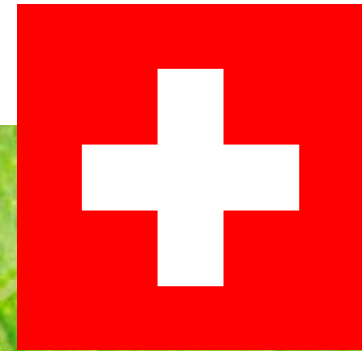


TFRN Ammonia Mitigation Workshop

St. Petersburg, February 29, 2012



Country case study from Switzerland

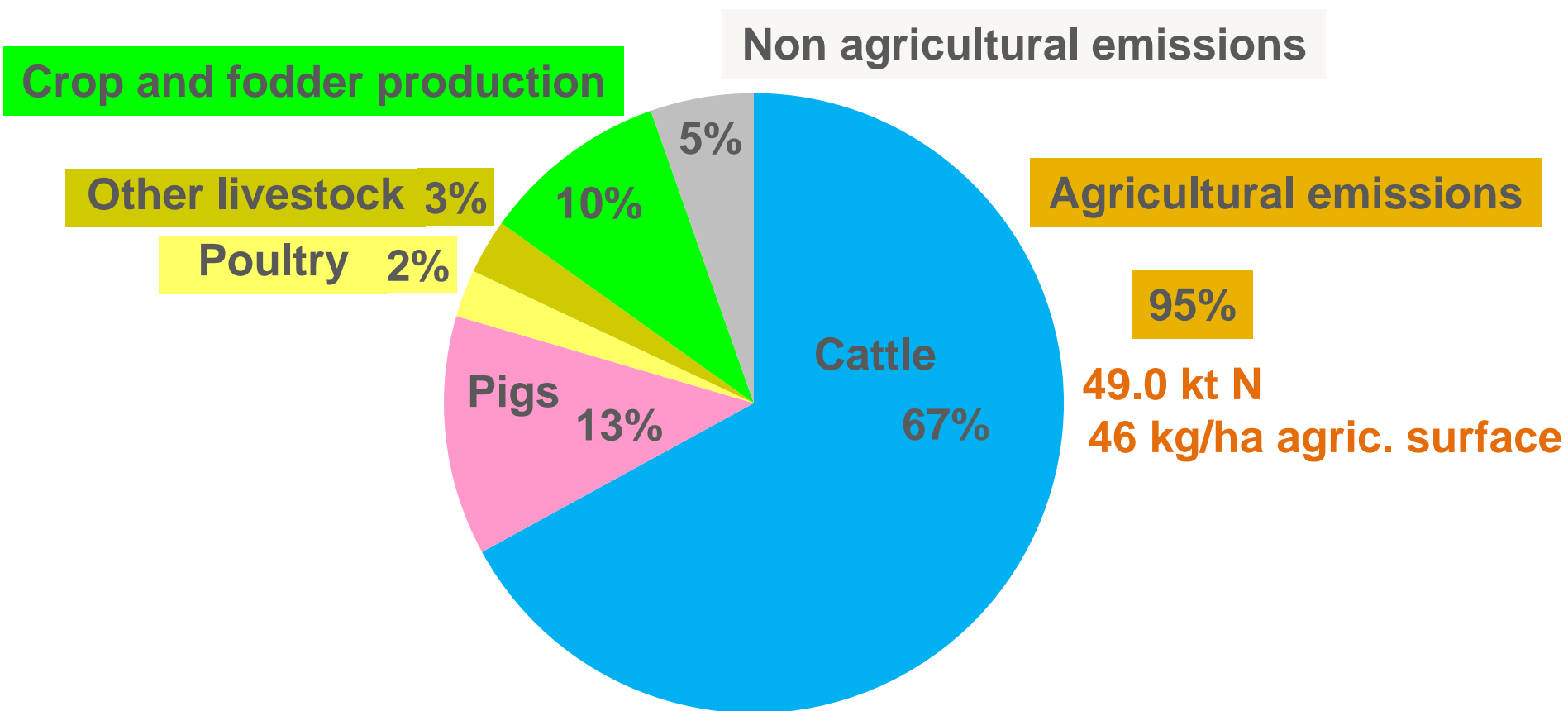
Harald Menzi¹⁾, Thomas Kupper¹⁾, Beat Achermann²⁾

1) Bern University of Applied Science, School of Agricultural, Forestry and Food Science

2) Federal Office for the Environment

Ammonia Emissions in Switzerland 2007

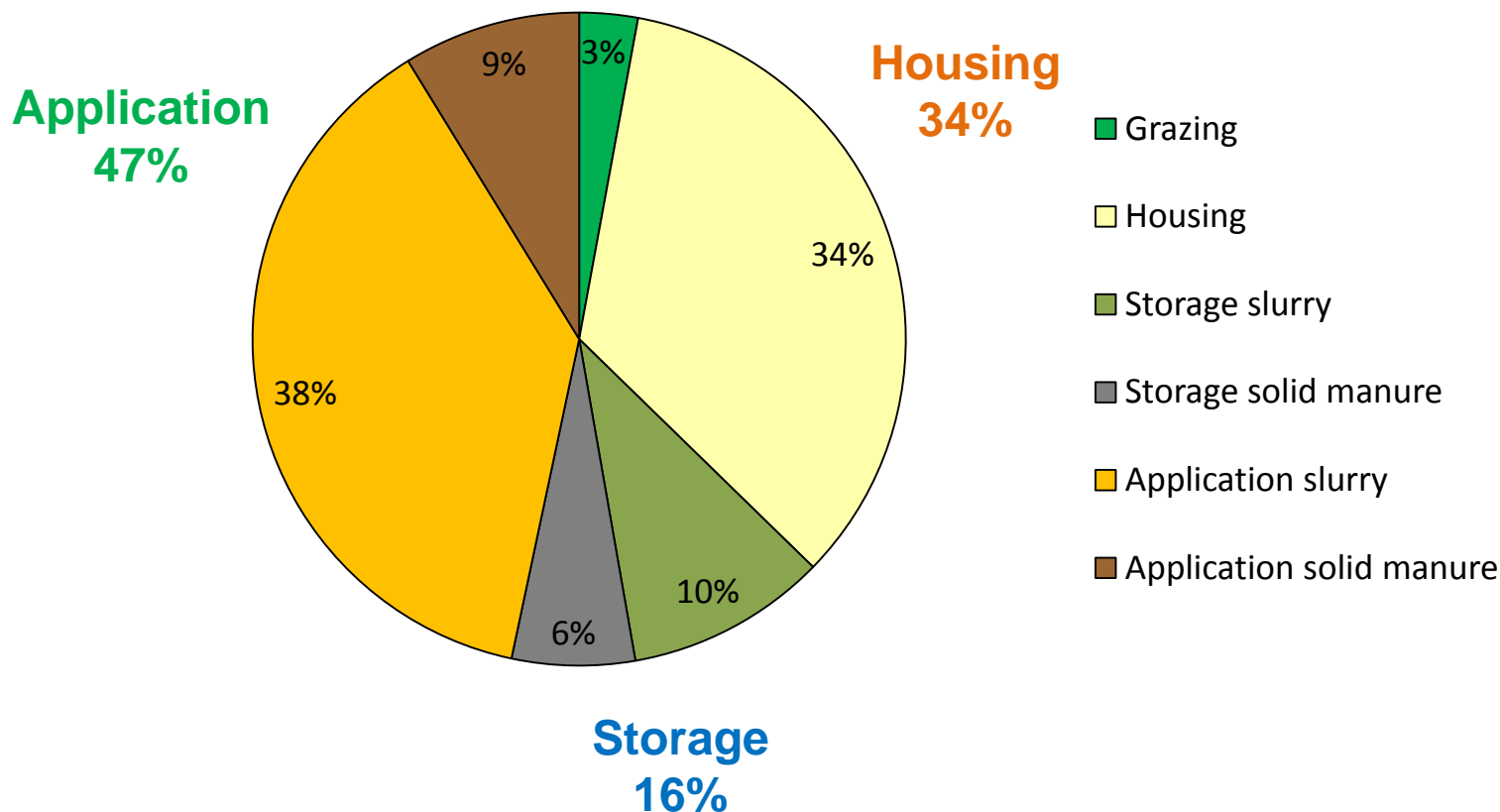
Total: 52.3 kt NH₃-N



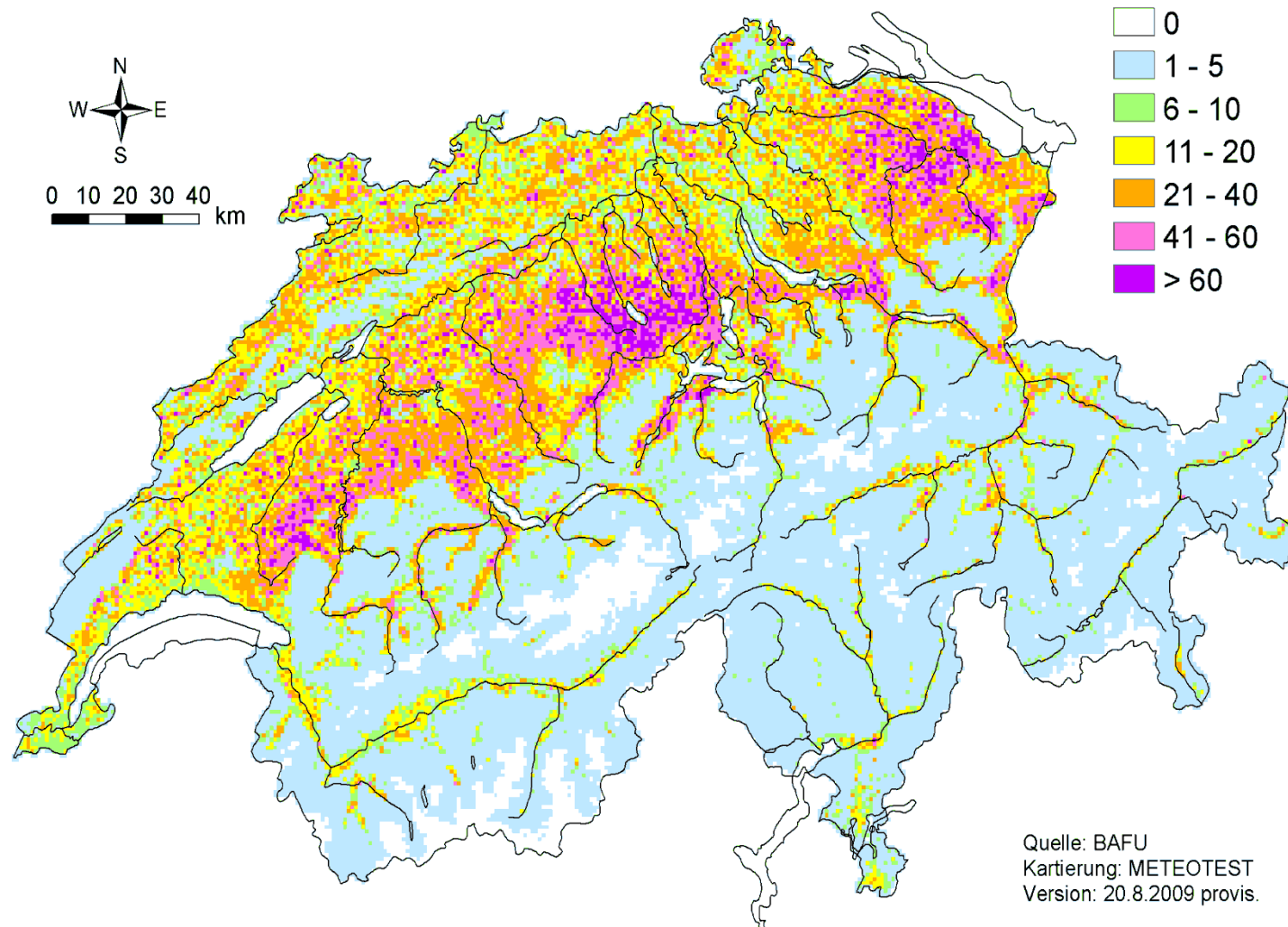
Emissions from livestock and manure

Emission sources

Total: 43.9 kt NH₃-N



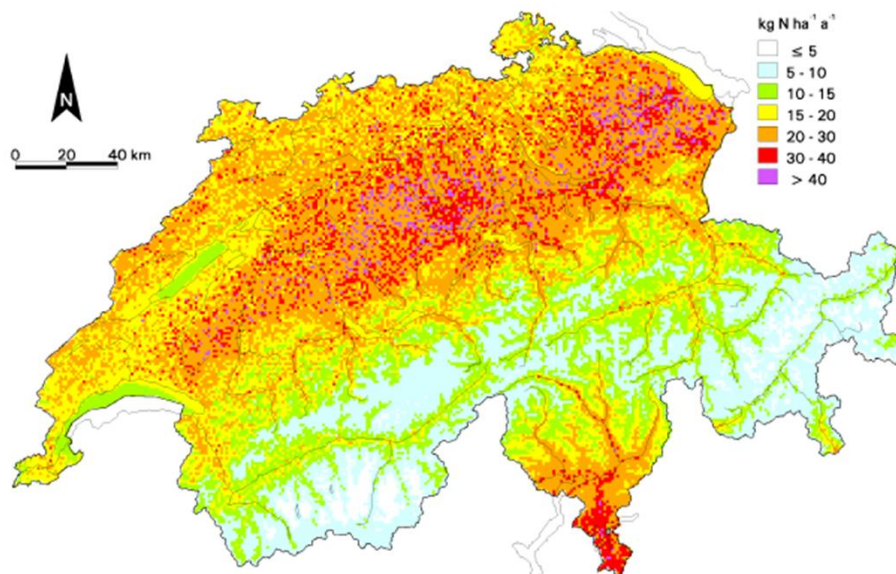
Spatial distribution of NH_3 emissions 2007



Quelle: BAFU
Kartierung: METEOTEST
Version: 20.8.2009 provis.

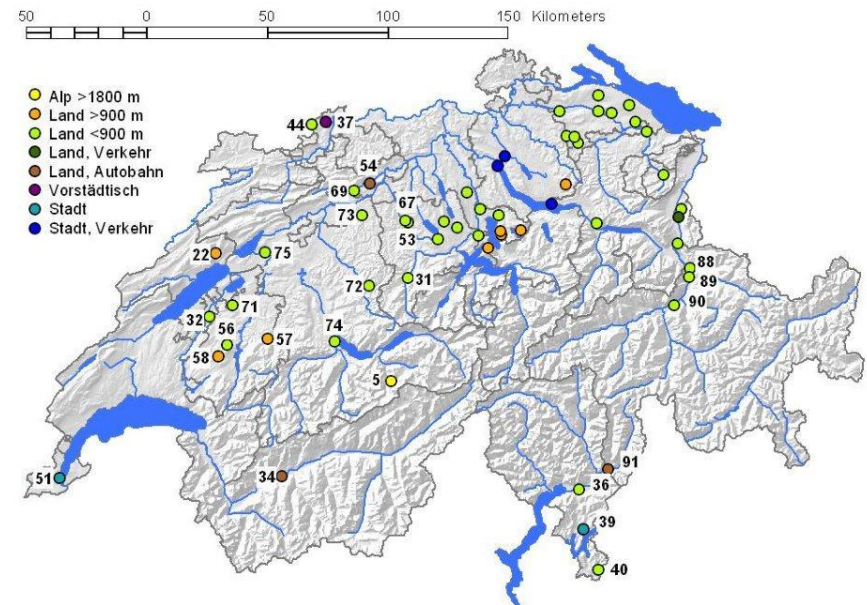
Spatial distribution of N deposition

Modeled N deposition



BUWAL SR 384

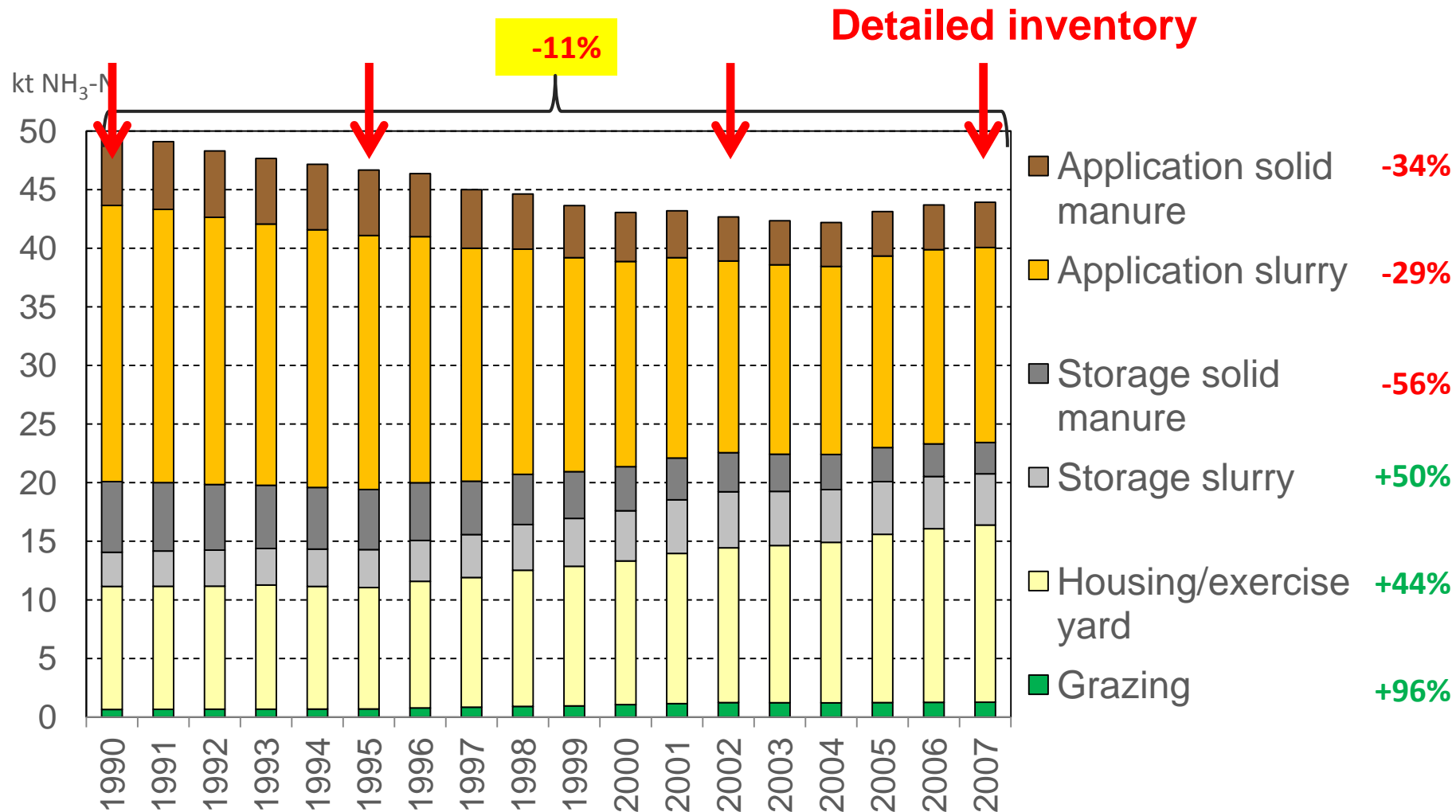
Concentration monitoring sites



Good agreement between emission inventory and concentration monitoring results (development in time and individual sites)

Emissions from livestock and manure

Development 1990 - 2007



Relevant aspects of Swiss agriculture

- Average farm still relatively small (average 17.6 ha, full time farms 21.5 ha)
- Wide variety of conditions valley zone to mountain area
- Strong focus on grassland and dairy production
- In lowlands most farms are mixed (livestock and crops)
- Since 1994 direct payment program with strong focus on reduced environmental impact and more animal welfare
 - Nutrient balance → -25% N fertilizer, -15% manure N, good yields
 - More grazing
 - More loose housing systems and exercise yards

Important activities on ammonia emissions:

Emission calculation model AGRAMMON

- N-flow model AGRAMMON developed
 - Excretions different livestock categories (N and TAN); liquid and solid manure
 - Emission rates in % of TAN for grazing, houses, storage application
 - Correction factors for management and structural influencing factors
 - Versions for single farm and regional calculations
 - User friendly; in German, French, English
 - For scenario calculations and awareness raising
- AGRAMMON is publically and freely available under www.agrammon.ch ; very easy to use
- For other regions default assumptions (e.g. Emission factors) would have to be adapted (we could help)

Important activities on ammonia emissions:

Emission inventory

- 1990, 1995 based on expert assumptions
- 2002, 2007, 2010 based on survey on representative stratified sample of farms. Why survey?
 - Consulted experts can not reliably and comparable estimate changes that lead to 14% shift in emissions over 20 years
 - Information on different regions, altitude zones, farm types
 - Survey on development of livestock and manure management also valuable for other activities
 - Allows a detailed assessment of the abatement potential
- Emission calculation with N-flux model AGRAMMON

Important activities on ammonia emissions:

Assessment of emission abatement potential

- Detailed assessment of farm specific abatement potential through individual and combined measures possible via AGRAMMON
- Detailed assessment of applicability of different measures
 - model calculations for abatement potential
 - “Business as usual”
 - Realistically feasible
 - Maximum technically possible (without cost considerations)

What did we achieve?

- Ceiling value 2010 (-14%) was just achieved
- Awareness of farmers on need of emission abatement has increased. Mainly thanks to new agricultural policy with nutrient balance restriction
- AGRAMMON is a valuable tool for scenario calculations on emissions at farm or regional level
- Reliable emission inventory; good agreement with atmospheric concentration monitoring network
- Detailed assessment of emission mitigation potential
- Thanks to regular survey on livestock and manure management we have a good understanding of the development of emissions
- Good collaboration between Federal Office and research

Thank you for your attention

