

Nitrogen balance from dairy farms

Denmark
2000

Nitrogen inputs and outputs from farms

The Danish aquatic environment plan focuses on reducing societies nitrogen discharge to the aquatic environment. Farming is one of the biggest contributors this to discharge, which is why it is useful to have an overview of the nitrogen balance in Danish farming, which is given here. The data presented refers to production of nitrogen from different types of Danish dairy farms in 2000. For process description, data collection and treatment etc. please look at the processes for each farm type ([Here](#)).

The nitrogen balance data presented is divided in to three tables:

Table 1: Characteristics and area-based average of mixed dairy farms in Denmark

Table 2: Farm gate Nitrogen turnover and loss at mixed dairy farms in Denmark

Table 3: Field Nitrogen turnover at mixed dairy farms in Denmark

Table 1: Characteristics and area-based average of mixed dairy farms in Denmark

Soil type	Loamy (clay)				Sandy				
	<1.4	1.4-2.3	>2.3	Org.	<1.4	1.4-2.3	>2.3	Org.	Sucler cows
Farmtype (LSU ha ⁻¹)									
Data									
Number of farms in dataset	23	32	14	24	83	182	16	125	32
Area represented by farm type (1000ha)	43	43	12	10	156	261	16	71	198
Herd balance									
Dairy per farm (cows farm ⁻¹)	55	55	82	62	48	67	76	85	55
LSU ¹ per farm (LSU farm ⁻¹)	87	84	121	100	81	109	126	133	84
Stocking rate (LSU ha ⁻¹)	0.9	1.7	2.8	1.1	1.0	1.7	2.6	1.3	0.6
Feed uptake, 100 SFU LSU ⁻¹ y ⁻¹	48	48	47	44	48	48	48	45	40
N uptake, kg N LSU ⁻¹ y ⁻¹	147	146	152	130	143	143	141	133	149
N-efficiency, herd ²)	21.3%	20.6%	21.4%	19.8%	20.1%	20.0%	19.1%	19.7%	18.2%
Area									
Total farm area (ha farm ⁻¹)	99	50	44	88	81	65	48	102	50
Crop rotation (% of farm area)									
Permanent grass	9	8	3	11	9	11	6	9	8
Set-aside	6	4	6	5	7	6	5	5	4
Cereal for harvest	46	32	42	23	40	19	16	14	32
Maize/whole crop silage	13	21	28	19	16	32	52	27	21
Grass/clover in rotation	14	24	4	33	18	26	13	41	24

Production									
Cereal yield (hkg ha ⁻¹)	56	54	66	44	52	49	47	41	54
Milk yield (kg ECM cow ⁻¹ year ⁻¹)	7227	7288	7053	6811	7431	7429	7125	6861	5820

1) Livestock units (LSU), DK definition: 0.85 LSU=1 dairy cow on 7,500 l milk year⁻¹

2) N-eff = output of animals products/input of feed

Table 2: Farm gate Nitrogen turnover and loss at mixed dairy farms in Denmark (kg N ha⁻¹ year⁻¹)

Soil type	Loamy (clay)				Sandy				Sucler cows
	<1.4	1.4-2.3	>2.3	Org.	<1.4	1.4-2.3	>2.3	Org.	
Farmtype (LSU ha ⁻¹)									
Farm gate balance									
Mineral fertilizer	104	83	45	0	104	96	70	0	120
Organic fertilizer & living animals ³⁾	6	1	-59	1	8	1	-34	9	10
Supplement feed	48	121	338	43	50	110	245	54	25
Straw for bedding ³⁾	0	8	15	6	1	9	18	7	0
Fixation	21	35	6	68	23	34	26	78	23
Precipitation	16	16	16	16	16	16	16	16	16
Total input	195	264	361	134	202	266	341	163	194
Milk	-22	-44	-75	-23	-23	-42	-60	-29	0
Meat	-8	-10	-21	-7	-8	-10	-20	-6	-19
Cash crops	-28	-8	-28	-7	-19	-4	-5	-2	-28
Total output	-58	-62	-124	-37	-50	-56	-85	-37	-47
Farm N-balance	137	202	236	97	152	210	256	127	147
N loss, stable and storage	-11	-22	-46	-13	-13	-22	-37	-15	-9
Field N balance	125	179	190	84	139	188	219	112	138
Field N-efficiency ⁴⁾	48%	43%	39%	57%	47%	42%	37%	52%	42%
N loss, field									
Fertilization, spreading	-11	-17	-21	-9	-13	-18	-21	-11	-10
Crops	-4	-4	-5	-2	-4	-4	-4	-2	-3
Denitrification	-36	-39	-46	-36	-14	-18	-22	-16	-12
Leaching ⁵⁾	-74	-119	-119	-37	-108	-148	-171	-83	-113

3) Net import = import-export of manure, straw and living animals

4) N-eff = output/input

5) Leaching = field N balance +/- soil-N changes - N loss (fertilization+crops+denitrification)

Table 3: Field Nitrogen turnover at mixed dairy farms in Denmark (kg N ha⁻¹ year⁻¹)

Soil type	Loamy (clay)				Sandy			
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Farmtype (LSU ha ⁻¹)	<1.4	1.4-2.3	>2.3	Org.	<1.4	1.4-2.3	>2.3	Org.	Sucler cows
Input									
Mineral fertilizer	104	83	44	0	105	95	70	0	120
Imported organic fertilizer ⁶⁾	6	0	0	22	7	0	0	23	8
Produced manure	96	183	245	92	109	181	234	117	72
Fixation	21	35	6	68	23	34	26	78	23
Precipitation	16	16	16	16	16	16	16	16	16
Total input	243	317	311	198	260	326	347	234	239
Output									
Cash crop	-5	-2	-15	-1	-4	-1	-2	0	-3
Grain	-23	-6	-13	-6	-15	-3	-3	-2	-25
Grain for feed ⁷⁾	-19	-22	-31	-11	-19	-11	-9	-7	-11
Straw harvested	-8	-8	-10	-4	-10	-6	-4	-2	-5
Straw mulched ⁸⁾ (Not in output)	-1	2	2	0	3	3	2	0	-3
Roughage for feed ⁷⁾	-62	-100	-52	-92	-74	-117	-111	-112	-58
Total output	-117	-137	-121	-114	-121	-138	-128	-123	-101
Output without roughage⁹⁾	-55	-38	-69	-22	-47	-21	-18	-11	-44
Field N balance	125	179	190	84	139	188	219	112	138
Field N-efficiency ⁴⁾	48%	43%	39%	57%	47%	42%	37%	52%	42%

4) N-eff = output/input

6) Average include not precented farms with more than 2.3 LSU ha⁻¹

7) Used for feed for own herd

8) Straw left on field, not included in balance

9) Output without roughage, sum of output from cash crops, cereals and straw

Administrative information

Data URL: <http://www.lcafood.dk/processes/agriculture/dairyfarms.html>

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Authors: Ib Sillebak Kristensen, [Danish Institute of Agricultural Science](#).

Data responsible: Ib Sillebak Kristensen, DIAS

Contact:

Data entry: Transformed into this format by Rikke Frederiksen, DIAS

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References