The EU Nitrogen Expert Panel and its indicator for Nitrogen Use Efficiency (NUE)

Tiffanie Stéphani – Fertilizers Europe

tiffanie@fertilizerseurope.com

"Agriculture and Air Pollution" Special Session held in the framework of the WG on Strategies and Review
UNECE – Geneva, 1 June 2017
Background
EU Nitrogen Expert Panel

Nitrogen is essential for life

EU nitrogen experts have joined forces to promote efficient nitrogen use in food production

The ambition is to encourage best use of nitrogen to mitigate threats to our health and the environment
EU Nitrogen Expert Panel

➢ To improve linkages
➢ To get things done

Science ➔ EU Nitrogen Expert Panel ➔ Practice
Policy ➔ EU Nitrogen Expert Panel ➔ Industry
Objective is to contribute to improving NUE in food systems, through

i. communicating a vision and strategies on how to improve nitrogen use efficiency (NUE) in food systems

ii. generating new ideas, and recommending effective proposals and solutions

iii. acting as referee in controversial issues and by communicating as authority
EU Nitrogen Expert Panel

- Initiated by Fertilizers Europe
- About 20 members
- Joint meetings since 2014
- Coordination with other fora (GPNM, CFA, SDG, INMS, European Commission, IFA, etc.)
Why Nitrogen?

Nitrogen is a main crop yield limiting factor

Excess nitrogen has a range of unwanted effects to human health and the environment

Matching nitrogen demand and supply requires knowledge, tools and site-specific actions
Why nitrogen use efficiency?

Key indicator for ‘resource use efficiency’ and ‘sustainable intensification’

Currently, there is no such indicator in use in policy and practice

Easily understood by policy and practice
A NUE indicator

- A robust and easy-to-use NUE indicator, based on the mass balance.
- NUE should be reported together with nitrogen output and nitrogen surplus.

Hence:
- NUE = Output / Input
- N output = N yield
- N surplus = Input - output
Multi-scale applicable

- Concept is multi-scale applicable
  - Field, Farm, Region, Country, World
  - Food systems
  - Sectors

... Systems and its boundaries have to be defined

- Time span has to be defined
- Changes in storage (e.g., soil) have to be reported
Interpretation

There are no absolute reference values for NUE, but possible target values can be derived.

Interpretations can be made on the basis of:

– Changes over time (direction and size of change)

– Differences between

  • actual and target values (NUE gap)
  • different cropping systems
  • different management practices
  • different countries
A graphical presentation, in three steps: (i) NUE

- **NUE very high (NUE > 90%): Risk of soil mining**
- **Desirable range for NUE**
- **NUE very low (NUE < 50%): Risk of inefficient N use**

**Possible targets**

NUE = 90%

NUE = 50%
A graphical presentation, in three steps: (ii) N output

Possible targets
- NUE = 90%
- NUE = 50%

NUE very high (NUE > 90%): Risk of soil mining
NUE very low (NUE < 50%): Risk of inefficient N use

Desirable range for NUE and N output

N output, kg/ha/yr
N input, kg/ha/yr
A graphical presentation, in three steps: (iii) N surplus

Possible targets
- NUE = 90%
- NUE = 50%
- Desired maximum: N surplus < 80 kg/ha/yr
- Desired minimum productivity: (N output > 80 kg/ha/yr)

**NUE very high (NUE > 90%): Risk of soil mining**

**NUE very low (NUE < 50%): Risk of inefficient N use**

N output, kg/ha/yr vs. N input, kg/ha/yr graph.
Indicating the directions of change

Possible targets

NUE = 90%

Desired maximum
N surplus < 80 kg/ha/yr

NUE = 50%

Desired minimum productivity
(N output > 80 kg/ha/yr)

Sustainable intensification
Intensification
Extensification
Degradation

N output, kg/ha/yr

N input, kg/ha/yr
Applicability of concept:

- Nitrogen fertilization experiments
- Farming systems
- Cropping systems at regional/national levels
- Food chain systems

However, boundaries, inputs/outputs and target values change with change in systems!
Current Work

- Testing of the Guidance Document on how to derive NUEFM for different farm types, soil types, farming conditions...
- ... via case studies in different EU regions— in cooperation with Panel members...
- ... in order to open a dialogue with farmers to get them involved and to share results with them to enable the understanding of the indicator and develop benchmarks
Concluding remarks

- In order to change practices, we need to be able to **measure** those
- NUE is key indicator for **resource efficiency** and for **continuous improvement** of the environmental performance (as well the productivity) of farming
- Matching with the need to implement the different **Sustainable Development Goals**!
Now let’s walk the talk!

EU Nitrogen Expert Panel
Wageningen University, Alterra,
PO Box 47, NL-6700 Wageningen
Email: oene.oenema@wur.nl
Website: www.eunep.com