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Integrated nitrogen management in Bulgaria

Bulgaria – geography, climate and soils

- A country in the Balkans in south-eastern Europe.
- The total territory of Bulgaria is 11.1 million ha.
- A temperate climate, with cold winters (with considerable snowfall) and hot summers (rainy at first and dry during the second half).
- Two main types of cultivated soils – maroon soils (29% of the total territory) and black earth soils (23% of the total territory).

Agricultural land use and major agricultural sectors in Bulgaria

- 5.3 million ha (48.0%) of the total territory of Bulgaria is utilised agricultural area (UAA) and 3.7 million ha (33.6%) - forest and other wooded area.
- The arable area is about 3.3 million ha (61.8% of UAA), and about 70% of it is concentrated in 3 regions - *North-East, North-Central and South-Central* region.
- Crop production amounts to 52% of the gross agricultural output. *Cereals, vegetables and industrial crop*s account for 80.4% of the value of the crop output.
- Livestock production contributs to 31% of the Bulgarian agricultural output. The cattle herd amounts to 949 037, 2 732 145 sheep, 998 642 pigs, 1 032 317 goats and 23 130 720 birds (89% of which are hens and broilers).

Present situation of the nitrogen management in Bulgaria (application of organic and mineral fertilizers)

Bulgarian Ministry of agriculture and foods has adopted in 2005 Rules for good agricultural practice in order to limit N emissions from agriculture. According to this document:

- It is not allowed slurries and solid manures to be applied right after their removal from the buildings. Solid manure must be stored for at least 6 – 8 months and slurry – 4 months, before spreading.
- Manure has to be applied before the cultivation of the soil (in autumn and spring).
- The quantity of imported N-compounds in the organic or mineral fertilizers during the year must not exceed 17 kg/da, with the exception of vegetables and maze where it can reach 21 kg/da.
- When is applied more than 12 kg N/da, the manure is divided in two – 2/3 of it is applied before sowing or planting and the rest is used for feed.
- When applying N-fertilizers over terrain that is not covered with plants, they must be buried immediately by ploughing or trough the use of tine or disk cultivator.
- On plane surfaces watering with diluted manure is allowed, but it must be at an adequate distance from water basins.

Present situation of the nitrogen management in Bulgaria (storage of organic and mineral fertilizers)

- It is difficult to reduce the ammonia and nitrate emissions (respectively in air and water) from the lagoons, where the manure stays for at least eight months.
- Manure and slurries should be stored in separate facilities.
- The reservoirs must be covered with lids.
- The manure kept in the open air must be stored for short time, on concrete sites and covered with waterproof cover.
- It is not allowed mineral fertilizers to be stored in the open air.
- Saltpetre nitre must be packed and must not be stored in the open in bulk state.

Present situation of the nitrogen management in Bulgaria (animal housing systems – pig houses)

- A slatted metal floor with narrow pit – reducing emitting manure surface.
- Channels with sloping walls which are made of smooth material are emptied by means of vacuum system.
- In some housing systems for farrowing sows (including piglets) is used a combination of water and manure channel.
- Also phased feeding is applied (with consequent alternation of diets).

Present situation of the nitrogen management in Bulgaria (poultry buildings)

- Straw bedded houses. The thickness of straw differs in the summer (3-5 cm) and in the winter (7-9 cm).
- Spillage of water is prevented (nipple type drinkers).
- Proper food management.
- Reduction of the emitting manure surface.
- Drying of the litter through proper ventilation systems (in the new buildings).
- Surfaces made of smooth material - easy for cleaning.

Future development of nitrogen management in Bulgaria

- Additional investments in proper installations and working teams are necessary, in order to be in compliance with the adopted rules for good agricultural practice.
- Strengthening of the control of the nitrogen content in the soil must be provided, including precise assessment of the soil and plant's main nutrient elements.
- The approved by the Ministry of agriculture and foods National strategy plan for rural development (2007 – 2013) envisages investments in the construction of manure storage facilities that will prevent pollution of agricultural origin.
- According to the information presented by the operators in their IPPC applications, the existing lagoons have to be replaced with tanks or other storage facilities.

Implementation of the Directive 2001/81/EC and Directive 96/61/EC which are co-related with the nitrogen management

- The National emissions' inventory shows level of 58.2 kt emissions of ammonia for 2007 which is lower compared to the past years levels. As a whole this is mainly due not only to the applied measures but also to the reduced number of animals and cultivated land. The figure, received by using of new methodology, is also lower than the national emission ceiling. But it is not correct to make comparison before making recalculation of the data from the previous and the base year. Nevertheless even the most pessimistic forecast for the country shows values lower than the NEC both in the short-term (2010) and the long-term (2020) perspective according to the National Programme for limitation of total emissions of sulphur dioxide, nitrogen oxides, VOC and ammonia /2006/, which was elaborated with a view to the implementation of the requirements, laid down by the emission ceilings Directive 2001/81/EC.
- By 2008, IPPC permits have been promulgated for all existing large poultry and pigs' farms, in accordance with the IPPC Directive 96/61/EC, and in compliance with the Bulgarian legislation. It is expected that this will have a positive effect relating to further limitation of N emissions as the operators have to apply the Best Available Techniques.

Thanks for your attention!