

Biodiversity conservation and impact assessment

After the convention on biological diversity (CBD) came into force from 29 December 1993, it is mandatory for all its signatory countries to implement the provisions in the Convention (UNEP, 1992)¹. The CBD was developed as an umbrella agreement to encompass three main components – conservation of biodiversity, its sustainable use and sharing the benefits arising from it. Initiatives at local, national, regional and international levels began with a big aplomb immediately but only a few were success stories. At the national level, several countries including India started working on these issues and the government of India is developing a couple of Acts to protect the biodiversity and share the benefits as well as to look at methodologies for protecting the rights of breeders and farmers.

Whatever may be the initiative, all the signatories are meeting once in ap-

proximately 18 months to take stock of the situation, especially looking at each other for success stories and failures, with an intention to learn from them. Several countries like Canada, European Union, Indonesia, and Philippines were among the first few to look into details of the implementation of the Convention and had several programmes set-off.

The basic need for all such implementation processes has been assessing of the impact of efforts and activities. These impacts, in general, are social, economic and environment-based. However, environmental impact assessment (EIA) is the most common approach and is well structured in several countries to look at both developmental and conservation activities. But what is missing is the component of biodiversity impact assessment (BIA) as a part of the EIA process².

The role of EIA in taking care of biodiversity is often limited but it led to

the development of the BIA process and later emerged to integrate the strategic environmental assessment (SEA) approach into conservation.

How to assess the impact of biodiversity conservation is the principal question which needs to have supportive answers from scientific, economic and social angles. For this we may need to look at existing tools and develop new methods. The BIA exercise is to achieve integration needed to spur innovative solutions which concern conservation, use and benefit sharing at the core of the planning process.

Articles 6, 8, 10, 11, 14 and 20 of the CBD call for sustainable action to conserve biodiversity (Box 1). The CBD also recognizes the value of impact assessment as a tool for integrating biodiversity into decision-making processes and provides a strong international mandate in Article 14 (Box 2). At the

Box 1. Some key actions called for in the CBD.

Article 6: General measures for conservation and sustainable use

- (i) Integrate biodiversity considerations into national strategies, plans and programmes
- (ii) Integrate biodiversity into sectoral or cross-sectoral plans, programmes and policies

Article 8: In situ conservation

- (i) Establish a system of protected areas and guidelines for the formulation of protected areas
- (ii) Promote the protection of ecosystems, natural habitats and maintenance of viable populations
- (iii) Promote environmentally sound and sustainable development in areas next to protected areas
- (iv) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species
- (v) Prevent the introduction of alien species threatening ecosystems, habitats or species

Article 10: Sustainable use of components of biological diversity

- (i) Integrate consideration of biodiversity into national decision-making
- (ii) Adopt measures relating to the use of biological resources to avoid or minimize adverse impacts on biological diversity
- (iii) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements
- (iv) Support local populations to develop and implement remedial action in degraded areas

Article 11: Incentive measures

- (i) Adopt economically and socially sound measures that act as incentives for conserving and sustainably using biodiversity

Article 14: Impact assessment and minimizing adverse impacts

- (i) Ensure that biodiversity is addressed in projects, programmes and policies and decisions

Article 20: Financial resources

- (i) Provide financial support and incentives to those activities intended to achieve the objectives of the convention, in accordance with national plans, priorities and programmes
- (ii) Provide new and additional financial resources to enable developing country parties to meet their full incremental costs of implementing measures which fulfil the obligations.

Box 2. The CBD on impact assessment.

Article 14.1: Each Contracting Party shall, as far as possible and as appropriate:

- (i) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoid or minimize such effects and, where appropriate, allow for public participation in such procedures;
- (ii) Introduce appropriate arrangements to ensure that the environmental consequences of its programmes and policies that are likely to have significant adverse impacts on biological diversity are taken into account.

Article 7: Each Contracting Party shall, as far as possible and as appropriate:

- (i) Monitor through sampling and other techniques, the components of biological diversity identified
- (ii) Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques.

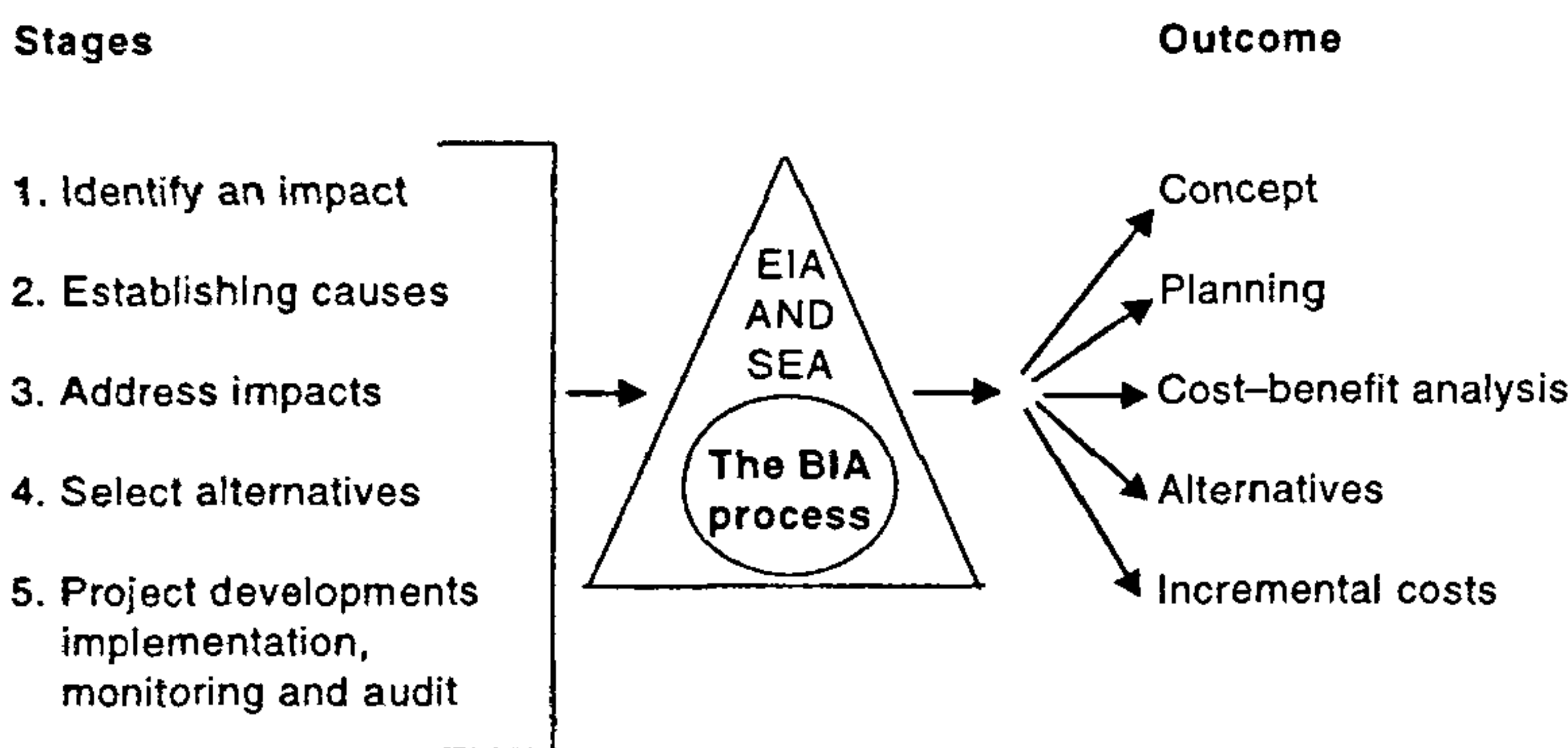


Figure 1. The BIA process and its relation to EIA and SEA.

Fourth Conference of Parties to the CBD held at Bratislava in 1998, it was discussed that impact assessment can be conducted on the following thematic areas: (i) Biological diversity and forests (Decision II/9); (ii) Coastal and marine biodiversity (Decision II/10) and (iii) Agricultural biodiversity (Decision III/11).

Impact assessment is a powerful tool for implementing the CBD as it ensures a forum for new thinking, enables adverse impacts to be anticipated, avoided and mitigated, provides alternate options such as incentive measures, introduces biological and environmental parameters into decision making, calls for evaluation and monitoring of the activities and facilitates the development of environmentally sensitive technologies and business management techniques.

Biodiversity impact assessment

Impact assessment is a process to improve decision-making and to ensure

that the project/programme options under study are sound and sustainable. Such an assessment deals with not only identifying, predicting and evaluating the foreseeable impacts but also aims to minimize or eliminate negative impacts and optimize positive impacts³.

BIA is proposed as an extension of existing impact assessment techniques to help countries meet the objective of sustainable use. BIA, in the words of the International Summit on Environmental Assessment, is a response to the impact assessment community's call for the development of '...effective ways to link environmental assessment into other planning and decision-making processes'. BIA has to be conducted after the core idea for a project, programme or policy has been developed but before it is given permission to be tried out. This will ensure minimal adverse impacts.

Though BIA techniques may vary from country to country, there can be stages which may be common to all of

the BIA processes. BIA can be adopted as a modification of the EIA but may be critiqued because it does not address underlying structures that predetermine the project decisions. Closer examination of the CBD provisions reveals how and where biodiversity is and is not included in the EIA procedures. Biodiversity considerations can be integrated into EIA through the use of guidelines to supplement legislation. The Canadian guidelines on biodiversity and environmental assessment in 1996 outline methods of integrating biodiversity into the impact assessment stages, thereby filling the gaps left by the legislation. Indonesian guidelines also explicitly identify ecosystems and species types to be considered in the EIA.

To achieve the objectives of conservation, the assessment procedures must be integrated into planning processes itself starting at the earliest phases. This assessment must be non-adversarial in approach, be adaptive in application and resolute in purpose. It can be argued that fundamental patterns of human development causing biodiversity loss, habitat loss, pollution, over-exploitation, degradation are integral paths of 'development'.

The methodology of BIA includes nine steps. Identification of the impact on biological diversity, establishing the causes of impact, determining alternate means of addressing the impact, assessing the costs and benefits of each alternative, selecting an alternative, developing the project, programme or policy, implementing the project, monitoring the progress and auditing the process⁴. Figure 1 explains the BIA process and its relation to EIA and SEA.

With structural constraints of traditional impact assessment techniques, biodiversity concerns are often not addressed to a reasonably good extent. EIA and SEA alone are unable to affect the shift in the requisite development path as envisaged in the CBD.

BIA is a new technique that can potentially help EIA and SEA to achieve the three major mandates of the convention on biological diversity.

To conclude, a more complete survey of the existing EIA legislation is needed to determine the extent to which it meets the CBD's mandates. But there is a need for further discussion about the

potential uses of BIA and methodology. To begin the process the following can be taken as recommendations: (i) Establish transparent EIA and SEA methodologies. (ii) Discuss the role of BIA in existing EIA and SEA processes. (iii) Develop BIA methodology (perhaps on a case-by-case basis). (iv) Determine how BIA can alter decisions on EIA. (v) Integrate BIA into the planning process.

Responses to these recommendations will be more than welcome.

1. UNEP 1992, The Convention on Biological Diversity, Nairobi.

2. Bagri, A. and Vorhies, F., *Biodiversity Impact Assessment*, IUCN, Gland, Switzerland, 1997.
3. Roe, D., Dalal-Clayton, B. and Hughes, R., *A Directory of Impact Assessment, Guidelines*, IIED, London, UK, 1995.
4. Bagri, A., McNeely, J. and Vorhies, F., *Biodiversity and Impact Assessment*, International Association of Impact Assessment, Christchurch, New Zealand, April 1998.

P. Balakrishna, M. S. Swaminathan
Research Foundation, Chennai 600 113,
India

Active tectonics and paleoseismology

A short course on active tectonics and paleoseismology was organized jointly by the Centre for Earth Science Studies, Thiruvananthapuram, and J. N. Centre for Advanced Scientific Research, Bangalore, at Bangalore, during 14–19 September 1998. C. P. Rajendran and K. S. Valdiya were co-ordinators of the course which was sponsored by the Department of Science and Technology (DST), Government of India. Fifteen participants, selected out of 89 applicants, represented universities and research institutes all over the country. Participants from different parts of the country including Manipur, Assam and Andaman and Nicobar islands formed a cross section of researchers from different geographic and tectonic provinces. The faculty for the course was selected to ensure that a cross-disciplinary, integrated approach to addressing active tectonics and paleoseismology problems comes through and there is a perfect blend of classical and contemporary ideas. The efforts of the organizers and the DST resulted in a remarkable course which drew universal accolades and all of them considered it to be one of the best courses they had ever attended.

The curtain raiser was a welcome address by M. Baba (Director in-Charge, CESS, Thiruvananthapuram) who pointed out that the process for participant selection focused on the current and future research potential of

the participants and the need to ensure maximum possible diversity in geographic area and earth science disciplines amongst participants. This was followed by an introduction to paleoseismology by C. P. Rajendran (CESS) who along with Kusala Rajendran (CESS) gave a series of excellent lectures on the core concepts in paleoseismology, active tectonics and seismology. Their efforts were complemented by experts in fields related to active tectonics and paleoseismology. K. S. Valdiya (JNCASR, Bangalore) delivered an excellent and stimulating talk on the application of classical tools such as structural geology and geomorphology to work out the active tectonics and the related structure in Cauvery Basin (which was earlier thought to be stable) and the Kumaon and Garwhal Himalayas.

G. D. Gupta (Joint Advisor, DST) discussed the current programmes taken up by DST in the field of seismology and active tectonics. DST's efforts to establish new digital seismic stations and Global Positioning Systems (GPS) in different parts of the country were highlighted in his brief presentation. He invited fresh proposals to work in new areas where paleoseismological investigations could be taken up to provide better insights to understanding earthquake processes. G. D. Gupta's eagerness to support new, exciting program-

mes provided a firm basis for more discussions on taking up new programmes in hitherto unexplored areas.

As the technical sessions progressed, R. N. Singh (Scientist-in-Charge, CMMACS, Bangalore) talked about the various contributions to the intraplate stress field and how they relate to earthquake mechanisms and the importance of understanding large-scale stress regimes prior to detailed paleoseismological work. John Paul (CMMACS, Bangalore) and later M. N. Kulkarni (SOI, Dehradun) presented some results and the concepts behind the use of GPS for studying crustal dynamics and active tectonics in India. M. N. Kulkarni also pointed out that a national, well coordinated effort is currently underway to systematize GPS data collection and archiving in our country for various applications including active tectonics. T. M. Mahadevan (Retd Director, AMD) pointed out that seismotectonics should be viewed in the context of the stress field generated by plate boundary forces. He went on to give very interesting insights into the deep continental structure of the Indian Shield and how it relates to the seismotectonics observed in parts of our country today. R. N. Iyengar (CBRI, Roorkee) presented a fascinating account of the search for evidence of Indian earthquakes from historical records and reported that records of 40 previously unaccounted