

BIO LINK

VOLUME **01**
ISSUE **02**

JULY **2019**
PAGES **44**

Publication: Biannual/
January & July
of every year

New Section on
**SCIENTIFIC
ARTICLES**

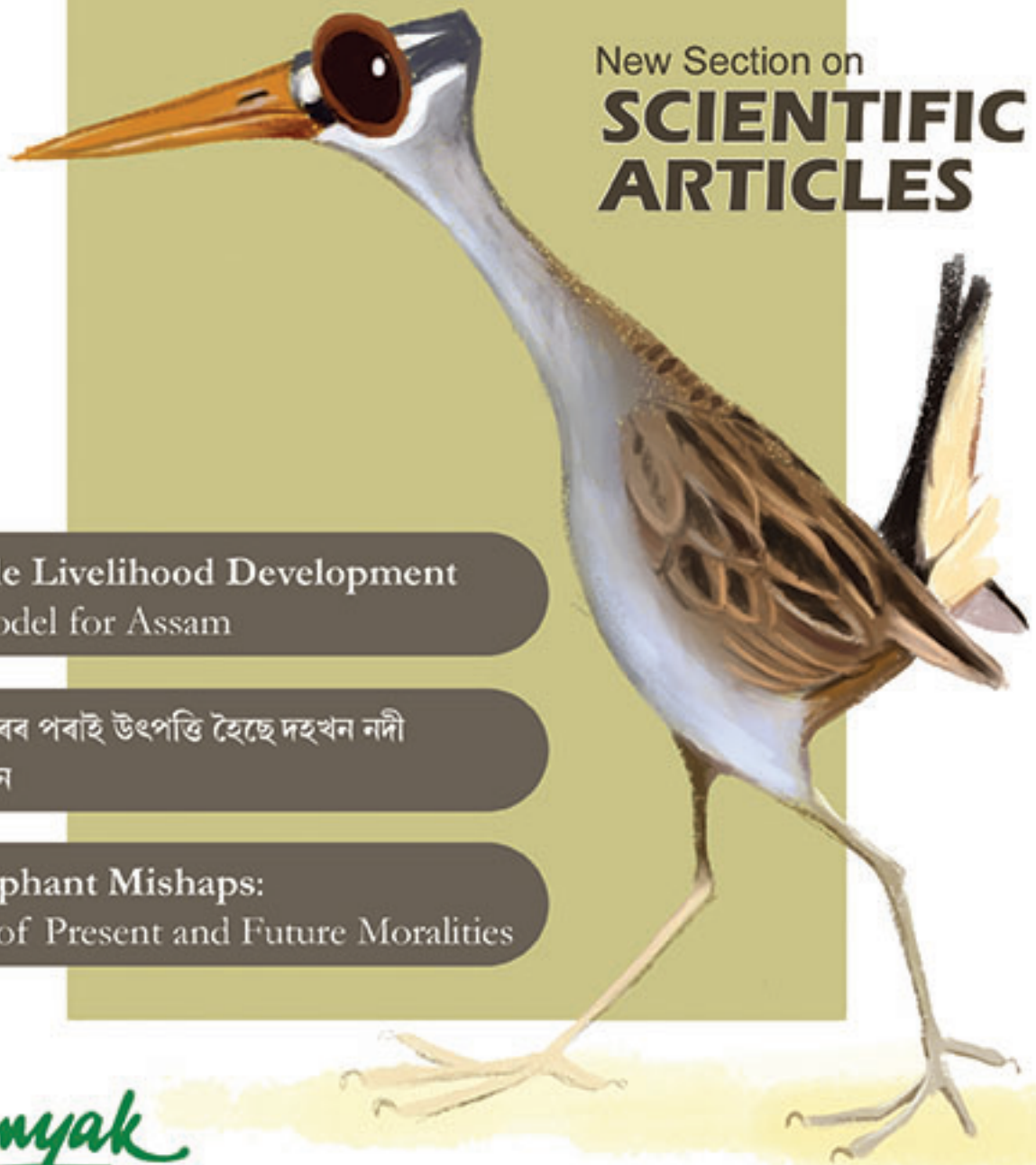
Sustainable Livelihood Development
-OTOP model for Assam

সিংহাসন পাহাৰৰ পৰাই উৎপত্তি হৈছে দহখন নদী
আৰু বহু উপনৈ

Train–Elephant Mishaps:
The cause of Present and Future Moralities

Aaranyak

Nourishing nature to secure our future



ABOUT AARANYAK

Aaranyak is a registered society working towards nature conservation in North East India, since 1989. Our strength lies in applied research in biological and social fields and our thrust area of work is the North Eastern India and Eastern Himalayas.

MISSION

Our mission is to foster conservation of biodiversity in Northeast India through research, environmental education, capacity building and advocacy for legal and policy reform to usher a new era of ecological security.

Know more about us at
www.aaranyak.org

COVER ILLUSTRATION

Credit: Deborsee Gogoi
 The species in the cover is White browed crane

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Editorial



One fine morning in the year 1989, in our neighbourhood of Survey, Beltola a few of us decided to form a Nature Club. This idea came about since in those days ‘conservation’ wasn’t a word you would use in the context of environment, biodiversity etc. People would understand it to mean basically as tree planting!

I remember in the early ‘90’s I had arranged a plantation program in the Girls’ Polytechnic, Bamunimaidam premises that was carried out by our Club members. The then Principal of that Institute agreed to allow us to proceed with it and we were delighted. We planted and fenced each plant with bamboo sticks and I requested the Principal to arrange for someone to take care, at least initially. Strangely, he expressed his inability

in this regard! Here was an educationist who should have jumped at this initiative to make the campus environment green and he had the manpower to utilise in this effort! Anyway this shows that only like-minded individuals can work towards a goal and if others choose to join in then the goal is easier to achieve.

The evolution of Aaranyak Nature Club into the present organisation was inevitable with the participation of many enthusiastic scientists and nature-lovers. The vibrancy in all the varied activities could be felt over the years and to keep this in control we soon had to have an Administration wing and a Finance wing, initially manned by our members . But as the legislations covering NGO’s became more stringent and our involvement with foreign funds deepened we had to take professional help and I can humbly claim that our organisation has a very high standard of governance. Without being complacent I would like to mention that from the days of tree -planting, bird -watching etc. to more advanced and contemporary fields like scientific research, genetics, capacity-building, legal policy reforms and so on it has been a long journey of thirty years; and for me it has been like raising a child to adulthood. Now, Aaranyak can claim to be on par if not better than any NGO worldwide and this has been made possible due to the tremendous hard work, dedication and belief of the scientists, staff and well-wishers of Aaranyak.

I think the importance of biodiversity conservation and environment protection need not be emphasised since these days everyone is familiar with the negative fall-out of climate change. I think we have wrongly taken Mother Nature’s bounty for granted and as unlimited . Deforestation, mining, wildlife-hunting etc. had taken its toll to such an extent that some species have been wiped out from the face of this earth, so action must be taken now to preserve whatever is left. Remember, DOOMSDAY at this rate of destruction isn’t very far off (i.e. no living creature on our planet!) and we must strive to stop this at whatever the cost.

Ranjan Bhuyan
President, Aaranyak



SUSTAINABLE LIVELIHOOD DEVELOPMENT

OTOP model for Assam

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Sustainable development can be classified as the development that suffices the needs of the present population without compromising the availability of future generations. The development process should consume less than the environment's ability to replenish the resources. In such a situation it becomes environmentally sustainable. Livelihood thus derived does not have adverse impact on the environment and eco system.

Among many models that I studied and personally observed, OTOF of Thailand will suit Assam well. OTOF is the acronym for 'One Tambon One Product'. Tambon means sub-district. It is a local area based entrepreneurship stimulus program which targets to identify and support the unique locally made and marketed products of each Tambon all over Thailand and world.

OTOF frames its basics and motivation from Japan's successful One Village One Product (OVOP) programme, and guides village communities to improve local product variety, design, quality and marketing. One superior product from each Tambon is selected to receive formal branding as a "starred OTOF product". It is provided local and international stage for branding, promotion and marketing of these products. I visited OTOFs in Ayutthya and Surin provinces in 2005. There were Banana, Jasmine Rice, Organic products, Bamboo, Lotus, Sericulture, Water Hyacinth, Orchid OTOFs etc.

OTOF products mostly cover a large variety of local items, including handicrafts, cotton and silk garments, pottery, fashion accessories, household items, wood carvings, handloom items, natural dye products, medicinal products, aromatic products, essential oils and processed food items. Over the years a number of product groups have been identified for promotion;

these include food items and beverages, textiles and clothing, woven handicrafts, wood carvings, embroidered products, artistry items, gifts, household and decorative items, home furnishings and non-edible herbal products. These cover traditional items made in village communities, each lovingly and carefully crafted with trade mark local ingredients with traditional knowledge and skills.

Different regions contribute specific types of products based on locally available raw materials and resources. Brief of such products from various regions in Thailand are:

NORTHEASTERN THAILAND

Northeast villagers traditionally weave two sets of clothes – daily used clothes and one set of high quality gorgeous silk garment weaved with intricate skill for grand occasions like marriages and festivals. High quality fabrics are picked up as OTOF products. Silk weaves and cotton fabrics, especially tie and dye designs. The most fabulous items are various silk garments. Others include reed mats, baskets woven from water hyacinth and triangular pillows.

NORTHERN THAILAND

Excellent handicrafts, mainly carved and crafted wood, tin items, silverware, hand-made paper products, ceramics, bamboo basketry, cotton made fabrics, indigo dyed cotton home furnishings and ethnic jewellery made from silver by hillmen.

EASTERN THAILAND

Famed for its fruits, fresh and processed, as well as bamboo and rattan baskets, reed mats and natural fibre fabrics. Banana Sun Dried items and other items are produced in large quantities and exported.

CENTRAL THAILAND

Traditional handicrafts of bamboo, basket, furniture, hand fans, great earthen pots, enameled pottery, Red pottery and artistic terracotta items are selected as OTOP products.

SOUTHERN THAILAND

Batik fabrics, woven products from natural fibres, mother-of-pearl inlays and carved wood products are typical of southern side.

QUALITY CONTROL AT OTOP

Rural made OTOP products are selected for promotion based on their quality and export potential. In many cases I saw Japanese clients giving designs and specifications for products to be made for Japanese market. Quality and continuous improvement through design and research is the mainstay of the OTOP movement.

The project has strong multi-level government support

1. Selecting potential OTOP products
2. Providing advice on process of production
3. Creating Common facility
4. Packaging
5. Design
6. Quality Control
7. Market Linkage
8. Branding and Promotion
9. Competition and Award system.

The endeavor is to make continuous effort to make the products continuously more attractive to domestic and export markets. Entire OTOP product cycle comes under the supervision and monitoring of a National OTOP Committee, with regional, provincial and prefecture level committees to assist in identifying, developing, promoting and grading OTOP products.

OTOP CHALLENGES

Due to its basic nature, the OTOP concept comes with inherent set of challenges. In traditional societies, villagers produce products either for their own consumption or exchange. Surplus is bartered or sold to neighbours. These products are made during available spare time, when farming or housework has been completed. Hence, production capacity and the ability to supply in high volume of products required by buyers quickly becomes an issue.

With the system of OTOP, villagers are entangled with the complex realities of foreign trade. It has brought forth the issues of meeting deadlines, quality control, production in large quantities, design issues, brand building and marketing challenges.

Many allied government agencies dovetailing their schemes and facilities to provide the village communities the necessary support. For example, the OTOP Task Force of the Department of Export Promotion (DEP), Ministry of Commerce, Thailand frames policies and creates facilities that assists in the export of OTOP products. These include display of selected products at trade fairs in Thailand and abroad, as well as display of wares in in-store promotions and Thailand Exhibitions outside.

While the aim of the OTOP project is to enhance rural income, Thai government also offers options to into full time OTOP production with plenty of public support. Major government agencies provide support: The Interior Ministry's Department of Community Development works directly with the artisans to fine tune their products; the Industry Ministry's Department of Industrial Promotion helps in product development, skills training and quality control; DEP's Product Development Centre engages teams of designers to work with villagers to create marketable designs and suitable packing materials for their products.

MARKET LINKAGES:

OTOP Products are marketed through various platforms.

- OTOP online www.thaitambon.com
- Jatujak Weekend Market <http://www.jatujakguide.com/> or <http://www.bangkok.com/shopping-market/popular-markets.html> or http://thailand-travel.suite101.com/article.cfm/chatuchak_weekend_market...
- Baan Tawai Market Village, Chiang Mai <http://www.ban-tawai.com/>
- Market Village, Hua Hin
- Small OTOP corners in some malls, major department stores or in the duty free sections of international airports at Bangkok, Chiang Mai and Phuket.
- Thailand Export Mart in Bangkok
- Export Promotion Centre in Chiang Mai etc.

There are other such successful models of rural/ semi-urban development through cluster approach. These are OVOP, (One Village One product), Japan; Town & Village Enterprises (TVE), China; One Town One Product (OTOP), Taiwan.

Many desi models were developed like RBH (Rural Business Hub), MSE-CDP (Micro, Small Enterprise-Cluster Development Scheme); SFURTI (Scheme of Fund for Upgradation of Traditional Industries), Clusters under Development Commissioner (Handlooms) and DC (Handicrafts). National handloom development project has drawn up ambitious project to implement a large number of clusters. Many schemes are under implementation under NERTPS (North eastern region Technology Promotion

Scheme), Comprehensive Micro Planning and Promotion of sustainable Livelihood in 499 JFMC & EDCs under French Govt. aided project COMPELO. National Rural Livelihood Mission (NERM), Assam State Rural Livelihood Mission projects aim at cluster development and promotion of sustainable livelihood in rural areas. APART (Assam Project on Agriculture and Rural Transformation) is another such ambitious project funded by the World Bank.

Another ambitious project launched by Govt. of Assam in 2017 is 'Mukhyamantrisamagra Gram Vikash Yojana'. It aims at providing Rs. 1.2 Cr each to Assam's 15000 villages for promotion of livelihood and some basic infrastructure. Hope this project will bring desired result.



Photo: Aaranyak



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অপূৰ্ব বহুভাষী গোস্বামী

লেখক গোলাঘাট জিলাৰ জ্যেষ্ঠ সাংবাদিক আৰু এগৰাকী প্ৰকৃতি প্ৰেমী।

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অসমৰ প্ৰতিটো পৰ্বত-পাহাৰৰে এক তাৎপৰ্য আছে। তেনে এক পাহাৰেই হৈছে কাৰ্বি-আংলং জিলাৰ ঐতিহাসিক সিংহাসন পাহাৰ। এই সিংহাসন পাহাৰৰ পৰাই দহখন নদীৰ উৎপত্তি হৈছে। দহখনকৈ নদী বৈ অহা সিংহাসন পাহাৰটোৰ সংৰক্ষণৰ ক্ষেত্ৰত গুৰুত্ব প্ৰদান কৰাটো প্ৰয়োজন যদিও ৰাজনৈতিক হস্তক্ষেপৰ বাবে বৰ্তমান সিংহাসন পাহাৰ বে-দখল কৰলত পৰি অস্তিত্ব বিপন্ন হৈ আহিছে। পাহাৰটোৰ সংৰক্ষণৰ ক্ষেত্ৰত চৰকাৰে গুৰুত্ব প্ৰদান কৰাটো অতিকৈ প্ৰয়োজন হৈ পৰিছে। অক্ষাংশ ২৬০-১৫'২৯" উত্তৰে আৰু দ্ৰাঘিমাংশ ৯৩০-২২'২৪" পূবে প্ৰকৃতিৰ ভাৰসাম্য ৰক্ষা কৰা সিংহাসন পাহাৰটোৰ উচ্চতা ১৩৫৭ মিটাৰ। এই সিংহাসন পাহাৰৰ ভূ-খণ্ডই খণ্ডবামনৰ পৰা চামেলাংছ', হাইঠা পাহাৰ হৈ কাৰ্জিৰঙালৈকে প্ৰায় ৪০০০ বৰ্গ কিলোমিটাৰ আগুৰি আছে। 'কাৰ্জিৰঙা-কাৰ্বি আংলং ইন্টাকী হস্তী প্ৰকল্প'ৰ এক বৃহৎ অঞ্চল সিংহাসন পাহাৰৰ অন্তৰ্গত। সিংহাসন পাহাৰৰ পৰাই লংনিত নৈ, পাত্ৰাদিছা, চেলাবৰ, সোনাৰীজান, সৰগুটি, নামবৰ, দৈগ্ৰোং, কালিয়নী, ডিফলু, কঁহৰা নামেৰে দহখন নদী উৎপত্তিৰ লগতে এই নদীসমূহৰ পৰা বহু উপনৈ অসমৰ বিভিন্ন স্থানলৈ বৈ গৈছে। এই নদীসমূহে অসমৰ প্ৰাকৃতিক সম্পদৰ ভৰাঁল সমৃদ্ধ কৰাৰ লগতে কৃষিখণ্ডৰ বাবে নৈ সমূহ অত্যন্ত গুৰুত্বপূৰ্ণ বুলি বিবেচিত হৈছে। উল্লেখযোগ্য যে এই দিশৰ পৰা কাৰ্বি-আংলংৰ সিংহাসন পাহাৰক হিমালয়ৰ লগত তুলনা কৰিব পাৰি। হিমালয়ৰ তুলনাত ক্ষুদ্ৰ হ'লেও দহখনকৈ নদীৰ উৎপত্তি স্থল হোৱাটো আচৰ্য্যৰ কথা। হিমালয়ৰ 'ভেলী অৱ ফ্লাৱাৰ'ৰ দৰে সিংহাসন পাহাৰতো এনে কিছু অঞ্চল আছে, যিসমূহক সুগন্ধি ফুলেৰে ভৰপূৰ 'ফুলৰ উপত্যকা' বুলিও অভিহিত কৰিব পাৰি। ফৰকাল বতৰতো সিংহাসন পাহাৰৰ কিছু অঞ্চলত অস্বাভাৱিকভাৱে বৃষ্টিপাত হোৱাৰ দিশলৈ লক্ষ্য কৰিলে অঞ্চলসমূহক বৰ্ষাৰণ্যৰ লগত তুলনা কৰিব পাৰি। কিন্তু সম্প্ৰতি সিংহাসন পাহাৰত জীৱশ্ৰেষ্ঠ মানুহে চলাই অহা ধ্বংসলীলাই কেৱল জৈৱ-বৈচিত্ৰৰ ওপৰতে বিৰূপ প্ৰভাৱ পেলোৱা নাই, উল্লিখিত নদীকেইখনৰ অস্তিত্বও বিপদাপন্ন কৰি তুলিছে। ঐতিহাসিক সিংহাসন পাহাৰৰ পৰা উৎপত্তি হোৱা নৈসমূহৰ সংক্ষিপ্ত বিৱৰণ তলত দাঙি ধৰা হ'ল-

- ১। **লংনিত নৈঃ** ডিফু মহকুমাৰ মধ্যাংশৰ পাতৰ ফাংছৰ কাষেৰে পশ্চিমমুৱা হৈ আহি কুপিল গাঁৱৰ মাজেৰে বৈ আহি তাৰ পাছত দক্ষিণ-পশ্চিমমুৱা হৈ প্ৰায় তিনি কিলোমিটাৰ ভটিয়াই লংচেক পাহাৰৰ সোঁফালে অলপ বৈ আহি ডেৰিলাংছুক বাঁওফালে লগত লৈ দক্ষিণফালে বৈ আহি খণ্ডবামন লংছুত পৰে। উজনি যমুনা হৈ লংনিত দৰকা হৈ বিভিন্ন স্থানলৈ বৈ গৈছে। নামনি অংশত এই নদীকেইখন যমুনা নামেৰে জনাজাত।
- ২। **পাত্ৰাদিছা ঃ** কাৰ্বি-আংলং জিলাৰ ডিফু মহকুমাৰ মধ্যাংশৰ চাটিমগাঁৱৰ উত্তৰদিশে বৈ আছে পাত্ৰাদিছা নৈখন। প্ৰথমে দক্ষিণমুৱা হৈ ৪ কিলোমিটাৰ আহি টেং নৈৰ বাঁওফালে লগ লাগে। এনেদৰে নৈখনে এটা সুৰংগৰ তলেদি আহি সৰুপাত্ৰাদিছা নৈৰ লগ লাগে। নৈখনে অসংখ্য পাহাৰীয়া জানজুৰিক লগত লৈ ৩৬ নং ৰাষ্ট্ৰীয় ঘাইপথ পাৰ্শ্বহৈ চিকাৰীঘাটৰ দক্ষিণাংশ

হৈ যমুনাৰ সোঁফালে পৰিছে। এই নৈখনে হাওৰাঘাট আৰু ডিফু থানাৰ মাজৰ সীমান্তত সৰগুৰিত পৰে।

- ৩। **চেলাবৰ নৈঃ** চেলাবৰ নৈখনক দংকেহাই বুলিও কোৱা হয়। এই নৈখন চাটিম গাঁও হৈ ওলাই পশ্চিম দিশে চৰমেন গাঁৱৰ দক্ষিণ-পশ্চিমমুৱা হৈ চেলাবৰ সংৰক্ষিত বনাঞ্চলৰ মাজেদিয়েই বৈ আহি উত্তৰ দিশে চিঞ্জিল নৈ, লাংছুমিপই নৈ, বিছনাথ নৈ আৰু পাকলাংছুমিপি, লংহাৰা জনক লগত লৈ সৰগুটিত পৰে।
- ৪। **সোণাৰীজানঃ** সোণাৰীজান এখন সৰু নৈ। এই নৈখনৰ উজনি অংশক গৰখীয়া জন বুলিও কয়। গৰখীয়া নাম লৈ লেৰুৰামুখৰ দক্ষিণ-পূৱৰ গাঁৱহৈ নৈখন অলপ দূৰ উজাই গৈয়ে সোণাৰীজান নাম লৈ বৈ আহি শালমাৰী বিলত পৰে। এই নৈখন পশ্চিম দিশলৈ বৈ গৈ ধুমকুৰাজানত লেতেৰী সূঁতিত মিলিছে।
- ৫। **সৰগুটি নৈঃ** সৰগুটি নৈখন ডিফু মহকুমাৰ মধ্য অংশৰ ছাইগাঁৱৰ দিশৰ পশ্চিমফালে বৈ আহি কাটক লাংছুৰ সোঁফালে লগ হৈ দক্ষিণ-পশ্চিমমুৱা হৈ বৈ আহিছে। এনেদৰে আহি চিৰি লাংছু আৰু লুচিন নৈৰ লগ হৈ সৰু গুটি চাৰমেন গাঁও হৈ বৈ আহে। এনেকৈ লাংকা লাংলাংছুৰ লগ হৈ ভৈয়ামলৈ বৈ আহি দুভাগত বিভক্ত হয়। পশ্চিমমুৱা হৈ বৈ অহা অংশক সৰু সৰগুটি আৰু দক্ষিণমুৱা হৈ বৈ অহা অংশক মাদুলি নৈ বুলি কোৱা হয়।
- ৬। **নামবৰ নৈঃ** নামবৰ নৈখন কাৰ্বি-আংলং জিলাৰ বোকাৰান মহকুমাৰ অন্তৰ্গত নামবৰ গৰমপানী বন্যপ্ৰাণী অভয়াৰণ্য আৰু নামবৰ দৈগ্ৰোং বন্যপ্ৰাণী অভয়াৰণ্যৰ মাজেৰে বৈ আহিছে। এই নদীৰ পাৰতেই বৰপুং, গেলিপুং, গৰম পানী উঁহৰ অৱস্থিত। নৈখনে উত্তৰ-পূৱ দিশে ছপানজুং টিঙৰ দক্ষিণেদি আহি তিৰিখেং গাঁৱত থকা এটা ২৫ মিটাৰ উচ্চতাৰ ফটাশিল জলপ্ৰপাত পাৰ হৈ আহিছে। নামবৰ নদী বৰজানক লগত লৈ ৩৯ নং ৰাষ্ট্ৰীয় ঘাইপথ পাৰ হৈ ধনশিৰিত মিলিত হৈছে।
- ৭। **দৈগ্ৰোং নৈঃ** দৈগ্ৰোং নৈখনৰ দৈৰ্ঘ্য প্ৰায় ৬৪ কিলোমিটাৰ। কাৰ্বি-আংলং জিলাৰ উত্তৰ-পূৱ দিশৰ এই নৈখন পূৱ দিশত প্ৰায় ১৫ কিলো আহি ৰিকা নৈত মিলিত হৈছে। নৈখন উত্তৰ-পূৱ দিশে হেহাই গাঁৱৰ কাষেদি প্ৰায় ৩ কিলোমিটাৰ আহি ৰেংদাং নৈৰ লগ হৈ দৈগ্ৰোং নদীৰ নাম লয়। তাৰ পৰা ক্ৰমাৎয়ে আহি আহি বালিজান, কাছমাৰীজান, হেমাৰীজান, বৰচাপৰিজান হৈ বৈ আহি নামবৰ হাৰিৰ ওপৰেদি উত্তৰ-পূৱ দিশেদি বৈ গৈছে।
- ৮। **কালিয়নী নৈঃ** কালিয়নী নদীৰ দৈৰ্ঘ্য প্ৰায় ১১০ কিলোমিটাৰ। নৈখন পাহাৰৰ কয়লাস্তৰৰ মাজেৰে বৈ অহাৰ ফলত পানীৰ বৰণ ক'লা হোৱাৰ বাবেই নৈখনৰ নাম 'কালিয়নী' হোৱা বুলি বিভিন্নজনে মতপোষণ কৰিছে। কাৰ্বিসকল কালিয়নী নৈখনক ফংলাংচু নামেৰে নামাকৰণ কৰিছে। ফংলাংচু নৈখন বৰপুঙত মিলিত হোৱাৰ পৰাই কালিয়নী নাম লয়। তাৰপৰা প্ৰায়

১.৫ কিলোমিটাৰ আহি কাণীলাংছুত লগত লৈ বৈ আহি তাৰাংপুংনৈৰ বাওফালে মিলিত হয়। কালীয়নী নদীৰ প্ৰধান উপনৈসমূহ হ'ল- নিহাং লাচুং নৈ, লাংকাটাং নৈ, বৰপুং নৈ, তাৰাপুং নৈ, জাংহানৰি নৈ, দেউৰী নৈ আৰু বাংছালী নৈ।

৯। **ডিফলু নৈঃ** ডিফলু নৈ খন কাৰ্বি-আংলং জিলাৰ উত্তৰ দিশেদি ওলাই আহি গোলাঘাট জিলাৰ কাজিৰঙা ৰাষ্ট্ৰীয় উদ্যানৰ মাজেৰে ব্ৰহ্মপুত্ৰত পৰিছে। এই নদীখনে পূৱদিশে আহি চাবজুৰিৰ লগত লগ হৈ পুৰুলাংছুৰ সোঁফালে লগ লাগিছে, ইয়াৰ পিছত নৈখনে সৰু ডিফলু, থেদং, দেধবা আদি নৈৰ লগত মিলিত হৈ কাজিৰঙাৰ মাজেৰে প্ৰায় ২ কিলোমিটাৰ উত্তৰ দিশে বৈ আহি নদীখন পশ্চিমুৱা হয়।

১০। **কঁহৰা :** এই নৈখন কাজিৰঙাৰ মাজেৰে বৈ আহিছে। কাজিৰঙা বিলত পাহাৰৰ পৰা অহা এখন জন আৰু কঁহৰা জন মিলি কঁহৰা নৈৰ লগত একেলগে প্ৰায় ২ কিলোমিটাৰ ভটিয়াই মিলি বিলৰ লগত সংযোগ হৈ বঙাজানত পৰিছে। ইয়াৰ পাছত খাগৰি বিল, দৰ্জা বিল, বৰ বিলৰ কাষেদি বৈ আহি হাতীখুলি চাহ বাগিচাৰেদি শিঙিমাৰী নৈত পৰিছেহি। নৈখনে পাহাৰৰ পৰা অহা বৰ দিহিং নৈৰ লগত বাগৰি অঞ্চলত লগ হৈ মৰা ডিফলুৰ লগ মিলি নগাঁও জিলাৰ মাজেৰে বৈ গৈছে।

উল্লেখ্য যে সিংহাসন পাহাৰত কোনো হুদ নাই যদিও কেনেকৈ ইমান সংখ্যক নদীৰ উৎপত্তি হৈছে তাক লৈ এতিয়াও কোনো গৱেষণা কৰা হোৱা নাই। সেই দিশৰ পৰা চালে সিংহাসন পাহাৰৰ ডাঠ অটব্য অৰণ্য, গছ-গছনিৰ পৰাই বৃহৎ জলভাণ্ডাৰ সৃষ্টি হৈছে বুলি অনুমান কৰিব পাৰি। যাৰফলত উল্লিখিত দহখন নদী উৎপত্তি হৈ ভৈয়ামলৈ বৈ আহিছে। কিন্তু, এনে গভীৰ অৰণ্য অঞ্চলত থকা মূল্যবান গছ-গছনিৰ ওপৰটো বৰ্তমান মানৱ জাতিৰ লোলোপ দৃষ্টি পৰা পৰিলক্ষিত হৈছে। যাৰ ফলত সিংহাসন পাহাৰৰ পূৰ্বৰ প্ৰাকৃতিক সৌন্দৰ্য নাইকিয়া হোৱাৰ উপক্ৰম ঘটিছে। সিংহাসন পাহাৰৰ গুৰুত্ব অনুধাৱন কৰি ইয়াৰ জৈৱ-বৈচিত্ৰৰ প্ৰতি ইংৰাজ সকলো আকৃষ্ট হৈছিল। ১৯৪০ চনত ব্ৰিটিছ আয়ুক্ত জিজি শ্বোৱেল, সেই সময়ৰ অবিভক্ত শিৱসাগৰ জিলাৰ উপায়ুক্ত সিদ্ধেশ্বৰ গোঁহাই, গোলাঘাটৰ মহকুমাধিপতিসহিত এটা দল গৈ সিংহাসন পাহাৰৰ শিখৰত উপস্থিত হৈ সৌধ নিৰ্মাণ কৰিছিল। যাৰ অস্তিত্ব এতিয়াও পাহাৰটোত বিৰাজমান। দ্বিতীয় বিশ্বযুদ্ধৰ সময়ত এখন উৰাজাহাজ দুৰ্ঘটনাগ্ৰস্ত হৈ সিংহাসন পাহাৰত পৰাত সেই উৰাজাহাজৰ ভগ্নাৱশেষ আজিও দেখিবলৈ পোৱা যায়। উক্ত উৰাজাহাজৰ কিছু অংশ সিংহাসন পাহাৰৰ পৰা আনি প্ৰধান মুখ্য বন সংৰক্ষক অভিঞ্জিৎ ৰাভা আৰু বনাঞ্চলিক বিষয়া ৰঞ্জন বৰুৱাই ডিফুৰ ৰিক্ৰিয়েশ্বন পাৰ্কত দৰ্শনাৰ্থীৰ বাবে সংৰক্ষণ কৰি ৰাখিছে।

সিংহাসন পাহাৰত লুকাই আছে বহু বহস্য। একবিংশ শতিকাৰ ভৰি দিয়াৰ পাছটো সিংহাসন পাহাৰৰ বহু বহস্য ভেদ কৰিবলৈ এতিয়াও সক্ষম হোৱা নাই। সিংহাসন পাহাৰত অদৃশ্যমান গাঁও থকাৰো লোকবিশ্বাস আছে। আশ্বৰ্যকৰ কথাত যে সিংহাসন পাহাৰৰ এক দুৰ্গম অঞ্চলত ৰংবিন নামৰ এখন অলৌকিক গাঁও আছে। উক্ত অদৃশ্য গাঁওখনত কিছুলোকে জীৱন নিৰ্বাহ কৰি আছে যদিও গাঁওখন আজিলৈকে কোনোও দেখা পোৱা নাই। বহুতে ক'ব বিচাৰে ৰংবিন নামৰ গাঁওখন এক কাল্পনিক সীমাৰেখাৰ ভিতৰত সোমাই থকাৰ বাবে লোকচক্ষুত অদৃশ্য হৈ থাকে। কিছুলোকে ৰংবিন গাঁওখন গুহাৰ ভিতৰতে থকা বুলি ক'ব বিচাৰে। সেয়েহে সিংহাসন অঞ্চলৰ লোকে ৰংবিন গাঁওখনক অদৃশ্য মানুহৰ গাঁও বুলি কয়। আহোমৰ দিনত মানৱ আক্ৰমণৰ সময়ত মানৱ অত্যাচাৰৰ পৰা ৰক্ষা পাবলৈ কাৰ্বিসকলে ইষ্ট দেৱতাক প্ৰাৰ্থনা কৰোতে উক্ত গাঁওখন সৃষ্টি হৈ তেওঁলোক ৰক্ষা পৰিছিল বুলি কাৰ্বিসকলৰ মাজত লোকবিশ্বাস আছে। সিংহাসন পাহাৰত বন মানুহে বসতি কৰে বুলিও বিভিন্নজনে ক'ব বিচাৰে। বিশিষ্ট প্ৰকৃতিবিদ



Photo: Hari Krishna Baruah

ড০ আনোৱাৰউদ্দিন চৌধুৰীয়ে কেংলেংপ' নামৰ এক বৃহৎ মানৱ সদৃশ প্ৰাণী সিংহাসন পাহাৰত আছে বুলি জানিব পাৰি পাহাৰটোত প্ৰাণীবিধৰ সন্ধানত অভিযান চলাইছিল। নামনিত চামেলাংচ, লাংলোচক', বৰপুং, তাৰাপুং আদি অঞ্চলত কাৰ্বিসকলৰ লগতে কুকি জনগোষ্ঠীৰ লোকেও বসবাস কৰি আহিছে। স্থানীয় লোকে এই পাহাৰটোক 'সিংহাচন' পাহাৰ বুলি কয়। সিংহাসন পাহাৰৰ গাঁওসমূহৰ উত্তৰ-পূৰ্বাঞ্চলৰ বিদ্রোহী সংগঠণৰ বিচৰণ থলী হিচাপে চিহ্নিত হৈছে। উল্লেখ্য যে সিংহাসন পাহাৰ বে-দখল কৰি বহু লোকে ৰুম, আদা, আদি কৃষিকাৰ্য কৰিবলৈ লোৱাৰ ফলত পাহাৰটোলৈ ভাবুকি কঢ়িয়াই আনিছে।

কাৰ্বি আংলং জিলাৰ বনবিভাগে সিংহাসন পাহাৰত আজি পৰ্যন্ত সম্পূৰ্ণকৈ জৰীপ কাৰ্য চলাবলৈ সক্ষম হোৱা নাই। ৩৬ নং ৰাষ্ট্ৰীয় ঘাইপথৰ মাজাৰ পৰা কিলোমিটাৰ দূৰত্বত অৱস্থিত লুঙ্গিৰ পৰাই সিংহাসন পাহাৰৰ পাদদেশ। ২০১২ চনৰ ২৭ ফেব্ৰুৱাৰীত কাৰ্বি-আংলং জিলাৰ বন বিষয়া অভিঞ্জিৎ কুমাৰ ৰাভা, বনাঞ্চলিক বিষয়া ৰঞ্জন বৰুৱাসহ বনবিভাগৰ এটা দলে সিংহাসন পাহাৰত জৰীপ চলাইছিল। বন বিভাগৰ দলটোৰ লগত 'ৱাইল্ড লাইফ ট্ৰাষ্ট অৱ ইণ্ডিয়া'ৰ দুগৰাকী জাপানী নাগৰিকো আছিল। দুৰ্ভাগ্যজনকভাৱে দলটোৱে লগত 'ৱাইল্ড লাইফ ট্ৰাষ্ট অৱ ইণ্ডিয়া'ৰ দুগৰাকী জাপানী নাগৰিকো আছিল। দুৰ্ভাগ্যজনকভাৱে দলটোৱে জৰীপ চলাই উভটি আহোঁতে বন বিষয়া আৰু বনাঞ্চলিক বিষয়া দুগৰাকীক ৩ মাৰ্চত কাৰ্বি উগ্ৰপন্থী কে.পি.এল.টিয়ে অপহৰণ কৰে যদিও দৈৱক্ৰমে 'ৱাইল্ড লাইফ ট্ৰাষ্ট অৱ ইণ্ডিয়া'ৰ জাপানী লোক দুজন ৰক্ষা পৰে। উগ্ৰপন্থীৰ এনে বাধা প্ৰদানৰ বাবেই সিংহাসনৰ বুকুৰ বহস্য উক্ত জৰীপত উন্মোচিত হৈছিল যদিও পৰৱৰ্তী পৰ্যায়ত সিংহাসন পাহাৰৰ সংৰক্ষণৰ ক্ষেত্ৰত কোনো কাৰ্যকৰী ব্যৱস্থা গ্ৰহণ কৰা দেখা নগ'ল। যাৰ ফলত সিংহাসন পাহাৰত আজিও অব্যাহত আছে ব্যাপক বে-দখল। সিংহাসন পাহাৰৰ গন্ধি কচু, ধূনা, বেত, ওদাল, কৰপুৰ, অৰ্কিড, বাঁহজাতীয় আদি বনজ সম্পদৰ লুপ্তন অব্যাহত আছে। সিংহাসন পাহাৰত থকা হাতী, বাঘ, পছ, ৰাম ছাগলী, হলৌ বান্দৰ, ৰাজ ধনেশপক্ষী আদি কৰি বিভিন্ন প্ৰজাতিৰ বন্যপ্ৰাণী অস্তিত্ব বিপন্ন হৈ পৰিছে। অসমৰ প্ৰতিটো পাহাৰৰে গুৰুত্ব আছে যদিও চৰকাৰে আজিলৈকে পাহাৰসমূহ সংৰক্ষণত গুৰুত্ব প্ৰদান নকৰাত বহু নদ-নদী আজি বিলুপ্তিৰ পথত। সিংহাসন পাহাৰৰ জৈৱ বৈচিত্ৰতা তথা নদীৰ উৎপত্তিসমূহ বিপদাপন্ন হৈ পৰিছে যদিও কাৰ্বি-আংলং স্বায়ত্ত্বশাসিত জিলা পৰিষদ, অসম চৰকাৰ আৰু কেন্দ্ৰীয় পৰিৱেশ আৰু বন মন্ত্ৰালয়ে সংৰক্ষণৰ ক্ষেত্ৰত আজি পৰ্যন্ত কোনোধৰণৰ পদক্ষেপ গ্ৰহণ কৰা নাই।



TRAIN-ELEPHANT MISHAPS: The Causes of Present and Future Mortalities

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Photo: Udayan Borthakur

Introduction:

No Matter how revered are our elephants from the socio-religious viewpoint, developmental activities, must remember, are thick skinned and thick headed to the issues and ethos of conservation. It was lamented by the International Union of Conservation of Nature and Natural Resources (IUCN) that even after the term 'Conservation' was defined precisely in the World Conservation Strategy in 1984, the powers that be in the world, could not implement that even after the passage of the year 2K. This is the era when information is precious; speed is required to give everything a premium service. Also, there are markets at global, regional and local levels which are insensate

to the emotional factors that kept our animals safe through centuries. Man-Elephant issue used to be that of co-existence in the North-Eastern Indian. The coming of the Colonial era saw large acreage of forests being felled for raising extensive tea plantations, having a subsidiary ply-wood industry for tea-packaging, laying railway tracks to transport out the tea-chests and so on. The railway tracks needed clearance through the unbroken continuous jungles, the iron-steamer route from the upper Assam to Calcutta also took part in tea-transportation, the steam driven paddle boats required huge amounts of firewood or coal. The ultimate impacts were on the green cover and the animals therein. The simple job of encouraging

settlement in extensive areas in Kamrup District of the yore cost the colonial government over a lakh rupees in 1910¹, to pay the compensation for man wildlife conflict. Environmental costs could have been considerable for running colonial economy and structure. Till late 50's, there were no diesel locomotives in the North-East Frontier Railways. However, the major work force was steam driven and slow meter gauge engines which spanned from New Bongaigaon to upper Assam on both the banks of the Brahmaputra. Low speed, inherent jerky motion and difficulty in track maintenance kept the forward speed low and many collisions with elephants were possibly averted. Further, the frequency of trains were very low. Added to this was the pristinity of jungles which afforded very good habitat and shelter for elephants.

Keywords : Migration, conservation, *Elephas maximus* development, Locomotive engines.

Materials and Methods:

The primary data available with the Divisional Forest Officers of Goalpara, Kamrup East, Guwahati Wildlife Division, Sonitpur East Division, Karbi Anglong East and Karbi Anglong West Divisions of KAAC, Jorhat, Golaghat, Digboi, Tinsukia and Dibrugarh Divisions were collected and compiled in the office of the CWLW, Assam. Theses were subjected to GIS analysis. Analysis showed that the crossing points on the tracks definitely belonged to traditional movement patterns. In many new cases, due to degradation of habitat, the new collision points could be explained. Literatures available were studied in historical perspective. This indicated that the problem started with the introduction of Tea Cultivation and the Railway Tracks in the elephant habitat areas. In the height of elephant catching in Assam, the elephant population fell to about 3610 in 1917-18. It did not find much favour with the forestry fraternity⁶. The present day figure is put around 5100 individuals⁷. This is probably due to absence of licensed hunting and reasonable degree of ivory poaching.

Understanding Elephant Movements:

This is a key to finding a holistic solution to Man-Elephant Conflict of any kind. Also, one can have the power over prevention of any future mishaps and

consequent loss to the Habitat, Elephant Population, Human Life and Property. Except professional shikaries or poachers, nobody had tracked herds of elephants over a large tract of jungle or landscape in the North East India.

The movements of elephants driven by energy needs, seasonal availability of nutrients in the various Forest Types, water and carrying capacity of the species in a landscape. Asian Elephants (*Elephas maximus*) of the North East India are very selective feeders. As for example, while they go as a whole for new sprouts in a post burned *Terai-Bhabar* grasslands in Manas National Park. But leave the abundant Tora (Elephant Grass or *Alpinia allaughas*) plants till the mid August. The Simul Tree (*Bombax ceiba*) barks are not sloughed off and eaten till December-January². The habitats as per major forest types have different levels of productivity. The Moist Deciduous (3C1) forests have the maximum productivity whereas the Tropical Wet Evergreen (1C1(a) and 1C1(b)) is endowed with the least productivity. No wonder, the Nahor and the Hollong take so long to grow. When we find that the forest types evolve towards a climax stages of Semi-Evergreen to Evergreen types, they can behave negatively towards the elephant population, which is largely terrestrial. Maximum Distance Moved by elephants are governed by their mass, Field Metabolic Rate (FMR) and to certain extent, the terrain and geographical attributes. In a scientific study undertaken in South Africa, the elephants were reportedly found to consume 80% to 120% of their body weight per day per individual in a herd. If this as applicable in Indian Situation, a herd composed of 50 large elephants may need a minimum of 80-176 ton of forage per day. Considering three such herds in a small fragmented habitat, the requirement would be three fold. Now, all forests are not that productive and degradations of various levels do exist and naturally the cycle of movement becomes smaller. Resultant low regeneration of utilized habitat degrade quickly with anthropological pressure. Downstream development is that of loss of water regime. This cycle has become vicious over the years.

The south bank and the north bank elephant movement scenario depends upon the Hills-Valley-Hills continuum for survival of elephants. Elephants from the Khasi and Garo Hills traditionally descended to large water bodies like the Deepor (Sanskrit Deep, for

elephant) Beel of Kamrup and Urapad in Goalpara in the months following the month of April and remaining in the vicinity till the advent of the Autumn Season. Thereafter, they become dependent upon the jungle habitats of the hills till April, completing a cycle. A valley-valley migration of the elephants through the jungle of the plains were earlier known but never documented well enough. Till the Guwahati-Goalpara railway tracks carry on or herds frequenting the Deepor and Urapad wetlands vanish for some reason, the train locomotives will cause mortality to these hapless animals. If one wanted to avoid collisions, there should not be any trains running on the tracks between sunset and sunrise. Data available on train smashing up elephants show 100% cases happen in the night and are caused by speeding goods trains. Hill-Hill-valley-Hill configuration of movement is difficult and time consuming. But the informed sources who were jungle dwelling hunters in Karbi Anglong; say that such movements took elephants from the Karbi-Anglong to Khasi Hills areas. Some important crossing points are also gone; those who can remember that Ninth Mile-Jorabat section of the road was frequented by elephants which eventually went to Amchang, Chandrapur, digaru then into Khasi hills and may be to Nagaon jungles beyond the Kiling River.

Smash ups : The Raison d'être

It is not known how many wild animals were encountered daily and hunted down with much ado and bravado while the train lines were swathed through the various jungles to upper Assam via both the banks of the river Brahmaputra. It is on record that a British road builder always hunted down big games prior to his breakfast". For the Railway engineers, Tea-planters and Foresters; the triune bred by the British Raj there were common factors: the elephant herds, Tigers and leopards. They were the occupational hazards too. However, there were government prize money of Rs. 25 for a Tiger and Rs. 5 for a leopard that were hunted down. This was hiked from earlier Rs. 5 and 2 Rs. 8. Annas for a hunted tiger and a leopard respectively since 1870. This was a result of Imperial design of Agricultural expansion (read Tea growing)³. The elephant could be hunted under Elephant Control Licence. Late David Long Enghee, a legendary Karbi gentleman from Amrenng area under Hamren Sub

Division, who was a Travelling Ticket Examiner in the Railway Department has an unbroken record of shooting 300 elephants under elephant control licence. Many were tuskers with large sized tusks. Surviving photographs show that certain tusks were taller than him in length⁴. The majestic pachyderms were sources of Revenue for the Colonial Economy. As for example, the organized Mela-Shikar or Khedda earned Rs. 3,02,836 between 1875-1900. The estimated export price of an elephant in 1835 AD was Rs. 300 only. Though the earnings were initially put under the head of Minor Forest Produce they were a kind of precious property of the crown after all.

This brings us to the topic of ecological valuation of an elephant or a elephant population in Assam. This is pertinent for us to know in terms of valuation in USD or Euro or INR otherwise the insensate factors will neither listen nor understand a bit of elephant conservation. Though such studies in conservation of landscapes have been made in many ways, direct valuation of species is not done so far. The last known ad-valorem rate of Royalty for a species is that of Great Indian Rhinoceros in Assam. That was Rs. 5.00 lakhs per animal (1983)⁵. If the wildlife enthusiasts need to find a way, this can be good handle for enforcing elephant conservation measures. The animals like the elephants are the product and function of the habitat. If we found out the entire ecosystems services and the carbon sequestration (Going rate is USD300.00 per tone) that the habitat is producing plus the commercial value; the resident population of the habitat would be of that many USD or Euro Or INR worth. That is, even after leaving aside the genetic and other values. Some sense of whooping economic loss can be attributed to the carelessness of the railways and erring jungle keepers can be inculcated. In such cases, the sense of economic responsibility may be stupendous enough to make policy makers stand up, listen and do something positive and practical. At least, the worthiness of the species will prevail (Lord Ganesha must be smiling!).

The railway-lines on the south bank is the major offender. The track is bang on the many crossing points in an elephant habitat however fragmented. The Goalpara-Panikhaiti stretch notwithstanding, the same track goes through the MaratLongri-Dhansiri RF junction. Dhansiri has broken contiguity with nearby

Doldoli RF (From 'slushy area') and fareway Nambor to the north through civil and USF hills areas. The Kaziranga National Park and these areas are connected via a slim corridor at Panbari RF area. The over the hill view to the south of Bagori Range of KNP gives us the Dejoo Valley area. One of the earliest RF's Dejoo Valley North and South are here. From the Forestry point of view, this is the eastern culminating point of *Shorea robusta* (Dipterocarpaceae) from its western limit of Mohand near Dehradun. But, according to the working plans and reserve register of the undivided Nagaon Division, both of the RF's were de-reserved to a large extent. Now, a missile storage facility is being planned within the South Dejoo RF. This proposal was dealt with by CWLW of Assam's office sometime in 2007-08. The further fate is not known to this writer. The point emphasized here is that connectivity from KNP is lost via Dejoo Valley. At this moment, there are several big and small tea gardens in that valley including Amlakhi, Dejoo Valley, Lengteng, Kellyden and so on. Even establishments of tea gardens like the Behora, Sekonee, Hatikhulie are obvious signs of historical mistakes. Vast fields of paddy at the Nagaon District side of the Parkup Pahar had been marauded by elephant herds since 1980's. With earlier history of extensive forest operation under lease system and recurring jhumming even in PRFs, the elephant habitat in Karbi Anglong is not what that used to be in the late 1970's. Whatever remained has supported, with dwindling efficiency, a population of elephants which have to frequently cross the railway line cutting like parabola through it. The frequency of locomotives with high speed and traction has gone up. The traditional crossing points do not attempt crossing at any point of the track at any time. Therefore the future has grave portents. Antagonizemnt caused by introduction of Railway line can go away only when

the Railway lines are removed. This, everybody will agree, is not possible.

Suggested measures:

As suggested earlier, the following exercises would help in short in short and long term.

1. Tracking teams on elephant back, equipped with Global Positioning System, Solar charged Laptops and camera should track the elephant movement in the habitat (It is true for Assam). It will generate the data seasonal and diurnal, of approach to any area. This will be helpful in long term conservation planning versus any developmental activity.
2. Immediate organization of a group, paid against a time bound hectic project to know the ecological valuation of elephant population in Assam.
3. Formulation of ideas on the basis of the other two enumerated above.
4. Get Lungding-Dhansiri-Itanki ER under MIKE site with immediate effect.

Conclusion :

One must not take what he cannot give back. Humanity has taken toll of countless lives of species across the globe. Humanity is not humanity when it cannot perform the basic task of giving what it took away for fun or fancy or whatever. Antagonizement by animals is a misunderstanding by and of man. To understand conservation is to understand relationships with one and all of the creation. This is central to the human survival. Future generations of humans are dependent upon efficient and same functioning of present generations. For development and spiritual growth, the future generations are privy to all things unharmed and as they were of Nature. Only then, the humanity will live forever thorough generations of perfect offspring.

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“এক বৃক্ষ দশপুত্রসম”

বিগু দেৱী, বেলতলা
মোবাইল নং - ৯৫০৮৮৮৭৪২৬

অসমৰ বিভিন্ন কাকত আলোচনীত সঘনাই লেখা প্ৰকাশ হৈ থকা বেলতলা নিবাসী বিগু দেৱী বৰ্তমান অসম চৰকাৰৰ কৰ আয়ুক্ত কাৰ্যালয় কৰভৱনত কৰ্মৰত।



Photo: Udayan Borthakur

প্ৰকৃতিৰ অপৰূপ সৌন্দৰ্য্যৰাজিয়ে মানৱ জাতিক পৃথিৱীৰ জন্মলগ্নেৰে পৰা সুৰক্ষা প্ৰদান কৰি আহিছে। প্ৰকৃতিৰ এই অপৰূপ সৌন্দৰ্য্য আৰু বিস্ময়যুক্ত ক্ৰিয়া-কলাপত বিমুগ্ধ হৈ আদিম যুগৰে পৰা মানুহে প্ৰকৃতিক বিভিন্ন ধৰনে পূজা-পাতল কৰি আহিছে বুলি বিভিন্ন পৌৰাণিক কাব্যত উল্লেখ আছে। প্ৰকৃতিৰ বিভিন্ন সম্পদ সমূহ সংৰক্ষণৰ এইতো এটি উত্তম আহিলা বুলি ক’ব পাৰি। যিহেতু বৰ্তমান বনাঞ্চল ধ্বংসৰ যিখন ছবি আমি প্ৰত্যক্ষ কৰিছো, এই ধৰ্মীয় প্ৰভাৱৰ কাৰণে অলপ হলেও সংৰক্ষিত হৈ আছে বুলি অনুমান কৰিব পাৰি। আমি যদি অতি সুক্ষ্ম অনুভূতিৰে পৰ্য্যবেক্ষণ কৰো, আমাৰ চোতালৰ তুলসীজোপাৰ কথা ক’ব পাৰো।

“তুলসী দৰ্শনে পুণ্যাং স্পৰ্শনে পাপ নাশনং,
ছাঁয়ায়ং সৰ্ব তীৰ্থানি তুলসী ত্বাং নমো নমঃ।”

উক্ত শ্লোক ফাঁকিয়েই তুলসীজোপা দৰ্শনত মনটো পবিত্ৰ হৈ পৰে ধৰ্মীয় প্ৰতিটো কাৰ্যতে তুলসীজোপা অপৰিহাৰ্য্য। যি ঠাইত তুলসীৰ গন্ধ বতাহত প্ৰবাহিত হৈ

থাকে সেই অঞ্চলৰ চাৰিওদিন পবিত্ৰ হৈ থাকে। তাৰোপৰি তুলসীৰ পাত বিভিন্ন ৰোগৰ মহৌষধ বুলি সকলোৰে জ্ঞাত। কাতি বিহুত তুলসী পুলি ৰুই তুলসীৰ তলত মাটি চাকি জ্বলোৱা প্ৰথা সকলোতে আছে। সেই দৃষ্টিৰে লক্ষ্য কৰিলে বৃক্ষ পূজাৰ প্ৰভাৱতে তুলসী প্ৰায় সকলোৰে নিজৰ চোতালত আজিও সংৰক্ষণ কৰি আহিছে। তুলসীৰ দৰেই আমি সচৰাচৰ দেখিবলৈ পোৱা প্ৰতিজোপা নিজৰ চোতালত আজিও সংৰক্ষণ কৰি আহিছে। তুলসীৰ দৰেই আমি সচৰাচৰ দেখিবলৈ পোৱা প্ৰতিজোপা বৃক্ষই একোজোপা ঔষধি গছ বুলি ক’ব পাৰি। আমলখি, শিলিখা, আম, কঠাল, জামু, বকুল, মধুৰী, চন্দন, নীম, অৰ্জুন, খাজুৰী, তেতেলী, অমৰা, ৰুদ্ৰাক্ষ ইত্যাদি ইত্যাদি বহুতো বৃক্ষই মানৱ জাতিক সুমিষ্ট ফল যোগান ধৰাৰ লগতে সু-শীতল ছাঁ প্ৰদান কৰি আহিছে। সেয়েহে সংস্কৃত শাস্ত্ৰৰ এটি শ্লোকৰে ক’ব পাৰি।

“সেবিতব্য মহাবৃক্ষ: ফলচছায়া সমন্বিত :
যদি দৈবাৎ ফলং নাস্তি, ছায়া কেন নিৰ্বায়তে।”

অৰ্থাৎ, বিশাল বৃক্ষৰাজিক সেৱা কৰিব লাগে, কিয়নো বৃক্ষই ফল আৰু ছাঁ দুয়োটা যোগান ধৰে, যদিহে দুৰ্ভাগ্যবশত: বৃক্ষজোপাত ফল নধৰে, তথাপিও শীতল ছাঁ প্ৰদান কৰাত কোনোও বাধা দিব নোৱাৰে। ভূমি অৱক্ষয় ৰোধ কৰি পৰিবেশক সুৰক্ষা প্ৰদান কৰি আহিছে বৃক্ষৰাজিয়ে। বায়ুমণ্ডলৰ অধিকাংশ কাৰ্বনডাই অক্সাইড শোষণ কৰি জীৱজগতক বুজন পৰিমাণৰ অক্সিজেন যোগান ধৰি আহিছে, গতিকে গছ আমাৰ পৰম বন্ধু। “গছ থাকিলেহে মানুহ থাকিব” শ্লোগানতো সকলোৱে মনত ৰখা উচিত।

প্ৰাচীন কালৰ পৰা প্ৰচলিত বৃক্ষপূজাৰ বিষয়ে শাস্ত্ৰত উল্লেখ আছে। সেই ধৰ্মীয় প্ৰভাৱতেই এতিয়াও কিছুমান মন্দিৰ, নামঘৰ, শিক্ষানুস্থান প্ৰাংগনত ডাঙৰ বৃক্ষ সংৰক্ষিত হৈ আছে। ধৰ্মীয়স্থানত আহঁত, বেল, বৰগছ ইত্যাদি ধৰণৰ নানান বৃক্ষ ভক্তিভাৱত সংৰক্ষণ কৰা দেখা পোৱা যায়। আহঁত গছৰ তলত মৌৰ্য বংশৰ ৰজা অশোক তপস্যা কৰি ব্ৰহ্মজ্ঞান লাভ কৰিছিল সেয়েহে আহঁতগছ বোধিদ্ৰুম নামেৰেও জনাজাত। সেইদৰে জনবিশ্বাস মতে বেলগছত মহাদেৱ শিৱ আৰু বৰগছত নামঘৰৰ বুঢ়া-ডাঙৰীয়া থাকে বুলি প্ৰচলিত হৈ আছে। এনে ধৰণৰ ডাঙৰ ডাঙৰ বৃক্ষবোৰ মানুহে কাটিবৰ কাৰণে বৰ সাহস নকৰে। তেনেধৰণৰ গছক আতৰৰ পৰা প্ৰণাম জনায়। এই আধ্যাত্মিক ভাৱৰ প্ৰভাৱে গছ সংৰক্ষণৰ এটি যোগাত্মক দিশ বুলি ক’ব পাৰি। জীৱ জগতৰ কাৰণে সিংহভাগ অক্সিজেন আহঁতগছে যোগান ধৰে, গতিকে সকলোৱে যদি এজোপা গছ কাটিলে দুটি গছ পুলি ৰোৱাৰ এটি সুন্দৰ পদক্ষেপ গ্ৰহণ কৰে তেতিয়াহ’লে বৰ্তমান যি ভয়াবহ প্ৰদূষণ গা কৰি উঠিছে সেইয়া ৰোধ কৰাৰ এটি উত্তম উপায় হ’ব। সেয়েহে মহাপুৰুষ শ্ৰীমন্ত শংকৰদেৱৰ বাণীৰে আমি সংকল্পবদ্ধ হওঁ আহক “এক বৃক্ষ দশ পুত্ৰ সম।”

পৰিবেশ আৰু প্ৰকৃতি সুৰক্ষাৰ ক্ষেত্ৰত জনবিশ্বাসৰ কিছুমান প্ৰভাৱ শৈশৱৰ কিছুমান স্মৃতিয়ে সোঁৱৰাই দিয়ে। “মা’—দেউতা আৰু বৰদেউতাই কোৱা কথাবোৰ এতিয়াও মনত পৰে, “ভৰদুপৰীয়া ডাঙৰ গছৰ তললৈ যাব নাপায়, তাত হেনো দেৱতা থাকে, তেওঁলোকে জিৰণী লয় আমনি কৰিব নাপায়।” ভাবিলে বৰ ভয় লাগে। আৰু কোৱা মনত পৰিছে আমাৰ ঘৰৰ বাটেদি সন্ধিয়া সময়ত কেতিয়াবা বা ৰাতি ওখ বগা কাপোৰ পিন্ধা মানুহ এজন খোজ কাঢ়ি গৈ পিচফালে মিঠা আমজোপাৰ ওচৰতে নাইকীয়া হয়। সেইকাৰণে কোনোও অকলে সেই আমজোপাৰ তললৈ যাবলৈ সাহস নকৰে আৰু ওচৰতে থকা ঔটেঙাজোপা আৰু অমৰাজোপা তললৈও যাবলৈ বৰ ভয় লাগে। ঔটেঙাজোপাৰ তলত ভূত ওলায় বুলি কোৱা কথাষাৰত মনটো অজান ভয়াত কঁপি উঠিছিল। শৈশৱৰ

কোমল মনত ভয় আৰু ভক্তি ভাৱত গদগদ হৈ থকা সেই মিঠা আমজোপা, ঔটেঙা আৰু অমৰাজোপা সময়ৰ ধামখুমিয়াত নোহোৱা হৈ গ’ল। বৰ্তমান অঞ্চল বিশেষে এই জনবিশ্বাসৰ প্ৰভাৱ হ্রাস পোৱা কাৰণে বন অঞ্চল ধ্বংসৰ এটি কাৰণ বুলি ক’ব পাৰি। তাৰোপৰি সৰুতে সোঁৱাগছৰ ঠাৰি, বঙালী এৰা আৰু বকুল গছৰ ঠাৰিৰে দাঁত ঘৰিবলৈ কোৱা মনত পৰে। দাঁতৰ বিষ হ’লে বঙালী এৰাৰ এঠা লগালে ভাল হয় বুলি কয়। পেটৰ কিবা অসুখ হ’লে ত্ৰিফলা, মানে আমলখী, শিলিখা আৰু ভোমোৰাণ্ডাৰ গুৰি মিশ্ৰণ কৰি খুৱায়। মধুৰীগছৰ কোঁহ খুন্দি ৰস খালেও ভাল হয়। এনেধৰণৰ বনদৰৰ বিষয়ে প্ৰাচীন আয়ুৰ্বেদত পোৱা যায়। বিভিন্ন ঔষধি গছৰ পৰা ঘৰুৱা উপায়েৰে সেইসময়ত বন দৰৰ প্ৰস্তুত কৰি বিভিন্ন ৰোগৰ চিকিৎসা কৰা হৈছিল। বৰ্তমান বিজ্ঞানৰ যুগত উন্নতমানৰ প্ৰযুক্তিবিদ্যা অৱলম্বন কৰি সেই কেঁচা সামগ্ৰীসমূহৰ পৰাই বিভিন্ন দৰৱ, আয়ুৰ্বেদিক, এল’পেঠিকৰ বিভিন্ন ৰোগৰ কাৰণে দৰৱ প্ৰস্তুত কৰিছে। এই কথা বহুতে গভীৰভাৱে চিন্তা নকৰি মূল্যবান বৃক্ষসমূহ সংৰক্ষণত গুৰুত্ব প্ৰদান কৰা দেখা নাযায় যেন অনুভৱ হয়। এইটো মানৱ জাতিৰ কাৰণে বা সমগ্ৰ জীৱজগতৰ কাৰণে শুভলক্ষণ নহয়।

কিন্তু ব্যৱসায়িক দৃষ্টিৰে লক্ষ্য কৰিলে প্ৰকৃতি সুৰক্ষাৰ ক্ষেত্ৰত কিছুমান শুভলক্ষণ দেখা পোৱা যায়। উদাহৰণস্বৰূপে সাচী গছ, কদমগছ, যজ্ঞ ডিমৰু, তামোলগছ ইত্যাদি ধৰণৰ বহুতো মূল্যবান গছ ৰোপণত গুৰুত্ব আৰোপ কৰিছে। বৰ্তমান সময়ত সাচীগছৰ সু-গন্ধি তেলৰ ব্যৱসায় এটি অতি লাভজনক ব্যৱসায়, সেয়েহে এই বৃক্ষজাতি সংৰক্ষণ কৰি পৰিবেশ সুৰক্ষাৰ লগতে আৰ্থিক দিশটোত যথেষ্ট লাভজনক। তাৰোপৰি কদমগছ অতি সহজে ডাঙৰ হয়। কদমৰ কাঠ অতি নৰম বাবে জুইশলা শিল্পৰ বাবে অতি উপযোগী। সেইদৰে যজ্ঞ ডিমৰুৰ পাত তামোল গছৰ ঢকুৱাৰে ব্যৱসায়ভিত্তিত আহৰি গ্ৰহণ কৰিব পৰা সামগ্ৰী তৈয়াৰ কৰা দেখা যায়। গতিকে এই ধৰণৰ গছবোৰ সংৰক্ষণ কৰি তাৰপৰা ব্যৱহাৰযোগ্য সামগ্ৰী উৎপাদন কৰা হয় তেতিয়াহ’লে বৰ্তমান বহুলভাৱে ব্যৱহৃত পেলনীয়া প্লাষ্টিকৰ সামগ্ৰীৰ প্ৰদূষণক অলপ হলেও ৰোধ কৰিব পৰা হ’ব বুলি আশা কৰিব পাৰি অন্যহাতে আৰ্থিকভাৱে স্বাৱলম্বী হোৱাৰ এটি সুন্দৰ পথ। সেয়েহে আমি যদি অতি বহুলভাৱে অধ্যয়ন আৰু গৱেষণা কৰি বনাঞ্চল সংৰক্ষণৰ এটি মহৎ পদক্ষেপ কাৰ্য্যকৰী কৰিব পাৰো অদূৰ ভৱিষ্যতে এই সুন্দৰ পৃথিৱীখন গোলকীয় উষ্ণতাৰ কবলৰ পৰা নিঃসন্দেহে সুৰক্ষিত হ’ব বুলি আশা কৰিব পৰা যায়।



Photo: MPCD/Aaranyak

- আপুনি প্ৰকৃতিৰ লগত কেনেধৰণে জড়িত বা আপুনি নিজকে প্ৰকৃতিৰ মাজত কেনেকৈ বিচাৰে ?
প্ৰকৃতিৰ প্ৰথম শিক্ষা আমি সংস্কৃতিৰ পৰাই পাও আৰু আমাৰ অসমৰ সংস্কৃতিৰ ডাঙৰ কথা হ'ল যে মহাপুৰুষ শ্ৰীমন্ত শংকৰদেৱৰ দৰে এগৰাকী আমাৰ সাংস্কৃতিক চিন্তাৰ নায়ক হিচাপে পালো। তেওঁ কৈছিল, “যত জীৱ জঙ্গম কীট পতঙ্গম অগ নগ জগ তেৰি কায়া।” আৰু এই বাক্যতে তেওঁৰ প্ৰকৃতিৰ প্ৰতি থকা চিন্তা প্ৰকাশ পাইছিল। তেওঁৰ মতে, যিমান জীৱ-জন্তু আছে, যিমান কীট-পতংগ আছে, যিমান চলি থকা বা নথকা বস্তু আছে, এই সকলোৰে দেহ মাথো এটাই। আৰু সেই উপলব্ধি এতিয়াৰ বিজ্ঞানৰ উপলব্ধিৰ সৈতে সম্পূৰ্ণ একে। গতিকে, প্ৰকৃতিও আমাৰেই বা মানুহৰে এটা অংশ বুলি ভাবিবলৈ আমাক বিজ্ঞানে শিকায়। ইয়াতে বিজ্ঞান আৰু সংস্কৃতিৰ মিলন হৈছে যিটো এটা ডাঙৰ কথা আৰু সেই হিচাপেই মই প্ৰকৃতিক মোৰে বা আমাৰে এটা অংশ বুলি ভাবো লগতে প্ৰকৃতিয়ে মোকো এটা অংশ হিচাপে লোৱা বুলি বিবেচনা কৰো।
- ‘বিশ্বব্যাপী পৰিবেশৰ সংকটাত্মক’ হৈ আছে বুলি কোৱা হয়, বিশেষকৈ জলবায়ু পৰিৱৰ্তন। বিভিন্ন বন্যপ্ৰাণীৰ বসতিৰ ক্ষেত্ৰত এই সংকটাত্মক প্ৰভাৱৰ ওপৰত আপোনাৰ মতামত কি ?
সেয়া মানুহেই কৰা সমস্যা, গতিকে মানুহেই তাৰপৰা উদ্ধাৰ কৰিব লাগিব, সকলোৱে মিলি। দুৰ্ভাগ্যৰ কথা যে, আমি যিধৰণে ভাবিছিলো যে পৃথিৱীৰ বিভিন্ন দেশ বিলাক বিশেষকৈ শক্তিশালী দেশবিলাক আহিব, এইটো নোহোৱাৰ কাৰণে আমাৰো দোষ আছে, কিন্তু পৃথিৱীৰ বিভিন্ন ঠাইৰ পৰিবেশ কৰ্মীসকলে যিধৰনে এতিয়াও আত্ম উৎসৰ্গা কৰি আছে। তেনেক্ষেত্ৰত, এতিয়াও এটা আশা বাছি আছে।
- পৃথিৱীৰ অন্যঠাই বা দেশৰ তুলনাত অসম তথা উত্তৰ-পূৰ্বাঞ্চলৰ জৈৱবৈচিত্ৰৰ বৰ্তমান অৱস্থাৰ ওপৰত আপোনাৰ মতামত কি ?
স্বাভাৱিকভাৱে, অসম তথা উত্তৰ-পূৰ্বাঞ্চলক প্ৰাকৃতিক সম্পদৰ ভঁৰাল বুলি কোৱা হয়। কিন্তু, আমাৰ লোভ নে অজ্ঞানতাৰ ফলতেই নাজানো আমি প্ৰকৃতিক যিধৰণে বিনষ্ট কৰিছো, সেইটোলৈ চালে পৃথিৱীয়ে সামগ্ৰীক ভাৱে যিমান অন্যায়ে কৰিছে তাৰ তুলনাত কিন্তু আমি অত্যন্ত দায়ী, আমাৰ অপৰাধ কম নহয়। লগতে, আমাৰ ইমান চহকী সংস্কৃতি আৰু চিন্তা থাকোতে এই পৰ্যায় পাইছোহি, এইটোৱে অত্যন্ত মৰ্মাহত কৰে মোক।
- ‘গঁড় অসমৰ সম্পদ’ বুলি কোৱা হয়, কিন্তু অন্য জীৱ-জন্তুৰ তুলনাত কিয় গঁড়ৰ লোককথা বা বাখ্যা পোৱা নাযায় বা কম ?
আচলতে, আন প্ৰাণীৰ লগত মিলা-মিছা কৰা প্ৰাণীবোৰৰ বিষয়ে চৰ্চা অলপ বেছিকৈ হয়। আনহাতে, গঁড় অলপ আছুতীয়াকৈ থাকিব বিচাৰে বা বেছিকৈ সামাজিক সম্পৰ্ক এটা দেখা পোৱা নাযায়। এইটো কাৰণত সাধুসমূহত গঁড়ৰ ছবি বেছিকৈ প্ৰতিফলন নহয়। সেইটোও এটা কাৰণ হ'ব পাৰে। লগতে, গঁড় মানুহৰ কাষলৈ নাহে আৰু অন্য হিংস্ৰ প্ৰাণীৰ দৰে মানুহৰ মনত ত্ৰাস নথকাতেও এটা কাৰণ হ'ব পাৰে।
- বৰ্তমান সময়ৰ অসম তথা উত্তৰ-পূৰ্বাঞ্চলৰ আটাইতকৈ গুৰুত্বপূৰ্ণ পৰিবেশ সম্পৰ্কীয় সমস্যাটো আপুনি কি হয় বুলি ক'ব বিচাৰে।
পৰিবেশৰ সমস্যাবোৰ এটা আনটোৰ লগত জড়িত। এতিয়া গছ-গছনি নোহোৱাৰ ফলত নিৰ্মল বতাহৰ অভাব হৈছে। লগতে, অসমৰ বিভিন্ন প্ৰান্তত গাড়ী-মটৰৰ বাবেও যথেষ্ট বায়ু প্ৰদূষণ হৈছে। এই পৰিৱৰ্তনটো স্পষ্ট ভাৱে দেখিবলৈ পাইছিলো তেজপুৰ বিশ্ববিদ্যালয়ত। তেজপুৰ

বিশ্ববিদ্যালয়ত আৰম্ভণিতে যেতিয়া গৈ যোগদান কৰো ১৯৯৭ চনত, সেইখিনি সময়ত বিশ্ববিদ্যালয়ৰ চৌহদলৈ গ'লে উশাহত গোটেই ভিতৰখন পৰিষ্কাৰ হৈ অহা যেন লাগে। যিধৰণৰ অভিজ্ঞতা এখন হাবিলৈ গ'লে হয়, ঠিক তেনেধৰণৰ অভিজ্ঞতা তাত হৈছিল। সেইকাৰণেই তাত ৰাতিপুৱা খোজ কঢ়াটো আমাৰ কাৰণে বৰ আনন্দৰ কথা আছিল। কিন্তু বছৰ বছৰ ধৰি আমি দেখিবলৈ পাইছো যে বিশ্ববিদ্যালয়ৰ সংৰক্ষিত পৰিবেশটোৱে উশাহৰ বতাহখিনি ভাল কৰি ৰাখিব পৰা নাই। তাতো দ্ৰুত অৱনতি হৈছে আৰু এই পৰিস্থিতি অসমৰ বিভিন্ন প্ৰান্তত দেখিবলৈ পোৱা যায়।

গুৱাহাটী মহানগৰীৰ বায়ুতো নিৰ্মল বায়ুৰ তুলনাত ধোঁৱাৰ পৰিমাণ বৃদ্ধি হৈছে, যাৰ ফলত বাট-পথত ওলাব নোৱাৰা অৱস্থাৰ সৃষ্টি হৈছে। অলপতে মই বহুদিনৰ মূৰত এটা বিশেষ ৰাস্তাত খোজ কাঢ়িছিলো। তাত খোজকাঢ়োতে মোৰ এটা সময়ত এনেকুৱা লাগিছিল যেন মই ধোঁৱাৰ মাজত জীয়াই আছো। গধূলি সময়ত প্ৰদূষণৰ মাত্ৰা যথেষ্ট বেছি হয়। প্ৰায়ে মই নৈৰ পাৰতহে খোজ কাঢ়ো। গতিকে নৈৰ পাৰত খোজ কঢ়া আৰু সেইৰাস্তাত খোজকাঢ়াৰ মাজত ভয়ানক পাৰ্থক্য আহি পৰিছে।

• **আপোনাৰ মতে সাধাৰণ জনতাই কেনেকৈ দৈনন্দিন কাৰ্যৰে জৈৱবৈচিত্ৰ সংৰক্ষণত অৰিহণা যোগাব পাৰে ?**

আমাৰ সংস্কৃতিয়ে সকলো জীৱ-জন্তু, কীট-পতংগক শ্ৰদ্ধা কৰিবলৈ শিকাইছে, সেইবিলাকক কেৱল আঁতৰাই পঠাবলৈ কৈছে। কালীয় দমনৰ কিছুমান বাহিৰৰ উপাখ্যানৰ মতে কালীয়ক কৃষ্ণই নাচি নাচি মাৰি পেলাইছিল কিন্তু আমাৰ উপাখ্যানত কয় যে কালীয়ক এটা বিশেষ হৃদৰ পৰা আঁতৰি যাবলৈ কৈছিল কাৰণ সেইটো হৃদত মানুহে পানী খায়। গতিকে জীৱৰ লগত মানুহৰ সহবাস কৰাৰ যিটো প্ৰক্ৰিয়া, সেইটো আমাৰ কৃষ্টি-সংস্কৃতিত ভালকৈ আছে। সেই চিন্তা, গাঁৱে-ভূঁৱে সোমাই গ'লে, মানুহৰ লগত কথা পাতিলে তেওঁলোকৰ মাজত দেখিবলৈ পোৱা যায়। এতিয়া মূল কথা হ'ল যে, এই বিশ্বাসৰে আঁত ধৰি যোৱা কেইটামান দশকত পৰিবেশৰ যিটো দ্ৰুত অৱনতি হ'ল সেইটো ক্ষেত্ৰত পৰিবেশৰ কৰ্মীসকলে আগবাঢ়ি আহিছে ঠিকেই কিন্তু লগতে এই সমগ্ৰ অসম জুৰি এই চেতনাটো যদি ঘূৰাই অনাৰ প্ৰক্ৰিয়া কৰিব পাৰে তেন্তে মই ভাবো ই অত্যন্ত আশাৰ কথা হ'ব।

• **আপোনাৰ প্ৰকৃতি বা বন্যপ্ৰাণীৰ লগত কিবা স্মৰণীয় অভিজ্ঞতা আছে নেকি ?**

সৰুকালৰ এটা ঘটনা মনত আছে। মই সৰুৰে পৰা গুৱাহাটীতে ডাঙৰ হৈছো। আমাৰ ঘৰ আছিল উত্তৰ গুৱাহাটীতৰ ৰংমহলত। সৰুতে মই পথাৰৰ মাজত শুই বহুত আনন্দ পাইছিলো। এদিন সেই পথাৰৰ পৰা আগবাঢ়ি গৈ গৈ কাষৰ হাবি এখনত সোমাই গৈছিলো। মই বাট হেৰুৱাইছিলো হাবিখনৰ মাজত। কিন্তু হাবিখন বেছি ডাঙৰ নাছিল বাবে কাষৰ গাঁওখনৰ মানুহে মোক বিচাৰি অহা খোজৰ শব্দ শুনিবলৈ পাইছিলো। মোৰ বিশ্বাস আছিল যে মই নিৰাপদ, সেয়েহে মই তাত বৈ আছিলো। কিন্তু, সেইসময়খিনি সঁচাকৈ অপূৰ্ব আছিল, তাত থকা গছ আৰু চৰাইবিলাকৰ সৈতে একাত্ম হোৱাৰ এক অদ্ভুত প্ৰক্ৰিয়া আৰম্ভ হৈছিল। সেই সময়ত মোৰ বয়স ৭ ৰ পৰা ৮ বছৰৰ ভিতৰত হ'ব। কিন্তু সেই সময়তে যি উপলব্ধি হৈছিল সেই অভিজ্ঞতাই মোক এতিয়াও ৰোমাঞ্চিত কৰে। সেইখিনি সময়ত এক হৈ থকা বুলি কওঁ যদিও এতিয়া আমি প্ৰকৃতিৰ পৰা বহুত বিচিন্ন।

• **আপোনাৰ মতে, আৰণ্যক বা তেনেধৰণৰ সংস্থাসমূহৰ জৈৱবৈচিত্ৰ সংৰক্ষণত ভূমিকা কেনে বুলি ভাবে ?**

দৰাচলতে, আৰণ্যকে যিধৰণে নিজকে প্ৰতিস্থা কৰিছে আৰু যিধৰণে পৰিবেশৰ সমস্যাবোৰৰ মুখামুখি হোৱাৰ ক্ষেত্ৰত ভূমিকা লৈছে সেয়া অত্যন্ত প্ৰশংসনীয়। এতিয়া অসমত পৰিবেশৰ চিন্তা কৰা বুলি ক'লে, 'পৰিবেশৰ চিন্তা' আৰু 'আৰণ্যক' প্ৰায় এক হৈ গৈছে। যিকোনো পৰিবেশৰ চিন্তাৰ কথা ক'লে আৰণ্যকৰ কথা নভবাকৈ নোৱাৰি। আৰু ই এক সত্য কথা। আৰণ্যকে এটা নেতৃত্ব দিব পাৰিছে আৰু পৰিবেশৰ সমস্যাৰ সৈতে মুখামুখিকৈ যুজিছে, ই এক ডাঙৰ কথা। লগতে ই বহুতো পৰিবেশকৰ্মীৰ সৃষ্টি কৰিছে, যিটো আজিৰ পৰা ২০ বছৰ বা ৩০ বছৰ আগতে ভবাটো অসম্ভৱ আছিল।

• **আপুনি বসবাস কৰা গুৱাহাটী মহানগৰীত পৰিবেশ সংৰক্ষণৰ ক্ষেত্ৰত ল'ব লগা ভূমিকাৰ বিষয়ে আপোনাৰ মতামত কি ?**

গুৱাহাটীত এটা সুস্থিৰ পৰিবেশ ধৰি ৰখাৰ বাবে কৰিব লগীয়া বহুখিনিয়ে আছে। তাৰে ভিতৰত আটাইতকৈ দুখ লাগে যে আমি সৰু থাকোতে মোৰ বন্ধুসকলে সাঁতুৰা ভৰলু নদীৰ পানী এতিয়া দূষিত আৰু তেনেকৈ মই সাঁতুৰা দীঘলীপুখুৰীৰ পানীও এতিয়া দূষিত। গতিকে এইয়ে পানীও দূষিত কৰিলো, মাটিও দূষিত কৰিলো। সেইবোৰৰ পৰা কেনেকৈ পৰিত্ৰাণ পোৱা হ'ব। সেইটোৰ চিন্তা সামগ্ৰীকভাবে যিটো পৰ্যায়ত হ'ব লাগিছিল, সেইক্ষেত্ৰত এটা অনুষ্ঠানে কৰাতকৈ চৰকাৰো তাৰ লগত ব্যাপক পৰ্যায়ত জড়িত হোৱাৰ প্ৰয়োজন আছে।

MY WONDERFUL EXPERIENCE

WITH
AARANYAK

Mary Gaduk

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I honestly had an astounding experience with Aaranyak on “9th Field Course in Conservation Biology and Global Health”, at Gibbon Conservation Centre, H. Gibbon Wildlife Sanctuary, Assam, held from 10th to 14th December, 2018. It would be unquestionably hopeless for anyone of us to work to save wildlife without working to educate the young generation of conservationists. I belong to a community Adi (Bori) that has heaps of hunting pressure in the past, present and Arunachal Pradesh as a whole. This practice paved a way and as I grew up I became crystal clear about my dream. The situation of my state towards conservation of wildlife is at risks and we need many youngsters’ to come up in the field and volunteer to fill the research gap along with promoting conservation communication with the locals. I want to be one amongst them. As I am on my budding stage of learning with trial and error method, Aaranyak is one of such organization who reflects about safeguarding wildlife and the motivating platform to boosts up one’s own self confidence to become active conservationists in the near future and inspiration for better guidance and engine for learning.

The course focuses on a variety of topics relating to Conservation Biology and Global Health with a special focus on the Human-Environment Interface. The smooth classroom talks included field study method (line transect), with population assessment, Primates Diversity of North-East India and its Conservation, Vulture Conservation, an Introduction to an Asian Elephant, an Introduction to Global Positioning System, Conservation of Rhinos, Ficus towards conservation of Biodiversity, Introductory identification difference between poisonous and non-poisonous snakes, and filmed demonstration on uses of foldscope. Participants were allocated into four groups; hiking two transects a day in the morning for the two days with hands on training on the field observation technique, equipment and technology (such as GPS, camera- trapping, and range finder). As we walked through the track we sighted Rhesus macaque, Hoolock Gibbon, Pig tailed macaque and

capped langur. However, the thrill was to sight Capped langur and Pig tailed macaque first time ever in the wild. Community outreach programme involved drawing competition for school students with awarding prizes and screening to create impact on community education.

The course was well organized, time valued, enlightenment and informative. The resource persons were very thoughtful and keenly interactive. This training upturns my curiosity and lift up my self-confidence to keep working for conservation of nature so as someday to wake up my people from darkness and come forward to create impact towards saving our dwindling wildlife. I met my expectation and in fact till now my best learning experience. Participants had the wonderful experience of learning and handling GPS, range finder, blow gun and setting of the camera for the very first time and hence felt like proud wild lifers. The training exposed me to the world of new technology such as foldscope, which was never known to me till I attended the course and immediately ordered online on amazon

as soon as I returned from the field which is an instant impact. The activity of pre-and post-test conducted by Prof. Randel Kyes to evaluate our performance was pretty innovative and had handful impact to the participants. It is extremely commendable that the course was very diverse and we managed to cover the entire syllabus within short duration of four days.

I admire and bow my respect to a society that work with local people for conservation of biodiversity of Northeast in particular and India as whole. I put my gratitude with thanks for giving me this great chance to be part of the programme and making the course worthy to applause. My sincere thanks are due to Dilip Chetry in particular, Prof. Randel Kyes, Mridu Paban Phukan and the entire respectable resource person for skipping their valuable work for building us mentally and physically to come out better and make this world a better place to live. A big thanks to my fellow participants, nothing could be better without all of them and the staffs who contributed in the training course.



PROTOCOL TO DEAL WITH CONFISCATED SNAKES

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Confiscation by government authorities is a means to discourage illegal trade to assist conservation. As a solution to snake confiscation, the authorities should put a humane solution by releasing the animals 1. Back to the wild, 2. Held captive in the lifelong care facilities (Zoo, rescue center, aquaria etc) 3. Humanly destroy (euthanize) them. However it is to be mentioned that any of the above option must have to be made in accordance to wildlife protection act 1972 and any release to the wild must include the necessary screening and monitoring to address potential negative impacts, as set forth in the IUCN guidelines for reintroduction (IUCN 1998). Most important source of confiscated snakes are from Snakes charmers and the most common species confiscated are *Naja naja* (Binocled Cobra), *Naja kaouthia* (Monocled Cobra), *Ptyas mucosa* (Indian Rat Snake), *Coelognathus radiatus* (Copper headed Trinket Snake), *Gongylophis conicus* (John's Sand Boa), *Eryx johnii* (Red Sand Boa), *Chrysopelia ornata* (Ornate Flying Snake), *Ahaetulla pulverulentus* (Vine Snake).

Option 1: Back to the wild:

Confiscated snakes whose origin are known or are freshly captured from a known local area can be released back to the wild after proper veterinary screening. Also fit individuals of a species that is naturally distributed in the area of procurement can be assessed for release only under expert opinion.

However, following are the difficulties to release confiscated snakes into the wild:

1. Confiscated snakes are often found in a poor health state. Many of the venomous species like cobra are defanged and carry mouth rot disease. Thus mortality is high and a weak snake unlikely to survive in the wild.
2. Many xeric adapted species like Sand boa, Royal snake cannot survive in mesic areas like Northeast India if released into the wild.

3. Snakes released into the wild outside natural range might become pest or invasive species that may replace native biodiversity.
4. Confiscated snakes often carry disease and parasites that can infect wild species if released into wild.
5. Provenance of confiscated snakes are often remain unknown thus difficult to ascertain the geographical race of the species.
6. Confiscated snakes often belong to common species and doesn't belong to high conservation category. Thus generation resource (e.g. financial) for release into wild becomes difficult.

Option 2: Captive Care

Keeping confiscated snakes in temporary captive care might help the snake to be fit enough for release into wild. On the other hand, life time care facilities (Zoo, rescue centers, aquaria) help in Snake awareness, as a stock for future captive breeding programme and potential use in conservation and other valuable research programme.

The costs of keeping snakes in captivity might include:

1. A diseased snake might infect other captive snakes.
2. Long time captive care of ever increasing number of confiscated snakes require space, finance and expertise not readily available and the practice often overpopulate the cage degrading the care facility.

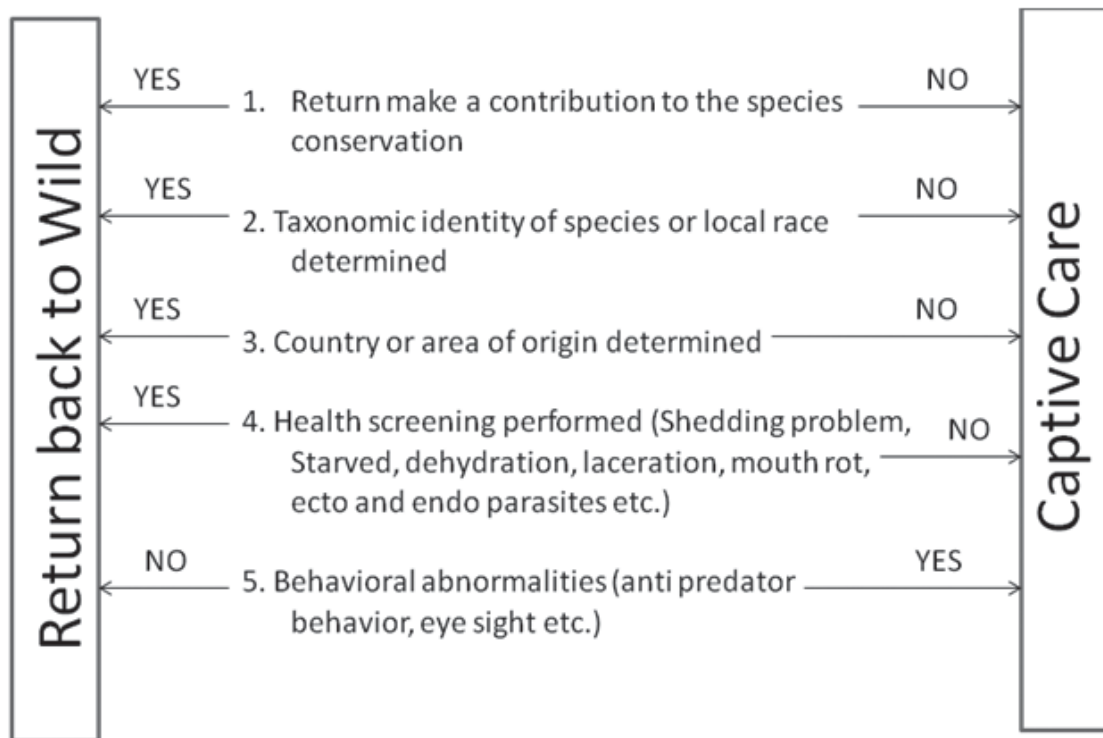


Figure: Five question after snake confiscation

Reference:

IUCN guidelines for the placement of confiscated animals. Approved by the 51st meeting of the IUCN council, Gland, Switzerland, February, 2000.

Aaranyak

Composed by:
Tushar Ghosh
G-680

From time immemorial
On this earth
Prior to pre-historic age
Since homo-sapien's birth
Reigned supreme in men's heart
And inexplicable wanderlust.

Aeons passed, terra and depths
Sky and space got explored
Inch by inch remotest corners
Unseen even got exposed.

Tenzing to Gagrin, Scott to Chawla
Amundsen to Armstrong excelled
The grey-matters enhanced by
Science incredible has always prevailed

The fires still burns more intense
with conservation's and research's flame
Why not? As 'Aaranyak' shines
In this darkest world, like a gem!



WILDSCAPES

FROM A NATURE WORSHIPER

Illustrations: Deborshee Gogoi

This photo essay is adorned with cartoons by Deborshee Gogoi, a wildlife cartoonist from the easternmost district of Assam i.e Tinsukia, who has been cartooning for the last 30 years. Primarily his cartoon subjects include human atrocities on wildlife and nature.

He believes that cartoon is one of the most influential medium that can draw attention, make people laugh and at the same time make them think about the wrong happenings around them. It is one such medium which can be understood by everyone irrespective of his or her educational background. Apart from cartooning he is also interested in bird watching, photography and trekking. In 2016, he recorded 'White-browed Crake' (along with his friend Porag J Phukan) from Maguri-Motapung wetland, an IBA site located in the district of Tinsukia, Assam. This was the first record of the bird from South Asia.

Presently he is focusing on creating awareness about rich biodiversity of Northeast India through his cartoons. He founded his own brand under the name and style of 'Wildscapes' that basically deals with wildlife merchandise. He is a 'Nature Worshiper' and believes Mother Nature as 'Supreme'.



Amazon Tribe Faces Extinction due to illegal Logging



Man-Elephant conflict on Intellectual Property



Climbers have left behind tons of rubbish from all of the mountains and now that they carried with them up the slopes over the years. Some of the greatest accounts of rubbish on Mount Everest are located in the "death zone" about 4000m

Birds of Northeast India



Black-breasted Parrotbill (VUL)



White-bellied Heron (CR)



Blue Pitta (LC)



Austen's brown Hornbil (NT)



Bugun Liocichla (CR)



Fire-tailed Myzornis (LC)



Chestnut-breasted Partridge (VUL)



Chestnut-backed Laughingthrush (NT)



Rufous-throated Partridge (LC)



Red-headed Vulture (CR)



Blue-eared Kingfisher (LC)



Large blue Flycatcher (LC)

Are you sure, this is the same wetland we visited last year?



Don't be afraid, See I am only a birder... not a photographer



Please don't kill me...I am the last surviving male of my species



I am sorry but you have broke the wildlife law by keeping Schedule-I species under your possession

Now I know, what happened to my lost parents.



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EXPLORATION FOR GENETIC EVIDENCES OF BENGAL TIGER (*PANTHERA TIGRIS TIGRIS*) PRESENCE IN DAMPA TIGER RESERVE, MIZORAM

Author

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Abstract:

Noninvasive genetic sampling provides ways of confirming presence and estimating population size of elusive species such as Bengal Tiger. These tools are especially useful in areas of low population density and physically challenging mountainous terrain. In the present study, carnivore scats were collected from the Dampa Tiger Reserve located in the state of Mizoram to genetically identify samples of tiger origin and to estimate the minimum number of individuals present. The field sampling of scats was undertaken by the Field Director, Dampa Tiger Reserve, during regular anti-poaching patrolling jointly with Aaranyak and WWF during December 2011 to March 2012. Genetic species identification using mitochondrial DNA based markers confirmed that nine out of the twenty six scat samples collected from Dampa Tiger Reserve were of tiger origin. Further, three unique multilocus genotypes were identified from nine tiger scats using polymorphic microsatellite markers. The present study demonstrates the utility of noninvasive genetic tools in studying elusive species in low density areas.

Keywords: Dampa Tiger Reserve, *Panthera tigris tigris*, noninvasive genetics, mitochondrial marker, microsatellite marker

Introduction:

Bengal tiger (*Panthera tigris tigris*) is protected as a Schedule-I species under Wildlife (Protection) Act, India (1972) and categorized as Endangered by IUCN Red List (IUCN 2012). Population monitoring of large carnivores such as tiger is difficult to conduct because they are rare and roam over large distances and remote areas (Schipper et al. 2008). Some of the present methods of enumeration of tigers include pugmark study, photographic capture with remotely triggered cameras and noninvasive genetic analysis of scats. The photographic capture method has been widely used for estimation of population size of tigers over the years (Karanth and Nichols 1998, Karanth and Sunquist 2000, Karanth et al. 2004, Simchareon et al. 2007). However, the method has a number of potential drawbacks especially in low density areas (Mondol et al. 2009). In the given context, noninvasive genetics tools can be effectively used for estimating tiger population.

In India, the noninvasive genetic technique has been successfully implemented for estimation tiger population in recent years (Mondol et al. 2009, Borthakur et al. 2011, Borthakur et al. 2013). The method involves identification of genuine tiger scats from other sympatric

tric carnivore species using mitochondrial markers. In the next step, polymorphic microsatellite markers are used for the identification of individual tiger through determination of unique genetic profiles of individuals. Further, sex identification of tiger individuals is carried out using sex-chromosome associated markers. Apart from population estimation, noninvasive genetic sampling of wildlife population is a powerful tool for assessing demography, gene flow, population structure and this technique is increasingly used in conservation genetics (Sharma et al. 20013, Reddy et al. 2012).

In the present study, carnivore scat samples were collected from Dampa Tiger Reserve (DTR), as part of a joint effort of the Field Directorate, Dampa Tiger Reserve (DTR), Aaranyak and WWF-India. The scat samples were analyzed in the Wildlife Genetics Laboratory of Aaranyak, Guwahati to identify samples of tiger origin using species-specific mitochondrial marker and thereby determine locations with tiger presence in the area. Further, the number of individuals in the confirmed tiger samples was determined, which provides the minimum number of tigers present in DTR.

Materials and Methods

Study Area

Dampa Tiger Reserve (Figure 1) lies in the Mamit district of Mizoram, with an area of 988 km², of which 500 km² is categorized as the core area. Mizoram lies in the Indo-Burma global biodiversity hotspot, with an impressive forest cover of 90.69% and 39% notified forest area of the total area (FSI India State Forest Report 2011). With the state of Mizoram sharing international boundary with Myanmar (404 km) and Bangladesh (318 km), DTR share its western boundary approximately 76 km (62 km of the core area) with Bangladesh by River Saza. The geographic location of DTR to that of Myanmar and Bangladesh makes it an important corridor for gene flow of tigers from the source populations of northeastern India (Jhala et al. 2008), such a Pakke-Nameri population, which is contiguous till Namdapha in the east and further extending south to DTR. The major source population of Kaziranga is connected to this forest extent through Karbi-Anglong Hill forests. Thus, Dampa may establish a potential corridor for long term gene flow to that of Myanmar and Balgladesh. Jhala et al. (2011) in their

report on the status of tigers in India suggests that this region could support a viable tiger population if managed as a trans-boundary population with Myanmar and also with contiguous forests with Bangladesh. Ahmed and Talukdar (2010) in a report submitted to the NTCA of India stated that the DTR is one of the important landscapes in the Indo-Bangladesh border with contiguous forests in both the countries that could be an ideal site for transboundary conservation of flora and fauna that facilitates migration of species across the border. DTR has some connectivity to that of Kassalong Reserve Forest on Bangladesh side (Ahmed and Talukdar 2010), where there are reports of tiger presence. This area is already within an area classified as a Tiger Restoration Landscape, contiguous with the Northern Forest Complex-Namdapha-Royal Manas Global Priority Tiger Conservation Landscape (Sanderson et al. 2006).

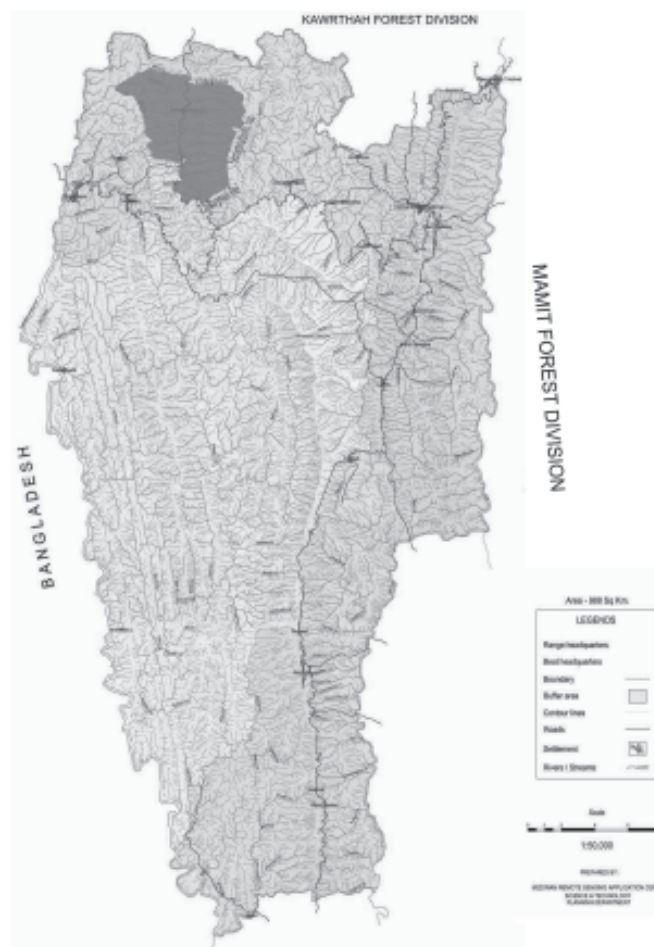


Figure 1: Map showing Dampa Tiger Reserve, Mizoram, indicating range & beat headquarters

Collection of Carnivore Scat Sample

Field survey for carnivore scat collection was carried out by a joint team of the Field Directorate, DTR and a field team from Aaranyak and WWF-India during December 2011 to March 2012. The entire team was divided into two units and each unit undertook survey for multiple days in different tracks running from the north to the south of the Tiger Reserve. Scat samples collected during this survey were transported to the laboratory, where these were kept at -20°C until DNA extraction. The GPS locations of all the scat samples were also noted during field sampling for future reference.

Extraction of DNA

DNA extractions for all the scats were performed using the guanidine isothiocyanate - silica based protocol, albeit with few modifications from Boom et al. (1990). All DNA extractions were performed in a room dedicated to low copy-number DNA work. For every extraction, negative controls composed of reagent blanks without the scat sample were included to monitor contamination.

Genetic Species Identification :

We have used four mitochondrial genetic markers developed by Mukherjee et al. (2007) for identification of tiger scats. These are Polymerase Chain Reaction (PCR) based mitochondrial markers where the species identity is based on the presence or absence products of specific size, determined through agarose gel electrophoresis. PCR reactions were carried out using QIAGEN Multiplex PCR Kit (QIAGEN, Germany) following standard PCR conditions described by Mukherjee et al. (2007). 10 μl volume of PCR reaction were performed, using 2.5 μl of scat DNA.

Microsatellite Genotyping :

A panel of 8 highly polymorphic microsatellite loci optimized by Borthakur et al. (2011) for individual identification of tigers were used for genotyping tiger scat samples. The forward primers of each microsatellite marker used in the study were labelled at the 5' end with fluorescent dyes viz., 6-FAM (blue), PET (red), VIC (green) or NED (yellow), while the reverse primers were not labelled. All the PCR were carried out in multiplex of four loci in a single 10 μl

reaction, each loci labelled with a separate fluorescent dye. Multiplexing were carried out using QIAGEN Multiplex PCR Kit (QIAGEN, Germany) following standard kit protocols for reagent concentration with 0.2 μM of each primer and 2.5 μl template DNA. The thermal cycling were performed with 95°C initial denaturation for 15 min, followed by 40 cycles of 94°C for 45 sec, 52°C for 45 sec and 72°C for 60 sec followed by a 72°C for 15 min final extension step. PCR products generated after amplification were loaded in a capillary electrophoresis based ABI 3130 Genetic Analyzer (Applied Biosystems, USA) and the allele sizing were done using the software Peak Scanner V1.0 (Applied Biosystems, USA).

Tables 1: Results of five microsatellite markers used for individual identification of the 9 tiger scat samples.

Locus Name	No. of Alleles	Allele Range	ADO (%)	FA (%)
Fca628	4	93-109	0	0
HDZ170	3	210-222	0	0
Ple51	3	185-199	0	0
HDZ700	3	139-153	0	0
F53	5	125-159	0	2

Genetic Analysis :

Each sample and loci were typed for three or more replicates depending on the genotype discrepancy (Navidi et al. 1992) and consensus genotypes were created from these repeat genotypes. Microsatellite genotyping errors principally arise due to allelic drop-out (ADO) or false alleles (FA), these two types of error were also estimated using the software GIMLET v 1.3.3 (Valiere 2002). From the microsatellite genotype data the probability of identity (PID) and Probability of identity among siblings (PID-sibs) were calculated using the software GIMLET v 1.3.3 (Valiere 2002). The unique multilocus microsatellite genotypes, i.e., individual tigers were identified using the identity analysis module of the program CERVUS (Marshall et al. 1998). Sex identification for all the confirmed tiger scat samples were performed using the Y chromosome linked SRY loci as demonstrated in the domestic cat

individualization panel, MEOWPLEX (Butler 2002, Butler et al. 2002), following the methodology described by (Borthakur et al. 2011).

Results :

A total of 26 carnivore scat samples were collected from DTR during the field survey. The DNA extractions were carried out for all the 26 scats. Genetic analysis showed that 9 out of the 26 scat samples were of tiger origin. 11 samples were found to be of non-tiger origin while the rest of the samples failed to produce any result.

Out of the 8 microsatellite markers used, 5 markers viz., Fca628, HDZ170, Ple51, HDZ700, and F53 produced usable data and were selected for further analysis (Table 1). The genotyping error rates i.e., ADO and FA for these 5 markers ranged between 0 to 2% (Table 1). The productPID and PID-sib values were found to be 1.08×10^{-4} and 1.94×10^{-2} respectively (Figure 2).

The programme CERVUS identified 3 unique multilocus genotypes i.e., three individual tigers out of the 9 tiger samples. Molecular sexing confirmed two of the three individual tigers identified from scat DNA as male while the sex identity of the third individual could not be determined after repeated sexing PCR assay.

Discussion

The present study confirms the presence of minimum three tiger individuals in the Dampa Tiger Reserve, Mizoram. The results also demonstrate the applicability of noninvasive genetic tool as an alternative to the traditional field based methods such as camera trapping for

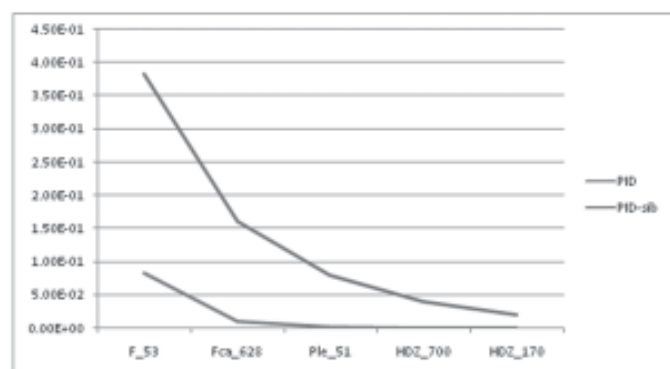


Figure 2: Graphical representation of PID and PID-sibs value of the five microsatellite markers in 9 tiger scat samples from Dampa Tiger Reserve.

monitoring of tiger, especially, in low density reserves such as Dampa. Further, Dampa Tiger Reserve covers an area of 988 km² which is characterized by high altitude mountains that are fed by hundreds of streams and rivers (Devi et al. 2011) and setting up of camera traps is often difficult owing to requirement of a large number of cameras and skilled personal for such an exercise. On the other hand, collection of noninvasive samples such as scat can be effectively carried out by trained local forest staff giving greater efficiency in terms of area coverage and greater capture probability.

Acknowledgements

We are thankful to the National Tiger Conservation Authority, Govt. of India, for providing necessary permission for collection of scat samples from Dampa Tiger Reserve. We thank Field Entertainment Inc. USA for providing funds to Wildlife Genetics Division for undertaking this genetic study. We are also thankful to the officials and staff of Department of Environment and Forest, Mizoram and Field Directorate, Dampa Tiger Reserve for entrusting upon us by providing us scat samples collected from the area as well as allowing us to work in the area for tiger

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LAND USE / LAND COVER CHANGE IN HOLLONGAPAR GIBBON WILDLIFE SANCTUARY AND BUFFER AREAS USING GEO-SPATIAL TECHNOLOGY

Author

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Abstract:

This study was carried out in Hollongapar Gibbon Wildlife Sanctuary and 1 kilometer buffer area. It covers a total Geographical area of 47 square kilometer, out of which Wildlife Sanctuary covers an area of 20.98 square kilometer. An attempt was made to evaluate the changes that have taken place between 1989 to 2011. Remote Sensing and Geographical Information System was extensively used for analyze the land use/ Land cover change pattern. Satellite imageries of Landsat TM, USGS of 1989, IRS P6 LISS III of 2003 & IRS P6 LISS III of 2011 satellite imageries were used for analysing of Land Use-Land Cover change analysis. Different Image Processing techniques were applied by using ERDAS 9.1 software, such as Spectral & Radiometric Enhancement to improve the quality of the imagery to acquire more information for interpretation. Subsetting of satellite images were done. Handheld GPS Garmin 60 was used to acquire the Geographical position and ground verification. In the present study visual interpretation was done by Arc GIS 9.3 software. Base map of different vector layers such as roads and wildlife sanctuary boundary were digitized from Survey of India Topographical sheet No. 83J/6. ASTER DEM 30 meter resolution data was

used to analyze the elevation range of the study area. The study shows the decreasing trend of area under Evergreen forest from 1989 to 2011. In 1989, Evergreen forest represents 15.74 Sq. Km (33.48%), It has decrease to 13.24 Sq. Km (28.17%) in 2003 and followed by 11.57 Sq. Km (24.61%) in 2011. On the other hand, it has been observed that the area under tea garden has the increasing trend from 1989 to 2011. In 1989, the area under Tea garden covers an area of 15.65 Sq. Km (33.27%) and in 2011, it covers an area of 13.24 Sq. Km (28.17%).

Key Words:

Remote Sensing, GIS, Land use, Satellite Image.

Introduction:

North-eastern region of India, counted among the world's 34 biodiversity hotspots, has remained a biological frontier even well into the twenty-first century. Recent explorations into these forests have continued to yield discoveries of new species and range extensions for many faunal groups (Athreya 2006; Das et al. 2006; Datta et al. 2003; Mishra et al. 2006; Pawar and Birand 2001; Sinha et al. 2005). This region's Upper Brahmaputra Valley harbors wet alluvial grasslands and

lowland tropical evergreen forests, regarded among the most threatened forest types in the world. The biologically diverse and unique Upper Brahmaputra Valley of north-eastern India has experienced a historical deforestation of its tropical lowland forests over the last two centuries. Extensive land-use changes, mainly brought about by the expansion of tea plantations and agriculture, has resulted in the dramatic transformation of the once contiguous forests of the region into many small and isolated forest fragments that extend over less than a quarter of the valley today. Land cover and land use are often assumed to be identical, they are rather quite different. Land cover may be defined as the biophysical earth surface, while land use is often shaped by human, socio-economic and political influence on the land (Nagendra *et al.* 2003).

Information on land use / land cover in the form of maps and statistical data is very vital for spatial planning, management and utilization of land for agriculture, forestry, pasture, urban-industrial, environmental studies, economic production, etc.(Chopra *et al.* 1997). Remote sensing, integrated with Geographic Information System (GIS), provides an effective tool for analysis of land-use and land cover changes at a macro, meso and micro level which could potentially enhance management of critical habitats for wildlife. Therefore, we have used remotely sensed satellite imageries and GIS techniques were used to analyze the present land use/ land cover pattern & changes from 1989 to 2011 of Hollongapar Gibbon WLS.

Study Area :

The Hollongapar Gibbon Wildlife Sanctuary is located in the Jorhat district with a distance of 20 km, Assam (India). It is situated in close proximity to the Naga Hills and the town of Mariani. Its geographical location is 26°40'N to 26°45'N latitude and 94°20'E to 94°25'E longitude. As per the official records, the sanctuary accounts for an area of 20.98sq.km. (Bhattacharjee *et al.* 2012) Formerly it was called "Hollongapar Reserve Forest"; that was declared as a wildlife sanctuary in 1997. (Chetia, *et al.*, 2012; Kalita, *et al.*, 2012.) , There is an army base on the western boundary, which takes up 4sq km of the 20.98 km² sanctuary. The army base was established during the Chinese war of aggression in 1963, there is no place in

the vicinity to shift it. The sanctuary officially extends to the Dissoi Valley Reserve Forest, Dissoi Reserve Forest, and Tiru Hill Reserve Forest, which are used as dispersal areas for Indian elephants (*Elephas maximus indicus*) and other animals (Haziraka. *et al.*, 2005; Gupta. *et al.*, 2005.) The park has been often regarded as the man made forest. The study area is surrounded by human population or villages in the northern, western and southern directions. (Fig. 1)



Fig 1: Study Area Map

The northern side is bounded by Madhupur, Bhogpur, Gobinpur villages and Jetukia Tea garden. The western Boundary is surrounded by the Bhogdoi River, Pukhuriagaon, MES village, Kathalghuri and Kaliapani Tea garden. South western side is bordered by Santipur village and Lakhipur village. The southern boundary is bordered by Kathalguri Tea garden. Dihingapar, Bhelaguri tea garden and lakhipurgaon lies on the eastern part. On the mid southern part from Santipur village to Lakhipur village, railway line divides the sanctuary. The altitude of the study area ranges between of 43m -165m MSL.

Objectives :

The present study was carried out in order to achieve the following objectives:

1. To understand the present land-use and land-cover of the Hollongapar Gibbon Wildlife Sanctuary and its 1 km buffer area and to make a classification thereof;
2. To estimate the trend of land use/ Land Cover change;
3. To create a GIS database of the protected areas for proper biodiversity conservation and future research work.

Methodology :

Multi date satellite imageries were used to analyze the land use/ land cover change dynamics in the study area. Besides this, the Survey of India topographical sheet no. 83 J/6 at 1:50,000 scales were used for delineation of forest boundary and Google earth was used for baseline information for the study area. Satellite imageries Landsat TM 1989, IRS LIS III 2003 and IRS LIS III 2011 were used to analyze the land cover change dynamics in the study area. Subset operation of satellite imageries of 1989, 2003 and 2011 were carried out by creating an area of interest (AOI) layer of the vector layer of forest boundary with its 1 km buffer. The details of the datasets used in this study are shown in

Table- 1.

Table-1: Dataset used for Land use/Land Cover.

Data Type	Path/Row	Date of acquisition
Landsat TM	135/42	14 January, 1989
IRS LISS III	112/53	19 January, 2003
IRS LISS III	112/53	07 April, 2011
SOI toposheet	No.83 J/6 1:50,000	1974
Google Earth		2010

After sub setting, the images of the study area were processed through spectral enhancement technique using ERDAS Imagine 9.2 software. Onscreen digitization technique was used to assess the land use/land cover change dynamics in the study area from 1989 to 2011. Ground truth verification was made and based on the ground verification data, classes were assigned in the images.

Result and discussion :

The entire study area was classified and the following land-use/land-cover types were obtained, shown in (Table-2).The entire land use/ land cover of the study area is categorized into seven classes based on field visit. The classes are as follows: Evergreen forest, Scrub forest, Tea Garden, Agriculture, Human settlement-Home garden, Water body and River sand.

From the land use and land cover change analysis of Hollongapar Gibbon WLS and its surrounding areas which

includes 1 km buffer area from the WLS boundary. It has been observed that Evergreen forest has decreasing trend from 15.74 km² in the year 1989 to 13.24 km² in the year 2003 with a net change of 2.5 km² and it has decreased up to 11.57 km² in the year 2011, with a net change of evergreen forest from 2003 to 2011 was 1.67 km². The decreasing trend of evergreen forest was mostly due to the illegal cutting of trees mostly on the north eastern sides of the sanctuary and on the buffer areas. The regeneration trees were illegally cutting down mostly on the western part by the fringe villagers. It has also been observed that trees were uprooted by elephants in some cases which is not frequent and also by strong winds fallen trees in the sanctuary. Due to the decreasing trend of evergreen forest results in the destruction of the habitat of animals mainly elephants and ultimately the animals move to the nearby areas and create human wildlife conflict. The scrub forest has an increasing trend from 6.18 km² in the year 1989 to 7.38 km² in the year 2003, with net change between 1989 to 2003, represents 1.2 km². It has further increased up to 8.91 km² in the year 2011; with a net change from 2003 to 2011 was 1.53 km². The increasing trend of scrub forest is mainly due to natural increase of secondary forest and decrease in evergreen forest cover, which is converted into scrub forest. It has been observed that tea garden has increasing trend from 15.64 km² in the year 1989 to 16.54 km² in the year 2003. With a net change of 0.9 km² during this period. In the year 2011, the tea garden covered 18.25 km² and the net change of tea garden from 2003 to 2011 is 1.71 km².

The increasing trend of tea garden is mainly due to the presence of big tea garden surrounding the sanctuary and due to rapid destruction of elephants

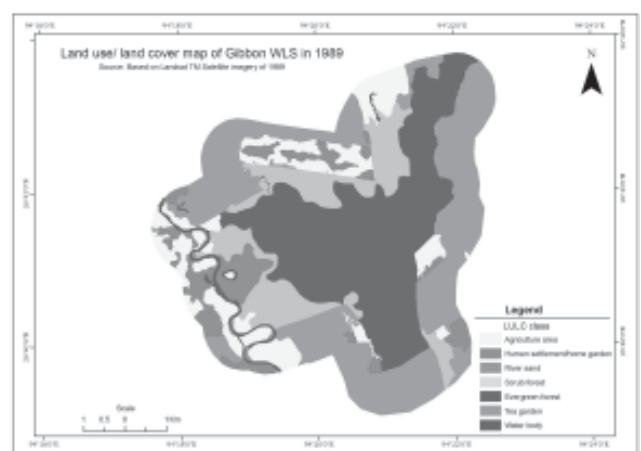


Fig 2: Land use / Land Cover in 1989

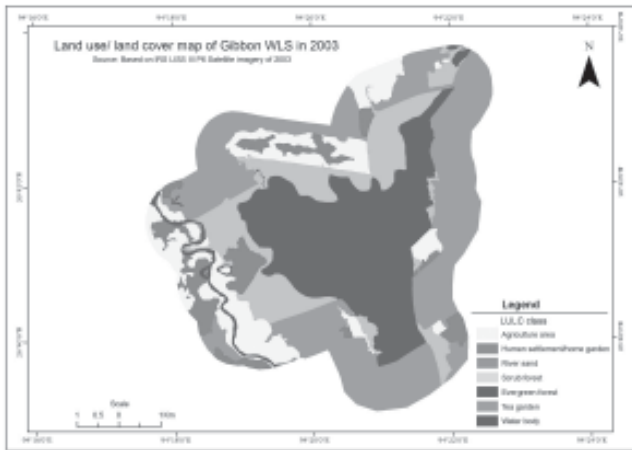


Fig 3: Land use / Land Cover in 2003

on the agricultural crops, local people converted their paddy fields into small plots of tea gardens. Most of the local people practiced tea cultivation which is less damaged by elephants. Tea gardens near villages are serving as a good habitat for leopard, they hide in these tea garden and attacks on the cattle's and sometimes people.

It has been observed that agriculture has increasing trend from 6.03 km² in the year 1989 to 6.31 km² in the year 2003 with a net change of 0.28 km² and it has decreased up to 4.2 km² in the year 2011; with a net change of agriculture from 2003 to 2011 was 2.11 km².

Table No. 4.3a. Showing land use / land cover class and its area in 1989, 2003 & 2011.

Land use/land cover class	Area in km ² (1989)	Area in (%)	Area in km ² (2003)	Area in (%)	Area in km ² (2011)	Area in (%)
Evergreen Forest	15.74	33.489	13.24	28.17	11.57	24.61
Scrub Forest	6.18	13.148	7.38	15.702	8.91	18.96
Tea Garden	15.64	33.277	16.54	35.194	18.25	38.829
Agriculture	6.03	12.829	6.31	13.425	4.2	8.94
Human Settlement/home garden	2.53	5.385	2.89	6.148	3.16	6.725
Water Body	0.7	1.489	0.59	1.255	0.65	1.383
River Sand	0.18	0.383	0.05	0.106	0.26	0.553

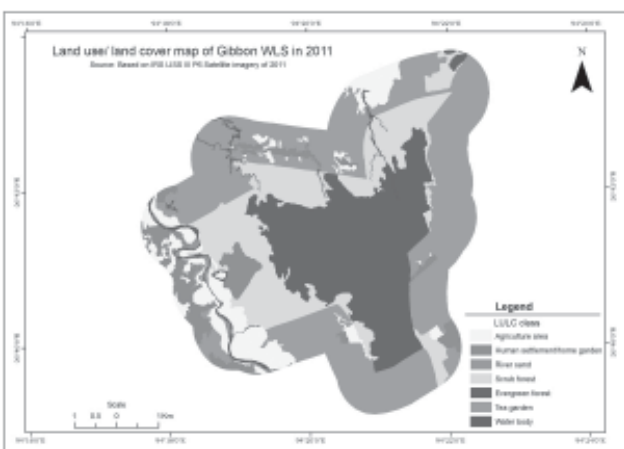


Fig 3: Land use / Land Cover in 2011

The decreasing trend of agriculture is mainly due to conversion of the agricultural fields mainly paddy field into small tea garden areas.

It has been observed that human settlement and home garden has increasing trend. 2.53 km² in the year 1989 to 2.89 km² in the year 2003, with a net change of 0.36 km² and 3.16 km² in the year 2011. Net change between 2003 to 2011 is 0.27 km². The increasing trend of human settlement and home garden is due to increase in human population. The maximum increase was observed on the western side. The increase in the area of human settlement ultimately leads human wildlife conflict. It has been observed that there has decreasing

trend of water body from 1989 to 2003 with a net change of 0.11 km² and increase from 2003 to 2011 with a net change of 0.06 km². This is the only water source for animals which leads to conflict. The river sand has decreased from 1989 to 2003 with a net change of 0.13 km² and increase from 2003 to 2011.

Conclusion :

Change in the land use/land cover directly disturbs the natural environment of the wildlife

sanctuary. The small size of the sanctuary still holds rich diversity of flora and fauna species. Conflicts are occurring on both the side's wildlife and people. They are sharing the common surroundings to satisfy their needs and wants. Proper measures have to be taken to conserve the sanctuary and its wildlife population by legal inclusion of some parts of buffer areas as protected under the jurisdiction of the sanctuary and try to reduce the loss of life and property of the fringe villagers.

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RED PANDA,

SOLE REPRESENTATIVE OF FAMILY: AILURIDAE

A SHORT REVIEW ON ECOLOGY AND THREATS

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Abstract

Red panda belonging to Family Ailuridae (cat bears) are endangered species across its geographical home range. Red panda are known habitat specialists, generally found in subtropical and temperate forests with a bamboo species as their major diet. Currently habitat destruction along with hunting and trade are major threat to this species. Forest fragmentation and loss of corridors are further creating risk of inbreeding depression in isolated populations. The present work reviews the taxonomy, distribution, ecology and protection measures adopted to conserve this enchanting species.

Keywords: red panda, endangered, distribution, habitat specialist, threats, conservation

Introduction

The iconic black and white giant pandas are so captivating that have somehow overshadowed another enchanting species, the “Red Panda”. The red panda are very elusive, shy and solitary that it takes special luck to see them in wild. Strangely red panda is not even related to the giant panda. The giant panda belongs to Family Ursidae (Bears) whereas the red panda belongs to its own taxonomically unique Family Ailuridae. The giant panda and the red panda do share some of the same characteristics through a phenomenon called as “convergent evolution.”

In India, red panda was first discovered by an

English General Thomas Hardwicke in 1821 and the naming was done by Frederic Cuvier in 1825. Hardwicke first came across this species while being posted in Darjeeling, India. He wrote his complete encounter with Red panda which was published subsequently.

Taxonomically the species was named as *Ailurus fulgens* which literally means “cat with shining fur”. In China the species is locally known as *Hun-ho* which means fire fox owing to its shining red fur. Frederic Cuvier was extremely fascinated with the species and probably borrowed the word panda from Nepalese word “*ponya*” which means bamboo eater referring to its habit of preferring bamboo species as a major part of its diet. Like gaint panda, red panda also loves bamboo. Red panda also feeds on lichens, fruits, roots of some species and occasionally gorges on smaller mammals, bird eggs and young birds.

Recent advances in genetic researches have helped in better understanding of its taxonomy. Earlier, based on morphological characteristics it was clubbed as a sister taxon of the giant panda or a relative of the bears and even with racoons. It was also thought to be a monotype within the Arctoidea superfamily of the carnivore. Molecular studies have disregarded earlier assumptions based on morphologic resemblances only. Today red panda’s are considered as the only representative of Ailuridae family (cat bears) belonging to Order Carnivora. Genetic studies have provided

closer insights and now two sub-species of the red panda can be found in the Himalaya and its northeastern border mountain ranges.

Both sub-species *Ailurus fulgens fulgens* and *Ailurus fulgens styani* are now categorized as threatened mammal species. The geographic range of red pandas extends across the Himalayan regions of Nepal, India, Bhutan, Myanmar and China and are reported between 2200 and 4800 m altitude. Red pandas are generally found in subtropical and temperate forests with a bamboo-thicket understory. Although, tropical forests of Meghalaya in India also harbor this species which is an exception. Red pandas have small home range and are known habitat specialists.

In last two decades researchers have finally studied habitat use and diet of this largely mysterious species. In the protected areas of Darjeeling in India, the red panda was often found to occur on steeper slopes where bamboo in high density. Across its home range, red pandas are known to commonly feed on bamboo species belonging to the genera- *Arundinaria*, *Phyllostachys*, *Thamnocalamus*, *Chimonobambusa*, *Semiardunaria*, *Pseudosyachyum*, and *Qiongzhusa*. A study conducted in Singhalila National Park found that red pandas preferred *Arundinaria maling* and *A. aristata* as their most favored species. Occasionally, they also gorged on seasonal fruits and bamboo shoots. During breeding season female panda give birth to 1 to 4 young ones and tends them until they are mature enough. Male panda usually do not take part in rearing of young ones.

Threats and conservation

National Geographic describes them as victims of deforestation and categorizes red panda as 'at-risk species'. The loss and fragmentation of this habitat threatens the red panda throughout its range. In recent years tourism in the form of hiking/ trekking has come up as a big recreational activity across Himalayan landscape. This has led to exponential growth of home stays, hotels, small eateries and new housings. IUCN identifies these as potential threats under its residential and commercial development section. This threat is extremely important to understand because red pandas often develop canine distemper disease through zoonosis. Ghose and Dutta (2011) also highlight the loss of corridors across protected areas in Kanchenjunga Landscape which may lead to problems

of inbreeding in the near future.

Researchers guesstimate that there are fewer than 10,000 mature individuals, and populations continue to decline. For this reason both subspecies (*A. f. fulgens* and *A. f. styani*) are listed as Endangered in the IUCN Red List of Threatened Species. Earlier the IUCN Red List classified them as "vulnerable" but in recent assessments it was again reclassified as "Endangered". The justification for this change was finalized when estimates the total population was found to be of less than 10,000 fecund individuals. Fecundity is the ability of an individual to reproduce offspring and implies stable fertility.

The Indian version of Population and Habitat Viability Analysis (PHVA) of red panda was held in 2013. The PHVA figures are taken here as the most realistic guides, although none has been corrected for suitability of gross area of broadly suitable habitat accounting for specific preferences. This is important for a species like red panda which is very specific about its habitat. Forest type, altitude, slope gradient and aspect, proximity to water courses, precipitation and presence of tree stumps, all these influence the way red panda chooses its habitat.

Currently, there are no reliable population numbers available. Choudhury (2001) estimated red panda habitat based on forest service maps and national park maps. He suggested that in India, the cat bear's population is estimated to be of 5,000 to 6,000 individuals. Recent PVHA data is based more on accurate satellite imagery and this population estimation can go far down. Due to fewer site-specific studies, it is very hard to estimate exact population size of red pandas. Nevertheless we can definitely assume that probably population has been reduced to a great extent. Wei (2014) in his work suggests that a 40% decrease in population may have happened due to loss of habitat, poaching and trading.

As early as 1975, the red panda was listed in the Annexure 1 of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). This gives a legal binding in any wildlife trade of this endangered species and thus making any international commercial trade of red panda illegal. The Indian government in its two CITES notification (1995 and 2018) has totally banned the export for commercial purposes of all wild-taken specimens of

species included in Appendices I, II and III. Also, as per legal course hunting for the red panda is strictly forbidden and is considered as a serious punishable offence.

With shrinking of natural space, destruction of virgin forests due to tree felling and ever increasing demand for agriculture, red panda today are at crossroads with a bleak and dark future ahead. It is now extremely important to protect the habitats of

red panda before it's too late. More research pertaining to the ecosystem services provided by this species will further highlight their role in maintenance of regions such as eco-sensitive Himalayan landscape.

Acknowledgement

The first author thanks Rumana Maheen, Researcher from Wildlife Genetics Laboratory, Aaranyak for her constructive suggestions.



Figure: Red Panda (*Ailurus fulgens*) in its habitat.

Photo: Mitrajit Deb

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GLIMPSES OF AARANYAK'S WORK IN THE PAST MONTHS

AARANYAK DONATED A WOODEN FLOATING BOAT CAMP TO KNP AUTHORITY

A wooden Floating Boat camp was donated by Aaranyak to Kaziranga National Park Authority on 30th August 2018 in its Northern Range. The boat had been formally handed over by Mr. Attila Hildmann of Germany, who contributed the required funds for construction of the boat through Nabu International of Germany. Mr. Pranjal Barua, Range Officer of the range had formally taken the delivery of the boat.

SKILL DEVELOPMENT TRAINING UNDER MANAS TIGER CONSERVATION PROGRAM

To develop skills on eco-tourism management to ensure better service delivery to the tourists in respective localities in future, a 10 day-long Cooking, Catering and Hospitality Training was organized by Aaranyak's Manas Tiger Conservation Programme (MTCP) in partnership with Aranya Lodge from 26th August to 4th September, 2018. A total of 10 participants belonging to various fringe villages of Manas National Park, Roing, Arunachal

Pradesh and Kohora, Karbi-Anglong participated in the training.

MOU SIGNED BETWEEN AARANYAK AND IITG

To facilitate coordination between the Centre for Rural Technology Indian Institute of Technology Guwahati and Aaranyak in matters of common interest, Aaranyak had signed a MoU with IITG on 4th September, 2018 at the premises of IITG. The MoU was signed by Dr. Bibhab Kr. Talukdar, CEO & Secretary General of Aaranyak on behalf of Aaranyak and Prof. Gautam Biswas, Director of IIT on behalf of IITG in the presence of higher officials of both the organizations.

NATURE GUIDE TRAINING WORKSHOP

A presentation on 'Environment and Tourism' was delivered by Dr. Partha Jyoti Das, Head, Water, Climate and Hazard Division of Aaranyak in 'Nature Guide Training Workshop' held at Nameri Eco Camp on 25th September 2018. The programme was organized by ABN Foundation and Aaranyak was one of the Co-organizers.

HERBAL GARDEN ESTABLISHED NEAR BANSBARI RANGE OF MANAS

To promote conservation awareness among school children and general public, Aaranyak, under its Manas Tiger Conservation Programme (MTCP) had established a medicinal plant garden at the Mahut Camp, under the Bansbari Range of Manas National Park. With this, a total of eight herbal gardens have been established by Aaranyak in various localities including schools in the fringes of Manas National Park, which will help students in understanding importance of plants as well as to know various medicinal plants of importance.

CELEBRATION OF "64TH WILDLIFE WEEK"

The 64th Wildlife Week was celebrated jointly by Aaranyak, Kaziranga National Park Authority, WWF India, Bhumi, WTI and TCF in Kaziranga from 2nd to 8th October, 2018. During the week, various activities and competition related to wildlife were conducted among students of Agaratoli, Kohora, Bagori and Burapahar area.

AARANYAK IN “INDIA INTERNATIONAL SCIENCE FESTIVAL”

Aaranyak took part in “India International Science Festival 2018” held at Lucknow with different scheduled programme from 5th to 8th October 2018. Being a premier organization of North East India, Aaranyak shared its various social interventions through scientific research and conservation in the field of biodiversity and environment.

AARANYAK AT “STATE LEVEL NATIONAL CHILDREN’S SCIENCE CONGRESS 2018”

Aaranyak took part in “State level National Children’s Science Congress 2018” held at Majuli from 23rd to 26th October 2018. With the objective to convey scientific thinking and approaches for conservation of biodiversity, Aaranyak’s various interventions in the field of biodiversity conservation were presented in the event.

TRAINING ON “POPULATION MONITORING TECHNIQUES”

Aaranyak, under its Manas Tiger Conservation Programme (MTCP) organised a short term professional training course on “Population Monitoring Techniques of Terrestrial Mammals” from 6th to 10th November, 2018 at Bansbari, Manas National Park, Assam. The five day long training programme was attended by 17

wildlife researchers and forest officials belonging to Indonesia, Myanmar, Bhutan as well as India.

DISTRIBUTION OF WIRELESS HANDSETS TO POBITORA STAFF

Aaranyak provided 20 numbers of wireless handsets and 2 base stations to Pabitora Wildlife Sanctuary on 23rd November, 2018 in an event held in premises of the Wildlife Sanctuary. The wireless handsets, funded by Born Free of Australia were formally handed over by Dr Bibhab kumar Talukdar, CEO & Secretary General of Aaranyak to the forest staff engaged in the protection of the one-horned rhinos in the Wildlife Sanctuary.

TRAINING ON SCIENTIFIC LIVESTOCK REARING

Aaranyak, under its Manas Tiger Conservation Programme (MTCP) organised a training programme on scientific livestock rearing for the eco-development committee (EDC) members under Bhuyanpara Forest Range on 8th December, 2018 at Bamunkhal Village Library. A total of 32 participants belonging to Bamunkhal, Madanguri and Laharipara villages of Baksa district took part in the training.

9TH FIELD COURSE IN CONSERVATION BIOLOGY & GLOBAL HEALTH

The 9th Field Course in Conservation Biology & Global Health was held in Gibbon Conservation Centre, Hoolock Gibbon Wildlife Sanctuary, Assam from 10th to 14th December

ACCOLADES

AFFILIATION UNDER DIBRUGARH UNIVERSITY AS RESEARCH INSTITUTE

Aaranyak signed Memorandum of Understanding (MoU) with Dibrugarh University in February 2018 recognising the importance of research and development and intend to form a nucleus for promoting excellent quality manpower in the fields of wildlife research, biodiversity monitoring and climate change and related fields.

2018. A total number of 17 participants from different parts of India joined in this Collaborative Program of University of Washington, USA, Gibbon Conservation Centre of Aaranyak and Assam Forest Department (Jorhat Forest Division).

‘KNOW YOUR MANAS’- AN INITIATIVE FOR STUDENTS

In an effort to create environmental awareness among the students belonging to fringe areas of Manas National Park, Aaranyak under its Manas Tiger Conservation Programme (MTCP) organised a programme called “Know Your Manas” in November-December, 2018. As a part of this programme, a team of 15 students and 1 guide teacher from each of 5 schools of the locality were taken for a day-long exposure visit inside the Manas National Park under the guidance of MTCP team.

TALK ON GLOBAL PARTNERSHIPS IN FIELD TRAINING AND OUTREACH EDUCATION

Aaranyak and Department of Life Science, Dibrugarh University organized a talk & interaction session on “Global Partnerships in Field Training and Outreach Education: Promoting Human-Wildlife Coexistence” by Prof. Randell C. Kyes University of Washington, USA at Dibrugarh University on 17th December 2018. Around 100 students, research scholars and faculty of the university were present during the event. The same talk by Dr. Kyes was also organized by Aaranyak and Department of Zoology, Gauhati University at Department of Zoology, Gauhati University on 7th December 2018.

‘JOURNEY FOR LEARNING’ - AN INITIATIVE

In an effort to promote community based eco-cultural tourism, Aaranyak successfully completed its first ever ‘Journey for Learning’ programme from 17th December, 2018 to 1st January, 2019. It is a recent initiative of Aaranyak to provide learning experiences to interested persons irrespective of their age, profession or background and has been designed in coherence with the principles of community-driven ecological learning.

AWARENESS CAMPAIGN IN BRAHMAPUTRA ISLANDS

To introduce the conservation issues and make them aware about the need of conservation, Aaranyak and Kaziranga National Park authority organized a series of awareness campaign in Islands (Chaporis) of river Brahmaputra. Major activities like schools programs, community programs and discussions, documentary shows, audio visual talk, wildlife quiz and interactions were carried out as a part of this awareness campaign.

WILDLIFE PHOTOGRAPHY WORKSHOP AT POBITORA

Media Production & Communications Division of Aaranyak organised a daylong advanced wildlife photography workshop at Pobitora Wildlife Sanctuary on 6th January 2019. The workshop was mentored by Wildlife Photographers Udayan

Borthakur and Ashok Kumar Das. Total number of 14 participants took part in the workshop. Discussions on several techniques of photography and importance of understanding wildlife behaviour were conducted and they were taken for field photography.

24TH WEEK LONG TRAINING COURSE ON RS, GIS & GPS

Geo-spatial Technology and Application Division of Aaranyak successfully conducted the 24th Week long training course on “Application of Remote Sensing, GIS & GPS in various fields” which was started from 6th January 2019 at Research Division office of Aaranyak.

BIKE RALLY FOR CONSERVATION OF GOLDEN LANGUR & MANAS TIGER RESERVE

A bike rally was organized by United Bikers Club Assam (UBCA) in association with Aaranyak on 13th January 2019, from Bijni toll gate of Chirang district to Abhayapuri town of Bongaigaon district. The rally was specially conducted to make awareness among bikers and public on the road to save Golden langur of the region and also to save Manas Tiger Reserve. About 100 youth bikers from different districts took part in the rally.

“RHINO GOES TO SCHOOL 2019” AN INITIATIVE OF AARANYAK

Aaranyak organized “Rhino goes to school” at Kanyakashram Junior college and Kaliabor Higher Secondary School, Kaliabor on 21st January 2019 with 100 students. With an aim to create awareness about rhino conservation, various programmes such as presentation on rhino and its habitat, world distribution, population and lifespan, along with open interaction and wildlife quiz competition were conducted. This programme was supported by David Shephard Wildlife Foundation.

INTERNATIONAL APPLIED ENVIRONMENTAL EDUCATION COURSE

A three-week long international course on applied environmental education, organised by ‘Aaranyak’ in

association with Environment Education and Conservation Global (EECG) and Satpuda Foundation (India) was organized from 28th January, 2019 followed by a glittering inaugural session. This course, which covered two field sessions at Manas and Kaziranga National Park, ended on 17th February, 2019.

4TH ANNUAL GLOBAL EVENT OF WOMEN IN NATURE NETWORK (WINN)

Aaranyak and Women in Nature Network (WiNN) in collaboration with Kamrup Police, Assam Forest Department and Kamrup District Administration successfully hosted the 4th annual global event of Women in Nature Network (WiNN) at Guwahati from 28th to 31st January, 2019. Alice C. Tyler Perpetual Trust Global Wildlife Conservation (GWC) and International Finance Corporation (IFC) had provided generous support in organizing the landmark event.

ECOTOON



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নলবাৰী জিলাৰ টিছৰ কাউৰেহাগি (জলখানা) গাঁৱত জন্ম গ্ৰহণ কৰা প্ৰব্ৰজ্যোতি কলিতা আৰণ্যকৰ আজীৱন সদস্য হোৱাৰ উপৰিও প্ৰাৰম্ভিক স্তৰৰ পৰাই সংগঠনটোৰ লগত ওতঃপ্ৰোতভাৱে জড়িত। তেওঁ একেধাৰে এজন লেখক, কবি আৰু আলোকচিত্ৰ শিল্পী। এজন দায়িত্বশীল চৰকাৰী কৰ্মচাৰী হোৱাৰ উপৰিও তেখেত অসম বিজ্ঞান সমিতি, চি.ই.ইৰ দৰে সংগঠনৰ লগত নিবিড়ভাৱে জড়িত।

এখন ঠাইৰ ৰ'দ, বৰষুণ, মাটিৰ গুণাগুণ আদিৰ ওপৰত নিৰ্ভৰ কৰি ঠাইখনত স্বাভাৱিকভাৱে কিছুমান বিশেষ প্ৰজাতিৰ গছ-বন গজি উঠে। এই কথা আমি গাঁৱৰ জলাশয়, পিতনী, পুখুৰী বা ঘৰৰ পিছফালে থকা বাৰীখনলৈ গৈ সাধাৰণভাৱে পৰ্যবেক্ষণ কৰিলেই ধৰিব পাৰিম। এটি পুৰণি পুখুৰীৰ মাজভাগৰ পৰা ক্ৰমে আঁতৰলৈ যদি লক্ষ্য কৰোঁ তাতোই দেখিম, পুখুৰীৰ মাজৰ পৰা ক্ৰমে দূৰলৈ বিভিন্ন প্ৰজাতিৰ তৃণ বা গছ-গছনি গজি উঠিছে। একে ধৰণে নৈৰ পাৰ, বিলৰ পাৰ, পাহাৰৰ ওপৰত বা নামনিত গঢ় লৈ উঠা ঘাঁহনি বা বননিৰ মাজত কিছু পাৰ্থক্য দেখা পাব। এনে কাৰণতেই এখন গাঁৱৰ পৰা কিছু আঁতৰৰ এখন গাঁৱৰ ঘাঁহনি বা সৰু সৰু বননি-বাৰণিবোৰৰ মাজতো কিছুমান পাৰ্থক্য দেখা যায়।

আমি জানো যে বছৰটোৰ ভিতৰত বিভিন্ন গছে পাত সলায়। সেইদৰে ধুমুহা-বৰষুণৰ বাবেই হওক বা আন কাৰণতেই হওক গছবোৰৰ ফল-ফুল, ডালো মাটিত পৰে। যদিহে মানুহে সংগ্ৰহ নকৰে বা পশু-পক্ষীয়ে সংগ্ৰহ বা ভক্ষণ নকৰে তেনেহ'লে সেইবোৰ সময়ৰ লগে লগে মাটি-পানীত মিহলি হয়। এনেদৰে একোখন ঠাইৰ মাটিৰ কিছুমান মূল্যবান উপাদান সেইঠাইত থকা গছ-বনৰ ওপৰত নিৰ্ভৰ কৰি গঢ় লৈ উঠে। সেইদৰে এখন ঠাইত থকা গছ-লতিকা, ঘাঁহনিবোৰৰ ওপৰত নিৰ্ভৰ কৰি অসংখ্য অনুজীৱৰ লগতে বিভিন্ন প্ৰজাতিৰ কীট-পতংগ, চৰাই-চিৰিকটি, সৰীসৃপে আশ্ৰয় লয়। ক্ৰমবিকাশৰ লগে লগে এই চৰাই-চিৰিকটি, পতংগ, সৰীসৃপ, ঘাঁহনি আৰু বিভিন্ন প্ৰজাতিৰ উদ্ভিদৰ মাজত এনে এক পাৰস্পৰিক সম্পৰ্ক গঢ় লৈ উঠে যে এবিধে আন এবিধক জীয়াই থকাত সহায় কৰে বা আন কিছুমানক ব্যাপক হাৰত বৃদ্ধি পোৱাত সহায় কৰে বা আন কিছুমানক ব্যাপক হাৰত বৃদ্ধি পোৱাত বাধা দি ৰাখে। অৰ্থাৎ ঠাই এটুকুৰাৰ প্ৰাকৃতিক পৰিবেশৰ ভাৰসাম্য ৰক্ষা কৰাত বা সুস্থ হৈ থকাৰ বাবে সেই ঠাই টুকুৰাত স্বাভাৱিকভাৱে গজি উঠি পূৰ্বৰে পৰাই থকা প্ৰতিডাল উদ্ভিদৰে তুলনাবিহীন ভূমিকা থাকে। অৱশ্যে মানুহৰ সাধাৰণ দৃষ্টিত তেনে উদ্ভিদ বা প্ৰাণীবিধৰ বিশেষ গুৰুত্ব

নাথাকিব পাৰে। এনেদৰে কিছুমান প্ৰজাতিৰ পতংগ, পক্ষী বা সৰীসৃপো পোনপটীয়াকৈ চালে মানুহৰ বাবে অলাগতিয়াল বা ক্ষতিকৰ যেন লাগিলেও প্ৰাকৃতিক ভাৰসাম্যৰ বাবে তেনেবোৰ জীৱবোৰ মূল্য থাকে। আমি যদি অলাগতিয়াল বুলি ভাবি নিঃশেষ কৰি দিও হয়তো দীৰ্ঘ কালত সেইবিধ প্ৰজাতিৰ অনুপস্থিতিৰ বাবেই এলেকাটোত গুৰুত্বৰ বিপৰ্যয়ে দেখা দিব পাৰে। এনেবোৰ কাৰণতেই বিশ্বৰ পৰিবেশ বিজ্ঞানীসকলে বিভিন্ন ঠাইত বৰ্তি থকা থলুৱা প্ৰজাতিৰ উদ্ভিদৰ ৰক্ষণা বেক্ষণৰ বাবে বিশ্ববাসীক সজাগ হোৱাত গুৰুত্ব দিছে।

অকল পাৰিপাৰ্শ্বিক দিশৰ পৰাই নহয় অৰ্থনৈতিক আৰু সাংস্কৃতিক দিশৰপৰাও থলুৱা উদ্ভিদৰ গুৰুত্ব অসীম বুলি স্বীকৃতি দিয়া হৈছে। একোখন সমাজৰ ৰীতি-নীতি, গীত-মাত, সাধু, নৃত্য-শিল্প আদি সেই ঠাইৰ প্ৰাকৃতিক বৈশিষ্টৰ লগত সম্পৰ্ক থকা দেখা যায়। অসমৰ বিভিন্ন জনগোষ্ঠীৰ গীত-মাতত স্থানীয় গছ-গছনি, পশু-পক্ষী, পতংগৰ উল্লেখ আছে। সেইদৰে কাপোৰৰ আৰ্হি আৰু বা ফুলতো সেইবোৰৰ প্ৰতিফলন হয়। বিভিন্ন উৎসৱ পাৰ্বণতো থলুৱা গছ-লতিকা, ঘাঁহ-বন ব্যৱহৃত হয়। পশু-পক্ষীৰ লগতে মানুহৰো খাদ্য অভ্যাস, বনদৰৱৰ ব্যৱহাৰো বৰখিনি থলুৱা গছ-বনৰ ওপৰত নিৰ্ভৰশীল। দৈনন্দিন জীৱনত ব্যৱহৃত সা-সঁজুলি তৈয়াৰ কৰাৰ উপৰিও বহু পৰম্পৰাগত নিৰ্মাণ কাৰ্য আৰু শিল্প কৰ্মও থলুৱা উদ্ভিদৰ ওপৰত নিৰ্ভৰ কৰি গঢ়ি উঠে। কলগছৰ আঁহ, তামোলৰ ঢকুৱা, বাহৰ আঁহ, মৰাপাটৰ আঁহ, বেত, পাটী দৈৰ দৰে কিছুমান থলুৱা উদ্ভিদক নিৰ্ভৰ কৰি চলি থকা ঘৰুৱা উদ্যোগক আধুনিক প্ৰযুক্তিৰ সহায়ত অতি উচ্চ মানদণ্ড সম্পন্ন কৰা হৈছে, য'ত উৎপাদিত সামগ্ৰী আজি দেশৰ ভিতৰত লগতে বিদেশতো সমাদৃত হৈছে। প্ৰাকৃতিক ৰং, বনদৰ, জৈৱিক সাৰ, কীটনাশক আদি প্ৰস্তুত কৰাৰ বাবেও বহু কেইবিধ থলুৱা প্ৰজাতিৰ গছ লতা ব্যৱহাৰ কৰা হয়। এনেদৰে অলপমান মনোযোগ দিলেই আমি অনুভৱ কৰিব পাৰিম যে থলুৱা প্ৰজাতি গছ-বন লতাবোৰে কিদৰে আমাৰ প্ৰাকৃতিক পৰিবেশৰ ভাৰসাম্য ৰক্ষা কৰাৰ লগতে

আমাৰ জীৱন, শিল্প, সাহিত্য-সংস্কৃতিৰক চহকী কৰি আহিছে। সেয়েহে আমি যদি উপৰুৱা দৃষ্টিভংগীৰে আমাৰ চমু জীৱনত লাভ কৰা ক্ষুদ্ৰ-অভিজ্ঞতাৰ ভিত্তিত থলুৱা প্ৰজাতিৰ গছ-বনবোৰক অদৰকাৰী বুলি আখ্যা দি কাটি নিঃশেষ কৰো বা দূৰৈৰ পৰা অনা কিছুমান গছ-বন সৌন্দৰ্য বৃদ্ধি বা বৃহৎ পৰিমাণৰ ধন লাভৰ আশাত আনি ঘৰৰ চৌহদ বা ৰাজহুৱা স্থানত ৰোপন কৰিবলৈ লও, তেনেহ'লে তেনে কাৰ্যৰ বাবে ভৱিষ্যতে এলেকাটোত কিছুমান ভয়াবহ সমস্যাই মূৰ দাঙি উঠিব পাৰে। তাৰবাবে আমাৰ ভৱিষ্যৎ বংশধৰসকলৰ জীৱন বিষময় হ'ব পাৰে।

সাধাৰণতে দূৰৈৰ পৰা আনি কোনো এঠাইত নতুন প্ৰজাতিৰ গছ ৰোপন কৰাৰ পিছত যদি গছ ডালৰ বৃদ্ধি নিয়ন্ত্ৰণ কৰিব পৰা পতংগ বা আন প্ৰজাতিৰ গছ-বন অঞ্চলটোত নাথাকে, তেনেহ'লে গছডাল অতি খৰকৈ বৃদ্ধি হ'ব পাৰে। এনে কাৰণত বহুলোকে বিদেশ বা আনঠাইৰ পৰা অনা গছপুলি ৰোপন কৰিবলৈ বিচৰা দেখা যায়, কিন্তু এনে কাৰ্যৰ ফলত কিছুমান সমস্যাই দেখা দিব পাৰে। যেনে- গছডালৰ লগত অহা অপৰিচিত ভাইৰাছ বা কীট-পতংগই নতুন ঠাইত অবাধ হাৰত বৃদ্ধি হৈ আন থলুৱা গছবন বা খেতিৰ প্ৰতি আতংকৰ কাৰণ হৈ উঠিব পাৰে। আনকি মাটিৰ গুণাগুণো প্ৰভাৱিত কৰিব পাৰে। সেয়েহে আমি নিজৰ ঘৰতেই হওক বা ৰাজহুৱা স্থানতেই হওক যিবোৰ থলুৱা প্ৰজাতিৰ গছ-বন আছে সেইবোৰ সুৰক্ষিত কৰি ৰখাৰ লগতে সেইবোৰকেই আৰ্থিকভাৱে লাভান হোৱাকৈ বা চৌহদৰ সৌন্দৰ্য বৰ্দ্ধনক কৰিব পৰাকৈ প্ৰনালীবদ্ধভাৱে প্ৰতিপালন কৰাত গুৰুত্ব দিয়াটোৱেই উত্তম উপায়। আনহাতে বাহিৰৰ পৰা কিবা নতুন প্ৰজাতিৰ গছ-বন বা শস্য আদি ৰোপন কৰিবলৈ বিচাৰিলেও কেৱল বিজ্ঞাপন বা বিক্ৰেতাৰ কথাত ভুল নগৈ অভিজ্ঞ উদ্ভিদ বিশেষজ্ঞ বা কৃষি বিশেষজ্ঞৰ পৰামৰ্শ লোৱা উচিত।

আহক আমি পৰিবেশ, থলুৱা সংস্কৃতি আৰু অৰ্থনৈতিক সুদৃঢ় কৰি ৰখাৰ বাবে আমাৰ নিজৰ এলেকাত থকা থলুৱা প্ৰজাতিৰ গছ-বনবোৰক ৰক্ষা কৰাৰ বাবে নিজে হাতে-কামে যত্ন কৰাৰ লগতে আনকো সজাগ কৰো।

Butterflies

of Pakke Tiger Reserve

Text & Photo: Khan Subhendu
Dutta Gayatri

Due to its unique geographical location, deep forest cover and also various natural water bodies, Northeast India has richest butterfly diversity in the oriental region. About 962 butterflies are found in Northeast including the northern part of West Bengal. In recent years, Butterfly tourism has picked up its growth. People from different parts of India often come to explore the butterfly diversity of the region. Butterflies like Kaiser I Hind, Bhutan Glory, Brown Gorgon, Kohinoor, Dragon tail, Jungle Glory are the most beautiful butterflies found only in NE India.

Pakke Tiger Reserve or Pakhui Tiger Reserve, is situated in the East Kameng district of Arunachal Pradesh and about 300 km away from Guwahati, Assam. Pakke tiger reserve harbours unique butterfly diversity, with about 236 different species of butterflies being reported so far. This tiger reserve is famous for butterflies like Large Yeomen, Vagrent , Dragontail, Courtesans, Imperials and they are commonly found in the month of September, October and November. The North East Butterfly Meet, held in different part of North East India every year, was organized in Pakke Tiger Reserve in the month of September 2018. People from different parts of India with different background participated, in order to study the butterfly diversity of the reserve. More than 150 different species of butterflies were photographed during the three days of the Meet.

There has been considerable debate on the decline population of butterflies all over the Northeast. It is a matter of concern that rapid decline of forest cover and larval host plants for butterflies, together with pollution and climate change are some of the factors adversely effecting the population of butterflies.

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Branded Orange Awlet (*Burara oedipodea*)



Small Green Awlet (*Burara amara*)



Chestnut Angle (*Odontoptilum angulatum*)



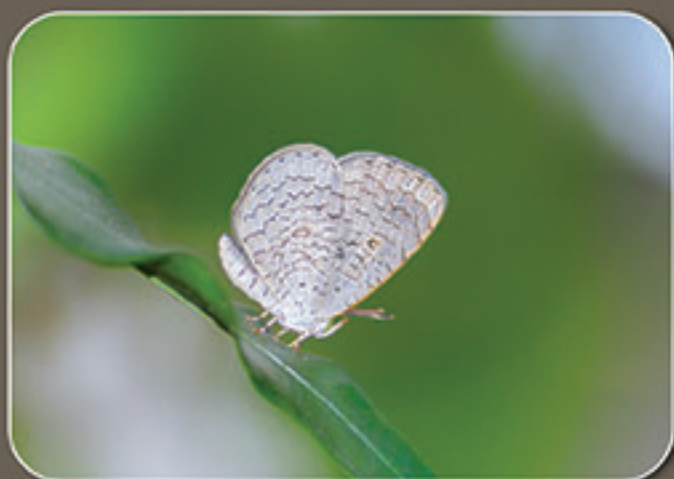
White Dragontail (*Lamproptera curius*)



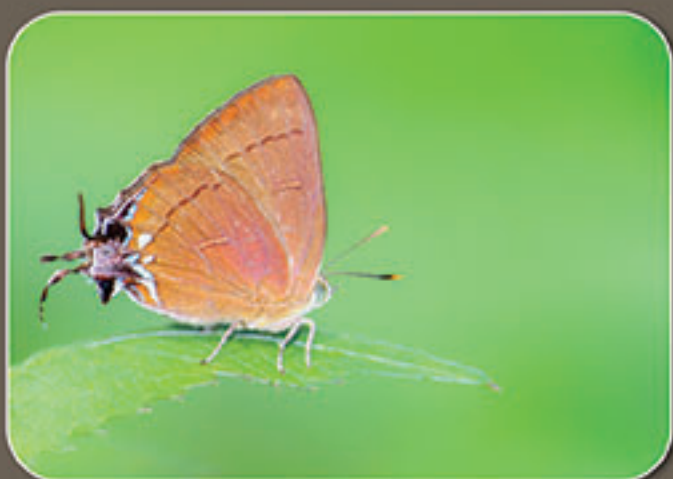
Cruiser (*Vindula erota*)



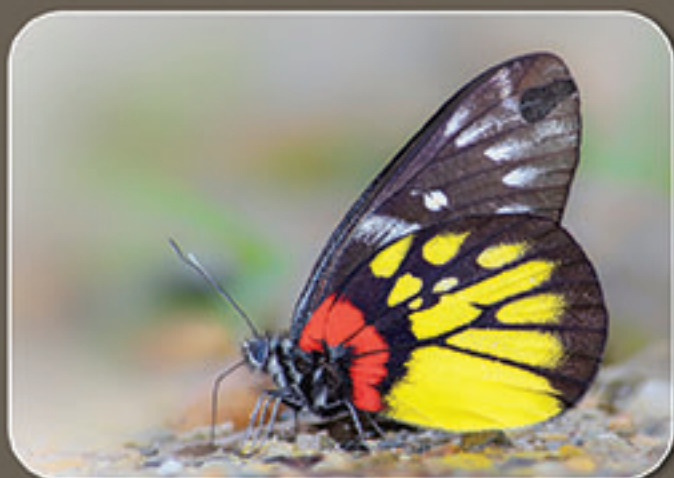
Pallid Nawab (*Polyura arja*)



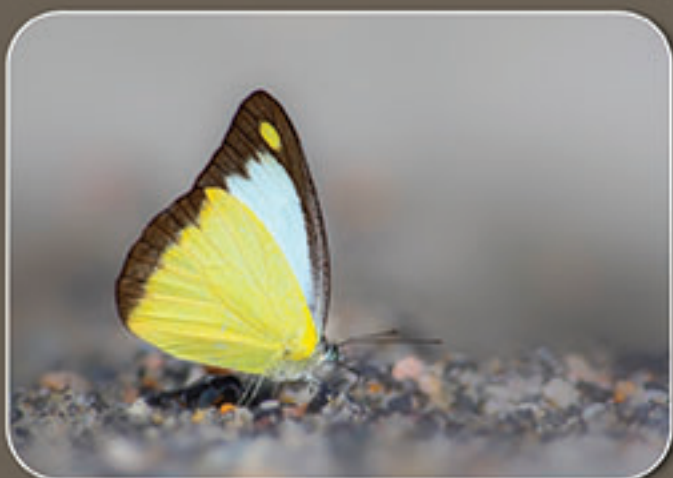
Apefly (*Spalgis epini*)



Chocolate Royal (*Remelana jurgala*)



Red Base Jezebel (*Delias pasithee*)



Chocolate Albatross (*Appius lycida*)

Printed by Mr. Chandan Chakravorty and Published by Mr. Udayan Borthakur on behalf of Aaranyak, a Registered Society for Biodiversity Conservation, having its registered office at House no. 50, Samanwoy path, Survey Beltola, Guwahati, Post Office: Beltola, Post Office: Dispur, in the District of Kamrup (metropolitan), Assam, India, PIN:781028, and communication address at House no. 13, Tayab Ali Byelane, Bishnu Rabha Path, Beltola Tiniali, Bhetapara link Road, Post Office: Beltola, Police Station: Hatigaon, in the District of Kamrup (metropolitan), Assam, India, PIN:781028, and printed at Fairgraphics Media Services (P) Ltd. ASIDC Road, Industrial Area, Bamunimaidan, Near Amtron, Guwahati, in the District of Kamrup (metropolitan), Assam, India, PIN:781021, and published from House no. 13, Tayab Ali Byelane, Bishnu Rabha Path, Beltola Tiniali, Bhetapara link Road, Post Office: Beltola, Police Station: Hatigaon, in the District of Kamrup (metropolitan), Assam, India, PIN:781028, Telephone: +91-3612230250, Telefax: +91-3612228418, email: info@aaranyak.org, web www.aaranyak.org