

A Handbook of Environment Impact Assessment



**V.S. Kulkarni
S.N. Kaul
R.K. Trivedy**

**A HANDBOOK OF
ENVIRONMENT
IMPACT ASSESSMENT**

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Published by:
Scientific Publishers
5A, New Pali Road, P.O. Box 91
Jodhpur 342 001, India
E-mail: info@scientificpub.com
Website: www.scientificpub.com

Print : 2019

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ISBN: 978-81-72332-99-0 (Hardbound)
ISBN: 978-93-88449-12-0 (E-book)

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Printed in India

PREFACE

Much of today's Environmental crisis is due to scientific materialism and rampant economic development without adequate care of the environment and knowledge of physical limits by ecological systems on economic activity. Many of our environmental problems are due to the reliance on overexploitation of Natural resources, faulty planning and execution of infrastructure and industrial activity' and inadequate emphasis on parameters of sustainable development.

All this is changing now with the emergence of the concept of sustainable development and shift towards ecological determination so as to achieve growth within the limits of ecosystems carrying capacity.

Environment Impact Assessment is potentially one of the most valuable interdisciplinary and objective decision making tools with respect to alternate routes for development, process technologies and project sites. It is an ideal anticipatory mechanism allowing measures that ensure environmental compatibility in our quest for socioeconomic development.

Although Environment Impact Assessment of major developmental projects was undertaken in 1950s in several countries; it was US National Environmental Policy Act of 1970 which gave fillip to EIA activities all over the world. In India serious environmental review of developmental projects started in the early 80s and with the release of EIA Notification of Govt. of India on 27th Jan. 1994, Environment Impact Assessment of certain categories of projects became mandatory.

This book addresses itself to the development of a tool to provide scientific inputs to the process of EIA of industrial projects as a decision making tool to the development and computerization of methods for impact identification, prediction, evaluation and mitigation.

The concept of EIA and available methodologies have been discussed at length. The book also presents extensive literature survey on EIA as well as various practices followed all over the world. The literature survey also analyzes documented literature

on site selection criteria, screening of projects for EIA, EIA methodologies, impact quantification techniques and scope for enlarged role of project EIA.

The book also presents, incorporating the best features of various EL4 methodologies and prediction models, a user friendly PC based software package acronymed EIA-AID. The software is developed in quick basic 4.5. The software developed is validated through a real life case study.

It is hoped that the book shall be of immense help to the students and teachers of Environmental Science and Engineering and also to Environmental Consultants, Industries and several Government Departments.

January 01, 2002

V.S. Kulkarni

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CHAPTER — 1

INTRODUCTION

1.1 CONCEPT OF EIA

The sociocultural roots of the present environmental crisis lie in the paradigms of scientific materialism and economic determinism which fail to recognize the physical limits imposed by ecological systems on economic activity. The economies must expand within ecosystems which have limited regenerative capacities. Contrary to the neoclassical theory of continuous material growth, economic activities directly undermine the potential for development through over-exploitation of natural resources, and indirectly compromise future production through the discharge of residuals. The entrenchment with quantitative growth as a major instrument of social policy is thus quite paradoxical (Khanna, 1989).

The emergence of the concept of sustainable development in recent years has brought in the general realization that societal perceptions must shift towards ecological determinism so as to achieve qualitative growth within the limits of ecosystem carrying capacity. The carrying capacity based planning process, innovative technologies for enhanced material and energy effectiveness of production and consumption, structural economic change towards less resource-intensive sectors, and preventive environmental management through increasingly interventionist policies are some of the strategies for reconciling developmental goals with ecological capabilities (Khanna and Kulkarni, 1992).

Environmental impact assessment is potentially one of the most valuable, inter-disciplinary, and objective decision-making tools with respect to alternate routes for development, process technologies and project sites. It is an ideal anticipatory mechanism allowing measures that ensure environmental compatibility in our quest for socio-economic development.

There is no universally accepted definition of EIA. Some commonly used definitions are:

- EIA consists in establishing quantitative values for selected parameters which indicate the quality of the environment before, during, and after the action (Heer & Hagerty, 1977).
- EIA is an assessment of all relevant environmental and resulting social effects which would result from a project (Battelle, 1978).
- EIA is an activity designed to identify and predict the impact on the biogeophysical environment and on man's health and well-being of legislative proposals, policies, programmes, projects and operational procedures, and to interpret and communicate information about impacts (Munn, 1979).
- EIA is a process to identify, predict and to describe in appropriate terms the pros and cons (benefits and penalties) of a proposed development. To be useful, the assessment needs to be communicated in terms understandable by the community and decision-makers and the pros and cons should be identified on the basis of criteria relevant to the countries affected (UNEP, 1980).
- EIA is the systematic examination of environmental consequences of projects, policies, plans and programmes. Its main aim is to provide decision-makers with an account of implications of alternative courses of action before a decision is made (Clark, 1984).
- EIA is a . formal study process used to predict the environmental consequences of the proposed developmental project, find ways to reduce unacceptable impacts, and shape the project so that it suits the local environment, and present these predictions and options to decision-makers (UNEP, 1988).

The definition proposed by Hear and Hagerty forms the basis of present research. EIA is a process that has the objective of