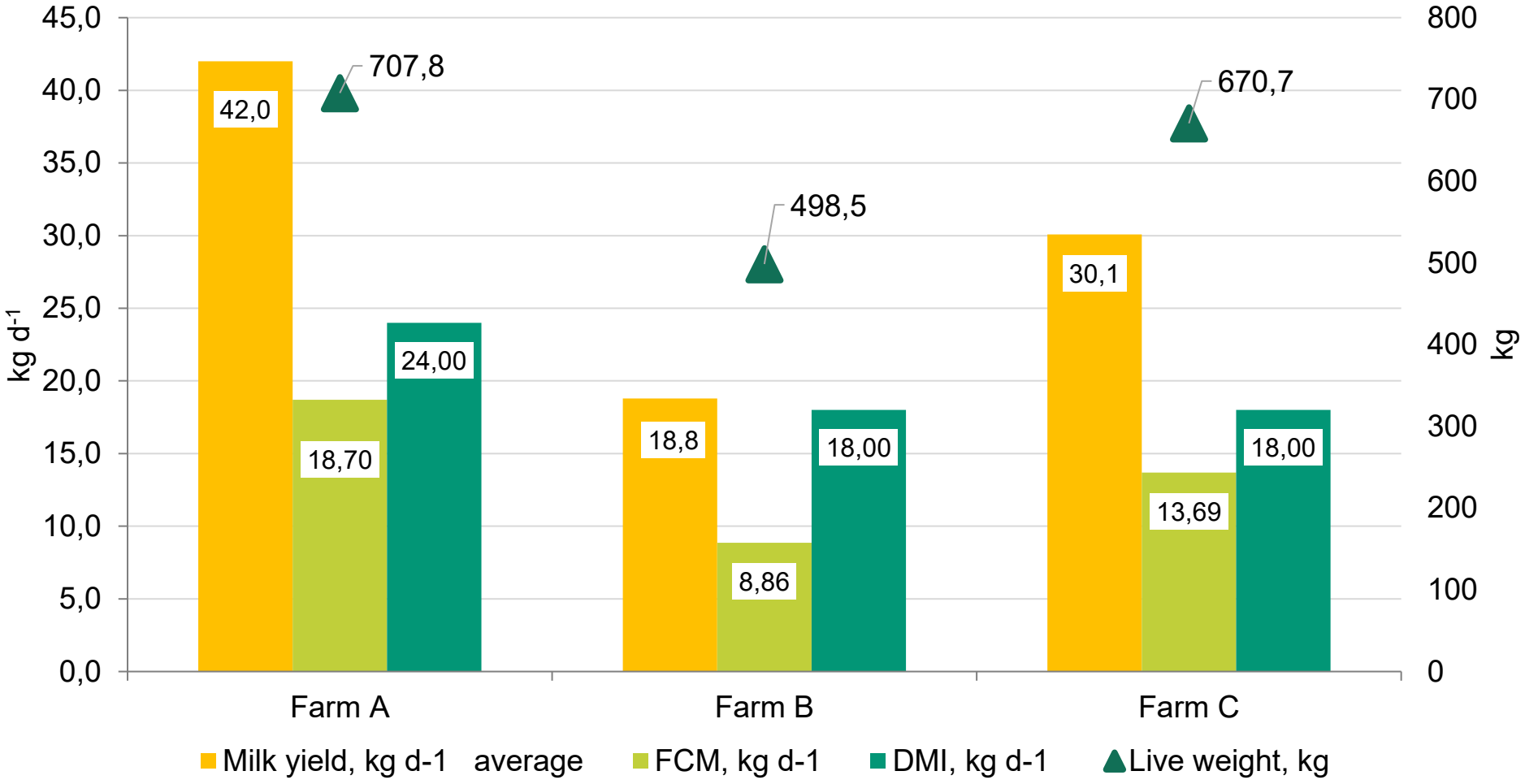
Overview of Reference farms



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Methods used for calculation of GHG emissions

Traits	Livestock data	Manure management system	Milk yield, kg d^{-1}	Animal weight, kg	Feed digestibility, %	Feed database used	Tier level
Latvia GHG Inventory, 2024	Central Statistical Bureau	University of Life Sciences and Technologies calculations: Pastures 5% Solid manure 35% Slurry 43% Digesters 17%	24.6	570	67	Calculations for observed productivity	Enteric fermentation: Tier 2 Manure management Tier 2
Farm A	Actual farm data	Digesters	39.1	708	74	Farm based data	Enteric fermentation: Tier 2 Manure management Tier 2
Farm B	Actual farm data	Solid manure pastures	18.8	498	63	Farm based data	Enteric fermentation: Tier 2 Manure management Tier 2
Farm C	Actual farm data	Solid manure pastures	30.1	670	63	Farm based data	Enteric fermentation: Tier 2 Manure management Tier 2

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$C0_2$ eq. per dairy cow, kg

Calculation methodology	Guidelines	Methodology	Farm A	Farm B	Farm C	LV Inventory
			Emissions, kg, $C0_2$ eq. (Gross energy intake, MJ)			
Latvia Inventory Version 1	IPCC 2006, actual version of inventory, Tier 2	IPCC 2006 GE based on net energy for necessary requirements	5822 (464)	4691 (367)	6090 (478)	5039
Version 2	IPCC 2006, farm based feed data GE calculations, Tier 2	IPCC 2006 GE calculated based on farm feeding characteristics	5569 (444)	4220 (320)	3940 (311)	-
Version 3	IPCC 2019, Tier 2	IPCC 2019, Simplified Tier 2 for enteric methane emission (DMI, DE, NDF)	5162	3685	5466	-

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Insights for further work

- Major changes in GHG emissions calculations within latest years include update to the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- Moving to highest Tier calculation methodology and using high accuracy national data the National Inventory can be a reliable base for decision-making, in particular to develop GHG emissions reduction strategies.
- Methodological frameworks for GHG reporting can resulted in only minor changes in agricultural GHG emissions in the National Inventory, most important differences for calculation outcome may be observed when specific feeding data are used.
- Methane emissions from enteric fermentation are significantly influenced by digestibility data of feed, however emissions from manure management can be significantly reduced by switching from slurry based manure management system to digesters that especially important for intensive dairy farms to reduce amount of emissions.

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Importance of data quality

Decision-making on **the farm** :

- works prioritizing
- improvement of quality
- increasing of efficiency
- investment planning, etc.

Decision-making in **the country** :

- development of strategy
- Common Agricultural policy
- support payments
- emissions inventory, etc.

DATA QUALITY = DECISIONS QUALITY

https://www.istockphoto.com/vector/agriculture-industry-farming-people-and-animal-husbandry-concept-happy-smiling-gm1285081636-382022090

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THANK YOU FOR YOUR ATTENTION!

Acknowledgement:

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Ministry of Agriculture
Republic of Latvia