

Nitrogen in Belarus

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Ecological problems in agriculture

- Problems recognized on the governmental level:
 - agriculture is the source of water and soil pollution;
 - waste from livestock enterprises → biogas plants.
- The problem of air emission from agriculture enterprises is not the priority problem.
- The ammonia concentration in air does not measured in the impact zones of agriculture enterprises.
- There is no background measurements of ammonia concentrations.

Ecological limits

- Ammonia in the air
 - Maximum permissible concentration $200 \mu\text{g}/\text{m}^3$
 - Maximum permissible concentration in the working air $20 \text{ mg}/\text{m}^3$
 - Maximum permissible concentration in the air on enterprises territory $7 \text{ mg}/\text{m}^3$
- Nitrogen in the water:
 - ammonium nitrate: $0,39 \text{ mgN}/\text{dm}^3$
 - nitrite-nitrogen: $0,025 \text{ mgN}/\text{dm}^3$

Emissions assessment methodology: statistical data vs data obtained using EMEP approach

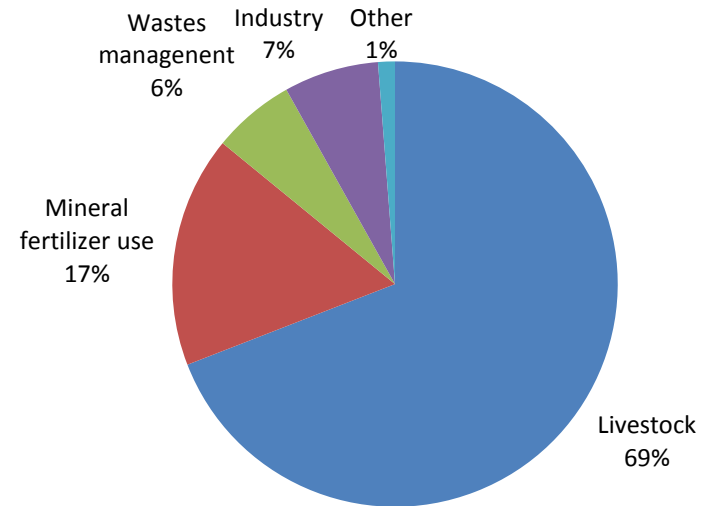
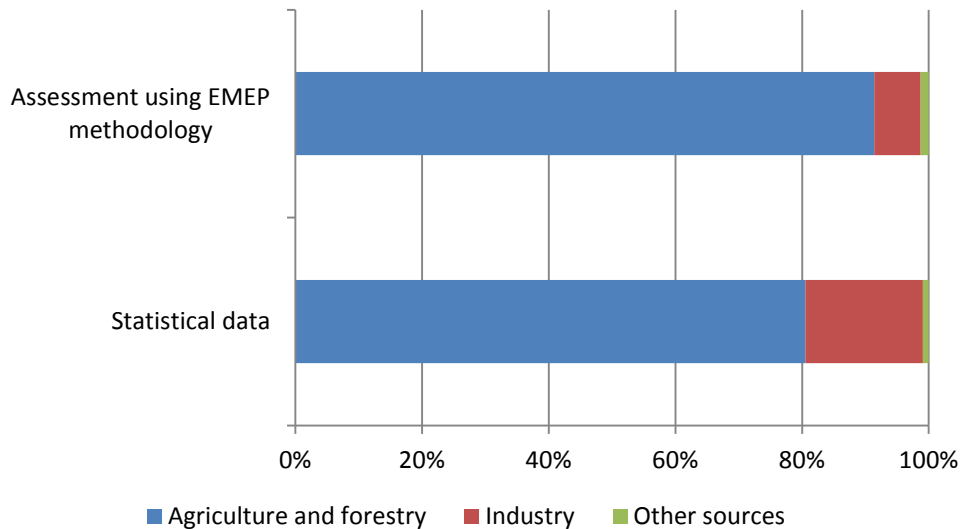
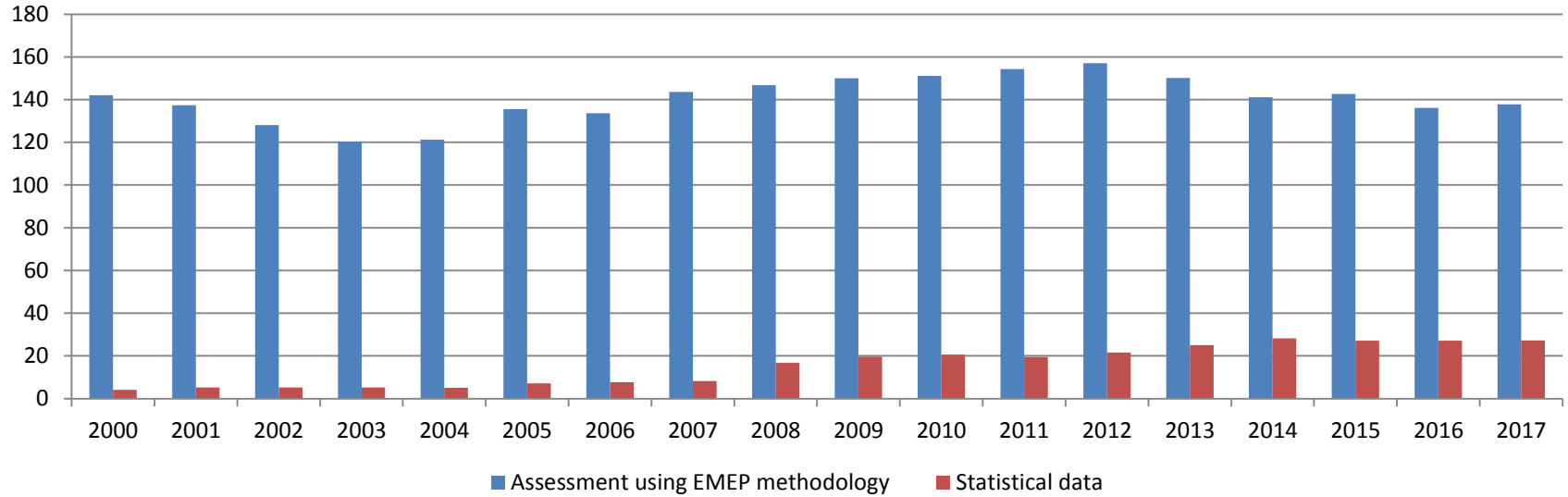
Statistical

- Bottom-up approach
- Emissions from enterprises are summarized
- Limit for reporting – 25 tones/year
- Not all enterprises involved into the reporting system
- Domestic sector does not covered by statistics
- + In 2008 new document on emissions assessment from livestock was approved

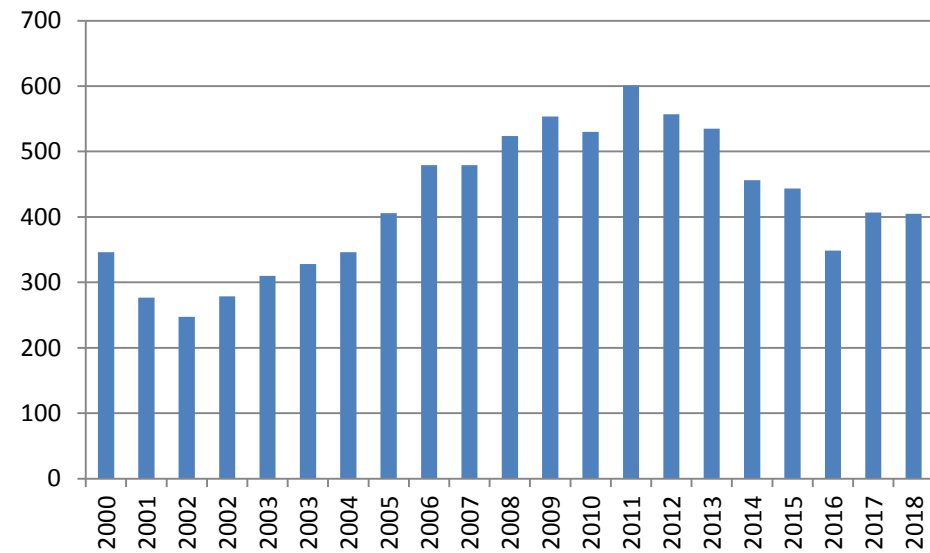
EMEP

- Top-down approach
- EMEP methodology is used
- Emissions from key sources are assessed using Tier2 approach
- Domestic sector is covered

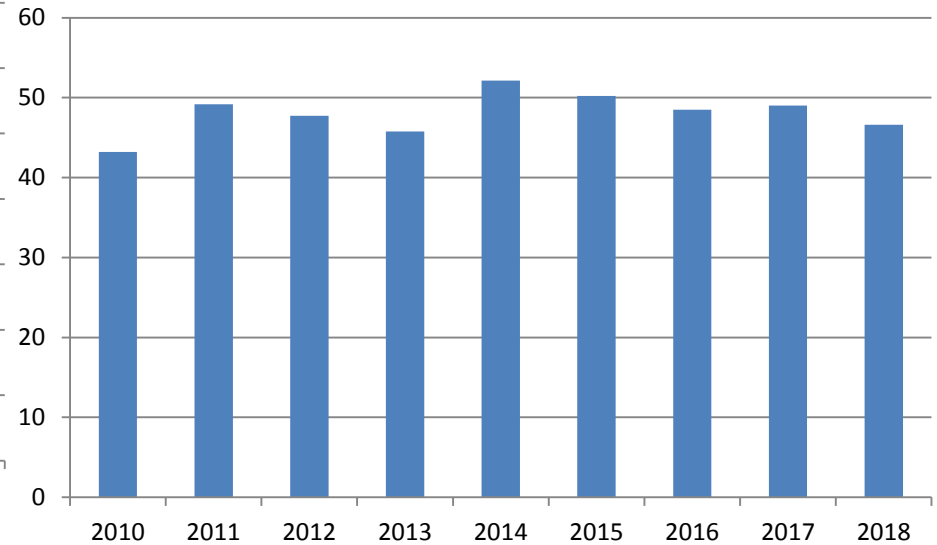
Emissions assessment results: EMEP vs statistical data



Fertilizer consumption

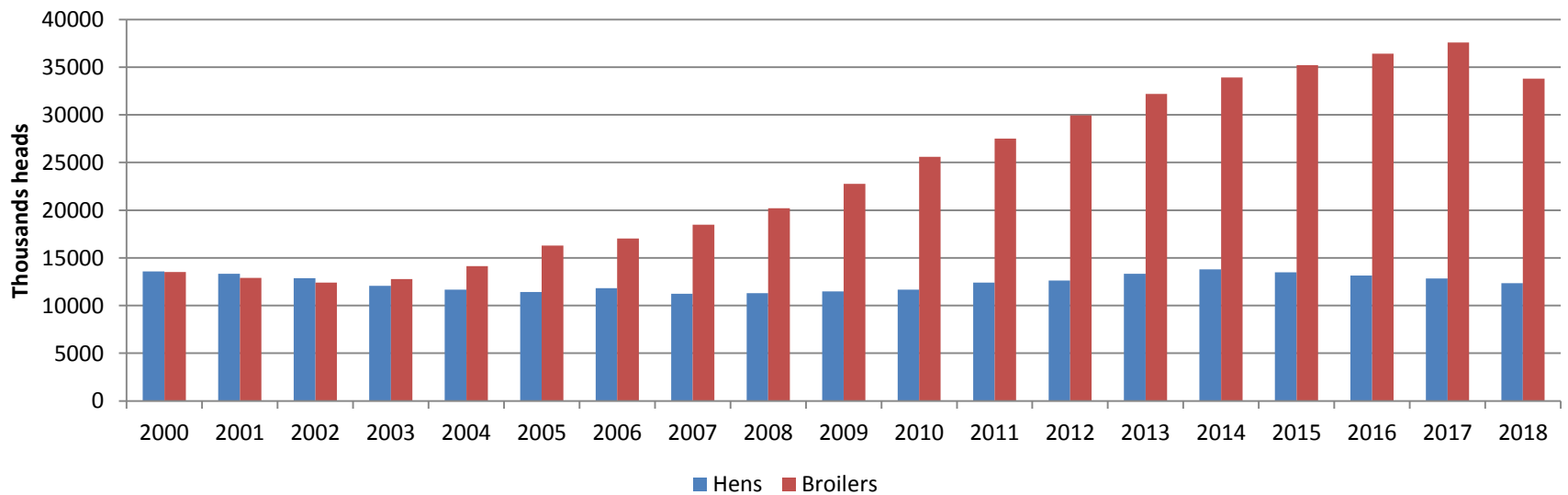
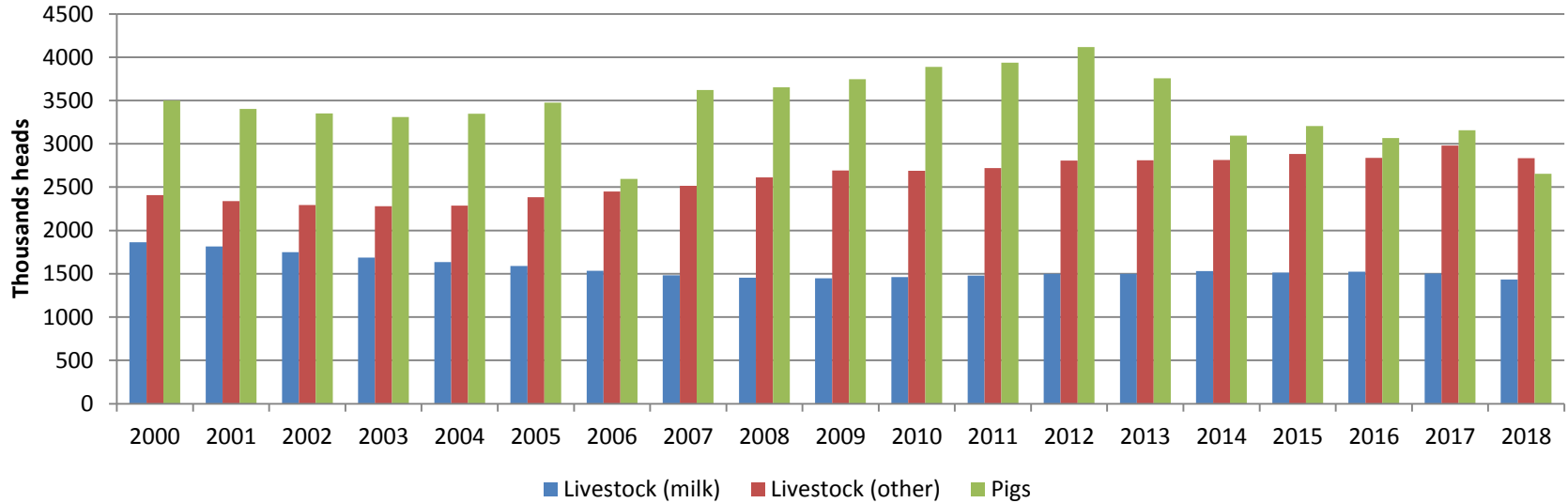


Mineral fertilizer consumption,
thousand tons



Organic fertilizer consumption, mln
tons

Livestock population



Cattle housing

Agricultural practice, cattle:

- housing only;
- housing with grazing (during the summer only milk livestock).

Milk livestock housing:

- tied stalls without any litter; manure is removed by mechanical transporter;
- there are some new farms with straw litter and loosing housing.

Other livestock housing:

- box stable with slats floor (large farms);
- box stable with litter (small new farms)

Other livestock manure removal: solid system is widely used



Pigs housing

Agricultural practice, cattle:

- housing only (large farms),
- housing with grazing (during the summer)

Large farms housing:

- partially slatted floor, without litter;
- slurry manure system;

Small farms housing:

- using straw as a litter;
- solid manure system

Two systems of manure management are applied:

- liquid/solid separation followed by separate storage of solid and liquid fractions;
- all manure is collected in manure store.

Poultry housing

Laying hens : cage system

Broilers: deep litter floor

Conclusions

- data compilation on farms (last revision was made in 2005);
- emission factors correction – measurements are needed;
- is it possible to prepare continuously updated database with information on farms?



Thank you for your attention

