

Phosphorus Cycle: Sustainable Management of Resources, Food Security and Environment



Workshop on

Phosphorus Cycle: Sustainable Management of Resources, Food Security and Environment

NASC Complex, New Delhi
18th -19th January, 2013

Proceedings & Recommendations

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Organized by
(Indian Nitrogen Group)
Society for Conservation of Nature

Funded by
Ministry of Earth Sciences, Govt. of India

Acknowledgement

ING-SCON has been actively engaged in research and policy aspects of reactive nitrogen from the point of view of agricultural nutrient use efficiency and limiting nitrogen emissions from other sectors to retard climate change. Since the launch of the Global Partnership on Nutrient Management (GPNM) and ING's engagement in the global dialogues as a member of the GPNM, ING has broadened its focus and interest towards other important nutrients such as phosphorus and look at them collectively from a nutrient management perspective. ING's work in the field of nitrogen and phosphorus management contributes both for the scientific and policy discourse in India and wider global debates that are pursued under the auspices of GPNM and the Global Environment Facility supported project Global foundations for reducing nutrient enrichment and oxygen depletion from land based pollution, in support of Global Nutrient Cycle. The workshop organized by ING with funding from the Indian Ministry of Earth Sciences are ING's contributions to promote effective nutrient management to achieve the twin goals of food security through increased productivity and conservation of natural resources and the environment.

The Organizers

Indian Nitrogen Group

Indian Nitrogen Group (ING) was established as a think-tank and policy forum under the umbrella of the Society for Conservation of Nature (SCON), by bringing together select Indian experts from diverse backgrounds to discuss the issue of N in the Indian environment. The group undertook a series of nationwide consultations with the National Academy of Agricultural Sciences (NAAS) in 2005 and the Department of Biotechnology (DBT), Govt. of India and Indian National Science Academy (INSA) in 2006, with active support from other agencies including the Ministry of Environment and Forests (MoEF), Govt. of India and Council of Scientific and Industrial Research (CSIR). The discussions on Nr and N use efficiency in Indian agriculture led to the adoption of a policy paper entitled “Policy options for efficient N use”. A network of researchers and science experts has also been formalized as an outcome of the INSA workshop in 2006. ING has begun to identify gap areas and catalyze research into them. ING came into contact with the International Nitrogen Initiative (INI), to address similar concerns and bring about international coordination. Other recent regional initiatives elsewhere, such as an organization called “Nitrogen in Europe” and the “NitroEuropeIP”, a project for integrated European research into the N cycle, highlight the growing concerns related to nitrogen at the national, regional or international level. ING will coordinate with such bodies to harmonize the national regional and international concerns and priorities on reactive N.

The Society for the Conservation

The Society for the Conservation of Nature (PRAKRITI) is a non-profit, non-governmental organization, registered with the Govt. of India under the Societies Registration Act XXI of 1980 on July 22, 1998. The registration no. of the society is 33194. Its registered office is situated at F-4, A Block, NASC Complex, Dev Prakash Shastri Marg, New Delhi 110012, India. It has been actively engaged in promoting research, education and awareness for preserving the environment against onslaught of industrial expansion, intensification of agriculture and adoption of resource intensive life styles. Since its inception, SCON has organized wide spectrum of activities including scientific talks, environmental awareness and community services. The society was established with the following aims and objectives:

- To acquaint the public at large with scientific basis on major environmental problems.
- To suggest better ways of utilization of natural resources like soil, water and air, climate and other genetic resources.
- To initiate dialogue with industry and scientific agencies to utilize biological resources.
- To emphasize particularly the role of women in controlling pollution at the household level and further educating the younger generations about the need to develop a clean environment.
- To collaborate with the international agencies and non-resident Indians to hold seminar/ workshops and publish state of the art report in research/ policy journals as well general publication of public interest.

Funding Agency

Ministry of Earth Sciences, Govt. of India

The Ministry of Earth Sciences (MoES) is mandated to provide the nation with best possible services in forecasting the monsoons and other weather/climate parameters, ocean state, earthquakes, tsunamis and other phenomena related to earth systems through well integrated programmes. The Ministry also deals with science and technology for exploration and exploitation of ocean resources (living and non-living), and play nodal role for Antarctic/Arctic and Southern Ocean research. The Ministry mandate is to look after Atmospheric Sciences, Ocean Science & Technology and Seismology in an integrated manner. The Earth Commission, Ministry of Earth Sciences works in Mission Mode based on Commission structure, is responsible for formulating policies, oversee implementation of policies and programs in mission mode, and ensure the necessary interdisciplinary integration.

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Foreword

Phosphorus is a key chemical element that is essential to life because of its role in numerous key molecules in the ‘storage and processing of genetic information’, as well as a major component in the “energy currency” of cells as ATP and of the redox generating molecules like NADP. Given this crucial role the pool of biologically available P controls ecosystem productivity including agriculture to a great extent.

Phosphorus plays a critical role in Indian Agriculture. As the proven reserves are of inferior quality, India’s import dependence for P is >90%. On Indian scenario, P is consumed to the extent of 7 million tonnes. Most of the P stays in the soil with some gradual movement to the rivers while in some regions, air movement is reported. With its poor use efficiency of approximately 20 per cent, emphasis needs to be placed on solubilization and increased recovery from the soil by root modification, microbial as well as mycorrhizal activities to reduce dependency on exogenous application of phosphatic fertilizers. Other possibilities are improvement in Food Chain Use Efficiency; to recover P from : **a.** human waste i.e urine and faeces; **b.** surface seas. The technologies need to be placed in order for all the possibilities. In other words, we need to move from **P PATHWAY TO P CYCLE.**

The Ministry of Earth Sciences (MoES), Govt. of India, considering their mandate to develop an intricate understanding of the Biogeochemical P Cycle as a step towards developing a land-water-air-ocean continuum, very kindly supported the initiative of holding the workshop on “Phosphorus Cycle: Sustainable Management of Resources, Food Security and Environment”.

The two-day deliberations that identified a number of researchable and policy issues need to be implemented by all users including ICAR Institutes/

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