

Establishing an IndoFlux: a long-term biogeochemical monitoring network in India to study global environmental change

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Rapid economic growth has often come at a price of unsustainable use of natural resources and rapid environmental degradation. As developed and developing nations continue on the path of unprecedented economic growth, the regional and global environment remain in threat. Global environmental change can have both local and global impacts and have serious implications for success of the Millennium development projects. GEC impacts resource availability and use; is tied to global awareness and education; disproportionately affects women and children through socio-economic burdens; is intricately linked to human health issues including spread of diseases and their vectors; critical for ecosystem health and environmental sustainability; as well as global partnerships, since agents of cause for environmental change and the affected can often be separated in time and space (for example citizens of Bangladesh are susceptible to changes in sea-level rise that is attributed to global environmental change due to disproportionate resource use by the developed and developing world).

The unprecedented increase in the rate of global environmental change has prompted various global advisories and actions. The stressors include changes in greenhouse gas emissions and global warming, as well as anthropogenically induced changes in global cycling of important bio-limiting elements such as nitrogen and phosphorus. As developing nations forge ahead with exceptional economic growth, it is unlikely that human population and pressures on our natural resources will abate in the near future. In all likelihood, global human and economic growth will contribute to increase in emissions of greenhouse gases with yet unpredictable consequences. Understanding the impact of diverse environmental stressors and development of efficient mitigating strategies requires an integrated effort of comprehensive long-term data collection, synthesis and analyses, which can also form the basis for informed policy decisions. In fact lack of availability and accessibility of robust scientific data from developing countries is one of the major factors that undermine the predictive capability of global and regional models on global climate and environmental change.

Globally, various countries have invested in long-term monitoring networks, which have already yielded dividends in terms of robust scientific data that have helped develop defensible resource management guidelines and policies. These global programs are a collection of regional efforts that while providing globally relevant data, also generate vital information that are regionally and nationally important. Currently there are no coordinated multidisciplinary long-term flux towers and biogeochemical monitoring programs in India to help assess the present status of the environment and create a baseline for environmental changes in the future. There are however many activities and programs underway in various agencies that can provide the basis for establishing the proposed long-term biogeochemical monitoring network.

Recently, we have initiated an effort to establish a long-term biogeochemical monitoring network across terrestrial, coastal and oceanic environments in the Indian subcontinent. The Department of Science and Technology, Government of India has taken a proactive role in establishing this network and filling this critical gap.

Through a series of planning meetings, the Department of Science and Technology, Government of India, has agreed to coordinate the establishment of an IndoFlux network. The concept has broad multi-agency interest and support. To facilitate this, in this bilateral workshop Indian and United States scientists will develop a blueprint for the IndoFlux. The first of such workshops held during July 2006 in Chennai, is jointly organized by Anna University, Chennai, India and the South Dakota School of Mines and Technology, in the USA. This workshop will be held under the aegis of the Department of Science and Technology, Government of India and the Indo-US Science and Technology Forum. This

bilateral workshop will partner a team of 17 multidisciplinary US scientists with their Indian counterparts to design guidelines for the IndoFlux. The outcome of the workshop will include a decision on placement of monitoring stations and an agreement on the instrumentation at these stations. Importantly, we will create an oversight committee, a scientific plan for the proposed network, a statement of strategic vision, as well as identification of near-term bilateral actions for sustained interactions.

For India, there is an urgent need to implement an integrated long-term monitoring program that will link terrestrial, coastal and oceanic processes. The proposed network will most certainly provide a map of various sources and sinks for carbon dioxide and other greenhouse gases from diverse Indian landscapes; will enable better representation of regional biospheric processes in global and regional climate models leading to improvements in our ability to predict climate change scenarios; provide information and strategies for mitigating domestic and global emission of these gases; enhance scientific inquiry and education; as well as provide the kind of robust scientific data that is central to developing long-lasting and defensible public policy. The infrastructure put in place through this initiative will help India manage its natural capital more effectively.