

Government of India
Ministry of Environment, Forests and Climate Change
Wildlife Division

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F. No. 12-1/2013 WL (pt)

Dated: 3rd February 2016

Sub: Comments on the Draft National Wildlife Action Plan (2017-2031)- Reg.

The Ministry of Environment, Forest and Climate Change has been implementing the National Wildlife Action Plan (2002-2016), as adopted by the Indian Board for Wildlife in 2002. In order to review the implementation of the said Action Plan and to suggest a new Plan of Action for Wildlife Conservation, the Ministry had constituted a Committee under the chairmanship of Shri J.C. Kala, Ex-DGF and Secretary to the Government of India. The Committee had convened several meetings and have drafted the National Wildlife Action Plan (2017-2031). A copy of the said draft National Wildlife Action Plan is attached with this communication.

It is requested that comments and suggestions, if any, on the draft Action Plan (2017-2031) may kindly be e. mailed at:

wl-mef@gov.in

The last date for receipt of comments/suggestions by e.mail is **17th February 2016.**


(S.P. Vashishth)
Deputy Inspector General of Forests (WL)
Tel: 011-24695355

Encl.: As above

DRAFT NATIONAL WILDLIFE ACTION PLAN (NWAP-3)

(2017-2031)

PREFACE

A road map to conserve wildlife of the country, in the form of an Action Plan was mooted in XV meeting of Indian Board for Wildlife (NBWL) during 1982 and accordingly, the first National Wildlife Action Plan (NWAP-1) was drafted and adopted in 1983. It was implemented from 1983 through 2001. On its completion and based on the new concerns and challenges viz. increased commercial use of natural resources, growth in human and livestock population, changes in the consumption patterns, rising interest in biodiversity conservation etc., the Plan was revised and a new Action Plan (NWAP-2) was put in place for the period 2002-2016.

The 26th meeting of Standing Committee, on the suggestion of NBWL, directed to undertake a review of NWAP-2 and based on its evaluations and lessons learnt, develop a Plan for the period 2017-2031. Hence this new National Wildlife Action Plan (NWAP-3). The order is attached.

Highlights

The Plan is based on the premise that essential ecological processes that are governed, supported or strongly moderated by ecosystems, are essential for food production, health and other aspects of human survival and sustainable development. And maintenance of these ecosystems which can be termed as 'Life Support Systems' is vital for all societies regardless of their stage of development.

It also emphasizes on other two aspects of living resource conservation viz. preservation of genetic diversity and sustainable utilization of species and ecosystems which has direct bearing on our scientific advancements and support to millions of rural communities.

The Plan adopts landscape approach in conservation of all uncultivated flora and undomesticated fauna that has ecological value to mankind irrespective of where they occur.

It accords special emphasis to rehabilitation of threatened species of wildlife while conserving their habitats which include inland aquatic, coastal and marine eco-systems.

It also takes note of concerns relating to climate change on wildlife by integrating it in to wildlife management Planning.

It underlines the fact that despite being one of 12 mega biodiversity countries of the world, national planning has not taken serious note of adverse ecological consequences of reduction and degradation of wilderness areas from the pressures of population, commercialization and development projects. Accordingly, the plan has brought to focus the alarming erosion of our natural heritage comprising of rivers, forests, grasslands, mountains, wetlands, coastal and marine habitats arid lands and deserts

The plan underscores the increasing need for people's support for conservation of wildlife and to this effect recommends strengthening the 'core buffer multiple use surround' structure with higher inputs for eco-development, education, innovation, training, extension, conservation awareness and outreach programs.

Wildlife health is yet another area which receives attention in this Plan.

Management of tourism in wildlife areas with related plough back mechanism, development of Human resource and Staff welfare has undergone reorientation in the Plan.

The plan is alive to communities, inhabiting forest lands and other wilderness areas, to be treated appropriately in the light of Forest Rights Act and their inadequacy of resources and strong dependence on natural biomass resource.

The plan takes note of and addresses rising human animal conflict owing to shrinkage , fragmentation and deterioration of habitats generating animosity against wild animals and protected areas.

J C KALA

CHAIRMAN NWAP

F.No. 12-1/2013 WL-I
Government of India
Ministry of Environment and Forests
(Wildlife Division)

Paryavaran Bhawan,
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Dated: 22.05.2014

Sub: Composition of the Committee to review the implementation of the National Wildlife Action Plan (2002-2016) and to develop a National Wild Life Action Plan 2017- 2031 based on the evaluation and the lessons learnt.

In line with the suggestions made by the members of National Board for Wild Life and agreed in the 26th Meeting of the Standing Committee held on 31st October, 2012, Ministry of Environment and Forests (MoEF) has decided to constitute a Committee to review the implementation of the National Wildlife Action Plan (2002-2016) and to develop a National Wild Life Action Plan 2017-2031 based on the evaluation and the lessons learnt thereby. The composition of this Committee will be as follows:

- | | |
|---|--------------------|
| 1. Shri J. C. Kala, Former Secretary to Govt. of India and DG Forests | - Chairman |
| 2. Member Secretary, National Tiger Conservation Authority | - Member |
| 3. Director, Wildlife Institute of India, Dehradun | - Member |
| 4. Chief Wildlife Warden, Government of Karnataka | - Member |
| 5. Chief Wildlife Warden, Government of Gujarat | - Member |
| 6. Dr. Dibyabhanu Singh Chavda | - Member |
| 7. Dr. Bibhab Kr. Talukdar, Aranyak, Guwahati | - Member |
| 8. Mr. V.B. Sawarkar, Former Director, Wildlife Institute of India | - Member |
| 9. Shri S. S. Bisht, Former PCCF, West Bengal | - Member |
| 10. Dr. Vivek Menon, Wildlife Trust of India | - Member |
| 11. Dr. R. Sukumar, Indian Institute of Science, Bangalore | - Member |
| 12. Additional Director General of Forests (Wildlife), MoEF | - Member Secretary |

The Terms of Reference for the Committee will be as follows:

1. The Committee will undertake a review of the state of implementation of the Wild Life Action Plan 2002-2016 in the country.
2. The review will essentially include action taken in the "Action required" part of all the 13 chapters of the Action Plan, in context of the stated objectives. The state of "priority projects" as listed in the Action Plan will be specifically dealt with.

3. The Committee will evaluate the outcome of the implementation by developing criteria/indicators for success and will undertake an assessment thereafter based on the same.
4. The Committee will identify the challenges and constraints in the implementation of the Action Plan and suggest measures to be taken to address those.
5. Based on the analysis of the state of implementation and constraints therein, the Committee will work on a draft Wild Life Action Plan for the country for the period 2017-2031. The action plan will contain specific targets and time frames and specific responsibilities assigned to the concerned agencies for its implementation.
6. The Wild Life Action Plan will be evolved based on the assessment of the success of the actions as done in the evaluation made by the Committee. The Action Plan will take into account the global imperatives of conservation, sustainable use of biodiversity and the national policy aiming at preservation of the nature harbouring the remarkable biological diversity and genetic resources of the country.
7. The Committee will be free to co-opt any members including as and when required, Chief Wild Life Wardens of the States, for any particular meeting based on the relevant agenda items. If it is felt necessary to co-opt any additional members for all the meetings, such members may not exceed 2.

The Committee shall submit its report to the Ministry of Environment and Forests within a period of one year. For co-ordination of the deliberations of the Committee, DIG (WL), MoEF will be the nodal officer at MoEF. Chief Wild Life Wardens of all the States will be required to provide all the information/data demanded by the Committee. If considered necessary, any proposal for holding regional consultations will be submitted to MoEF for approval.

Entitlements of the Committee members with respect to travel expenses etc. will be as admissible to the members of NBWL. An honorarium of Rs.1000/- will be provided to non-official members as a token of appreciation for their participation in the deliberations for each meeting.


(Dr. Vivek Saxena)

Deputy Inspector General (WL)

Distribution:

1. Shri J. C. Kala, Former Secretary to Govt. of India and DG Forests, Chairman.
2. All Members of the Committee.
3. PS to MEF.
4. PPS to DGF&SS/PPS to ADG(WL)/PPS to IGF(WL)
5. PA to Joint Director (WL).
6. IFD

National Wildlife Action Plan

(2017-2031)



Ministry of Environment, Forest and Climate Change
Government of India

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References

ABBREVIATIONS USED

AC: Areas of Concern
ACF: Assistant Conservator of Forest
APO: Annual Plan of Operation
B4Life: Biodiversity for Life
BCRLIP: Biodiversity Conservation & Rural Livelihood Improvement Project
BDA-2002: Biological Diversity Act, 2002
BMC: Biodiversity Management Committee
BNHS: Bombay Natural History Society
BoBP: Bay of Bengal Programme
BSF: Boarder Security Force
BSI: Botanical Survey of India
CAMIA: Conservation Area Mutual Impact Assessment
CAMPAA: Compensatory Afforestation Management and Planning Authority
CASFOS: Central Academy for State Forest Service
CBD: Convention on Biological Diversity
CBI: Central Bureau of Investigation
CBO: Community Based Organisations
CCA: Climate change adaptation
CEE: Centre for Environment Education
CF: Conservator of Forest
CMS: Centre for Media Studies
CENIO: Conservation Education, Nature Interpretation and Outreach
CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMES: Coastal and Marine Ecosystems
CMFRI: Central Marine Fisheries Research Institute
CMIP: Coupled Model Inter-comparison Project
CMLRE: Centre for Marine Living Resources & Ecology
CMPA: Coastal and Marine Protected Areas
CMS: Convention on Migratory Species
CoE: Centre of Excellence
CoP: Conference of Parties
CPREEC: C.P. Ramaswami Aiyar Environmental Education Centre
CRZ: Coastal Regulation Zone
CSR: Corporate Social Responsibility
CSS: Centrally Sponsored Scheme
CWH: Critical Wildlife Habitat
CWLW: Chief Wildlife Warden
CZA: Central Zoo Authority
CZMP: Coastal Zone Management Plan
DCF: Deputy Conservator of Forest
DDMA: District Disaster Management Authority
DFO: Divisional Forest Officer
DNA: Deoxyribonucleic Acid
DRDA: District Rural Development Agency
DRI: Directorate of Revenue Intelligence
DRR: Disaster Risk Reduction
EBA: Ecosystem Based Adaptation
EBM: Ecosystem Based Management
EDC: Eco-development Committee
EDP: Eco-development Programme / Project
EE: Environmental Education
EEHV: Elephant Endotheliotropic Herpes Virus
EIA: Environment Impact Assessment
EPA-1986: Environmental Protection Act, 1986
ESZ: Eco-Sensitive Zone

DRAFT FOR COMMENTS

FCA-1980: Forest (Conservation) Act, 1980
FDA: Forest Development Agency
FPC: Forest Protection Committee
FRA-2006: Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
FRC: Forest Rights Committee
FSI: Forest Survey of India
GDP: Gross Domestic Product
GEF: Global Environmental Facility
GIB: Great Indian Bustard
GIS: Geographical Information System
GOs: Government Organisations
GOI: Government of India
HFL: High Flood Line
HoFF: Head of Forest Force
HRD: Human Resource Development
HWLW: Honorary Wildlife Warden
HWC: Human Wildlife Conflict
IAS: Invasive Alien Species
IBIS: Integrated Biosphere Simulator
ICCW: International Consortium on Combating Wildlife Crime
ICFRE: Indian Council of Forestry Research & Education
ICMBA: Important Coastal and Marine Biodiversity Areas
IDWH: Integrated Development of Wildlife Habitat
IFA-1878/1927: Indian Forest Act, 1878/1927
IFGTB: Institute of Forest Genetics and Tree Breeding
IFS: Indian Forest Service
IGNFA: Indira Gandhi National Forest Academy
IIFM: Indian Institute of Forest Management
IPCC: Intergovernmental Panel on Climate Change
IPR: Intellectual Property Right
IT: Information Technology
ITBP: Indo-Tibetan Border Police
ITK: Indigenous Traditional Knowledge
IUCN: International Union for Conservation of Nature and Natural Resources
IVRI: Indian Veterinary Research Institute
JFM: Joint Forest Management
JFMC: Joint Forest Management Committee
LTEO: Long Term Ecological Observations
MEE: Management Effectiveness Evaluation
MoEFCC: Ministry of Environment, Forests & Climate Change
MoES: Ministry of Earth Sciences
MoHRD: Ministry of Human Resources Development
MoIB: Ministry of Information and Broadcasting
MoLJ: Ministry of Law and Justice
MoTA: Ministry of Tribal Affairs
MOU: Memorandum of Understanding
MCPA: Marine/ Coastal Protected Area
MPCA: Medicinal Plant Conservation Area
MPDA: Medicinal Plant Development Area
MSUT: Maritime State/UT
NBA: National Biodiversity Authority
NBAP: National Biodiversity Action Plan
NBRI: National Botanical Research Institute
NBT: National Biodiversity Targets
NBWL: National Board for Wildlife
NCERT: National Council of Education, Research & Training
NCSCM: National Centre for Sustainable Coastal Management
NDMA: National Disaster Management Authority
NEAMA: National Environmental Appraisal and Monitoring Authority

DRAFT FOR COMMENTS

NGO: Non-Governmental Organisation
NHAI: National Highway Authority of India
NHM: Natural History Museum
NIC: Nature Interpretation Centre
NITI: National Institution for Transforming India Aayog
NNHM: National Natural History Museum
NP: National Park
NPV: Net Present Value
NTCA: National Tiger Conservation Authority
NTFP: Non Timber Forest Product
NWAP: National Wildlife Action Plan
NWIS: National Wildlife Information System
NWRCC: National Wildlife Research Coordination Committee
PA: Protected Areas
PBR: People's Biodiversity Register
PCCF: Principal Chief Conservator of Forest
PESA-1996: Panchayat (Extension to Scheduled Areas) Act, 1996
PF: Protected Forest
PRA: Participatory Rural Appraisal
PRI: Panchayat Raj Institutions
PRT: Primary Response Team
PSC: Public Service Commission
PWD: Public Works Department
RCP: Representative Concentration Pathways
RF: Reserved Forest
RTI: Right to Information
S.: Section
SAC: Space Application Centre
SACON: Salim Ali Centre for Ornithology and Natural History
SAWEN: South Asia Wildlife Enforcement Network
SBB: State Biodiversity Board
SDMA: State Disaster Management Authority
SFD: State Forest Department
SFS: State Forest Service
SHG: Self Help Group
SIA: Social Impact Assessment
SOP: Standard Operational Procedure
SSB: Sashastra Seema Bal
STPF: Special Tiger Protection Force
TCP: Tiger Conservation Plan
TR: Tiger Reserve
UAV: Unmanned Aerial Vehicle
UNDP: United Nations Development Programme
UNESCO: United Nations Educational, Scientific and Cultural Organization
UNGA: United Nation's General Assembly
UP: Uttar Pradesh
UPSC: Union Public Service Commission
UT: Union Territory
VOs: Voluntary Organisations
WCCB: Wildlife Crime Control Bureau
WII: Wildlife Institute of India
WLS: Wildlife Sanctuary
WPA: Wetland Protected Area
WPA-1972: Wildlife (Protection) Act, 1972
WRAC: Wildlife Research Advisory Committee
WTI: Wildlife Trust of India
WWF: World Wide Fund for Nature
ZSI: Zoological Survey of India

I. Strengthening and Improving the Protected Area Network

Overview and Objectives

1. Protected Areas (PAs) are clearly defined geographical spaces, recognized, dedicated and managed through legal and other effective means to achieve the long term conservation of nature with associated ecosystem services and cultural values. The PAs provide a wide range of social, environmental and economic benefits to the people worldwide. In a rapidly changing world where natural ecosystems are under severe pressure, the PAs, when governed and managed effectively, can provide nature based solutions to environmental problems and serve as integral component of sustainable development. Section 3.3 of the National Forest Policy, 1988 states, “For the conservation of total biological diversity, the network of national parks, sanctuaries, biosphere reserves and other protected areas should be strengthened and extended adequately”.
2. At the beginning of the second National Wildlife Action Plan (NWAP) (2002-2016), there were only about 400 PAs covering an area around 1.56 lakh sq. km. in the country. Presently, there are a total of 726 PAs in the country covering 1.60 lakh sq. km. i.e., 4.88% of the geographical area. The following table gives the break-up of various categories of PAs in the country:

Current status of the PA Network in India as on November 2015 (Source: National Wildlife Database, WII)

Protected Area	Number	Total Area (sq. km)	% Coverage
National Parks	103	40500.13	1.23
Wildlife Sanctuaries	531	117607.72	3.58
Conservation Reserves	66	2344.53	0.07
Community Reserves	26	46.93	0.001
Total Protected Areas	726	160499.31	4.88

3. In addition to the PA network mentioned above, the managed forests under the State Forest Departments (SFDs) are also contributing towards wildlife conservation. Thus, India has over 20% of the total geographical area under effective wildlife conservation, thereby exceeding the target of 17% envisaged in the Aichi Target 11. However, wildlife in the urban landscapes and other human habitations as well as the marine and coastal biodiversity need more conservation attention.
4. The previous NWAP recommended a number of measures to strengthen the PA network and enhance their management effectiveness. These included: five-yearly review of the existing PA network in the country; establishment of

new PAs; development of guidelines and identification of sites for setting up Conservation Reserve and Community Reserves; implementation of the recommendations given in the Wildlife Institute of India's (WII) PA network report; completion of legal procedures for final notification of existing and new PAs; readjustments of boundaries of PAs, where required, in accordance with ecological and natural features; and preparation of scientific and ecologically sound management plans for all PAs. There has been varying success in achieving these targets.

4.1. Several Conservation Reserves and Community Reserves have been notified, albeit their area is still very small. Several Wildlife Sanctuaries (WLS) have since been upgraded to National Parks (NPs). Similarly, a number of PAs have been enlisted as Natural World Heritage Sites (NWHS) where globally significant species or ecosystems are being protected. Further, in compliance with India's commitment to the Convention on Biological Diversity (CBD) in respect of PAs, the Government of India has formulated 10 National Biodiversity Targets (NBT) in 2014, of which, Target 6 aligns with the Aichi Target 11 that deals with strengthening the PA network in the country [Ref. National Biodiversity Action Plan (NBAP), Addendum 2014].

4.2. The National Tiger Conservation Authority (NTCA) has been fulfilling its mandate within the ambit of the Wildlife (Protection) Act, 1972 (WPA-1972) for strengthening tiger conservation in the country by retaining an oversight through advisories/normative guidelines based on appraisal of population status of tiger, ongoing conservation initiatives and recommendations of specially constituted Committees. Several PAs have been notified as Tiger Reserves (TRs) since the initiation of the second NWAP. Beginning with 9 TRs in 1973, the number of TRs has gone up to 48 (Rajaji NP in Uttarakhand being the latest), encompassing about 2.12% of total geographical area of the country. 'Project Tiger' is a Centrally Sponsored Scheme (CSS) of the MoEFCC providing funding support to the tiger range States for in-situ conservation of tigers in designated TRs, and has put the endangered tiger on an assured path of recovery by saving it from extinction, as revealed by the recent findings of the All India tiger estimation of 2226 (1945-2491) tigers with 1540 (1686) individual photographs of adults using the refined methodology.

4.3. As stipulated in the previous NWAP, the MoEFCC has institutionalized a five-year periodic review of PAs on parameters such as status of management, protection, habitat restoration, diversity indices, conservation of threatened and indicator species, adequacy of infrastructure, staff and financial resources and socio-economic status of local communities. Based on the aforesaid criteria, the WII has so far carried out 'Management Effectiveness Evaluation' (MEE) of 126 PAs. It is noteworthy that on an average, the management effectiveness of the Indian PAs comes to about 61% which is much higher as compared to the global average (56%). Similarly, the NTCA has initiated MEE of all the TRs and, so far, three cycles of evaluation have been completed. The WII has published a manual entitled

‘A Guide for Planning Wildlife Management in Protected Areas and Managed Landscape’. The WII has also prepared a manual for eco-development planning in and around PAs. The NTCA, with technical support from the WII, has prepared guidelines for preparing Tiger Conservation Plans.

4.4. Conservation of threatened species and their habitats; control of poaching; research and ecological monitoring; and ensuring people’s participation in wildlife conservation have been accorded high priority in the previous NWAP and the Wildlife Conservation Strategy, 2002. In order to encourage the field staff in effective management of PAs, the MoEFCC has instituted various awards for meritorious work within PAs. Similarly, many SFDs and NGOs have also initiated awards for the frontline staff in recognition of their valuable contribution to the cause of wildlife conservation.

5. Impacts from invasive alien species (IAS) on biodiversity can be direct, indirect, and cumulative. In PAs, impacts from IAS take the form of impacts on ecosystem function, impact on ecosystem structure, and impacts at the level of species communities or habitats as well as at the level of species. IAS problem species range from the Giant Sensitive Tree (*Mimosa pigra*) to the more unusual feral elephants in the Andaman Islands. A National Policy on Invasive Species is urgently required in India that should cover the regulation of introduced species, measures to prevent their spread, their control and their eradication. Before having a National Policy, it is important to complete inventorisation and mapping of both plant and animals invasive species in the country especially in the wildlife protected areas.
6. It is felt that in many States/UTs where forest to people ratio is very low and there is high human dependency on natural ecosystems, creation of new NPs and WLS could be a big challenge and the only option is to go for other forms of PAs, viz. Conservation Reserves and Community Reserve.
7. All the PAs in the country would need to follow multi-pronged approach for effective management which includes anti-poaching activities, habitat management, outreach programmes, human resources development (HRD), research and monitoring, mitigation of human-wildlife conflict (HWC), eco-development programme (EDP) for ensuring local support for conservation and adequate financial support.
8. The MoEFCC lays strong emphasis on the preparation of scientific and ecologically sound management plans for the PAs. Many States have developed their own mechanisms to prepare and review the management plans. The Chief Wildlife Wardens (CWLWs) of respective States/UTs coordinate the preparation of management plans. However, review process and implementation of the plans needs to be streamlined in most of the States/UTs.

Action Required

Considering the inadequacy of the PA network in certain biogeographic zones; challenges of meeting the biomass needs of poor people; and need for much more effective and interactive monitoring of the PA network, the following actions and projects are recommended for the next NWAP (2017-2031):

1. Undertake periodic review of the status of Protected Areas in India.
2. Expedite the process of settlement of rights in the existing or proposed PAs.
3. Enhance the PA network by including terrestrial, inland water and coastal/marine areas of high conservation values and by integrating PAs into wider landscapes and seascapes as per the Target 11 of the NBAP.
4. Complete the process of rationalisation and demarcation of boundaries and zonation for effective management of PAs.
5. Prepare Integrated and Adaptive Management Plans for all the PAs.
6. Promote use of modern tools for monitoring and surveillance of highly sensitive PAs.
7. Assess, monitor and manage the alien invasive species inside PAs and TRs
8. Secure wildlife corridors and also draw appropriate plans for their management.
9. Improve the capacity of frontline staff for better monitoring and management of PAs.
10. Involve local communities in protection and management of PAs.

Priority Projects

1.1. Publish a periodic status report on the PA network in India, once every 5 years covering all the vital statistics and conservation values. A complete review of the PAs in coordination with the SFDs to be conducted once in 10 years.

Timing: Status report to be published by 2017 and every 5 years thereafter. Review of PAs to be completed by 2025 and every 10 years thereafter.

Responsibility: MoEFCC, SFDs and WII.

2.1. Complete legal formalities including payment of compensation to the right-holders for facilitating final notification of existing or new PAs in a time-bound manner so as to avoid harassment of the local people. It is imperative that while establishing new PAs in future, SFDs should adopt a realistic approach regarding the rights of the people. For example, in many cases, the intended purpose of a PA may be better served by establishing a Conservation Reserve/Community Reserve rather than a NP or a WLS. Similarly, while establishing a WLS, advantage may be taken of S.24(2)(c) of the WPA-1972 which permits the local people to allow the continuance of such rights within the limits of the WLS as the CWLW may find to be innocuous.

Timing: Complete by 2019; and every 5 years thereafter.

Responsibility: MoEFCC and SFDs.

2.2. Undertake, in collaboration with suitable NGOs and Scientific Institutes, a review of the management of the PAs with a view to accommodate genuine needs of the local people in accordance with the provisions of the WPA-1972 and principles of scientific management and make appropriate provisions in the Management Plans. [For example, S.33(d) authorises the CWLW to permit regulated grazing by livestock within a WLS. S.26A (1) (proviso) read with S.35(1) (proviso) makes it incumbent upon the State Government to take adequate measures for protecting the occupational interests of the local fishermen while notifying any part of the territorial waters to be a WLS or a NP. S.26A (2) read with S.35(1) (proviso) protects the right of innocent passage of any vessel or boat through the territorial waters constituted as a WLS or a NP. S.18A (2) enjoins upon the State Government to make available fuel, fodder and other forest produce to the right-holders within a WLS till such time as their rights are finally settled. S.29 (proviso) read with S.35(6) (proviso) stipulates that where the forest produce is removed from a WLS or a NP, the same shall be used for meeting the personal bonafide needs of the local people and not for any commercial purpose.].

Timing: To start in 2017 and complete by 2019.

Responsibility: SFDs, suitable NGOs and Scientific Institutes.

2.3. Undertake a review of the past cases of relocations of villages from the PAs and TRs, with the help of the SFDs, suitable NGOs and Scientific Institutes, with a view to assess the current status of the relocated people, net impact on wildlife conservation, and the lessons learnt. The review should be used for developing good practices for future relocation projects and also for planning additional support for improving the plight of the already relocated people where necessary. Relocation of villages from PAs in future, if essential for the purpose of wildlife conservation, should be based on the willingness of the affected people and carried out in accordance with the NTCA's guidelines.

Timing: To start in 2017 and complete by 2019.

Responsibility: MoEFCC, SFDs, suitable NGOs and Scientific Institutes.

2.4. Complete the process of determination of forest rights and identification of Critical Wildlife Habitats (CWHs) within PAs in accordance with the FRA-2006 in a time-bound manner.

Timing: The process for settlements of forest rights and identification of CWH is already on and should be completed by 2019.

Responsibility: MoEFCC, SFDs, Ministry of Tribal Affairs (MoTA), State Tribal Welfare Departments, District Magistrates and Panchayats.

3.1. Conduct a scoping study for establishment of a new category of PAs analogous to the IUCN's categories.

Timing: Complete by 2020.

Responsibility: MoEFCC, SFDs, Scientific Institutes and Civil Society Organizations.

3.2. Commission a feasibility study for enhancing the PA network by including terrestrial, inland water and coastal/marine areas of high conservation values and by integrating PAs into wider landscapes and seascapes as per the Target 11 of the NBAP. The prioritized inventory of 158 wetlands prepared by the WWF-India; wetlands mapped and inventorised by the MoEFCC with the help of the SACON; and the recommendations made by the WII* for potential CMPAs should also be taken into account for inclusion in the PA network.

Timing: Complete by 2019.

Responsibility: MoEFCC, SFDs, WII and other Scientific Institutions and Civil Society Organizations.

3.3. Initiate steps for setting up new PAs and enhancing the coverage of existing PAs based on recommendations of the studies mentioned in 3.1 and 3.2 above and develop integrated landscape level conservation plans for such areas.

Timing: Complete by 2023.

Responsibility: MoEFCC, SFDs, WII, NCSCM and BoBP.

3.4. Align the PA network in accordance with the gap analysis done by the WII so that all the ecosystems and biogeographic zones are properly represented.

Timing: Complete by 2022.

Responsibility: MoEFCC, SFDs and WII.

3.5. Identify potential NPs and WLS in consultation with the SFDs for enhancing the network of Tiger Reserves.

Timing: Complete by 2022.

Responsibility: NTCA and SFDs.

3.6. Identify important wildlife habitats, corridors and sacred groves situated outside the administrative control of the SFDs in collaboration with suitable NGOs and Scientific Institutes and get them notified as Community Reserves under S.36C of the WPA-1972 or Biodiversity Heritage Sites under S.37 of the BDA-2002.

* Ref. ENVIS-Coastal and Marine Protected Areas in India: Challenges and Way Forward, WII, 2014.

Timing: Complete by 2020.

Responsibility: SFDs, SBBs, Scientific Institutes and suitable NGOs.

4.1. Undertake rationalisation of boundaries of PAs wherever needed based on expert advice keeping ecological and natural features as well as genuine hardships of the local communities in mind. The boundaries of all the PAs should be properly demarcated and zonation carried out for effective management.

Timing: Complete by 2022.

Responsibility: MoEFCC, SFDs, WII and other Scientific Institutes.

5.1. Prepare/update Integrated and Adaptive Management Plans for all the PAs (including the WPAs and the CMPAs) in accordance with the guidelines prepared by the WII*. The Management Plans should, in particular, have an exclusive chapter on Interpretation and Conservation Awareness. Establish a Management Plan Development Cell at the headquarters of all SFDs for preparing and periodically reviewing the management effectiveness of the Management Plans.

Timing: Complete by 2020; and review every 5 years thereafter.

Responsibility: MoEFCC, SFDs and WII.

6.1. Set up Electronic Eye (E-eye) surveillance in highly sensitive PAs and initiate the use of drone/Unmanned Aerial Vehicle (UAV) technology as an airborne monitoring /warning system.

Timing: Complete by 2025.

Responsibility: MoEFCC, NTCA and SFDs.

7.1. Develop a National Policy on Invasive Alien Species and their management.

Timing: Complete by 2018.

Responsibility: MoEFCC and Scientific Institutes.

8.1. The MoEFCC should, in consultation with the WII, other Scientific Institutes and suitable NGOs, issue guidelines for preparing management plans for wildlife corridors. The SFDs should formulate and implement management plans for corridors based on the aforesaid guideline.

Timing: Guideline to be prepared by 2018 and management plans for wildlife corridors to be prepared by 2021.

Responsibility: MoEFCC, WII, Scientific Institutes, suitable NGOs and SFDs.

* The MoEFCC is presently in the process of finalizing the Guidelines for the Process of Management Planning for Protected Areas (PAs) —2015.

9.1. *Projects for enhancing the capacity of the frontline staff in PAs have been recommended in Chapter XIII (Development of Human Resources).*

10.1. *Projects for ensuring people's support in protection and management of PAs have been recommended in Chapter XI (People's Participation in Wildlife Conservation) as well as in paragraphs 2.1, 2.2, 2.3, 2.4, 3.6 and 4.1 of this Chapter.*

II. Landscape Level Approach for Wildlife Conservation

Overview and Objectives

1. The 2.5% Indian landmass holds about 8% of the world's biodiversity. Of these, about 5% of areas have only been declared as Protected Areas and the large numbers of wildlife is occurring outside PAs. Therefore, challenges of limited land (habitats), human pressures and development must all be kept in mind before preparing plans for the conservation of these wildlife and their habitats. Conservation of species must be seen as maintaining or enhancing populations, genetic exchanges between metapopulations, improving significantly, prospects of their long term persistence. Therefore, the plans must address species loss in the short term and the reasons for such depletions in the long run.
2. Amongst the main causes of species loss, apart from habitat degradation which is the reason for limiting space for animals, is the issue of poaching. Poaching, depletion of genetic diversity and inbreeding (several species of birds, small mammals and other restricted range species), competition from non native species (e.g. fishes), persistent chemical pollutants (e.g. Pesticides and several species of invertebrates) and unsustainable commercial harvest (marine fishes) could either be for trade (as in tiger, leopard, bear, rhino, elephant and others) or for local consumption (mainly ungulates and birds). Both cause serious losses to species, either directly or by removal of prey base for carnivores. Loss of genetic purity, for species that have been domesticated but whose wild ancestors exist (red jungle fowl, wild buffalo), could be a major problem and efforts must be made to identify and conserve the wild genome. Increased pesticide use also harms wildlife, especially graminivorous birds (like sparrows and peafowl) and ways need to be found of how to protect these species from the ill effects of pesticides.
3. Ecological requirements of species have to be kept in mind before framing prescriptions for their conservation. For instance, elephants need large areas for sustenance and therefore cannot be conserved in small areas. Likewise, species like tigers may well be conserved by a combination of smaller areas (Tiger Reserves) but allowing for movement across such areas through largely human dominated habitats (corridors). Thus, while protected areas or habitats within these must remain the focus of our conservation efforts, plans should also be drawn for landscapes using larger landscapes like the bio-geographic zones (Rodgers and Panwar 1989).
4. Species that are highly depleted in numbers may need to be aided by *ex-situ* conservation efforts so that species can be secured and propagated under controlled conditions for release when a large enough stock is raised. This is a relatively new concept and capacity needs to be built to achieve impacts.

Action Required

1. To identify the present status of all wildlife species in the country.
2. To lay special emphasis on species that are endemic or endangered and in need of conservation through special recovery projects.
3. To identify and implement landscape level conservation projects using flagship species concepts.
4. To identify critical areas outside protected areas for wildlife conservation and initiate projects.
5. To undertake a programme of *ex situ* captive breeding and rehabilitation in the wild for critically endangered species in accordance with IUCN guidelines, after developing requisite techniques and capabilities in this regard.
6. To publish flora and fauna species status papers periodically, which should be translated into local languages.
7. To initiate work on contemporary threats such as climate change and also focus on ecosystems such as marine, wetland, island, montane and arid zones.
8. Corridors for large mammals need to be secured. Elephant and tiger corridors across the country have been identified in several reports of the MOEFCC. On ground demarcation of those corridors, and restricted land use change need to be in place for those areas.
9. A strategy to be developed for managing free ranging domestic animals such as dogs, cats etc in and around wildlife habitats. There have been reports of dogs killing threatened species like black necked crane (nest attacks), red panda and blue sheep in the Himalayas. Dogs have also been reported to act as carrier of Canine Distemper Virus in plains, wherein wild carnivores like tigers and leopards have the chance of getting exposed to this disease outbreak. Further, dogs are known to predate sea turtles eggs and similarly cats that are known to predate eggs of ground nesting birds. Appropriate multi-agency strategy needs to be adopted to check the population of these free ranging animals and regular vaccination needs to be carried out for domestic dogs to prevent them from being a carrier of Canine Distemper Virus.
10. The country has successfully translocated tiger, gaur, swamp deer, sambar, chital, gharial. Therefore, species specific protocols may be developed so that all the states can follow it. Monitoring protocols for the translocated species may also be developed.
11. Illegal wildlife trade threatens many flagship species in India. The list of lesser known species found in illegal trade is also growing each day. Curbing of illegal trade of the flora and fauna may be included with projects

on recording the status of the species in illegal trade and reviewing policies and institutional framework to ensure that illegal trade is minimised.

12. Arrest further escalation of already present negative interactions by ensuring that all development projects, in key wildlife habitats, do not turn out to be drivers of conflict, in future.

Priority Projects

1.1. Establishment of baseline data and regular monitoring of different indicator species to monitor the wildlife habitat – in both, within PA and outside- at the State level

Timing: 2017-18 and then once in every 5 years.

Responsibility: ZSI, BSI, MoEFCC, SFDs, WII, Scientific Institutes, Universities, NGOs.

1.2. Undertake periodic review on conservation status of species using IUCN Red Listing criteria and appropriately update the Schedules of the WPA-1972.

Timing: 2017-18 and then once in every 5 years.

Responsibility: ZSI, BSI, WII, MoEFCC, SFDs, Scientific Institutes, Universities, NGOs.

1.3. Undertake field status surveys on threatened and data deficient species so that distribution patterns are known, key areas identified and threats identified.

Timing: 2017-19 and then once in every 5 years.

Responsibility: ZSI, BSI, WII, MoEFCC, SFDs, Scientific Institutes, Universities, NGOs.

1.4. Publish a status report on Wildlife of India providing assessment of major wildlife taxa and update every five years.

Timing: 2017-19 and then once in every 5 years.

Responsibility: ZSI, BSI, WII, MoEFCC, SFDs, Scientific Institutes, Universities, NGOs.

2.1. Initiate and focus on Species Recovery Projects to recover species that are critically endangered or endangered such that their threat status lowers in a targeted period of time.

Timing: 2017-20 and continue.

Responsibility: MoEFCC, SFDs, WII, NGOs.

2.2. Identify species with single populations and translocate to a second home after drawing up the requisite plans.

Timing: 2017-2022 and to continue

Responsibility: MoEFCC, SFDs, CZA, WII, NGOs.

2.3. Build capacity within the SFD and other practising agencies, organisations for capture and transport of threatened wildlife to safer habits.

Timing: 2017-2022 and to continue.

Responsibility: MoEFCC, SFDs, WII, NGOs

3.1. To identify suitable flagship species and develop landscape level action plans for priority landscapes.

Timing: by 2018.

Responsibility: MOEFCC, SFDs, WII.

4.1. To identify and map critical areas that have rich faunal and floral attributes that lie outside the PA network especially those that are critical as passages for wildlife, and ensure that such identified areas are kept intact or restored as the case may be.

Timing: 2017-2022 and to continue

Responsibility: MoEFCC, SFDs, WII, Scientific Institutes, Universities, NGOs.

5.1. To reconcile species identified for recovery with the ones listed for support of conservation breeding to consolidate the list of species and identify organisations/zoos, centres to undertake the conservation breeding.

Timing: 2017-2022 and to continue.

Responsibility: MoEFCC, CZA, SFDs, WII, Scientific Institutes, Universities, NGOs.

5.2. To build capacity in enclosure design, animal husbandry, breeding techniques, raising of young, reintroduction and monitoring among select zoo and protected area staff.

Timing: 2017-2022 and to continue.

Responsibility: MoEFCC, CZA, SFDs, WII, Scientific Institutes, Universities, NGOs

5.3. To prioritize and initiate time bound conservation breeding projects with proper breeding and release plans.

Timing: 2017-2022 and to continue.

Responsibility: MoEFCC, CZA, SFDs, WII, Scientific Institutes, Universities, NGOs.

6.1. To publish status papers on floral and faunal species periodically with translation in local languages.

Timing: To begin in 2017 and continue.

Responsibility: ZSI, BSI, WII, Scientific Institutes and Universities.

7.1 To Constitute National and State level Authorities for sustainable management of Mountain, Wetlands and Riverine, Marine and Island, and Arid Zones with state level authorities in each State / UT.

Timing: 2017-2022 and to continue.

Responsibility: MoEFCC, CZA, SFDs, WII, Scientific Institutes, Universities, NGOs.

7.2 To prioritize key habitats under each of these four priority landscapes and initiate landscape level management planning for them

Timing: 2017-2022 and to continue

Responsibility: MoEFCC, CZA, SFDs, WII, Scientific Institutes, Universities, NGOs.

8.1. Develop and implement the long term conservation plans for identified wildlife corridors in the country. Corridors need to be mentioned in the district and state level development plans, for the knowledge of stakeholders other than the state forest department. MoEFCC need to put in place a strategy for developing and implementing corridor management plans. Convergence of ongoing initiatives like BCRLIP that is looking at large conservation landscapes have components of corridor conservation built into them, and recommendations from those work need to be converged with those from academicians and researchers for preparing solid long term corridor conservation plans.

Timing: 2017-2022 and to continue

Responsibility: MoEFCC, SFDs, WII, Scientific Institutes, Universities, NGOs

9.1. Develop an appropriate multi-agency strategy or plan to check the population of free ranging feral and domestic animals in the wildlife habitats that are occupied by the threatened wildlife.

Timing: 2017-2022 and to continue.

Responsibility: MoEFCC, Ministry of Agriculture, State Animal Husbandry Departments, SFDs, WII, Scientific Institutes and NGOs.

10.1. Develop species specific translocation and monitoring protocols for threatened species in India.

Timing: 2017-2022 and to continue

Responsibility: MoEFCC, WII, NTCA, NGOs

11.1. Undertake periodic review of status CITES listed wildlife species that are illegally traded.

Timing: 2017-2018 and once in every 5 years

Responsibility: MoEFCC, SFDs, WII, ZSI, CMFRI, BSI.

12.1 Ensure that Environmental Impact Assessment (EIA) of developmental projects takes into consideration potential HWC spin-offs that large landscape level land-use practices or alterations can cause.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC.

12.2 Review and analyse and recommend alternative development options as well as amendments to proposed developmental projects, through comprehensive land-use practices vis-à-vis Wildlife habitat requirements analyses, for all Protected Areas and PA interlinking areas such as wildlife corridors and implement through community based organizations at local level.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC and NGOs.

III. Rehabilitation of Threatened Species

Overview and Objectives

1. Several species of flora and fauna in the country are highly threatened due to over exploitation, habitat degradation and loss. Of these, many have been pushed to the brink of extinction. Such species, especially endangered and critically endangered, need immediate conservation measures by way of conducting status surveys, preparation of recovery plans, and identification and protection of critical habitats. In most of the cases *in-situ* conservation has to be given highest priority backed by conservation breeding (*ex-situ* conservation) in case of species which are critically endangered.
2. During the NWAP (2002-2016), the MoEFCC, with technical support from research organizations, initiated several actions towards conservation of threatened species of fauna including status survey of highly threatened species such as Tibetan Antelope, Wild Yak, Hangul, Brow-antler Deer or Sangai, Wild Buffalo, Gangetic Dolphin, Lesser Florican, Bengal Florican, Great Indian Bustard, Nicobar Megapode, Dugong, Sea Turtles, and other coastal and marine species. Species recovery plans have been prepared for various terrestrial and aquatic species. Conservation breeding projects for threatened species such as vultures and pigmy hog have been implemented successfully in the country. Technical expertise for capture, translocation, and rehabilitation of large mammals including carnivores, gaur, rhinoceros and elephants have been developed. A special programme has been initiated for reintroduction of Asiatic Cheetah in the its original habitat in the Western India under the supervision of a technical committee, which supervised the identification of site for reintroduction, identification of the source population, captive breeding and soft release. Central Zoo Authority (CZA) has listed as many as 73 species of fauna for conservation breeding, of which 26 have been listed as priority species and guidelines have been developed for their captive breeding. Stud books have been prepared and maintained for several threatened and captive bred species.
3. Conservation of threatened species of flora especially local endemics and highly traded species such as medicinal plants and orchids has received relatively less attention so far. MoEFCC with the support from UNDP and GEF has recently completed a project on the conservation of globally threatened medicinal plants in three states of India *viz.*, Uttarakhand, Chhattisgarh and Arunachal Pradesh. One of the outcomes of this project has been establishment of several Medicinal Plant Conservation Areas (MPCAs) in these states. In addition, a concept of medicinal plant development area (MPDA) has been given for *ex-situ* conservation of such species. During the current NWAP (2017-2031) many more MPCAs and MPDAs will need to be established in various eco-climatic zones of India. As in the case of zoological gardens, a series of botanical gardens and arboreta

will have to be established in the country with a focus on *ex-situ* conservation of threatened flora.

4. The MoEFCC has also initiated a new Centrally Sponsored Scheme: Integrated Development of Wildlife Habitat (IDWH) for assisting the State Governments in protection of wildlife and its habitats outside PAs (Anon. 2009). The State Governments are encouraged to identify habitats for highly threatened species of flora and fauna outside the PAs and submit proposals for their management and long term monitoring. This would include conservation and long term monitoring of such habitats.

Action Required

1. Identify endangered and critically endangered species of flora and fauna, conduct status surveys and prepare species recovery plans in a time bound manner.
2. Expedite implementation of species recovery plans prepared during the NWAP (2002-2016), and prepare such plans for other priority species.
3. Develop capacity for *ex-situ* conservation and multiplication of threatened taxa.
4. Prepare a comprehensive plan for conservation of endangered / critically endangered plants and establish more MPCAs / MPDAs / Botanical Gardens in different parts of country.
5. Identify critical habitats for threatened species of flora and fauna outside PA network and prepare their restoration / recovery plans involving local community institutions.

Priority Projects

- 1.1. Review and update the list of endangered and critically endangered species of flora and fauna and complete Red Listing of endemic species.

Timing: To be initiated by 2017 and completed by 2020.

Responsibility: MoEFCC, ZSI, BSI, WII and other Scientific Institutes.

- 1.2. Conduct status survey of Red Listed and other Data Deficient species and publish reports on their populations, area of extent, causes of threat and habitat.

Timing: To be completed by 2021.

Responsibility: ZSI, BSI and other Scientific Institutes.

- 2.1. Implement all the species recovery plans prepared during the previous NWAP.

Timing: To be completed by 2021.

Responsibility: MoEFCC, SFDs and Scientific Institutes.

2.2. Prepare and execute species recovery plans for the priority species. Initiate measures for safeguarding genetically pure populations from future genetic contamination and for phasing out genetic swamping where such swamping has occurred.

Timing: To be initiated in 2017 and continue throughout the plan period.

Responsibility: MoEFCC, SFDs, WII and other Scientific Institutes.

2.3. Identify suitable alternative homes for species having single isolated populations such as Jerdon's Courser, Wroughtons's Free-Tailed Bat, etc., and prepare rehabilitation plans.

Timing: To be completed by 2021.

Responsibility: MoEFCC and SFDs with technical support from Scientific Institutes.

3.1. Develop a cadre of trained Wildlife Biologists and Botanists and build their capacity in *ex-situ* conservation / conservation breeding. Develop capabilities of planned breeding and reintroduction of captive bred populations of identified endangered species in accordance with the IUCN guidelines.

Timing: To be initiated by 2017 and continue throughout the plan period

Responsibility: MoEFCC, SFDs, CZA, WII, ZSI, BSI and other Scientific Institutes.

3.2. Develop *ex-situ* conservation facilities for critically endangered species and initiate conservation breeding programmes.

Timing: To be initiated by 2017 and ongoing.

Responsibility: MoEFCC, CZA and SFDs.

3.3. Develop a centralized database of available information for identified species that leads to their successful *ex-situ* conservation and restoration in natural habitats.

Timing: To be completed by 2018

Responsibility: CZA (for animals) and NBRI (for plants)

4.1. Establish new MPCAs and MPDAs for the globally threatened medicinal plants in different States / UTs.

Timing: Initiate by 2017 and complete within 2022.

Responsibility: MoEFCC, SFDs, National Medicinal Plants Board, State Medicinal Plant Boards and Scientific Institutes.

5.1. Initiate a national programme on inventory and monitoring of threatened habitats and link with conservation of eco-sensitive area programme.

Timing: Initiate by 2017 and continue throughout the plan period.
Responsibility: MoEFCC, SFDs and Scientific Institutes.

IV. Conservation of Inland Aquatic Ecosystems

Overview and Objectives

1. Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life. The Ramsar Convention takes a broad approach in determining the wetlands which come under its aegis. For most wetlands, direct rainfall provides only a small proportion of the water, with the primary source being surface runoffs, rivers or aquifers and of oceanic and marine waters from offshore. Successful management of wetland sites requires adequate protection to the source of water. Insufficient water reaching wetlands is often a major cause of wetland loss and degradation.
2. A key requirement for wetland management is to ensure that adequate water is available to maintain the ecological processes in the wetland. With increasing water demand and decreased water availability the water allocation for aquatic ecosystem level process are being affected. Therefore, for achieving adequate allocation of water to wetlands requires that the water needs of the wetland is determined what is known as environmental flow, and it is communicated to other stakeholders so as to ensure adequate water allocation for the concerned wetland. As an example this has been a concern of the National Chambal Sanctuary. Wetlands are liable to degrade due to enhanced eutrophication or change in water quality leading to decreased species diversity, enhanced biomass production, increased turbidity, sedimentation and loss of recreational and aesthetic values. Therefore maintenance of water quality should be one of the important objectives of the management planning of wetlands and wetland protected areas.
3. During normal rainfall years lacustrine wetlands usually are flooded to the high flood line (HFL). In case of reservoirs when there is risk to the dam because of too much flooding, water is released by opening sluice gates. There also are waste weirs that release excess water. Waters in both lakes and reservoirs recede during the post monsoon period which happens due to natural causes in case of natural lakes and because of release of water for irrigation or power generation or for drinking water supply in case of reservoirs. Receding waters progressively expose the drawdown areas that in time act as mudflats that are important feeding and nesting habitats for waders. Portions of these get extensive regeneration of grasses and herbs that is important for wild ungulates. Muddy patches serve as wallowing areas for some species and at times for mud bath by elephant. Any exposed sandy banks, depending on slope and proximity of water, are suitable as nesting sites for the mugger.

Exposed stretches of sand are important as loafing grounds for otter. If there are suitable areas along the margins otters will establish their Holts. Exposed sandy banks are potential nesting sites for fresh water turtles as well.

4. Trees and groves in the proximity of the lake/reservoir are potential locations for heronries. Standing dead trees (snags) within the water and along the margins are important perching, roosting sites and lookout points for raptors and kingfishers; the suitable ones also serve as feeding platforms for fish eating raptors. Fallen large woody debris along the margins also serves as feeding platforms. Exposed rocks are potential sites of nesting for terns, basking sites for crocodiles and terrapins. The shallows are important habitats of many species of waterfowl. The patches of emergent, submerged and floating vegetation provide sources of food, hiding cover and nesting opportunities for several species of waterfowl. Fishes are significant source of food for fish eating species.
5. Geomorphic habitats of riverine wetlands depend upon the geology along the stretch of the river. Moist patches along the banks with changing bank morphology and variously changing patches of shade and light are likely to have assemblages of threatened species of primitive plants such as drossera, utricualria, and species of pteridophytes and bryophytes. Rivers and streams originating in basalt and other hard rock formations are likely to have cliffs, caves, overhangs and rocky outcrops. There are patches of natural salt licks and in appropriate habitats there are crocodiles and gharials, mahseer and turtles. There are stretches of mudflats used by waterfowl and several other species.
6. Palustrine wetlands are commonly found in the terai areas of UP, Bihar/Jharkhand called *Tals*, in Assam, and the duars of West Bengal. Some bogs are also found in the low lying areas of moist deciduous forests in southern India referred to as *hadlus* in Karnataka and *vayals* in Kerala. Bogs are also present in high altitudes of Himalayas. In Assam the marshes and swamps are called *beels*.
7. Marshes, swamps and bogs are relatively small and scattered. They are significant habitats for plant assemblages and many species of animals and therefore need to be considered as highly vulnerable to change. Extensive terai areas have been drained during the past many decades to make way for agriculture and habitations with heavy impacts on species that have restricted geographic distribution as well as those with small populations and those that are habitat specialists. Most of such species are on the red list in various categories. These habitats in combination with moist and evergreen forests in proximity of wetlands are among the most productive natural ecosystems.

8. Fishing is a major economic and livelihood related activity. Illegal fishing in swamps in the terai areas has often resulted in fatalities with men surprising a sleeping tiger or meeting one in thick patches of tall grasses, being gored by wild buffalo, attacked and trampled by a rhino or an elephant.
9. The drawdown areas of lakes and reservoirs are rich in nutrients and as the areas are successively exposed they are used for cultivation of several crops and vegetables by members of the local community. Remaining areas may be used for livestock grazing. This usurps what potentially would give rise to mudflats and grassy areas important for waterfowl and wild ungulates. It also enhances the chances of invasive species making their appearance along the lakeshores and increasing the silt load within the wetland. Such cultivation gives rise to associated interests of middlemen and local power players giving political colour to the activities in time. This has happened in several instances with contentious issues in some of the better known PAs.
10. In the pools of rivers and swamps fishing by locals is often undertaken by using dangerous pesticides that could enter several food chains. Use of explosives such as gelatin sticks and gun cotton slabs to kill fish *en mass* is not uncommon. Collection of tall grasses for thatch resulting in habitat alteration/destruction is another activity.
11. Sand mining is a highly destructive activity in which many stakeholders including politicians are involved. Likewise impactive is the activity of collection of boulders from river beds to manufacture metal for construction and making roads. These operations have negative impacts on river dynamics resulting in increase in damage during floods and cause serious erosion.
12. Untreated sewage and solid waste disposal are serious problems. Although there are appropriate provisions to control and eliminate dangerous effluents from industrial units, these keep getting released in streams and rivers. Dangerous chemicals get ingested and stored in the tissues of fish and can cause bio-magnification up the food chain resulting in thinning of egg shells of diurnal and nocturnal raptors, thereby causing reproductive failure. Besides their high potential for destroying habitats the pollutants are a serious health hazard for humans and animals. Persistent pollutants can pollute ground water as well. There is a regular flow of agriculture pesticides and excess fertilizers into streams and rivers which cause eutrophication in pools. All categories of wetlands are affected by these processes but some are more vulnerable than others.
13. Water sports have in recent times emerged as popular activities on lakes/reservoirs that are promoted by the ministry and departments of

tourism. Boating, wind sailing; water skiing can have negative impacts on wetland vegetation. Angling for mahseer-catch and release-has become a highly popular sport on some of the rivers in Himalayan and sub-Himalayan region and in south India. It is restricted to small stretches and is a rewarding livelihood activity for local community provided the locals are integrated into it in the form of entrepreneurship and not for few low paying jobs.

14. To say the least, bird watching is the mainstay of visitor attraction to wetlands not to mention the focal areas for sighting elephant, rhino, wild buffalo, tiger (not infrequently) and large herds of swamp deer and groups of hog deer in Assam. The UP terai unfortunately has lost its great herds of swamp deer. They now occur in small parties. At appropriate geographic locations sighting crocodiles and gharials is possible. In the Chambal River the Gangetic dolphin can be seen.

Action Required

1. In addition to those wetlands already under the network of PAs, each State/UT needs to identify new wetlands of biological/ecological significance. Complete management plans for all PAs with process for regular revision once the tenure of a plan is completed.
2. Management plans need to include measures concerning Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR)
3. Management of inland wetlands should be included in the professional training curricula of all training institutions—IGNFA, CASFOS, colleges for training Range officers and all those for training other ranks.
4. Forest Officers to be empowered under the Environment (Protection) Act 1986 (EPA-1986).
5. Convergence of inter-agency/department cogent programmes including knowledge, skills, manpower and finances need to be ensured to forge partnerships for addressing issues relating to inland wetlands.

Priority Projects

- 1.1. SFDs to consider WII's recommendations (1988 report and subsequent revision) and explore the possibilities of creating new PAs the existing ones using areas that have escaped attention. Suggestions about upgradation of status of some of the existing PAs should also be considered if not done already. Further, WWF-India has made an inventory of 883 wetlands in 21

States and also has attempted to prioritize 158 of those as per the standards suggested (Report of year 2000). In addition MoEFCC with the help of SACON and SAC had also carried out extensive mapping and inventorization of wetlands of India. Findings of these studies could be used to identify and prioritize important inland wetlands in India for long term conservation and management. Those that are difficult to notify as NPs or WLS could be considered for the status of Conservation Reserves or Community Reserves depending on the status of ownership of the area. A project for this purpose has been recommended in Chapter-I (Strengthening and Improving the Protected Area Network).

1.2. Prepare / update Management Plans for the existing Wetland Protected Areas (WPAs). A project for this purpose has been recommended in Chapter-I (Strengthening and Improving the Protected Area Network).

2.1. The Management Plans for WPAs should integrate various strategies for climate change adaptation (CCA), mitigation and disaster risk reduction (DRR) that are site specific. Plans for coordination with authorities/agencies responsible for addressing disaster risks at national level (NDMA), state level (SDMA), and district level (DDMA) and down to Panchayat Raj institutions (PRI) should be in readiness for implementation as situations that need such response are likely to develop. Please refer to Chapter 2 for further guidance on CCA and DRR.

Timing: To be completed by 2020

Responsibility: MoEFCC, SFDs, concerned Ministries/Departments of the Central Government, concerned Departments of the States/UTs

3.1. Wetlands are areas of special knowledge and skills that are not mainstreamed in the forest management sector. It is required to undertake an exercise in need assessment, engage subject experts (government/private institutions, NGOs, individuals), establish a team of resource persons and develop training curricula and their administration for frontline staff in the designated training centres of the SFDs. Specialized training needs for Range Officers and upward should be taken up with the WII.

Timing: To be initiated by 2017 and to be continued.

Responsibility: MoEFCC, SFDs, WII, IGNFA, CASFOS, other Forestry Training Centres of the SFDS, Scientific Institutes and NGOs.

4.1. Initiate process to empower forest officers under section 19 of the Environment (Protection) Act 1986 for taking cognizance of violations and further needful.

Timing: To be completed by 2020

Responsibility: MoEFCC and SFDs.

5.1. A numbers of agencies have interest in use of wetland resources. Some of these tend to overlap. It is therefore essential to undertake institutional mapping to ensure that most of plan objectives and strategies are appropriately addressed through arrangements of coordination. Institutional mapping includes six categories of functions involving authorities, agencies and departments. These are those with—jurisdiction over resources, regulatory responsibilities, repositories of knowledge and data, functions of development, resource users (regulatory users), and decision making bodies. Understanding and using the hierarchy of control, the implementing agencies and mechanisms among these is extremely important. Gaps in understanding linkages between actions and their impacts on wetland ecosystems need to be addressed.

Timing: To be initiated in 2016 and continued

Responsibility: MoEFCC, SFDs, concerned Central Ministries/Departments, and concerned Departments in the States/UTs.

V. Conservation of Coastal and Marine Ecosystems

Overview and Objectives

1. Bounded by the Indian Ocean to the south, the Arabian Sea to the south-west and the Bay of Bengal to the south-east the coastline of India extends over a length of 7,517 km of which the peninsular coast of the mainland accounts for 5,423 km and the coastlines of Andaman, Nicobar and Lakshadweep Islands makeup the rest of 2,094 km. India has the world's 0.25% coastline but 11% of the world's coastal population, an estimated 63 million people and 19% population of the country. Coastal and marine ecosystems represent important sources of food, fisheries being the mainstay. Besides they provide innumerable ecosystem services. There are 77 coastal cities including Mumbai, Kolkata, Chennai, Vishakhapatnam and Kochi. The coastal and marine ecosystems contribute 10% of India's GDP.
2. There are several types of coastal ecosystems that include: inland brackish water wetlands; estuarine wetlands; coastal mudflats and salt marshes; sand dunes; rocky shores, cliffs and caves; mangrove forests; coral reefs, sea grass beds and marine areas. The Andaman and Nicobar Islands represent unique assemblages of plants and animals with inter-island variation and uniqueness. There are 18 Coastal and Marine Protected Areas (CMPAs) along and off the coast of peninsular India and 106 along and around its islands with some terrestrial habitat components. Within IUCN's Transboundary PA Programme included are the Sunderbans Tiger Reserve (with Bangladesh) and the Gulf of Mannar national park together with the biosphere reserve (with Sri Lanka). The Sunderbans Tiger Reserve is inscribed as a World Heritage Site under the World Heritage Convention of UNESCO. India also has 2 coastal/marine Ramsar sites- the Chilika/Nalaban Lake sanctuary and the Point Calimere sanctuary.
3. Coral reefs are critical to the fisheries and they protect the coasts from wave action and erosion; however they are undergoing rapid destruction due to a number of factors including destructive fishing techniques and reef mining for calcium carbonate production, overfishing by small boats, siltation as a result of deforestation, sedimentation, marine pollution with contaminants, sewage and solid waste disposal, fresh water dilution, sub-aerial exposure and disease; irresponsible tourism such as snorkelling and reef walking. Global warming, the consequent climate change and rising sea levels are posing an additional emerging and severe threats to already stressed coral reefs.
4. Mangroves are effective barriers against cyclones and are important for fisheries. They are restricted to the intertidal zone along the coasts and provide habitats to a number of species such as the critically endangered tiger, the Eurasian otter, five species of marine turtles, the estuarine crocodile and a large numbers of crustaceans and fishes. As a result of

rising sea levels 7500 ha of mangroves along the shores of India and Bangladesh are lost due to inundation. Over-exploitation for timber and fuelwood, shrimp culture, inland water diversion, clearing for development and for other land uses have reduced mangrove extent and quality significantly.

5. Seagrass meadows are considered marine equivalent of rainforests in terms of diversity. These are threatened by turbidity due to sedimentation, excess nutrients from farms and domestic waste leading to eutrophication, discharge of oil, thermal and chemical effluents from industries, artificial beach stabilization, and dredging; sea walls and revetments; port, harbour and jetty development, boating and fishing by dragnets.
6. Salt marshes are affected by inland pollutants, toxic chemicals such as lead; mercury and aluminium from industrial effluents pose grave risks to flora, fauna and human health. Excess nutrients from farm lands lead to eutrophication. Accumulation of dredged material alters flooding regime, soil type, plant and animal communities. Since salt marshes combine terrestrial and marine elements they are threatened by invasive species from both systems.
7. Sand dunes are threatened for a variety of reasons such as being cleared for illegal infrastructure, incidental planting of green belts, sand mining, and destruction of sea turtle nesting sites and trampling of vegetation during recreational activities.
8. Coastal wetlands are associated with deltas, lagoons, estuaries and sheltered bays. They are threatened with change in river water discharge, rising sea levels affecting salt marshes and mudflats. The Rann of Kutch is so threatened with submergence. Mudflats constitute significant year round and seasonal habitats of an estimated 76 species of resident and migratory waterfowl.
9. To achieve the Aichi biodiversity targets with reference to the marine environment it is essential to preserve the ecologically sensitive areas and maintain the health of the marine environment by protection, sustainable use, and conservation of the living marine resources.

Action Required

1. Strengthen the coastal and marine protected area network and its management in the country and to establish new PAs to protect the range of biodiversity in coastal and marine ecosystems in participatory mode.
2. SFDs are significant players in conservation of coastal and marine ecosystems. The training institutions for professionals at all levels of

responsibilities therefore need to tailor the training curricula to meet management needs of such ecosystems.

3. Restoration of the fragile marine and coastal habitats is necessary
4. Ascertain the extent of implementation of the CRZ Notification 2011 in context of at least the 'Areas of Concern (AC)' as would be referred to in the subsection titled *priority projects*. The gaps need to be followed up for completion with the concerned agencies. Forest Officers to be empowered under the Section 19 of the Environment Protection Act 1986 to take cognizance of violations for enforcement.
5. Complete Management Plans of CMPAs at the earliest.
6. Convergence of inter-agency/department cogent programmes including knowledge, skills, manpower and finances needs to be ensured to forge partnerships for addressing issues relating to coastal and marine ecosystems.

Priority Projects

1.1 Review the 'Important Coastal and Marine Biodiversity Areas (ICMBA)' identified by WII and consider these ICMBAs either as Conservation or Community reserves (ENVIS-Coastal and Marine Protected Areas in India: Challenges and Way Forward, WII, 2014). These are considered as the 'Areas of Concern (AC)'.
Timing: To be completed by 2020
Responsibility: SFDs and WII.

2.1 Coastal and marine ecosystems are areas of special knowledge and skills that are not mainstreamed in the forest management sector. Each MSUT to conduct exercise in need assessment, engage subject experts (government/private institutions, NGOs, individuals), establish a team of resource persons and develop training curricula and their administration for frontline staff in designated training schools within the respective MSUTs. Training needs for Range Officers upward to be taken up with WII/other institutions/NGOs. The IGNFA and CASFOS likewise need to add such training components.
Timing: To be initiated by 2017 and to be continued.
Responsibility: MoEFCC, SFDs, WII, IGNFA, CASFOS, other Forestry Training Centres of the SFDS, Scientific Institutes and NGOs.

3.1 Select appropriate areas considering changes that have taken place to restore mangroves in preference to new ones. Select a combination of species to

simulate natural pattern in consideration to habitat. Assist natural regeneration and avoid monoculture. Alongside protection and conservation measures coral reefs can be restored by using a variety of originals and artefacts. Tree planting for 'stabilization' of sand dunes/beaches and construction of revetments to 'arrest' sand erosion should be avoided. Recognizing and controlling unsustainable practices of resource uses is important. The principle is to assist natural ecosystems recovery by their natural resilience. Recourse to artificial interventions should be adopted only when the situation has serious and tested demands.

Timing: To be initiated by 2017 and to be continued

Responsibility: SFDs.

4.1 As per the process for preparation of CZMPs the SFD as a stakeholder has a claim on participation of plans at the appropriate administrative units (see CRZ Notification 2011). It is essential to ensure that coastal and marine ecosystem interests are fully taken on board. The management plans for PAs and ACs need to express the needs that could be aligned with the provisions of CZMPs with appropriate provisos that could be addressed via existing mechanisms. Coastal and marine ecosystems represent continuum of relevant terrestrial ecosystems therefore management plans need to integrate appropriate landscape-seascape perspectives. Forest officers need to be empowered under section 19 of the Environment (Protection) Act 1986 to take cognizance of violations for further needful.

Timing: To be initiated by 2017 and to be continued

Responsibility: MoEFCC, SFDs and WII.

5.1 The Management Plans for CMPAs and ACs in addition should integrate various strategies (already established) for climate change adaptation (CCA), mitigation and disaster risk reduction (DRR) that are site specific. Plans for coordination with authorities/agencies responsible for addressing disaster risks at national level (NDMA), state level (SDMA), and district level (DDMA) and down to Panchayat Raj institutions (PRI) should be in readiness for implementation as situations that need such response are likely to develop. Please refer to Chapter 1 titled Strengthening and Improving Protected Area Network and their Management. Please also refer to Chapter 2 that addresses matters concerning CCA and DRR for guidance.

Timing: To be initiated by 2017 and to be continued

Responsibility: MoEFCC, SFDs, concerned Central Ministries/Departments and concerned Departments in States/ UTs.

6.1 Large numbers of agencies work in areas of coastal and marine ecosystems with different mandates and priorities. Some of these tend to overlap. It is therefore essential to undertake institutional mapping to ensure that most of plan objectives and strategies are appropriately addressed through arrangements of coordination. Institutional mapping includes six categories of functions involving authorities, agencies and departments. These are those with—jurisdiction over resources, regulatory responsibilities, repositories of knowledge and data, functions of development, resource users (regulatory users), and decision making bodies. Understanding and using the hierarchy of control, the implementing agencies and mechanisms among these is extremely important. Gaps in understanding linkages between actions and their impacts on coastal and marine ecosystems need to be addressed.

Timing: To be initiated by 2017 and to be continued.

Responsibility: MoEFCC, SFDs, concerned Central Ministries/Departments, and concerned Departments in the States/UTs.

VI. Integrating Climate Change in Wildlife Planning

Overview and Objectives

1. Earth's climate has changed notably over the past century because of anthropogenic greenhouse gas emissions, with an increase of 0.85 °C in mean global temperature recorded between 1880 and 2012, and further changes expected during the 21st century according to the latest (2014) assessment of the Intergovernmental Panel on Climate Change (IPCC). Projections by IPCC indicate further warming of 1.1-2.6 °C under a relatively mild greenhouse gas emissions scenario, and 2.6-4.8 °C under a strong emissions scenario by the period 2081-2100 relative to the period 1986-2005 (IPCC 2014). Other changes include altered regional precipitation, increased frequency of extreme weather events, sea level rise and ocean acidification from absorption of carbon dioxide.
2. Climate change is expected to make major impacts on global biodiversity through drivers such as carbon dioxide fertilization of plants, changes in fire frequencies, insect and pathogen attacks, latitudinal and altitudinal shifts in species distributions, and altered community interactions resulting in changes in species abundances. The present-day boundaries of major terrestrial ecosystems or vegetation types would change significantly, while freshwater, coastal and marine ecosystems would be similarly impacted.
3. Indian climate scientists have used the IPCC's global climate models under the Coupled Model Inter-comparison Project (CMIP) using a set of new greenhouse gas emissions scenarios termed as Representative Concentration Pathways (RCPs) (Chaturvedi et al. 2012). Using an ensemble of five climate models, CMIP5 has provided projections of temperature and precipitation over the Indian subcontinent from the baseline (1961-1990) under the milder RCP 4.5 scenarios and the more extreme RCP 8.5 scenario. In the short term (2030s), a warming between 1-2 °C is projected over the major part of India under both RCP scenarios, while the warming in northern and northeast Himalayan regions and western Rajasthan could be 2-3 °C. In the long term (2080s), a warming of up to 5 °C is projected for the Himalayan region and between 2-3 °C over the rest of India under the milder scenario. However, under the more extreme RCP8.5 a warming of up to 5 °C is projected for a major part of India with much larger warming of 7 °C and more for the Himalayan region (see Chaturvedi et al. 2012 for complete details). Increase in temperature is overall greater in the north than in the south of the country. There is less confidence in projections of precipitation. On average precipitation is likely to increase under all scenarios across the country with slight reductions in the short-term in some parts such as the south (a recent Japanese model projects significant decline in rainfall over the western slopes of the Western Ghats). The all-India precipitation is

projected to increase by 6-14% by the 2080s. A large area of the western, central and eastern regions of the country could experience strong increases in precipitation by as much as 40-50% in places. More important, the frequency of extreme weather events is projected to increase as a consequence of global warming. Such climatic changes would make impacts on the various terrestrial and aquatic ecosystems and their wildlife in the country.

4. The global dynamic vegetation model IBIS (Integrated Biosphere Simulator) projected a change from the baseline in the character of forests (i.e. change from one type to another) in 39% and 34% of forested grids by 2085 under the A2 and B2 scenarios, respectively (Chaturvedi et al. 2011). A forest vulnerability index based on the observed datasets of forest density, forest biodiversity as well as model-predicted vegetation type shift suggested that the upper Himalaya, northern and central parts of the Western Ghats and parts of central India are most vulnerable to projected impacts of climate change, while the forests of the northeast forests are more resilient. Using the newer five-climate model ensemble-mean climatology, Jagmohan Sharma et al. (unpublished data, 2015) carried out climate change impact assessment for Indian forests using IBIS in the short term (2030s) and long term (2080s). The percentage of forest grid points projected to undergo vegetation-shift by the IBIS is 22% (RCP4.5) and 23% (RCP8.5) in the short term (2030s), and 31% (RCP4.5) and 37% (RCP8.5) in the long term (2080s).
5. Thus, it is possible to make a robust conclusion that about one-third of the forested areas of India is projected to be impacted by climate change to the extent that they could change in character to another type before the end of the century. The spread of invasive alien species and changes in fire regimes could further exacerbate the situation. There is already evidence from the Western Ghats that invasive plants such as *Lantana camara* in deciduous forests, and Australian wattles (*Acacia dealbata* and *A. mearnsii*) planted on a large-scale in the montane grasslands and the ornamental scotch broom (*Cytisus scoparius*) at higher elevations have spread in recent times. Such changes in the character of the vegetation would have consequences for several wildlife species.
6. As a megadiverse country, India with over one-fifth of the land under forest cover and a long coastline can also be expected to experience significant impacts of climate change. The mean surface annual temperature over India has already increased by 0.56 °C per 100 years during the period 1901-2009, most of it since 1975 (IMD 2010). There are also indications that during the last three decades of the 20th century the monsoon has actually declined. If such climatic trends continue, they are bound to make major

regional impacts on the country's ecosystems and biodiversity. India also has a large human population with growing needs for energy and natural resources for the economic wellbeing of a substantial proportion below the poverty line. Therefore, an adequate understanding of the likely impacts of future climate change on these ecosystems is thus imperative to plan for strategies to promote climate change adaptation and resilience in natural ecosystems to change.

7. Climate change adaptation (CCA) is defined as 'adjustment in natural or human system in response to actual or anticipated climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities'. The options to adaptation are changing human habits or behaviour; taking recourse to technology or engineering interventions; adopting risk management strategies such as early warning systems; developing financial instruments like insurance; and promoting ecosystem based practices also called Ecosystem Based Management (EBM)/Ecosystem Based Adaptation (EBA) and mitigation.
8. Mitigation specifically refers to reduction in carbon emissions-e.g. using clean energy from wind, solar, water and atomic sources; carbon offsets which is balancing emissions with absorption and thirdly by carbon trading.
9. Disaster Risk Reduction (DRR) is a systematic approach to preventing and reducing the damage from natural hazards. It is essential for working with CCA and is one of the best links for promoting biodiversity conservation and sustainable environmental resource management and there should be an overlap between CCA and DRR.

Action Required

1. Climate specific research is essential. This may include assessment of change in species distribution-vegetation including sea grass meadows, ascertaining possible change in marine species form fish landings etc.; change in population sizes, reproduction/phenology, movement patterns, diseases and their frequency
2. The EIA process needs to integrate the issues concerning CCA and DRR. How a project relates to specific risks those can be derived from collection and collation of data on hazards; integration of relief and rehabilitation and climate proofing
3. It is essential to understand the relevant policies, laws and international treaties because departments normally do not go beyond what concern their own mandates. All laws and regulations pertaining to development are very important and it is necessary to understand their objectives and important provisions in connection with climate change.
4. Developing a common action plan integrating CCA and DRR with shared responsibility into all sectors is crucial. The state coastal zone management

plan required to be prepared under CRZ provisions would pave the way for such synergy. Involving local communities with regard to their knowledge and capacities

5. Management plans for CMPAs need to suitably integrate CCA and DRR.
6. Rationalize the boundaries of Protected Area in connection with climate change.
7. Ensure the anticipatory planting along ecological gradients with respect to climate change.
8. Promote the assisted migration of wildlife.
9. Undertake research on animal responses to climate change, use of pesticides, emerging zoonotic diseases, invasive species and the threats of hybridisation so that appropriate adaptation plans are drawn for species and areas.
10. Review the existing Biogeography Report of WII with respect to climate change and planning for PA Networks.
11. Review the WII's Management Planning Guidelines of PAs with respect to climate change adaptation.

Priority Projects

1.1. Assess the impact of climate change in all ecosystems with respect to their ecological services and incorporate the findings in the Management Plans of respective PAs and TRs with adaptive or mitigation measures. These assessments of change in species distribution-vegetation should also include sea grass meadows, ascertaining possible change in marine species form fish landings etc.; change in population sizes, reproduction/phenology, movement patterns, diseases and their frequency

Timing: To be initiated by 2017 and to continue

Responsibility: MoEFCC, NTCA, SFDs, Scientific Institutes, Universities and NGOs.

2.1. The EIA process needs to be integrated with the issues concerning CCA and DRR. How a project relates to specific risks those can be derived from collection and collation of data on hazards; integration of relief and rehabilitation and climate proofing

Timing: To be initiated by 2017 and to continue.

Responsibility: MoEFCC, SFDs, Scientific Institutes, Universities, NGOs.

3.1. Undertake a review to harmonize the existing both national and international policies in connection with climate change and impacts in India so that a better climate change adaptation plan could be drafted at national level.

Timing: 2017-2018.

Responsibility: MoEFCC.

4.1. Develop a common action plan integrating CCA and DRR with shared responsibility into all sectors and the state coastal zone management plan required to be prepared under CRZ provisions would pave the way for such synergy, with participation of all stakeholders.

Timing: 2017-2018.

Responsibility: MoEFCC and SFDs

5.1. Integrate CCA and DRR in all Management Plans of PAs and TRs including the Coastal and Marine Protected Areas.

Timing: 2017 and to continue.

Responsibility: MoEFCC, NTCA, SFD, WII, Scientific Institutes and NGOs.

6.1. **Rationalization of boundaries of Protected Areas:** Building adaptive capacity of natural ecosystems and wildlife species is the best insurance against large scale extinctions in response to climate change. The most natural way of building adaptive capacity is to ensure that species of plants and animals are able to disperse to more suitable habitat niches in tune with a changing climate. India's PAs have been designed in past times when climate change was hardly a criterion for wildlife conservation. Based on region-specific projections of future climate change impacts, there should be a comprehensive and time-bound programme of re-designing the boundaries of PAs where deemed necessary, by including newer areas to which species are likely to migrate. For instance, species are likely to migrate upwards on mountains with increased warming; thus in PAs located on mountainous areas, it would be prudent to consider extending PA boundaries to higher elevations even if these are presently barren or under snow cover. Rationalization of boundaries could also help in removing some of the present conflicts arising from inclusion of large areas of private lands within PAs and TRs.

Timing: 2017 to 2020.

Responsibility: MoEFCC, NTCA and SFDs.

7.1. **Anticipatory planting along ecological gradients:** Climate change is expected to result in die-offs of certain tree species unable to adapt to the newer environmental conditions. These would be replaced by other tree species dispersing from adjoining areas. Based on an understanding of how tree species are shifting or likely to shift their distributional ranges, a programme of

anticipatory planting could be undertaken through a careful choice of species most likely to adapt to the changing climatic conditions.

Timing: 2017 and to continue.

Responsibility: MoEFCC, SFDs and NGOs.

8.1. **Assisted migration of wildlife:** While anticipatory planting of trees along environmental gradients can help in adaptive capacity of vegetation, a more active policy of assisted migration of wildlife species may be needed in many cases, especially in highly fragmented landscapes and coastal areas.

Timing: 2017 and to continue.

Responsibility: MoEFCC, SFDs and NGOs.

9.1. Research on animal responses to climate change, use of pesticides, emerging zoonotic diseases, invasive species and the threats of hybridisation so that appropriate adaptation plans are drawn for species and areas.

Timing: 2017 and to continue.

Responsibility: MoEFCC, SFDs, Scientific Institutes, Universities and NGOs.

10.1. Review the existing Biogeography Report of WII with respect to climate change and rationalize the PA Network planning accordingly.

Timing: To be completed by 2020.

Responsibility: MoEFCC, WII.

11.1. Review the Management Planning Guidelines of PAs, TRs and include an appropriate chapter to address the climate change issues and adaptation plan

Timing: To be completed by 2018.

Responsibility: MoEFCC and WII.

VII. Control of Poaching and Illegal Trade in Wildlife

Overview and Objectives

1. With a rich diversity of flora and fauna, India has always been a target of the illegal wildlife trade as a source country. It has emerged as one of the most serious threats to wildlife. The international trade in wildlife and its derivatives is an organized and established global criminal activity with hubs and trade routes spanning countries and continents. Wildlife trade remains one of the five top illicit economic activities globally valued between USD 50-150 billion, annually.
2. India's biodiversity ranges from the charismatic Asian elephants, tigers, rhinos, lions, four species of bears and leopards to lesser known mammals like the pangolin and the river dolphin, to myriad other forms of life that includes snakes, butterflies, gharials, whale sharks, sea cucumbers, etc. This range means that conservation and protection challenges are also numerous. Killing of prey of big cats, such as deer, wild boar, etc. in the forest results in human-wildlife conflict in the fringe areas due to decrease of prey species. Also, when the predators such as tigers and leopards are poached, the herbivore population increases, which also give rise to conflict, in the shape of crop raiding by them. In such a scenario, large amounts of money and human resources invested in conservation go into conflict mitigation. The trade is known to have connections with other illegal activities such as arms trafficking, drugs smuggling, etc. In a nutshell, the crime against wildlife does not only affect the survival of the target species in the wild including associated biodiversity but also impacts the economy, development, and security of the country
3. India as a nation is well-known for its demonstrated concern for conservation of wildlife and biodiversity and its national laws to protect wildlife are some of the most stringent in the region. It thus assumes greater responsibility and leadership even in the global conservation of natural heritage. The country is obliged to undertake necessary steps to prevent illegal trade or transfer of wildlife and wildlife articles which are regulated under various appendices of CITES.
4. Although the wildlife protection laws and policies of the country are one of the best of its kind in the world, the implementation of these laws and policies is a major problem. The conviction rate in wildlife crime cases is very low, resulting in persistence of habitual offenders in the illegal wildlife trade. Preventive measures along with enforcement of deterrent law are necessary to ensure the reduction of incidents of wildlife crime across the country. To make this a reality, appropriate policies need to be evolved, and put in place urgently.
5. The increase of tiger, leopard and elephant population across the country also increases the chances of an increase in human-wildlife conflicts in the fringe areas of forests across the country. If not addressed on time with

suitable measures, the conflicts could result in retaliatory killing of wildlife by mobs. Timely compensations for any loss or damage to life, property and crops should be given out by the government to maintain good faith. This should be complemented by installation and maintenance of barriers wherever required. Wildlife corridors should be identified, recognized, established and maintained to reduce conflict.

6. Investigation in wildlife crime still lacks steam even after the establishment of National Wildlife Crime Control Bureau (WCCB). The capacity of frontline forest guards and officers charged with the responsibility to investigate wildlife crime needs major improvement by way of organizing capacity building trainings in various aspects of investigation and documentation of wildlife related offences. As technologies such as internet and mobiles are being used effectively by crime syndicates, the wildlife crime investigators also need to be equipped with matching skills, fit to carry out technology based investigations leading to busting of networks behind these crimes.
7. On 30 July 2015, during its 69th session, the United Nations General Assembly (UNGA) adopted a resolution on 'Tackling Illicit Trafficking in Wildlife'. The Resolution expresses concern that illicit trafficking in protected species of wild fauna and flora is in some cases an increasingly sophisticated form of transnational organized crime that poses a threat to health and safety, security, good governance and the sustainable development of States. It calls for firm and strengthened national measures, and an enhanced regional and global response. It is aimed at both supply and demand, including by strengthening the legislation necessary for the prevention, investigation and prosecution of offences, treating certain wildlife offences as a serious crimes, providing for illegal trade in wildlife offences to be treated as predicate offences (for anti-money laundering offences), supporting the exchange of evidence between States and taking steps to prohibit, prevent and counter corruption. It urges States to reduce demand for illegal wildlife products using targeted strategies to influence consumer behaviour, emphasizes that the protection of wildlife must be part of a comprehensive approach to achieving, inter alia, sustainable development and sustainable livelihoods and encourages States to address sustainable and alternative livelihoods for affected communities to enable them to benefit from wildlife and wilderness.

Action Required

1. Increase ability of frontline field staff to protect wildlife through capacity building and proper equipping to increase focused crime prevention, patrolling and reporting.

2. Set up Special Tiger Protection Force (STPF) in TRs.
3. Use modern technology for patrolling, crime data management, intelligence gathering and surveillance.
4. Conduct assessment of the protection measures undertaken by PAs to improve protection standards for wildlife, and to build capacity of frontline staff across the country.
5. Organize audit of protection mechanisms for enhancing efficiency.
6. Set up of Regional Forensic Labs to assist in speedy crime investigation.
7. Establish special courts for wildlife crime related cases.
8. Orient and involve the customs, police, paramilitary, coastguard, postal and courier services and other agencies that can play a key regulatory role in preventing wildlife offences.
9. Enhance the capacity of all concerned enforcement agencies in India to efficiently implement both national and international laws and policies including that of CITES.
10. Take policy, legal and administrative measures.
11. Promote international cooperation to combat organized wildlife control.

Priority Projects

1.1. Fill up frontline staff vacancies in SFDs, particularly in TRs and PAs to ensure that a young and proactive protection force is present in critical habitats to protect wildlife.

Timing: To be completed by 2018.

Responsibility: MoEFCC, NTCA, SFDs.

1.2. Enhance the capacity of frontline staff to effectively collect, package and dispatch the samples for further forensic analysis.

Timing: To be initiated by 2017 and to be continued.

Responsibility: MoEFCC, SFD, WII and WCCB.

1.3. Provide adequate logistics with modern communication and equipments, incentives and supports to the frontline forest staff to ensure effective protection of wildlife in remote camps and areas.

Timing: To be initiated by 2018 and to be continued.

Responsibility: MoEFCC and SFDs.

2.1. Set up STPFs in all TRs and arrange for their recruitment, training, equipment and deployment.

Timing: Complete by 2025.

Responsibility: NTCA and SFDs.

3.1. Use mobile technology to develop “Digital field Guides” for easy identification of various wildlife goods and their derivatives.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, SFDs, WCCB and WII.

3.2. Enhance protection activities such as patrolling anti-snare perambulation, use of camera traps in important corridor areas connecting habitats to ensure zero poaching of transient wildlife population between PAs.

Timing: To be initiated by 2018 and to be continued.

Responsibility: MoEFCC, SFD.

4.1. Assess the effectiveness of protection measures undertaken by the State in TRs and PAs to combat wildlife crime. Replicate best practices in other areas.

Timing: Complete by 2022 and repeat every 5 years.

Responsibility: MoEFCC, NTCA, WCCB, SFDs.

4.2. Form special investigation units in PAs with recent and recurrent history of wildlife poaching and trafficking. Empower the units with weapons, investigation training, investigation powers(e.g. access to technical surveillance records and data monitoring) and create a network with other operational entities with credible standing across the country through WCCB for improved and institutionalized coordination.

Timing: Complete by 2022.

Responsibility: MoEFCC, NTCA, WCCB, SFDs.

5.1. Conduct national level audit of wildlife trade using scientific methods to understand the change in global and Indian wildlife trade patterns and then ensure that preventive measures are in place to counter trade trends in the beginning stage itself.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, WCCB.

6.1. Establish State of the Art wildlife forensic laboratory at WII and develop a network of wildlife forensic Laboratories in the country.

Timing: Complete by 2022.

Responsibility: MOEFCC, WII, WCCB and SFDs.

7.1. Establish special courts for the effective implementation of the WPA-1972 to ensure speedy trials of wildlife crimes.

Timing: Complete by 2022.

Responsibility: MoLJ, MoEFCC, State Governments.

8.1. Ensure operational cooperation and information exchange between various enforcement agencies under the guidance of WCCB and set up databank on wildlife crime accessible to nodal officers of all enforcement agencies.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, WCCB.

8.2. Increase information exchange, at operational level and joint operation in the international borders with neighboring countries to curb trafficking of wildlife goods through these borders by BSF, SSB, ITBP and Coast Guards. Give special attention to sea ports against high value timber (e.g. red sanders) smuggling.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, WCCB.

8.3. Create a national level wildlife crime database, which is accessible to investigating officers with options for networking and point to point information sharing on real time basis.

Timing: Initiate by 2018 and to continue.

Responsibility: WCCB.

9.1. Establish a National Level Wildlife Crime Prevention Committee of experts from enforcement agencies, scientists, NGO representatives to monitor and assess the illegal trade in wildlife and formulate strategies to counter these illegal activities at various levels.

Timing: Complete by 2020.

Responsibility: MOEFCC, WCCB.

9.2. Constitute state level team of experts on wildlife crime with members drawn from various enforcement agencies and relevant civil societies to ensure proper inter agency cooperation and coordination, which will improve crime prevention and detection.

Timing: Complete by 2019.

Responsibility: MoEFCC, SFDs.

9.3. Monitor beyond seizures and confiscation of goods in the trade of medicinal plants (e.g. *Saussurea costus*, *Taxus wallichiana*, *Aquilaria malaccensis*) and economically important plants and timber (e.g. *Santalus album*, *Pterocarpus santalinus*, *Delbergia latifolia*). Study the trade at various levels starting from the collection, distribution, processing and end-products (if any) to ensure that the trade in plants and products where the plant derivatives used are monitored. Train the DRI and customs officials to identify

the plant based products, plants at exit routes such as airports, sea ports and international check posts.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, WCCB, BSI, IFGTB, DRI and Customs.

9.4. Monitor any emergence of trade in lesser known species such as pangolin, tockay gecko, tarantulas, star tortoise etc. and take counter measures to ensure that the trade does not get established within an existing or new trade network.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, WCCB, ZSI and suitable NGOs.

9.5. Specifically monitor the lesser known marine product trade e.g. of sea cucumbers, corals etc.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, WCCB, CMFRI and suitable NGOs.

10.1. Adopt strict policies to check live animal trade to ensure that necessary procedures and screening is done during any kind of import or export of live wildlife in the pet trade in accordance with provisions of CITES and laws of the country.

Timing: Complete by 2020.

Responsibility: MoEFCC, WCCB, Customs.

10.2. Initiate schemes for the rehabilitation of habitual offenders and traditional hunting communities who are involved in wild and make them part of the mainstream society.

Timing: Initiate by 2018 and to continue.

Responsibility: MoEFCC, NTCA, SFDs, NGOs.

10.3. Develop action plan to use the digital media, celebrity endorsed campaigns and social networking sites to create awareness across the masses about wildlife crime.

Timing: Complete by 2020.

Responsibility: MoEFCC, SFDs, NGOs.

10.4. Ensure re-vitalization of CITES Cell in the MOEFCC and effective participation of Indian delegation consisting of experts in CITES meetings and discussions therein to ensure that the interest of the country is protected across the globe and also that the CITES polices and decisions under negotiation are favorable to the country.

Timing: Complete by 2019.

Responsibility: MoEFCC

10.5. Review the existing WPA-1972, so that wildlife Crime could be treated at par with the economic offences.

Timing: To be completed by 2020.

Responsibility: MoEFCC

11.1. India should make special efforts to forge and encourage international partnerships in combatting organized wildlife crime. India is already a member of the South Asia Wildlife Enforcement Network (SAWEN). As India is also the largest stakeholder in terms of the wildlife resources of South Asia, it is imperative that it should utilise the opportunities provided by the SAWEN to the optimum levels. India should also enhance its engagements with other regional and international coalitions against wildlife crime, e.g. ASEAN-Wildlife Enforcement Network (South-East Asia), Lusaka Agreement Task Force (East Africa), Wildlife Crisis Window of the Biodiversity for Life (B4Life) Initiative (European Commission) and the International Consortium on Combating Wildlife Crime (ICWC)[A consortium of five inter-governmental organisations, viz. CITES, INTERPOL, United Nation's Office on Drugs and Crime, World Bank and the World Customs Organisation). India should also try to have bilateral treaties with the neighbouring countries for facilitating joint action against organisations indulging in cross-border wildlife offences. India should also try to have technical collaboration with the reputed scientific and forensic institutes abroad working in the field of wildlife crime detection and enforcement.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC, WCCB, CBI (dealing with INTERPOL), NTCA and WII.

VIII. Wildlife Health

Overview and Objectives

1. The age old definition of health as "the absence of disease" has no relevance to the present scenario of wildlife management in the country. In the modern context, 'Wildlife Health' is the result of interacting biological, social, and environmental determinants that interact to affect the ability of a species to cope with these changes. "Wildlife Health" cannot, therefore, be measured solely by what is absent but rather by the characteristics of animals and their ecosystem that affect their vulnerability and resilience (Stephen, 2014). With globalization, human population explosion, habitat fragmentation and land-use changes that force wild animals to come into frequent contact with humans, the new role of a wildlife veterinarian should encompass the appropriate rehabilitation of confiscated animals; restoration of displaced wildlife and orphans to the wild; assessment of health of wild animals for the purpose of translocations and reintroductions; and surveillance for both endemic and emerging infectious diseases in addition to their traditional role of conducting necropsies, treating the sick and wounded animals and taking care of the elephants and other wild animals in captivity.
2. Emerging infectious diseases have been defined as the ones that have recently been discovered; or as those caused by newly evolved pathogens, including those that has recently moved into a new species as the host; or recently increased in incidence or geographical range. Emerging infectious diseases are a concern not only to humans but also to the conservation and welfare of wildlife species. Recent emergence of the tiger as a new host for Canine Distemper, geographic spread of Endotheliotropic Herpes Virus (EEHV) among elephants and reports of goat pox in goat-antelopes of the North-Eastern India only reiterate the need for urgent measures for protecting the Indian wildlife against diseases.
3. Veterinarians have not only become an integral part of a team attending to wildlife emergencies but also have key responsibilities when it comes to

alleviating stress and improve welfare aspects of the displaced wildlife. Wildlife health and wildlife rehabilitation can go hand in hand, primarily because veterinary expertise is integral to both these disciplines.

4. Whether it is rehabilitation or disease investigation that requires invasive procedures, or conflict animal management, chemical capture of free ranging animals is an indispensable tool. While syringe projectors have been made available in almost every PA, India is far behind in making the latest tranquilizing drugs available to wildlife veterinarians.
5. The subject of euthanasia among the wild animals has remained a sensitive subject as it amounts to hunting according to the Wildlife (Protection) Act, 1972 (WPA-1972). The IUCN has begun to differentiate euthanasia from mercy killing, the former being the act of putting an end to the misery of terminally ill animals, and the latter dealing with the issue of putting apparently healthy animals to sleep for reasons of space, lack of proper centres, resources and personnel. There is an urgent need to define these terms in the Indian context and identify the relevant procedures as well as implementing agencies to address the welfare of suffering animals.
6. The conventional view has been to treat the humans, livestock and wildlife populations as distinct ones, with a separate set of policies and programs for each. The new paradigm 'One World One Health,' demands a holistic approach and calls for a joint entrepreneurship between human and animal health workers to work hand-in-hand in realizing a healthy world for humans and animals.
7. The wildlife health programmes to be considered for continuation or commissioning in the country should take into consideration all the above realities in mind.

Action Required

1. Initiate research on the ecology of diseases that affect free ranging wildlife—including emerging wildlife diseases of both zoonotic and non-zoonotic importance.
2. Ensure that wildlife translocations, particularly those involving primates from urban environments, are based on veterinary considerations and not done indiscriminately as it could impact animals at the target site due to transfer of diseases endemic to urban settings.
3. Establish and strengthen centres for wildlife rehabilitation and disease surveillance in and around PAs. These centres should not only monitor the prevalence and spread of infectious diseases among wildlife but also focus on predicting the emergences of new diseases.
4. Develop facilities for rescue and rehabilitation of displaced wild animals and wildlife orphans by setting up mobile units and utilising the services of the newly established wildlife rehabilitation centres.
5. Set up an immune (infectious disease-free) belt around PAs and other sensitive wildlife areas by vaccinating livestock in the surrounding areas against infectious diseases posing threat to wildlife.
6. Commission a national programme to bring both human and animal health sectors in the country together in accordance with the modern paradigm of ‘One World One Health’

Priority Projects

1.1. Initiate long term studies to establish the role of infectious or non-infectious diseases as the cause for the decline or fluctuations in wild canid population (e.g. dhole, jackal, etc.) in selected pockets of their distribution range.

Timing: 20017 - 2021

Responsibility: MoEFCC, SFDs, WII, Indian Veterinary Research Institute (IVRI), local Veterinary Colleges and suitable NGOs.

1.2. Investigate into the epidemiology and ecology of goat pox reported among the goat antelopes (goral and serow) from the States of Mizoram and Sikkim.

Timing: 2017-2020

Responsibility: SFDs of Mizoram and Sikkim in partnership with the IVRI, local Veterinary Colleges and suitable NGOs.

2.1. Establish a practical and legally binding protocol on the subject of 'captive to wild' and 'wild to wild' translocation operations based on the advice of a committee of experts drawn from the wildlife and the veterinary sciences.

Timing: 2017-2018.

Responsibility: MoEFCC and SFDs.

3.1. Establish well-equipped wildlife rehabilitation cum disease surveillance centres manned by trained wildlife veterinarians in all TRs and selected PAs.

Timing: 2018 onwards and continued thereafter

Responsibility: MoEFCC, NTCA, SFDs, State Animal Husbandry Departments and local Veterinary Colleges.

3.2. Develop and maintain a national online database on wildlife disease (reports, prevalence and epizootics) using reports coming from various field and regional level surveillance centres.

Timing: To start in 2017 and to continue thereafter.

Responsibility: MoEFCC, WII, IVRI and the regional disease surveillance centres.

3.3. Make the latest drugs (narcotic and non-narcotic) for chemical capture of wild animals available to all zoos and the wildlife rehabilitation cum disease surveillance centres through a central nodal agency.

Timing: 2017 onwards and continued thereafter.

Responsibility: MoEFCC, NTCA, CZA and SFDs.

3.4 Monitor the prevalence of EEHV and tuberculosis among wild and captive elephants and initiate measures to prevent their spread.

Timing: 2017-2022 (to be continued if necessary)

Responsibility: MoEFCC (Project Elephant) and concerned SFDs in partnership with the IVRI, local Veterinary Colleges and suitable NGOs.

4.1. Incorporate chapters on the rescue and rehabilitation of displaced wild animals and wildlife orphans in the Management Plans of TRs and PAs.

Timing: 2017 and continued thereafter

Responsibility: MoEFCC, NTCA, WII and SFDs.

4.2. Establish suitably equipped Mobile Units supported by trained veterinarians in districts having high levels of Human-Wildlife Conflict (HWC) to attend to wildlife emergencies, rescue and rehabilitation, and to provide wildlife health support.

Timing: 2017 and continued thereafter

Responsibility: MoEFCC, SFDs, local Veterinary Colleges and suitable NGOs.

4.3. Initiate orphan animal rehabilitation projects in the States / UTs on the lines of the 'return to the wild' programme in Assam to address the welfare of animals displaced from the wild.

Timing: 2018-2019

Responsibility: MoEFCC, SFDs, local Veterinary Colleges and suitable NGOs.

4.4. Establish a practical and legally binding protocol on the subject of mercy killing and euthanasia of wild animals based on the advice of a committee of experts drawn from the wildlife and the veterinary sciences.

Timing: 2017-2018.

Responsibility: MoEFCC and SFDs.

5.1. Launch a coordinated immunization programme for livestock living in and around TRs, PAs and other sensitive wildlife areas along with a monitoring mechanism in coordination with State Animal Husbandry Departments, local Veterinary Colleges, Panchayats and suitable NGOs.

Timing: 2017 onwards and continuing.

Responsibility: MoEFCC, NTCA, SFDs, State Animal Husbandry Departments, local Veterinary Colleges, Panchayats and suitable NGOs.

6.1. Initiate a nation-wide study on communicable diseases of zoonotic importance among primates living in urban environments in collaboration with the public health authorities and human disease surveillance institutes.

Timing: 2017-2021

Responsibility: MoEFCC, Ministry of Health, SFDs, State Health Departments, Regional Institutes of Communicable and Infectious Diseases, IVRI, local Veterinary Colleges and suitable NGOs.

IX. Mitigation of Human-Wildlife Conflict

Overview and Objectives

1. Human-Wildlife Conflicts (HWC) have been increasing at local and regional scales in India in recent decades. Such conflicts include loss of cultivated crops, livestock, property such as houses, transmission of diseases by wildlife to people and livestock, and loss of human lives both indirectly and directly (Sukumar 1994, 2016; Treves 2009). It is important to understand the ecological basis of conflict in order to develop appropriate mitigation strategies. The causes of wildlife-human conflicts lie in a complex set of factors related to human transformation of habitat, behavioural ecology of wildlife species, and external environmental drivers such as climate variability.
2. The primary cause of wildlife-human conflicts is the loss, degradation and fragmentation of many wildlife habitats, thereby increasing the chances of wild animals moving out of natural habitat and encountering cultivation and people. Habitat loss and fragmentation have been clearly shown to enhance conflict between Asian elephants (*Elephas maximus*) and agriculture. At the same time, local overabundance of elephants may also cause them to move into human production landscapes as seen in parts of southern India. The substantial recovery of once dwindling populations of ungulates such as black buck (*Antelope cervicapra*) and nilgai (*Boselaphus tragocamelus*) has also resulted in increased conflict with agriculture in northwest and central India (Chauhan and Singh 1990). Land-use change outside forest areas, with irrigation from tube wells and canals aiding the cultivation of crops for longer time periods may also attract animals such as elephants. Highly productive crop fields that provide more palatable and nutritious forage also promote conflicts with herbivores. Adverse climatic events such as droughts have been implicated in increased conflicts between lions and people (Saberwal et al. 1994) as well as elephants and people (Sukumar 1994). Interestingly many wildlife species have adapted to the changing landscape through behavioural changes for crop raiding. This is true of elephants and of certain commensal wildlife species such as black buck, nilgai, rhesus macaque (*Macaca mulatta*) of northern India, as well as the bonnet macaque (*Macaca radiata*) of southern India. Even non-commensal animals such as leopard (*Panthera pardus*) have adapted to surviving in human-inhabited areas (Athreya et al. 2013).
3. Such conflict situations generally lead to growing antipathy among the people towards wildlife conservation resulting in retaliatory killings or injuries to animals. Wildlife species are also impacted by accidental deaths due to development of infrastructures, such as railway lines, roads, etc. Conflict-related mortality of wildlife does not bode well for conservation.
4. As diverse the wildlife-human conflict scenarios are in India, so are the approaches to mitigate the conflict. It is only over the last decade or so that

a comprehensive understanding of conflict scenarios has been acknowledged as a critical necessity for devising long-term-sustainable strategies for mitigation of wildlife-human conflicts in the country. However, it is imperative to understand that wildlife-human conflicts are largely a human-induced phenomenon combined with the specific behavioural ecology of animals, and external environmental factors. Any long-term conservation measures such as taking a landscape approach to integrate Protected Area management with outside lands are only possible through people's cooperation. Thus, all conflict mitigation measures should be developed on the basic premise of engagement of all primary stakeholders, especially local communities.

5. Welfare of the wild animals involved in HWC should not be lost sight of while planning mitigation measures. Wild animals should not be captured physically unless absolutely required. When captured these animals must immediately be released back into a suitable habitats as far away from the conflict site as possible, unless impaired by grievous injuries, in which case they should be placed under lifetime care establishments.

Action Required

1. Identify and document the wide range of wildlife species that regularly come into conflict with humans, and prioritise the species that cause maximum damage to humans and are most adversely impacted due to conflict. Develop a national level database to document frequencies of conflicts, quantum of damage to human life and property and wildlife deaths due to conflict.
2. Draw up comprehensive, species and region specific, conflict-mitigation plans that can cater to prevention of HWC situations and reduce the adverse impacts on both humans and wildlife. These should focus primarily on scientific management of wildlife populations as well as land-use practices that aid and abet HWC.
3. Constitute a well-trained and adequately equipped workforce in the State Forest Departments (SFDs) to actively address HWC situations *in situ*, especially those involving dangerous large mammals.
4. Arrest further escalation of already present negative interactions by ensuring that all development projects, in key wildlife habitats, do not turn out to be drivers of conflict, in future.
5. Create a Centre of Excellence (CoE) on HWC mitigation, under the aegis of the MoEFCC, to address, develop and implement long-term and short-term measures to reduce the adverse impacts of HWC.
6. Formulate and implement extensive education and awareness programmes to reduce the growing animosity among people towards wild animals involved in conflict situations, as well as to enlist their help in mitigating HWC.

7. Encourage community participation in the HWC mitigation.

Priority Projects

- 1.1. Conduct surveys to collect primary and secondary data on wildlife-human conflict at the national, regional and state level, and to prioritise species and areas for focussed interventions.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC, SFDs, Scientific Institutes and NGOs.

- 1.2. Create a centralised analytical database to assess the temporal changes in frequency of conflict.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC (for National and State Level), Scientific Institutes and NGOs (for regional level).

- 2.1. Establish a Land-use Practices Assessment and Planning Committee to identify the various land-use practices that promote HWC and develop more pragmatic land-use practices for various relevant regions.

Timing: Begin in 2017 and end by 2020.

Responsibility: MoEFCC, Scientific Institutes and NGOs.

- 2.2. Ascertain population status and trends for various species involved in intensive conflict situations with humans, and develop population management strategies for the various prioritised species and regions, where other mitigation measures are found to be inadequate.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC, SFDs and Scientific Institutes.

- 2.3. Develop national level conflict-mitigation plans for prioritised species and regions, in tandem with associated strategic plans under the NWAP.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC, SFDs and NGOs.

- 2.4. Develop and promote suitable mitigation measures including appropriate cropping and land-use practices to deter wild animals, such as nilgai, elephants, macaques, wild pigs etc., which cause immense damage to human property.

Timing: Begin in 2017 and ongoing.

Responsibility: SFDs, Scientific Institutes, CBOs and NGOs.

- 2.5. Streamline the official procedure for payment of ex-gratia relief to the victims of HWC to ensure that the relief is disbursed immediately with minimal paperwork and hindrances.

Timing: Begin in 2017 and ongoing.

Responsibility: SFDs.

- 3.1. Set up Conflict Mitigation Squads in the selected regions comprising carefully screened forest personnel; and develop and implement a comprehensive training and capacity enhancement programme for the Squads.

Timing: Begin in 2018 and ongoing.

Responsibility: SFDs and NGOs.

- 3.2. Assess the needs of various forest divisions in the country for equipment required to address HWC and formulate a plan for meeting this requirement in a time-bound manner.

Timing: Begin in 2017 and end by 2020.

Responsibility: MoEFCC and SFDs.

- 3.3. Put in place arrangements so that the persons injured by wild animals receive quick and proper medical treatment and rehabilitation support including wheelchairs, prosthetic limbs and plastic surgery whenever required.

Timing: Begin in 2017 and ongoing.

Responsibility: SFDs, State Health Departments and suitable NGOs.

- 4.1. Ensure that Environmental Impact Assessment (EIA) of developmental projects takes into consideration potential wildlife-human conflict spin-offs that large landscape level land-use practices or alterations can cause.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC.

- 4.2. Review and analyse and recommend alternative development options as well as amendments to proposed developmental projects, through comprehensive land-use practices vis-à-vis Wildlife habitat requirements analyses, for all Protected Areas and PA interlinking areas such as wildlife corridors and implement through community based organizations at local level.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC and NGOs.

- 5.1. Establish a Centre of Excellence (CoE) for wildlife-human conflict mitigation under the aegis of the MoEFCC that caters to various priority projects recommended in this Chapter. This CoE should serve as a central hub to coordinate among and network across SFDs, NGOs, CBOs and Scientific Institutions for planning and implementing focussed programmes for mitigating wildlife-human conflicts across the country.

Timing: Begin in 2017 and ongoing.

Responsibility: MoEFCC, WII and reputed NGOs.

- 6.1. *Projects for carrying out awareness campaign on issues relating to HWC have been recommended in Chapter XII (Conservation Awareness and Outreach).*

- 7.1. Constitute a network of Primary Response Teams (PRTs) consisting of local community persons which address conflict situations *in situ* and form a bridge between the larger community and the SFD. PRTs should be constituted through extensive consultation with the community representatives, and should be trained and equipped adequately.

Timing: Begin in 2017 and ongoing.

Responsibility: SFDs, CBOs and NGOs.

- 7.2. Encourage the participation of the Local Bodies (Panchayats, Municipal Corporations, Municipal Committees and Cantonment Boards) in the management of HWC, such as formation of Local Wildlife Squads / Primary Response Teams (PRTs); construction and maintenance of barriers and fences; promotion of alternative cropping practices among villagers; distribution of relief to the victims of HWC; and organisation of eco-development activities in the villages affected by HWC. It may also be useful to empower suitable Local Bodies, currently under S.11(1)(b) of the WPA-1972 for driving and capturing common wild animals involved in HWC.

Timing: Begin in 2017 and complete in 2020.

Responsibility: SFDs, Local Bodies and NGOs.

- 7.3. Identify, validate and support Indigenous Traditional Knowledge (ITK) available in various parts of the country for dealing with the HWC.

Timing: Begin in 2017 and complete in 2020.

Responsibility: SFDs, Scientific Institutes and NGOs.

- 7.4. It may be recalled that the Gujarat Forest Department has achieved encouraging results by appointing local youth as 'Vanya Praani Mitra' (Friends of Wild Animals) in villages situated in the high HWC zones. These youth, who receive only a token honorarium from the SFD, liaise between the villagers and the SFD in cases of HWC; manage the conflict

before the arrival of the forest staff on the scene; help in crowd-control; and assist in rescuing the stranded wild animals. This practice may be replicated in other States / UTs with the help of Local Bodies and NGOs.

Timing: Begin in 2017 and ongoing.

Responsibility: SFDs, Local Bodies and NGOs.

X. Management of Tourism in Wildlife Areas

Overview and Objectives

1. Eco-friendly and regulated wildlife-based tourism (also referred to as eco-tourism) has the potential to be a vital conservation tool as it helps win public support for wildlife conservation. However, in recent years mushrooming of tourist visitation and tourist facilities have led to overuse, disturbance and serious management problems for managers in a number of PAs.
2. In case of any conflict between tourism and conservation interests of a PA, the paradigm for decision must be that tourism exists for the PAs and not vice versa, and that tourism demands must be subservient to and in consonance with the conservation interests of PA. While revenues earned from tourism can help the management of the PA, maximisation of income must never override the main goal of tourism viz. to educate the visitor and create in him respect for nature.
3. Guidelines have been formulated to make tourism in PAs eco-friendly and educative and these should be followed. To this end, an emphasis must be placed on tourism facilities that are sustainable, environmental-friendly, moderately priced, clean and wholesome – rather than lavish, five-star facilities. Media should be used to promote for nature conservation.
4. As stipulated by the National Tourism Policy-2002, eco-tourism must primarily involve and benefit local communities. Goals set for the MoEFCC in the 12th Five Year Plan (2012-17) include promotion of eco-tourism and building capacity of JFMCs for management of eco-tourism. One of the monitorable targets set for the Plan is to prepare Integrated Eco-tourism District Plans covering 10% of all potential PAs by 2017. There is a great scope for enhancing the coverage of PAs by eco-tourism.
5. The objective of wildlife tourism should be to inculcate amongst the visitors empathy for nature, both animate and inanimate, and to provide a communion with nature, rather than to merely ensure sightings of a maximum number of wild animals. Students of all levels must be encouraged to visit PAs and to participate in conservation action therein, and these educative processes should be facilitated through concessions and park interpretations.
6. Regular monitoring of the impacts of tourism is needed. The parameters for such an evaluation should include ecological effects on the habitat, animal behaviour as well as secondary effects caused by changes in lifestyles and cultures of local populations. Representatives from local communities, local NGOs and field personnel should be a part of eco-tourism boards that monitor and regulate tourism activities in the area. These boards should help develop tourism and conservation plans and strategies.

7. Strict energy and water conservation and waste disposal guidelines need to be laid down and implemented for existing and new tourist facilities. Any new tourist residential facilities and eateries must be established outside PAs and all possible efforts should be made to relocate the ones existing inside PAs to suitable sites outside.

Action Required

1. An integrated guidelines for tourism as principles for preparation of eco-tourism plans for protected areas inside PAs to be framed by the MoEFCC and should be implemented to ensure sustainable ecotourism.
2. Standards and guidelines should be developed to prevent damage to wildlife and habitats, in particular to forest and mountain vegetation, coral beds.
3. Rules and regulations for visitor conduct should be framed and widely circulated to tourists and tourist agencies as well as prominently displayed on notice boards.
4. Measures should be taken for strengthening the capacity of the local communities and the tourism agencies for managing responsible tourism.
5. Measures should be taken for ploughing back a part of the income generated from wildlife tourism for management of PAs including eco-development communities of the local communities.

Priority Projects

- 1.1 Based on the existing guidelines, sustainable tourism needs to be implemented in Wildlife Areas.
- 1.2 Promote eco-tourism also in marine and Himalayan ecosystems keeping in mind the special requirements of minimal footprint in these areas.
- 1.3 Tourism plans for all TRs and PAs, either as a part of existing management plans or separate ones, shall be prepared.
- 1.4 Assess the impact of tourism and integrate its outcomes in the successive eco-tourism plans

Timing: 2017-2022.

Responsibility: MoEFCC, NTCA.

- 2.1. Develop impact assessment techniques and standards that can be used by PA managers to evaluate negative impacts of tourism on soil, water resources, vegetation, animal life, sanitation or waste disposal, and cultural environments.
- 2.2. Develop stringent standards of waste disposal, energy and water consumption, construction plans and materials used therein.

- 2.3. Impose a ceiling on the number of tourists/tourist vehicles permitted to enter the PA keeping in mind each PA's individual characteristics. The PA managers must be empowered to use their discretion in closing off certain sensitive areas of the PA, for example, an area where a tiger has littered.

Timing: To be completed by 2020.

Responsibility: MoEFCC and SFDs.

- 3.1. Frame rules and regulations for visitors' conduct in TRs and PAs.

Timing: To be completed by 2020.

Responsibility: MoEFCC, NTCA and SFDs in consultation with the Ministry of Tourism.

- 3.2. Safety measures for visitors should be clearly mentioned in the guidelines that facilitate tourism inside TRs and PAs.

Timing: To be initiated by 2018 and to continue.

Responsibility: SFDs, NTCA and Tourism Departments of States/UTs.

- 4.1. Conduct capacity building programmes for office bearers / members of JFMC, FDAs, Village Forests, *Vana Panchayats* and Local Bodies in management of eco-tourism facilities including homestays in TRs, PAs and other Conservation Areas.

Timing: To be initiated by 2018 and to continue.

Responsibility: SFDs, Tourism Departments of States, UTs and suitable NGOs.

- 4.2. Conduct orientation programmes for tour operators with emphasis on appraisal of the regulations governing tourism.

Timing: To be initiated by 2018 and to continue.

Responsibility: SFDs, Tourism Departments of States, UTs and suitable NGOs.

- 4.3. *A project for training and deployment of nature guides in PAs has been recommended in Chapter XII (Conservation Awareness and Outreach).*

- 4.4. Establish interpretation centre for all PAs and TRs and mandate the entrance ticketing centre of PAs and TRs are established inside these interpretation centres.

- 5.1. Make rules to ensure that all hotels /privately-run tourist facilities within a radius of 5 km from the boundary of a PA must contribute a fixed percent of their turnover to the PA and the monies thus collected should be utilized for eco-development of the local communities, and not go to the State Exchequer.

- 5.2. Orders for setting up mechanism for use of revenue generated from tourists for management of PAs shall be put in place.

Timing: To be completed by 2022.

Responsibility: SFDs.

XI. People's Participation in Wildlife Conservation

Overview and Objectives

1. The Indian Forest Act (IFA), 1878 (later replaced by the IFA-1927) and various provincial Forest Acts adopted Reserved Forests (RFs) and Protected Forests (PFs) as the basis for forest management in the country which sought either to exclude or to curtail existing rights of the local people over forests. The Wildlife (Protection) Act, 1972 (WPA-1972) also introduced an exclusionary model of wildlife management in the form of National Parks and Sanctuaries. Although chapter-III of the IFAs of 1878 and 1927 also empowered the provincial governments to constitute Village Forests to be managed by the village communities, yet, in practice, not many Village Forests were set up in the country. A notable exception is the *Vana Panchayat* system introduced in the hill areas of Uttarakhand in the 1930s which provides a robust legal mechanism for involving the local villagers in forest conservation.
2. The exclusionary models of forest and wildlife management, however, made the local people hostile towards the State Forest Departments (SFDs) and impacted negatively on conservation. A Task Force was appointed in 1981 on the initiative of the Indian Board for Wildlife to suggest ways for eliciting public support for wildlife conservation. The Task Force recommended that each individual PA should adopt a 'Core-Buffer-Multiple Use Surround' structure; strict protection and higher inputs for eco-system restoration should be ensured for Core-Buffer; while the Multiple-Use Surrounds, identified in terms of ecological and administrative requirement of the PA, should be regarded as Special Areas for Eco-development (SAEDs) with greater per capita inputs on development based upon firm conservation bias. The Task Force also recommended educational and awareness programmes for schools; involvement of media; and orientation programmes for the decision makers. All these recommendations were incorporated in the first National Wildlife Action Plan (NWAP) launched in 1983.
3. During the 1970s, the West Bengal Forest Department experimented with resuscitation of degraded forests in South Bengal with the co-operation of the local people. During the same period, the SFDs in many States/ UTs launched Social Forestry Projects for increasing the tree cover outside conventional forests with active support of the local communities. In yet another significant move, the 42nd Constitutional Amendment (1976) prescribed fundamental duties for the Indian citizens—one of the duties being "to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures". The impact of all these initiatives can be seen on the National Forest Policy-1988

which prescribes people's support as an essential component of forest conservation programmes. On 1.6.1990, the Government of India (GOI) issued an advisory to all State Governments for setting up Joint Forest Management Committees (JFMCs) for involving local communities in protection of forests. During the 10th Five Year Plan (2002-07), the GOI extended the concept of JFM to Forest Development Agencies (FDAs) and linked it with the National Afforestation Programme.

4. During the 1980s, the SFDs in many States introduced schemes for payment of ex-gratia relief to the villagers for loss of human life, crops and livestock caused by wild animals. The Government of India introduced eco-development programme (EDP) in villages around PAs in the late-1980s with the objective of generating additional livelihood opportunities for villagers and reducing biotic pressure on PAs. EDP and ex-gratia relief are intended to mitigate the hostility of the local people and procure their support for conservation of forests and wildlife.
5. The NWAP (2002-2016) also included a component for enlisting public support and participation in wildlife conservation and recommended a number of priority projects, viz.: preparation of guidelines for involvement of local communities in management of PAs; initiation of orientation / training programmes for PA staff in order to sensitise them towards community participation; giving preferential treatment to the local communities for employment in forestry operations and eco-tourism works as well as in recruitment of forest guards in PAs; formulation of effective schemes for mitigation of human-wildlife conflict (HWC) and expeditious payment of ex-gratia relief; evolving comprehensive guidelines for voluntary relocation of people from PAs; setting up participatory management committees for PAs; etc. Some SFDs have made significant progress in implementing these projects.
6. A significant development during the recent years has been the enactment of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, also referred to as the Forest Rights Act, 2006 (FRA-2006). The preamble of the FRA-2006 states: ".....forest rights on ancestral lands and their habitat were not adequately recognised in the consolidation of State forests during the colonial period as well as in Independent India resulting in *historical injustice* to the forest dwelling Scheduled Tribes and other traditional forest dwellers....." (Italics added). The FRA-2006 aims at redressing this injustice by assigning certain rights to the eligible Scheduled Tribes and other traditional forest dwellers, which include the right to cultivate forestland as well as other traditional and customary rights like grazing, fishing and collection of NTFPs but exclude hunting. The FRA-2006 applies to all forestlands including PAs. It is apprehended that the individual and community rights sought to be

bestowed upon the Scheduled Tribes and other traditional forest dwellers may dilute the sanctity of PAs and other sensitive conservation areas; enhance anthropogenic pressure on wildlife habitats; escalate HWC; and adversely impact the effectiveness of JFM. It may be recalled that a similar conflict of interests between the SFDs and JFMCs on one side and the Panchayats and *Gram Sabhas* on the other side has also arisen after the promulgation of the Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA-1996) which seeks to assign ownership of NTFPs in the tribal areas listed in Schedule-V of the Constitution to Panchayats and *Gram Sabhas*.

7. As the foregoing discussion would reveal, public support is no longer a matter of choice but an absolute necessity in the emerging scenario of wildlife management in the country. The current NWAP aims at building, enhancing and sustaining people's support and participation in wildlife conservation.

Actions Required

It is necessary to plan activities in the light of the experience gained during the earlier NWAPs. There is some unfinished agenda from the NWAP (2002-16) which need to be continued. The PESA-1996 and FRA-2006 seek to bestow various rights on the local people over PAs and general forests and the potential conflict of these right-holders with the SFDs can only be averted by making them a partner in the official programme for wildlife conservation. A substantial part of natural habitats in the country is outside the administrative control of the SFDs and the owners / managers of such habitats should be brought into the mainstream of wildlife conservation. Keeping the aforesaid factors in view, the following actions have been identified under the NWAP (2017-31):

1. Consolidate and improve upon the achievements made towards ensuring people's support and participation in wildlife conservation during the earlier NWAPs.

- i. Attempts should be made for reviving, strengthening and expanding the existing institutions like the JFMCs, FDAs, Village Forests and *Vana Panchayats* which provide a convenient platform for the SFDs to seek public co-operation. The existing mandate of these institutions is generally confined to forestry activities and there is a scope for extending the same to conservation and management of wildlife.
- ii. The WPA-1972 envisages establishment of Advisory Committees for Sanctuaries (S.33B) and Management Committees for Conservation Reserves (S.36B) and Community Reserves (S.36D) for ensuring public participation in management of PAs. But the prescribed Committees are yet to be set up in a large number of PAs.
- iii. S.4(1)(bb) of the WPA-1972 also envisages appointment of Honorary Wildlife Wardens (HWLW). The Act does not bar appointment of more

than one HWLW in a district. Therefore, the State Governments should appoint adequate number of HWLWs in each district—particularly for each sensitive wildlife zone in non-forest areas (e.g. villages / blocks suffering from acute HWC; important wildlife corridors; wetlands; etc.). The HWLWs should be selected keeping in view their acceptability among the local community; their commitment towards wildlife conservation; their potential to help the forest staff in the field, particularly in controlling crowds.

- iv. A large number of wildlife habitats in the country, including wetlands and wildlife corridors, are under the control of the Autonomous Councils, tribal communities, private entities and government agencies other than the SFDs. It is advisable to formally recognise the owners / managers of such habitats as wildlife managers.

2. Address the factors which adversely impact public support and attitude towards wildlife conservation.

- i. Long delays in settlement of rights and payment of compensation to the right-holders in PAs have been recognised as a major source of alienation of the local people from wildlife conservation. In many cases in the past, the PA boundaries were fixed rather irrationally so as to include human-habitations and crop-lands having no direct value for wildlife and, thus, causing harassment of the local people.
- ii. The FRA-2006 provides a fresh opportunity for identifying and recognising genuine rights of the tribal people and other traditional forest dwellers over PAs and other forest areas. Sections 2(b) and 4(2) of the FRA-2006 also provide for identification of Critical Wildlife Habitats (CWH) within PAs over which forest rights may be modified or resettled. Delays in determination of rights and CWH lead to bitter relationship between the local people and the SFDs.
- iii. Advantage should be taken of S.5 of the FRA-2006 which empowers the forest right-holders and *Gram Sabha* to protect wildlife and biodiversity.
- iv. The SFDs should take advantage of such stipulations of the WPA-1972 as facilitate accommodation of the genuine needs of the local people within PAs. Such enabling sections include: S.33(d); S.26A (1) (proviso) read with S.35(1) (proviso); S.26A (2) read with S.35(1) (proviso); S.18A (2); and S.29 (proviso) read with S.35(6) (proviso).
- v. Constant conflict with the wild animals along with inadequacy of mitigation measures and compensatory mechanism further accentuates the alienation of local people from wildlife conservation. It is necessary to put in place effective measures for mitigation of HWC as well as judicious and timely payment of ex-gratia relief to the affected people. It is also advisable to involve the affected people in planning and implementing mitigation strategies, particularly in setting up Local Wildlife Squads / Primary Response Teams (PRTs) and construction / maintenance of barriers and fences. There is a need for recognising and encouraging indigenous knowledge for dealing with HWC. There is also a need for promoting such lifestyles and practices as enhance people's tolerance for and ensure peaceful co-existence with wild animals.

- vi. People, in general, are also sceptical of the PAs for fear of displacement from their homes and crop-lands. A number of villages have been shifted out of PAs, particularly TRs, since the 1970s either for fulfilling the legal requirements of a National Park or for reducing anthropogenic pressure from the core area of TRs. Relocation of villages from PAs is also sometimes justified on the ground that it will save the people from HWC and facilitate their access to developmental activities. But forcible relocations or poorly executed resettlement projects have only resulted in the ill-will of the affected people towards wildlife conservation. In some cases the relocation projects have failed and the concerned people have returned to the original sites. The whole gamut of relocation of villages needs a serious review.

3. Revive, extend and sustain people's stake in wildlife conservation with due regard to relevant laws and without compromising with the scientific basis for conservation.

- i. People must have a stake in wildlife conservation as a motivation for supporting and participating in the government-run conservation programmes. The most important stake of the local people is the benefit directly accruing to them in the form of products of daily needs from PAs, forests and other conservation areas (e.g. wetlands). JFMCs, Village Forests and *Vana Panchayats* provide an opportunity for sharing usufructs from forests and PAs with the local people.
- ii. It is also necessary to help people develop intellectual or sentimental stakes in wildlife conservation through awareness and outreach programmes.
- iii. Eco-development has been used during the earlier NWAPs as an effective tool for building local people's stake in PAs and it should be continued during the current NWAP with necessary improvements. The WII has prepared a manual for preparation of Eco-development Projects (EDPs). Many lessons have also been learnt in the past while executing EDPs in various States, in particular the projects sponsored by the World Bank and other international funding agencies, and these lessons should be put to use while planning and executing new projects. For example:
 - EDP should not be confined to TRs, NPs and WLS but also extended to other important Conservation Areas, such as Conservation and Community Reserves, Biodiversity Heritage Sites, Elephant Reserves, important wetlands, recognised wildlife corridors, etc.
 - EDP should be implemented in collaboration with the people's institutions like JFMCs, FDAs, Village Forests, *Vana Panchayats*, *Gram Sabhas* and Local Bodies, based on a written agreement spelling out the role, duties and obligations of the SFD and the selected institution.
 - EDP should be based on micro-plans prepared jointly by the SFD and the selected institution through Participatory Rural Appraisal (PRA)

techniques. Necessary technical support for micro-planning can be obtained from suitable NGOs and scientific institutes.

- The micro-plans should be based on Conservation Area Mutual Impact Assessment (CAMIA), i.e. assessment of the positive and negative impacts of the Conservation Area on the people and vice versa. The objective of the EDP should be to maximise the positive impacts and minimise the negative impacts.
 - The activities selected through micro-plans should be subjected to Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) with the help of suitable NGOs and Scientific Institutes. It must be ensured that the benefits of the EDP are not usurped by the dominant sections of the society. The specific interests of the women should be accommodated in the EDP. Attention should also be paid to rehabilitation of communities having propensity for indulging in forest and wildlife crimes.
 - Priority should be given to creation of community assets which can generate income and livelihood opportunities on sustained basis. Self-Help Groups (SHGs) should be given priority over individuals.
 - The beneficiaries should also be encouraged to contribute a part of the expenditure in cash, kind or labour to inculcate in them a sense of belonging to the assets created. In particular, the selected institution should be encouraged to set up a development fund out of the income derived by its members from the Conservation Area or from the assets created through the EDP so as to ensure maintenance and growth of such assets.
 - There should be a mechanism for joint monitoring and evaluation of the EDP by the SFD and the selected institution as well as for resolution of conflict, if any.
- iv. Eco-tourism provides yet another opportunity for the people to have a stake in wildlife conservation. The National Tourism Policy-2002 stipulates that eco-tourism should help in eliminating poverty, in ending unemployment, in creating new skills, in enhancing the status of woman, in preserving cultural heritage, in encouraging tribal and local craft, and in improving overall environment and facilitating growth of a more just and fair social order. However, in practice, most of the benefits of eco-tourism are usurped by the private tourism operators and resort-owners, and the role of the local people is confined to merely serving as guides, cooks or porters. There is a great scope for increasing the participation of JFMCs, FDAs, Village Forests, *Vana Panchayats* and Local Bodies in management of eco-tourism in PAs and other Conservation Areas and for ploughing back a part of the income generated from eco-tourism into EDP in the region.

- v. The employment opportunities provided by the SFDs also serve as an incentive for the local people to participate in wildlife conservation. A great amount of traditional knowledge and skills useful for forest and wildlife management exists among the tribal communities, which needs to be identified and harnessed by the SFDs.

4. Build up capacity of the wildlife managers as well the local people to work together for wildlife conservation.

- It is necessary to build up the capacity of the officers and staff of the SFDs and Autonomous Councils; functionaries and members of JFMCs, FDAs, Forest Villages, *Vana Panchayats*, *Gram Sabhas* and Local Bodies; HWLWs; forest right-holders and other stakeholders to work together for wildlife conservation through formal training courses and informal orientation/sensitisation programmes.

Priority Projects

1.1. The MoEFCC should, in collaboration with the SFDs, suitable NGOs and Scientific Institutes, initiate a review of the JFMCs, FDAs, Village Forests and *Vana Panchayats* in the States/ UTs. Further measures to improve the quality and coverage of the aforesaid institutions in forests and PAs should be taken on the basis of the proposed review which should, in particular, address the following issues:

- i. Extending the scope of JFMCs, FDAs, Village Forests and *Vana Panchayats* to wildlife conservation within and outside PAs—particularly in mitigation of HWC; implementation of EDP; management of eco-tourism activities; preparation of Working Plans/ Management Plans/Micro-plans/ People's Biodiversity Registers (PBR), enumeration of wild animals; and protection against poaching of wild animals and smuggling of wildlife products.
- ii. Preferential treatment in terms of employment and usufruct sharing to those members of the JFMCs/ FDAs/Village Forests / *Vana Panchayats* who live below the poverty line.
- iii. Resolution of conflict between JFMCs / FDAs/ Village Forests / *Vana Panchayats* and Panchayat Raj Institutions (PRIs) over usufruct sharing from forests in the context of the PESA-1996 and FRA-2006.
- iv. Integration of JFMCs and BMCs in the forest areas in the context of the BDA-2002.
- v. Providing legal backing to JFMCs.
- vi. Enhancing the coverage of Village Forests / *Vana Panchayats* under the provision of S.28 of the IFA-1927 or other relevant Acts.

Timing: Review to start in 2017 and complete by 2019. Follow up action on the basis of the review to start in 2020 and complete by 2023.

Responsibility: MoEFCC, SFDs, State Panchayat Departments, National Biodiversity Authority (NBA), State Biodiversity Boards (SBBs), selected NGOs and Scientific Institutes.

1.2. The SFDs should set up the Management /Advisory Committees in all the PAs in a time-bound manner and make them functional. It is advisable to amend the WPA-1972 for facilitating the establishment of Advisory Committees for National Parks as well.

Timing: To start in 2017 and complete by 2018.

Responsibility: SFDs and MoEFCC.

1.3. The State Governments should appoint adequate number of HWLWs in each district and, in deserving cases, entrust them with the responsibility of supervising the Local Wildlife Squads / Primary Response Teams (PRTs); overseeing the working and maintenance of barriers, fences and other devices meant for mitigating HWC; helping in verification of claims for ex-gratia relief; assisting in preparation of micro-plans for the FPCs / EDCs; and monitoring the implementation of EDP.

Timing: To start in 2017 and complete by 2018.

Responsibility: SFDs.

1.4. *A project for formation of Environmental Cells in the Autonomous Councils has been recommended in Chapter XII (Conservation Awareness and Outreach). A project for notifying important wildlife habitats, corridors and sacred groves situated outside the administrative control of the SFDs as Community Reserves under the WPA-1972 or Biodiversity Heritage Sites under the BDA-2002 has been recommended in Chapter I (Strengthening and Improving the Protected Area Network).*

1.5. The forest officers and staff working under the Autonomous Councils should be given the same powers, responsibilities and facilities for managing wildlife as available to their counterparts in the SFDs. The owners / managers of wildlife habitats under the control of communities, private entities and government agencies should be appointed as HWLWs and delegated powers under S.50 (prevention and detection of offences) and S.55 (prosecution of offenders) of the WPA-1972. They should also be assisted by the SFDs, suitable NGOs and Scientific Institutes, in the preparation and implementation of Management Plans / Working Plans for the areas under their charge.

Timing: To start in 2017 and complete by 2020. Preparation of Management Plans / Working Plans to be completed by 2025.

Responsibility: SFDs, Autonomous Councils, SBBs, suitable NGOs and Scientific Institutes.

1.6 *A project for formation of Environmental Cells in the Local Bodies (Panchayats, Municipal Corporations, Municipal Committees and Cantonment Boards) has been recommended in Chapter XII (Conservation Awareness and Outreach). A project for involving the Local Bodies in the management of HWC has been recommended in Chapter IX (Mitigation of Human-Wildlife Conflict).*

1.7. The MoEFCC should, in collaboration with the SFDs, WII, IGNFA, CASFOS and suitable NGOs, take up a project for compilation of case studies of people's participation in wildlife conservation from across the country. The experience gained through such case studies should be distilled into key learning points to help in making effective strategies for future.

Timing: To start in 2017 and complete by 2019.

Responsibility: MoEFCC, SFDs, WII, IGNFA, CASFOS and selected NGOs.

2.1. *Projects for rationalisation of the PA-boundaries and liberal treatment of the people's rights have been recommended in Chapter I (Strengthening and Improving the Protected Area Network).*

2.2. *A project for early finalisation of forest rights and CWH within PAs under the FRA-2006 has been recommended in Chapter I (Strengthening and Improving the Protected Area Network).* Attempts should also be made to complete the process of determination of rights in forest areas outside PAs.

2.3. The SFDs should, in collaboration with suitable NGOs, initiate negotiation with the forest right-holders and *Gram Sabhas* and enter into Memorandum of Understanding (MOU) with them to facilitate their participation in management and protection of forests and wildlife and to ensure that the natural resources are utilised in a sustainable and equitable manner with minimum impact on wildlife.

Timing: The signing of MoUs with the forest right-holders and *Gram Sabhas* should start in 2017 and completed by 2022.

Responsibility: SFDs, *Gram Sabhas* and suitable NGOs.

2.4. *A project for accommodating the genuine needs of the local people within PAs in accordance with the WPA-1972 has been recommended in Chapter I (Strengthening and Improving the Protected Area Network). Projects for alleviating the grievances of the local people regarding HWC have been recommended in Chapter IX (Mitigation of Human-Wildlife Conflict). A project for*

reviewing the past cases of relocation of villages from PAs and streamlining the relocations in future has been made in Chapter I (Strengthening and Improving the Protected Area Network).

3.1. *A project for strengthening JFMCs, Village Forests and Vana Panchayats has been recommended in Para 1.1. Similarly, a project for accommodating genuine needs of the local people within PAs in accordance with the WPA-1972 has been recommended in Chapter I (Strengthening and Improving the Protected Area Network). Projects for developing and nurturing intellectual and sentimental stakes of the people in wildlife conservation have been recommended in Chapter XII (Conservation Awareness and Outreach).*

3.2. All the PAs and other important Conservation Areas in the country should be brought under the ambit of the EDP. The MoEFCC should increase financial support for EDP under various Centrally Sponsored Schemes (CSS). The SFDs should network with district administration, Local Bodies, development agencies, Corporate Bodies and NGOs to ensure funds for the implementation of micro-plans. The SFDs should identify all such schemes launched by the State Governments and rural development agencies as, with suitable adjustments, can serve the objectives of eco-development of the selected areas or the selected SHGs.

Timing: Continuing from the previous NWAP and ongoing.

Responsibility: MoEFCC, SFDs, district administration, Local Bodies, development agencies, Corporate Bodies, NGOs and Scientific Institutes.

3.3. *Projects for promoting local people's stake in wildlife conservation through eco-tourism have been recommended in Chapter X (Management of Tourism in Wildlife Areas).*

3.4. The previous NWAP had recommended amendment of recruitment rules in the States / UTs with a view to give priority to the local communities in appointment of forest guards and other frontline staff. It also recommended preference in employment to the local people, particularly the poor and the landless, in seasonal works such as fire protection, road repair, improvement of habitat, eco-tourism, etc. All these programmes should be continued during the current NWAP as well.

Timing: Continuing from the previous NWAP and ongoing.

Responsibility: SFDs.

4.1. *A project for the capacity building of the officers and staff of the SFDs, Autonomous Councils and other stakeholders has been recommended in Chapter XIII (Development of Human Resources).*

XII. Conservation Awareness and Outreach

Overview and Objectives

1. Soon after the Independence, the Government of India (GOI) realised the importance of public awareness as a tool for conserving forests and wildlife. The GOI initiated *Vana Mahotsava*, the annual tree-planting festival, in 1950 as a step towards making the people forest-conscious. The GOI set up the Central Board for Wildlife in April 1952 with a number of objectives that included promotion of public interest in wildlife. Another step for creating public consciousness towards wildlife was taken in 1955 in the form of the Wildlife Day—upgraded to the Wildlife Week since October 1959. Conservation education in India got a boost in 1980 when the first International Conference on Environmental Education (EE) was organised in New Delhi.
2. The first National Wildlife Action Plan (NWAP) launched in 1983-84 included the subject under the title ‘Wildlife Education and Interpretation’. The NWAP (2002-16) continued with the theme under the title ‘Conservation Education and Protected Area Interpretation’ and, as its review has revealed, many significant achievements have been made during this period, particularly in making EE a part of the school curriculum and in using media as a tool for creating awareness about wildlife. The prescriptions of the NWAP (2002-16) relating to schools got a significant boost from the Hon’ble Supreme Court which, in its Judgment delivered on 18th December 2003 in Writ Petition No 860 of 1991, directed the National Council for Educational Research and Training (NCERT) to prepare a model syllabus for the EE to be taught at different grades. The Supreme Court directed all the States and educational agencies in the country to introduce environment as a compulsory subject in all classes in schools up to the higher secondary level from the academic year 2004-05. As a result, EE now forms a part of the school-curricula in all the States /UTs.
3. Performance review of the NWAP (2002-16) has produced many useful lessons which should be kept in mind while deciding actions and priority projects for the current NWAP. For example, it has been pointed out that the NWAP (2002-16) assigned bulk of the responsibilities to the MoEFCC and little or no responsibility to other Ministries, SFDs, Autonomous Councils, Local Bodies, Corporate Sector and Civil Society Groups. Shortage of qualified teachers and absence of the component of outdoor activities / camping programmes in the school-curriculum have been identified as major gaps in the EE programme in schools. Weaknesses were also noticed in the interpretation programmes in the PAs. It has also been the experience that target group-specific and issue-specific awareness programmes were

more effective than run-of-the mill kind of programmes. Need for expanding the scope of some of the projects was also felt. Problems regarding co-ordination among implementing agencies and resource-crunch have also been noticed during the previous NWAPs.

4. India, at present, is in the midst of a great change: the economy is showing up; urbanisation is on the increase; the proportion of young people in the population is getting higher; information technology is becoming a way of life; and the influence of global processes on the Indian society is much more pronounced than at any time before. All these changes are bound to have significant impacts on the wildlife conservation scenario in the country. One way to ensure that such impacts don't turn negative is that of nature-literacy. It is, therefore, imperative that the strategy of conservation awareness and outreach continues to be an integral part of the NWAP (2017-31).
5. The former Department of Environment (now a part of the MoEFCC) had launched its flagship scheme, viz. the 'Environmental Education, Awareness and Training' (EEAT) in 1983-84 with the following basic objectives:
 - To promote environmental awareness among all sections of the society;
 - To spread environment education, especially in the non-formal system among different sections of the society;
 - To facilitate development of education/ training materials and aids in the formal education sector;
 - To promote environment education through existing educational/scientific/ research institutions;
 - To ensure training and manpower development for environment education, awareness and training;
 - To encourage non-governmental organizations, mass media and other concerned organizations for promoting awareness about environmental issues among the people at all levels;
 - To use different media including films, audio, visual and print, theatre, drama, advertisements, hoarding, posters, seminars, workshops, competitions, meetings etc. for spreading messages concerning environment and awareness; and
 - To mobilize people's participation for preservation and conservation of environment.

The aforesaid objectives are still relevant and form the basis of the current NWAP.

Action Required

Keeping in view the experience gained through the previous NWAPs and challenges of the emerging scenario of wildlife management in the country, the following actions have been identified under the NWAP (2017-31):

1. Develop and promote infrastructure and capacity for Conservation Education, Nature Interpretation and Outreach (CENIO) in the country.
2. Continue, improve and expand formal environmental education programme in schools.
3. Improve and expand facilities for informal environmental education in the country.
4. Continue, improve and expand use of media and technology for carrying out CENIO in the country.

Priority Projects

1.1.A. The MoEFCC should set up an Advisory Group on CENIO consisting of representatives of relevant Ministries (e.g. Information & Broadcasting, Human Resources Development, Culture, Communication, Tribal Affairs, Agriculture, Rural Development, Coal, Mines, Defence, Railways, etc.), SFDs, Corporate Sector, subject matter experts, civil society groups, academics and the news media. The Group will advise the MoEFCC on matters relating to CENIO—particularly in respect of the contents and quality of the educational and publicity material and training programmes; monitor the implementation of the priority projects; provide co-ordination among different departments and agencies entrusted with the implementation of these projects, and ensure synergy with the nature education component of the National Biodiversity Action Plan (NBAP) and other such plans.

Timing: To start in 2017 and complete by 2018.

Responsibility: MoEFCC.

B. The SFDs should also set up similar Advisory Groups in the States / UTs.

Timing: To start in 2017 and complete by 2018.

Responsibility: SFDs.

1.2. A. The MoEFCC should persuade all Armed Forces and Para-Military Forces in the country to set up Environment Cells. The MoEFCC should also persuade all Ministries, Departments, Agencies and the Corporate Bodies approaching it for environmental and forest clearance to set up Environment Cells and include conservation education in their Action Plans.

Timing: To start in 2017 and complete by 2019.

Responsibility: MoEFCC, Armed Forces, Paramilitary Forces, concerned Ministries, Departments, Agencies and the Corporate Bodies.

B. The SFDs should persuade the State Police; relevant Government Departments (e.g. Agriculture, Livestock Development, Education, Tourism, Tribal Affairs, PWD, etc.); Autonomous Councils, Local Bodies (Panchayats, Municipal Corporations, Municipal Committees and Cantonment Boards) and State Universities to set up Environment Cells and to include conservation education in their Action Plans.

Timing: To start in 2017 and complete by 2019.

Responsibility: SFDs, Police, concerned Departments, Autonomous Councils, Local Bodies and State Universities.

C. The MoEFCC and SFDs should organise orientation programmes for the officers managing the aforesaid Environment Cells with support of the WII and the Centres of Excellence (viz. CEE and CPREEC).

Timing: To start in 2018 and ongoing.

Responsibility: MoEFCC, SFDs, WII, CEE and CPREEC.

1.3. The MoEFCC has a Media Cell. Some SFDs also have Publicity Cells. The remaining SFDs should also set up Media Cells. These Media Cells should liaise with the news media; keep watch over the media reports; do follow-ups on complaints and criticism; and respond promptly to negative and inaccurate reports.

Timing: To start in 2017 and complete by 2018.

Responsibility: SFDs.

1.4. All Zoos in the country should set up Education & Outreach Cell and all large and medium Zoos should appoint an Education Officer in accordance with the Recognition of Zoo Rules, 2009. The CZA should provide necessary guidance and support to the Zoos for this purpose.

Timing: To start in 2017 and complete by 2019.

Responsibility: CZA and Zoos.

1.5. *Projects for building up capacity of forest officers of various ranks—particularly those working in PAs and Autonomous Councils; education officers of zoos; and candidates interested in pursuing a career as a Nature guides in a PA or a Zoo in respect of CENIO techniques have been recommended in Chapter XIII (Development of Human Resources).* The SFDs and Zoos should prefer only such persons for deployment as Nature Guides in TRs, PAs and Zoos as have passed the prescribed certificate course. Similarly, the SFDs should prefer only such staff for posting in Nature Interpretation Centres (NICs) in TRs and PAs as have attended a training programme in CENIO.

1.6.A. The WII should, in collaboration with the CEE and CPREEC, prepare a Master Plan for development of existing Nature Interpretation Centres (NICs) and creation of new NICs in PAs.

Timing: To start in 2017 and complete by 2019.

Responsibility: WII, CEE and CPREEC.

B. Based on the above Master Plan, the MoEFCC and the SFDs should take steps for setting up NICs in all PAs (National Parks, Sanctuaries, Conservation Reserves and Community Reserves) in the country. The funds for this purpose may be provided under appropriate Centrally Sponsored Schemes (CSS) of the MoEFCC or from the State CAMPA. In case a particular SFD is unable to provide regular and trained staff for managing the NICs, it should work out partnerships with suitable research institutes or NGOs.

Timing: To start in 2019 and complete by 2023.

Responsibility: MoEFCC, SFDs and the selected research institutes, NGOs.

C. A project for preparing / updating Management Plans for all the PAs with an exclusive chapter on Interpretation and Conservation Education in accordance with the guideline prepared by the WII has been recommended in Chapter I (Strengthening and Improving the Protected Area Network).

1.7.A. The National Natural History Museum (NNHM) should prepare a Master Plan for development of existing Natural History Museums (NHMs) and creation of new NHMs in all districts of the country.

Timing: To start in 2017 and complete by 2019.

Responsibility: NNHM.

B. Based on the above Master Plan, the MoEFCC should initiate a scheme for setting up NHMs in all districts of the country. The NHMs can either be set up as branches of the NNHM, or as extension of a Zoo, a Vana-Vigyan Kendra (ICFRE) or a Scientific Institute. Suitable NGOs and Corporate Bodies should also be permitted to set up or sponsor a NHM. The CZA should provide necessary guidance and support to the Zoos for this purpose.

Timing: To start in 2019 and complete by 2023.

Responsibility: MoEFCC, SFDs, CZA and selected Zoos, Vana-Vigyan Kendras (ICFRE), Scientific Institutes, NGOs and Corporate Bodies.

1.8.A. The SFDs, Autonomous Councils, PAs, Zoos and NHMs should prepare their own Action Plans for CENIO in conformity with the NWAP (2017-31). These Action Plans should identify the specific target groups and specific issues and tailor the awareness strategy accordingly. Help should be taken from suitable NGOs for developing and implementing such strategies. The Joint Forest Management Committees (JFMCs) and the Biodiversity Management Committees (BMCs) should also be involved in implementing these Action Plans. Publicity materials should be prepared for a specific target group or a specific issue in an appropriate language in consultation with the communication experts. The CZA should provide necessary guidance and support to the Zoos for this purpose.

B. An illustrative but not exhaustive list of 'Specific Target Groups' is given below:

1. Tribal groups indulging in traditional hunting or poaching.
2. Snake charmers and professional animal trappers
3. Farmers affected by human-wildlife conflict
4. Judiciary
5. Media persons
6. Political leaders
7. Elephant owners (Temples and individuals)
8. Livestock-owners and graziers
9. Tea estates / coffee estates on the fringe of forests
10. Mining industries in and around forests
11. Fishermen
12. Train drivers
13. Tourists
14. Tribal groups engaged in shifting cultivation

C. An illustrative but not exhaustive list of the 'Specific Issues' is given below:

1. Akhand Shikar (Tribal hunting) as practiced in Odisha, Jharkhand and South West Bengal.
2. Illegal wildlife trade
3. Cruelty to animals
4. Superstitions about medicinal properties of wildlife products
5. Forest fires
6. Grazing in PAs
7. Better agricultural practices to mitigate crop-depredation by wild animals
8. Better animal-husbandry practices to mitigate cattle lifting by carnivores
9. Protection of dolphins and turtles during fishing
10. Wild animal mortalities on railway tracks
11. Responsible tourism in PAs
12. Ill-effects of polythene
13. Ill-effects of herbicides

Timing: Preparation of Action Plans to start in 2017 and complete by 2018 (by 2024 for new NHMs). Implementation of Action Plans to start in 2018 and ongoing.

Responsibility: SFDs, Autonomous Councils, PAs, CZA, Zoos and NHMs.

1.9. The MoEFCC should, in collaboration with the SFDs, WII, CEE, CPREEC and suitable NGOs take up a project for compilation of case studies of conservation education from across the country. The experience gained through such case studies can be distilled into key learning points which will help in making effective strategies for future.

Timing: To start in 2017 and complete by 2019.

Responsibility: MoEFCC, SFDs, WII, CEE, CPREEC and selected NGOs.

2.1. It may be recalled that a major initiative for introducing EE in schools was taken by the MoEFCC in the late 1990s when it sponsored a country-wide survey by Bhartiya Vidyapeeth Institute of Environmental Education and Research (BVIEER) to assess the contents of EE in the school text books. The MoEFCC and the Ministry of Human Resources Development (MoHRD) should repeat the survey to assess the present status of EE in schools including quality of teachers and the text books. Further measures to improve the quality of formal EE in schools should be taken on the basis of this survey.

Timing: To start in 2017 and complete by 2019.

Responsibility: MoEFCC and MoHRD.

2.2. The CEE and the CPREEC should intensify their teacher training programmes to include as many schools as possible. The MOEFCC and SFDs should also seek collaboration with suitable NGOs to boost up training programme in EE for school teachers—particularly in the rural areas.

Timing: To start in 2017 and ongoing.

Responsibility: CEE, CPREEC and the selected NGOs.

2.3. The MoEFCC and the SFDs should also persuade the Corporate Bodies to sponsor EE programme in schools under CSR—particularly in rural areas, by improving infrastructure and providing study material. The MoEFCC and SFDs should also provide help to schools situated on the forest-fringe under eco-development programmes (EDPs).

Timing: To start in 2017 and complete by 2022.

Responsibility: MoEFCC, SFDs and the identified Corporate Bodies.

3.1. The MoEFCC, NNHM, CEE and CPREEC should intensify their existing programmes of informal EE like National Green Corps, National Nature Camping Programme, etc. for children and the youth—particularly those from the rural and tribal areas. The PAs should also chalk out excursions and camping programmes through the NICs for the children and youth from the forest-fringe villages. The Zoos and NHMs should chalk out special programmes for the children and youth from the urban areas. Construction of NHMs in all districts of the country as proposed in Para 1.8 is likely to boost up informal EE—particularly in the urban areas. The CZA should provide necessary guidance and support to the Zoos for this purpose.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC, NNHM, CEE, CPREEC, PAs (SFDs), CZA, Zoos and NHMs.

3.2. The MoEFCC should continue with its programmes like Green Haat, Science Express-Biodiversity Special (SEBS), etc. The SFDs should undertake similar programmes by setting up 'Green Stalls' in local fairs and mobile exhibitions on nature conservation on motor vehicles.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC and SFDs.

3.3. The CMS-VATAVARAN festivals on environment and wildlife have been quite effective in increasing nature-literacy—particularly among the urban population, and should be continued. The SFDs should organise similar festivals in districts in collaboration with the MoEFCC and the CMS.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC, SFDs and CMS.

3.4. The MoEFCC and SFDs should, in collaboration with the MoHRD and State Education Departments, promote EE in the adult-literacy programmes. Help should be taken from the CEE and CPREEC for developing suitable study material. The NHMs, NICs, Zoos and the NGOs engaged in adult-literacy programmes should be involved in promoting environmental awareness among the neo-literates. The CZA should provide necessary guidance and support to the Zoos for this purpose.

Timing: Preparation of study material to start in 2017 and complete by 2018.

Implementation to start in 2018 and ongoing.

Responsibility: MoEFCC, MoHRD, SFDs, State Education Departments, CEE, CPREEC, NHMs, NICs (SFDs), CZA, Zoos and selected NGOs.

3.5. It may be recalled that the four Natural World Heritage Sites (NWHS) in India, viz. Keoladeo NP, Nandadevi NP, Kaziranga NP and Manas NP have formed a network of NWHS Ambassadors, comprising mainly students from the nearby schools, to reach out to the neighbouring communities for enlisting their support for these PAs. Similar programme may be replicated in other PAs in the country with the support of the Corporate Bodies as a part of CSR.

Timing: To start in 2018 and ongoing.

Responsibility: MoEFCC, SFDs and Corporate Bodies.

4.1.A. As proposed in the previous NWAP, the MoEFCC should continue with the project to generate a body of copyright free and reliable conservation information and make it available on its website. It may seek collaboration with the CEE and CPREEC for this purpose.

Timing: Continuing from the previous NWAP and to complete by 2018.

Responsibility: MoEFCC, CEE and CPREEC.

B. The SFDs should also undertake a similar exercise in the state languages.

Timing: To start in 2017 and complete by 2019.

Responsibility: SFDs.

4.2. The MoEFCC and the SFDs should continue with the use of electronic media for CENIO and also explore the use of social media.

Timing: Continuing from the previous NWAP and ongoing.

Responsibility: MoEFCC and SFDs.

4.3. The Ministry of Information and Broadcasting (MoIB) and the Doordarshan should, in collaboration with the MoEFCC, set up an exclusive channel 'DD-Prakriti' for promoting awareness about nature conservation in the country.

Timing: To start in 2018 and ongoing.

Responsibility: MoIB, Doordarshan and MoEFCC.

XIII. Development of Human Resources

Overview and Objectives

1. Effectively managing the wildlife in and outside the Protected Areas (PAs) is a key challenge for biodiversity conservation in India. An expanding array of external threats continually tests the abilities of wildlife managers and professionals to maintain the integrity of the protected area units and systems for which they are responsible. Demand for resources for both subsistence and commercial use puts pressure on PAs in all over the country. Global-scale environmental change (e.g., climate change, desertification, invasive species) and localized catastrophic events (e.g., earthquakes, tsunamis, hurricanes, and typhoons) add further complexity to the task of ensuring a robust and resilient system of landscapes and seascapes devoted to conservation. Finally, there is an increasing recognition of the need to view PAs within the context of regional economic development and human livelihood concerns. All these factors taken together suggest that the modern wildlife professional must rise to the challenge of a truly integrated approach to management that applies principled decision-making based on the use of sound science from a wide range of ecological and social science disciplines. The need for an interdisciplinary, systems-thinking wildlife management paradigm that embraces complexity and promotes adaptation to changing conditions is illustrated in the context of PA management in India.
2. The vast PA network in India reflects an increasing recognition of the vast extent of globally significant biodiversity, endangered species, and unique landscapes present in the country. This network is juxtaposed with a very diverse mosaic of human communities that represents more than 17% of the world's population. Therefore, capacity building to enhance leadership skills and technical abilities for adapting to change in the global development context is required. In this context, there is a need for enhanced national and international collaboration in capacity development activities in India. Specifically, sharing the best practice experience among a suite of global partners and thereby enhance the ability of wildlife managers in India to develop appropriate responses to change
3. Ecosystems provide numerous benefits and services which are underpinned by biodiversity. Climate change has increased vulnerability and reduced resilience of ecosystems globally with potentially far reaching impacts on human well-being. There is, therefore, a need to foster a greater understanding of the links between biodiversity conservation, ecosystem services, climate change and other disasters risks to enhance leadership at a local and global scale.
4. Despite the tremendous ecological and economic importance and the existence of a policy and regulatory framework, India's wildlife and their habitats are still under threat. Numerous direct and indirect pressures

arising from different types of economic development and associated activities are having adverse impacts on wildlife and their habitats. Therefore, the challenging wildlife conservation scenario requires committed wildlife managers who possess the scientific competence and social awareness aided by communication skills. They also need sharp detection and enforcement capabilities against organised criminal elements nursed by big-money illegal trade. Accomplished wildlife biologists and social scientists are also necessary. Frontline staff equally must have similar skills at the grassroots level.

5. Although, the wildlife conservation and PA management in India have been strengthened in the recent past but still neglected in relation to other functions of forest management such as commercial plantation, extraction of timber and non-timber produce from forests. Fewer forest staff opt for wildlife training and postings. During the National Wildlife Action Plan 2002-16, a total of 158 officers in the rank of DCF/ACF could complete the Post Graduate Diploma Course in Wildlife Management in the Wildlife Institute of India whereas the 300 seats were available. Similarly, 175 officers in the rank of RFO could complete the Certificate Course in Wildlife Management against 300 seats. Although, the MoEFCC had fully sponsored the participations of these courses at WII still there were poor subscriptions of these courses largely due to a shortage of officers in the State or lack of interests among officers. Therefore, a premium on the right aptitude and commitment towards wildlife and nature must be recognised as key qualifications when recruiting and training staff, officers and volunteers.
6. People trained in wildlife must be given wildlife postings. Professionals dedicated solely to the protection of wildlife are crucial to achieving wildlife conservation objectives. At appropriate levels, skills for species and habitat recovery, landscape management, GIS and related technology must be imparted.
7. In India, there are multiple governance frameworks and structures that administer the coastal and marine environment. While these are intended to have positive outcomes, overlapping jurisdictions, contradictory mandates and limited coordination hinders multiple agencies from working effectively in managing coastal and marine biodiversity in India. Efforts are currently underway in securing and strengthening community participation in the management of the marine protected area network in India. However, Management Agencies in India are still having limited understanding about management of multiple use coastal and marine areas. Given this scenario, the challenge lies in reconciling livelihood needs and development *vis-a-vis* conservation. In this connection, capacity building programmes that would address these issues need to be institutionalized at WII, IGNFA and CASFOS so that coastal and marine biodiversity of India could be effectively managed.

8. Universities should initiate undergraduate and graduate courses in wildlife biology and EIA techniques. Wildlife Institute of India (WII) is the main training facility in order to train Indian Forest Service (IFS) and State Forest Service (SFS) officers as well as the Forest Rangers whose responsibility is to protect and manage wildlife in the States/UTs. WII should expand its mandate by training the trainers who build capacity in wildlife management and science in India. The frontline staff is trained in State-run forest training schools, only a few of which have exclusive programmes in wildlife management. The availing of WII's training programmes by States falls far short of their requirement and also WII's capacity. As a result, in a majority of States, officers not trained in wildlife management. Besides a shortage of trained officers, often there is little consistency in wildlife postings. Aberrations surface as short tenures on postings in PAs as well as posting of available trained officers on non-wildlife jobs. The paucity of officers and funds are a major stated reason for under-utilisation of WII's training programmes. This is also the reason for inadequate training facilities in States for frontline staff. A real cause for this deficiency is the continuing low priority assigned to the forestry sector in States, and within the forestry sector to the wildlife sub-sector, despite the critical role that these have in the security of soil, water and biodiversity.
9. The issue of appropriate priority to forestry at the State level, as well as to wildlife within the forestry sector, needs to be urgently addressed in conformity with the National Biodiversity Action Plan and National Biodiversity Targets. Likewise, the integration of forest and wildlife management and rural development is essential and the initiative for this must come from the forest-wildlife sector. It is clear that the efficiency of wildlife management in India has improved but the further improvement in this sector would greatly depend upon the professional quality of personnel and a meaningful personnel policy.

Action Required

1. Review and strengthen the existing mechanisms for recruitment, training and career development of wildlife managers and to strengthen and sustain a professional wildlife cadre.
2. Give thrust on the current and fresh capacity building efforts, with a special focus on WII, shall need to sharply focus upon the scientific and human aspects of the present requirements of field conservation.
3. Undertake awareness programmes for personnel of other departments/services whose work has a bearing upon forest and wildlife conservation.
4. Strengthen and establish wildlife training centres or State Forest Research Institutes at the State level for training frontline staff including those posted in PAs.
5. Providing exclusive capacity building programmes for the management of Coastal, Marine and other wetland PAs.

6. Enhance the welfare of the frontline staff and their families.
7. As suggested in Chapter XI (People's Participation in Wildlife Conservation), action is required to build up capacity of the wildlife managers as well the local people to work together for wildlife conservation.
8. As suggested in Chapter XII (Conservation Awareness and Outreach), action is required to build up capacity of forest officers of various ranks—particularly those working in TRs, PAs and Autonomous Councils; faculty members of State Forestry Training Centres; education officers of zoos; and candidates interested to serve as nature guides in zoos, PAs and NICs in Conservation Education, Nature Interpretation and Outreach (CENIO) techniques.

Priority Projects

- 1.1 Review and improve the existing personnel management policies of India.

Timing: To start in 2017 and complete by the year 2020.

Responsibility: MoEFCC, SFDs.

- 1.2. Country-wide database for wildlife-trained officers to be maintained by MoEFCC and at State level by the CWLW. MoEFCC will monitor and constantly pursue with States, linking if necessary, the flow of Central assistance in the entire forestry sector with such compliance.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC and SFDs.

- 1.3. A substantial proportion of wildlife existing outside PAs is managed by the territorial Divisional Forest Officers (DFOs) and Conservators of Forests (CFs). The CWLW should be authorised to make entries in the annual Performance Appraisal Reports of all the territorial DFOs and CFs in the State / UT as regards their role in managing wildlife.

Timing: Orders to be issued by 2018.

Responsibility: SFDs.

- 2.1. Upgrade syllabi of WII's training programmes (Diploma, Certificate and M. Sc.) to cover conservation of the full range of biodiversity. Aspects on which strengthening is required are:

- ❖ Conservation of wildlife in connection with climate change and other natural disasters.
- ❖ Conservation of lesser known and small fragmented populations including corridor revival.
- ❖ Techniques for conservation and recovery of threatened species.
- ❖ Habitat amelioration and on-ground invasive species management.

- ❖ Application of modern IT techniques in wildlife management including use of GIS in combination with remote sensing.
- ❖ Ensuring people's participation in planning and implementation of PA management plans and PA sponsored ecologically sound rural development schemes. Also include local community participation and benefits from well-organised ecotourism.
- ❖ Use of people-participatory management zoning as a tool for integrating wildlife conservation with rural development on a landscape scale.
- ❖ Human-animal conflict mitigation and damage control based on case studies.
- ❖ Integrated management of coastal and marine PAs and biodiversity.
- ❖ Case study-based demonstration that forest and wildlife conservation and ecologically sound rural development are mutually complementary.
- ❖ Techniques developed from ethnic knowledge for use in wildlife management, based upon prior investigations.
- ❖ Developing capacity in trainees to find and harness ethnic knowledge in developing IPRs to benefit local communities.
- ❖ Wildlife protection in the face of current threats including carriage and use of fire arms in dealing with poachers as well as intelligence based action against mafia involved in poaching for illegal trade. Collection of samples for forensic investigations, procedures for arrests, seizures and effective prosecution and liaison with enforcement agencies should also be built in.
- ❖ Integration of National and International Policies and Laws.

Timing: To start in 2017 and complete by the year 2020.

Responsibility: MoEFCC and WII.

2.2. MoEFCC should resume schemes for providing 100% central assistance for capacity building programmes for the PA managers at the WII and the frontline staff at the State Training Centres;

- ❖ Adequate grant placed with WII to fully meet the cost of training at Diploma (IFS and SFS) and Certificate (Rangers) levels, so that lack of funds does not stand in the way of States/UTs deputing required number of trainees.
- ❖ Increase the number of Sh Hari Singh Fellowship so that more young probationers would avail the Advanced Diploma Course at WII.
- ❖ 100% incremental Central assistance to States in strengthening infrastructure and training staff at state forestry training institutions for undertaking full-time training of frontline staff in wildlife management and allied people issues. WII should assist in developing syllabi and training of trainers.

Timing: To start in 2017 and complete by the year 2019.

Responsibility: MoEFCC and WII.

3.1. WII, IGNFA, CASFOS and IIFM to conduct annual workshops for District Collectors, Fisheries Officers, rural development and enforcement personnel, as well as legislators and NGOs in methodologies for biological diversity conservation, landscape level integration of development and PA management, control of poaching and illegal trade in flora and fauna. Their thrust is to be upon values and benefits of sound conservation and responsible use of natural resources for the sustenance of agriculture, animal husbandry and fisheries. Conservation ethos of traditional practices should be recalled for disciplining the current overuse. Modalities of reorienting rural development and allied activities so as to be compatible with forest and wildlife conservation would need to be demonstrated. Case study based deliveries should convince participants that this is possible and that it would also benefit local people.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC, SFDs, WII, IGNFA, IIFM, CASFOS.

4.1. Provide a mandatory 3-5 days training followed by a periodic refresher, at each PA level, covering all aspects of PA Management as well as Management Plans (including eco-development plan, eco-sensitive zone plan and any other plan like eco-tourism, heritage, local development and others as the factual position be) is required to be conducted for each and every staff/ officer up to PA in-charge. CWLW or PA in-charge should organize with PA personnel & local resource persons of GOs & VO. This PA Orientation Training needs to be appropriately included for finance & other resources required into an annual action plan and budget of PA concerned.

Timing: To start in 2017 and complete by the year 2020.

Responsibility: MoEFCC, SFDs, WII, State Forestry Training Centres, suitable NGOs.

4.2. Strengthening the capacity of local institutions to provide required technical inputs to PAs authorities especially assessment and monitoring of wildlife inside PAs is required. Further, linkages between these local institutions and PAs need to be strengthened and appropriate funding supports to these institutions needs to be provided in the management plans of respective PAs.

Timing: To start in 2017 and complete by the year 2020.

Responsibility: MoEFCC, SFDs, WII, State Forestry Training Centres, suitable NGOs.

5.1. Provide exclusive capacity building programmes for the integrated management of Coastal, Marine and other wetland Protected Areas in India. Short-term courses in every year targeting both ACF/DCF level officers (one week), CF/CCF/APCCF level officers (one week) and RFO level frontline officers (three weeks) with scuba diving skills.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC, WII, IGNFA, CASFOS.

5.2. Build capacity to promote the integrated and sustainable management of coastal and marine biodiversities inside and outside PAs.

Timing: Initiate in 2017 and to continue

Responsibility: MoEFCC, SFDs, WII, CMFRI, NCSCM, BOBP and suitable NGOs.

6.1. Formulate and implement welfare schemes for the frontline staff and their families, particularly with regard to proper housing, education and health. Devise appropriate insurance schemes to deal with mortality / disability of frontline staff in the course of their duty.

Timing: To be initiated by 2020 and to continue.

Responsibility: MoEFCC, SFDs.

7.1. Build up the capacity of the officers and staff of the SFDs and Autonomous Councils; functionaries and members of JFMCs, FDAs, Forest Villages, *Vana Panchayats*, *Gram Sabhas* and Local Bodies; HWLWs; forest right-holders and other stakeholders to work together for wildlife conservation through formal training courses and informal orientation/sensitisation programmes.

- A. The WII, IGNFA, CASFOS and all Forestry Training Centres should include / strengthen courses on community participation in forestry and wildlife management in their regular training curriculum for the freshly recruited officers and field staff of various ranks (including those under the Autonomous Councils) and also organise regular refresher courses for the serving officers and field staff. These training programmes / refresher courses should, in particular, be designed to develop skills in the use of PRA techniques for micro-planning; formulation of EDP including EIA & SIA; management of relocation and rehabilitation projects; effective communication; conflict resolution; inter-departmental co-ordination; networking and fund-raising; etc.
- B. The State Forestry Training Centres should organise short-term training programmes for the HWLWs; non-official members of advisory/management committees of PAs; functionaries of JFMCs, FDAs, Forest Villages, *Vana Panchayats*, *Gram Sabhas* and Local Bodies; and managers / owners of wildlife habitats not under the administrative control of the SFDs. An illustrative but not exhaustive list of topics for the proposed training programmes is given below:
- Duties and responsibilities of HWLWs

- Protection of wildlife against poaching, illegal trade, electrocution, poisoning, cattle-borne diseases, etc. (including procedure for seizure, arrest and prosecution under the WPA-1972)
 - Introduction to relevant provisions of laws (e.g. IFA-1927, WPA-1972, FCA-1980, BDA-2002, PESA-1996, FRA-2006)
 - Information about relevant government orders and schemes for the benefit of the local communities [e.g. usufruct-sharing for JFMC members, ex-gratia relief for victims of HWC, subsidies for SHGs, marketing support for NTFPs, insurance schemes for tribals/ farmers / livestock owners; rewards / honours instituted by the MoEFCC and SFDs; public grievance-redressal system of the SFD including authorities appointed under the RTI Act, 2005; etc.]
 - Management of eco-development and eco-tourism projects
 - Basics of Micro-plans / Working Plans/ Management Plans / PBR
 - Management of HWC [including legal provisions, Standard Operational Procedures (SOPs), maintenance of barriers/fences, alternative cropping and community crop-guarding]
 - Responsible and sustainable exercise of Forest Rights
- C. The SFDs should, with the help of suitable NGOs and scientific institutes, organise combined orientation/sensitisation programmes for the field-level forest staff and members of JFMCs, FDAs, Forest Villages, Vana Panchayats, Gram Sabhas and Local Bodies as well as forest right- holders and other groups of stakeholders. Such programmes should be conducted in PAs and forest divisions as frequently as possible on suitable topics, including those mentioned in Para B above. The sensitisation programme can also be carried out through study-tours to the model sites of community participation within the State and adjoining States.

Timing: Continuing from the previous NWAP and ongoing.

Responsibility: SFDs, WII, IGNFA, CASFOS, Forestry Training Centres, suitable NGOs and scientific institutes.

8.1. The WII should organise capsule courses on CENIO for senior forest officers—particularly PA managers, and education officers of Zoos. The WII should also include CENIO in its diploma and certificate programme on wildlife management. The CZA should provide necessary guidance and support to the Zoos for this purpose.

Timing: To start in 2017 and ongoing.

Responsibility: WII, SFDs, CZA and Zoos.

8.2. The WII should, in collaboration with the CEE and CPREEC, develop course contents and reading material for short term training programme on

CENIO for subordinate forest officers of different ranks and a certificate course for the Nature Guides. The WII should also organise capacity building programmes for the faculty members of State Forestry Training Centres to enable them to conduct the aforesaid training programme and certificate course.

Timing: To start in 2017 and complete by 2020.

Responsibility: WII, CEE, CPREEC and State Forestry Training Centres (SFDs).

8.3. The State Forestry Training Centres should, with the help of the WII, CEE and CPREEC, organise short term training programmes on CENIO for the subordinate forest staff—particularly the staff of TRs, PAs and Autonomous Councils, and certificate courses for the candidates interested in pursuing a career as a Nature Guide in a TR, PA or a Zoo. The CZA should provide necessary guidance and support to the Zoos for this purpose.

Timing: To start in 2018 and ongoing.

Responsibility: SFDs, Autonomous Councils, State Forestry Training Centres, Zoos, CZA, WII, CEE, and CPREEC.

XIV. Strengthening Research and Monitoring

Overview and Objectives

1. With the reduction and fragmentation of natural habitats resulting in increased stress on ecosystems and plant and animal populations, there is an urgent need for formulating conservation strategies and management plans for the target species and PAs backed by sound scientific research. Climate change and recurring extreme weather events have added new dimensions to the problems in the form of habitat alteration, prevalence of diseases, rapid spread of alien invasive species (AIS) and forest fires (Corlett 2012, IPCC 2014,). This calls for in-depth research on all endangered, keystone, flagship, and umbrella species of wildlife and their habitats so as to so as to develop long term conservation strategies. Scientific research allows us to generate reliable knowledge to address the range of issues confronting the management, monitor their effectiveness and take mid-course corrections, if needed. Broad areas of research that would be relevant for conservation and management of wildlife, PAs and various habitats include population ecology, community ecology, ecosystem ecology including flow of goods and services, landscape ecology, animal behaviour, evolutionary biology, biogeography and biodiversity, taxonomy, conservation biology and genetics, wildlife health, restoration ecology, human ecology, eco-toxicology, ecological history, natural resource management and ecological economics.
2. Need for focussed and organized research and long term monitoring of wildlife populations and their habitats has been felt in the country since early 1980's as articulated in various policy documents and first National Wildlife Action Plan (NWAP). During 1980's most of the wildlife research in the country centred around natural history and ecology of a few endangered and charismatic species. The scope of wildlife research since then has broadened considerably to encompass all wildlife, their habitats, interaction with humans and the ecosystem processes at local as well as landscape levels covering a wide range of themes including animal-habitat interactions to ecosystem functioning, evolutionary processes and molecular biology. The decade of 1990 and 2000 also saw a steady increase in the number of institutions both government and non-government undertaking wildlife research in the country. An urgent need was felt for formation of a national Wildlife Research Coordination Committee (WRCC) in order to prioritize, monitor and coordinate research in the country (NWAP 2002-2016). In

addition, several areas of research were identified during the previous plan period, viz., Patterns of species diversity in various ecosystems; Populations of endangered species and their habitats; Valuation of ecosystem services flowing from the PAs including watershed functions especially ground water recharge and flood and draught mitigation; Dissemination of scientific research on wildlife species; Resource use pattern of indigenous ethnic communities and traditional ecological knowledge of such communities in and around PAs so as to develop access and benefit sharing mechanisms; Develop and standardize methodologies for disease surveillance, epidemiology of wildlife; Study the impacts of developmental projects on wildlife and their habitats; Identify critical corridors between the present and proposed PAs especially for the movement of large mammals such as Asian elephant, tiger and other species. The 2nd NWAP also recommended that each PA manager should prepare research priorities for the concerned PA, which was to be mainstreamed in the respective State Wildlife Research Plans and priority projects were to be funded partly or fully by the GOI.

3. During 2002–2015, a considerable ecological information has been generated on selected species such as Asian Elephant (population status, corridors and conflict cases), Tiger (decline and rise of populations, conservation genetics), Great Indian Bustard (population trends and habitat use) to name a few. However, very few studies have been done in the area of valuation of ecosystem services from the PAs, watershed functions and soil moisture regimes. A few states such as M. P., Gujarat and Rajasthan have initiated mechanism of disease surveillance and epidemiological investigation with technical support from WII. MoEFCC (2006) has prepared guidelines for conducting research on wildlife in PAs with a view to generate scientific knowledge, both for its own sake and in order to formulate conservation planning for the target species and ecosystems. A few well established PAs such as Kaziranga, Corbett, Kanha and Periyar have identified priority areas of research. However, in most of the Pas there is a lack of adequate funding and institutional mechanism to execute research. Also, there is a need to prepare a complete review of the research done during the 2nd NWAP period, flag the key findings in the form of state of the art report on the selected species and their habitats, and implications for conservation to be disseminated among the PA managers and conservation agencies.
4. Efforts at long term ecological monitoring in the wildlife areas / PAs are rather few in the country. One of the best examples of long term monitoring is in the 50 ha vegetation monitoring plot in Nagarhole NP by the Indian

Institute of Sciences (Sukumar et al., 1992). In other areas (e.g., Great Himalayan National Park, HP), Kanha and Melghat Tiger Reserve such initiatives have been taken up. Uttarakhand Forest Department, in collaboration with various national research organizations has been executing a 'Decadal Monitoring' of wildlife species and their habitats since 1982. However, in most of the PAs monitoring programmes have not been fully operationalized due to lack of institutional mechanism.

5. Although, there has been a rapid advancement in the tools and techniques for conducting ecological research, high quality research is possible even without sophisticated infrastructure or instrumentation. In addition to advanced research on various species, basic information and knowledge is required on little known species, ecosystems and priority landscapes for conservation planning and future monitoring. Some of the basic steps required in this direction are as follows:
 - a) Set up a network of weather monitoring stations across various eco-climatic zones within representative PAs and maintain databases on basic parameters such as temperature, humidity, precipitation, and solar radiation.
 - b) Develop a web-enabled National Wildlife Information System (NWIS) giving the regular updates on the PA coverage, status of the species and habitats.
 - c) Publish large scale maps showing soil types, drainage, vegetation types, land use and land cover in and around PAs.
 - d) Map distributions of selected species of plants and animals, such as dominant, endangered, endemic, invasive or otherwise of ecological and conservation importance.
 - e) Determine the abundance or relative abundance of target species of plants and animals, and initiate long term environmental monitoring.
 - f) Document the effects of management interventions such as habitat restoration and enhanced protection on populations of target species, and their habitats.
 - g) Assess the ecosystem services from the PAs, patterns of service flow and dependence of local communities on these services. Develop management strategies for reducing park-people conflicts and sustaining services.

Action Required

1. The National Wildlife Research Coordination Committee (NWRCC), visualized for the 2nd NWAP period, needs to be constituted with the revised mandate of reviewing the research outputs, information gaps and prioritizing areas of further research. This committee may also suggest financial requirements for wildlife research in the country and review the existing guidelines (MoEF 2006) for conducting wildlife research through wider participation of scientists across various disciplines and scientific institutions in the country. There is a need to bring out regular update on the conservation status of endangered species and their habitats.
2. All States / UTs need to set up Wildlife Research Advisory Committees (WRACs) and come up with the priority areas of research – both basic and applied relevant for the state. The Research Wings of the State Forest Departments (SFDs) should set up baseline data on the land use land cover, vegetation types and commission ecological studies focussing on distribution of key faunal species, status of wildlife habitats, vegetation types, human ecology and other topics directly relevant to management of PAs.
3. Bring about reforms in the review process and improve transparency pertaining to Environmental Impact Assessments (EIAs) of developmental projects and land use changes in the country. Impact assessment approaches should be refined to capture 'big picture' of impacts from multiple projects and on a regional level and larger contiguous landscapes including wetlands and wildlife habitats. Sector level impact assessments must replace EIAs of projects in key sectors such as energy (specially hydro and nuclear power), mining, transportation and coastal development where strategic planning would be more relevant to avoid impacts and discourage efforts of patchwork mitigation of impacts of individual projects.
4. Develop institutional mechanism to monitor the populations of endangered species and their habitats in all biogeographic regions of the country. The new initiative by the MoEFCC on the Long Term Ecological Observations (LTEO; Anonymous 2015) should be linked with wildlife research and monitoring covering multiple sites and PAs.

Priority Projects

- 1.1 Publish a State of the Art report on the wildlife research in the country giving key findings and conservation implications, information gaps and priority areas of research.
Timing : Initiate in 2017 and publish by 2018.
Responsibility : WRCC, Scientific Institutes, MoEFCC.
- 1.2 Finalize and publish guidelines for conducting research in wildlife areas in the country.
Timing : Complete by 2017.
Responsibility : WRCC, MoEFCC.
- 1.3 Allocate more financial resources for wildlife research and monitoring for priority areas of research.
Timing : Initiate by 2017 and continuing.
Responsibility : MoEFCC and SFDs.
- 1.4 Review and amend Wildlife (Protection) Act of 1972 appropriately to encourage and facilitate research and monitoring within the PAs. Amendments to the Act are needed whereby scientific research is recognized as important, desirable and integral activities in PAs and other natural habitats.
Timing : Complete by 2017.
Responsibility : MoEFCC and SFDs.
- 2.1 Set up Wildlife Research Advisory Committee (WRAC) in each State / UT so as to streamline and prioritize wildlife research in the State / respective PAs.
Timing : Complete by 2017.
Responsibility : SFDs (Wildlife Wings)
- 2.2 Strengthen State Forest Research Institutes in the area of wildlife research and monitoring.
Timing : Initiate by 2017 and to be continued.
Responsibility : State Forest Research Institutes backed by National Research Institutes such as WII.
- 2.3 Build capacity of frontline staff of various PAs in collection of basic data on wildlife populations, use of modern tools, sample collection, identification of flora and fauna.
Timing : Initiate by 2017 and to be continued.
Responsibility : SFDs, WII, Scientific Institutes & Training Institutes.

- 3.1. Set up of an independent National Environment Appraisal and Monitoring Authority (NEAMA) to bring about reforms in the review process and improve transparency pertaining to Environmental Impact Assessments (EIAs) of developmental projects in the country. NEAMA should also monitor the compliance of necessary mitigation measures.

Timing : Complete by 2018.

Responsibility : MoEFCC.

- 3.2. Commission a study on the impacts of various industries, mines and other developmental projects on the wildlife habitats including wetlands, eco-sensitive areas and movement of endangered species and suggest mitigatory measures.

Timing : Initiate in 2017 and complete by 2020.

Responsibility : MoEFCC

- 4.1 Strengthen the long term ecological monitoring activities initiated in a few PAs / Tiger Reserves by allocating more financial and human resources to such programmes.

Timing : Begin in 2017 and to be continued.

Responsibility : MoEFCC; SFDs; WRACs

- 4.2 Train frontline staff of various PAs, Para-taxonomists and volunteers in recording basic data on species (identity, presence/absence), phenology of plants, habitats, wildlife health, AIS, occurrence and intensity of fire and climatic variables.

Timing : Begin in 2017 and to be continued.

Responsibility : SFDs (Wildlife Wings), WII, Scientific Institutes and Training Institutes.

- 4.3 Develop institutional mechanisms to carryout long term ecological monitoring and effects of conservation initiatives on the species and habitats.

Timing : Begin in 2017 and to be continued.

Responsibility : SFDs; Scientific and Training Institutes.

XV. Improving Compliances with Domestic Legislations and International Conventions

Overview and Objectives

1. Legislations and international conventions provide an enabling environment for implementing and evolving policy and the programs either through government interventions, or by providing scope of non government interventions or by regulations.
2. Wildlife conservation is closely linked to a few basic components of the national economy *viz.* land, water, ecosystem services and climate regulation, biodiversity, livelihood and also food security. Therefore, recognition of the imperatives of forest conservation and that of wildlife as an integral part of the national economic development should be the thrust of the legislations and global interactions of the country.
3. While legislative evolution is a larger part of the governance, a pragmatic implementation of the Acts and flagging of the concerns of conservation are the matters to be looked into by the government. This is more relevant when forest and wildlife conservation has a large range of stakeholders.
4. Participation in various global platforms on sustainable development, conservation of biodiversity and sustainable use of bioresources also puts responsibility on domestic legislations for facilitating achieving of the global objectives. Not only legislations, but implementation mechanisms also need to be oriented towards these objectives.
5. In this context, this Plan proposes strengthening the legislative mechanism for providing “protection” to ecologically viable habitats outside PAs for facilitating the most ancient processes of biological evolution and close interface for international agreements.

Action Required

1. Review of the Wildlife (Protection) Act, 1972 (WPA-1972), and related laws is needed in order to provide for a clear and comprehensive way for not only conservation of wild life but also protection and regulations related to sustainable management and use. This should inter alia include review of schedules, legal provisions enabling wildlife managers to be associated with regional planning outside the PAs for pursuing landscape approach participation of the people.
2. Integration of important international conventions such as CITES, RAMSAR, CMS, CBD etc. with the existing wildlife and environmental Laws. India is party to several conventions and has also entered into MoUs with a number of countries on several other cross-border issues of conservation. The mechanism for advising the MoEFCC, NBWL or other statutory agencies on these issues may be strengthened by putting in place subject-specific technical groups of advisors. This will help in evolving science and

knowledge-based national strategies and decisions on matters of global importance.

3. Harmonization of the wildlife and other related laws. Environmental laws are largely regulatory laws while the forest and wildlife laws cover not only regulations, but also provide for enabling environment for management of forest and wildlife areas. By and large environmental regulations have inherent arrangements for environmental appraisal of activities covered, and this includes impact on flora and fauna. The provisions are, therefore, to be seen as complementary to Forest and Wild Life laws. In such circumstances, mechanisms for regulations in the wildlife laws need to be factored into processes for environmental regulations.

Priority Projects

- 1.1. Review of the WPA-1972 should be completed with inter alia, restructuring of the schedules to suit the regulatory provisions related to capture/handling and trade of species based on precautionary and fair trade principles, participation of communities and equitable sharing of benefits of conservation between public (government) and local communities.
- 1.2. Provide for legal mandate within the forest/ wild life laws to enable interaction of forest/ wildlife managers with forest fringe populations and local democratic institutions in local development policies and plans so that the area development planning takes into account conservation concerns, ecosystem services and benefits from the economic opportunities available from the forests.
- 1.3 Make provision in the Wildlife Act for identifying the areas of extended habitats and migratory routes (buffers and corridors) of species based on scientific studies, and for regulating activities in such landscape elements to ensure compatibility with the conservation values, in close consultation with the people.

Timing: Complete by 2018.

Responsibility: MoEFCC.

- 2.1. Provide for appropriate provisions for CITES in the new WPA so that the violations of the conventions are tackled by the forest authorities within the WPA.
- 2.2 Initiate action plans and implementation thereof in respect of all the agreements entered into with respect to Convention for Migratory Species (CMS) like Raptors, Marine Turtles, Dugong, Siberian cranes and various flyways,.

- 2.3 For all the global conventions, set up technical advisory groups at national level for advising the government on the deliberations.

Timing: To be completed by 2020.

Responsibility: MoEFCC, SFDs and Scientific Institutes.

- 3.1. Provide for mandatory Biodiversity Impact Assessment for all the activities (in addition to those notified in Environment clearance notification) in the vicinity of forests/ PAs, which may have impact on forest/ wildlife ecosystems, at all regulatory levels ranging from local body to national EIA Authorities, implemented under Environment Protection Act.

Timing: Initiate by 2017 and continuing.

Responsibility: MoEFCC (the set up of implementation of EAct)

- 3.2. Establish a database capturing all individual and community rights in forests as well PAs for documentation of forest rights under the Forest Rights Act 2006 so that the processes of notification of PAs and activities like relocation of villages are not hampered by the legal prerequisite.

Timing: To be set up by 2017 and continuing.

Responsibility: MoEFCC and SFDs.

- 3.3. Present model of declaration of Ecosensitive zone around PAs under EPA-1986 should be reviewed to take into account ecological imperative for identification of area and role of forest managers in implementing the regulation. Separate rules should be formulated for identification including criteria for declaration and activities to be regulated/prohibited in such identified zones, in accordance with the recommendations of the NBWL.

Timing: To be completed by 2020.

Responsibility: MoEFCC and SFDs.

XVI. Ensuring Sustained Funding for Wildlife Sector

Overview and Objectives

1. Conservation of Wildlife and its habitat plays an important role in maintaining ecosystem services that are pivotal to human survival, and economic and social development of the country. People, businesses and industries all rely on ecosystem services for their wellbeing and development and would stand to incur significant costs and losses if they are degraded. Therefore, fund resources should not be a constraint for the conservation in the socio-economic interest of people in India. However, Conservation action in general and protected area management in particular has been facing far less financial support than required in terms of the needs of the country as envisaged in the global commitments on conservation and management requirement for sustainability of the forest resources.
2. Traditionally largely supported by the central initiatives in terms of financial investment, wildlife conservation sector needs expanding resource base. With more restrictions within and around PAs on tangible benefits, short term economic returns diminish, making it more difficult to attract investment.
3. Fourteenth Finance Commission has now integrated the state of forests (and wildlife) with the overall eligibility criteria for devolution of central tax revenue resources to the states. In addition to enhancement of the share of the states to 42% from earlier 32% in allocation of total central resources, the state of forests has been taken as a new criterion with a weightage of 7.5%. This implies that the states not only get more untied funds from the central tax revenue, but those with more and better forests also get larger share of central resources. This though leaves the power of allocation of these additional untied resources to the sector with the states.
4. In the meanwhile, a few extra budgetary resource mobilisation attempts being made at policy level include participation of corporate sector for specific conservation initiatives like species recovery programmes, private investment in forestry, tourism in case of wild life / nature tourism sector, and sustainable forestry in degraded forests. Such model however is not being contemplated for protected area management.
5. In many States, as a policy, the fees collections from tourists visiting PAs are permitted to be ploughed back and varied mechanisms have been adopted for this purpose. One such important mechanism is that of the Tiger Conservation Foundation provided for the Tiger Reserves in the WPA-1972. In view of the fact that very few PAs have been attracting nature enthusiast tourists and income from gate fees are meagre, viability of this option depends upon investment for upkeep of tourism values and appropriate publicity thereof.

6. Improved support for conservation activities in the state budgets can improve now while higher proportion of the cost of building infrastructure is being borne in the central government in most of the development needs of the country.
7. In the aforesaid scenario, the actions and priorities for mobilisation of resources will be needed to be looked into in a new perspective. It is essential to articulate the strength of long term measures in ensuring the resilience of forest resources, which is essential for economic well-being arising from the factors like ecosystem services, non-invasive benefits like nature tourism, sustained flow of life support benefits for local communities and richness of genetic repositories.

Action Required

1. For developing justification for seeking adequate funds for conservation of forests and wild life, it is urgently needed to launch a robust economic analysis study programme with support of scientific facts highlighting the indispensability of the forest as the basic requirement for maintaining ecosystem services, in terms soil protection and regeneration, cleansing of water for food security, health and economic well-being of the country.
2. The valuable assets with potential of economic returns like PAs with tourism potential and those with high tourist pressure should be dealt on priority with the available funds so that eco tourism is optimized to achieve not only appropriate sensitization of public on nature's contribution to economy, but also for sustaining the value of tourism for contribution to the management by plough back arrangements.
3. Further, as an approach to integrating the wildlife/ biodiversity conservation into the corporate economy, feasibility of participation of private sector in conservation needs to be explored. Possible areas in this can be integration of conservation oriented practices in the natural resource related corporate activities, investment in economically viable forest/ wildlife conservation actions expected to provide returns that might be already planned in government sector, corporate environmental responsibility and support for targeted conservation campaigns.
4. Scope of investment from extra budgetary sources like CAMPA fund, community development programmes, plough back of the entry fees to protected areas and zoos, sponsorship from the interested enthusiastic individuals/ organisations, corporate participation in management with appropriate cost benefit and safeguards be explored by working on policy and mechanisms for such investment streams.

Priority Projects

1.1. Launching a landscape based–economic valuation study based on the relationship between the human development activities like agriculture, industry, air quality, water quality etc. and PAs/ forests. This must include value and importance of genetic resources for scientific research for improvement of quality of life.

Timing: To be initiated by 2017 and to continue.

Responsibility: SFDs.

1.2. Demand of allocations for optimisation of forest frontline staff establishment and their capacity building for robust performance in order to realise the economic potential of the PAs should be taken up on priority with the State Governments independent of annual allocations.

Timing: To be initiated by 2017 and to continue.

Responsibility: SFDs.

2.1 The natural and other tourism attractions of the PAs (and other forests) other than those popular at present as tourist destinations should be publicised to broadbase the nature tourism management so that the tourism value of the wild life and forests is utilised for linking pleasure with awareness and sensitisation of the people; visitation of tourists is spread out and carrying capacity of a few presently popular overflowing destinations is not jeopardised. This will also augment resource mobilisation if coupled with plough back policies. Safeguards like avoiding infrastructure development in immediate vicinity or within such areas shall though, be a prerequisite.

Timing: To be initiated by 2017 and to continue.

Responsibility: MoEFCC and SFDs.

2.2 All the public awareness related assets in the States like Van Vigyan Kendras and NICs should be renovated and refurbished for establishment of a network for awareness about economic potential of wildlife and forests.

Timing: To be initiated by 2017 and to continue.

Responsibility: MoEFCC and SFDs.

3.1. Develop a strong capability within the forest staff for dealing with community development programmes like employment generation programmes, tribal sub plans and area development programmes to tap resources for building environmental assets like eco-development around PAs, non invasive job opportunities for the villagers from the forests/ PAs, improvement of habitats for supporting air, water and soil regimes. Policy decisions should be emphasised for earmarking funds under such programmes in forestry sector proportionate to the land area under forests/ PAs.

Timing: To be initiated by 2017 and to continue.

Responsibility: MoEFCC and SFDs.

4.1. Policy options may be assessed for corporate partnership in management of wildlife in forest areas other than PAs, which have potential but could not be developed because of resource constraints (e.g. provision of safaris in the buffer zones of Tiger Reserves). Appropriate checks and balances and precautions for protection of interests of the communities will be key challenges in this area.

Timing: To be initiated by 2017 and to continue.

Responsibility: MoEFCC and SFDs.

4.2. Set up rules and procedures for ploughing back entry fees of PAs for management, sponsorship for wildlife conservation from interested agencies/ individuals, mechanism for parking and management of funds thus received – like Foundations of Tiger Reserves, institutional structure for enforcing and accounting of fiscal levies on the enterprise based on wild life tourism, statutes for supporting such steps, integration of CAMPA funds in Annual Plans of Operations (APOs) of the PAs and areas outside PAs identified as corridors etc.

Timing: To be initiated by 2017 and to continue.

Responsibility: MoEFCC and SFDs.

XVII. Integrating National Wildlife Action Plan with other Sectoral Programmes

Overview and Objectives

1. In India, there are multiple governance frameworks and structures that administer the various ecosystems including coastal and marine. While these are intended to have positive outcomes, overlapping jurisdictions, contradictory mandates and limited coordination hinders multiple agencies from working effectively in managing wildlife and their habitats in India. Efforts are currently underway in securing and strengthening community participation in management of the protected area network in India. However, Management Agencies in India are still having limited understanding about management of multiple use areas. Given this scenario, the challenge lies in reconciling livelihood needs and development *vis-a-vis* conservation. In this connection, it is important to integrate the National Wildlife Action Plan with sectoral programmes of other ministries and departments.
2. With the emphasis in this plan on landscape approach to conservation as the basic tenet of wild life action, more often than not the actions related to economic activities in the vicinity of forests have a bearing on all economic as well as social sectors. In these circumstances, cross sectoral coordination becomes imperative for success of all aspects of sustainable development.
3. Therefore, harmony among the National Development agenda, National Biodiversity Conservation Strategy, and the National Wildlife Action Plan is an imperative and not a choice. These three, along with other related Action Plans, must be recognised as vital national developmental priorities.
4. In context of AICHI Targets, the road map for implementation of the new NBAP involves the MoEFCC and 23 Ministries/Departments of the GOI that have been identified for achieving the National Biodiversity Targets. A coordinated approach with sustainability of the development and state of natural resources therefore will be a focus of wildlife conservation action in this plan period.

Action Required

1. The mandates of various ministries and other sectoral institutions, wherever relevant in context of NWAP, should be highlighted, pointed out and monitored at the national level. An appropriate mechanism for ensuring effective coordination among these mandates for the benefit of conservation needs to be set up in the MOEFCC.
2. Mainstreaming conservation concerns of biodiversity into sectoral strategies, plans and programmes particularly of the sectors dealing with natural resources would benefit both wildlife and human well-being.

Production sectors such as agriculture, fisheries, forestry, infrastructure, fossil fuel extraction industry, tourism etc. and the people depending on these sectors need to be involved in accounting for the impact on and of wildlife and redressal thereof, at the planning stage and integrating conservation action including sustainable use in their activities.

3. Regular consultations should be initiated with decision maker level stakeholder groups like Members of Parliament, State legislators, parliamentary and legislative committees, various Ministries, State Boards of Biodiversity, organisations like NHAI, Railways, Urban development organisations, defence organisations etc. on the economic importance of protecting and sustainably using, the forest and wild life resources and habitats. Similarly, briefing sessions should be held with Chief Ministers, Finance Ministers, Home Ministers and Agriculture Ministers of States/UTs.

Priority Projects

1.1. Initiate action for setting up an institutional mechanism in MoEFCC for sensitizing and effectively coordinating among the various sectoral ministries at the Central Government, and Departments at State Government level.

Timing: To be initiated in 2018 and ongoing.

Responsibility: MoEFCC, and State governments.

1.2. Various Union Ministries to work out the following details:

- ❖ Ministry MoA also to initiate projects for addressing Human Wild Life Conflict by mitigating Crop-depredation and livestock depredation by wild animals; promote alternative cropping in areas seriously affected by HWC; and extend the provisions of the National Crop Insurance Scheme to damage by wild animals.
- ❖ Ministry of Rural Development NREGS
- ❖ Ministry of Water Resources to be convinced not to pursue big projects for irrigation in the area and to opt for minor irrigation relying on check dams, ponds, wells and other appropriate water harvesting units.
- ❖ Ministry of Water Resources to be provided with appropriate information back up on the environmental and ecosystem service values of the important rivers/aquatic ecosystems of the country and tools for evaluation of any project area for planning water resource management on sustainable basis. (To be done by WII)
- ❖ Ministry of Medium and Small Scale Enterprises should start a programme to develop training and promotion for value addition and marketing based enterprises in the potential areas for natural resource/ forest based products to ensure that benefits of such products are maximised at the enterprise level itself and sustainability is ensured.
- ❖ Ministry of Non-Conventional Energy Sources should provide on priority, allocation of resources for the programme to popularise new alternative

energy solutions/technologies in the areas in the vicinity of forests/PAs as an alternative to fuel wood.

- ❖ Ministry of Surface Transport and Ministry of Railways should be provided with information regarding the areas bearing important wild life/ biodiversity and corridor connectivity values so that such information is taken into account at the planning stage. Both the Ministries should have representatives of the MoEFCC or the SFDs in the planning teams to ensure that ecological solutions are adopted for infrastructure at this stage itself.
- ❖ Ministry of Human Resource Development to set up a national institute of landscape ecology and planning for evolving information and models for meaningful ecological evaluation of landscapes in context of land use planning.
- ❖ Ministry of Home Affairs should facilitate strengthening of the wild life crime investigation and prosecution systems by empowering the state forest organisations and WCCB with the legal powers to act as police organisations for safety and security of the country.
- ❖ MoHA should also vest the border management forces with the specific responsibility for intelligence and action on illegal wild life traffic on the same seriousness as that for arms or drugs.
- ❖ Ministry of Defence to provide help to armed forces in the census and survey of endangered species in far-flung and remote areas of the country, and to help apprehend criminals indulging in smuggling.
- ❖ Ministry of Defence in coordination with the MoEFCC to provide required capacity to Coast Guard and the Indian Navy to monitor the threatened marine species and their illegal trade.
- ❖ Ministry of Finance to issue directions to State Governments that like the police and other law enforcing agencies, the field formations of SFDs are exempt from all financial and other cuts. Adequate funds should be made available for protection, prevention of poaching and protecting wildlife habitats through eco-development and other activities. Wildlife should be declared as a 'priority sector'.
- ❖ Ministry of Steel and Mines to exclude PAs/wildlife corridors from their mining plans. Proper rehabilitation of degraded and abandoned mining areas should also be done.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC in collaboration with the concerned Ministries / Government Agencies and Scientific Institutes.

1.3. Set up mechanism and undertaking monitoring and releasing the report on trends and progress of implementation of the National Biodiversity Targets.

Timing: To start in 2017 and ongoing.

Responsibility: MoEFCC, with help of WII, State Governments and Scientific Institutes.

2.1. Start interaction with all natural resource utilisation related ministries and state departments for adopting a policy of undertaking a biodiversity/

ecological impact assessments of the activities – projects or programmes - at the planning stage.

Timing: To start in 2017 and continue.

Responsibility: MoEFCC

2.2. The process of Environment Clearance includes seeking information about the status of wildlife and impact of the project is expected to be assessed by the respective Expert Appraisal Committees. For making the process effective, the objectives of such should be clearly disseminated in the public and EAC so that the appropriate provision of the existing reporting requirements are ensured and are adequately evaluated.

Timing: To start in 2017 and continue.

Responsibility: MoEFCC

3.1. Start a regular programme for interaction of decision making level functionaries in judiciary, legislature and executive, so that the concepts, concerns and stakes of conservation of wildlife and biodiversity are kept up to date.

Timing: To start in 2017 and continue.

Responsibility: MoEFCC