

ASIA-PACIFIC OUTLOOK

Organic phosphorus recycling and long-term phosphate fertilizer demand

by Patrick Heffer, IFA

At the 2010 IFA Crossroads Asia-Pacific Conference, participants' discussions included the outlook for organic phosphorus recycling and long-term phosphate fertilizer demand in Asia-Pacific. The half-day workshop on this topic featured three speakers who presented the situation in their respective countries: China, India and New Zealand.

China

In China, until the early 1950s all P inputs to agricultural land were of organic origin. It is estimated that some 1.2 Mt of P₂O₅ were applied through organic fertilizers in 1957, compared with only 0.05 Mt P₂O₅ through inorganic ones. The national P balance at that time was negative, estimated at -1.1 Mt P₂O₅. In 1980, total P inputs to crop land increased to 5.1 Mt P₂O₅, with 60 per cent coming from inorganic fertilizers. P balances have been improving steadily, to become positive in 1980 (+0.4 Mt P₂O₅).

The second national soil survey, carried out in the early 1980s, indicated that after mining of soil P reserves for several decades, some 80 per cent of China's arable land contained less than 10 mg P/kg of soil and half of it had a very low soil P level, below 5 mg P/kg of soil. In order to cope with this high prevalence of P deficiency, domestic P fertilizer consumption continued to increase. In 2000, total P inputs had risen to 15.5 Mt P₂O₅, of which 74 per cent was of inorganic origin. The national P balance strongly increased, to 4.9 Mt P₂O₅. As a consequence, the occurrence of P deficiency in Chinese agricultural soils declined steadily.

With the progressive accumulation of P in arable soils, it is estimated that, over the 1995-2000 period, the proportion of soils with P deficiency declined to 45 per cent. There is a need to continue improving soil P levels in some 40 per cent of Chinese agricultural soils. This requirement can be met partly through higher fertilizer application rates and better recycling of organic P sources. Domestic P fertilizer consumption is forecast to rise to 13.1-13.6 Mt P₂O₅ in 2015. Beyond 2015, demand would increase only modestly.

India

In India, some 80 per cent of the soil samples tested show low or medium P levels, with a large variation among Indian states. Similarly to China, India had historically negative P balances, as P inputs were not sufficient to offset P exports with the harvested product. In 2007/08, it is estimated that 7.5 Mt P₂O₅ was applied to agricultural land, with 5.5 Mt coming from inorganic fertilizers and 2.0 Mt from organic sources. Out of the 2.0 Mt from organic sources, 47 per cent was from farmyard manure and 47 per cent from compost. Assuming a limited increase in the recycling of P fertilizer sources, P fertilizer demand in India is forecast to continue rising steadily, to some 12 Mt P₂O₅ in 2020 and 14 Mt P₂O₅ in 2030.

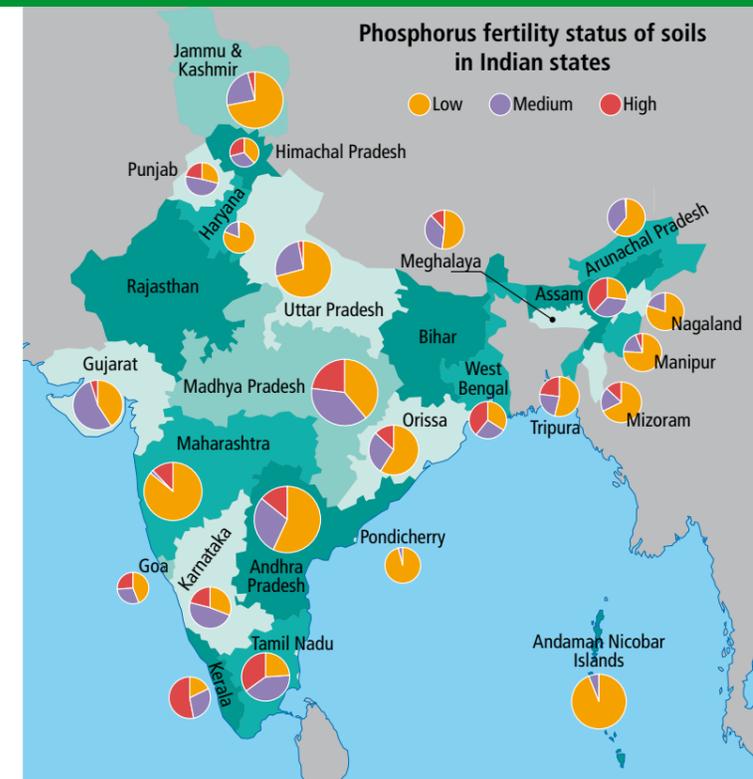
In China and India, it is difficult to assess the potential supply through the recycling of P contained in sewage sludge and to what extent, and when, this could have an impact on P fertilizer demand.

New Zealand

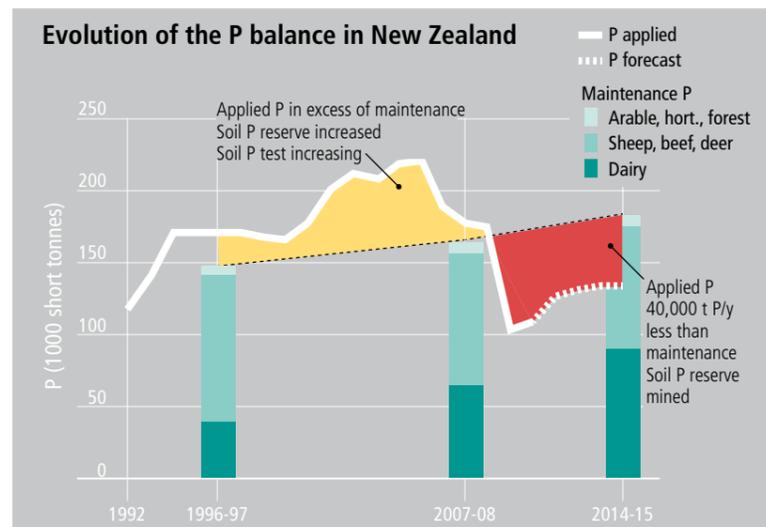
In New Zealand, there is a long history of P fertilization. P fertilizer demand is highly influenced by the livestock sector (mostly sheep and dairy cows). It is es-

timated that some 95 per cent of the P fertilizer used in New Zealand is applied to pastures. Large amounts of P are recycled through animal manure. National P balances were positive in the 1990s and up to 2007/08. With the sharp drop in P fertilizer consumption in 2008/09, the P balance became negative, estimated at some -60,000 t P. With the recovery of demand, the P balances would progressively recover. P applications are, however, forecast to remain some 40,000 t P below maintenance levels in the medium term. To rebalance inputs and outputs, there will be a need to increase P fertilizer use as there is little scope to increase P supply from organic sources.

For more details on the presentations: www.fertilizer.org/ifa/Home-Page/LIBRARY/Conference-papers/Crossroads-Asia-Pacific-Conferences/2010-Crossroads-Asia-Pacific



Adapted from Satish Chander

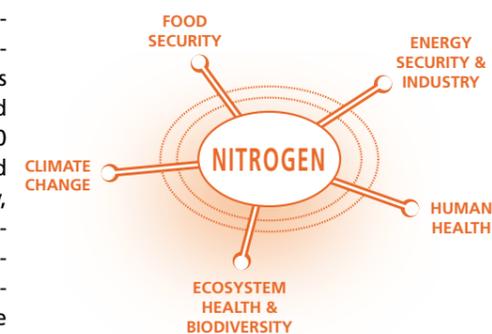


Outcome of the Fifth International Nitrogen Conference (N2010)

by James Galloway, Cheryl Palm, Manbir Sachdev, Yash Abrol, Mark Sutton, Nandula Raghuram and Martina Havlikova

The Fifth International Nitrogen Conference on Nitrogen Management for Sustainable Development – Science, Technology and Policy (N-2010) took place in New Delhi, India, on 3-7 December. It was hosted by the Indian Nitrogen Group of the Society for the Conservation of Nature, on behalf of the International Nitrogen Initiative (INI). The conference was attended by 345 scientists from 36 countries. The conference was supported by IFA, the Food and Agriculture Organization of the United Nations (FAO), the International Plant Nutrition Institute (IPNI), the United Nations Environment Programme (UNEP), the Dutch Ministry for the Environment (VROM), the Bill & Melinda Gates Foundation and the Packard Foundation, as well as several Indian industries and ministries. In addition to providing financial support, several of these organizations actively participated in the conference.

The overall objective of the INI is to optimize nitrogen's beneficial role in sustainable food production and to minimize its negative effects on human health and the environment. In that context, N2010 focused on the following themes: Food Security, Energy Security and Industry, Human Health and Environmental Degradation, Ecosystem Health and Biodiversity, Climate Change, and Integration. Within these themes, there were 175 verbal and 130 poster presentations. The conference noted that since the Fourth International Nitrogen Conference (Brazil, 2007) substantial progress had been made on: reducing emissions of nitrogen oxides (NO_x); linking the nitrogen and carbon cycles; establishing the Global Partnership on Nutrient Management (GPNM); planning for regional nitrogen assessments; and developing communication tools, such as the nitrogen footprint calculator. At the conclusion of the conference, the attendees approved the Delhi Declaration, which, among other points:



- affirmed the scientific findings that the global nitrogen cycle is one of the most anthropogenically altered nutrient cycles on earth, that the adverse consequences of unabated accumulation of reactive nitrogen compounds (in our soil, water, air and upper atmosphere) are real, for our health, environment and climate change, and that it is possible to reduce them by concerted (local, regional and global) action through science-based practices and policies;

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- recognized that the anthropogenic releases of reactive nitrogen vary hugely between countries, between regions within countries and between different economic sectors, and that the responsibility to mitigate the damage varies proportionately;
- affirmed that nitrogen from fertilizers, biological nitrogen fixation and recycling of organic residues is necessary for food security. However, leakage of reactive nitrogen from crop, animal, aquatic and industrial production systems into the environment is a cause for concern, whether the leakages are of chemical, biological or organic origin. It is possible to minimize these leakages through scientific and technical solutions and enabling policies. This includes ways to optimize the efficient use of inorganic and organic fertilizers worldwide, and to facilitate enhanced access and sustainable use of nitrogen inputs in the predominantly nitrogen-deficient soils of Africa and parts of Latin America and Asia;
- restated that nutritional inequities, whether due to overnutrition among some populations (especially from protein-rich animal products) or undernutrition in a significant fraction of the world, affect the health and sustainable development of both populations, as well as exacerbating disturbances in the nitrogen cycle. This necessitates better management of food chains and food security, particularly intensively managed livestock production systems, which cause excessive losses from nitrogenous excreta (urine, dung and other biological wastes) unless properly recycled;
- acknowledged that while fossil fuel and biomass combustion are currently necessary to meet demands for electricity, transportation and energy, reactive nitrogen by-products from these sources are a serious cause for concern;
- expressed concern that in a business-as-usual scenario, the problems associated with inefficient production and use of reactive nitrogen will multiply in the coming years, as the demand for food, especially animal proteins, and biofuels increases, fossil fuel and biomass burning increases, and growing urban populations produce more waste;
- encouraged co-ordination for interdisciplinary research, capacity building and policy within and between countries, intergovernmental bodies, the INI and civil society: a) to ensure adequate nitrogen availability for food and nutrition security in different regions, and b) to understand and mitigate the adverse impacts of accumulation of excess reactive nitrogen.

The attendees called upon United Nations bodies such as FAO, the UN Development Programme (UNDP), the UN Environment Programme (UNEP), the UN Human Settlements Programme

(UN-HABITAT) and the World Health Organization (WHO), as well as regional organizations, national governments, scientific communities including the Consultative Group on International Agricultural Research (CGIAR), industries, policy-makers, the INI and civil society, to address nutrient deficiencies and move towards increased efficiencies in each segment of nitrogen cycle management, in order to reduce the adverse effects. Approaches should consider the use of incentives, make full use of recycling and ensure the treatment of discharges. In conclusion, the conference agreed that policies developed to address societal issues should be "nitrogen proofed" to maximize the benefits and minimize the negative effects of reactive nitrogen. There is a pressing need for national governments to develop more integrated, rigorous and multi-disciplinary approaches for the management of sources, sinks, flows and effects of nitrogen and other nutrients at the local and national levels. These approaches must be based on consolidation and synthesis of existing data, identification of gaps to undertake necessary research, and the use of information to promote appropriate practices and technologies, with the accompanying policies encouraging adoption of "nitrogen proofed" best practice.

In that regard, regional assessments such as the European Nitrogen Assessment are required so as to frame issues of nitrogen deficiencies and excesses and mitigation options in policy relevant contexts, based on expert judgements of scientific knowledge and uncertainties. These regional assessments should lead to a similar framing of issues and options in a comprehensive global assessment for policy-makers.

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N2010 Conference: www.n2010.org/
Delhi Declaration: www.igbp.net/



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However, the text acknowledges that current emission reduction pledges need to be scaled up to meet the 2°C ceiling.

- Setting out of the monitoring, reporting and verification of developing countries' emission reduction pledges that involve international funding.
- Establishment of a new Green Climate Fund to help developing countries support climate action. The fund will be financed by industrialized countries, starting at US\$ 30 billion until 2012 and rising to US\$ 100 billion annually by 2020. The fund will be operated by the UN and the World Bank, with a board on which developed and developing countries are equally represented.
- A "Cancún Adaptation Framework" to enhance projects or adaptation to climate change in developing countries through increased financial and technical support.
- Adoption of a draft forest treaty, "REDD+", which enables action to reduce emissions from deforestation and degradation in developing countries. The mechanism will eventually allow the monetization of these countries' rainforests, and host nations will receive carbon credits for preserving forests. REDD+ had initially been considered the most likely agreement to come out of the conference. Unfortunately, the process of reaching such an agreement was slowed down throughout the two weeks.
- Approval of carbon capture and storage (CCS) projects, to be considered as GHG offsets under the Clean Development Mechanism (CDM) provided that issues such as permanence, boundaries and safety are addressed and resolved. The decision calls for rules concerning CCS projects to be finalized at the next climate talks in December 2011.

There was no agreement to commit to a second period of the Kyoto Protocol, which commits almost 40 developed nations to emission targets but expires at the end of 2012. The hard decisions on this subject have been deferred until next year's climate change conference in Durban.

Although several elements of the Copenhagen Accord have been officially recognized, Cancún's success remains modest since there were no binding commitments on emissions.

CANCÚN SIDE EVENTS

by Bill Herz and Clyde Graham

Agriculture and Rural Development Day

To help ensure global food security and avoid conversion of forests to farmland, more intensive agriculture is needed. This was a key conclusion by participants in Agriculture and Rural Development Day 2010, which took place on 2 December in Cancún. More than 400 policy-makers and negotiators, rural development practitioners, agricultural producers and representatives of civil society took part in this ARDD and related events. It is the second time the event has been held during the Climate Change Conference. The first time was in Copenhagen in 2009.

The final communiqué, formally presented to UN Framework Convention on Climate Change (UNFCCC) officials, stated that "More attention needs to be given to develop sustainable and productive agriculture systems on existing crop and pasture lands, to help reduce poverty and food insecurity, and the pressure on forests."

There was wide recognition by participants that the requirement to feed 9 billion people by 2050 (and to increase agricultural production by 70 per cent) will create pressure to cut down forests unless more food can be produced on existing farmland. This is consistent with the fertilizer industry's position that crop nutrients are essential if deforestation is to be prevented. There was also recognition that farmers in developing countries need more extension and technology:

There is a need to strengthen the capacity of national and regional institutions to achieve climate smart agriculture especially for smallholder farmers. Extension services need to be effective, expanded and funded to address the adaptation of livelihoods to climate change and help in the diffusion of technologies to farmers. Adaptation to and mitigation of climate change will require funding for interdisciplinary research that draws on the best of traditional knowledge and science to achieve more sustainable food and farming systems.

The communiqué pointed out that **UNFCCC negotiations now recognize the importance of food security, adaptation and productivity enhancements for agriculture, together with the importance of mitigating the significant emissions associated with agriculture.**

World Business Day

World Business Day at Cancún on 6 December focused on the concept of "building bridges" to increase the dialogue between business and government, as well as within the global business community, to deliver action and prevent unacceptable climate change. Christiana Figueres, Executive Secretary of the UN Convention on Climate Change, chided business leaders for being the real cause of a breakdown in negotiations in Cancún. She told more than 150 business leaders from companies including Coca Cola, Dow Chemical, BASF, Cemex, Arcelor Mittal, Royal Dutch Shell and KPMG that governments do not have the support they need from the corporate community to make tough decisions on climate change. The International Chamber of Commerce, on the other hand, has stated that although business is critical to curbing emissions, it has been shunned during the negotiations. In addition, a World Trade Organization official, Vesile Kulaçoğlu, has said that the WTO is rejecting calls for trade measures to protect trade sensitive industries in countries that establish aggressive emission reduction targets. According to Kulaçoğlu, protection for industry should be negotiated at the Climate Change Conference, not within the WTO.

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The next UN Climate Change Conference will be held in Durban, South Africa, in December 2011.

More information

- www.cfi.ca/nitrousoxideemissionreductionprotocol/
- Farming First and Climate Change: Farming First has interviewed many important figures related to climate change and agriculture. All the videos can be found at: www.farmingfirst.org and <http://vimeo.com/user1591868>

