

Programme of the XXI International N Workshop: version 21-Oct-2022

Sunday 23th	
16:00/19:00	Registration

Monday 24th			
	Room 1	Room 2	Room 3
8:00	Registration		
9:00	Opening Session		
9:40	Opening Session + KEYNOTE 1 Mark Sutton		
10:50	Coffee/Snack		
11:30	RS Crop (1)	SS Cost-Benefit (1)	RS Livestock (1)
13:00	Lunch		
14:15	KEYNOTE 2 Nandula Raghuram		
15:15	RS Crop (2)	SS Policy (1)	RS Livestock (2)
16:45	Coffee/Snack		
17:30	Poster session		
18:30/20:00	Welcome cocktail and flamenco show		

Tuesday 25th			
	Room 1	Room 2	Room 3
9:00	KEYNOTE 3 Xin Zhang		
10:00	RS Crop (3)	SS Cost-Benefit (2)	RS Livestock (3)
11:30	Coffee/Snack		
12:10	Roundtable fertilizers	RS Agro-Food (1)	RS Livestock (4)
13:40	Lunch		
15:00	Spanish presidency of the GRA 2023 (INIA-CSIC) + KEYNOTE 4 Laura Cárdenas		
16:30	Coffee/Snack		
17:00/18:30	RS Crop (4)	SS Policy (2)	RS Livestock (5)

Wednesday 26th	Field trips / Paralell activities		
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Thursday 27th			
	Room 1	Room 2	Room 3
9:00	KEYNOTE 5 Gilles Billen		
10:00	RS Crop (5)	RS Livestock (6)	SS Remote sensing & Precision Agr.(1)
11:15	Coffee/Snack		
12:00	Roundtable animal nutrition	RS Agro-Food (2) + Landscape (1)	SS Remote sensing & Precision Agr. (2)
13:30	Group picture		
13:40	Lunch		
14:45	KEYNOTE 6 Jill Baron		
15:45	Coffee/Snack		
16:15	RS Crop (6)	RS Landscape (2)	SS Remote sensing & Precision Agr. (3)
17:45/18:45	Poster session		
20:30	Gala dinner		

Friday 28th			
	Room 1	Room 2	Room 3
9:00	KEYNOTE 7 Aimable Uwizeye		
10:00	Poster		
11:00	Coffee/Snack		
11:40	RS Crop (7)	RS Landscape (3)	SS Circular Economy (1)
13:10	Lunch		
14:30	KEYNOTE 8 Estela Romero		
15:30	RS Crop (8)	RS Landscape (4)	SS Circular Economy (2)
17:00-18:00	Closing session, conclusions and farewell coffee		

Keynote
Regular session
Special session
Poster session
Roundtable
Lunch/Coffee
Social

NOTE: Regular and special sessions last for 90 minutes
Sessions of Thursday 27th at 10:00 am last for 75 minutes

Detailed Programme

XXI International N workshop 2022

Sunday 23rd October

Registration from 16:00 to 19:00

Monday 24th October

Registration from 8:00

Opening session from 9:00 to 9:40

Room 1

Opening table

Guillermo Cisneros Pérez (Rector of the Universidad Politécnica de Madrid, UPM)

José Manuel Palacios Alberti (Director of the Escuela Técnica Superior de Ingeniería Agronómica, Alimentaria y de Biosistemas, ETSIAAB)

Isabel Bardají De Azcárate (Director of Centro de Estudios e Investigación para la Gestión de Riesgos Agrarios y Medioambientales, CEIGRAM-UPM)

Esther Esteban Rodrigo (Director of the Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria, INIA-CSIC)

Fernando Miranda Sotillos (General Secretary of Ministerio de Agricultura, Pesca y Alimentación, MAPA)

Guillermo Cisneros Pérez (Rector of the Universidad Politécnica de Madrid, UPM)

Opening keynote from 9:40 to 10:50

Meeting overview

Alberto Sanz-Cobeña and Luis Lassaletta (CEIGRAM-Universidad Politécnica de Madrid)

Keynote 1 “Halving nitrogen waste: general perspective”

Chair: Kevin Hicks

By *Mark Sutton*



Professor Mark Sutton is an environmental physicist based at the UK Centre for Ecology & Hydrology (UKCEH), in Edinburgh. An expert on atmospheric ammonia, he leads international research activities on nitrogen at the science–policy interface.

He is a former chair of the International Nitrogen Initiative (INI) and currently directs the UNEP/GEF International Nitrogen Management System (INMS) and the UKRI Global Challenges Research Fund’s South Asian Nitrogen Hub.

Professor Sutton is also a co-chair of the UNECE Task Force on Reactive Nitrogen (TFRN) and vice chair of the Global Partnership on Nutrient Management (GPMN).

Coffee/Snack

Sessions from 11:30 to 13:00

Regular Session “Crops 1” (Plant-Soil system)

Sub-topic: N Losses

Room 1Chairs: *Xin Zhang and Ana Meijide***Abstract title & authors**

- 11:30 Environmental N losses from Chinese and global vegetable production systems.
Klaus Butterbach-Bahl, Waqas Qasim, Li Wan, Zhisheng Yao, Shan Lin.
- 11:45 Application technology and slurry type affect slurry acidification effect on ammonia emissions and crop response.
Andreas Pacholski, Christian Wagner, Anette V. Westergaard, Sasha Hafner, Tavs Nyord.
- 12:00 Methodology for recording ammonia emissions in field trials - are we measuring correctly?
Helmut Doehler, Janis L. Klug, André Acksel, Martin Kaupenjohann. REMOTE
- 12:15 Is nitrogen management alone sufficient to mitigate nitrate, nitrous oxide, and ammonia loss from cornfields?
Fabián G. Fernández, Sonia T. Menegaz.
- 12:30 Use Efficiency and Loss of Nitrogen in Wetland Rice Field Under Nitrogen Fertilizer Management: Field Observation and Multispectral Image Analysis.
Majharul Islam, H.M. Al-Amin, Maruf Hossain, Mohammad Saiful Alam, Hasan Muhammad Abdullah, Robert Martin Rees and Md. Mizanur Rahman.
- 12:45 CULTAN fertilization with urea ammonium sulfate: Impacts on field NH₃ emissions and N-use efficiency.
Alexander Kelsch, Mareike Hofemeister, Hannah Götze, Heinz Flessa, Sina Kukowski, Andreas Pacholski, Jörg Michael Greef, Karolin Müller, Nicolas Brüggemann.

Special Session “Costs and benefits 1”

Room 2Coordinators of the special session: *Hans van Grinsven and Bonnie Keeler*Chairs: *Hans van Grinsven and Alfredo Rodríguez***Abstract title & authors**

- 11:30 Global costs and benefits of nitrogen use and losses in 2010 and 2050 under Shared Socioeconomic Pathways.
Hans van Grinsven, Baojing Gu, Lin Zhang, Rita Van Dingenen, Xiuming Zhang, Lena Schulte-Uebing, Wim de Vries, Roy Brouwer, Rute Pinto, Laurence Jones, Alice Fitch, Mathilde Jackson-Bué, Alfredo Rodríguez, Luis Lassaletta, Arthur Beusen, Jan van Dam, Massimo Vieno, Mark Sutton.
- 11:50 A Cost-Benefit Analysis of Water Framework Directive implementation in Denmark towards 2027
Brian H. Jacobsen, Zandersen M., Olsen, S.B., & Hasler B.

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- 12:10 The overestimated costs of fertilizer reduction – Time for new nitrogen fertilizer application heuristics.
Andreas Meyer-Aurich.
- 12:22 Costs and benefits of synthetic nitrogen for global cereal production under the INMS Shared Socioeconomic Pathways.
Alfredo Rodríguez, Hans J.M van Grinsven, Marloes P. van Loon, Arthur H.W. Beusen, Luis Lassaletta.
- 12:34 Evidence-based Nitrogen Indexes for Sustainable Agro-food Systems
Xia Liang, Xiuming Zhang, Shu Kee Lam, Hans van Grinsven, Xin Zhang, Deli Chen.
- 12:45 Group discussion

Regular Session “Livestock 1” (Animal system & Animal-Plant-Soil system)

Sub-topic: Reduction of N Losses through feeding and housing technologies

Room 3

Chairs: *Barbara Amon and Federico Dagróni*

Abstract title & authors

- 11:30 A novel ammonia treatment of barley to optimize rumen function and increase N efficiency in sheep.
Belanche A., Martín-García A.I., Jiménez E., Jonsson N., Yáñez-Ruiz D. REMOTE
- 11:45 Influence of feed intake pattern of lactating sows on the nitrogen efficiency.
*María Rodríguez, Naila Talavera, **Gema Montalvo**, Joaquín Morales, Carlos Piñeiro.*
- 12:00 N balance to update excretion and nh3 emissions from fattening pig farms in eastern Spain.
*Elena Sanchis, Fernando Estellés, **Salvador Calvet***
- 12:15 Project EmiDaT – Ammonia emission rates from fattening pig housings with outdoor yard in Germany.
Brigitte Eurich-Menden, Ulrike Wolf, Gianna Dehler, Dieter Horlacher, Alexej Smirnov, Ewald Grimm, Katrin Wagner, Sebastian Wulf.
- 12:30 Lignite is a low-cost technology for reducing nitrogen loss and odour from litter in commercial broiler housing.
Brendon Costello, Mei Bai, Deli Chen, Clayton Butterly.
- 12:45 Assessing the cost of technologies reducing ammonia emissions for future BAT requirements for finishers in pig production in Denmark.
Brian H. Jacobsen.

Lunch

From 14:15 to 15:15

Keynote 2 “Crop improvement for NUE”

Room 1

Chair: *Inés Mínguez*By *Nandula Raghuram*

Nandula Raghuram is a Professor and former Dean of Biotechnology at Guru Gobind Singh Indraprastha University, New Delhi and the Chair of International Nitrogen Initiative

Prof. Raghuram's main research goal is in crop improvement for nitrogen use efficiency (NUE). His research focus is on the functional biology and biotechnology of crop N use efficiency in rice, apart from its broader environmental aspects and policy. His group discovered the phenotype for NUE in rice and is shortlisting candidate genes for NUE improvement. Raghuram co-founded the Indian Nitrogen Group and co-led the Indian Nitrogen Assessment and is currently involved in South Asian and International Nitrogen Assessments. He facilitated the first ever UN resolution on 'Sustainable Nitrogen Management' at UNEA4 and is currently a member of the Indian govt's inter-ministerial committee for its implementation. He has also been Editor in Chief of the international journal *Physiology and Molecular Biology of Plants* and Guest Editor for *Frontiers in Plant Science*, *Environmental Research Letters* and *Environmental Research Communications*.

Sessions from 15:15 to 16:45

 Regular Session “Crops 2” (Plant-Soil system)
 Sub-topic: Agricultural Management and NUE

Room 1

Chairs: *Guillermo Guardia and María Alonso-Ayuso*

Abstract title & authors

- 15:15 Combination of plant-based fertilisers and compost can replace farmyard manure for nitrogen fertilization, and builds soil fertility in organic vegetable production.
Hanne Lakkenborg Kristensen, Mesfin T. Gebremikael, Sindhuja Shanmugam.
- 15:30 Nitrogenous sources and tillage depths determine NUE in wheat crop.
Ahmad Mujtaba, Abdul Wakeel, Hafeez ur Rehman and Muhammad Sanaullah. REMOTE
- 15:45 The Effect of Nitrogen Fertiliser Type on Milling Wheat Yield and Crop Nitrogen Use Efficiency, Findings from a 3-Year UK Study.
Kate E. Smith, Dan Jakes, Rachel E. Thorman, John R. Williams.

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- 16:00 Estimation of changes in soil organic N stocks is crucial to determine the fate of surplus N in intensively managed cropping systems.
Muhammad Adil Rashid, Sander Bruun, Merete Elisabeth Styczen, Signe Kynding Borgen, Søren Kolind Hviid, Lars Stoumann Jensen.
- 16:15 Assessment of nitrogen management practices for intensive irrigated agriculture sustainability.
Wafa Malik, Farida dechmi.
- 16:30 Influence of different N sources and tillage depth on NUE and soil microbial activity in wheat crop.
Abdul Wakeel, Ahmad Mujtaba, Muhammad Rizwan Shahid, Abdul Qadeer, Muhammad Sana Ullah, Tariq Aziz.

Special Session “Policy 1” (Policy strategies for reducing N waste)

Room 2

Coordinators of the special session: *David Kanter and Wilfried Winiwarter*

Abstract title & authors

- 15:15 A comprehensive review on the fertilizer subsidy policy and its impact on nitrogen fertilizer use in Sri Lanka.
Anuradha Jayaweera, S.P. Nissanka
- 15:27 Best practices in promoting and implementing sustainable nitrogen management policies.
Mihai Constantinescu, Naiana Milea.
- 15:39 Oceania: A global region with diverse nitrogen issues, policy responses and future challenges.
Cameron Gourley, Susanne Schmidt.
- 15:51 Strategies and policies for reducing nitrogen wastes in the United States.
Eric A. Davidson, David R. Kanter.
- 16:03 Reactive-N in South Asia – Strategies for Sustainability and Reducing Waste.
Tapan K. Adhya, Tariq Aziz, Md. Mizanur Rahman and N. Raghuram.
- 16:15 The Dutch region-specific nitrogen policy approach: addressing nitrogen to support biodiversity.
Roel Jongeneel, **Co Daatselaar**.

**Regular Session “Livestock 2” (Animal system &
Animal-Plant-Soil system)
Sub-topic: Measurement and modelling of N flows**

Room 3

Chairs: *Carmen Fernández and Salvador Calvet*

Abstract title & authors

- 15:15 Ammonia emission measurements from dairy housing and wastewater treatment plants using an inverse dispersion method.
Alex Valach, Christoph Häni, Marcel Bühler, Thomas Kupper.
- 15:28 Ammonia emission and landscape fluxes near a cattle feedlot in Victoria, Australia.
Qingmei Wang, Thomas K. Flesh, Claudia Wagner-Riddle, Deli Chen. REMOTE
- 15:41 Modelling and mitigating nitrogen emissions from key European dairy production systems.
Xabier Díaz de Otálora, Agustín del Prado, Federico Dragoni, Fernando Estellés, Barbara Amon.
- 16:54 A newly developed model for quantification of nutrient flows and losses along dairy manure management chains with different complexity.
Qingbo Qu, Keqiang Zhang, Jeroen C.J. Groot.
- 16:07 Advantages of a well-referenced flow-chart of manure management to spatialize nitrogen pressure and ammonia emissions: the case of Brittany (France)
Laurence Loyon.
- 16:20 Analysis of Nitrogen balances and Nitrogen Use Efficiency on farm level of the German agricultural sector – implications for policy design.
Philipp Löw, Bernhard Osterburg.
- 16:33 Measures to reduce nitrogen losses in Spanish livestock. Implementation of an electronic tool to estimate, monitoring and reporting N emissions (ECOGAN).
Lorena Algarra, Fernández, C., Ruiz, J.J., López, M.

Coffee/Snack

Poster Session from 17:30 to 18:30

Poster Session 1.1 (Crops Agricultural Management and NUE)

Exhibition 1

Chair: *Markus Geupel*

Abstract title & authors

Maize diversification and N fertilization rate impact on crop productivity and N use efficiency in flooded irrigated systems under semiarid Mediterranean conditions.

María Alonso-Ayuso, *Victoria Lafuente, Ana Bielsa, Samuel Franco-Luesma, Jorge Álvaro-Fuentes.*

Biological nitrification inhibitor-trait reduces soil nitrification and improves nitrogen uptake in wheat under ammonium or nitrate fertilization.

Adrián Bozal-Leorri, *Guntur V. Subbarao, Masahiro Kishii, Leyre Urmeneta, Víctor Kommerell, Hannes Karwat, Hans-Joachim Braun, Pedro Aparicio-Tejo, Iván Ortiz-Monasterio, Carmen González-Murua, Begoña González-Moro.*

Precision agriculture at farm level: innovative soil technologies and fertilization efficiency to reduce the N footprint of Portuguese wine.

Soraia Cruz, *Cláudia M.d.S Cordovil, Cecília Rego, Pedro Baptista, Sónia Martins, António Marques-dos-Santos.*

Right place, right time: connecting soil N and plant uptake for greener agriculture

Sneha Gupta, *Uta Wille, Michelle Watt, Ute Roessner.*

Android Based Fertilizer Management Tools for Increasing Nitrogen Use Efficiency in the South Asian Countries: A Review.

Md. Mizanur Rahman, *Mohammad Saiful Alam, Md. Sazzad Hossain, Jonathan Hillier, Tapan Kumar Adhya, Md. Giashuddin Miah and GKM Mustafizur Rahman.*

Apparent nitrogen balance under different cover crops managements.

Raimondi G., *Cabrera M., Quemada M., Maucieri C., Borin M.*

Biochar and compost impact on soil N processes: results from a long-term field study in an organic olive tree crop.

María Sánchez-García, María Luz Cayuela, Raúl Castejón-del Pino, Miguel A. Sánchez-Monedero.

Modeling the effects of climate change on nitrogen use efficiency (NUE) of wheat in arid and semi-arid environments.

Muhammad Rizwan Shahid, Abdul Wakeel, Muhammad Sana Ullah, Tasneem Khaliq.

Effect of different types of fertilizers on nitrogen use efficiency of rice and emission of greenhouse gasses.

H.D.S Shyamantha, S.P Nissanka and G. Senevirathne.

Assessing nutrient use efficiency of different fertilizer types and weed control systems of tea fields in Hapugastenne estate in Maskeliya plantations plc.

L.R.R.P. Bandara, S. P. Nissanka and H.M.P. Peiris.

Introduction of legumes in maize double cropping systems: Effects on soil and plant N dynamics.

Jesús Fernández-Ortega, *Jorge Álvaro-Fuentes, Carlos Cantero- Martínez.*

Effect of nitrogen management system on growth and yield of rice and maize in Central Tarai, Nepal.

Prakash Ghimire, Khem Raj Dahal, Yam Kant Gaihre, Chetan Gyanwali and Umesh Sah.

Poster Session 1.2 (Crops Fertilizers)

Exhibition 2

Chair: *Francesca Degan*

Abstract title & authors

Improving nitrogen fertilisation efficiency by connecting soil nitrogen availability and crop yield through the design of novel urease inhibitors.

Benjamin Andrikopoulos, *Joses Nathanael, Ute Roessner, Uta Wille.*

Urease inhibitors effects on the nitrogen use efficiency in a maize-wheat rotation with or without water deficit.

Raúl Allende-Montalbán, *Diana Martín-Lammerding, María M. Delgado, Miguel A. Porcel, José L. Gabriel.*

Nitrogen, potassium and sulphur availability from residue-based fertilisers applied singly or combined.

Beatriz Gómez-Muñoz, *Jakob Maigd, Lars Stoumann Jensen.*

Impact of Different Fertilizers of Nitrate and Ammonium Forms and Slow Releasing, on Growth, Yield and Nutrient Use Efficiency of Rice (*Oryza sativa*).

S.P. Nissanka, *W.K.B.A.S Parakkrama.*

Effect of stabilized fertilizers of urea with Dicyandiamide, N-butyl thiophosphoric-tramide, Coated urea, and Biochar on Nitrogen Use Efficiency in Rice.

S.P. Nissanka, *U.L.D.L.D Gunasinghe, M. Gunawardana.*

Impact of control release and bio fertilizers on nutrient use efficiency and productivity in Tea.

I.R. Dammullage, and S.P. Nissanka.

First experiences in chickpea inoculation with indigenous rhizobia in Croatia.

Sanja Sikora, *Petra Borovec, Sanja Kajić, Nina Toth, Branka Maričić.*

Ammonia Energy: The future for Power Generation and Storage.

Andrea Guati Rojo.

Nitrogen Use Efficiency in radish fertilized with N-doped biochar-based fertilizers compared to synthetic fertilizer.

Raúl Castejón-del Pino, *Miguel Ángel Sánchez-Monedero, María Sánchez-García, María Luz Cayuela.*

Sorghum bicolor as producer of biological nitrification inhibitors for reduced N losses in wheat crop rotation systems.

Izargi Vega-Mas, *Estefanía Ascencio-Medina, Sergio Menéndez, Jon González, Carmen González-Murua, Daniel Marino, M^a Begoña González-Moro*

Increased nutrient efficiency of new upgraded mineral fertilizers with Rhizobium strain.

Marcia Barquero Quirós, *José M. Carpintero Salvo, Javier Brañas Lasala, João Castro Pinto, Sanaa Kamah, Fernando González Andrés.*

The optimization of nitrogen application on yield of potato crop by Finder® a biofertilizer produced with MAMPs Enhancer Technology.

Kamah Darkaoui S., *Castillo Jurado S., Gomis García M. D, Galindo García A, Branás Lasala J., Akdi Laaroussi K.*

Comparative effect of Zn coated urea and conventional urea on N₂O emissions in different soils under crop plantation and bare soil conditions

Wajid Umar, *Imre Czinkota, Miklós Gulyás, János Balogh*

Poster Session 1.3 (Livestock)

Exhibition 3

Chair: *Mónica López*

Abstract title & authors

Different stages NPK evaluation of a slurry treatment plant in a 3000 sow industrial scale production farm.

*Rubén Linares, Oscar Hernández, Lidia Álvarez, Cristina de Arriba, **María del Pino Pérez.***

Chances and challenges to improve Polish inventories of ammonia emissions from livestock systems.

***Anna Rychła,** Jacek Dach, Jakub Mazurkiewicz, Agnieszka Wawrzyniak, Wilfried Winiwarter.*

The carbon footprint per liter of milk is explained by NUE.

***Gregorio Salcedo Díaz,** Dolores Báez Bernal, Athanasia Varsaki, Fernando Vicente Mainar, Paola Eguinoa Ancho.*

Effects of grazing XTriticosecale with Manchega sheep on N₂O emissions.

***Gregorio Salcedo Díaz,** Oscar García García, Lorena Jiménez Sobrino, Roberto Gallego Soria, Rafael González-Cano, Ramón Arias Sánchez.*

Exploring the pathways for nitrogen losses from sheep urine patches between upland and lowland grazing systems.

***Danielle Hunt,** Davey Jones, Laura Cardenas, Dave Chadwick.*

Nitrogen and carbon excretion from beef cattle grazing two sward types in South West England.

*Aranzazu Louro-López, Daniel Enriquez-Hidalgo, Paulo Meo-Filho, M. Jordana Rivero, Mieke Verbeeck, William Roberts, Carmen Segura-Quirante, Mélanie Roffet-Salque, Charlie Maule, Karina A. Marsden, Amber Manley, **Laura Cardenas.***

Influence of feeding regime on ammonia emission from dairy slurry applied to Galician pasture.

***Carme Santiago Andión,** Dolores Báez Bernal, María Isabel García Pomar, David Fanguero.*

Nitrogen cycle regulation and associated ecosystem services in the context of climate change: assessing the potential of agroforestry in Brittany

*Romane Mettauer, **Olivier Godinot,** Edith Le Cadre*

Ammonia and nitrous oxide losses from intensive dairy cattle farms in the Basque Country (northern Spain).

***Haritz Arriaga,** Oscar del Hierro, Eduardo Rosa, Joseba Lizarralde, Noemí Paino, Pilar Merino.*

Poster Oral Session Policy and Cost benefit

Exhibition 1

Chairs: Coordinators of the Special Sessions

Abstract title & authors

Dynamic Quantification of Greenhouse Gas Emissions N₂O in Natural Wetlands.

***Rana Kanaan,** José Miguel Sánchez Pérez, Sabine Sauvage.*

Cost-effective strategies to reduce of ammonia emissions from livestock production: A multi-country assessment.

***Anna Rychła,** Wilfried Winiwarter, Barbara Amon, Gültac Cinar, Federico Dragoni, Tony van der Weerden, Nick Hutchings, Francisco Salazar, Maguy Eugene, Mélynda Hassouna, Saoirse Cummins, Vasileios Anestis, Jacek Dach, Jakub Mazurkiewicz.*

Improving Nitrogen Use Efficiency in Oceania: Policy Advice from Social, Scientific and Technological Perspectives.

Kristopher Woodrow-Smith, Cameron Gourley, Susanne Schmidt.

Understanding and optimizing agricultural nitrogen utilization for synergies of UN 2030 SDGs.

Chuanzhen Zhang, Baojing Gu, Shu Kee Lam, Emma Liang, Deli Chen.

Getting integrated nitrogen management into policy and practice - perspectives from UK and Africa.

W Kevin Hicks, McKendree, J. Malley, C. and O'Neill, C.

How to address Nitrogen waste abatement in the SUDOE territory: A co-creation approach based on the experience of three workshops.

Hamid Yammine, Ivanka Puigdueta, Alberto Sanz-Cobeña, Carmen Galea, Juliana Hurtado, Alba Monistrol, José Miguel Sánchez-Pérez, Sabine Sauvage, Irene Blanco.

18:30

Welcome cocktail &
Flamenco concert

Tuesday 25th October

From 9:00 to 10:00

Keynote 3 “NUE in cropping systems”

Room 1

Chair: *Luis Lassaletta*

By *Xin Zhang*



Xin Zhang is an Associate Professor at the University of Maryland Center for Environmental Science.

She holds a Ph.D. in environmental science from Yale University and held a post-doctoral position at Princeton School of Public and International Affairs.

The goal of Xin's research is to evaluate how socioeconomic and biogeochemical processes affect the global nutrient cycle and the sustainability of agricultural production and, in turn, provide policy input on mitigating nutrient pollution while meeting global food and biofuel demands.

Xin has published papers on various peer-reviewed journals (e.g., *Nature*), and have received grants from multiple institutions (e.g., National Science Foundation).

Sessions from 10:00 to 11:30

Regular Session “Crops 3” (Plant-Soil system) Sub-topic: Integrated approaches

Room 1

Chairs: *Margarita Ruiz-Ramos and Sonia García-Marco*

Abstract title & authors

- 10:00 Towards a global nutrient budget data platform.
Achim Dobermann, *Pauline Chivenge, Rasmus Einarsson, Patricio Grassini, Armelle Gruere, Patrick Heffer, Luis Lassaletta, Cameron Ludemann, Francesco Tubiello, Martin van Ittersum, Nathan Wanner, Xin Zhang.*
- 10:15 Nitrogen in irrigation water sources: the missing link in the agricultural nitrogen cycle and related policies in Europe.
João Serra, *Rosário Cameira, Cláudia Cordovil, Joana Marinheiro, Eduardo Aguilera, Luis Lassaletta, Alberto Sanz-Cobena, Josette Garnier, Gilles Billen, Wim de Vries, Tommy Dalgaard, Nicholas Hutchings.*
- 10:30 Nitrogen balance in smallholders' maize cropping systems in Kenya.
Winnie Ntinyari, *Joseph Gweyi-Onyango, Mekonnen Giweta, Cargele Masso.*

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- 10:45 Sustainable nitrogen management in South Asia; drivers, trends and way forward.
Tariq Aziz, Tapan K. Adhya, Md. Mizanur Rahman and N. Raghuram. **REMOTE**
- 11:00 Some lessons learned about the use of water and nitrogen in vegetable crops.
José Salvador Rubio-Asensio, Jose Manuel Miras-Avalos, Juan Miguel Ramirez-Cuesta, Diego Intrigliolo.
- 11:15 Vermicomposting for improved N availability and the potential of vermicompost sources on N mineralization and soil biological properties on Nitisols.
Zerihun Getachew Gebrehana, Mesfin T. Gebremikael, Sheleme Beyene, Steven Sleutel, Wim M.L. Wesemael, Stefaan De Neve.

Special Session “Costs and benefits 2”

Room 2

Coordinators of the special session: Hans van Grinsven and Bonnie Keeler

Chairs: Hans van Grinsven and Alfredo Rodríguez

Abstract title & authors

- 10:00 Economic Analysis of Correcting Market Failure Causing Nitrogen Pollution from Agricultural Production.
Chinthani Rathnayake, Bill Malcolm, Garry Griffith, Alex Sinnett, Paul Deane. **REMOTE**
- 10:20 Costs and benefits of ammonia abatement in Australia.
Xiuming Zhang, Yi Sun, Xia Liang, Shu Kee Lam, Lei Liu, Baojing Gu, Deli Chen. **REMOTE**
- 10:40 Ammonia mitigation cost analysis for the German livestock sector.
Helmut Doehler, Helena Müller, Uwe Hauessermann, Gabriele Borghardt. **REMOTE**
- 10:52 Abatement of agricultural ammonia emissions in Irish agriculture - development of a marginal abatement cost curve to 2030.
Dominika J. Krol, Cathal Buckley, Trevor Donnellan, Kevin Hanrahan, Gary J. Lanigan.
- 11:04 How nitrogen inhibitors keep agricultural yields & environmental policies on target.
Gregor Pasda
- 11:16 Group discussion

**Regular Session “Livestock 3” (Animal system
& Animal-Plant-Soil system)
Sub-topic: N emissions from manure management**

Room 3

Chairs: *Carme Santiago Andión and Brigitte Eurich-Menden*

Abstract title & authors

- 10:00 Nitrogen fertilisation effect and ammonia emissions from field application of cattle slurry depending on slurry treatment and application strategy
Andersson, K., Delin, S., Pedersen, J., Nyord, T.
- 10:15 Potential leaching of N in a sandy soil amended with pH modified animal slurry.
S. Chrysanthopoulos, J. Coutinho, L. Brito, D. Fangueiro.
- 10:30 Promoting animal slurry application in conservation agriculture.
*Arejacy A Silva, Mario Carvalho, João Coutinho, Ernesto Vasconcelos, **David Fangueiro.***
- 10:45 Does digestion of manure and organic waste improve crop nitrogen recovery and reduce nitrate leaching and greenhouse gas emissions in organic farming?
Jochen Mayer, Michael Scheifele, Nora Efosa, Else Bünemann.
- 11:00 The impact of slurry acidification on ammonia loss, greenhouse gas emissions and crop nitrogen supply.
Rachel E Thorman, James G R Dowers, Ryan Hickinbotham, Sam Kendle, Helen L Kingston, Chris J Dyer, John R Williams.
- 11:15 Regulation of N₂O emissions in two soils with surface-application of cattle slurry.
Xiaoyi Meng, Pauline Sophie Rummel, Klaus Dittert, Søren O. Petersen.

Coffee/Snack

Sessions from 12:10 to 13:40

Roundtable “Fertilizers”

Room 1

Title: Ambition vs reality: reducing nitrogen losses by 50%

Chair: Jacob Hansen. Fertilizers Europe

- *Marcos Caballero Molaga. Fertinagro: New N fertilizers for the future*
- *Israel Carrasco. EurochemAgro: Fertilizer technologies to overcome the challenge of fertilization*
- *Alessandra Bonamano. Yara: Digitalization and precision farming to improve NUE*
- *Javier Brañas. Fertiberia: Production of green ammonia and climate-neutral fertilization*
- *Achim Dobermann. International Fertilizers Association: Global perspective on NUE*

Regular Session “Agro-Food 1” (Agro-Food system)

Room 2

Chair: Josette Garnier and Rasmus Einarsson

Abstract title & authors

- 12:10 N-Print Plus: A multi-country, multi-language N footprint tool for consumers.
*Allison M. Leach, **James N. Galloway**, Cláudia M.d.S. Cordovil, Soraia Cruz, Morten Graversgaard, Joana Marinheiro, Sergiy Medinets, Camille Nolasco, João Pompeu. REMOTE*
- 12:25 Personal consumption pattern matters: Nitrogen footprint in Ukraine.
***Sergiy Medinets**, Allison Leach, Tetiana Pavlik, Volodymyr Medinets, James Galloway. REMOTE*
- 12:40 The regionalization of the Nitrogen Footprint for the five Great Regions of Brazil.
***Camille L Nolasco**, Joao Pompeu, Jean Ometto.*
- 12:55 A local and participatory perspective on restoring nutrient circularity in nutrient-saturated agro-food-waste systems.
***Bernou Zoë van der Wiel**, C. E. van Middelaar, J. Weijma, C. J. N. Buisman and F. Wichern.*
- 13:10 Importing feed or food? The impacts of shifting trade portfolio between US and China.
***Yanyu Wang**, Xin Zhang, Eric A. Davidson, Baojing Gu.*
- 13:25 Reactive nitrogen compounds and human health.
Rolf Nieder.

Regular Session “Livestock 4” (Animal system & Animal-Plant-Soil system)

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Sub-topic: N cycling, mitigation and decision support

Room 3

Chairs: *Francesco Accatino and Corentin Pinsard*

Abstract title & authors

- 12:10 MilKey: decision support system for sustainable GHG and N optimised milk production in key European areas.
Barbara Amon, Xabier Díaz de Otálora, David Janke, Wilfried Winiwarter, Monika Suchowska-Kisielewicz, Anna Rychła, Joanna Frątczak-Müller, Thomas Bartzanas, Vasileios Anestis, Kobe Coorevits, Lorraine Balaine, Dominika Krol, Cathal Buckley, Aurélie Wilfert, Klaus Mittenzwei, Grete Jørgensen, Elisabeth Castellan, James Breen, Jacek Dach, Federico Dragoni.
- 12:25 MELS: Mitigation of greenhouse gas and nitrogen emissions from livestock systems.
B. Amon, G. Çinar, T. van der Weerden, T. Bartzanas, N. Hutchings, Vasileios Anestis, M. Hassouna, F. Salazar, A. Noble, W. Winiwarter, A. Rychła, D. O'Brien, K. Klumpp, F. Dragoni.
- 12:40 ALFAMI: Model-based calculation of ammonia loss from field-applied manure for emissions inventories.
Sasha D. Hafner, Barbara Amon, Roland Fuß, Nicholas J. Hutchings, Gokul Prasad Mathivanan, Andreas S. Pacholski, Sven G. Sommer, Sebastian Wulf. **REMOTE**
- 12:55 Effect of N inputs by grazing cattle and fertilizer applications on pasture N₂O emissions.
Christof Ammann, Lena Barczyk, Karl Voglmeier, Daniel Bretscher.
- 13:10 Impacts of land use change on nitrogen and carbon stocks in volcanic soils in Chile.
Oswaldo Salazar, Francisco Nájera, Leah L.R. Renwick, Marco Pfeiffer, Oscar Seguel, Juan Pablo Fuentes, Yasna Tapia, Manuel Casanova. **REMOTE**
- 13:25 Multi-trophic interactions between microbivorous and herbivorous mesofauna: implications for N cycling and plant growth.
Ummehani Hassi, Junwei Hu, Mesfin Tsegaye Gebremikael, Stefaan De Neve.

Lunch

Spanish presidency of the Global Research Alliance 2023 (INIA-CSIC) from 15:00 to 16:30

Room 1

Esther Esteban (*Director of en Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria, INIA-CSIC*)

Alberto Sanz-Cobeña (*Coordinato of red Científica sobre Mitigación de GEI en el sector Agroforestal, REMEDIA*)

Keynote 4 “Nitrous oxide: emission factors”

Chair: *Jorge Álvaro Fuentes*

By *Laura Cárdenas*



Dr. Laura Cárdenas (LC) is a Senior Research Scientist at Rothamsted Research with expertise in nitrogen (N) cycle in agricultural systems; investigating mechanisms leading to environmental losses to air and water and the controlling factors affecting N cycling in soils. She is also an inventory compiler of the UK GHG inventory and an Inventory Expert Reviewer for the UNFCCC.

Coffee/Snack

Sessions from 17:00 to 18:30

Regular Session “Crops 4” (Plant-Soil system) Sub-topic: N gas emissions

Room 1

Chairs: *Maria Luz Cayuela and Jorge Álvaro Fuentes*

Abstract title & authors

- 17:00 Effects of different cover crops before maize cropping on soil nitrogen dynamics and N₂O emission.
Heinz Flessa, Mirjam Helfrich, Simone Merl, Roland Fuß, Thomas Rübiger, Insa Kühling, Michaela Schlathöller, Henning Kage.

- 17:15 Evaluation of N₂O fluxes using the eddy covariance technique: first observations on a barley field in central Germany.
Mubaraq Olarewaju Abdulwahab, Christian Markwitz, Alexander Knohl, Stefan Siebert, Ana Meijide.
- 17:30 Effect of drip (surface versus subsurface) fertigation and synthetic N sources on N uptake, N₂O emissions and related key N-cycling genes.
Guillermo Guardia, Mónica Montoya, Sandra García-Gutiérrez, Alba Monistrol, Antonio Vallejo.
- 17:45 Assessment of the effects of manure additives on gaseous emissions and grass yield in a North-Western Atlantic climate.
Maxwell Y. Owusu-Twum, George Gleasure, Patrick Forestal, David Kelleghan, Gary Lanigan, Karl Richards, Dominika Krol.
- 18:00 Genetic diversity in nitrogen fertilizer responses and N gas emission in modern wheat.
Maria Oszwald, Kirsty L. Hassall, David Hughes, Adriana Torres-Ballesteros, Ian Clark, Andrew B. Richie, Sigrid Heuer.
- 18:15 High temporal frequency measurements of soil N₂O emissions in a wheat crop under irrigated Mediterranean conditions: impact of tillage and fertilizer type.
María Alonso-Ayuso, Borja Latorre, Samuel Franco-Luesma, Jorge Álvaro-Fuentes.

Special Session “Policy 2” (Policy strategies for reducing N waste)

Room 2

Coordinators of the special session: *David Kanter and Wilfried Winiwarter*

Abstract title & authors

- 17:00 Knowledge for integrated nutrient management: flows, targets and possible measures in the European Union.
Grizzetti B., Vigiak O., Aguilera E., Aloe A., Biganzoli F., Billen G., Caldeira C., de Meij A., Egle L., Einarsson R., Garnier J., Gingrich S., Hristov J., Huygens D., Koeble R., Lassaletta L., Le Noë J., Liakos L., Lugato E., Panagos P., Pisoni E., Pistocchi A., Sanz Cobeña A., Udias A., Weiss F., Wilson J., Zanni M. REMOTE
- 17:12 Mapping of waste water treatment technologies for suitable policy implications to control nitrogen pollution in Delhi, India.
Sangeeta Bansal, N. Raghuram, Tapan Kumar Adhya, Ananta N. Panda, Annie Yang, Jaffery Roger.
- 17:24 Exploring the potential of the Horizon Europe candidate partnership on Agroecology Living Labs and Research Infrastructures to reduce farming reactive nitrogen losses.
Benjamin S. Gimeno, Nicolas Tinois, Torsten Rodel Berg.
- 17:36 To what extent public policies have reduced nitrogen flows in Brittany, the leading agri-food region in France: Analysis of available public data.
Laurence Loyon.
- 17:48 Defining farm-specific sustainability nitrogen-use-criteria that ensure the compliance with regional environmental thresholds for the application in EU-policy frameworks.
Anne Biewald, Martin Bach.

- 18:00 From Urban Nitrogen Budgets to Sustainable Development Goals: N governance in Urban context.
Samuel Guéret, *Katrin Kaltenegger, Xianwen Fan, Zhaohai Bai, Wilfried Winiwarter.*
- 18:12 Wrap-up by David Kanter and/or Wilfried Winiwarter

**Regular Session “Livestock 5” (Animal system
& Animal-Plant-Soil system)
Sub-topic: N emissions from livestock at different scales**

Room 3

Chairs: *Marian Rufino and Olivier Godinot*

Abstract title & authors

- 17:00 Impacts of agricultural practices on large scale losses of ammonia, greenhouse gases, nitrate and phosphate to air and water.
Wim de Vries, *Johannes Kros, Jan Cees Voogd and Gerard H. Ros.*
- 17:15 Quantifying nitrogen flows in European agricultural grasslands and fodder crops: overview and key challenges.
Rasmus Einarsson, *Alberto Sanz-Cobena, Eduardo Aguilera, Gilles Billen, Josette Garnier, Hans van Grinsven, Luis Lassaletta.*
- 17:30 A nitrogen flow model to assess crop residue management in integrated crop-livestock systems at a territorial scale in France.
Julia Hebbrecht, *Francesco Accatino, Raia Silvia Massad, Benjamin Loubet.* **REMOTE**
- 17:45 Nitrogen management challenges in reducing coastal eutrophication.
Wafa Malik, *François Oehler, Lea Sgro, Patrick Durand.*
- 18:00 Effect of changes in farm management on agricultural ammonia emissions and Nitrogen flows in Switzerland for 1990 to 2020.
Harald Menzi, *Thomas Kupper, Ernst Spiess.*
- 18:15 The trade-off between satisfying meat demand and avoiding excess manure nitrogen at the regional scale in China.
Francesco Accatino, *Yang Li, Zhigang Sun.*

Wednesday 26th October

Fieldtrips / Parallel activities

Five excursions have been designed to immerse attendees in some of the most characteristic agro-food systems nearby the Madrid region as well as some research initiatives related to reactive N monitoring and emission abatement. All excursions except Excursion 5 have both a scientific and a cultural side.

Excursion 1. Nitrogen flows in cropping systems and riparian buffers in the Henares watershed.

ETSIAAB 9:00 – 18:00 ETSIAAB

Visit to the National Centre of Irrigation where the research COAPA team (UPM) is carrying out their field experiments on GHG and reactive N quantification using different technologies, in the most relevant crops of the region. After this first stop, participants will visit the “Center of Phyto-genetic resources and sustainable agriculture” (INIA-CSIC). The visit will finish with a cultural guided visit to Alcalá de Henares, the city where Miguel de Cervantes was born.

Excursion 2. Boosting circular economy through N management.

ETSIAAB 9:30 – 18:00 ETSIAAB

The visit will start with a visit to the “Migas Calientes” composting facilities where most of the plant residues of the city are composted. Then, participants will be taken to the National Centre of Irrigation where the research COAPA team (UPM) is carrying out their field experiments on GHG and reactive N quantification using different technologies, in the most relevant crops of the region. The visit will finish with a cultural visit to the Palace of Aranjuez and gardens, the country residence of Spanish royal families.

Excursion 3. Livestock systems and feeding strategies.

ETSIAAB 7:30 – 18:00 ETSIAAB

Attendees will enter the experimental facilities to see some of the feeding technologies that are being tested to increase the sustainability of these confined livestock systems. After the visit to the farm, there will be a guided visit to the UNESCO cultural heritage city of Segovia.

Excursion 4. Biotechnology and N fixation.

ETSIAAB 9:15 – 17:30 Museo del Prado

Participants will visit CBGP (INI-CSIC/UPM), one of the top research centers on biotechnology in Europe. In addition to a guided visit at the Center, participants will hear two talks on the work carried out to increase the capacity of fixing N by cereals (a project funded, among others, by Gates Foundation). After this visit, attendees will be taken to Prado Museum in the city, to enjoy a guided visit to one of the most amazing art museums of the world.

Excursion 5. A break from N.

ETSIAAB 12:30 – 17:30 Reina Sofía

Excursion number 5 is the only one designed with no scientific side. This excursion will take participants across “Madrid de los Austrias”, one of the oldest areas of the city. Then, participants will enjoy a guided visit to Reina Sofía Museum and Art Center, one of the most famous Contemporary Art Museums worldwide, where, among other masterpieces, Guernica (by Pablo Picasso) is exhibited.

Thursday 27th October

From 9:00 to 10:00

Keynote 5 “System approaches: N abatement scenarios”

Room 1

Chair: *Alberto Sanz-Cobeña*

By *Gilles Billen*



Gilles Billen got his PhD at the Free University of Brussels in 1976, where he later headed the Group of Aquatic Environmental Microbiology for 15 years.

He was mostly active in studying microbial processes in estuarine and marine areas, in connection with the cycles of carbon and nutrients. In 1997, he moved to Paris, and joined the CNRS, for taking, until 2007, the direction of the National Research Program on the Seine river (PIREN-Seine). He played a leading role in the development of biogeochemical modelling tools, aimed at testing scenarios for water resources management.

He also participated in various international forums, such as the SCOPE-UNESCO Global NEWS program and the NinE (Nitrogen in Europe) ESF Network, and participated to the editorial team of the European Nitrogen Assessment.

He is now conducting interdisciplinary research on agro-food systems, developing, among other things, future scenarios for feeding France, Europe and the World with agro-ecological agriculture using no synthetic fertilizers and pesticides.

Sessions from 10:00 to 11:15

Regular Session “Crops 5” (Plant-Soil system) Sub-topic: Modelling

Room 1

Chairs: *Klaus Butterbach-Bahl and Diego Ábalos*

Abstract title & authors

- 10:00 Investigating the scope for N surplus reductions in Flevoland using WOFOST extended with N-limited growth.
Herman N.C. Berghuijs, Joao Vasco Silva, Pytrik Reidsma, Allard J.W. De Wit. REMOTE
- 10:15 Optimum N intensity in arable crop systems: a model based analysis using different GHG-indicators.
Dorothee Neukam, Rima Rabah Nasser, Jarno Rouhiainen, René Dechow, Henning Kage.

- 10:30 Dynamic monitoring of winter wheat N fertilization through the APPI-N method: an experimental evaluation.
Raphael Paut, Pierre Lebreton, Marie-Hélène Jeuffroy, Jean Marc Meynard.
- 10:45 Effects of crop residue management on N-balance and N₂O inventories on European croplands. A multi-modelling evaluation.
Marco Carozzi, Edwin Haas, Klaus Butterbach-Bahl, Clemens Scheer, Raia-Silvia Massad.
- 11:00 Use of Random Forest to predict the main factors that affects ammonia volatilization in Mediterranean climate cropping systems.
Juliana Hurtado Patiño, Eduardo Velázquez, Luis Lassaletta, Guillermo Guardia, Eduardo Aguilera, Alberto Sanz-Cobeña.

**Regular Session “Livestock 6” (Animal system
& Animal-Plant-Soil system)
Sub-topic: Livestock emissions at the system-based level**

Room 2

Chairs: Rachel Thorman and Jean Ometto

Abstract title & authors

- 10:00 The Manureshed Initiative: Reconnecting animal and crop production to reduce fertilizer reliance.
Sheri Spiegel, Peter Kleinman, Ray Bryant, Curtis Dell, Colton Flynn, Robb Meinen, Gwendwr Meredith, Shabtai Bittman. REMOTE
- 10:15 Maximizing food production while minimizing inputs in three French farming systems: studying optimised compositional changes from a nitrogen perspective.
Corentin Pinsard, Francesco Accatino.
- 10:30 Ley grazing in Integrated Crop Livestock Systems (ICLS) for sustainable dairy systems in NW-Europe.
Friedhelm Taube, Thorsten Reinsch, Carsten Malisch, Ralf Loges. REMOTE
- 10:45 Modelling nitrogen flows on African smallholder farms; many challenges and some solutions.
Nicholas Hutchings, Winnie Ntinyari, Jonathan Vayssières, Claudia Arndt. REMOTE
- 11:00 When the baseline meets the present: reactive N emissions in wildlife- vs. livestock-dominated African landscapes.
Agustín del Prado, Pablo Manzano, Guillermo Pardo.

Special Session “Remote sensing 1” (Remote sensing & precision agriculture)

Room 3

Coordinators of the special session: *Miguel Quemada and Jose Luis Pancorbo*

Abstract title & authors

- 10:00 **Special Session invited keynote:** Optimizing the nitrogen management on the farm level by using proximal and remote sensing
Urs Schmidhalter
- 10:45 Multi-platform remote sensing of nitrogen status and leaching from agricultural fields with random forest regression approach.
Vita Antoniuk, Junxiang Peng, Mathias Neumann Andersen, Kiril Manevski.
- 11:00 Improving Nitrogen Use Efficiency through Precision Nutrient Management in Winter Wheat and Maize Cropping Systems.
John D. Jones, Carrie A.M. Laboski.

Coffee/Snack

Sessions from 12:00 to 13:30

Roundtable “Livestock feed”

Room 1

Title: How much further can be reduce emissions by nutritional means?

Chair: David Yáñez-Ruiz. Spanish Research Council, CSIC

Odón Sobrino. Spanish Ministry of Agriculture (MAPA): Factors affecting the overall nitrogen balance in livestock production. Getting the numbers right

Araceli Orozco. Interporc: Pork Sector: Sustainability strategies to reduce nitrogen

Jaume Coma. CESFAC: Latest technical improvements in pigs feeding and future possibilities

Alejandro Belanche. University of Zaragoza: Latest technical improvements in ruminants feeding and future possibilities

Regular Session “Agro-Food 2” (Agro-Food system) + “Landscape 1” (Landscape system) Sub-topic: N and ecosystem health

Room 2

Chairs: *Josette Garnier and Rasmus Einarsson*

Abstract title & authors

- 12:00 A detailed bottom-up characterisation of the nitrogen flow evolution of the Spanish Agro-Food System at the province and national level.
Alfredo Rodríguez, Alberto Sanz-Cobena, Eduardo Aguilera, Margarita Ruiz-Ramos, Miguel Quemada, Gilles Billen, Josette Garnier, Luis Lassaletta.
- 12:15 Nitrogen sources and fates in the agroecological transition. Integrated scenario modeling combining production and consumption measures in Spain.
Eduardo Aguilera, Gilles Billen, Mar Calvet, Josette Garnier, Manuel González de Molina, Gloria I. Guzmán, Alfredo Morilla, Alfredo Rodríguez, Alberto Sanz-Cobena, Marta Rivera-Ferre.
- 12:30 Nitrogen management in food production is a key driver of the energy budget of agricultural systems.
Petros Chatzimpiros, Souhil Harchaoui.
- 12:45 Assessing nutrient fate from terrestrial to freshwater systems in Fuxian Lake Basin, China.
Jinhui Zhou, Peter M. van Bodegom, José M. Mogollón.
- 13:00 Ammonia measurements for ecosystem protection: considerations for the design of a monitoring network
Alexander Moravek, Markus Geupel, Simone Richter.

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- 13:15 Temporal variations of atmospheric ammonia revealed from space: from long-term global trends to weekly cycle and intraday variability.
Martin Van Damme, Lieven Clarisse, Bruno Franco, Trissevgeni Stavrakou, Roy Wichink Kruit, Cathy Clerbaux, Pierre-François Coheur.

Special Session “Remote sensing 2” (Remote sensing & precision agriculture)

Room 3

Coordinators of the special session: *Miguel Quemada and José Luis Pancorbo*

Abstract title & authors

- 12:00 Comparison between hyperspectral indices and traits derived from biophysical model for assessing winter wheat genotypes performance.
María D. Raya-Sereno, Paola Bongiovani, Carlos Camino, José L. Pancorbo, José L. Gabriel, Nicolas Vuille-dit-Bille, Juan Herrera, Pieter S.A. Beck, Miguel Quemada.
- 12:15 Future Farm: Technology solutions for improved nitrogen application in Irrigated Cotton, Australia.
Tim Weaver, Peter Grace, Stephen Leo, Kellie Gordon.
- 12:30 Proximal sensing by RGB camera to assess N content at plant leaf.
Jiftah Ben-Asher.
- 12:45 Removing soil background to improve the prediction of wheat nitrogen traits with UAV imagery.
Andrés F. Almeida-Nañay, Ana M. Tarquis, Juan López-Herrera, Enrique Pérez-Martín, José L. Pancorbo, María D. Raya-Sereno and Miguel Quemada.
- 13:00 Wheat nutritional status estimation based on chemometric methods combining proximal and UAV-based measurements.
Marie-Astrid Bouchard, A.L.Herinaina Andriamandroso.
- 13:15 Effect of split N-fertilization timing on yield and quality in oat cultivars.
Sofia Delin, Lena Engström.

Lunch

From 14:45 to 15:45

Keynote 6 “Farmers involvement in N abatement”

Room 1

Chair: *Maria Luz Cayuela*

By *Jill Baron*



Jill S. Baron is a Senior Scientist with the U.S. Geological Survey, specializing in ecosystem ecology. Her interests include applying ecosystem concepts to management of human-dominated regions, and understanding the biogeochemical and ecological effects of climate change and atmospheric deposition on mountain ecosystems.

Since 2017 she has served on the project management board of the International Nitrogen Management System, a program that brings together the science community, the private sector and civil society to gather and synthesize evidence that can support international policy development to improve global nitrogen management.

Baron is founder and Co-Director of the John Wesley Powell Center for Earth System Science Analysis and Synthesis. She is also founder and Principal Investigator of the Loch Vale Watershed long-term monitoring and research program in Rocky Mountain National Park, which, since 1983, seeks to understand the ecological and biogeochemical implications of atmospheric deposition and climate change.

Baron was President of the Ecological Society of America in 2014 and is a Certified Senior Ecologist. She is a Fellow of the Ecological Society of America and the American Association for the Advancement of Sciences. Dr. Baron received her Ph.D. from Colorado State University in 1991 and has undergraduate and master's degrees from Cornell University and the University of Wisconsin.

Coffee/Snack

Sessions from 16:15 to 17:45

Regular Session “Crops 6” (Plant-Soil system)
Sub-topic: Grasslands

Room 1Chairs: *Cameron Gourley and Agustín del Prado***Abstract title & authors**

- 16:15 Optimising Nitrogen Use Efficiency on Grasslands.
Gerard H. Ros, *Sven E Verweij, Wim Bussink.*
- 16:30 Potential role of plant diversity in optimising nitrogen cycling in a Mediterranean grassland.
Alba Llovet, *Rosa Llurba, Salvador Aljazairi, Mercedes Ibañez, Stefania Mattana, Maria-Teresa Sebastià, Angela Ribas.*
- 16:45 Tropospheric ozone and atmospheric nitrogen deposition effects on nitrogen cycling in Mediterranean annual pastures.
Ignacio Gonzalez-Fernandez, *Raquel Ruiz-Checa, Tania Carrasco-Molina, Susana Elvira, Miguel Quemada, Victoria Bermejo-Bermejo.*
- 17:00 Riparian buffer strips influence N-losses as nitrous oxide and leached N from upslope permanent pasture: evidence from a field experiment and a meta-analysis.
J.C. Dlamini, *E.H. Tesfamariam, R.M. Dunn, N. Loick, A.F. Charteris, L. Cocciaglia, S. Vangeli, M.S.A. Blackwell, H.R. Upadhayay, J. M. B. Hawkins, J. Evans, A.L. Collins, L.M. Cardenas.*
- 17:15 Nitrogen use efficiency by pasture after sewage sludge addition in the region of Galicia (NW Spain).
Alvarez-Lopez V., *Rigueiro-Rodriguez A., Mosquera-Losada R. REMOTE*
- 17:30 Nitrogen but not phosphorus addition affects symbiotic N₂ fixation by legumes in natural and semi-natural grasslands located on four continents.
Eduardo Vázquez, *Per-Marten Schleuss, Marie Spohn.*

Regular Session “Landscape 2” (Landscape system) Sub-topic: Agriculture

Room 2

Chairs: *Patrick Durand and Victoria Bermejo*

Abstract title & authors

- 16:15 In search for the missing nitrogen in lowland agricultural basins: soils and canal networks as denitrification hotspots.
Elisa Soana and Giuseppe Castaldelli.
- 16:30 Nitrogen fluxes and use efficiency in cropland and grazing systems in the Upper Paraguay Basin, Pantanal, Brazil.
Karina Tosto, Felipe S. Pacheco, Jean Ometto.
- 16:45 Comparing global regions using Pressure-State-Impact metrics of nitrogen threats.
David Hooper, Cargele Masso, Luis Lassaleta, Mark Sutton, Jill Baron, Hideaki Shibata. REMOTE
- 17:00 Carbon-Nitrogen coupling in arable cropland soils: data at the plot scale in the central Paris basin.
Josette Garnier, Gilles Billen.
- 17:15 Increasing tropospheric ozone impacts wheat nitrogen use efficiency.
Chang-Espino M.C, Bermejo-Bermejo V., Araus J.L., Samuel Prieto-Benitez, Tania Carrasco, Gonzalez-Fernandez I. REMOTE
- 17:30 Monitoring atmospheric deposition of nitrogen at the landscape level in Germany from 2005 till 2020
Stefan Nickel, Winfried Schröder REMOTE

Special Session “Remote sensing 3” (Remote sensing & precision agriculture)

Room 3

Coordinators of the special session: *Miguel Quemada and José Luis Pancorbo*

Abstract title & authors

- 16:15 Assessment of different N treatments in Hedgerow Almond Orchards by means of LiDAR point clouds.
Leire Sardonis-Pozo, Jordi Llorens, Àlex Escolà, Jaume Arnó, Miquel Pascual Roca, José A. Martínez-Casasnovas.
- 16:28 Accurate assessment of grass nitrogen status based on multispectral data from two optical sensors and the critical nitrogen dilution curve.
Shaohui Zhang, Poul Erik Lærke, Mathias Neumann Andersen, Kiril Manevski.
- 16:41 Analysing the optical response of nitrogen and phosphorous addition on a semi-arid grassland using hyperspectral field spectroscopy and airborne data.
Rosario Gonzalez-Cascon, Javier Pacheco-Labrador, J., Vicente Burchard-Levine, Mirco Migliavacca, Tarek El-Madany, Arnaud Carrara, Lucia Casillas-Martinez, Gerardo Moreno, M. Pilar Martín.
- 16:54 Hyperspectral and thermal sensors for distinguishing between nitrogen and water stress in winter wheat.
Jose L. Pancorbo, Carlos Camino, María Alonso-Ayuso, María D. Raya-Sereno, Ignacio Gonzalez-Fernandez, Jose L. Gabriel, Pablo J. Zarco-Tejada, Miguel Quemada.
- 17:07 Wheat grain protein content estimated by machine learning from hyperspectral and thermal remote sensing images
Andrew Longmire, Tomás Poblete, James Hunt, Deli Chen, Pablo Zarco-Tejada
- 17:20 Tree based leaf N prediction and management zones as tools to optimize N application And minimize leaching.
Shahar Baram, Eran Rave, Bar Peltin, Tuvia Turkeltaub, Anna Beryozkin, Raphael Linker, Dolev Termin, Tarin Paz-Kagan
- 17:33 Optimal nitrogen management in rice and wheat based on normalized difference vegetation index using sufficiency index.
Hafeez ur Rehman, Imran Ali, Jalal Hussain, Muhammad Sanaullah, Abdul Wakeel. **REMOTE**

Poster Session from 17:45 to 18:45

Poster Session 2.1 (Remote sensing)

Exhibition 1

Chair: *Belen Diezma*

Abstract title & authors

Sensing Nitrogen dynamics in spatially and temporally diversified cropping systems.

Md Tawhid Hossain, *Sonoko D. Bellingrath-Kimura and Kathrin Grahmann.*

Fine-tuning fertilization strategies to local production conditions through on-farm experimentation.

Ángel Maresma, *Israel Carrasco.*

Winter wheat traits prediction through ensemble modeling approaches using hyperspectral and Sentinel-2 imagery

José L. Pancorbo, *María Alonso-Ayuso, Carlos Camino, María D. Raya-Sereno, Íñigo Molina, Pablo J. Zarco-Tejada, José L. Gabriel, Miguel Quemada*

High-resolution airborne hyperspectral data for spring wheat assessment: yield, biomass, grain N concentration and N output.

María D. Raya-Sereno, *J. Ivan Ortiz-Monasterio, María Alonso-Ayuso, Francelino A. Rodrigues, Lorena González-Perez, Miguel Quemada.*

High-resolution hyperspectral imagery and ground-level sensors to detect N fertilizer rate and residual effect in winter wheat

María D. Raya-Sereno, *María Alonso-Ayuso, José L. Pancorbo, José L. Gabriel, Carlos Camino, Pablo J. Zarco-Tejada, Miguel Quemada*

Monitoring agricultural patterns in Central Valley, California during a multi-year drought with AVIRIS imagery

J. L. Pancorbo, *M. Quemada, Dar A. Roberts*

Nitrogen status monitoring of sugarbeet crop with ground and remote level sensors

Juan Manuel Arroyo-Sanz, *Jose Soler-Rovira, Miguel Llorente-Manas, Ivan Martin, Elba Rosique, Maria Cabrera*

Developing a new tool for N optimization and precision agriculture in potato farm

Francesca Degan, *Grégory Vericel, Cyril Hannon, Anaïs Tourse, Jean-Pierre Cohan*

Poster Session 2.2 (Agro-food system)

Exhibition 2

Chair: *Eduardo Aguilera*

Abstract title & authors

Food Waste Management towards Nitrogen Recovery.

Tapan K. Adhya, *Snehasish Mishra.*

Wheat flour fortification for post COVID nutritional support to vulnerable segments through food distribution networks in Pakistan.

Muhammad Umair Arshad, *Florencia Vasta, Farrah Naz, Faiz Rasool, Ali Imran, Hameedullah Babar.*

Assessing the Tradeoffs and Synergies Between Sustainable Development Goals and Nitrogen Management.

Kevin Jackson, *David Kanter, Eric A. Davidson, Xin Zhang.*

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Nitrogen Footprint comparison of a Spanish Research Center under COVID-19 pandemic conditions.
Sara Martínez, **José Luis Gabriel**, Sergio Álvarez, Raúl San Juan, María del Mar Delgado.

The Portuguese nitrogen footprint, a challenge in a Mediterranean country.
Soraia Cruz, Joana Marinheiro, Cláudia M.d.S Cordovil, Allison Leach, James Galloway.

Poster Session 2.3 (Crops Emissions)

Exhibition 3

Chair: Hanne Lakkenborg

Abstract title & authors

The source and rate of N fertilizer influence N assimilation and ammonia and nitrous oxide emissions from wheat.

Marieme Drame

Reabsorption of ¹⁵N enriched ammonia by a winter wheat crop at two different growth stages.

Jonas Fröböl, Reiner Ruser, Torsten Müller.

Reducing ammonia emissions from field applied fertilizers – comparing multi-plot approaches for ammonia measurements.

Hannah Götze, Sina Kukowski, Jonas Fröböl, Alexander Kelsch, Heinz Flessa, Andreas Pacholski.

NH₃-Min project: Reducing NH₃ losses from application of synthetic nitrogen fertilizers and increasing nitrogen use efficiency of fertilization.

Sina Kukowski, Andre Acksel, Julian Brokötter, Nicolas Brüggemann, Christian Brümmer, Christine von Buttler, Annette Freibauer, Jonas Fröböl, Hannah Götze, Jörg Michael Greef, Paul Heinemann, Mareike Hofemeister, Julia Jaquemotte, Henning Kage, Martin Kaupenjohann, Alexander Kelsch, Sandra Kiesow, Karolin Müller, Torsten Müller, Andreas Pacholski, Sandra Riesch, Reiner Ruser, Urs Schmidhalter, Sebastian Wulf, Heinz Flessa.

Cover crop's effect on agricultural soils mineral N dynamics and nitrous oxide emissions.

Victoria Nasser, Miriam Helfrich, Lisa Idler, Klaus Dittert.

Optimising N₂O measures following the application of mineral and organic nitrogen fertiliser to sugarcane.

Daniel Poultney, Frédéric Feder, Charles Detaille, Laurent Thuriès and Antoine Versini.

Organic vs. synthetic fertilization of silage maize: N₂O emissions from digestate and urea.

Leonardo Verdi, Peter Kuikman, Marco Mancini, Simone Orlandini, Anna Dalla Marta.

Impact of different nitrogen rates on ammonia volatilization and nitrogen use efficiency of wheat (*Triticum aestivum* L.).

Muhammad Rizwan, **Abdul Wakeel**, Muhammad Rizwan Shahid, Muhammad Sanaullah, Faisalabad-Pakistan

Greenhouse gas emissions from cultivated soils vs riparian areas in the Sorraia Valley, Portugal.

David Fanguero, Cláudia Cordovil, Maria do Rosário Cameira.

Understanding cover crop traits as drivers of nitrogen losses

Carlos R. Fernandez Pulido, Jim Rasmussen, Jørgen Eriksen, **Diego Abalos**

Effect of crop diversification on soil N₂O emissions in semiarid Mediterranean conditions.

Irene Martin Brull, **María Alonso Ayuso**, Carlos Cantero Martinez, Victoria Lafuente, Ana Bielsa, Fernando Gómez Valenciano, Jorge Álvaro-Fuentes.

Effects of different nitrogen fertilization sources and rates on nitrogen use efficiency and N₂O emissions of tropical forage grasses

Mike Bastidas, Daniel M. Villegas, Alejandro Ruden, Idupulapati M. Rao, Nelson J. Vivas-Quila, Jhon F. Gutierrez³, Miguel Amado, Carlos Berdugo, Jacobo Arango

Nitrous Oxide Emission Dynamics in Sri Lankan Paddy soils under controlled water management

Lakshani M M T, Chamindu Deepagoda T K K, **S.P. Nissanka**, Senanayake D M J B

Gala Dinner

Friday 28th October

From 9:00 to 10:00

Keynote 7 “NUE in livestock systems”

Room 1

Chair: *Barbara Amon*

By *Aimable Uwizeye*



Dr Aimable Uwizeye is interested in global change towards sustainable agri-food systems focusing on the modelling of nitrogen flows and greenhouse gas emissions, and design of alternative futures of livestock systems.

He is a Livestock Policy Officer at the Food and Agriculture Organization of the United Nations (FAO). He has experiences in livestock development, one health and environmental assessment.

He leads a programme aiming at improving the sustainability of livestock systems, while considering its vulnerability to climate change, reducing its environmental impacts and addressing food security.

He holds a doctorate in Veterinary Medicine, a double master's degree in Sustainable Development in Agriculture and a PhD in Global Animal Production systems from Wageningen University and Research (NL).

Poster Session from 10:00 to 11:00

Poster Session 3.1 (Circular economy)

Exhibition 1

Chair: *José Mogollón*

Abstract title & authors

Taking advantage of drainage water from a modernized irrigation district in the Ebro basin to reduce the nitrogen input in downstream traditional district.

Víctor Altés, Pierre Laluet, Miquel Pascual, Olivier Merlin, Josep Maria Villar.

Agronomic evaluation in different crops of a bio-stabilized Municipal Solid Waste.

María del Mar Delgado, José Luis Gabriel, Raúl Allende, Raúl San Juan, Sara Martinez.

N and C in composting processes: Mass balance and GHG emissions.

Ana García Randez, Luciano Orden, José Sáez-Tovar, Ma Ángeles Bustamante, Ma Dolores Pérez-Murcia, Javier Andreu, Enrique Agulló, Encarnación Martínez-Sabater, Raúl Moral.

The potential of N recovery from agrofood waste: the case study of Valencia Region (Spain).

Ana García Randez, David Alfonso, Ma Dolores Pérez-Murcia, Luciano Orden, José Sáez-Tovar, Ma Ángeles Bustamante, Javier Andreu, Enrique Agulló, Encarnación Martínez-Sabater, Raúl Moral.

Filters made by waste to fix N gas emissions from slurry.

Adrián González-Guzmán, Antonio Rafael Sánchez Rodríguez.

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Circular Economy Model of Nitrogen Management and Bioenergy Production from Waste Water.
Inga Grinfelde, Alina Rozenvalde, Dace Grazule, Jovita Pilecka-Uļčuģačeva, Linda Grinberga, Kristaps Siltumens, Anda Bakute, Juris Burlakovs.

Emergy approach to the sustainable use of ecosystems towards better land management
Joana Marinheiro, Ana Fonseca, João Serra, Cláudia Marques-dos-Santos Cordovil, Christine Watson.

Revealing stakeholders' perceptions of N-fertilizing practices in SUDOE herbaceous agroecosystems.
Ivanka Puigdueta, Hamid Yammine, Irene Blanco, Guillermo Guardia, Carmen Galea, Juliana Hurtado, Alberto Sanz-Cobena.

Comparison of the ammonia trapping performance of different gas-permeable tubular membrane system configurations.
María Soto-Herranz, **Mercedes Sánchez-Báscones**, Pablo Martín-Ramos.

LIFE Green Ammonia project: Market technology based on membranes for ambient ammonia reduction in livestock farms.
Mercedes Sánchez-Báscones, María Soto-Herranz, Pablo Martín-Ramos.

An integrated innovative approach for sustainable delocalization of manure nitrogen in orchards
Elio Dinuccio, Luca Rollè, Flavia Dela Pierre, Martina Friuli, Gianfranco Airoidi, Paolo Balsari

Challenges for the development of the gas-permeable membrane technology for the recovery of nitrogen from wastewater: the LIFE Green Ammonia Project.
María Cruz García-González, Berta Riaño, Beatriz Molinuevo-Salces, Berta Gil

Harnessing Reactive Nitrogen in Integrated Food Production, Bioremediation and Energy Generation Systems.
Georgina Robinson, **Alasdair. O'Dell**

Poster Session 3.2 (Landscape)

Exhibition 2

Chair: *Martin Van Damme*

Abstract title & authors

Closing the gap: soil greenhouse gas emissions in a Holm oak forest.
Raquel Ruiz-Checa, Laura Sánchez-Martín, Hugo Pérez-Jordán, Sonia García, **Rocío Alonso**.

Long-term Trajectories of Soil Nitrogen Surplus Across Europe (1850-2019).
Masooma Batool, Fanny Sarrazin, Sabine Attinger, and Rohini Kumar.

Atmospheric deposition of organic nitrogen (DON and WSON) in Spanish Mediterranean forests.
David Elustondo, Ander Aranguren, Rocío Alonso, Héctor García-Gómez, Jesús Miguel Santamaría, Raquel Ruiz-Checa, Carolina Santamaría, Anna Àvila, Esther Lasheras.

Nitrous oxide emissions in riparian zones of the SUDOE territory. Static and automatic chambers methodology.
Carmen Galea, Luis Lassaletta, Juliana Hurtado, Antonio Vallejo, José Miguel Sánchez, Sabine Sauvage, Maria do Rosário Cameira, Roxelane Cakir, Rasmus Einarsson, Jaime Recio, Hamid Yammine, Eduardo Aguilera, Alberto Sanz-Cobena.

Impact of agricultural management changes on the risk for habitat conservation in protected areas in Spain.
Héctor García-Gómez, Rasmus Einarsson, Eduardo Aguilera, Hans van Grinsven, Mark Theobald, Marta G. Vivanco, Tania Carrasco-Molina, Luis Lassaletta, Alberto Sanz-Cobena.

Development of new fertilizers based on urea coated with biopolymers and biostimulants: CALL FOR PARTNERS.

Mohammed BENBRAHIM, Laurent KREMER.

Foliar nitrogen uptake in a Mediterranean forest: a fertilization experiment with labeled nitrogen.

Raquel Ruiz-Checa, Hugo Pérez-Jordán, Héctor García-Gómez, Samuel Prieto-Benítez, Victoria Bermejo-Bermejo, Rocío Alonso.

N cycling in food/excretion systems: the potential of human excretions used as fertilizers.

Thomas Starck, Fabien Esculier.

The fate of nitrogen in the urban area – the case of Zielona Góra, Poland.

Monika Suchowska-Kisielewicz, Wilfried Winiwarter, Barbara Amon, Katrin Kaltenegger, Andrzej Jędrzak, Sylwia Myszograj, Ewelina Płuciennik, Andrzej Greinert.

The impact of riparian buffers on N loading in the Nooksack River transboundary watershed.

Astoria Tershy, David Hooper.

Poster Session 3.3 (Crops processes)

Exhibition 3

Chair: *João Serra*

Abstract title & authors

Root traits explain multitrophic interactions of soil microfauna on N mineralization and plant growth.
Junwei Hu, Ummehani Hassi, Mesfin Tsegaye Gebremikael, Kenneth Dumack, Tom De Swaef, Steven Sleutel, Stefaan De Neve.

Nitrogen availability and losses from digestates, organic and mineral fertilizers.

Mohammed BENBRAHIM, Laurent KREMER, Jessica HAAS.

Results from a novel woodchips bioreactor test center may improve the performance of field-based woodchips bioreactors.

Finn Plauborg, Maja H. Skjødt, Arnaud Jégliot, Joachim Audet, Carl C. Hoffmann, Brian H. Jacobsen.

Understanding the inconsistency in performance of nitrification inhibitors by exploring their interactions in soil.

Ben A. Rigby, Clayton Butterly, Deli Chen, Helen C. Suter.

Productivity improvements of rubber with application of different sources of fertilizers.

D.N. Jayasinghe and S.P. Nissanka.

The humic-acid activation of nutrient transporters in the root is mainly regulated by jasmonic acid and indoleacetic acid.

Olaetxea, M., Erro, J., Zamarréño, A.M., Garcia-Mina, JM.

Nitrate signal use as potential modulator of plant metabolism in ammonium-fed crops.

Aitziber Calleja-Satrustegui, Mikel Rivero-Marcos, Idoia Ariz.

Ntrace, an advanced tool for analysing ¹⁵N tracing data.

Jansen-Willems, A.B., Zawallich, J., Müller, C.

Impact of missing inputs and outputs in agri-environmental N indicators

João Serra, Rosário Cameira, Cláudia Cordovil, Joana Marinheiro, Luis Lassaletta, Eduardo Aguilera, Sergiy Medinets

Identification of Rice Genotypes with Efficient Nitrogen Use by Assessing Phenotyping and Molecular Traits.

R.M.N.H. Senanayake, D.M.J.B Senanayake, N.A.A.S.P. Nissanka.

Coffee/Snack

Sessions from 11:40 to 13:10

Regular Session “Crops 7” (Plant-Soil system) Sub-topic: Processes

Room 1

Chairs: *Vincent Aduramigba-Modupe and Maria Dolores Raya*

Abstract title & authors

- 11:40 Crop development controls denitrification through Carbon exudation, Nitrogen and water uptake.
Pauline Sophie Rummel, Jonas Eckeï, Reinhard Well, Amanda Matson, Klaus Dittert.
- 11:55 A global synthesis of soil denitrification: driving factors and mitigation strategies.
Baobao Pan, Longlong Xia, Shu Kee Lam, Enli Wang, Yushu Zhang, Arvin Mosier, and Deli Chen.
- 12:10 Nitrogen immobilisation, mineralisation, and uptake of silage maize and sugar beet following cover crops from different functional groups.
Insa Kühling, Thomas Rübiger, Mirjam Helfrich, Simone Merl, Roland Fuß, Heinz Flessa², Michaela Schlathölter, Heinz-Josef Koch, Dennis Grunwald, Lisa Essich, Reiner Ruser, Henning Kage.
- 12:25 Abiotic nitrogen cycle in agricultural soils: NO_x fixation/emission through photocatalytic reactions.
Antonio Rafael Sánchez-Rodríguez, José María Méndez, Ute Skiba, Davey L Jones, Dave R Chadwick, Elena Gómez Álvarez, María del Carmen del Campillo, Rafael BA Fernandes, Vidal Barrón.
- 12:40 Agro-physiology of grasses and legumes destined for biorefining of protein – effects of defoliation and fertilization regimes.
Kiril Manevski, Uffe Jørgensen.
- 12:55 Soil nitrogen enrichment using biomass of *Gliricidia sepium* injected with labelled ¹⁵n fertilizer and subsequent recovery by *Zea mays*.
S P. Nissanka and U. R. Sangakkara.

Regular Session “Landscape 3” (Landscape system) Sub-topic: Global

Room 2

Chairs: *Lex Bouwman and Estela Romero*

Abstract title & authors

- 11:40 Impacts of anthropogenic nitrogen inputs on the spatial variation in greenhouse gas exchange at global scale.
Wim de Vries, *Lena Schulte-Uebbing, Naiqing Pan, Rita van Dingenen, Klaus Butterbach Bahl, Enzai Du, Massimo Vieno and Hanqin Tian.*
- 11:55 Nitrogen oligotrophication: How can it be?
Peter M. Groffman.
- 12:10 Spatially explicit targets for nitrogen use efficiency to keep food production within environmental boundaries.
Lena Schulte-Uebbing, *Wim de Vries, Gerard Ros, Astrid Berendsen, Arthur Beusen, Lex Bouwman.*
- 12:25 N human inputs into the biosphere: nutrient imbalances and their impacts on environment, food security and human wellness.
Josep Penuelas, *Jordi Sardans.*
- 12:40 Region oriented and integrated approach to reduce emissions of nitrogen and greenhouse gasses to the environment.
Hans Kros, *Edo Gies, Piet Groenendijk, Twan Cals, Jan Peter Lesschen, Jan Cees Voogd, Tia Hermans, Gerard Velthof.*
- 12:55 Urban Nitrogen Budgets – Comparison Across Cities.
Katrin Kaltenecker, *Xiangwen Fan, Samuel Guéret, Monika Suchowska-Kisielewicz, Wilfried Winiwarter.*

Special Session “Circular economy 1”

Room 3

Coordinators of the special session: *Raúl Moral and Maria Cruz García*

Chairs: *Maria Cruz García and Beatriz Molinuevo*

Abstract title & authors

- 11:40 Recovery of ammonia from livestock and municipal wastewater using gas-permeable membranes: Effect of carbonate alkalinity.
Matias Vanotti, *Patrick Dube, Raul Moral, Maria Cruz Garcia-Gonzalez.*
- 11:55 Futurability of our nitrogen use connecting humanity and nature.
Kentaro Hayashi, *Yoshinori Nakagawa, Hideaki Shibata, Keisuke Koba, Kazuyo Matsubae, Koichi Kuriyama, Tatsuyoshi Saijo.*
- 12:10 Fertilization strategies in organic winter wheat for bread quality.
Sofia Delin, *Lena Engström.*

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- 12:25 Global nitrogen demand, waste, and potential circularity under nationally sourced EAT-Lancet diets.
José M. Mogollón, *Nicolas H. Navarre.*
- 12:40 Revealing stakeholders' perceptions of N-fertilizing practices in SUDOE herbaceous agroecosystems.
Ivanka Puigdueta, *Hamid Yammine, Irene Blanco, Guillermo Guardia, Carmen Galea, Juliana Hurtado, Alberto Sanz-Cobena.*
- 12:55 Recoupling global livestock and crops through managing trade.
Chuanzhen Zhang, *Baojing Gu, Shu Kee Lam, Emma Liang, Deli Chen.*

Lunch

From 14:30 to 15:30

Keynote 8 “N dynamics in river basins”

Room 1

Chair: *Lena Shulte-Uebbing*

By **Estela Romero**



Dr Estela Romero is an ecologist interested in the impact of human activities on organisms and processes in aquatic environments. She studied Environmental Sciences and specialized in Marine Ecology during her PhD. She has worked in research institutions in Spain, the UK and France, and on projects concerning terrestrial, marine and freshwater issues.

The global dimension of the biogeochemical cycles and their unique role in linking terrestrial and marine systems has become the main focus of her current research work. In particular, Dr Romero addresses the question of how global challenges related to water and food security will affect the biogeochemical fluxes of N and P along the aquatic continuum and the impacts this may have on freshwater and marine communities. Dr. Romero is currently a researcher at CREAM, and an assistant professor at the University of Barcelona.

Sessions from 15:30 to 17:00

Regular Session “Crops 8” (Plant-Soil system)
Sub-topic: Enhanced Efficiency Fertilizers

Room 1

Chairs: *Jose Luis Gabriel and Beatriz Gómez-Muñoz*

Abstract title & authors

- 15:30 Barriers and opportunities for developing next-generation enhanced efficiency fertilizers.
Deli Chen, Shu Kee Lam, Helen Suter, Frank Caruso, Uta Wille, Hang-wei Hu, Bill Malcolm, Emma Liang, Charlie Walker, Michael Wilkes.
- 15:45 Leached nitrogen losses from urea fertiliser with and without urease and nitrification inhibitors.
Alison Carswell, William Roberts, Marieme Drame, Maria Oszvald, Martin Jemo, Guy Kirk, Sigrid Heuer, Tom Misselbrook.
- 16:00 Nitrate leaching in maize and wheat irrigated cropping systems under nitrification inhibitor and/or intercropping effects.
Raúl Allende-Montalbán, Diana Martín-Lammerding, María del Mar Delgado, Miguel A. Porcel and José L. Gabriel.
- 16:15 Reducing reactive nitrogen losses and improving nitrogen use efficiency in rice-wheat system using nitrification and urease inhibitors.
Arti Bhatia, Sandeep Kumar, Ritu Tomer, Shikha Sharma, Niveta Jain, Julia Drewer, Bob Rees, Himanshu Pathak and Mark A Sutton. **REMOTE**
- 16:30 Effect of tillage and DMPA on the fate of N and N₂O emission in a Mediterranean barley crop. A field ¹⁵N tracing study.
Sandra García-Gutiérrez, Guillermo Guardia, Mónica Montoya, Rocío Rodríguez-Pérez, Antonio Vallejo, Sonia García-Marco.
- 16:45 Degradation of the Nitrification Inhibitor 3,4-Dimethylpyrazole Phosphate in Soils: Indication of Chemical Pathways.
Parvinder Kaur Sidhu, Bethany Isabel Taggart, Deli Chen and Uta Wille.

Regular Session “Landscape 4” (Landscape system) Sub-topic: Aquatic

Room 2

Chairs: *Sabine Sauvage and Elisa Soana*

Abstract title & authors

- 15:30 The quest for efficient nutrient restoration strategies of aquatic ecosystems: an exploratory study.
Angel Udías, *Bruna Grizzetti, Olga Vigíak. REMOTE*
- 15:45 Integrated policy options to reduce future nitrogen load to surface waters.
Arthur Beusen, *Jan Janse, Peter van Puijenbroek, Paul Giesen, Lex Bouwman.*
- 16:00 Long-term trajectories of nitrogen and phosphorus point sources from wastewater to German river systems.
Fanny Sarrazin, *Sabine Attinger, Rohini Kumar.*
- 16:15 Strong hydroclimatic controls on vulnerability to subsurface nitrate contamination across Europe.
Rohini Kumar, *Falk Heße, P.S.C. Rao, Andreas Musolff, James W. Jawitz, Fanny Sarrazin, Luis Samaniego, Jan H. Fleckenstein, Oldrich Rakovec, Stephan Thober and Sabine Attinger.*
- 16:30 Optimizing Denitrifying Bioreactor Installation in the Chesapeake Bay Watershed to Treat Legacy N Pollution.
Sarah Kinz, *Kelly Cobourn, Kurt Stephenson, Zach Easton.*
- 16:45 Three decades of nitrogen fluxes in freshwaters and to the seas in Europe: a historic and regional analysis.
Olga Vigíak, *Angel Udías, Brunna Grizzetti, Michela Zanni, Alberto Aloe, Franz Weiss, Jordan Hristov, Berny Bisselink, Ad de Roo, Alberto Pistocchi.*

Special Session “Circular economy 2”

Room 3

Coordinators of the special session: Raúl Moral and Maria Cruz García

Chairs: *Maria Cruz García and Beatriz Molinuevo*

Abstract title & authors

- 15:30 Distribution of livestock populations and excretion relative to human populations in Canada: Implications for nitrogen circularity.
Shabtai Bittman, Derek Hunt, Devon Worth, Sheri Spiegel, Peter Kleinman, Joao Vendramin, Maria Silveira, Colton Flynn, Keith Reid, Tim Martin, Andrew VanderZaag. **REMOTE**
- 15:45 Comparative consequential LCA: microbial fertilizers grown on potato wastewater, common organic fertilizers, and mineral fertilizers.
Julia Santolin, Siegfried Vlaeminck, Marc Spiller. **REMOTE**
- 16:00 New composting technology as a potential tool for valorizing agri-food wastes into compost and liquid nitrogen fertilizer.
Mesfin T. Gebremikael, Dorian Medrano, , Hanne Lakkenborg Kristensen.
- 16:15 Sewage sludge and its value-added products for nitrogen circular economy: Opportunities and challenges.
Muhammad Riaz, Maryium Adil
- 16:30 Production of Smart Biofertilizers from recovered nutrients: a step forward to turn WWTPs into biofactories.
G. Noriega-Hevia, A. Mayor, A. Sánchez, L. Rodríguez, C. M. Castro-Barros.
- 16:45 Nutrient cycling indicators and their relation with nutrient use efficiency in agro-food systems.
Hein F.M. ten Berge, Marloes van Loon, Wytse Vonk.

Closing session Debate. The Madrid Declaration and Conclusions.

From 17:00 to 18:00

David Kanter, Corentin Pinsard, Luis Lasaletta and Alberto Sanz Cobeña

+ Farewell coffee

Poster Remote (on the meeting web)

Poster Remote Crops

Abstract title & authors

Effect of DMP-based nitrification inhibitors and soil pH on nitrifying and denitrifying soil bacterial populations.

Teresa Fuertes-Mendizábal, Ximena Huérfano, Miren K. Duñabeitia, Carmen González-Murua, José M^o Estavillo.

Nitrification inhibitors and soil pH effect on N₂O emissions in a cut grassland.

Ximena Huérfano, Teresa Fuertes-Mendizábal, Miren K. Duñabeitia, Carmen González-Murua, José María Estavillo.

Unveiling of genetic factors regulating nitrogen uptake and utilization in wheat (*Triticum aestivum* L.)

Rubab Iqbal, Aysha Kiran, Muhammad Ramzan Khan, Muhammad Kashif Naeem, Abdul Wakeel.

Nitrogen use efficiency of wheat as affected by variable potassium sources and nitrogen levels.

Aysha Kiran, Abdul Wakeel, Zunaira Bano, Rania Baloch.

The role of biological nitrogen in plant nitrogen nutrition on sod-podzolic soils of Russia.

Sergei Lukin.

Linking root traits and N₂O emissions from grassland soils.

Arlete S. Barneze, Jan Willem van Groenigen, Gerlinde B. De Deyn, Jørgen Eriksen, Diego Abalos

Agro-ecological validation of an organic fertigation protocol in areas vulnerable to nitrate contamination

Cristina Romero-Triguero, José María Bayona, María Puerto Sánchez, Felipe Bastida, Ana Belén Mira, Emilio Nicolás

Impact of Nitrogen Addition on CO₂ emissions at Different Stages of Plant Residue Decomposition.

Ahmad Mujtaba, Abdul Qadeer, Tahseen Afzal, Abdul Wakeel and **Muhammad Sanullah**.

Biochar production from forest waste as a source of nitrogen and phosphorus.

Nuria Ferreira-Domínguez, **Subhi Salman**, María Rosa Mosquera-Losada.

Poster Remote Livestock

High animal comfort and low emissions in a new housing system for pigs.

Helmut Doehler, Susanne Doehler.

Poster Remote Mix systems

Abstract title & authors

Nitrification potential and N₂O emissions assessment from processed slurry under controlled conditions.

Álvaro Doblás-Rodrigo, Mikel Anza, Haritz Arriaga, Laura Rincón, Pilar Merino.

Soil nitrogen modelling in grasslands of the north of Spain under conventional and rotational grazing scenarios.

Álvaro Doblado-Rodrigo, Raphaël Martin, Katja Klumpp, Pilar Merino.

Greenhouse gasses emission as affected by dairy manure fall-applied to a Silvopastoral system based on Pecan in Argentina.

Fernanda Figueiredo Granja Dorilêo Leite, Gustavo Sebastián Cambareri, Claudia Faverin³ and Marcelo Beltrán.

Integrated approach to estimation of nitrogen use efficiency in intensive dairy husbandry at farm level in the North-West Russia.

Aleksandr Briukhano, **Eduard Vasilev**, Natalia Kozlova and Ekaterina Shalavina.

Poster Remote Remote Sensing

Hyperspectral imaging for the assessment of mineral nutrition status in peach trees

Lourdes Lleó, Pilar Barreiro, Victoria Lafuente, Natalia Hernández-Sánchez, Jesús Val

Poster Remote Landscape

Abstract title & authors

Integrating environmental sustainability efforts across community and university bounds: A case study with Charlottesville City, Albemarle County, and the University of Virginia.

Elizabeth Dukes, James Galloway.

The "Atmosphere" pool flows within National Nitrogen Budget for Belarus.

Olga Krukowskaya, **Hanna Malchykhina**.

Integrity and potential future development of forests in Germany exposed to atmospheric nitrogen deposition and climate change in Germany.

Martin Jensen, Stefan Nickel, **Winfried Schröder**.

Estimation of Nitrogen budget in the transboundary river catchments of Eastern Europe dominated by agricultural activities

Sergiy Medinets, Oksana Butrim, Lidiya Moklyachuk, Tommy Dalgaard, Volodymyr Medinets

Nitrogen fluxes due to agricultural activities and wastewater management in Turkey.

Aysun (Vatansever) Boşça, Selim Latif Sanin.

Poster Remote Circular

Abstract title & authors

Surface Modification of Coal and its Application to Mitigate Ammonia Loss from Livestock Manure.

Wei Zhang, Deli Chen, Ji-Zheng He, Clayton Butterley, Bing Han.

The National Fertilizer Plan and its implications for nitrogen sustainability in Brazil.

Gisleine Cunha-Zeri, Jean Pierre Ometto, Evandro Albiach Branco.

Assessment of N mineralization from pelletized and non-pelletized composts through an incubation experiment.

Virgínia Takata Vidal, Cláudia Vitória, María Cruz García-González, **Carmo Horta**

