



- TAIEX/ECRAN –

- Agronomic parameters in Husbandry – - Manure Management Systems –

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Agriculture

› Agriculture seems difficult

- So keep it simple
- You cannot do it better, than the data you have
 - If you have uncertain data
 - › Keep Tier 1
 - Do not spend too much time on **“updating old data”**
 - › Use average data
 - › Expert judgement

Agriculture, aspects

- Some practical assumptions on
 - Enteric fermentation, CH₄
 - Manure management, CH₄, N₂O
 - Animal manure applied to soil, N₂O

Agriculture, aspects

› Please if possible:

- Use/coordinate the same activity data/methodologies (as in Serbia)
- Use your colleagues in this field
- UNFCCC reporting on GHG emissions (NIR, CRF)
- CLRTAP/EMEP reporting on air emissions inventories (IIR, NFR)



Technical guidance to prepare national emission inventories. The joint EMEP/EEA air pollutant emission inventory guidebook supports the reporting of emissions data under the UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and the EU National Emission Ceilings Directive. It provides expert guidance on how to compile an atmospheric emissions inventory. The Guidebook is published by the EEA with the CLRTAP Task Force on Emission Inventories and Projections responsible for the technical content of the chapters. The present edition replaces all earlier versions.

<http://www.eea.europa.eu/publications/emep-eea-guidebook-2013>

Agronomic parameters in Husbandry

› Husbandry isn't that difficult - you become what you eat!

- Think – Mass flow

- › An animal eat some feed
- › In the animal part of the feed is degraded
- › Part of it is exhaled through the mouth
- › Part of it is taken up by the body and deposited in fat, muscles, bones, foster, and milk
- › The rest is excreted in faeces or urine

- › The rest is manure
- › Manure is degraded and may yield CO₂, CH₄ and N₂O
- › Part of it is very difficult degradable and end up in the soil when the manure is applied to the soil

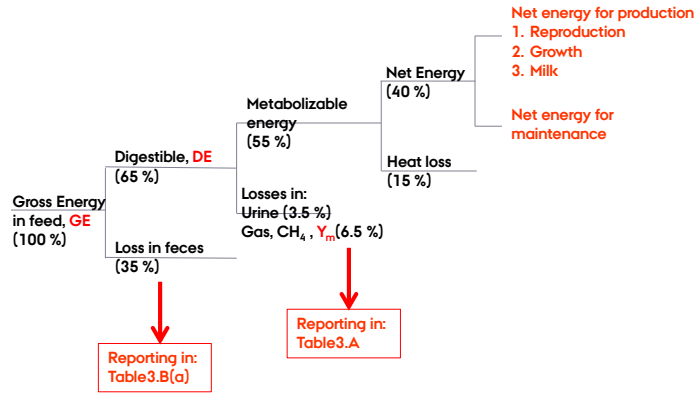
- › In the soil further degradation takes place
- › Part of the manure may be incorporated in the soil as soil organic matter (SOM)

An example for dairy cows

› Very likely you have to use Tier 2

- The IPCC 2006 Guidelines determines the energy need for for growth and production (Net Energy requirement)

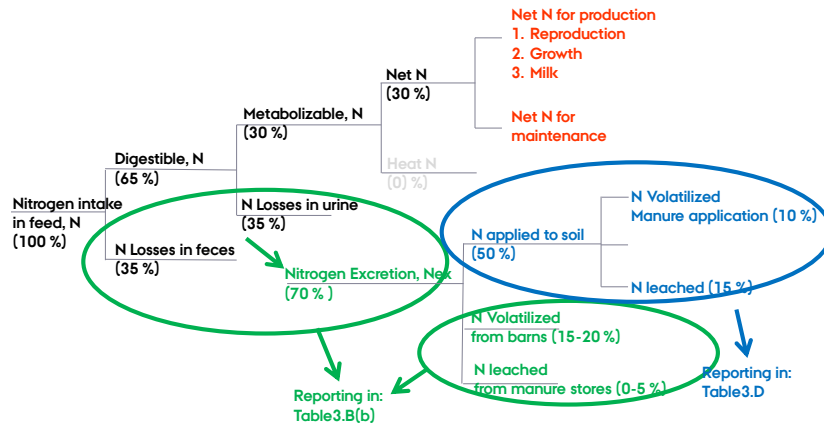
Mass balance – for Organic Matter (CH_4)



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Mass balance – for Nitrogen (N_2O)



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Manure Management Systems

From the Greek Inventory

Animal category		Indicator	Climate region	Manure Management Systems ^(a)								
				Anaerobic lagoon	Liquid system	Daily spread	Solid storage and dry lot	Pasture, range, and paddock	Composting	Digesters	Burned for fuel or as waste	Other
Option A	Dairy cattle	Allocation (%)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	5.52	NO	86.48	8.00	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO
		MCP ^(b)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	22.00	NO	0.04	0.02	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO
	Non-dairy cattle	Allocation (%)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	NO	3.00	64.00	33.00	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO
		MCP ^(b)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	NO	0.01	0.04	0.02	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO

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Manure Management Systems

› Some practical aspects

- The Balcan/Turkey are warm and dry countries
- Gives restrictions on feeding and manure management systems
 - › Limited grazing for dairy cattle - feed is often harvested and brought to the animals

From the Greek Inventory

Animal category		Indicator	Climate region	Manure Management Systems ^(b)								
				Anaerobic lagoon	Liquid system	Daily spread	Solid storage and dry lot	Pasture, range, and paddock	Composting	Digesters	Burned for fuel or as waste	Other
Option A	Dairy cattle	Allocation (%)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	5.52	NO	86.48	8.00	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO
		MCP ^(c)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	22.00	NO	0.04	0.02	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO
	Non-dairy cattle	Allocation (%)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	NO	3.00	64.00	33.00	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO
		MCP ^(c)	Cool	NO	NO	NO	NO	NO	NO	NO	NO	NO
			Temperate	NO	NO	0.01	0.04	0.02	NO	NO	NO	NO
			Warm	NO	NO	NO	NO	NO	NO	NO	NO	NO

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Manure Management Systems

From the Greek Inventory

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION												
	Population size (1000s)	Nitrogen excretion rate (kg N/head/yr)	Typical animal mass (average) (kg/animal)	Nitrogen excretion per manure management system (MMS) (kg N/yr)								Total N excreted (kg N/yr)	
				Anaerobic lagoon	Liquid system	Daily spread	Solid storage and dry lot	Pasture range and paddock ⁽¹⁾	Composting	Digesters	Burned for fuel or as waste ⁽²⁾		Other ⁽³⁾
1. Cattle	693.95			NO	2857157	870403	28133859	10654642	NO	NO	NO	42516066	
Option A:													
Dairy cattle ⁽⁴⁾	136.79	98.71	600.00	NO	2857157	NO	9565265	1080211	NO	NO	NO	13502633	
Non-dairy cattle ⁽⁵⁾	557.16	52.07	407.63	NO	NO	870403	18568593	9574431	NO	NO	NO	29013427	

- Anaerobic digesters: Do not occur in Europe
- Liquid systems: Limited for cattle in southern Europe only pigs
- Daily spread: Limited
- Solid management: Most likely for cattle
- Other: Poultry are often reported here
- Default: Eastern Europe ? Not very likely that this is average conditions in the Balcan

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Manure Management



Solid



Solid/Liquid?



Solid

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Liquid storage



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Swine



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Poultry



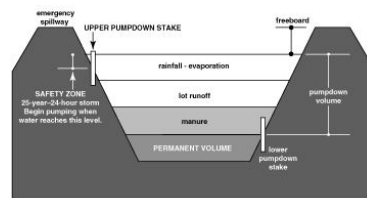
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Anaerobic digesters



Anaerobic digester



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Dry lot



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Agricultural soils

› Major issues

- Overestimation of indirect N_2O emissions from leaching in dry climates

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No more from me – questions ?