National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

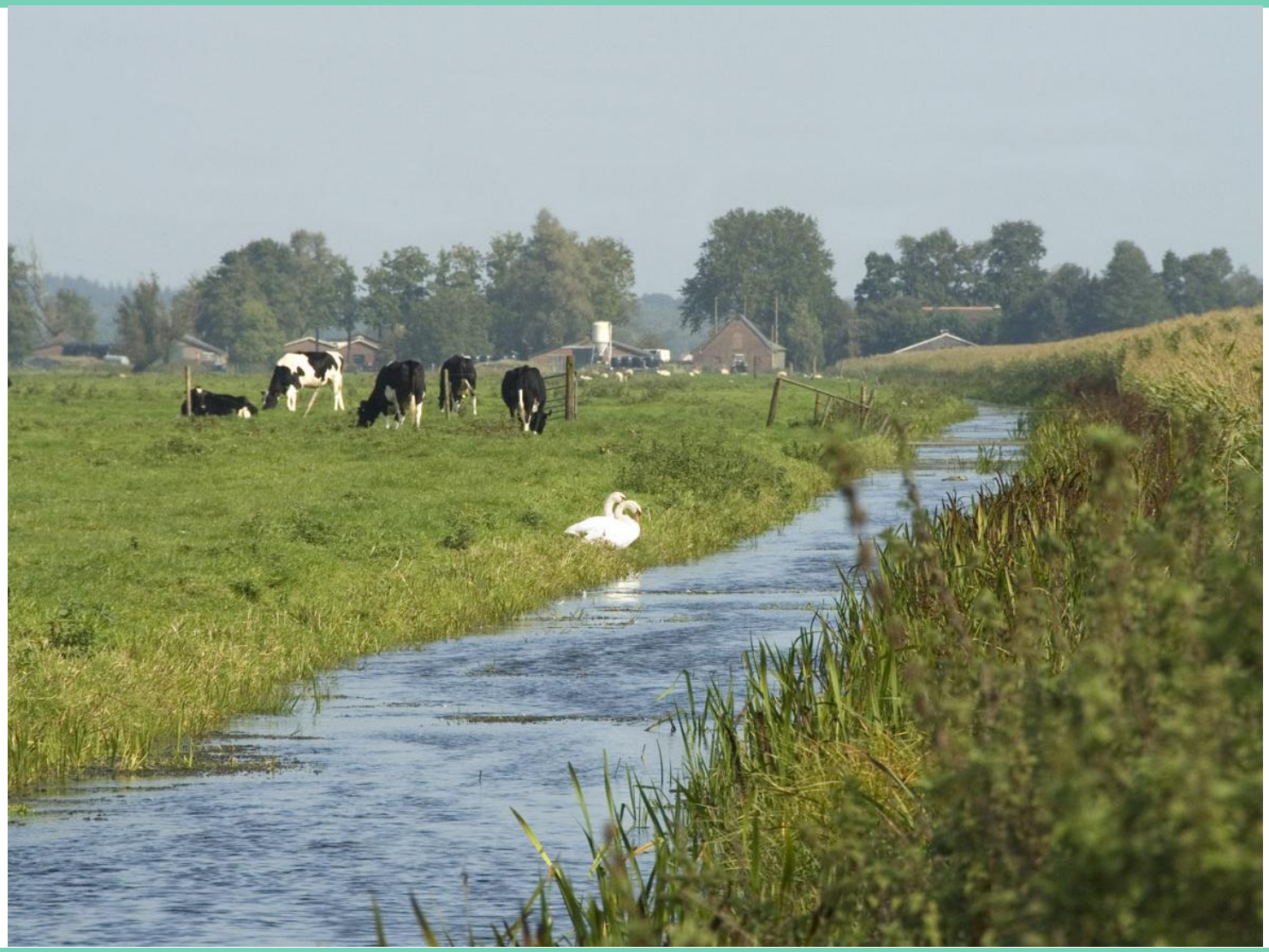
AMMONIA ABATEMENT WORKSHOP

COUNTRY CASE STUDY THE NETHERLANDS

29 February 2012

The Netherlands in a nutshell

Surface	4,152,600 ha	of which 18% is water		
	2,000,000 ha	agriculture		
	390,000 ha	forest		
Inhabitants	16,669,112			
Animal population	3,968,000	cattle	=	2.0 per ha agric land
	1,489,000	dairy cattle	=	0.75 per ha agric land
	12,200,000	pigs	=	6.1 per ha agric land
	100,000,000	poultry	=	50.0 per ha agric land
Milk quotum	11,000,000,000	kg milk	=	5,500 kg per ha agric land



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Emission of ammonia

Emission of ammonia = Country Specific

Dutch ammonia emissions from animal houses, and manure application are based on measurements on real farms and on manure applications on field plots.

In former years the calculation of national ammonia emission in animal houses was related to the total nitrogen excretion. In conformity with the EMEP Emission Inventory Guidebook the ammonia emission in animal houses is since 2009 related to the TAN excretion. TAN = total ammoniacal nitrogen.

The ammonia emissions from manure applications were already related to the TAN content.

Using a nitrogen mass balance flow the non-ammonia losses during storage of animal manure are now also taken into account.

Table 2
Share of housing systems and manure storage systems for major animal categories in 2009.

Animal category	Housing system	Share, %
Dairy cows	Cubicle house	95
	Low emission	1
	Tie stall	4
Fattening pigs	Common	61
	Low emission	39
Sows including piglets	Common	57
	Low emission	43
Layers >18 weeks	Battery cages	43
	Floor housing; common	17
	Floor housing; low emission	7
	Aviary house; common	8
	Aviary house; low emission	20
	Other	5
Broilers	Common	82
	Low emission	18

Source: Velthof et al., 2012

Table 3
Implementation rates of manure application techniques in the Netherlands in 2009.

Land use	Application method	
Grassland	Shallow injection	56%
	Partly shallow injected and partly band applied	12%
	Narrow band application	23%
	Surface application	9%
Arable land	Injection	61%
	Shallow injection	8%
	Narrow band application	6%
	Partly shallow injected and partly band applied	7%
	Surface spreading and incorporation in two tracks	3%
	Surface spreading and incorporation in one track	11%
	Broadcast surface spreading	4%

Source: Velthof et al., 2012

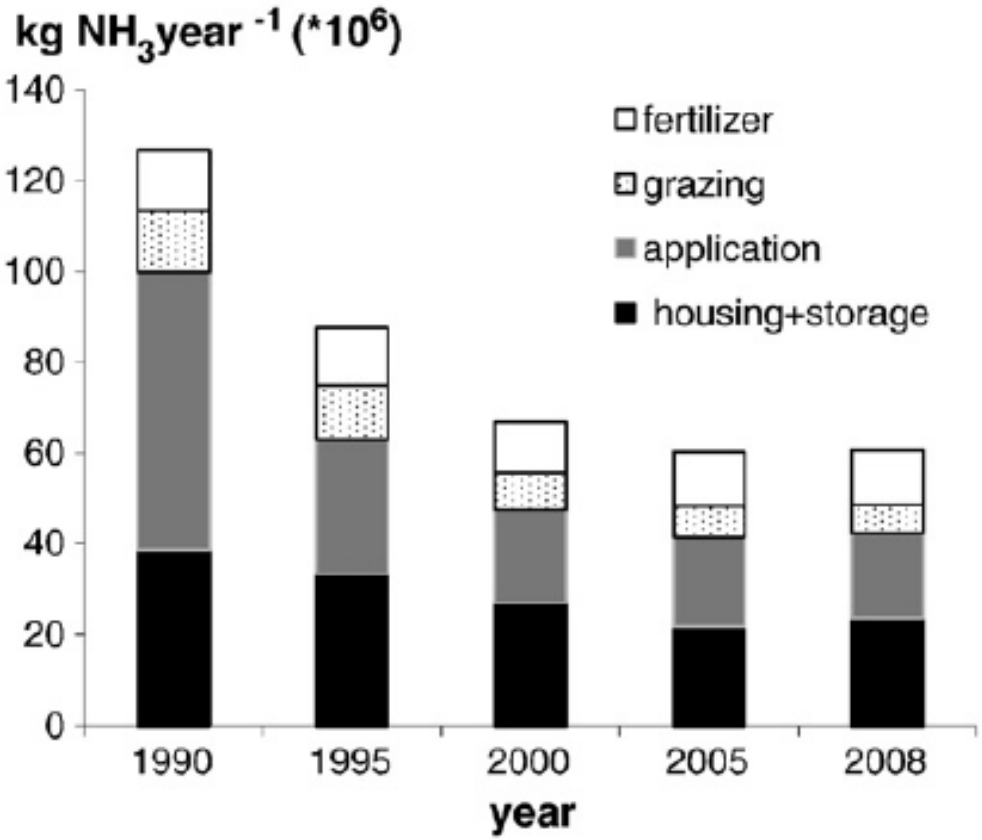
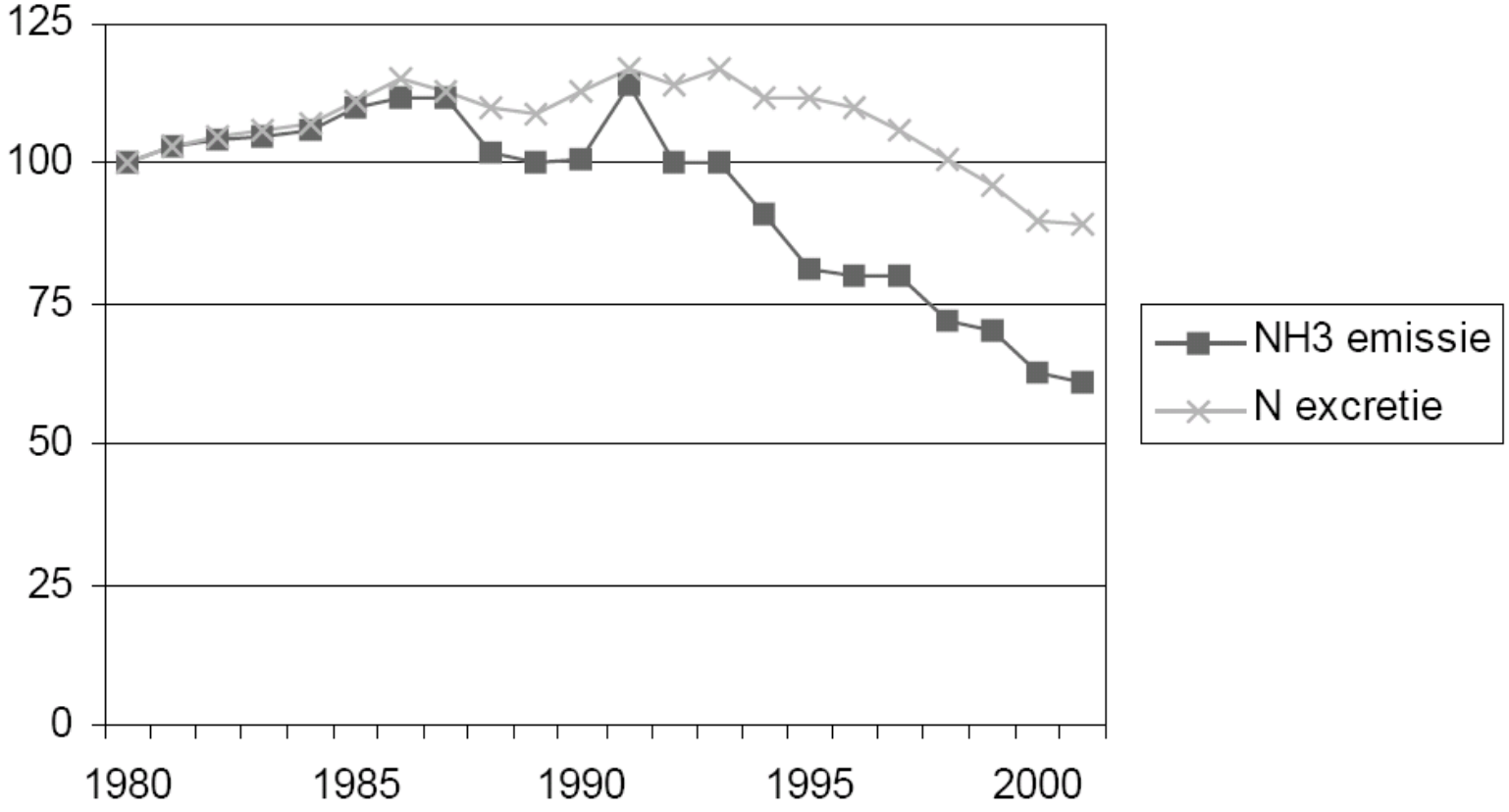


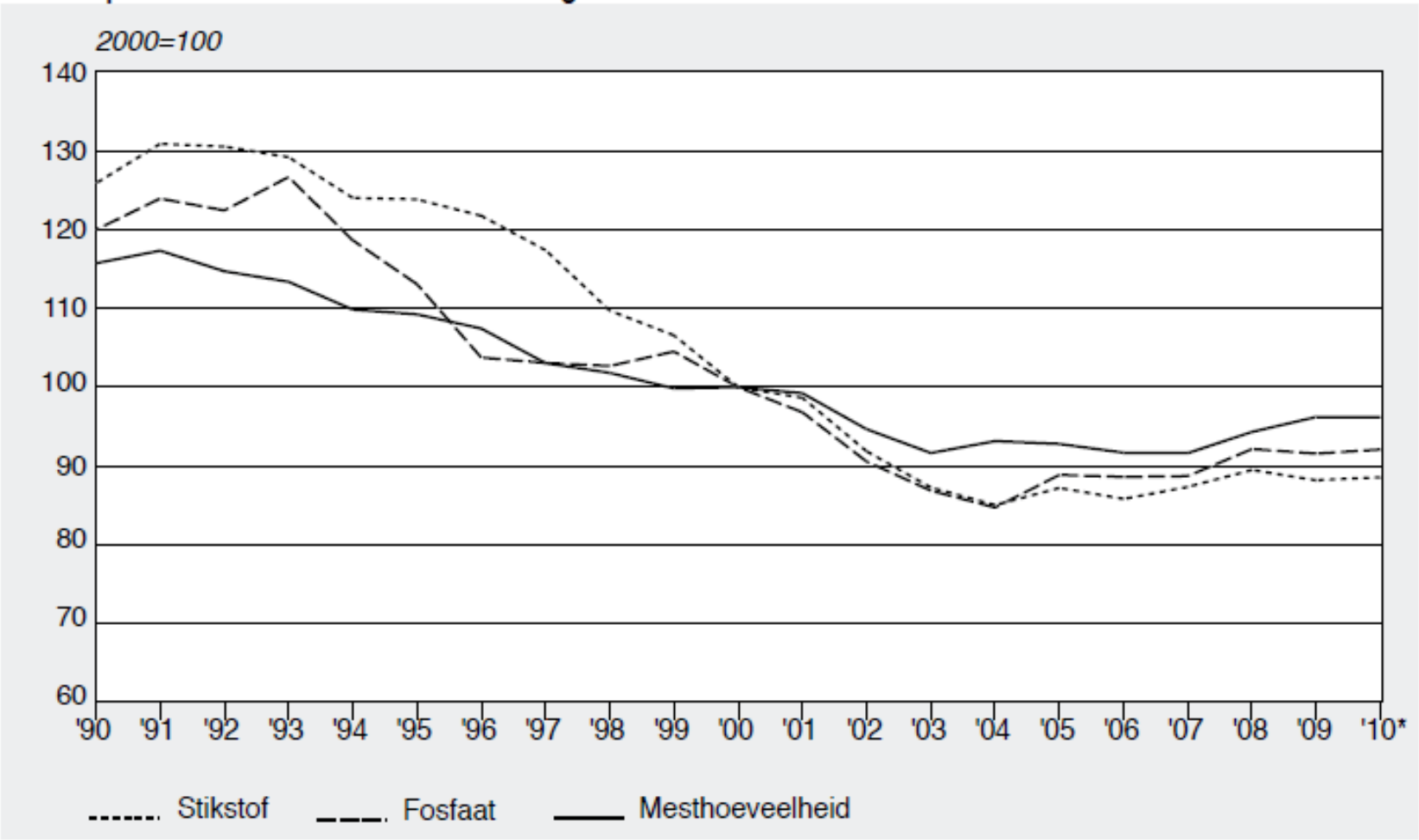
Fig. 3. NH_4 emission from dairy cattle (cows and young stock) in 1990, 1995, 2000, 2005 and 2008 (based on data from www.emissieregistratie.nl). NH_4 emission from fertilizer application is the total of the Netherlands. The majority of fertilizer is used in dairy cattle farming but its use is not specified per agricultural sector in the available emission statistics.

Source: Vellinga et al., 2011



Source: Van der Hoek, 2002

1. Mestproductie en mineralenuitscheiding



Bron: CBS.

Conclusions

1. Long term ammonia emission measurements on animal housing because emission factors are used for legal purposes like permits.
2. Central database for all agricultural emissions like ammonia, nitrous oxide, methane. Nitrogen mass balance flow used for calculations with calculated TAN excretions.
3. Data availability for local share of low emission techniques is limiting factor for local studies.