

Nitrogen balance from cash crop farms (2002)

Denmark, 2002

The Danish aquatic environment plan focuses on reducing nitrogen discharge to the aquatic environment. Farming is one of the major contributors to this discharge, which is why it is useful to have an overview of the nitrogen balance and emissions in Danish farming. The data presented here refers to the Nitrogen use and losses in different types of Danish cash crop farms in 2002. The different farm types are set according to soil type and major enterprise and they can be seen [here](#). For process description, data collection and treatment etc. please look at the processes for each farm type ([here](#)). For more details on the Nitrogen balance method see [here](#).

The Nitrogen balance data is presented in three tables:

[Table 1](#). Characteristics of area, land use and yields per hectare for full time cash crop farm types in Denmark year 2002

[Table 2](#). Farm gate N-turnover and -loss at cash crop farms in Denmark year 2002

[Table 3](#). Field level N-turnover at cash crop farms in Denmark year 2002

Table 1. Characteristics of area, land use and yields per hectare for full time cash crop farm types in Denmark year 2002 (average by farm)

Soil type ¹⁾	Sandy loam					Sand			
	Sugar beet	Seed	Cereal	Org.	Rest	Potatoes	Cereal	Org.	Rest
Representativity									
Number of farms in data set	96	66	68	49	38	25	67	128	90
Area represented by farm type [1000ha]	177	156	171	17	40	44	175	60	94
Herd data									
Dairy per farm [cows farm ⁻¹]	7	1	0	0	13	3	0	0	20
LSU ²⁾ per farm [LSU farm ⁻¹]	35	35	4	8	66	48	3	15	87
Area									
Total farm area [ha farm ⁻¹]	93	118	76	29	41	111	95	44	45
Crop rotation [% of farm area]									
Permanent grass	1	1	2	6	6	2	1	7	11
Set-aside	7	8	9	9	73	8	11	10	7
Cereal for harvest	62	62	75	52	60	48	74	46	46
Maize/whole crop silage	2	0	0	7	13	3	1	14	17
Grass/clover in rotation	1	1	1	11	10	2	1	15	14
Production									
Cereal yield [100 kg ha ⁻¹]	70	67	65	34	57	55	56	32	52
Peas [100 kg ha ⁻¹]	42	41	47	33	38	41	37	25	24
Rape[100 kg ha ⁻¹]	29	29	26	47	30	25	24	5	28
Potatoes [100 kg ha ⁻¹]	300	221	231	109	0	273	206	160	185
Sugar beet [100 kg ha ⁻¹]	96	88	85	0	80	65	84	95	53
Grass seed [100 kg ha ⁻¹]	9	11	10	9	10	8	12	11	13
Clover seed [100 kg ha ⁻¹]	4	5	6	1	0	0	0	0	0
Milk yield [kg ECM cow ⁻¹ yr ⁻¹]	7804	7426	0	0	8027	8150	0	0	7577

1) Sandy loam > 5 % clay, sand < 5 % clay

2) Livestock units (LSU), DK definition: 1 LSU = 100 kg total N in manure ex stable, 0.85 LSU=1 dairy cow on 8,500 l milk year⁻¹

Table 2. Farm gate N-turnover and -loss at cash crop farms in Denmark year 2002 (kg N ha⁻¹ year⁻¹)

Soil type	Sandy loam					Sand			
	Sugar beet	Seed	Cereal	Org.	Rest	Potatoes	Cereal	Org.	Rest
Farm type									
Inputs									
Mineral fertiliser	95	98	120	0	79	92	91	0	56
Organic fert. & live stock ¹⁾	8	9	12	29	10	33	28	42	11
Supplement feed	26	22	1	14	165	30	0	20	244
Biological N-fixation	4	5	6	39	13	3	4	46	19
Deposition and precipitation	16	16	16	16	16	16	16	16	16
Total input	149	150	155	98	283	174	139	124	346
Outputs									
Milk	-3	0	0	0	-13	-1	0	0	-18
Meat	-16	-19	-1	-8	-74	-24	-1	-14	-115
Cash crops	-56	-60	-87	-27	-18	-42	-70	-20	-12
Straw ¹⁾	-3	-5	-5	0	0	-4	-7	0	2
Total output	-78	-84	-93	-35	-105	-71	-78	-34	-143
Farm gate N-balance	71	66	62	63	178	103	61	90	203
N loss, stable and storage ²⁾	-6	-6	-1	-4	-29	-8	0	-6	-44
Field N balance	65	60	61	59	149	95	61	84	159
Field N-efficiency ³⁾	57%	59%	61%	44%	40%	46%	58%	38%	41%
N loss, field									
Fertilisation, manure spreading ²⁾	-7	-6	-5	-5	-15	-10	-6	-7	-15
Crops ²⁾	-5	-5	-5	-2	-4	-5	-5	-2	-4
Denitrification ²⁾	-15	-14	-14	-19	-30	-6	-4	-8	-10
Soil-N change ²⁾	-1	2	-2	-11	5	9	-6	0	19
Leaching ⁴⁾	-39	-33	-39	-44	-95	-65	-52	-67	-111

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

2) Calculated standard ammonia emission and denitrification

3) N-efficiency = 100 * output/input

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

Table 3. Field level N-turnover at cash crop farms in Denmark year 2002 (kg N ha⁻¹ year⁻¹)

Soil type	Sandy loam					Sand			
	Sugar beet	Seed	Cereal	Org.	Rest	Potatoes	Cereal	Org.	Rest
Farm type									
Inputs									
Mineral fertiliser	95	98	120	0	80	90	91	0	56
Imported organic fertiliser	5	5	12	29	0	27	28	41	0
Manure from own herd ¹⁾	33	25	5	21	143	41	3	34	178
Biological N-fixation	4	5	6	39	13	3	4	46	19
Deposition and precipitation	16	16	16	16	16	16	16	16	16
Total input	153	149	159	105	252	177	142	137	269
Outputs									
Cash crops	-6	-10	-5	-3	-3	-21	-3	1	-2
Grain	-50	-49	-82	-23	-16	-21	-67	-19	-10
Grain for feed ²⁾	-20	-20	-1	-9	-38	-27	0	-8	-29
Straw harvested	-5	-6	-5	-1	0	-7	-8	-2	-8
Straw mulched ³⁾ (Not in output)	-9	-13	-10	-7	-1	3	-6	-4	0
Roughage for feed ²⁾	-7	-3	-4	-10	-45	-8	-4	-23	-62
Roughage not utilized by own herd (Not in output)	0	0	0	-20	0	0	-1	-21	0
Total output	-88	-88	-97	-46	-102	-84	-82	-53	-111
Field N balance	65	61	62	59	150	93	60	85	158
Field N-efficiency ⁴⁾	57%	59%	61%	44%	40%	47%	58%	38%	41%

1) After deduction of ammonia loss in stables, storage and sold manure, see farm gate balance

2) Feed used in own herd

3) Straw left on field, not included in balance but used in soil-N modeling

4) N-efficiency = 100 * output/input

Administrative information

Data URL: http://www.lcafood.dk/processes/agriculture/N_balance_cash_crop_farms.html

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