

THE GREEN ARCHIVE

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BIRDING WITHIN THE HEART OF MUSSOORIE



Photo: Shraddha Bung

Shraddha Bung

B.Sc. Forestry 2016-20

I remember sharply, it was the time when the Himalayas were lush green and food was in abundance, everywhere in the Sanctuary. The delicious *Rubus elpticus* (Hisar) and *Berberis lycium* filled the region and it seemed like a perfect cue for monsoon to commence. It all started with a unique story when one day, we incidentally spotted a vigilant Black Eagle gliding over us while guarding its two-meter long nest. It was truly a moment to treasure.

Later that day, we met Dr. Shipra Sharma, the Ranger officer of the Sanctuary. She was surprised as we told her about the Black eagle and the nest since it was never spotted before in the

sanctuary. Since my friend (Siddharth) and I were nearing graduation, we decided to do a small study on the birds found in the sanctuary. Being fresh and naive about research and its procedure our only guidance was Dr. Monideepa Mitra, mentor and one of the authors of the book. She enlightened us about the sanctuary, also not one but many other aspect of concerns in the sanctuary.

The biggest concern of the sanctuary was that, it wasn't very well known amongst the famous touristic spots in Mussoorie and locals looked outside the sanctuary for employment. To bridge the gap between the employment opportunities through eco-tourism and to sustainably conserve the rich

biodiversity of Mussoorie Wildlife Sanctuary, this project of documenting the flora and fauna was initiated.

Initially, when we decided to carry out the project we were in need of a funding agency, which could help us financially to conduct research. Having trust in us as we were just Bachelor students, Mr. Raj Mohan, founder of Sustainable Green Initiative, supported us and provided us with all the financial help.

The team involved in field work consisted of, Siddharth, Harish and I. During the field days, we knew we were inexperienced and not professionals and we consistently had the fear of failing, but Moni ma'am showed a lot of faith and encouraged us throughout.

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EDITOR'S DESK



As the season of bloom dawned, a gamut of learning experiences was arisen at DBS.

The 3rd of March marked the World Wildlife Day, which is celebrated to memorialize the day when CITES was signed in 1973. The theme designated to this year's anniversary was Forests and Livelihoods: Sustaining People

and Planet, and in accordance to this theme, a webinar was hosted at DBS, with both offline and online attendance, giving the students an opportunity to interact with experts and learn more about what we need to do to achieve the goals of global sustainability. The guest-speaker list comprised of professionals from diverse

fields, including Dr. A. K. Srivastava (Ex-director, VPKAS), Anant Pande (Project Scientist, Wildlife Institute of India) and Mr. Saurabh Shanu (Assistant Professor, UPES) and resultantly, the discussion switched dimensions – from diving within the coastal sea ecology, up to the soaring Himalayan glaciers, and with tips on identifying our avian friends, the webinar turned out to be a goldmine of new erudition for the attendees. For the fresher year students, this day also marked the first college event which they got an opportunity to conduct and participate in offline means, and none failed to prove their competence.

The following week, a guest lecture was given by Dr. Ranjana Negi, a scientist from FRI, who gave a piece of her perspective on how to identify woody plants and the basic morphological characteristics to bear in mind. Despite the end of the students' academic syllabus, learning is ensured not to cease in these unpredictable, abstruse times.

While the surge of the second wave of the Covid-19 pandemic brings us no glad tidings regarding the reopening of classes, it becomes crucial for one to accept the metaphorical shadows casted with light, like Yin with Yang, and maintain a steady and safe demeanour. Only with an optimistic clairvoyance can we turn our invaluable time productive.

Manas Shukla
Editor-In-Chief

THE JOURNEY BEHIND PUBLISHING "ALLURING WINGS"

Our field days mostly included searching and killing of leeches, we constantly thought we discovered new species of bird and only after identifying and researching about them we would realize that they were resident of Mussoorie Wildlife Sanctuary.

We routinely went off trails and got lost so often in the forest, that we ended up finding new routes back to safety. The field days taught us a lot about team work, being alert and attentive, of course never to take any shortcuts in the forest and most importantly it taught us perseverance and being passionate towards nature and its bounty. With passing time, we gained experience and were confident enough to spot birds, butterflies and identify them.

As the field days finished, the harder part began which included

sorting the photographs, editing them and making of dataset. The work was interesting as each time we opened a folder, we learned about new species and with that a total of 70 species of birds were documented.

We suddenly decided that the book should be launched on the World's Forestry Day. It was both sudden and a moment of thrill had we felt. Deep within we

were worried that it was going to be impossible to design and gather the write-up/ content for the book.

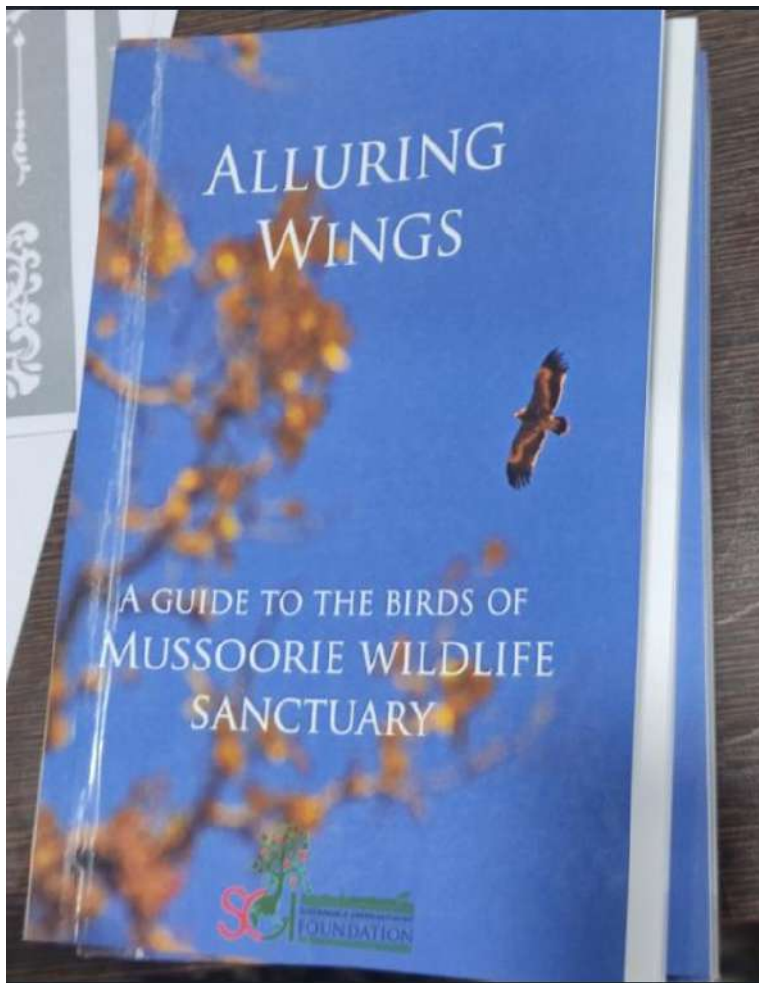
But eventually, we completed writing and designing the book due to the diligent

publishing house named Samay Sakshi who generously agreed to publish our book free of cost, for which we would forever be grateful. The process of obtaining the ISBN number which is required for any book to be published, is currently going on. This did not stop us from launching the book on 22nd March on the occasion of World Forestry Day.

The Mussoorie Wildlife Sanctuary organised a program in Bhatoli village which was known for its re-established Banj /Oak forest. This forest was protected, saved, and conserved by the women of the same village and they shed enlightenment on how they went about conserving it. The programme hosted dignitaries like the DFO, Dr. Madhuri Bhartwal - India's first female composer, recipient of Nari Shakti Puruskar 2018, Range officers and other forest officials. The book was launched after some speeches made by the

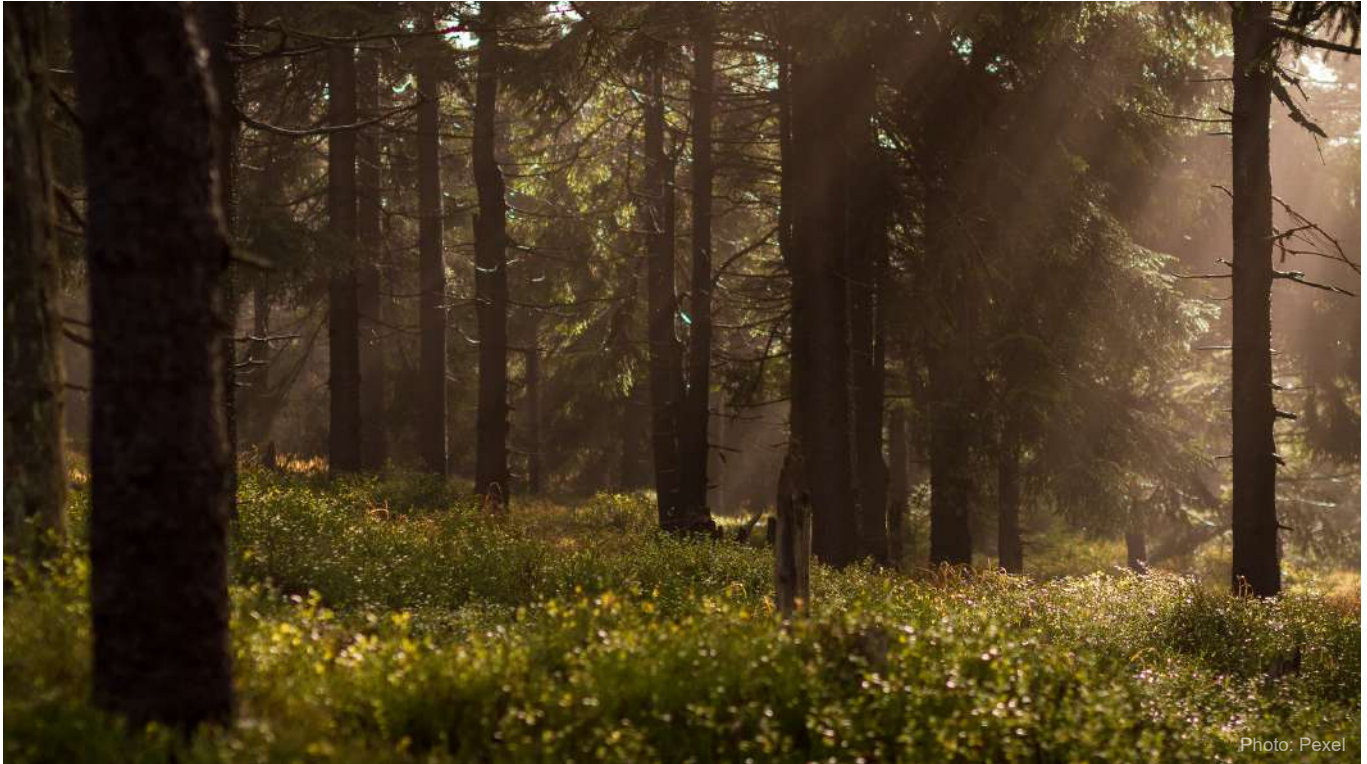
dignitaries and the day ended in a hefty traditional meal and a group dance performed by the local women.

We marked the launch by offering 5 copies of the book to the respected members. The journey to making this book will be a momentous experience and will provide a stepping stone to learn about a world unbeknownst.



efficiency of the team that was a part of the project. Manas and Manjeet dealt with designing and editing of the book which surely is the most creative and tedious job. Whereas Sonam, Harish, Siddharth and I took the responsibility of research and content write-up. As soon as the draft was ready, we now had to approach the printers and publishers. We came across a

UNSTABLE STABILITIES WOVEN WITHIN FORESTS



Bhoomika Hariharan T
B.Sc. Forestry I Year

As much as a forest is beautiful to see and get lost in, it is the only community that undergoes drastic and instant destruction in comparison with others. Off late, it has undoubtedly become common to come across sights of forest fires, unnecessary exploitation of forests, smuggling of wood, deforestation and sadly, the list is a never ending one.

Last month in March, who would have heard the screams of Odisha's 'Similipal National park'? Their tears, their pain, their desire to live a hundred years and bloom-up this toxic environment. Their ashes are our future. The fire that

charred them, will soon char us too.

Social websites have crowned this incident as 'India's worst natural disasters-2021', but hold on, there might be more. The fact that as many as 380 fire points were reported from forests between Feb and Mar 2021 is a depressing one. The news circulates faster than the speed of light, yet no one is concerned to the least point of understanding the problems faced by forests.

Running behind technology and being least bothered about the environmental issues is common now, no doubt. It is our concern and personal responsibility to act now in terms of washing away all the disastrous titles that forests have been subjected to. This

world of reality can be converted into magic by placing our mind sets in the direction of the wind that flows towards, and not from the forests.

Apart from the past events and happenings, an inevitable grid of disasters relating to the future of our forests has already been formed. 'Break it or Take it'; that's the only choice we have. If the environmental conditions become intensively positive, there's no doubt that our forests would be safe!

We're all submerged in toxicity of the inter relations between mankind, technology and development. The only body that has made our survival happen is, The Forests. One must realize that

it is this go-green anti-toxic drug that is capable of bonding mankind to the living system, firstly and to technology, secondly.

Forests, as a living body have undergone a wide variety of fluctuations of Destruction and Re-improvement. THEY FALL, THEY RISE. On the contrary, they are reaching the

minuscule circle day by day. If the central force of the circle relating to mankind indirectly contributing to the development of forests is strong, then forests would emerge out as the most static source of biological content present on earth.

Last but not least, forests are for those who can feel

them, hear them. You'll never know what's contained in the future. A practical thought process and sensible concern is all that forests need at the moment.

Let us not make forests our idols of worship of inner peace and happiness, and rather become the worshippers and ENROUTE!

GLACIAL TORRENTS AND THEIR TERRIBLE TRIALS



Wanishree Jha
B.Sc. Agriculture II Year

On 7th of February Uttarakhand's Chamoli district had a hard hit due to an avalanche, which is believed to be caused by a

phenomenon termed as glacial lake outburst floods (GLOF). A sudden havoc was created as three tributaries of the Ganga river; the Dhauliganga river, the Rishiganga river and the Alakhnanda flooded and Chamoli district witnessed

several terrible flash floods.

While the ongoing Rishiganga power project on the mentioned river got damaged, the Dhauliganga Dam at the confluence of the Rishiganga and the Dhauliganga deformed from

its pillar to post. Another heart wrenching impact of the flash floods were reported at the Tapovan Vishnugad Hydro Power project under NTPC, where around 175 workers got trapped inside the two tunnels. The death toll counts for 70 while more than 100 people were reported missing.

Causes and Relief:

The GLOF phenomenon occurs when a water body or a lake surrounded by glaciers melts and overflows along with a portion of ice/glacier causing an avalanche. Here the reports claim that a portion of Nanda Devi glacier cracked and overflowed into the Rishiganga basin causing such glacial torrents. Another report states the underlying effects of construction in the paraglacial zones as both the hydropower projects which washed off in the flood were constructed in

eco sensitive zone ignoring its harsh consequences.

Reviewing the causes on a big picture it's evident that climate change and subsequent rise in temperatures has impacted many such natural calamities. Melting of glaciers at a faster rate reflects the effects of climate change.

While the floods washed away many houses and bridges, three teams of NDRF were deployed in the rescue mission. The labourers who were stuck inside Tapovan tunnel were rescued and it took 2 days for the team to conduct the entire rescue operation.

Many villages were evacuated on time and in order to stop the floodwaters to affect towns, near Haridwar and Rishikesh two dams were emptied as it was reported by the authorities.

Future Prospects and Solutions:

Humans have had a direct or indirect impact that led to such natural calamities. Switching our lifestyle to an eco-friendly one, management of carbon footprints and depending on renewable resources will ensure benefits in long term.

Another technical solution to avoid such avalanche is to monitor the glacial lakes. Remote sensing assessment and observation of such glacial lakes beforehand using mathematical models, in case of potential risk of outburst the lakes could be drained artificially by building canals along the lake before the flood is triggered.

To stop restricting the natural flow of rivers by creating dams which disturbs nature will also help mitigate such disasters.

PLANT-BASED MEAT AND THE FUTURE IT HOLDS IN INDIA

Mayuri

B.Sc. Agriculture II Year

For several decades, one of the hottest topics in the community has been plant-based meat alternative (PBMA).

Imagine Meats, India's newest plant-based food start-up is developing a range of traditional Indian dishes which are formulated with soy and pea protein. The company is wheeled by Bollywood actors Genelia and Riteish Deshmukh, partnered with the US-based global ingredients



Photo: FutureBridge

manufacturer Archer Daniels Midland (ADM). This plant-based meat holds the key to attract non-vegetarians to the greener side. The company is calling on meat lovers for feedback for its research.

With insights from the feedback, the company is likely to innovate to create plant-based alternative tailor-made for the average Indian non-vegetarians' palette, which would be very interesting to watch out for the consumers.

If we speak about the composition, every plant-based meat has different

ingredients. Extracted protein from plants, spices and binding ingredients are the major ingredients of plant-based meat.

Plant-based meat has a similar nutritive value as compared to real meat in terms of calories and has more sodium and fiber with less cholesterol.

The above-mentioned ingredients are processed using the processes of shearing and extrusion which help in replicating the fibrous texture of real meat.

Will this transition from animal-based to plant-based

technology have the ability to change the agriculture industry? Or will it be the end of traditional meats? Well, there is no doubt that vegan meat production is on rise, also the demand for traditional meat has risen over a year because of emerging economics growing throughout the country.

Well, with our vast agricultural biodiversity and the opportunity to benefit farmers, India can be a keystone of growth for the global sector.

THE DASGUPTA REVIEW ON THE ECONOMICS OF BIODIVERSITY

Sonakshee Jha

B.Sc. Agriculture II Year

"1.6 Earths would be required to keep up with the world's current living standards", says the long awaited, first of its kind *The Dasgupta Review on The Economics of Biodiversity* which was released earlier last month. Led by the British Indian economist Partha Dasgupta, and commissioned by the UK's Treasury Department, the paper focuses on the relationship that economics and biodiversity share, and how natural capital's ignorance by economic thought has long been enabling destruction of natural resources on a huge scale.

The paper also highlights the monumental 40% decline

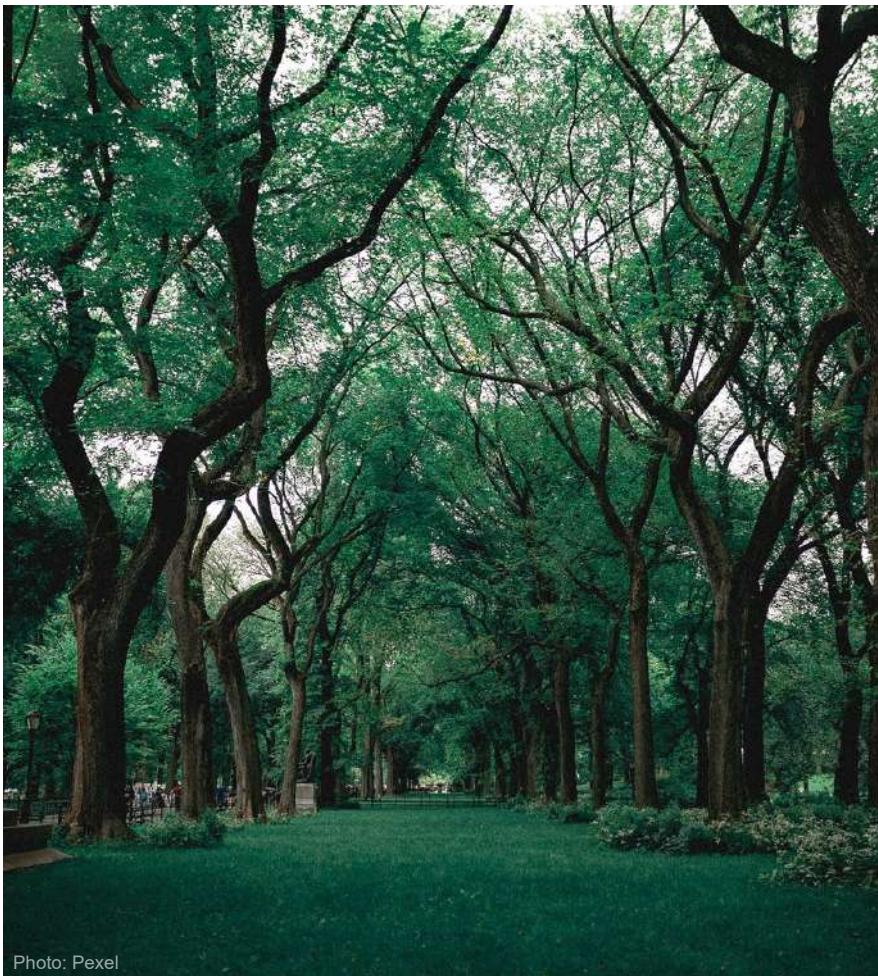


Photo: Pexel

that occurred in the availability of natural capital per person between the years 1992 and 2014, and how these stats emphasize upon the need to focus on the natural capital, just in the way we focus on the produced capital or the human capital.

The review has also suggested steps that should be taken in order to protect biodiversity, few of which are mentioned below"

• **Environmental education:**

The paper advises reframing the educational policies throughout the world and including environmental education in the curriculum, specifically focusing on the local issues. The author believes that this can help mend the unhealthy relationship that people share with nature these days.

• **Control on demands on natural resources:**

Warning about the consequences of the pressure that we put upon the natural resources constantly, the report calls for the governments and policy makers to bring about a change in consumption patterns by charging taxes on unsustainable activities. The

need for the better reuse and recycling policies along with delivery of community family planning services is also talked about.

• **Increase in supply from nature:**

The supply from the nature side can simply be increased either by restoring the lost natural assets or by protecting the existing ones, and the author here advocates for the latter one which is a far more convenient and economical way.

• **The financial system throughout the world needs reconsideration:**

According to the review the most important amendment needs to be made to the financial systems throughout the world, which are tilted against nature and exploit the natural assets in the name of development. He argues that economic development can't be outside of nature and this needs to be understood at earliest. Instances of some poorly designed farming schemes are mentioned, which in the name of providing subsidies are promoting exploitation of water and land resources.

• **A polycentric governance system:**

The importance of a polycentric governance system is also highlighted, where the problems of nature can be addressed at various different levels with much more perspective and knowledge.

The Dasgupta Review provides with a lot of ideas and plans which if implemented can prove to be a game changer for nature as well as the civilization, but it comes with plenty of challenges and risks, campaigners fear even more destruction of biodiversity if natural capital calculation isn't managed properly. Also implementation of such major reforms are never easy and should be done gradually in order to avoid conflicts which may arise, suggesting that even if the decision makers think of implementing these, it may even take years.

However, this review on the economics of biodiversity makes one thing very clear which nobody can deny- The conventional thought on economics and economic progress is impaired and needs to be amended while the going is good.

VOCAL MIMICRY IN SONG BIRDS

Rahul Tharun

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Mimicry is a very common aspect among birds. The internet is filled with videos of parakeets and macaws imitating human

speech and other man-made sounds that they have been accustomed to in captivity. The very famous Australian lyrebird can imitate plenty of song birds and can reproduce numerous sounds, including a chainsaw and a burglar alarm.

Even though this may be considered as a remarkable aspect in avian behavior, this is not natural or normal in any sense. This is because the birds were never exposed to other species, or members of their own in the wild. But of course,

there are birds which practice mimicry in the wild too.

One classic example for visual mimicry is of the Indian cuckoo, a brood parasite, whose eggs look very similar to the foster parents'. The Greater Racket Tailed Drongo is perhaps one of the most interesting *artists* when it comes to vocal mimicry in the jungle. It is a very common passerine, found in most forests in south east Asia. These birds can be easily identified by their glossy black plumage and two elongated racket like tail feathers and a significant crest.

Acoustic landscaping studies have shown that these birds can mimic 40 species of birds, a dozen mammals, a few insects and even two species of frogs! Now that it is known what they mimic, lets try and understand why they mimic. The first and the most obvious one is to attract mates. A male which can mimic a larger number of birds, and in turn a display a better variety in performance has a better chance of wooing a female. The second explanation and perhaps the most intriguing one is how these birds use mimicry to aid in foraging. They mimic the alarm calls of giant squirrels and macaques to alert herds of deer. The frightened deer flee, causing a disturbance in the leaf bed which in turn exposes grubs and insects. The Drongo perches on a high branch, from where it can easily overwatch a flock of Babblers. Once the babblers catch a worm, the Drongo falsely alerts them of an eagle's presence nearby. The poor babblers leave the prey and fly

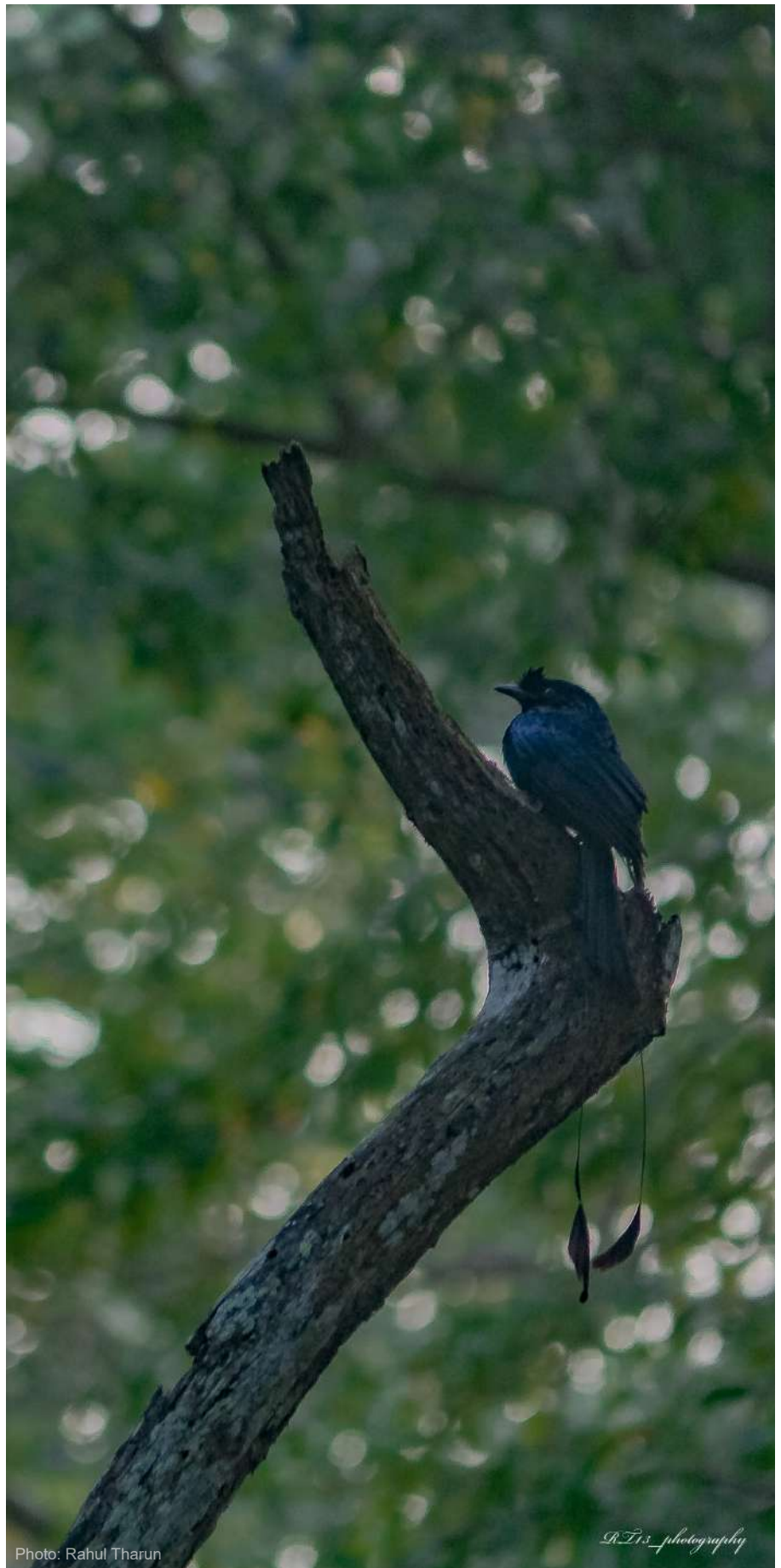


Photo: Rahul Tharun

for dear life, and that is exactly when the Drongo swoops in to have an easy meal.

When a Greater racket tailed Drongo feels left out or lonely, it will mimic other birds to blend in with their flocks to form what is called a mixed species flock. Apart

from these Drongos have their own calls too. Mimicry is a really vast topic and it is the most fascinating part of the jungle's intricate weaving.

These birds are magnificent, lazy but still smart, have knowledge about the hierarchy in the food web and even give

false alarms to watch deer flee (few naturalists even call them the bully of the jungle), are smart enough to use vocal mimicry in different social situations to their aid. When considering all these facts, one will use the phrase "bird brain" rarely as an insult.

THE SINISTER EFFECTS OF E-WASTE



Aadhya Chekoti
B.Sc. Forestry I Year

E-waste or Electronic waste describes discarded electronic devices. Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e waste. Informal processing of e waste in developing countries can lead to adverse human health effects and environmental pollution. This

waste is the most rapidly growing segment of the formal municipal waste stream in the world.

Waste Electrical Electronic Equipment (WEEE) are loosely discarded, surplus, obsolete, broken, electrical or electrical devices. In our country India, most e waste is stored at home as most people are not aware of how to discard them effectively. A fact about e-wastes is that these ever-increasing forms of waste are a rich source of metals like gold,

silver, and copper which can be reextracted and used for other purposes. Improper discarding of these wastes renders it perilous for human health and our precious environment.

According to the Greenpeace report of 2007, India generated over 38,000 tonnes of e-waste. Only 3% has been recycled. India has become a major dump yard of wastes for most countries. The Basel Action Network (BAN) stated in a report that 50-80% of e-wastes from US is dumped in India, China, Pakistan,

Taiwan and Africa.

Health impacts of dumping e-waste include the following:

- Electronic devices contain perilous metallic components such as lead, cadmium and beryllium and brominated flame retardants.

Lead enters biological systems via food, water, air and soil. Children are the ones to bear the brunt mostly as they tend to absorb more amounts of lead in their blood and nervous system.

- Many heavy metals have been soaring in the open air causing various health issues in China such as vertigo, nausea, duodenal ulcers and other gastric issues.

- Recycling operations harms the environment in a very adverse way as these caused the release of high levels of (PCDD/Fs) polychlorinated dibenzo-p-dioxins polychlorinated dibenzofurans, Pb, Mn, Ba, Cu which were found in hair, human milk and placenta in people from e waste processing site.

- 95% of e-wastes are treated

and processed in urban slums where children as well as many adults do treacherous procedures without any protective gear and equipments.

- For dismantling these e-wastes workers earn a paltry of rupees 5 to 10 only.

Reducing e-waste isn't necessarily and always about eliminating environmental risks. The other advantages of it is that we can conserve precious resources and the energy consumed to make these products.

A few ways to minimize e waste is by implementing a few tips and tricks such as the following:

- Donate or sell working electronics is one of the suggested ways to recycle, resell, repurpose and use or sell the spare parts for future use.

- Using an old mobile phone as GPS device in your car can help use those old phones in a much effective way.

- Upgrading the software of device rather than purchasing

a sleek and brand-new electronic device can help minimize the number of devices and e waste per person. Also organizing the electronics well can give a clarity whether you really need to discard the device or not.

- Saving data on cloud such as Dropbox or Google drive can help reduce the need to have a separate memory stick or device for data storage.

- Buying energy stars give rebates when you recycle old electronics and buy new star models. The advantage is that they consume less energy and saves the electric bill.

- Knowing state laws on battery disposal, as some states have made it illegal to dispose them in the trash. Lead, plastic and metal are few of the components which can be easily recycled.

- For e waste management, many technical solutions are available and also legislation, collection systems, logistics, and manpower should be adopted.

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