



FAO European Cooperative
Research Network



Recycling of Agricultural, Municipal and Industrial Residues in Agriculture

Network Coordinator: José Martinez, Cemagref, Rennes (France)

RAMIRAN 2002

**Proceedings of the 10th International Conference
of the RAMIRAN Network**

General Theme: Hygiene Safety

**Štrbské Pleso, High Tatras, Slovak Republic
May 14 - 18, 2002**

Edited by Ján Venglovský and Gertruda Gréserová

ISBN 80-88985-68-4



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THE PRESENT STATE OF THE AMMONIA EMISSION IN SR AND FACTORS CONDITIONING THEIR PRODUCTION AND POSSIBILITY OF THEIR REDUCTION

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INTRODUCTION

Ammonia emissions and their influence on environment are given factual conditions. Comprehensive are developed from intensity of the farm animals, their staff from census, used technology of the housing, technique of the manure storage and their capacity, and their application technique, time of the exposure in different conditions before their introducing in the soil systems, in which maybe minimize their influence at assumption loading LU per ha land (soil), or not overstep limited fertilisation, (over dung) which can partly tend towards influenced result ammonia emission.

INFLUENCE OF THE EMISSIONS ON ENVIRONMENT

Some important emissions of SO₂, NO_x, NH₃ contribute more than problems of acidification. They are implicated in the following environmental problems:

- greenhouse effect - formation of the trophospheric ozone O₃ (referred as greenhousegas)
- ozone layer depletion - adverse-effect on human health, materials and ecosystems
- deterioration of the air quality
- ammonia deposition - large part of the Europe have seen substantial changes in natural vegetation - in natural terrestrial ecosystems,
- eutrophication - atmospheric nitrogen deposition leads to eutrophication of soils, freshwater systems

RELATIONSHIP AMMONIA EMISSIONS AND ANIMAL HUSBANDRY

Ammonia emissions from animal husbandry as of the main reason depending on various factors including:

- properties of the animal manure (-animal feed, nitrogen content, the species, age and weight of the animals
- efficiency of the conversion of the nitrogen in feed to meat, milk and eggs and hence amount of the nitrogen in the animal manure
- the storage systems - open or covered slurry tank (pit)
- proportion of the time spent of the animal in indoors -stables and on pasture - outside
- soil properties such pH, cation exchange capacity, calcium content, water content, buffer capacity, and porosity,
- meteorological condition, including precipitation, temperature, humidity and wind speed

- the method and rate of manure application, including arable land, the time between application and ploughing (Sensi A., F3- Eurostat)

In West Europe region - country are more load as country in our region, consequence rapid animal staff reduction by economical transformation.

MATERIALS AND METHODS

Ammonia emission balances for animal rearing were calculated based on the methods of the Emission Inventory Guidebook 15 February, 1966 B 1040-1. The method used to calculate total balance was based on the average of emission factors and animal class numbers. Animal numbers were obtained from the annual agricultural census for all animal classes and their average numbers per year in Slovakia. Technology and rearing was described for stable, storage, surface spreading of waste and grazing. Total emissions balances were calculated for the important animal classes: dairy cows, other cattle, fattening pigs, sows, sheep and goats, laying hens, broilers and other poultry.

RESULT OF AMMONIA EMISSION BALANCES

Development of the state of ammonia emission depends decisively on staff of farm animals, which was more reduced from 1990 to 1998, cattle about 50%, dairy cows to 47%, other cattle to 52%, all pigs were reduced by about 33%, poultry about 11%. In 1999 was the same tendency with further reduction in farm animals. Dairy cows were reduced by about 3.5%, other cattle by about 7.13%; in sows was reduction by about 0.6%, fattening pigs were reduced 2.1%. In hens was reduction by 6.8%, in broilers by about 6.45%, poultry together by about 6.63 %. In 1999 was declared the animals staff increase only in goat and sheep, together by about 4.4%. In Slovakia was significant reduced the ammonia emission absolutely and relatively, too, if we compare the references year 1990 with compared years 1998 and 1999. It is compared with UN-ECE scenario too. In 1990 was in SR produced about 47 kt NH₃ per year. During the next time we reduced the production markedly to 27 kt NH₃ in 1998; if it was calculated precisely-end staff of farm animals were ammonia emission only 25.7 kt NH₃. In UN-ECE scenario was proscribed for SR 39 kt, reality in SR was smaller about 12 kt, or about 13.3 kt per year. From whole ammonia balance was 16.2 kt produced in large-scale farms, consisting of a number of production centres, in co-operatives or other economical forms at present (private form of production farms etc.) In year 1999 was for all animal staff in SR 24.7 kt NH₃; from registered farm was emission in this year only 20.7 kt NH₃. Differences are at present time 4 kt NH₃ per year. Specific emission in SR is at present for whole animals staff 0.503 t NH₃.km⁻², from registered farm was only 0.422 t NH₃.km⁻². In reference year 1990 was specific emission 0.959 t NH₃.km⁻². In Holland was in this time specific emission 7 t NH₃.km⁻². The change of animal housing systems and manure treatment and their application system is the way which gives the possibility to reduce ammonia in transformed animal production in the Slovak agriculture. This process needs more investment means which are probably not possible receiving in our agriculture at present.

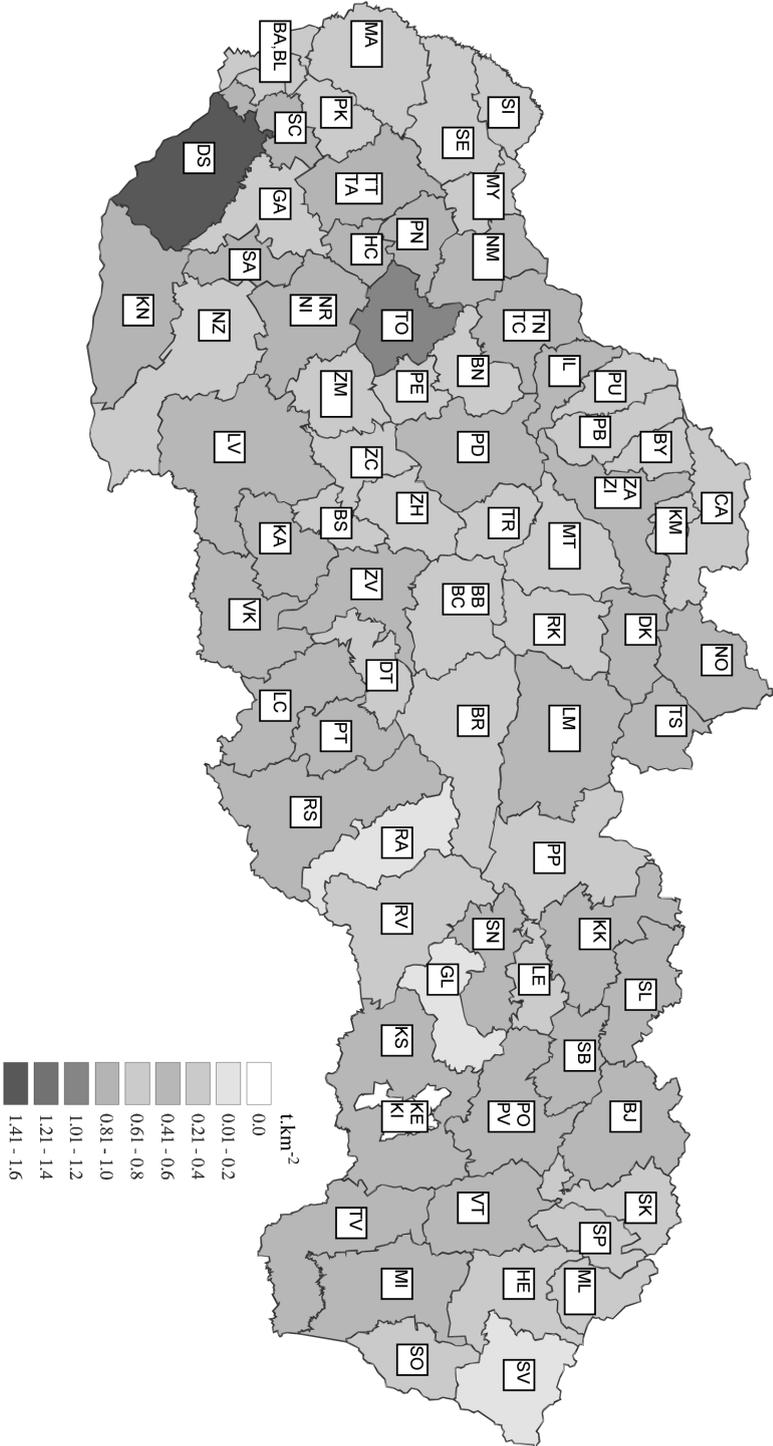
REDUCING OF THE AMMONIA EMISSION

Reasons for reduction of the ammonia emission are developed on necessity to reduce the environmental impact from country with defined high altitude influence. Described technique or principle are based on used model for different animal technology housing. Some important reasons are in respecting necessity for reducing ammonia emission as unwelcome state which originates in animal rearing as main resource. Their important reduction must be developed directly consequently from rearing of the housing environment parameters, possibility to conditioning their minimalized assumption function capacity for ammonia releasing factors- climatic, technological, manure treatment, food guarantee with minimalized remainder - surplus N in urine and excrements, from which are degraded ammoniac or ammonium. From well-known principles are recommended minimum surface which is in contact with excrements - that is minimisation of the active flat, stand - boxes, or pens, fast moving urine of them, equipment with spraying nipples scraper for removing excrements with water sprayed film, which-thereby came more ammoniac absorbed from dirty manure corridor - passage way. Minimum of their active rearing-housing surface are opposite with welfare principles, which are required as possible or necessity must be higher, than are released - produced more ammoniac. In pig housing are recommended some different systems of ammonia reduction. More course are systems of the control nitrogen substances consumption with good conversion and minimised course in to excrements for their degradation on ammonium. Especially specific way to reducing in poultry are in drying dropping excrement on belt, or new systems floor with possibility separating and chemical degradation or coupling with especially substances. Possible is physiological influence with added substances in food, which are declared more part reduction of the releasing ammonia. All reductions of the ammonia emission need some investment means to improving rearing systems or new technological treatment, improving manure storage, and systems of the application manure - excrement - dropping-reducing contact time with external environment - atmosphere.

CONCLUSION

Presented was ammonia emission in SR. The present state of them and their development with rapidly decreasing during last 10-12 years are call out some - discussion about necessity reducing in future ammonia emission in our agriculture, from animal production in general. Introduced differences in directly loading in environment are in our country little $0.5 \text{ t NH}_3 \cdot \text{km}^2$, more high are reality in West European Countries ($7 \text{ t NH}_3 \text{ km}^2$). From this point of view it is necessary to develop the future practical control in our farm animals.

Map 1 Ammonia emission from all farm animals in SR in individual districts



Map 2 Ammonia emission from all farm animals in SR in individual regions

