

# **Integrating Biodiversity into Strategic Environmental Assessment**

Case Studies from India

Prepared for the Netherlands Commission  
for Environmental Impact Assessment

***Dr. Asha Rajvanshi***

Senior Reader

&

Faculty Incharge, EIA Cell,  
Wildlife Institute of India, Chandrabani,  
Dehradun - 248001 (UA)

Email:ar@wii.gov.in

***Dr. Vinod B. Mathur***

Professor & Head

Department of Protected Area Network,  
Wildlife Management & Conservation Education  
Wildlife Institute of India, Chandrabani,  
Dehradun - 248001 (UA)

Email:vbm@wii.gov.in

January, 2005

## Contents

### Acknowledgements

### SEA in the Indian context 1 - 3

A prologue

Key references

### Case Study – II Strategic environmental assessment of proposed Human River Irrigation Project, Maharashtra State, India 4 - 17

#### 2.1 Introduction

*Description of the plan*

*Legal basis for strategic level assessment*

*Objectives and timing of SEA*

*Environment and social setting of the project*

#### 2.2 Links to other policies, plans and programmes

#### 2.3 Biodiversity, the general meaning of biodiversity in the SEA

#### 2.4 Transparency & stakeholder involvement

#### 2.5 Biodiversity in the different stages of the SEA process

*Screening*

*Scoping*

*The assessment*

*Mitigation*

*Decision-making*

*Monitoring*

#### 2.6 General observations and lessons learnt

#### 2.7 Key references

## Acknowledgements

*We are grateful to Dr. Stefan Morel, General Director, Netherlands Commission for Environmental Impact Assessment (NCEIA) for entrusting us the task of preparing case studies for the **Guidelines for the integration of biodiversity in SEA**. We also acknowledge Dr. Arend Kolhoff, Project Leader and Technical Secretary, Development Co-operation, NCEIA and Dr. Roel Slootweg, Coordinating Author for the Guidelines for their helpful suggestions and valuable guidance during the course of preparation of the case studies.*

*We are grateful to the Chairman, Wildlife Institute of India's Governing Body & Secretary, Ministry of Environment and Forests (MoE&F), Government of India and the Director General Forests, (MoE&F), Govt. of India & Vice Chairman, Governing Body, Wildlife Institute of India, for granting us necessary permission to take up this prestigious assignment.*

*We sincerely acknowledge the encouragement and support provided by Mr. P.R. Sinha, Director, Wildlife Institute of India during the preparation of the case studies.*

*We thank the staff of EIA Cell and Computer & GIS Cell of WII for providing necessary support in the preparation of the case studies.*

**Dr. Asha Rajvanshi**

**Dr. V.B. Mathur**

## Strategic Environmental Assessment (SEA) in the Indian context

### A prologue

In India, the term 'SEA' is not used in official parlance and therefore its use is not strictly governed by its many global definitions (DHV, 1994; Sadler and Veerhem 1996; Dalal-Clayton and Sadler 1998; Brown and Therivel 2000; Partidario and Clark 2000). Nevertheless, existing institutional mechanisms and EIA process at the country level provide elements of SEA that are being harnessed by decision makers and are increasingly popularizing SEA both as a concept and diagnostic tool for the review of environmental impacts including ecological, economic and social concerns that are integrated in decision making for economic development plans.

Presently, the Indian EIA practice does not make clear cut distinction in limiting the use of SEA approaches to review environmental consequences of policies, plans and programmes as has been advocated in the earliest definitions of SEA (Saddler and Veerhem, 1996) but views SEA as a voluntary practice of adopting flexible approaches to facilitate decision making even at the project level as these are seen as capital undertakings to achieve the outcome of proposed policies and programmes and involve strategic planning and design. This is much in line with the scope of SEA accepted by the Netherlands Commission for EIA ([www.eia.nl](http://www.eia.nl)) and Glasson *et al.*, (1994) and approaches adopted for SEA at project level in Vietnam and many other countries (Nierynck, 1997).

Despite the inherent lack of a nationally agreed definition of SEA, there is a general consensus amongst planners, EIA professionals and decision makers about its scope and applications in different situations for steering decision making both at early and late stages of impact assessment. In the Indian context, SEA approaches have commonly exhibited methodological and procedural elements to apply strategic assessment to evaluate policies, plans, programmes and also the integrated or stand alone projects at two stages, (i) before the project initiation, reflecting a 'top down' approach for decision making and (ii) after the project EIAs are prepared to review decision making, reinforce accountability and build public confidence thus reflecting a 'bottom up approach'.

The merits of applying SEA approaches in a pre project situation have commanded importance in India because outputs of such assessments have had the benefits of delivering information necessary to facilitate decision making by ruling out certain kinds of predetermined choices for a proposed development (e.g., project locations, technological options and intended substitutes for certain products of commerce) and thereby reducing the need for an EIA. The SEA outputs have thus proved useful in reducing time and costs and also the burden of conducting EIA on institutional capacities and skilled professionals that are often limited in India as also in many other countries in the region. In many cases, application of SEA approaches for assessment of site suitability for location of refineries, dams, canals, roads, airports and nuclear power projects have been extremely relevant in streamlining project level EIAs by providing a revised context and scope for EIA. At the plan and programme level also, approaches adopted to review strategic plan for upgrading national road network and the

environmental implications of donor funded integrated conservation development projects like the India Ecodevelopment Project supported by GEF funds have been useful in providing 'above the parapet' view of environmental and social issues for a broad based assessment of the cumulative impacts of proposed project before its implementation in some protected areas of the country (Rajvanshi, 2001). In the past 3 -5 years, there has been an increasing trend in the interests of donors, lenders, bilateral and multilateral partners to assess the environmental outcome of the activities above the project level. This is promoting SEA in sectoral developments in many key sectors such as transportation and energy planning, integrated watershed development, health and community development projects.

The post project strategic assessments are near equivalents of 'EIA inspired' SEA models referred to by Sheate *et al.*, (2003). These are often applied to highly politicized projects after the project EIAs have been conducted. Examples include review of EIAs of several hydropower and mining projects that were undertaken on the recommendations of the highest decision making body, the Ministry of Environment and Forests, Govt. of India prior to the reconsideration of select projects for according environmental clearance necessary for authorization of projects. SEA approaches for such projects involve adopting transparent participatory process that help to review earlier decisions by resolving uncertainties about the nature and magnitude of impacts and also aid in good governance. Such assessments are thus independent overights of earlier decisions, mitigation options, and approved conditions for project authorization. These assessments essentially require EIA outputs and results of scientific surveys and quantitative data and a quick follow up through reconnaissance studies within the project area. The post project EIAs in India command importance because they are independent and are thus able to stand scrutiny both by public and the decision making arm of the federal government *viz.*, Ministry of Environment and Forests, Govt. of India.

The two case studies presented here (WII, 1996; WII, 2003) represent examples of SEA approaches adopted in pre project and post project stages of developments for review of the environmental consequences. Both studies present outputs of conducting 'biodiversity driven' environmental assessments of the projects. The case studies provide relevant examples of assessments in which biodiversity issues perceived at the levels of landscape, ecosystems, habitats, communities and species formed the basis of informed decision making for approval of the project location in one case and in the second case, led to the final approval of the project that had been earlier shelved due to lack of inadequate considerations of biodiversity values of the project site and ineffective options for mitigation of identified impacts. The two case studies well serve the purpose of demonstrating how SEA can be useful both as a process and a diagnostic tool for mainstreaming biodiversity in EIA and steering developments with greater focus on protection of wildlife habitats and conservation of biodiversity resources of the country.

An important take home message from these case studies is that the decision aiding role of SEA needs to be further encouraged and formalized in the Indian context to promote sustainability driven development. The use of SEA as a 'sounding board' will better improve prospects of timely anticipation of the biodiversity impacts of proposed developments, determine 'no go' areas before financial investments are actually incurred in sites of critical importance for biodiversity conservation and ensure early considerations of preventive and ameliorative mitigation options for optimizing sustainability assurances in policy planning and implementation of economic development plans and programmes of the country.

### Key references

- Brown, A.L. and R. Therivel. 2000. *Principles to Guide the Development of Strategic Environmental Assessment Methodology*. Impact Assessment and Project Appraisal 18(3): 183-189.
- Dalal-Clayton, B. and B. Sadler. 1998. *The Application of Strategic Environmental Assessment in Developing Countries, draft report*. London: IIED.
- DHV (Environment and Infrastructures BV), 1994 *Existing Strategic Environmental Assessment Methodology*. European Commission – DGXI, Brussels.
- Glasson, et al. 1994. *Widening the Scope: SEA, Chapter 13 in "Introduction to EIA"*. pp.299-315. [http://minf.vub.ac.be/~gronsse/Vietnam/EU/EIAws1\\_12.html](http://minf.vub.ac.be/~gronsse/Vietnam/EU/EIAws1_12.html)
- Nierynck, E. 1997. *Capacity Building for Environmental Management in Vietnam – Strategic Environmental Assessment..* Proceedings of the first workshop on EIA in Vietnam.
- Partidário, M.R. and R. Clark, Eds. 2000. *Perspectives on Strategic Environmental Assessment*, Boca Raton, FL.: CRC-Lewis.
- Rajvanshi, A. 2001. *Strategic Environmental Assessment of the India Ecodevelopment Project: Experiences, Prospects and Lessons Learnt*. Journal of Environmental Assessment Policy and Management. 3(3): : 373-393
- Sadler, B. and R. Verheem. 1996. *Strategic Environmental Assessment – Status, Challenges and Future Directions*. The Hague. Ministry of Housing, Spatial Planning and the Environment of the Netherlands.
- Sheate, W.R., S. Dagg, J. Richardson, R. Aschemann, J. Pallerm and U. Steen. 2003. *Integrating the Environment into Strategic Decision - Making: Conceptualizing Policy SEA*. European Environment 13:1-18.
- WII, 1996 *An Evaluation of the Proposed Nuclear Power Station Site at Nagarjunasagar with Special Reference to its Conservation Value*. WII-EIA Technical Report 17. Wildlife Institute of India, Dehradun.
- WII, 2003 *Rapid Assessment of Habitat Availability and Wildlife Use in the Proposed Human River Project, Maharashtra State*. WII – EIA Technical Report 27. Wildlife Institute of India, Dehradun, Uttaranchal.

## Case Study - II

# Strategic environmental assessment of proposed Human River Irrigation Project, Maharashtra State, India

## 2.1 Introduction

### *Description of the plan*

India is predominantly an agrarian country faced with a relentless growth in its population that continues to impose increasing demands for enhancement of crop productivity on marginalized and impoverished land area under agriculture. The critical need for providing irrigation inputs for improving agriculture productivity has led to the commissioning of several minor and major irrigation projects of varying capacities in the country. As a result of past initiatives of harnessing water for irrigation, the area under irrigation in India has trebled in the last 40 years and stands at 70 million ha. By the year 2010, the country is aiming to bring an additional area of 113 million ha under irrigation. This envisages the construction of over 1000 dams on various rivers in different states of the country (MoWR, 2000).

The state of Maharashtra has been severely constrained in improving its agricultural production due to vagaries of monsoon and recurrent drought. In pursuit of the state policy to enhance agriculture production by providing irrigation facilities, the Government of Maharashtra proposed several schemes to harness its huge water resources for the improved inputs of irrigation. The Human (pronounced as 'hooman') Irrigation Project over the untamed Human River was prioritized to benefit Chandrapur District of the State (Fig. 3a).

The project envisages construction of a composite dam of 3172 m length with a maximum height of 27 m for creation of a storage reservoir with a Full Reservoir Level (FRL) fixed at 217.70 m and an estimated irrigation potential of 46118 ha. The Reservoir would consist of two head regulators on both flanks of the dam – the Left Bank Canal (LBC) and the Right Bank Canal (RBL). The project is expected to benefit 130,000 individuals of 160 villages in the command area of the Chandrapur District, provide 34.2 m<sup>3</sup> of drinking water to Chandrapur Township and enhance agriculture production of the District from 45128 metric tons to 336665 metric tons (Anon. 2001 & 2002).

Following the administrative and technical approvals granted to the project by the Maharashtra Govt. and Central Water Commission in early 1990s, Vidharba Irrigation Development Corporation (VIDC) prepared the technical proposal for seeking clearance for diversion of the forest for the project under the provisions of the Forest (Conservation) Act, 1980 and the Environmental Impact Assessment (EIA) report for seeking environmental clearance under the provisions of EIA Notification (GOI, 1994).

The review of the EIA report and other documentation prior to accordance of environmental and forestry clearances and observations made by MoE&F team based on site visit highlighted crucial gaps in biodiversity related information and the obvious deficiencies in mitigation planning. This constrained the decision making and created the necessity for undertaking SEA to review earlier evaluation. Further impetus for the review of the earlier EIA of the project was given by several conservation organizations in the country that questioned the comprehensiveness and the credibility of the EIA studies that had failed to incorporate the evaluation of the project induced habitat degradation and more specifically the disruption of the migratory route of the tigers moving between Tadoba – Andhari Tiger Reserve (TATR) and the Reserved Forests across the Human River. The SEA was adopted as a tool to undertake 'EIA inspired' assessment to supplement the deficient information and make value additions in critical information for aiding improved conservation planning and decision making. The Wildlife Institute of India, an independent professional body ([www.wii.gov.in](http://www.wii.gov.in)) was assigned the responsibility of overseeing the earlier EIA and conducting the strategic level assessment.

#### ***Legal basis for strategic level assessment***

Although the application of SEA does not find basis under the current Indian EIA legislations and procedures, the decision centric SEA of the proposed Human Project was necessitated to focus on delivering information relevant to address the significant biodiversity issues and aid decision making in the light of concerns highlighted through a typically 'objective led' and biodiversity driven assessment. The outputs of the post EIA strategic assessment directly became inputs for improving the existing information base for better perceptions of the missing dimensions of impacts for aiding decisions relating to environmental and forestry clearances, which are both statutory requirements under the provisions of national legislations for environmental impact assessment (GOI, 1994) and forest conservation (GOI, 1980) respectively. The application of SEA in this case is therefore more linked to its advisory, appraisal and mediation role in oversight of project level EIA to steer the environmental decision making.

#### ***Objectives and Timing of SEA***

The SEA was tiered to earlier EIA to introduce additional considerations for reinforcing the evaluation of the project. The initiation of strategic assessment was based on a combination of 'bottom-up' approach involving independent review of the project level EIA and initiation of further assessment for upgrading information on biodiversity issues and a 'top-down' approach for decision making based on the analysis of impacts on biodiversity that were material for decision making. The objective of SEA was to assess (i) habitat potential of the area under proposed Human Irrigation Project and its use by wildlife species (ii) corridor values of the forests under proposed storage reservoir and *en route* the canals and the implications of submergence of corridor area on movement of tigers between Tadoba-Andhari Tiger Reserve (TATR) and the adjoining forests of Chandrapur and Brahamapuri Forest Divisions across the Human river (iii) identify threats to TATR due to its proximity to the



project area (iv) review feasibility of mitigation measures and accordingly propose strategies for conservation of biodiversity in existing and potential wildlife habitats.

### ***Environment and social setting of the project***

The Human River is a tributary of Andhari River and represents a drainage system of the Wainganga and Wardha rivers, which subsequently join the Godavari River. The catchment area of the Human River is ca 103300 ha. of which ca 40% is under the Maharashtra Forest Department. The forests under the project area are representative of the Central Indian Highland Forests (South Tropical Dry Deciduous Forests) with *Tectona grandis* as the dominant tree species. Broad valleys merging into gently undulating sand stones towards the north and intermittently into highlands characterize the area. The riparian stretch along the river is generally restricted to a few isolated patches of vegetation with a conspicuous absence of old growth forests.

The total amount of forest land required for the project is ca. 1925.55 ha. of which 1535.85 ha. would fall under submergence and 271.24 ha. would be required for the alignment of left and right bank canals. The Karwa Reserved Forest area of Chandrapur Forest Division adjoining the submergence zone on the western side of the proposed reservoir is contiguous with the forests of the Andhari Wildlife Sanctuary bordering the core zone of the Tadoba-Andhari Tiger Reserve (TATR). The TATR comprising of 116.55 sq. km Tadoba National Park and the 508.85 sq. km. Andhari Sanctuary (Fig. 3b) is located within close proximity of the project area. The TATR consisting of forests interspersed with several large meadows provides high herbivore abundance for big cats, mainly represented by tigers and leopards. The TATR is a home to 41 species of mammals, 195 species of birds, 74 species of butterflies, 26 species of spiders, 30 species of reptiles, five species of amphibians and 23 species of fishes. In addition to the 625 sq. km. of tiger habitat in TATR, the Karwa Reserved Forest adjoining the submergence zone provides added spatial benefits for the dispersal of young tigers between TATR and other adjoining forests across the river (Fig. 3c).

The area proposed for clear felling (763.54 ha.) is restricted to the submergence area and to the forest stretch en route the Left Bank Canal. The submergence area is largely dominated by private and revenue lands with about 25% of the area under Protected Forests. The landscape of the proposed project is dotted with villages. The project is likely to affect a total of 39 villages. Of these, 15 villages will be under complete submergence, 8 villages under partial submergence and 16 villages will have only the agricultural land under submergence (Fig. 3c). The project will affect a population of over 15410 individuals, of which ca. 13150 individuals are likely to be displaced from different villages in Chandrapur District.

## **2.2 Links to other policies, plans and programmes**

The proposed project has positive links with National Water Policy that was first formulated in 1987 and amended in subsequent years. The amended National Water Policy (MoWR, 2002) advocates the urgency of planning and implementation of economically viable and environmentally sustainable multipurpose water resource projects for maximizing the utilization of water for management of floods and droughts, enhancing irrigation potential for raising agricultural productivity, meeting increasing demands of domestic water for rural and urban population and sustaining other consumptive uses for economic development activities. At the regional level, the project has links with economic development policies of the Maharashtra State, the beneficiary state from this project, and also with the Godavari Water Dispute Tribunal that authorizes Maharashtra state to use all waters of the Wainganga basin (of which Human River is a tributary) for optimizing irrigation benefits.

From the conservation standpoint, this project located near a 'Tiger Reserve' has links with the mandated objectives of the 'Project Tiger' that aim to strengthen wildlife conservation by improving ecosystem stability for supporting adequate prey base for building up a viable population of tigers in natural areas designated as 'Tiger Reserves'.

### **2.3 Biodiversity, the general meaning of biodiversity in the SEA**

The primary objective of undertaking this post EIA assessment was to satisfy appraisal needs for a more focused analysis of impacts on biodiversity. In this biodiversity driven SEA, greater importance was assigned to evaluation of impacts on ecosystem components valued as vital habitat links and movement corridors for tiger; ecosystem functions and features that characterize habitat suitability for conserving and managing viable prey base for tiger; and diversity of rare and endangered species. Consideration of benefits of conserving forest and natural habitats in the project area for long term assurances of useful goods and services (e.g., perpetuity of genetic resource base for conservation of biological resources and maintenance of hydrological balance for sustained availability of water) for local communities was also inherent in the approach adopted for SEA. The assessment thus took cognizance of all the three objectives of the CBD viz., conservation, sustainable use and fair and equitable sharing of benefits.

### **2.4 Transparency & Stakeholder involvement**

The key stakeholders involved in conducting the SEA were the Vidharba Irrigation Development Corporation – an agency for project planning and implementation; the EIA consultants who prepared the detailed EIA report for the project evaluation on behalf of project planners; the Maharashtra State Forest and Wildlife Department – a state level agency responsible for managing forests and wildlife resources and monitoring restoration activities; the Wildlife Institute of India – an independent professional body charged with the responsibility of conducting SEA; the local communities within the zone of project influence and the MoE&F – the apex body directly responsible for project authorization. Review of project documentation and EIA reports provided the initial reference for SEA. Consultations with Maharashtra Forest Department and perusal of the

records of MoE&F and the public hearing report highlighted the information needs and provided the context for the SEA. The review comments on the earlier EIA report by MoE&F and a clearly spelt out requirement of biodiversity specific assessment reflected transparency in the assessment process that remained consistent in SEA, which was a stakeholder driven exercise conducted by an independent agency.

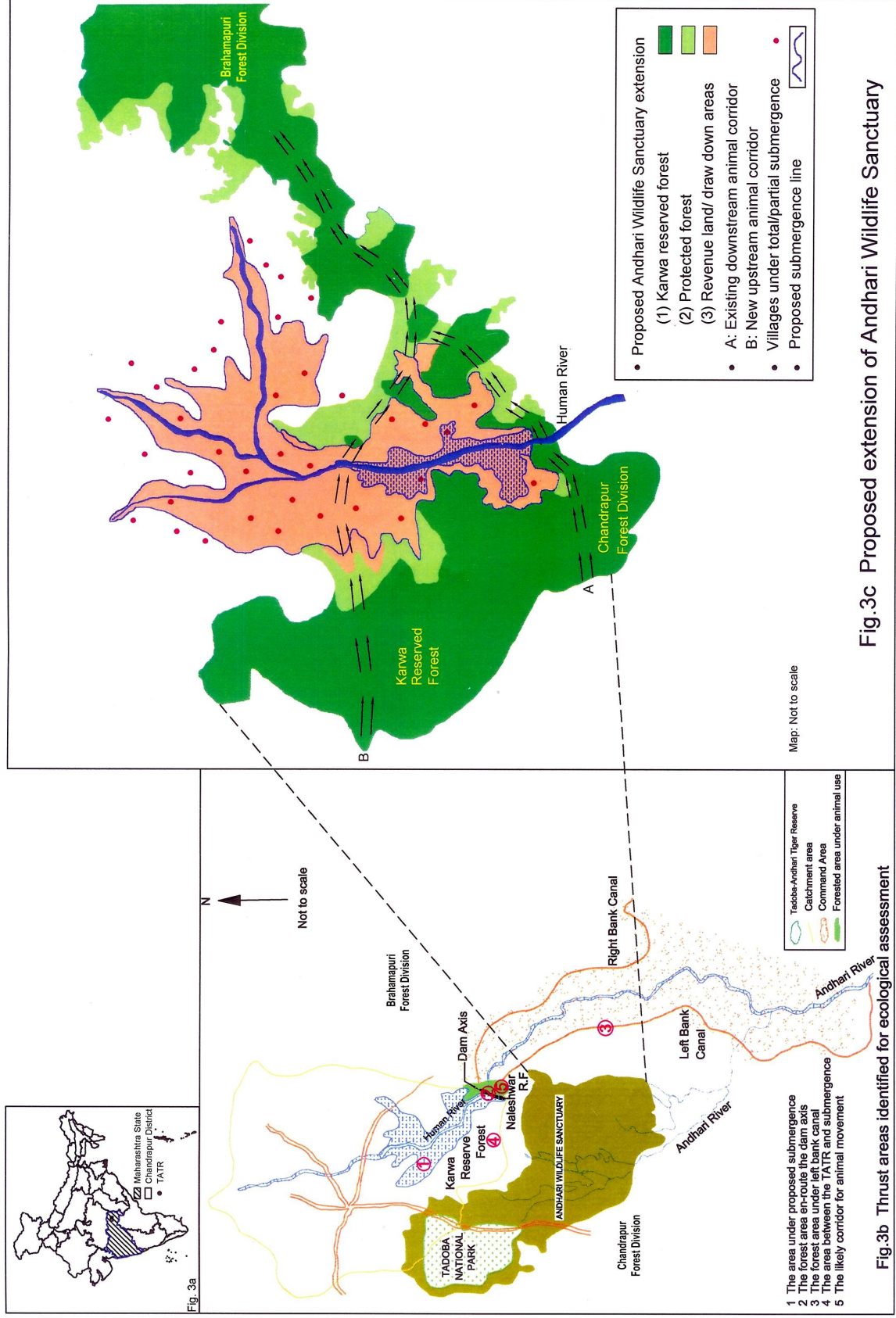


Fig.3 Mitigation of impacts of proposed Human Irrigation Project

## 2.5 Biodiversity in the different stages of the SEA process

Unlike the approaches adopted to meet formal specifications of SEA, the methodology for conducting SEA for the Human project was relatively flexible and more relevant to the needs of EIA inspired assessment of impacts and a top down approach for influencing decision making. The assessment was more like an extension of project EIA and required revisiting some of the earlier task such as collection of baseline for new information and identification of impacts. Therefore, several of the stages in SEA like scoping, assessment; impact identification and mitigation were common with project EIA.

The flow diagram (Fig. 4) presents the SEA process and the various stages in which biodiversity concerns were incorporated.

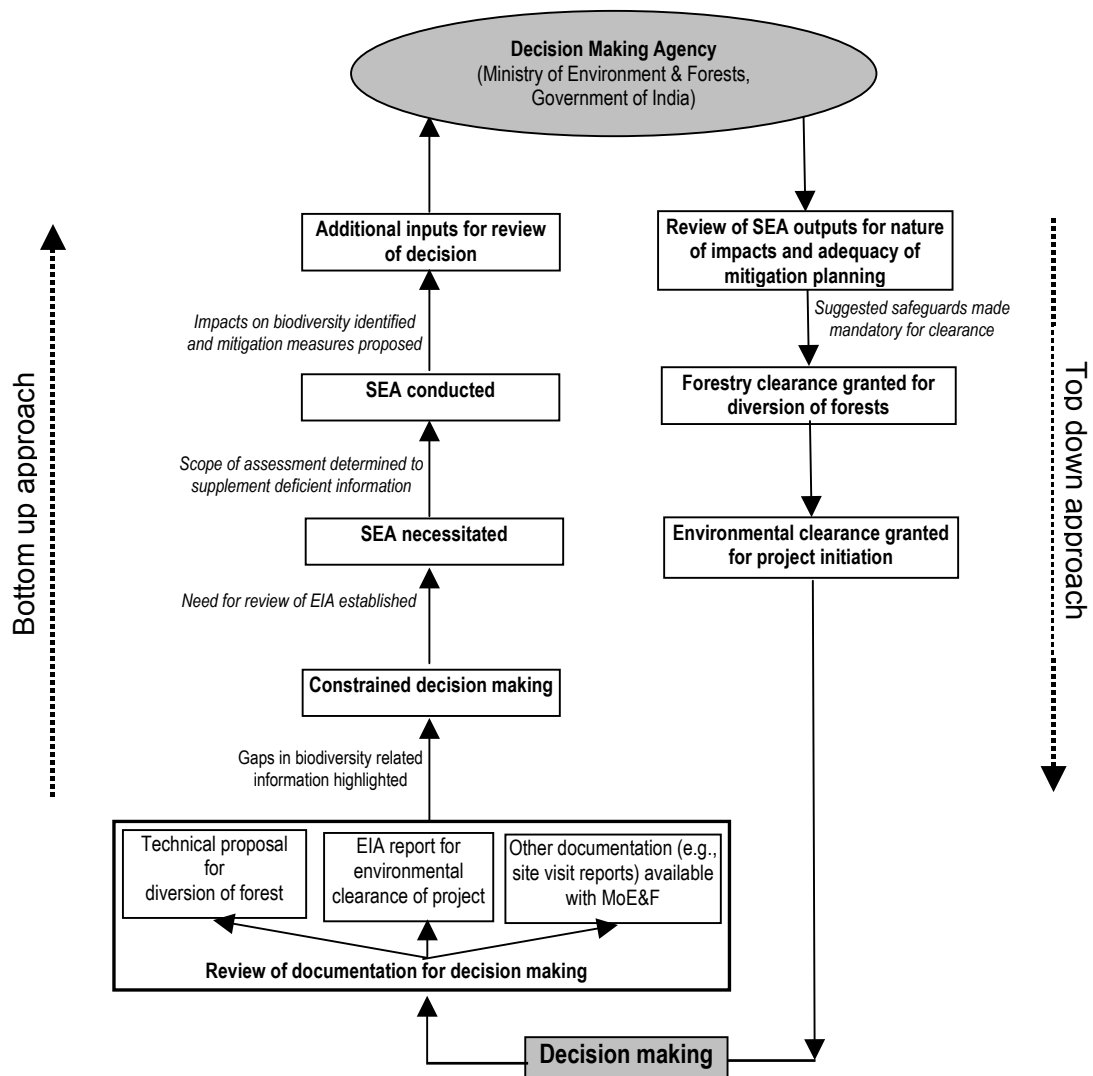


Fig.4 SEA approach adopted for evaluation of Human Irrigation Project

### **Screening**

The inadequacy and inconsistencies in current baseline information for meaningful evaluation of impacts on biodiversity and mounting controversies over the conflicting goals of development and conservation of biodiversity in the project site and the proximity of the site to TATR provided appropriate basis for SEA.

### **Scoping**

Based on combination of issues flagged off by stakeholders, concerns highlighted by MoE&F, observations made during the reconnaissance of the area and the expert judgment of wildlife professional involved in assessment, the scope of SEA was narrowed down to assess (i) the existing wildlife use of the area under proposed submergence and dam axis (ii) degradation and destruction of wildlife habitats in the route of Left Bank Canal (LBC) and probable changes in their use pattern (iii) threats of fragmentation of downstream corridor for animal movement between Chandrapur and Brahamapuri forest divisions due to canal alignment and (iv) impacts of submergence on available habitat between TATR and submergence. Accordingly, the following five thrust areas (corresponding to numbers 1 to 5 on Fig. 3b) were identified within the project area for generating key information to address issues highlighted above:

- i Area under proposed submergence;
- ii Forest area *en route* the dam axis;
- iii Forest area under left bank canal;
- iv Downstream corridor for animal movement and
- v Area between Tadoba-Andhari Tiger Reserve and the proposed submergence

### **The assessment**

The assessment stage of SEA primarily focused on determining the status of wildlife habitats and their biodiversity values and a broad assessment of the existing use of the area by wild animals. While the survey and inventory of all forms of life is desirable to generate the biodiversity profile of an area, it is not always practically feasible to study all life forms and ecological processes within the short time period, invariably made available for carrying out ecological assessments. Of the many approaches available to assess the biodiversity and use of the thrust areas by wild animals, a rapid assessment approach producing a species list with greater emphasis given to recording endangered species was adopted (Sutherland, 2003). Efforts were also made to document the presence and habitat use of large carnivores (tiger and leopard); prey species and birds and reptiles of conservation significance. Transects of variable lengths were laid in all the areas of ecological interest and all direct and indirect animal evidences were recorded along with their GPS locations. Opportunistic searches were conducted to strengthen information base on species diversity. Indigenous knowledge was also used to elicit information on floral and faunal values of different thrust areas and assess current levels of resource use (e.g., food, fuel, fodder and timber) and biotic pressures (associated with illicit wood removal, livestock grazing and poaching) for developing an appropriate baseline for better perception of impacts. The results of assessment highlighted the following salient findings:

- i. Although the forests in the proposed submergence area presently impacted by high biotic pressures from interspersed villages support insignificant populations of wild animals, they are

used by large and wide ranging carnivores (leopards and tigers) for movement towards the Human River, the only major source of water in this landscape.

- ii. The creation of wetland habitat in future due to formation of reservoir of variable spread and the grassy fringe habitats that would be created in the draw down areas would offer diverse habitats for conservation of tiger and its prey species. Through appropriate management inputs, the use of these newly created habitats can be effectively enhanced and managed in favour of diverse range of species including tiger and its prey base.
- iii. The physical disturbance associated with construction of the dam and spillways are likely to impede animal movement and restrict use of habitats by animals. The magnitude and duration of such impacts would however depend largely on the schedule of construction activities.
- iv. Although the alignment of LBC is based on sound engineering practice, it has not fully incorporated the ecological concerns relating to fragmentation of habitat in the initial 1.5 km linear stretch of Reserved Forest of Chandrapur Forest Division through which the proposed LBC would be aligned.
- v. The physical disturbance of varied levels during the construction phase is likely to affect the integrity of the habitats between Chandrapur and Brahamapuri Forest Divisions that are critical for ensuring the ranging opportunities for wild animals specially the wide ranging species such as the tiger. Protection of this down stream corridor through adequate measures should be a paramount responsibility for ensuring long term conservation prospects.
- vi. The area under proposed submergence currently dominated by villages and agricultural fields is used by wild animals for accessing Human River especially during dry spell, when the greater part of the tract is exposed because of the receding flow in the river. Protection of habitat values in 3.2 km long tract between submergence zone and the western boundary of TATR is critical for animal movement in the upstream area between Andhari Sanctuary of TATR and the Brahamapuri Forest Division.

### ***Mitigation***

Based on the assessment of the impact potential of the project, the following mitigation strategies for ensuring restoration, reinstatement, enhancement and compensation of impacted habitats and biodiversity resources were recommended:

- i. For enhancing habitat use in upstream areas for unrestricted animal movement across both the banks of the river, creation of additional 'upstream corridor' by extension of the ecological boundary of existing Andhari Wildlife Sanctuary to the edge of the reservoir is proposed. The proposed extension of Andhari Wildlife Sanctuary (Fig. 2c) including (a) Karwa Reserved Forests, (b) Protected Forest (c) evacuated villages and revenue land and the (d) the draw down areas would not only prevent illegal cultivation in evacuated village land but would also provide an ideal mosaic of wetland habitat, grassy habitats on the fringes and contiguous tracts of forested habitats for supporting varied wetland and terrestrial biodiversity.

- ii. For ensuring habitat contiguity in the way of LBC, modifications in design have been suggested to align certain sections of the canal below ground and create 'eco-friendly animal crossing over points' and water holes for facilitating the animal routing.
- iii. For protection of downstream animal movement corridor, measures for habitat restoration including afforestation and assisted natural regeneration and reduction in biotic pressures have been recommended.
- iv. Strengthening of protection infrastructure and habitat management in proposed Andhari Wildlife Sanctuary Extension is assured through recommendation for committing financial support from the project budget.

### ***Decision-making***

The SEA played a meaningful role in deciding a new course of conservation planning and impact mitigation to feed into the renewal of decisions. The recommendations of the Wildlife Institute of India for enhancement of wildlife habitat quality of the corridor areas and improving conservation prospects in TATR and adjoining reserved forests commanded significant merit in addressing biodiversity conservation concerns linked to the project. These recommendations that were subsequently incorporated as part of the conditions to be fulfilled for diversion of forest land for the project became binding for according forestry clearance. With the assurance of biodiversity protection fully incorporated in conditions stipulated for grant of forestry clearance, the MOE&F, subsequently, also accorded the environmental clearance to the project. This SEA that was customized to the characteristics of decision making greatly helped in overcoming the inconsistencies and uncertainties that constrained decision-making for authorization of project that was first mooted two decades ago.

### ***Monitoring***

The periodic monitoring of the project activities and ensuring compliance of conditions stipulated for mitigation of project impacts is the responsibility of the Regional Office of the Ministry of Environment and Forests (MoE&F), Government of India. Moreover, the MoE&F reserves the right to suggest additional safeguard measures subsequently, if deemed necessary and to revoke clearance under the provisions of the EIA Notification (1994), if the implementation of safeguards is inadequate and compliance to conditions is unsatisfactory. In addition to this, a 'Relief and Rehabilitation Committee' having representatives of project affected persons would be constituted to monitor the process of rehabilitation of villages from the submergence area. A multi-disciplinary environmental monitoring cell having experts from relevant department would also be established to monitor the project activities in the field.

## **2.6 General observations and lessons learnt**

The case study highlights the importance of separating SEA from EIA for optimal use of the strategic assessment tools in further refining project EIAs.



The SEA was recognized as a valuable exercise that exemplified an 'anticipate and prevent' approach for biodiversity resource management. Application of landscape level strategic assessment approach on the basis of 'best available' information provided a unique opportunity to adopt mitigation strategies involving biodiversity value enhancement.

The strategic level assessment not only positively influenced the integration of biodiversity concerns through value additions in EIA related information but also enabled substantiation of facts that triggered the conservation versus development debate.

The SEA finally catalyzed the parallel process of forestry and environmental clearances and performed the function of a 'help desk' in streamlining the assessment process for project authorization.

## 2.7 Key references

- Anon., 2001. *Environmental Impact Assessment and Environment Management Plan with Safeguard Measure of Human River Project in Chandrapur District (Maharashtra)*. EIA Report prepared by Vidarbha Irrigation Development Corporation in Consultation with S.S. Planners, Orissa.
- Anon., 2002. *A note on Human River Project for consultation meeting with Vidarbha Irrigation Development Corporation*, prepared by Vidarbha Irrigation Development Corporation, Govt. of Maharashtra.
- Ministry of Water Resources (MoWR). 2000.: <http://wrmil.nic.in/wrwelcome.htm>
- MoWR, (2002). *National Water Policy, April 2002, Ministry of Water Resources, Govt. of India*.
- WII, (2003). *Rapid Assessment of Habitat Availability and Wildlife Use in the Proposed Human River Project, Maharashtra State. WII – EIA Technical Report 27*. Wildlife Institute of India, Dehradun, Uttaranchal.
- Sutherland, W.J. 2003. *The Conservation Handbook Research, Management and Policy*. Blackwell Science Ltd. U.K. 278 pages.