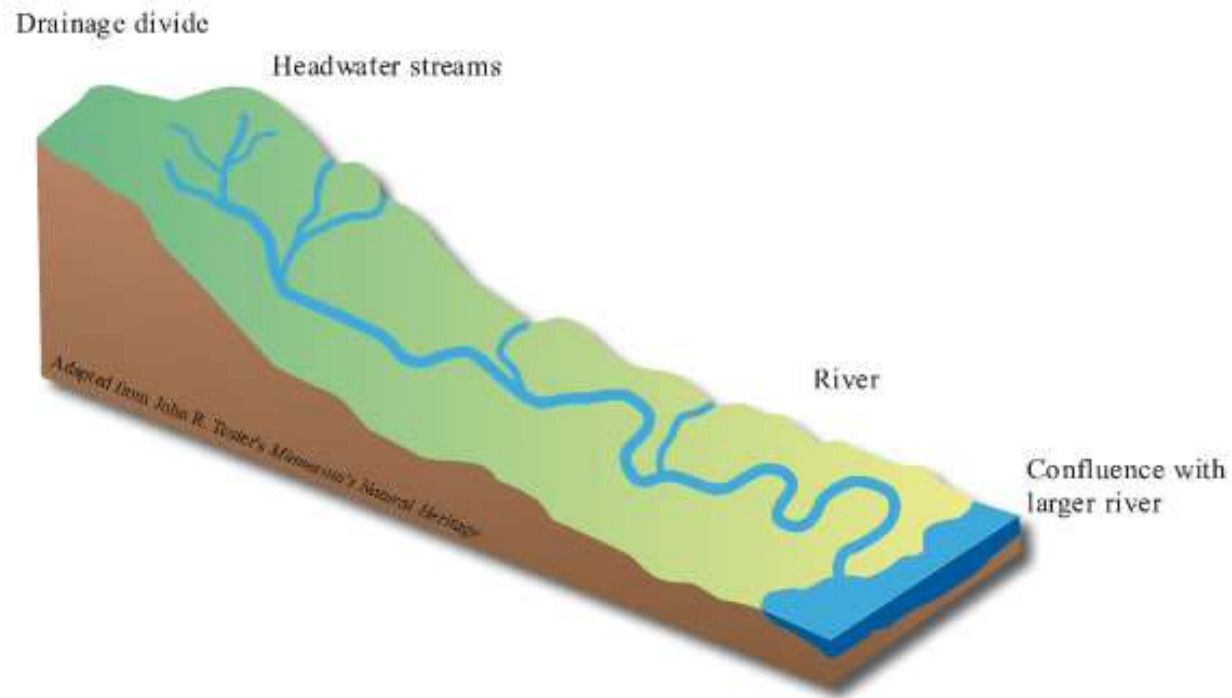


The Italian Nitrogen Network: achievements and future activities

Marco Bartoli and Alessandra De Marco

.... and all the participants to INN



A watershed is like a funnel-collecting all water within the drainage area and channeling it into a stream, river, or lake.

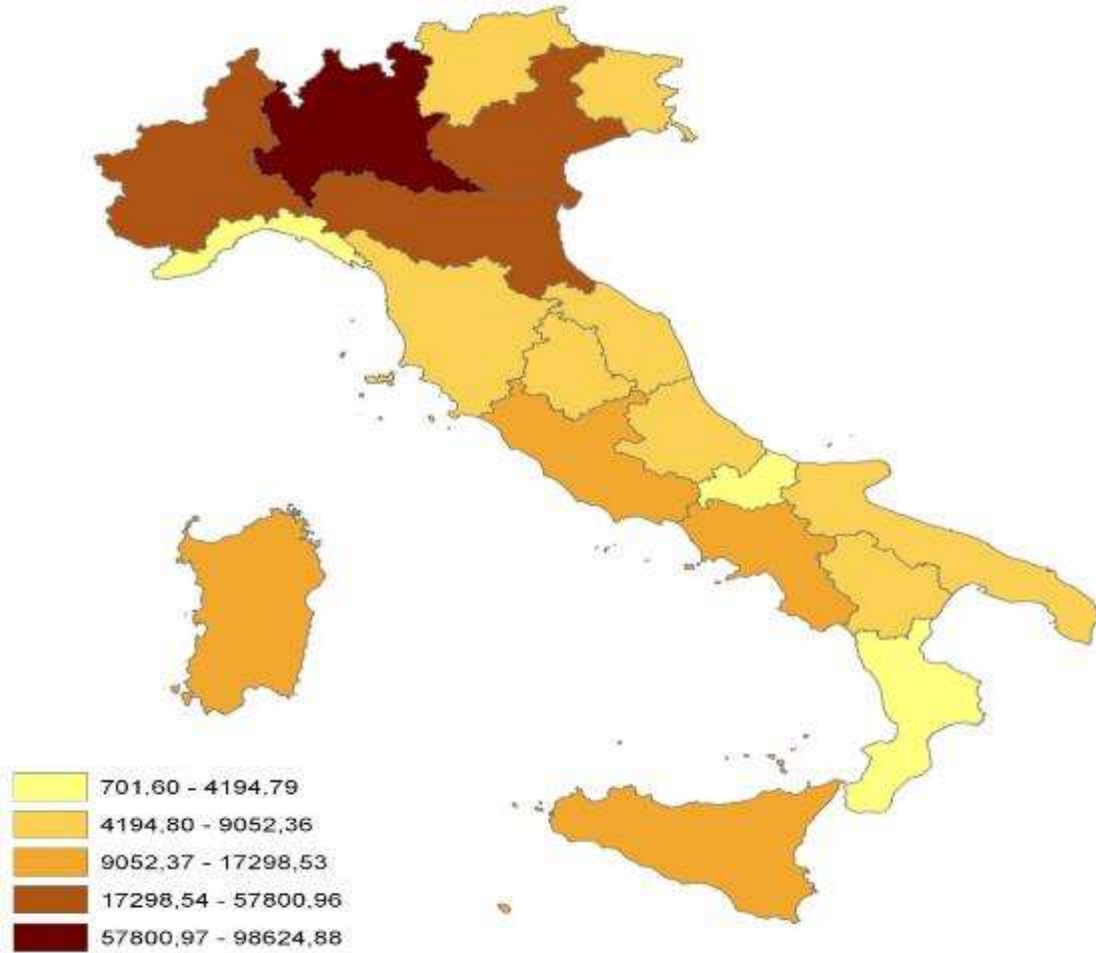


Why another network?

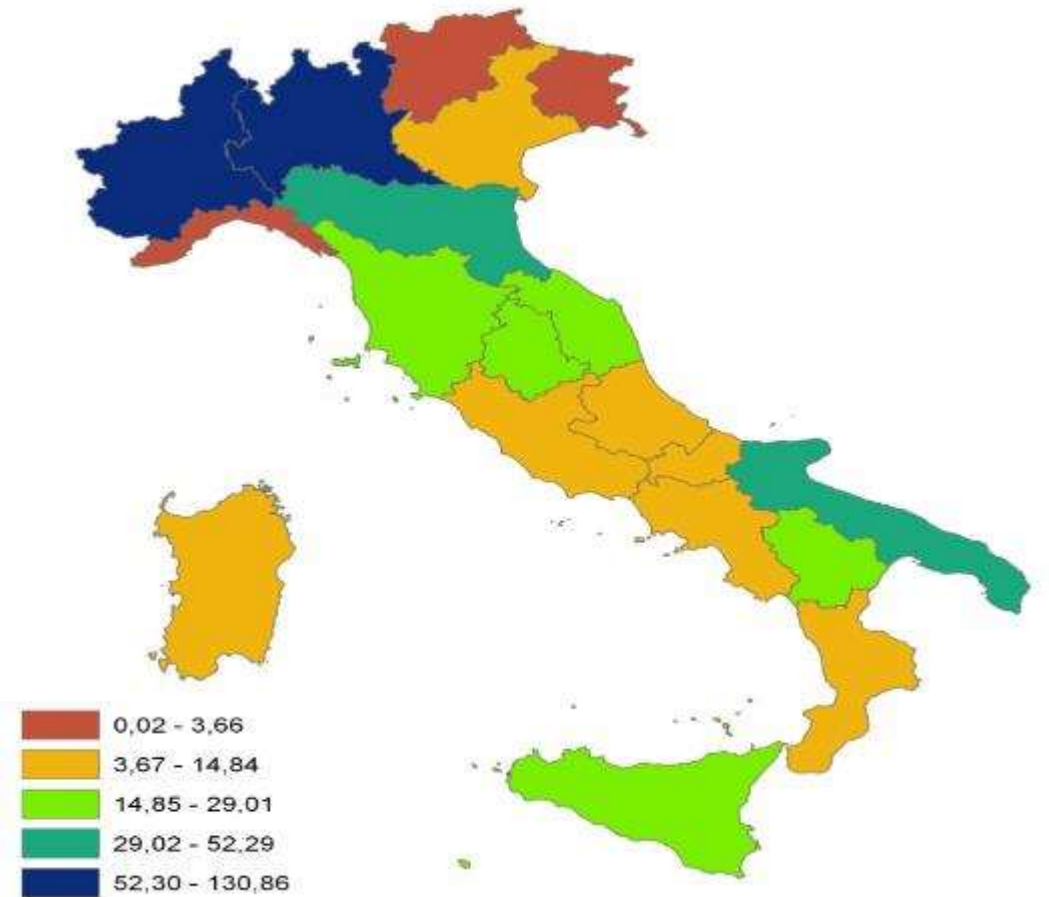
- There is still an open discussion on nitrogen directive (sources, retention processes, nitrogen losses...)
- Local actions apparently without a common rational approach
- Different sources of research:
 - agronomic finalized to yield optimization;
 - hydrogeological finalized to modelling;
 - ecological finalized to eutrophication issues, such as water quality and greenhouse gases emissions
- The idea is to compare different basin with different territory peculiarity
- Estimate surplus in the river basins
- The achievement is to realize a network of nitrogen expert at national level covering area from North to the South

Emission only for the agricultural sector

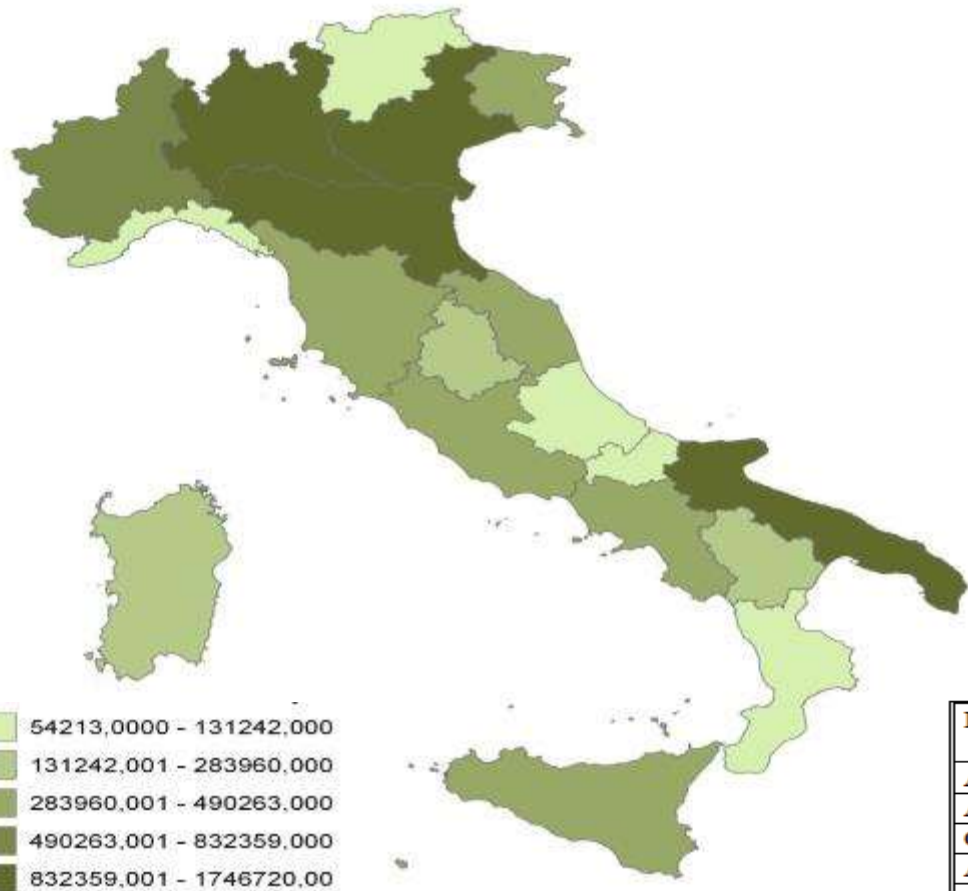
Ammonia



NOx



Nitrogen fertilizers consumption per region



Fertilizer type	Region A EF_A	Region B EF_B	Region C EF_C	Multiplier c	Comment
Ammonium sulphate	0.025	0.020	0.015	10	1)
Ammonium nitrate	0.020	0.015	0.010	1	
Calcium ammonium nitrate	0.020	0.015	0.010	1	
Anhydrous ammonia	0.04	0.03	0.02	4	
Urea	0.20	0.17	0.15	1	
Nitrogen solutions	0.11	0.09	0.07	1	2)
Ammonium phosphates	0.025	0.020	0.015	10	1)
Other NK and NPK	0.020	0.015	0.010	1	3)
Nitrate only (e.g. KNO_3)	0.007	0.005	0.005	1	

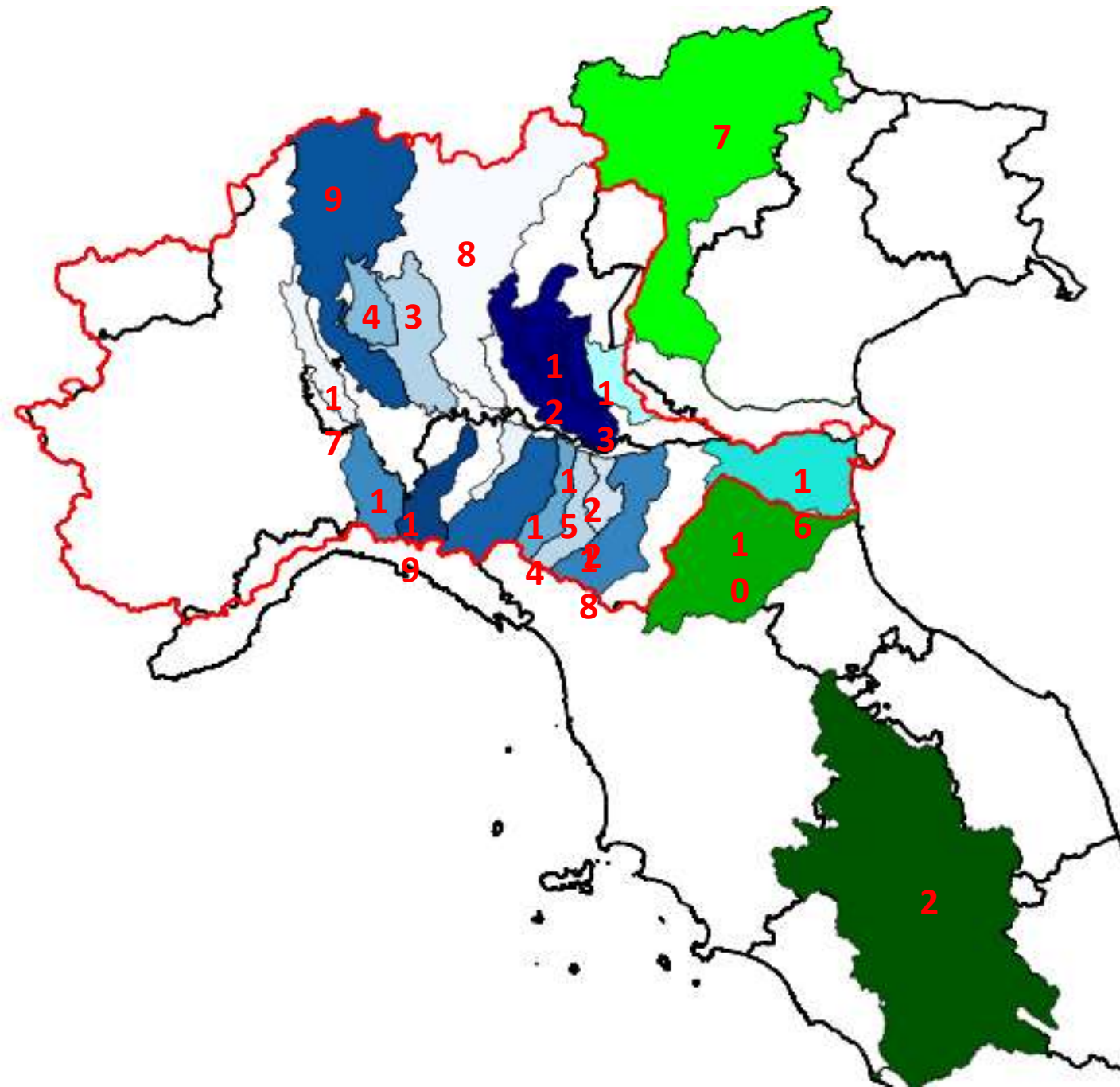
1) Note very strong pH effect supported by measurements and chemical principles (Harrison and Webb, 2001)

2) saturated solution of urea and ammonium nitrate

3) for fertilizers largely based on ammonium nitrate

What has been already done

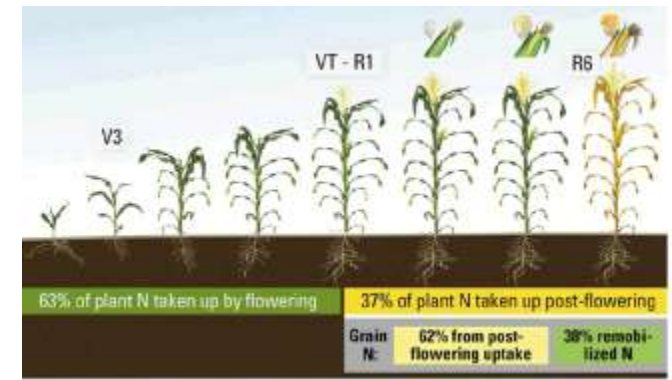
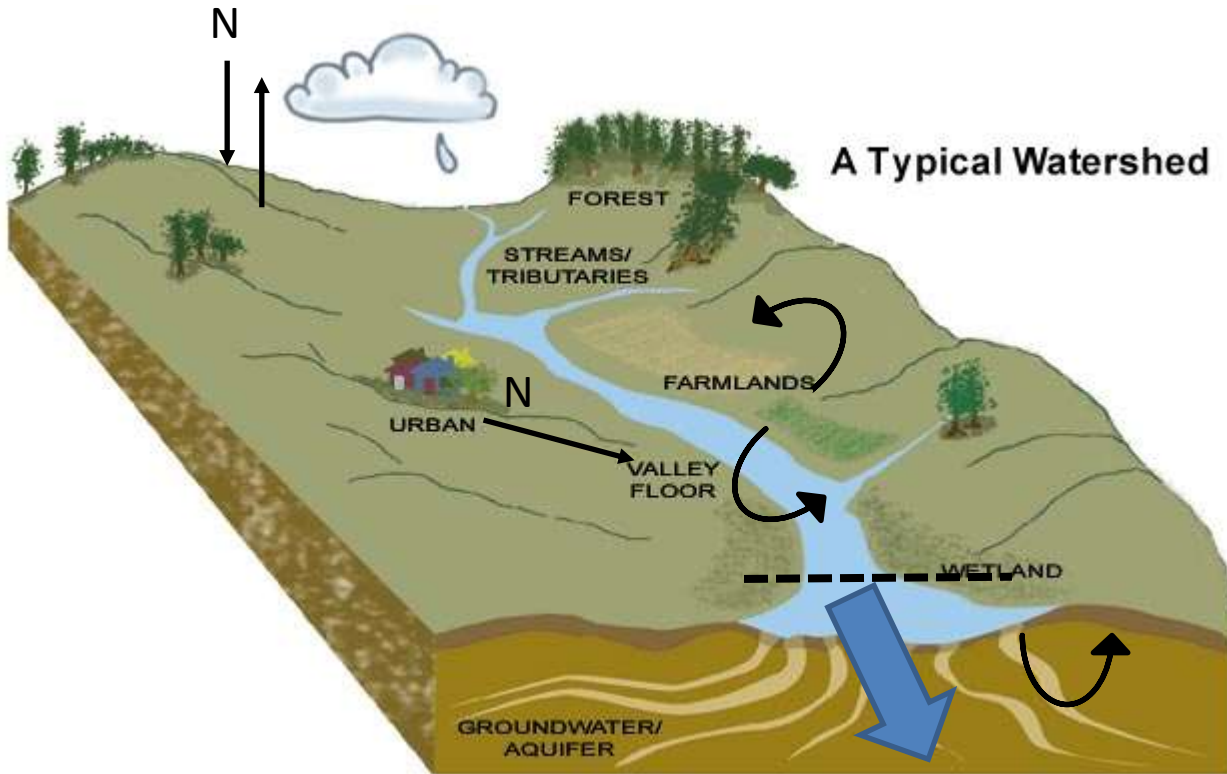
- ✓ Database containing all researchers and institutions working on nitrogen issue at national level
- ✓ Request to join the network to as much expert as possible
- ✓ Identification of what is possible to achieve in the first year of activity without costs, whit available data
- ✓ Standardization of a simple but robust methodology, based on national statistics and production of excel sheets to create a national database
- ✓ Preparation of a clear guidance to help in compiling the excel datasheets
- ✓ Realization of a nitrogen budget at river basin level to compare it with net nitrogen export data
- ✓ Three meeting have been organized to discuss and share the methodology between the partners without funding to support the activities



1. Bacino dello Scrivia, Sacchi Elisa, Università di Pavia
2. Bacino del Tevere, De Marco Alessandra, ENEA Roma
3. Bacino del Lambro, Acutis Marco, Università di Milano
4. Bacino dell'Olona, Acutis Marco, Università di Milano
5. Bacino dell'Arda/Taro-Stirone, Trevisan Marco, Università Cattolica
6. Sottobacini del Lago Maggiore, Rogora Michela, ISE-CNR Pallanza
7. Bacino dell'Adige, Boscaini Adriano-Salmaso Nico, Fondazione E. Mach San Michele all'Adige
8. Bacino dell'Adda sublacuale, Crosa Giuseppe-Salmaso Francesca, Università dell'Insubria
9. Bacino del Ticino sublacuale, Crosa Giuseppe-Salmaso Francesca, Università dell'Insubria
10. Bacino del Reno, Rossi Paola-Ventura Francesca-Vignudelli Marco, Università di Bologna
11. Altopiano del Fucino, Marco Petitta/Mastrocicco Micol, Università di Ferrara/Università La Sapienza Roma
12. Bacino dell'Oglio sublacuale, Soana Elisa-Racchetti Erica, Università di Ferrara, Università di Parma
13. Bacino del Mincio, Pinardi Monica, Università di Parma
14. Bacino del Parma, Nizzoli Daniele, Università di Parma
15. Bacino dell'Enza, Nizzoli Daniele, Università di Parma
16. Bacino del Po di Volano, Castaldelli Giuseppe, Università di Ferrara
17. Bacino dell'Agogna, Soana Elisa, elisa.soana@gmail.com, Università di Ferrara
18. Bacino del Secchia, Pinardi Monica-Soana Elisa, Università di Parma, Università di Ferrara
19. Bacino del Trebbia, Laini Alex, Università di Parma
20. Bacino del Calich Pier Paolo Roggero- Dr. Clara Demurtas, Università di Sassari
21. Bacino del Sangro, Luisa Stellato, Università di Napoli
22. Bacino del Crostolo, Alex Spagni, ENEA – Bologna

Soil system budget:

- input
 - atmospheric deposition
 - fertilizers use
- output
 - Volatilization
 - Denitrification
 - Uptake



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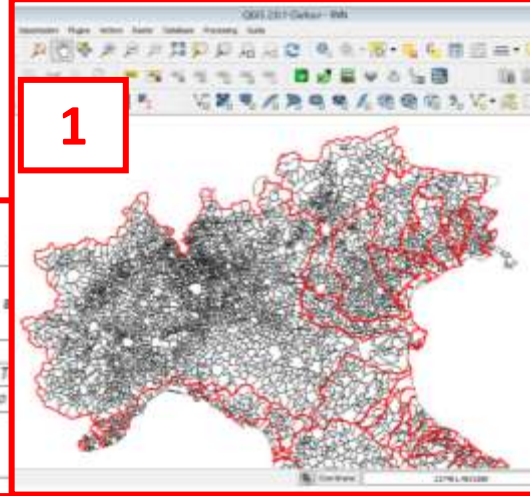
Approaches and uncertainties in nutrient budgets: implications for nutrient management and environmental policies

Oene Oenema*, Hans Kros, Wim de Vries

Alterra, Wageningen University and Research Center, P.O. Box 47, NL-6700 AA Wageningen, The Netherlands

Methodology

1. Select the municipalities



2. Download the data

Boletino Ufficiale della Regione Lombardia

TABELLA 2 - Azoto prodotto da animali di interesse zootecnico: valori al campo per ripartizione dell'azoto tra liquame e letame

Categoria animale e tipologia di stabulazione	kg / capo / anno
	kg / capo / anno
Suini: acrole con suinetti fino a 30 kg p.v. (b) • stabulazione senza lettiera • stabulazione su lettiera	26,4
Suini: accrescimento/ingrasso (b) • stabulazione senza lettiera • stabulazione su lettiera	0,0
Vacche in produzione (latte) (peso vivo: 600 kg/capo) (c) • fissa o libera senza lettiera • libera su lettiera permanente • fissa con lettiera, libera su lettiera inclinata • libera a cuccelle con paglia (grappa a grappa) • libera a cuccelle con paglia (testa a testa)	

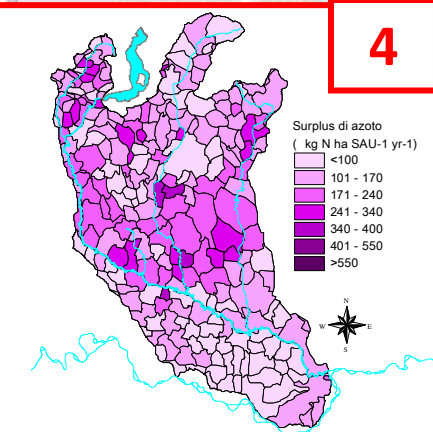


3. Calculate inputs and outputs by the excel sheets



Microsoft Excel spreadsheet showing a detailed table of zootecnical data (PATRIMONIO ZOOTECNICO) for various municipalities. The table includes columns for different animal categories (AVICOLI, BOVINI, SUINI, CILICOLI) and their respective stock and production metrics. A red box with the number '3' is overlaid on the top left corner of the spreadsheet.

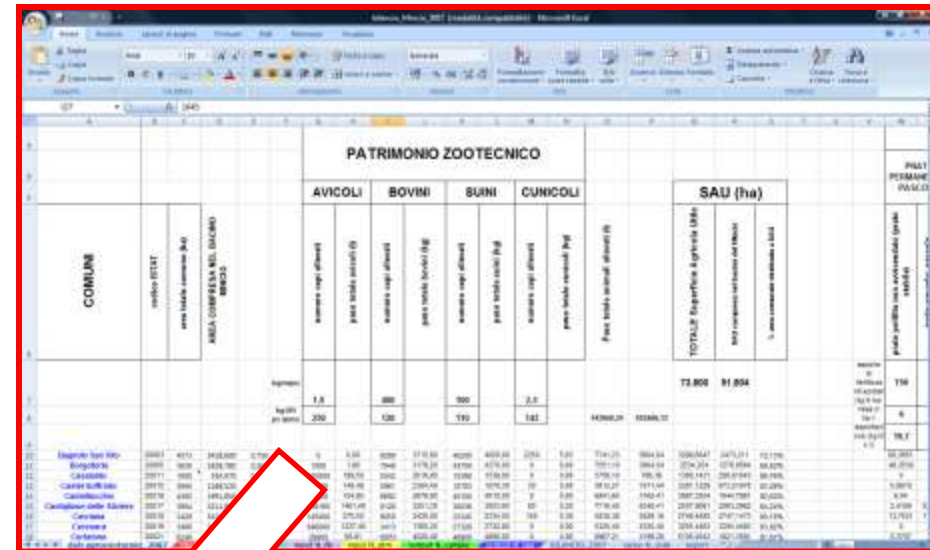
4. Modelling of the results by GIS



Example of the excel sheet to compile the budget

MS Excel

➔ If the data are accurate and the coefficient are applied at a very local scale, the budget will result to be very accurate



Comune	20017	3904	3211,960	0,823	1461,40	8128	3251,20	30038	3003,60	80	0,20	7716,40
Cavriana	20018	3429	3426,220	0,999	275,50	6050	2420,00	23345	2334,50	150	0,38	5030,38
Ceresara	20019	3466	3466,120	1,000	1227,40	3413	1365,20	27328	2732,80	0	0,00	5325,40
Curatone	20021	6240	2226,330	0,357	29900	56,81	10051	4020,40	48900	0	0,00	8967,21
dati agrozooteχνici_2007					input N_zab	input N_agr	input N_fix	input N_atm	output N_uptake	colture irrigate		BILANCIO_2007