



INMS Lisbon: Further information on Regional Demonstrations in 'Towards INMS'

April 2015

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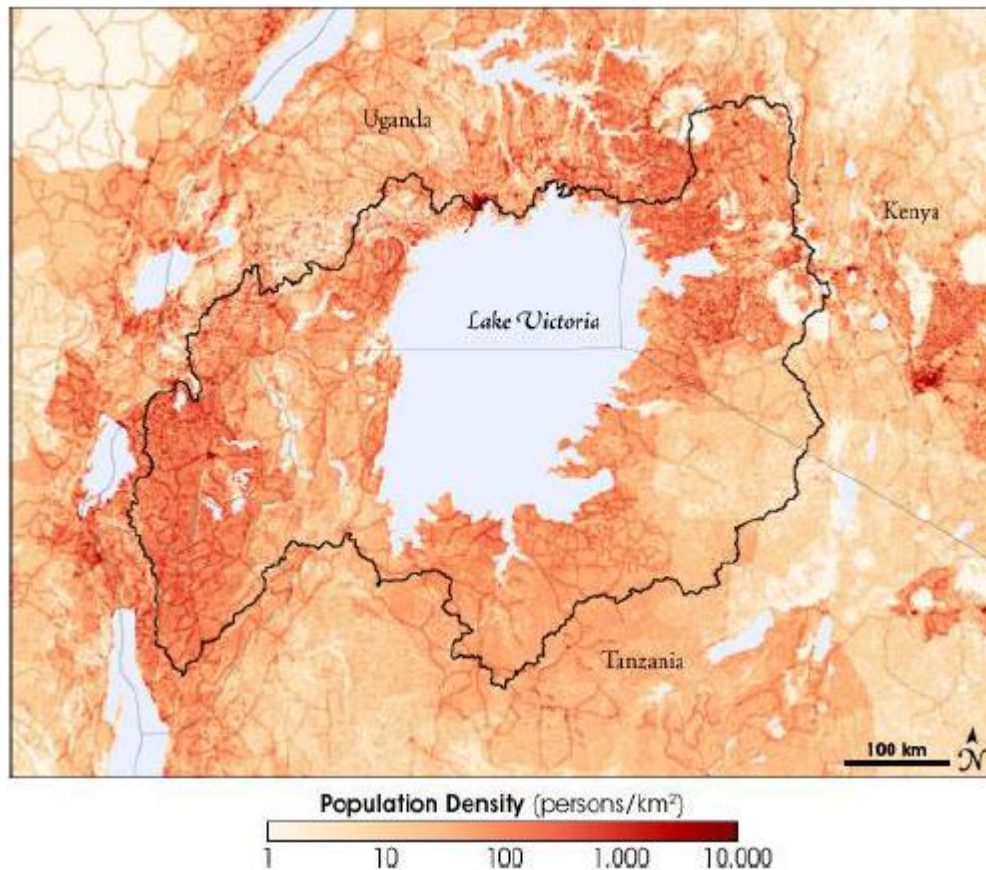
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East Africa

Proposed countries included the demonstration region:

Lake Victoria Basin (LVB). Countries covered: Burundi, Kenya, Rwanda, Tanzania, and Uganda.



Population around the Lake Victoria Basin LVEMP 2005 (Lake Victoria Basin Commission 2012)

Key nitrogen challenges for this region:

Most of the wastewater from the residential areas and the industry is discharged to water bodies without or with minimum treatment to remove nutrients such as nitrogen. Inadequate farming systems also contribute to N loading into the lake as a consequence of deforestation and encroachment to wetlands or other marginal lands because of population pressure. Recently, atmospheric N deposition has also been identified as a threat to the Lake. The current positive trend of fertilizers adoption is also expected to contribute to N loss to the environment. There is a need to assess the percent contribution of each source to N loading into the lake. Mitigation of N loss to the environment in the LVB will also require adequate assessment of the loss paths and strengthening policy interventions at the regional level.

Planned institutions involved:

There is a need to organize the interested and potential stakeholders into a forum to improve the synergy; this has not been done yet. So far, individuals from the following institutions have shown interest in the initiative: (i) ILRI (Butterbach Bahl Klaus), (ii) CIFOR (Mariana Rufino), (iii) Ghent University (Pascal Boeckx), (iv) Laboratoire d'Aérodynamique Observatoire Midi-Pyrénées (Corinne Galy-Lacaux), (v) Lake Victoria Basin Commission (LVBC), and (vi) IITA (Cargele Masso). IITA has already submitted an expression of interest and its co-funding will be mainly in-kind. The expression of interest of the other institutions still has to be verified. Other institutions that may contribute to the initiative include AGRA and IPNI based on their participation in the Africa Regional Centre of the INI. CIAT (an expert in hydrology), CIMMYT (an expert in modelling), and ICIPE (an expert in socio-economy) will be approached to contribute to the initiative.

Regional intergovernmental environment programme (ensuring a clear policy audience):

LVBC has shown interest in a recent discussion with both the Director of the Africa Regional Centre of INI and the INI Chair.

Which 'case' this demonstration activity supports:

Case 2: Challenges and opportunities for developing areas with insufficient N_x.

Nitrogen science partnership(s) already existing in the region: IFDC, AGRA, IPNI, IITA, ILRI, CIFOR, LVBC, CIAT, CIMMYT, ICIPE, and national research organizations among others. It is worth mentioning that other organizations with activities in the region will also be considered as mentioned above (i.e. planned institutions). There is also an African Regional Centre of INI.

Nitrogen science-policy engagement already existing in the region: As well as the activities of the INI African Regional Centre, LVBC can continue to engage national and international development partners such as UNEP.

Existing regional/national N assessments or synthesis documents available:

Hickman, J.E., Havlikova, M., Kroeze, C., Palm, C.A. (2011). Current and future nitrous oxide emissions from African agriculture. *Current Opinion in Environmental Sustainability*, 3, 370-378.

Leip, A., Leach, A., Musinguzi, P., Tumwesigye, T., Olupot, G., Tenywa, J.S., Mudiope, J., Hutton, O., Cordovil, C.M.D.S, Bekunda, M., Galloway, J. (2014). Nitrogen-neutrality: a step towards sustainability. *Environmental research letters*, 9, 1-10

Rufino, M.C., Brandt, P., Herrero, M., and Butterbach-Bahl, K. (2014). Reducing uncertainty in nitrogen budgets for African livestock systems. *Environmental Research Letters*, 9, 1-14

Zhou, M., Brandt, P., Pelster, D., Rufino, M.C., Robinson, T., Butterbach-Bahl, K. (2014). Regional nitrogen budget of the Lake Victoria Basin, East Africa: syntheses, uncertainties, and perspectives. *Environmental resources letter*, 9, 1-10

East Asia

Proposed countries included the demonstration region:

China, Japan, South Korea, Philippines

Key nitrogen challenges for this region:

- Large N loss and low N use efficiency in both China and Japan (including livestock husbandry)
- Farming is often not the mainstream or full-time profession of the farmers
- Advisory agencies are often dysfunctional
- Fertilizer subsidies encourage over-use
- Environmental consequences include surface water eutrophication and algal blooms and heavy N deposition levels
- There is low public awareness of the impacts of N pollution

Planned institutions involved:

- Institute of Soil Science, Chinese Academy of Sciences
- China Agricultural University
- National Institute for Agro-Environmental Sciences, Japan

Regional intergovernmental environment programme (ensuring a clear policy audience):

PEMSEA (Partnerships in Environmental Management for the Seas of East Asia), hosted in the Philippines, a partnership which includes a range of stakeholders of the Seas of East Asia.

Which 'case' this demonstration activity supports:

Case 1: Challenges and opportunities for developing areas with excess N

Nitrogen science partnership(s) already existing in the region:

- N Working Group, Soil Science Society of China
- Japanese Nitrogen Expert Group (in preparation on a voluntary basis)
- INI East Asia Regional Centre

Nitrogen science-policy engagement already existing in the region?:

PEMSEA is also relevant in this context as well as INI East Asia.

Existing regional/national N assessments or synthesis documents available:

Many individual datasets and evaluations are available, especially for crop production and animal production system. Synthesis would be the next step.



Eastern Europe

Proposed countries included the demonstration region: Black Sea basin

1. Dnieper (Ukraine, Belarus, Russia) [Fig. 1]
2. Dniester (Ukraine, Moldova) [Fig. 2]
3. Danube (Ukraine, Moldova, Romania) [Fig. 3]



Figure 1. Map of the Dnieper River Basin

http://www.karty.by/wp-content/uploads/2012/01/dniepr_basin.gif

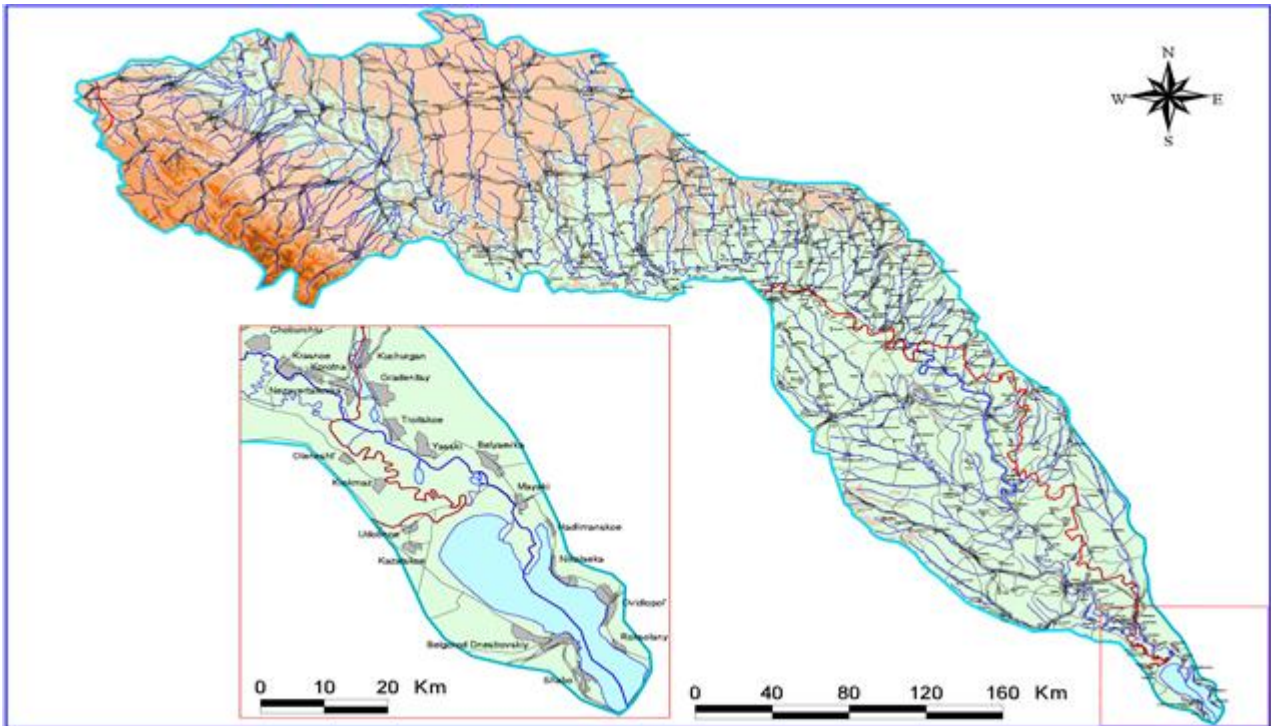


Figure 2. Map of the Dniester catchment area with proposed delta's area (the Low Dniester part) as the main case study region.



Figure 3. Map of the Danube River Basin

<http://commons.wikimedia.org/wiki/File:Muromian-map.png#/media/File:Muromian-map.png>

Key nitrogen challenges for this region:

Nitrogen threats:

1. Water quality (pollution, eutrophication, and acidification)
2. Soil quality (soil degradation - unsustainable deterioration of the soil as a habitat for biota, as well as yield reduction as a result of exposure to natural or anthropogenic factors. Soil degradation can be divided into physical (hydro-physical properties of the soil deterioration, disturbance of the soil profile), chemical (chemical deterioration of the soil, depletion of nutrients, loss of nitrogen compounds) and biological (reduction of species diversity, the violation of the optimum ratio of different types of soil macrofauna and microorganisms).
3. Air quality (bi-directional: emission of reactive N and deposition of reactive N as aerosols).
4. Degradation of Ecosystems and biodiversity (via deterioration of water, soil and air quality)
5. Impact to the Black Sea Nitrogen balance and eutrophication.

Challenges:

1. Characterization and quantification of main sources of N load (industry, agricultural, atmospheric transport, waste water) in the catchment of the Dniester (Dnieper, Danube) River
2. Quantification of N input parts of budget in case area from all possible sources in catchment of the Dniester (Dnieper, Danube) River (from water bodies, coasts, atmospheric deposition, agriculture and industrial activities, communal wastes as well as from basin's soils surface and underground leaching/seepage/washing)
3. Control of drinking, irrigation and underground water quality
4. Influence of N load to biodiversity and eutrophication in the Dniester (Dnieper, Danube) Delta (selection of sensitive species, relevant indicators).
5. Assessment of the Dniester (Dnieper, Danube) River catchment output parts of N Balance: water discharge into to the Black Sea (for the Black Sea Commission) and emission into the atmosphere
6. Assessment of data availability and trusted functionality for the region
7. Identify key uncertainties

Opportunities:

1. Propositions about the creation of a monitoring network for Nitrogen in region
2. Characterization of impacts of N balance changes (in terms of both negative impacts and beneficial effects (if any))
3. Recommendation for mitigation of well studied sources of reactive nitrogen with support of national government
4. Attraction of government, NGO's and public to N problem in region

Planned institutions involved:

Dnieper:

<i>No</i>	<i>Name of organization</i>	Has the partner previously submitted an INMS expression of interest?	Has the proposed partner shown an interest in being involved, but has not yet submitted an expression of interest?	Is this a potential partner that has not yet been approached?
1	Institute of Agroecology and Environmental Management of NAAS, Ukraine		Yes	
2	Odessa National I. I. Mechnikov University (ONU), Ukraine		Yes	
3	Russian organizations			<i>Possibly</i>
4	Belarusian organizations			<i>Possibly</i>

Dniester:

<i>No</i>	<i>Name of organisation</i>	Has the partner previously submitted an INMS expression of interest?	Has the proposed partner shown an interest in being involved, but has not yet submitted an expression of interest?	Is this a potential partner that has not yet been approached?
1	Institute of Agroecology and Environmental Management of NAAS, Ukraine		Yes	
2	Odessa National I. I. Mechnikov University (ONU), Ukraine		Yes	
3	Moldovian organisation			<i>Possibly</i>

Danube:

<i>No</i>	<i>Name of organisation</i>	Has the partner previously submitted an INMS expression of interest?	Has the proposed partner shown an interest in being involved, but has not yet submitted an expression of interest?	Is this a potential partner that has not yet been approached?
1	Institute of Agroecology and Environmental Management of NAAS, Ukraine		Yes	
2	Odessa National I. I. Mechnikov		Yes	

	University (ONU), Ukraine			
3	Moldovian organisation			<i>Possibly</i>
4	Romania organisation			<i>Possibly</i>

Regional intergovernmental environment programme (ensuring a clear policy audience):

Both the UNECE Convention on Long Range Transboundary Air Pollution (including through the Expert Panel on Nitrogen in EECCA Countries of the Task Force on Reactive Nitrogen) and the Convention on Transboundary Waters are relevant in this context.

Dnieper:

UNDP Project Document Governments of the Republic of Belarus and Ukraine and United Nations Development Programme. PIMS no. 3246. Implementation of The Dnipro Basin Strategic Action Program for the reduction of persistent toxics pollution.

Dniester relevant programmes:

Intergovernmental programmes between Ukraine and Moldova for Dniester catchment do not exist. Possible beneficiaries could be the following international bodies:

1. Bucharest Convention on the Protection of the Black Sea (the Black Sea Commission and its Secretariat).
2. The Convention on Long-Range Transboundary Air Pollution including EMEP Steering body
3. Organisation for Security and Cooperation in Europe

Which 'case' this demonstration activity supports:

Case 3: Nitrogen challenges and opportunities for regions with transition economies.

Nitrogen science partnership(s) already existing in the region:

- 1) In framework of EU FP6 Nitro Europe project (2006-2010)
- 2) In framework of EU FP6 Black Sea Scene project (2006-2009)
- 3) In framework of EU FP7 Black Sea Scene Upgrade project (2009-2012)
- 4) In framework of EU FP7 ECLAIRE project (2011-2015)

Nitrogen science-policy engagement already existing in the region?:

Again there are clear links with the Expert Panel on Nitrogen in EECCA Countries under the Task Force on Reactive Nitrogen of the UNECE LRTAP Convention.

Existing regional/national N assessments or synthesis documents available:

Regional/national reports focusing on N assessments are not currently available.

Some articles from ONU related to N measurements and assessments in Low Dniester basin and the Black Sea Basin have been published.

Moklyachuk L., Lukin S., Kozlova, N., Martkoplshvili M. Environmental pollution with active nitrogen from agricultural sources: the problem and its solutions // Agroecological journal. — 2014. — No. 1. — P. 13–20.

Latin America

Proposed countries included the demonstration region:

Argentina, Bolivia, Brazil, Paraguay and Uruguay (La Plata → ~4.2 million km²)



Key nitrogen challenges for this region:

The complex landscape, of the La Plata Basin (LPB), and societal arrangements result in a heterogeneous pattern of land use. There is a strong presence of commodities, such as soybeans, maize, wheat, sugarcane (bioethanol) and cattle, in the Cerrado and Atlantic forest areas in Brazil, pampas in Argentina and Paraguay, flooded and rich soils in Bolivian Chaco and Pantanal in Brazil and Bolivia (including the southern edge part of the Amazon biome). The rural and industrial production in the basin is responsible for about 2/3 of the GDP of the countries within the LPB. There is well established infrastructure, development of technology, marked trends, and some regulatory policies seen in the region, and within the countries. There is a big pressure on increasing agricultural activities in the region, which plays an important role in the international food market. Predicting and modelling Land Use Change and its impacts is critical to an effective and sustainable management scenario for the region.

Planned institutions involved:

Argentina, University of Buenos Aires;

Bolivia, Instituto Boliviano de Investigación Forestal (IBIF)

- The Brazilian partner (INPE) has submitted an expression of interest.
- Further partners have shown an interest in being involved but have not yet submitted expressions of interest
- There is a need to engage with partners in Paraguay and Uruguay

Regional intergovernmental environment programme (ensuring a clear policy audience):

This work will link with the Inter-American Institute for Global Change Research (http://www.iai.int/?page_id=1054), an “intergovernmental instrument by which scientists and decision makers of countries throughout the Americas might jointly address the critical issues associated with global change in the region. “

The demonstration will also make contact with the *Comité Intergubernamental Coordinador de los Países de la Cuenca del Plata (CIC)*, and the *Programa Marco para a Gestão Sustentável dos Recursos Hídricos da Bacia do Prata, Considerando os efeitos decorrentes da variabilidade e Mudanças Climáticas* (<http://projetoscic.org/a-bacia-do-prata>)

Which ‘case’ this demonstration activity supports:

This demonstration region covers both the challenges found in **Case 1** - Developing regions with excess reactive nitrogen & **Case 2**- Developing regions with insufficient reactive nitrogen.

Nitrogen science partnership(s) already existing in the region:

Nitrogen Cycling In Latin America: Drivers, Impacts and Vulnerabilities (Nnet). Partnership funded under the Coordinate Research network funding opportunity of the IAI. INI also has a regional centre in Latin America.

Nitrogen science-policy engagement already existing in the region?:

The INI Latin America Regional Centre is also relevant in this context.

Existing regional/national N assessments or synthesis documents available:

Bustamante MM, Martinelli LA, Ometto JPHB, Do Carmo JB, Jaramillo V, Gavito ME, Araujo, PI, Austin A, Pérez T, Marquina S. Innovations for a sustainable future: rising to the challenge of nitrogen greenhouse gas management in Latin America. *Current Opinion in Environmental Sustainability*, v. 9-10, p. 73-81, 2014.

Austin, A. T. ; Bustamante, M. M. C. ; Nardoto, G. B. ; Mitre, S. K. ; Perez, T. ; Ometto, J. P. H. B. ; Ascarrunz, N. L. ; Forti, M. C. ; Longo, K. ; Gavito, M. E. ; Enrich-Prast, A. ; Martinelli, L. A. . Latin America's Nitrogen Challenge. *Science (New York, N.Y.) JCR*, v. 340, p. 149-149, 2013.

Carmo JCB; Sousa Neto ER, Duarte Neto PJ, Ometto JPHB, Martinelli LA. Conversion of the coastal Atlantic forest to pasture: Consequences for the nitrogen cycle and soil greenhouse gas emissions. *Agriculture, Ecosystems & Environment (Print)*, v. 148, p. 37-43, 2012.

Barros V, Robin Clarke R, Silva Días P CLIMATE CHANGE IN THE LA PLATA BASIN. “Trends in the hydrological cycle of the Plata basin: Raising awareness and new tools for water management” of INSTITUTO INTERAMERICANO PARA EL CAMBIO GLOBAL (IAI), 219P.

Martinelli LA, Howarth RW, Cuevas, E. ; Filoso S, Austin A, Lara LBSL, Medina E. Sources of reactive nitrogen affecting ecosystems in Latin America and the Caribbean: current trends and future perspectives. *Biogeochemistry*, v. 79, p. 3-24, 2006.

