

Chapter 18

BIODIVERSITY AND WILDLIFE RESEARCH IN NORTHEAST INDIA: NEW INITIATIVES BY THE WILDLIFE INSTITUTE OF INDIA

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Introduction

The northeast India, being at the confluence of three major bio-geographical realm of the world, is extremely rich in floral and faunal biodiversity with several endemic species. Northeast, with seven states (Arunachal Pradesh, Assam, Manipur, Nagaland, Meghalaya, Mizoram, and Tripura), represents one of the few hot spots of biodiversity of the world. All the northeastern states make up for about 8% of the total geographical area of the country, but has about 25% of the country's total forest areas supporting about 30% of the total growing stock of the forest of the country. Nearly 64% of the total geographical area of northeast (2,55,000 km²) is having forest cover, of which only 35% of forest are under the control of Government and rest 65% are under the control of District Council, Village Communities and Private Ownership. About 70% of the total geographical area is mountainous and hilly and rest 30% is under Brahmaputra and Barak valley systems. The entire region is highly populated with about two third of total human population [31.5 million (1991 census)] is in Assam and remaining in other 6 states. The human population density is ca. 250 persons/km² in Tripura and Assam, less than 100 persons/km² in Mizoram, Manipur, Nagaland, Meghalaya, and about 10 persons/km² in Arunachal Pradesh. The demographic feature of northeastern states is unique in that there are more than 100 recognized tribes, which inhabit mostly the hill areas and each with distinct culture, ethos, and traditional knowledge systems. The majority of the people survive on subsistence economy based mainly on the agriculture, supplemented with limited horticulture, animal husbandry, crafts/handloom, etc. The forestry and wildlife resources contribute substantially in meeting even the needs of subsistence economy, which make the dependency of the people on the forestry resources very high. The use of areas rich in forestry and wildlife resources (mainly of practicing shifting cultivation across the region) and extraction of various forest products from the forests is in vogue since long past as an accepted practice. One unique feature of this natural-resource-dependent economy is its close and intimate linkages with the social, cultural, and traditional institutions and life-style of various communities. This linkage between the life-style and extraction and utilization of natural resources, which was in total harmony till the carrying capacity of the natural resources was sufficient to cater to the burgeoning needs of the people, has now over the past few decades totally disturbed following fast degeneration of the natural resources on the one hand and multiple increase in the user groups. Another major conservation problem is the inter-state border disputes and presence of a long and porous international boundary, which also facilitate draining down of natural forestry and wildlife resources across the border, thus further depriving the states with their natural wealth. A small contribution to this is also from the present civil unrest problem in the state, which is quite adversely affecting the management of protected areas as well as other forests under the management and control of the Government.

Northeast India is one of the rainiest regions of the world being fed with two monsoons. The highest rainfall area is also present in this region, the town called Mawsynram,



about 10 km away from earlier highest rainfall area (Chirapunjee) in the state of Meghalaya (the abode of clouds and also called as Scotland of India). The tropical climate of the regions with high rain fall and plenty of sun-light coupled with unique bio-geographical positioning of this region is responsible for rich biodiversity in terms of floral and faunal elements (Table 1). Recognizing the importance of this region as one of the hot spots, majority of the biodiversity rich areas of the region has been placed inside the protected area network system comprising mainly of the National Parks and Sanctuary. However, the total area under the protected area network is only about 6.5%, which ideally should be around 10% as per the policy of the government. The details on the forest area, forest cover and area under protected areas for each of eight states is presented in Table 2 (also refer Fig. 1).

Table 1: Biodiversity in Northeast India (Ghosh & Tiwari, 1984)

PLANT/ ANIMAL GROUP	NO. OF SPECIES
Plants Flowering plants	7,500
Orchids	700
Bamboos	58
Citrus	64
Conifers	28
Mosses	500
Ferns	700
Lichen	728
Animals Buffer flies	183
Molluscs	50
Fishes	236
Amphibians	64
Reptiles	137
Birds	541
Mammalian	160



Table 2: Forest area, forest cover, and area under protected area network in northeastern states (Source: FSI, 2001)

	Arunachal Pradesh	Assam	Manipur	Mizoram	Nagaland	Meghalaya	Tripura	Sikkim
Total Area	83743	78438	22327	21081	16579	22429	10486	9096
Forest Area (%)	51540 (61.5)	30708 (39.2)	15154 (67.9)	15935 (75.6)	8629 (52.0)	9494 (42.3)	6292 (60.0)	2650 (37.3)
Forest Cover (%)	68.602 (81.9)	23824 (30.4)	17418 (78)	18775 (89.1)	14221 (85.8)	15567 (69.8)	5546 (52.9)	3129 (44.1)
Area under PAs (%)	9582.6 (11.4)	2113.5 (2.7)	224.8 (1.1)	884 (4.2)	326.4 (1.9)	301.7 (1.3)	603.6 (5.8)	2049.1 (22.5)
No. of WLS	10	13	1	4	3	3	4	5
Area under WLS (%)	7114.45 (8.5)	939.8 (1.2)	184.8 (0.83)	634 (3.0)	24.4 (0.1)	34.2 (0.15)	603.6 (5.8)	265.1 (3.7)
No. of NPs	2	3	1	2	1	2	-	1
Area under NP (%)	2468.23 (2.95)	1173.7 (1.5)	40 (0.18)	250 (1.2)	202 (1.2)	267.5 (1.2)	-	1784 (25.1)

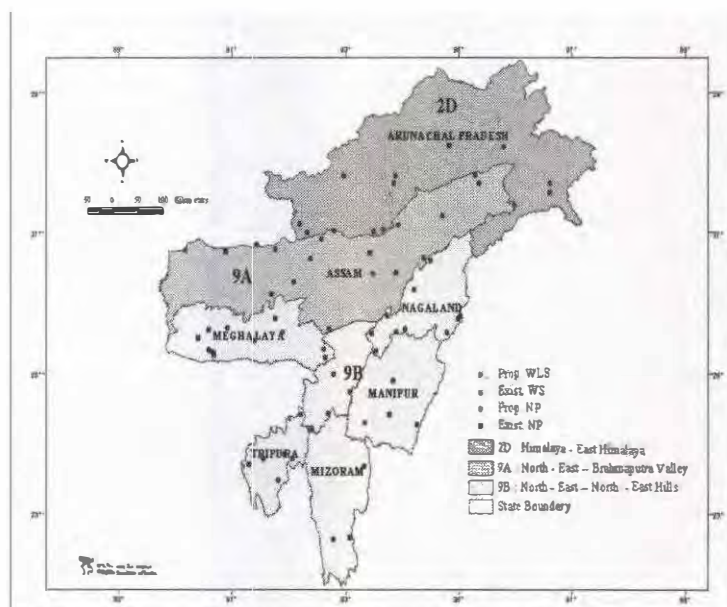


Fig. 1 The Protected Area network in northeast India



Besides the above protected areas, there are 8 Elephant Reserves (Sonitpur, Dibru, Kaziranga-Karbi and Manas in Assam; Kameng and Deomali in Arunachal Pradesh; Intaki in Nagaland; and South Garo Hills in Meghalaya) under the auspices of the Project Elephant Directorate and 6 Tiger Reserves (Dampa in Mizoram; Manas, Nameri, and Kaziranga in Assam; Namdapha and Pakki in Arunachal Pradesh) under the auspices of the Project Tiger Directorate of the Ministry of Environment and Forests, Government of India.

Wildlife Research Projects

Due to its uniqueness in various key elements affecting the biodiversity contained in different states of this region, the research projects also call for special measures to cater to those very specific needs that may differ in more than one ways from other wilderness areas of the country. The Wildlife Institute of India (WII) has been engaged for past many years in undertaking and collaborating with the concerned Stated Forest Department (SFDs) in facilitating both basic and applied project based research in various states of this region. The number of research projects in different protected areas undertaken on various species/issues by the WII is presented in Table 3 & 4, respectively.

Table 3: Number of various wildlife research projects undertaken by the WII in different protected areas

State	Number of Research Projects	Name of the Protected Area (no. of PAs covered/total number of PAs in the state)
Assam	11	Manas, Kaziranga, Pabitora, Borajan (4/18)
Tripura	6	Trishna, Sepahijala, Gumti (3/4)
Arunachal Pradesh	11	Pakhui, Namdapha, Mehao, Kamlang (4/13)
Meghalaya	5	Nongkhylllem, Siju, Balphakram, Nokrak(4/5)
Mizoram	4	Ngengpui (1/6)
Manipur	2	Keibul-Lamjao (1/4)
Nagaland	1	Across state (0/4)
TOTAL	40	17/54 (31.5%)



Table 4: Major fauna covered under various research projects by the WII in northeastern states.

STATE	SPECIES
Assam	Buffalo, Crane, Pygmy hog, gibbon, hog deer=5
Tripura	Langurs(3), monkey (1), gibbon, gaur, hog deer = 7
Arunachal Pradesh	Clouded leopard, hog deer, Arboreal mammals, hornbill, takin, bat, pheasants = 7
Meghalaya	Elephant, clouded leopard, hog deer, gibbon = 4
Mizoram	Gibbon, hog deer = 2
Manipur	Brow antler deer (sangai), hog deer = 2
Nagaland	Hog deer = 1
Region	Floral survey, Birds survey, Turtle survey, Lesser carnivore
TOTAL	16 Individual species

As is evident from the above referred tables, only a small fraction of the total number of protected areas (31.5%) and individual wildlife species (16) has been covered in various research projects of the WII. Therefore, there exists ample scope to cover different biodiversity rich areas to study many a highly endangered and endemic species of flora and fauna. Besides the research projects based on individual species, few surveys have also been undertaken by the WII covering flora, birds, turtles and lesser carnivores. The WII has also undertaken few projects on different subject matters as a part of dissertation work for partial fulfillment of the post-graduate degree course in wildlife biology. Till date, the following topics have been covered:

- Shifting Cultivation and Conservation of Tropical Forest Bird Communities in Mizoram (94-95)
- Food selection and ranging in hoolock gibbon (*Hylobates hoolock*, Harlan 1834) in Borajan Reserved Forests, Assam.
- Effect of habitat alternation on herpetofauna assemblages of evergreen forest in Mizoram (97-99).



- Habitat use by Rhino and other associate ungulates in Kaziranga NP, Assam (99-01).
- Pattern in species composition and distribution among vascular epiphytes in low lying semi-evergreen forests of Arunachal Pradesh (99-01).

Some of the major research/dissertation projects undertaken by the WII in the northeastern states during the last two decades are listed as below (not an exhaustive list):

1. The Asiatic wild buffalo in the Assam State: Population genetics and ecology for its management
2. Development of an Indian Cooperative WL Health Programme
3. Crane survey
4. Impact assessment of Jorhat-Numaligarh Pipeline Project.
5. Ecological assessment of proposed Hydro treatment plant.
6. Genetic swapping of wild buffalo.
7. Disease survey in Kaziranga National Park.
8. Biology, ecology and conservation of Phayre's leaf monkey in Tripura.
9. Effect of shifting cultivation on the ecology and conservation of mammals with special reference to *Trachypithecus phayrei* in Northeast India.
10. Conservation ecology of an isolated population of gaur in Trishna Wildlife Sanctuary, Tripura.
11. A survey of the clouded leopard in North-east India.
12. Responses of arboreal mammals to selective logging in Arunachal Pradesh.
13. An ecological study of sympatric hornbills and fruiting patterns in a tropical forest in Arunachal Pradesh.
14. Birds survey in selected localities of Arunachal Pradesh.
15. An ecological study of sympatric hornbills and fruiting patterns in a tropical forest in Arunachal Pradesh.
16. Investigation of the bio-geographic patterns of relevance of planning of long terms wildlife conservation.
17. Status survey of elephants, their habits and an assessment of elephant – human conflict in Garo Hills.
18. A survey of the clouded leopard in North-East India.



19. Management of forests in India for biological diversity and forest productivity- An ecological perspective.
20. Ecological assessment of the proposed Airport site in Mizoram.
21. Herpetological inventory in NE region.
22. Planning second home for Sangai in Manipur.
23. Loktak Lake Management with Wetland International in Manipur.
24. An assessment of endemism, rarity of flora of North-eastern region.
25. Turtle fauna assessment in North-east India.
26. Impact of the Forest Fragmentation on the Hoolock gibbon in Assam.
27. Habitat use by the Great Indian Rhinoceros and other sympatric large herbivores in Kaziranga, Assam.
28. Assessment of new additions in the existing areas of KNP – Assam.
29. Edge related changes in species composition in vascular epiphytes in forests of Sessa Orchid Sanctuary, Arunachal Pradesh.
30. Conservation of Hoolock gibbon (*Bunopithecus hoolock*) in Northeast India.

New Initiatives

To address the issues and concerns related to the biodiversity rich areas in the rainforests in this region, the WII has laid special emphasis in its recently revised research priority matrix to address all the elements of biodiversity at the landscape level using three pronged strategy (Anonymous, 2002). In this new strategy, the priority is to be defined first in the form of selecting landscapes. Within this selected landscape, would be research topics and sites will be determined based on a few major conservation problems. This shall have the potential to make valuable additions to the existing scientific knowledge. The three distinct stages of this strategy would be:

- To undertake landscape level macro studies at the first stage of this strategy, aiming at profiling the land use, the overall status of wildlife Conservation and wellbeing of local people.
- The above first stage shall be followed up by the 2nd Stage of the strategy through quantification of data aiming at benchmarking of the current status of wildlife habitats and abundance of selected flagship/indicator/keystone species. This stage shall also ensure that due attention is also paid at benchmarking the economic status and dependency of neighboring communities on the natural resources.

- The concluding 3rd Stage will relate with selection and prioritization of individual/group of topics for intensive studies within the selected landscapes to address the all possible issues related with the biological, management and human components of the biodiversity.

For the purpose of this new landscape approach to address the biodiversity related issues in the region, the Eastern Himalayan Region (covering the entire North-East India) has been identified as New Landscape. Details on the following components of the Region have also been worked out to facilitate actions to be taken during stages 2 and 3 as described above:

- Name and location of the prominent protected areas.
- Name, location and area of the important managed forests
- Name, extent and location of the Important Ecosystems
- Population of the important communities and individual species of high conservation values
- Major threats to the area with special linkages with the development projects, if any.
- Main issues and concerns related to the indigenous/local people
- Listing of prominent animal species for health monitoring
- List of key select topics for undertaking experimental research
- Identified agencies (local institutions, universities, NGO groups, etc.) to be involved for undertaking research activities on different aspects identified and prioritizes as above).

As a part of these new initiatives, the WII has also conducted special meetings with the Chief Wildlife Wardens of the northeastern states during the Annual Research Seminar of the institute during the last couple of years to identify and prioritize the research and training issues for each of those individual states. A proposal was also mooted and agreed upon that each northeastern state must have a Wildlife Research and Training Cell within the forests department to be headed by a senior officer for developing permanent and viable liaising with a similar cell in the WII on matters related to wildlife research and training needs. While four states (Mizoram, Manipur, Tripura and Meghalaya) have already created the Cell, other states are in the process of doing so. The WII has also drafted one Action Plan on Wildlife Research and Training specifically for the northeastern states, which has been circulated to each of the state for detailed discussions and finalization of the identification and prioritization process of specific research and training needs. Most of the states have acted on this draft Action Plan and submitted a list of prioritized research and training issues for future course of action. The Training, Research and Academic Council (TRAC)



and the Governing Body of the WII have also stressed on the needs for initiating and undertaking more and more research and training projects across this region.

Following are the objectives that are identified and included in the draft Action Plan on Wildlife Research and Training for the northeastern states:

1. Developing linkages between WII and the Wildlife Wings of all Northeastern States.
2. Providing technical inputs by WII to the Wildlife Research & Training Cell (WRTC) of the states in prioritization of research activities and helping them in capacity building processes.
3. To help WRTCs in raising funds for research activities.
4. To undertake Joint Research and Training Projects with WRTCs.
5. To involve local researchers, NGOs, Universities, and other Institutions in various Research and Training Programmes.
6. To undertake training programmes for officers at different levels including Training of Trainers (TOT) in various themes of immediate concerns.
7. To actively involve PA managers in research & training projects
8. To document and link use of traditional knowledge with the advanced scientific methods, especially for tackling the issue of shifting cultivation in the region.

(With more than 100 tribal groups in NE, the traditional knowledge system is very rich and need be documented and put to practice as one effective tool for WL conservation)

9. To address the upcoming issue of man-animal conflict with the use of experimental and applied research in usage of various traditional and advanced mitigation measures.
10. To identify major land-use patterns in view of the community ownership of the forests and wilderness area and arrive at best practice guide.
11. To devise and test the applicability and feasibility of Wildlife Protection measures under different conditions.
12. To ensure fair and equitable representation of Wildlife Conservation issues related to NE States in all the in-house Research & Training activities /projects / courses.

In order to achieve the above objectives, the following Action Points are suggested in the draft Action Plan:

1. Creation of a NE India Cell for Research and Training (NICRT) in the WII.

2. Appointment of a Nodal Officer to head the NICRT, besides other staff from within the existing setup.
3. Creation of a Wildlife Research & Training Cell (WRTC) in each NE State.
4. .Appointment of a Nodal Officer for WRTC (at least of DCF rank).
5. To encourage WRTCs to hold series of thematic Workshops for prioritization of the research and training projects related to Wildlife Conservation.
6. The WII may provide technical inputs for undertaking all such research and training inputs.
7. Actions as above can follow a NE level workshop involving all the NE States, concerned NGOs and other Research & Training Organizations involved in the matter of Wildlife conservation.
8. State Forest Departments may seek technical inputs in the form of consultancy from the WII while preparing the research projects and submitting to different National/ International funding agencies to raise funds for Wildlife Research & Training
9. WII to also actively involve as joint partner in various research, training and monitoring projects of mutual interests addressing Wildlife Conservation.
10. The initial focus by WII could be on collection of base line data & thorough surveys, periodic monitoring and resource evaluation of different habitat types.
11. Another important area for the WII could be to prepare different Techniques' Manuals for different major species with funding and man-power support from SFDs
12. Networking with various local Scientific Institutions, Universities and NGOs.
13. Encourage WRTC to engage local researchers in self-run projects covering different research topics.
14. Training component in all the research projects for front line staff as Training of Trainers to maintaining continuity in monitoring even after the project ceases to exist'
15. WRTCs may be encouraged to conduct short thematic training workshops for officers at different levels and WII may provide technical inputs.
16. Wherever possible, the PA managers may be made partners in research, monitoring and training projects being undertaken within their jurisdiction. *This may ensure better quality in the output and better time management.*
17. Special emphasis shall be given in documenting information/data related to propagation /use of medicinal plants.



18. Documentation of traditional methods for maintaining 'Sacred Groves'. Such traditional knowledge and methods may be used in combination with advanced technologies in a given area/ habitat.
19. A thorough assessment on the practice and effects of shifting cultivation vis-à-vis wildlife management.
20. Search for viable alternatives to wean away the faulty land use patterns either for shifting cultivation or management of community controlled areas.
21. An assessment on the role of Autonomous District Councils, various Cooperatives, and Rights and Concessions of various ethnic groups in view of the panchayati Raj Institutions and recent Panchayats (Extension in Scheduled Areas) Act in the NE region.
22. To identify suitable measures and steps to check poaching and encroachments, especially addressing the cultural and traditional needs for subsistence hunting and sports.
23. Possibilities on setting-up of Anti- poaching camps in areas of greater vulnerability to poaching and illicit trade.
24. Feasibility studies on the applicability of participatory approaches (Ecodevelopment, Joint Forest Management, etc) to address issues related to wildlife protection, man-animal conflicts, and faulty land-use patterns.

It is expected that by undertaking special measures and steps as described above, the biodiversity richness of the northeastern region is provided desired protection so that this region, as one of those last few remnants of the rainforests world over, is kept alive and vibrant with the diversity of flora and fauna, much essential for the survival of the humanity in the long run.

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