

## National Biodiversity Information Outlook – a roadmap for developing national biodiversity information infrastructure in India

Twenty-first century India provides several unique opportunities and challenges. Being one of the 17 megabiodiverse countries, it is supporting an estimated total of 7–8% of the globally documented species<sup>1</sup>. It is also advancing as a potential global economic powerhouse<sup>2</sup>. In the wake of its growing human population, India is experiencing increasing pressure on its bioresources and ecosystem services<sup>3</sup> due to high demand for food, water, fuel and raw materials<sup>4</sup>. Indian biodiversity researchers, governmental agencies, policy makers and even citizens are faced with challenges such as how to optimize food and water security together with sustainable biodiversity<sup>5,6</sup>. As a consequence, these stakeholders are acknowledging that it is essential to use and manage India's bioresources in a sustainable manner so as to ensure continued growth as a 'true global power'.

This has resulted into ever-increasing demand for timely discovery of and quick access to biodiversity data and information, as good data depicting the state of the biodiversity are vital to support responses to key issues related to biodiversity conservation and sustainable use of bioresources. While a plethora of biodiversity data and information are available and being generated, their adequate accessibility and use is limited due to scatteredness in diverse languages and digital and non-digital formats with researchers, institutions, universities and organizations<sup>7</sup>. In the recent past, biodiversity professionals in India have begun exploiting the power of information technology as a tool for organizing, disseminating, analysing, exchanging, publishing and discovering of biodiversity data and information<sup>7–14</sup>.

However, we lack national biodiversity information infrastructure that can enhance the discovery, accessibility and usage of available biodiversity data by creating interoperable framework of exchange and sharing of these resources<sup>15</sup>. This is irrespective of the fact that India has emerged as a global powerhouse of information technology. Information technology has further changed the ways biodiversity research is conducted, and has paved the way for a new multidisciplinary

field called 'biodiversity informatics'<sup>16,17</sup>. Thus, in our opinion, biodiversity informatics is the essential cornerstone for India's economic, environment and social well-being<sup>15,18</sup>. Therefore, a decentralized and distributed national biodiversity information infrastructure, the Indian Biodiversity Information Facility (INBIF) is urgently required. This will provide the much needed inter-operability mechanism as well as a exchange and sharing framework with several national and international biodiversity data initiatives. However, establishing such an infrastructure calls for consensus roadmap with stronger commitments from key stakeholders, beneficiaries and national funding agencies. The National Biodiversity Information Outlook (NBIO) has been initiated as a first step in this direction.

It is expected that NBIO will help in providing up-to-date assessment on the status of: (i) biodiversity data and information in India; (ii) use of biodiversity data for informed decision-making and governance; (iii) informatics infrastructure to acquire, manage, store, disseminate and analyse biodiversity data; (iv) use, implementation and need for standards, tools and processes in biodiversity informatics; (v) socio-cultural and economic challenges for and of biodiversity informatics; (vi) capacity building, incentives, impact and metrics for furthering and accounting progress in biodiversity informatics, and (vii) networking, engagement and outreach to foster and advance the science and practice of biodiversity informatics.

Further, it is also envisaged that NBIO will provide the roadmap for making comprehensive progress in biodiversity informatics so as to ensure that investments in this new emerging area remain ecologically, socially and economically relevant. It is imperative to have a sound rationale for every rupee invested in the planning and operationalization of INBIF. Such an investment will assist in addressing national challenges both in medium and long term. Thus, NBIO will be fundamental for sustenance and relevance of INBIF.

In view of the increasing attention to biodiversity conservation and a similar global initiative to develop 'Global Bio-

diversity Informatics Outlook (GBIO)<sup>19,20</sup> undertaken by the Global Biodiversity Information Facility, NBIO development is a timely initiative. Thus, as a first step towards this, the Ministry of Environment and Forests and the National Biodiversity Authority (NBA), Government of India and the Wildlife Institute of India, Dehradun have been assigned the task to prepare a strategic vision for the development of NBIO. The NBIO is expected to be released during the 11th meeting of the Conference of the Parties (CoP) to the Convention on Biological Diversity (CBD) in Hyderabad, in October 2012. The NBIO team has launched a national survey to identify; (i) major obstacles constraining the use, exchange and sharing of biodiversity data; (ii) barriers hampering progress in biodiversity informatics and (iii) crucial issues related to biodiversity data and information needs to be addressed over the coming decade. Based on the responses to the survey and questions by the stakeholders, a draft outline of NBIO was formulated. This formed the basis of a national consultation through a brainstorming workshop on NBIO, involving key researchers, policymakers and government representatives held during 20–21 August 2012 at New Delhi. The results from the survey and brainstorming session are being used for developing and finalizing the NBIO 2012. The authors would like to urge biodiversity stakeholders to participate in this initiative (<https://www.surveymonkey.com/s/NBIO>) and provide their valuable feedback for the development of a comprehensive vision document for ensuring effective progress in biodiversity informatics and in achieving CBD Aichi targets<sup>21</sup>.

In the short term, NBIO will help develop the roadmap for establishment of INBIF. In the long term, increased accessibility to biodiversity data will help develop national strategy and action plans (NBSAPs)<sup>22</sup> that are informed and accurate. Such NBSAPs will go a long way in ensuring sustainable management of our precious biodiversity resources.

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