Nitrogen balance from pig 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 loses in different types of Danish pig 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 production levels on full time mixed pig farms in Denmark year 2002

Table 2. Farm gate N-turnover and -loss at mixed pig farms in Denmark year 2002

Table 3. Field level N-turnover at mixed pig farms in Denmark year 2002

Table 1. Characteristics of area, land use and production levels on full time mixed pig farms in Denmark year 2002 (average by farm type)

Soil type[1)]	Sandy loam			Sand		
Farm type (LSU[2)] ha^{-1})	<1.4	1.4-1.7	>1.7	<1.4	1.4-1.7	>1.7
Representatively						
Number of farms in data set	68	29	107	89	53	176
Area represented by farm type [1000 ha]	114	39	112	152	75	174
% of Danish pig production	8	5	19	10	8	30
Herd data						
LSU per farm [LSU $farm^{-1}$]	71	100	198	73	175	193
Stocking rate [LSU ha^{-1}]	0.7	1.5	2.2	0.7	1.4	2.4
Feed uptake, 100 SFU LSU^{-1} y^{-1}	48	47	46	47	45	46
N uptake, kg N LSU^{-1} y^{-1}	149	151	148	150	148	147
N-efficiency, herd[3)]	34.2%	34.4%	32.9%	33.5%	33.5%	32.8%
Area						
Total farm area [ha $farm^{-1}$]	96	69	90	99	125	80
Crop rotation [% of farm area]						
Permanent grass	1	1	1	1	1	2
Set-aside	8	7	8	10	9	10
Cereal for harvest	78	78	77	76	75	76
Grass/clover in rotation	0	0	1	1	1	1
Production						
Grover pigs, no (1999)	125	368	511	0	1501	981
Pork meat, 100 kg, live weight (1999)	701	2031	3151	1186	1570	2841
Cereal yield [100 kg ha^{-1}]	65	67	66	56	55	57

1) Sandy loam > 5% clay, Sand > 5% clay
2) Livestock units (LSU), DK definition: 1 LSU = 100 kg total N in manure ex-storage, 1 LSU = 35 pigs produced (30 - 100 kg), 1 LSU = 4.3 sow and 175 piglets in one year
3) N-efficiency = output of animals products/input of feed

Table 2. Farm gate N-turnover and -loss at mixed pig farms in Denmark year 2002 (kg N ha^{-1} $year^{-1}$)

Soil type	Sandy loam			Sand		
Farmtype (LSU ha^{-1})	<1.4	1.4-2.3	>1.7	<1.4	1.4-1.7	>1.7
Imputs						
Mineral fertiliser	90	59	61	73	50	43
Organic fert. & live stock[1)]	14	14	-36	19	10	-50
Supplement feed	58	167	277	64	162	305
Biological N-fixation	3	4	2	3	3	3
Deposition and precipitation	16	16	16	16	16	16
Total input	**175**	**254**	**314**	**167**	**234**	**310**
Outputs						
Meat	-47	-90	-121	-46	-80	-132
Cash crops	-40	-44	-43	-28	-28	-29
Straw[1)]	-5	-5	-5	-7	-7	-6
Total output	**-92**	**-139**	**-169**	**-8**	**-116**	**-167**
Farm gate N-balance	**88**	**121**	**150**	**93**	**125**	**149**
N loss, stable and storage[2)]	-14	-28	-42	-14	-27	-46
Field N balance	**74**	**93**	**108**	**79**	**-98**	**-103**
Field N-efficiency[3)]	57%	53%	48%	51%	46%	46%
N loss, field						
Fertilisation, manure spreading[2)]	-10	-15	-17	-10	-14	-16
Crops[2)]	-5	-5	-5	-5	-5	-5
Denitrification[2)]	-14	-27	-28	-7	-8	-9
Soil-N changes	-4	4	6	-2	1	3
Leaching[4)]	-50	-42	-53	-60	-70	-71

1) Net import = import-export of manure, straw and living animals
2) Calculated standard ammonia emission and denitrifiction
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 mixed pig farms in Denmark year 2002 (kg N ha^{-1} $year^{-1}$)

Soil type	Sandy loam			Sand		
Farm type (LSU ha^{-1})	<1.4	1.4-1.7	>1.7	<1.4	1.4-1.7	>1.7
Inputs						
Mineral fertiliser	89	59	60	72	49	42
Imported organic fertiliser	4	0	0	10	0	0
Manure from own herd[1)]	59	118	131	61	114	130
Biological N-fixation	3	4	2	3	3	3
Deposition and precipitation	16	16	16	16	16	16
Total input	**171**	**197**	**209**	**162**	**182**	**191**
Outputs						
Cash crops	-8	-10	-8	-5	-6	-6
Grain	-32	-34	-35	-23	-22	-23
Grain for feed[2)]	-50	-51	-48	-43	-45	-46
Straw harvested	-6	-7	-8	-8	-9	-10
Straw mulched[3)] (Not in output)	-11	-10	-8	-5	-5	-5
Roughage for feed[2)]	0	0	-2	-2	-1	-1
Roughage not utilized by own herd[4)] (Not in output)	-1	-2	0	-2	-1	-2
Total output	**-97**	**-104**	**-101**	**-83**	**-84**	**-88**
Field N balance	**74**	**93**	**108**	**79**	**98**	**103**
Field N-efficiency[5)]	57%	83%	48%	51%	46%	46%

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) Factor = 0 = not include in balances
5) N-efficiency = 100* output/input

Administrative information

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