Switzerland: Nitrogen management in Swiss agriculture

WGSR 55th session, Special session on agriculture and air pollution
Geneva 1st June 2017
Swiss Agricultural NH$_3$ emissions
livestock and manure

Emissions livestock + manure 1990 – 2015

- 1990–2004 -17%
- 2004–2015 ±0%

Total national emissions
- 2005 – 2015 -5.0%

A complex story
Swiss Agricultural NH$_3$ emissions

Emissions livestock + manure 1990 – 2015

-37% Lower N flow; low em. technology
-23% Less FYM, more slurry
+75% More covered stores
+75% Loose housing cattle
4% → ~60%
Animal wellfare
N Efficiency Swiss agriculture

- ± same N input, +29% more N output → much better efficiency
- -21 kt N fertilizer use — +25 kt N in feed (+77% N feed)
• ± same N input, +29% more N output → much better efficiency
• But: -21 kt N fertilizer use — +25 kt N in feed (+77% N feed)
What happened?

• Quite successful 1990 to 2004
  – Less animals (fattening pigs ~-25%, dairy cows -20%) but higher milk yield
  – Introduction N + P balance → Strong reduction mineral fertilizer
  – → relative importance manure has increased

• Stagnation since 2004
  – Goals nutrient balance have been achieved
  – Reduction number dairy cows mostly compensated by suckling cows
  – Emission reduction (spreading technique, reduction N excretions, more grazing etc.) counterbalanced by shift to more animal friendly systems (loose housing + exercise yard cattle, multi pen housing with outside access pigs etc.)
Nutrient aspects in Swiss agricultural policy

- Since 1994 direct payment program with strong focus on reduced environmental impact and more animal welfare
  - Incentive payments if farmer comply with a set of measures: crop rotation, N and P balance equilibrium etc.; since 1999 mandatory
- N and P balance have lead to optimisation of production:
  - Mineral fertilizer use: N $-25\%$, P $-70\%$, K $-80\%$
  - Manure nutrients: N $-5\%$, P $>-20\%$
  - no decrease in yields
  - Farmers awareness for good manure management has increased considerably
Resource programs

• Since 2008 additional programs on Cantonal level for measures with special relevance for the environment
  • Farmers can apply to join program
  • Chose strategy and measures to include; clear quantitative aims
  • Detailed assessment of baseline situation; Monitoring program
  • Six year duration of program; Obligation to participate until end of program
  • Obligation to continue with measures after end of the program
Resource efficiency incentives

• Since 2014 Federal Resource Efficiency Incentives to improve the sustainable use of natural resources and the use efficiency of resource use techniques with known effect are supported
  • Low emission slurry spreading techniques
  • Conservative soil tilling
  • Use of more precise pesticide application systems
  • Cleaning systems for pesticide spraying equipment
Conclusions

- Stepwise approach with 1) incentive program and 2) compulsory program for ecological performance was quite successful during 10 years; then achievements maintained, because no new obligations or incentives

- General challenges
  - How to keep up persistent and sustainable optimization on farms?
  - Awareness raising and maintenance for farmers
  - Compliance monitoring
  - Counterbalancing effects and synergies of different measures
  - What fits into the existing policy implementation framework
  - Active communication to a broader public (e.g. [https://www.bafu.admin.ch/bafu/en/home/topics/air/info-specialists/air-quality-in-switzerland/nitrogen-containing-air-pollutants-affect-biodiversity.html](https://www.bafu.admin.ch/bafu/en/home/topics/air/info-specialists/air-quality-in-switzerland/nitrogen-containing-air-pollutants-affect-biodiversity.html))
Greetings from Switzerland!

www.schweizerbau.ch