

OASIS PRESENTS

VERDURE

CAMPUS GREENSCAPE
REPORT
IISER BERHAMPUR



VERDURE

A campus greenscape report of IISER Berhampur

Oasis - The Ecology Club

Indian Institute of Science Education and Research, Berhampur

Odisha, India

verdure

noun

ver·dure also -dyər

1 : the greenness of growing vegetation also : such vegetation itself

2 : a condition of health and vigor

greenscape

noun

Etymology

From green + -scape

1 : A predominantly green natural landscape, with foliage etc.

Dedicated to the beautifully growing campus of the Indian Institute of Science Education and Research, Berhampur, and the nature of the earth, which is healing itself and taking care of the biosphere above it. Dedicated to all Community members of the Indian Institute of Science Education and Research, Berhampur.

Dedicated to the Preceding and Succeeding Team of Oasis Club.

Oasis - The Ecology Club
Indian Institute of Science Education and Research, Berhampur
Odisha, India

Foreword

Dear Readers,

Oasis brings you the Greenscape Report of the Indian Institute of Science Education and Research, Berhampur—our beloved campus, our home.

This book delves into the changes and growth of the greenscapes and vegetation cover around our campus, offering a comprehensive exploration of how our surroundings have evolved over time. Using a blend of big data, satellite imagery, and aerial photographs, we track the progression of the landscape through the years. The images, some historical and some current, provide a visual narrative of how the campus and its greenery have transformed. These photographs are more than just pictures; they tell the story of nature's resilience, adapting to the steady march of time and human development.

Along with these images, the book integrates contributions from our community members, whose firsthand experiences and observations help paint a richer, more personal story of the campus's ecological journey. From dense forests to built-up spaces, from lush green areas to barren patches of land, this spatio-temporal study offers a clear picture of the vegetation cover we once had, what we have now, and how it continues to shift with every passing year.

Through this combination of scientific data and human perspective, we aim to provide a comprehensive understanding of the environmental changes around us. It is a reflection on both the impact of development and the adaptive power of nature, offering valuable insights into the ecological transformations that shape our campus and its surroundings. We hope this exploration not only informs you but also invites you to reflect on the interconnectedness between development, nature, and our role in preserving the balance between the two.

It's important to note that we do not wish to cast any negativity toward the inevitable changes that come with campus development or the authorities involved. The construction of a campus is a significant process, and it is essential for the growth and future of our institute. However, our focus here is not on criticism, but rather on how nature, ever resilient, is healing itself wherever possible. We also highlight the steps we, as a community, are taking to mitigate the effects of these changes.

Through this report, we hope to spark awareness and consciousness within the community about how the land, which has nurtured us, is also bearing the cost of our progress. As we tread forward, we must remember to respect the environment and take deliberate, thoughtful actions to repair and restore the green spaces whenever we can. Let us avoid unnecessary harm and contribute positively to the ongoing healing process of our beautiful campus.

We invite you to explore, reflect, and join us in this journey of understanding and care for the land we call home.

Team Oasis

Oasis - The Ecology Club

Indian Institute of Science Education and Research, Berhampur

Acknowledgements

We would like to express our sincere gratitude to all those who have contributed to making this report a reality. This project would not have been possible without the collective effort of the IISER Berhampur community, and we are truly thankful for everyone's involvement.

First and foremost, we extend our heartfelt thanks to the members of the Oasis Club for their unwavering support, enthusiasm, and commitment to this endeavor. Their tireless dedication in bringing this report to life has been invaluable.

We are deeply grateful to all the individuals who generously shared their observations and write-ups. Your personal experiences and reflections on the changes in the campus environment have greatly enriched this report. The unique perspectives you've provided give a human touch to the data and imagery, allowing us to better understand how our surroundings have evolved.

A special thank you goes to those who contributed images of the campus, both past and present. These photographs have been essential in visually documenting the transformations over time, and they serve as powerful reminders of both nature's resilience and the changes brought about by human activity.

We also want to acknowledge the invaluable information provided by various online resources, including satellite data and environmental records. The insights drawn from these sources have been crucial in shaping the data analysis and allowing us to track the spatio-temporal changes of the campus's greenscape.

Finally, to everyone who has supported and encouraged this project in any way, we are deeply grateful. Your contributions, no matter how big or small, have made this report a collaborative and enriching experience for us all.

Thank you!

Reviews and Credits

This modest report, "Verdure - A Campus Greenscape Report of IISER Berhampur," captures the essence of the evolving greenery inside our campus. We have taken a journey through time, observing the changes in vegetation, land cover, and the growth of our institute. By combining satellite imagery, aerial photographs, and personal observations from the community, we hope to present a balanced perspective of the land that serves as our academic home. Through this report, we not only highlight the transformations that have occurred but also emphasize the resilience of nature and the importance of sustainable development.

The creation of this report has been a truly collaborative effort, and we are proud to acknowledge all those who contributed in various ways:

Idea Generation and Data Collection: The initial concept was born from the need to understand the spatio-temporal changes in our campus environment. We brainstormed key themes such as land cover changes, the impact of construction, and the natural healing processes observed in the area. These themes guided our data collection process.

Satellite Data and GIS Analysis: We utilized publicly available satellite data, including Sentinel-2 imagery, and analyzed it through GIS software to track changes in vegetation and land cover over the years. Special thanks go to the data providers, including Google, Airbus, Maxar Technologies, and CNES, whose satellite imagery made this research possible.

Community Contributions: We are immensely grateful to the members of the IISER Berhampur community who shared their personal observations, write-ups, and photographs of the campus. Your input has been invaluable, and your stories add a deeply human dimension to the data presented in this report.

Images and Photographs: The images included in this report, both past and present, paint a vivid picture of the campus's transformation. A heartfelt thank you to those who provided these visual snapshots, capturing moments in time that tell the story of our evolving campus.

Design and Layout: The design and layout were carefully crafted to present the data and images in a reader-friendly manner. Our designer worked diligently to ensure that each page flows smoothly, integrating text, visuals, and data seamlessly.

Review and Refinement: The content of this report was reviewed and refined through collaborative efforts. We cross-checked facts, polished grammar, and ensured the clarity of visuals to provide you with a cohesive and insightful report.

Limitations: This report is based on available data and community contributions, and while every effort has been made to ensure accuracy, some errors or discrepancies may exist due to data limitations or human oversight. The purpose of this report is to raise awareness and provide a snapshot of the changes in our greenscape, with the intention of encouraging mindfulness about our campus's ecological footprint.

Thank you to everyone who played a part in bringing this vision to life.

Credits

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The findings, observations, and opinions expressed herein are based on available data, satellite imagery analysis, and anecdotal evidence contributed by members of the IISER Berhampur community. While efforts have been made to ensure accuracy, interpretations are subject to limitations, potential errors, and evolving environmental conditions.

Acknowledgment

We extend our sincere gratitude to all contributors, including students, faculty, and staff, who provided their insights, experiences, and photographic records to make this report more comprehensive. Special thanks to the eco-conscious community of IISER Berhampur for their continued efforts in fostering sustainability.

For inquiries, collaborations, or permissions regarding the content of this report, please contact the author at the provided email addresses.

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Latest Picture !



*Images of the campus from
January 28, 2025 (top),
May 3, 2022 (first on the
right), and March 3, 2023
(second on the right).
©Maxar Technologies via
Google Earth Pro*



scan to view original Images



Reviewing Satellite Data

The beautiful campus of IISER Berhampur lies within the extreme coordinates of 19.204339 dd, 84.842434 dd, 19.194595 dd, 84.832453 dd among north, east, south and west, covering a total perimeter of 3,300 meters and an area of approximately 130 acres (524,692 square meters)^[1], the campus is analyzed using SENTINEL-2 data for its higher resolution of 10 meters, as LANDSAT's 30-meter resolution was found to be insufficient for detailed study. Google Earth Pro imagery was used for temporal changes.



*Image of the Campus on January 28, 2023
©Maxar Technologies, via Google Earth*

With an error margin of 3–5%^[1], the satellite data was processed using supervised classification in ArcMap. Spatial maps created from this data reveal the timeline of the campus vicinity. Data from four specific years—2018, 2022, 2023, and 2025—was analyzed, providing significant insights into surface-level land cover changes. Captured during months of high UV Index^[3], the analysis focused on three primary land cover classes: Dense Vegetation, Sparse Land, and Built-Up Areas. Additionally, Land Exposure was observed in 2018. The study emphasizes the natural progression of land use as part of campus development, showing a transition from a 62.51% dense vegetation ratio in 2018 to 6.77% in 2025, with built-up areas increasing to 63.81%. This change is accompanied by the conversion of barren lands into sparse vegetation, reflecting the dynamic nature of the campus's evolving landscape.

Satellite imagery from April 2018 shows a campus area dominated by dense vegetation, including moderate-height plants and coconut trees. The only visible modern infrastructure was a road on the west side running north to south. A small hut visible on the north side near the road (bluish in the imagery) appears to be a native settlement, also seen in Google Earth imagery from May 2017. Another hut-like structure (brownish in the 2018 imagery) located slightly south of the center was visible as early as May 2011, suggesting another long-standing native settlement. A farm-like built-up structure can also be observed slightly south of the center in Google Earth data from May 2015.

From 2018 to 2025, the most significant visible change will be the loss of native vegetation, the growth of sparse vegetation in some areas, and the rapid expansion of built-up areas. Collaborative efforts involving Google Earth Engine, Airbus, CNES, Maxar Technologies, LANDSAT, Copernicus, and Sentinel satellite imagery enabled the creation of spatio-temporal maps of the region at a high level of detail across multiple timeframes.

Satellite data for 2018, 2022, 2023, and 2025 were collected during April, May, and January 2025. These specific periods were chosen based on two primary conditions: a high UV Index for more precise data, avoiding cloud coverage for accurate classification, and key institutional milestones.

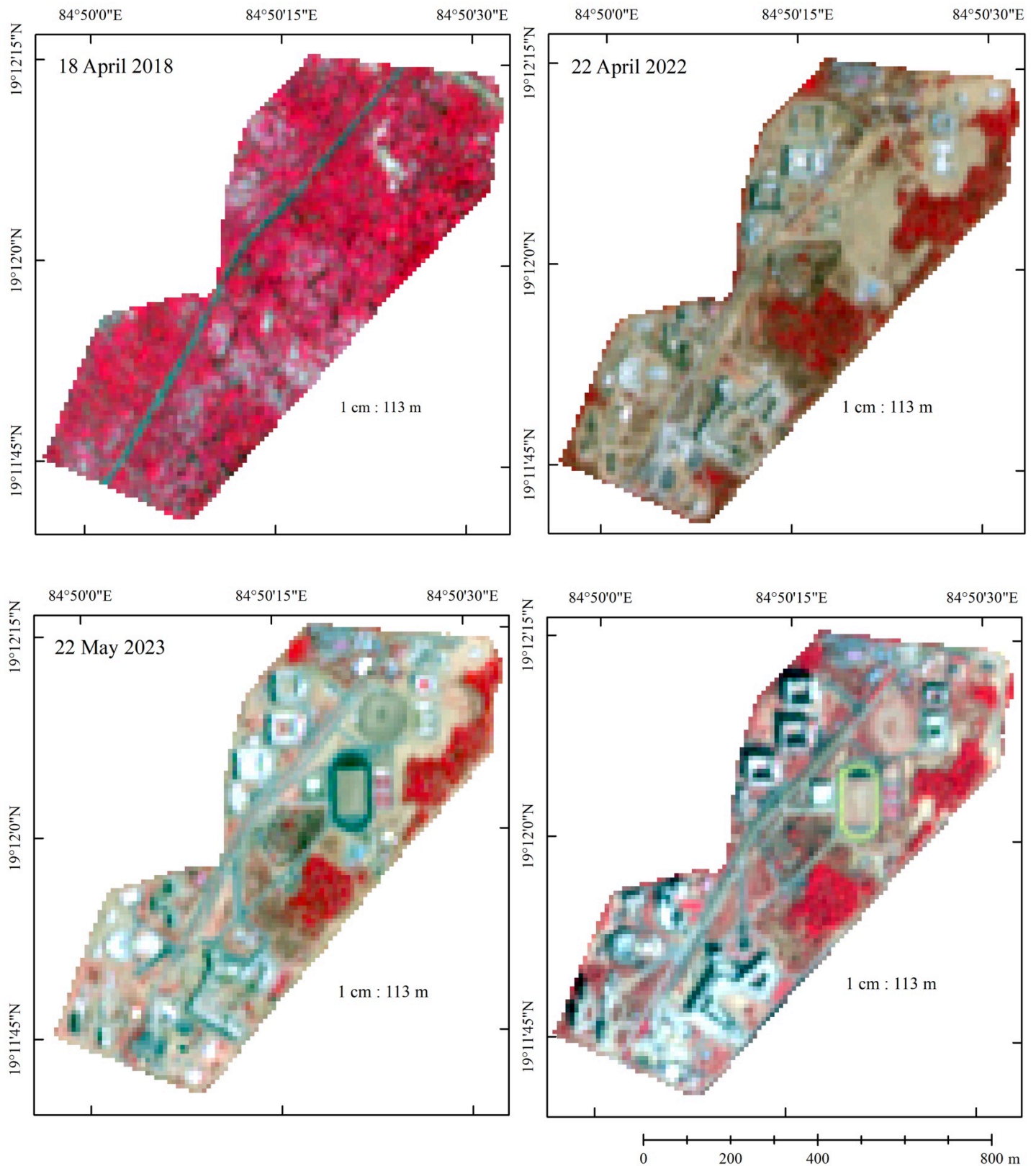
April 2018 represents a period during or before governmental procedures; April 2022 reflects conditions before the first settled batch (2021 batch) who arrived on campus in August 2022; May 2023 captures nine months after the initial settlement and prior to the arrival of the 2022 and 2020 batches, during which construction was minimal, and only the 2021 batch occupied the campus. January 2025 provides the most recent satellite data available. Sentinel data was processed using maximum likelihood classification (MLC) in ArcMap (ArcGIS), with a manually drawn polygon based on Google Earth imagery from May 2023 to define the campus boundary. The classification model was trained to identify four land cover types: Dense Vegetation, Sparse Vegetation (for 2023 and 2025), Built-Up Areas, and Land Exposure (for 2018 and 2022). The data underwent several GIS methodologies, including format conversions, area calculations, and the generation of final outputs.

Year	DenseVegetation	SparseLand	BarrenLand	BuiltUp	Total
	in acres	in acres	in acres	in acres	in acres
2018	80.93	-	28.24	20.29	129.46
2022	28.49	-	51.92	49.05	129.46
2023	11.52	52.66	-	65.53	129.71
2025	8.77	38.08	-	82.61	129.46

The data reveals significant changes in land cover within the campus area between 2018 and 2025, reflecting the dynamic nature of campus development. Dense vegetation, which covered 80.93 acres (62.51%) in 2018, saw a sharp decline to just 8.77 acres (6.77%) by 2025, marking a reduction of approximately 90%. On the other hand, built-up areas expanded substantially from 20.29 acres (15.67%) in 2018 to 82.61 acres (63.81%) in 2025, highlighting the rapid pace of infrastructure growth. Notably, barren land, recorded at 28.24 acres (21.81%) in 2018, disappeared from the records by 2023, likely transitioning into sparse vegetation or built-up areas. Sparse land emerged as a distinct category in 2023, covering 52.66 acres (40.60%) before reducing to 38.08 acres (29.41%) by 2025, indicating that some of this land was further developed into built-up areas. The total area remains consistent at approximately 129.46 acres, with minor variations attributed to mapping and classification adjustments. Overall, the data highlights the transformation of the landscape due to construction activities while also suggesting the potential for environmental recovery in certain areas through sparse vegetation growth.

1. Google Earth Imagery (May 3, 2023): Polygon boundaries manually drawn based on land details visible in Google Earth Pro imagery (Airbus and Google Earth Pro data).
2. Human Error Margin: Potential inaccuracies may arise from manually drawn polygons and the creation of training datasets during classification.
3. NASA LARC UV Index: Data sourced from NASA Langley Research Center (LARC) UV Index records. ALLSKY_SFC_UV_INDEX (W/m² x 40) from 2001 to 2022

False Color Composite Map of IISER Berhampur (2018-2025)



Map of the IISER Berhampur campus (2018, 2022, 2023, 2025) in False Color Composite (FCC), processed from Sentinel-2 satellite imagery using ArcMap to highlight vegetation and land cover changes. The external polygon boundary was manually digitized using May 2023 Airbus imagery from Google Earth Pro. Minor uncertainties may arise from manual tracing and data processing.

True Color Map of IISER Berhampur Land Cover Classification (2018–2025)



Map of IISER Berhampur campus, based on Sentinel-2 True Color Composite (TCC) imagery. Supervised classification was performed using the Maximum Likelihood Classification (MLC) algorithm with manually drawn training samples. The external polygon boundary was digitized using May 2023 Airbus imagery from Google Earth Pro. Minor uncertainties may arise from manual sampling, classification, and boundary tracing.

The Campus

Serene and Sound

The Campus of IISER Berhampur is on the eastern coastal belt of India, at Lohadigam (760030), a small coastal village in Ganjam District, Odisha.

One of the seven IISERs in India, this holds its uniqueness in being near the beach, but that is not everything it has! Dynamic environments from different directions surround the 130-acre campus area.

In the east, at less than 700 meters, the Campus has its proximity to the beach, with cashew (*Anacardium occidentale*) and she-oak (*Casuarina equisetifoli*) in majority numbers along with coconut trees and some other wild coastal plants, which is a hub of insects, birds, moths, and the region is an economic zone (due to presence of cashew plants) for the localities in the Markandi, and Garampeta (both are local village names) village.

The Campus and nearby village area is a zone of landfall for cyclones and heavy monsoon rainfalls; at the same time, it supports and nurtures the coastal land and the dependencies of agricultural villagers.

On the beaches of Garampeta and Markandi, we have observed various types of gastropods, mollusks, and bivalve shells; the shore is not way far from the Rushikulya turtle Roorkee (~40 km), which is a location of Turtle mass nesting, a known and recognized place of conservation, and also ~300 km from the Gahirmatha Marine sanctuary.



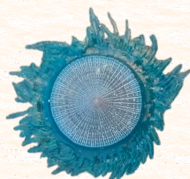
From second floor, block 2
October 17, 2024



Tulu Village on the west of the campus
July 09, 2023



Scan to see Original
Images



A dead Blue button
(*Porpita porpita*),
markandi
April 10, 2024, ©Sourajit



Campus from rooftop of Boys' Hostel
July 09, 2023

The Campus is at a distance of ~ 30 km from Tampara Lake at Chatrapur, which is recognized as Ramasar Wetland, and at a distance of ~ 120 km from Chillika Lake, which is a recognized UNESCO World Heritage site, Ramasar Wetland (added 1981) and a removed from Montreux Record site (1993 - 2002).

In previous instances, the students observed multiple dead turtles on the coasts in January 2024. Dead flesh and shells of fishes, squids, and sea urchins are commonly spotable at the seashore. The shore is a source of economic activity for the fishing people of the locality.

In the south of the Campus, there are human settlements, an area filled with Kewra [keora or kewda (Hindi: केवड़ा, Bengali: কেওড়া, Urdu: کیوڑہ, Punjabi: کیوڑا (Shahmukhi) वेहड़ा (Gurmukhi))] plantations. There are a few agricultural and fish cultivation ponds as well.

The west side of the Campus has moderate swamp land filled with forest coverage of moderate to tall trees, which is a hub of birds. On bright sunny days, the eastern ghat can be visible from some high-altitude places on the Campus, and the clear sky combined with the green belt shows the best sunset on the Campus.

The north region and the main road that connects the Campus to the town have a dense wetland region on either side; the Campus is near the Kirtipur wetland, another birding hotspot reported to have 77 species under 15 orders [2]. On the wayside of the road, we can observe different birds, including Indian grey hornbills, during certain seasons. In contrast, kingfishers, egrets, swamphen, drongo, bulbul, parakeets, lapwings, cormorants, kites, doves, and ravens are common.

Conclusively, the Campus is in place of a vibrant biodiversity-rich region filled with all the types of support the biosphere needs, and the area is an economic zone, too. A place filled with plants, wetlands, and birds makes it a suitable location for studying cyclones, monsoons, sea, seashore sedimentology, wetlands, kewra, and other related topics.



*A dead turtle spotted on the Markandi Beach
March 14, 2024 ©Aditya aryan*



*A dead squid spotted on the Markandi Beach
March 14, 2024 ©Aditya aryan*



*Students on a Birding trip to Mangalajodi Wetland
January 28, 2023 ©Prakhar Varshney, Oasis*



*Students on a Nature Walk to the North Wetland of the
campus, August 24, 2023*



(from left-clockwise) picture of Common Rose (*Pachliopta aristolochiae*), *Delta pyriforme*, Eastern carpenter bee (*Xylocopa virginica*), Oriental garden lizard (*Calotes versicolor*), and a butterfly from the Papilionidae family
Captured from the areas near the playground.

August 24, 2024 ©Subrat mallick

Although the ground inside the Campus is majorly sandy, we can still see vegetation coverage in some regions. Wild shrubs and weeds in some regions are still intact, and some have been plucked out - followed by the construction or replanting of other plants in those regions. We can see many birds roaming around, such as kingfishers, kites, egrets, Swampheens, and even house sparrows (mostly in playground regions). The Campus has dog numbers, and they have their puppies, which is a topic of conversation about whether to keep them inside the Campus. However, they do not cause any harm to the community. Still, hygiene, diseases, and cynophobia are other topics of concern. The Campus also has moths and butterflies, which are not rare to spot, but they have designated spots.

Notable regions of the organism (primarily birds and moths) are the gap between the ground and Boundary, behind the Boys' hostel, near the Academic Buildings.

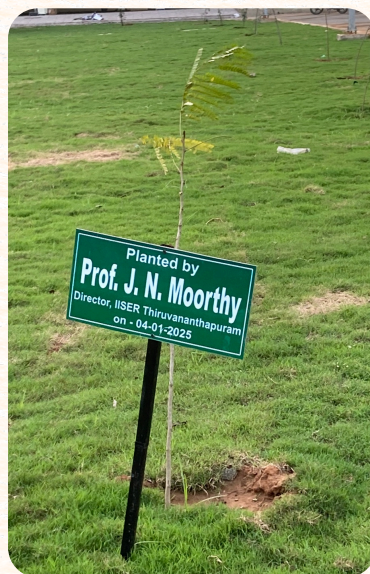
The Campus is still under construction, implying that the generation of waste and the removal of other sparse land or dense vegetation are uncertain. However, we have to understand that this is the process.



Students on a Nature Visit trip to Purnabandha estuary
February 12, 2024



Images of Indian roller (*Coracias benghalensis*), and a flock of Birds, both inside the campus, August 24, 2024 ©Sabyasachi



*Plants planted by the Directors of all seven IISERs during the January 2025 meeting, in front of the Staff Quarters near the library.
Photographs taken on January 29, 2025*

The institutional authority is doing great in initiating frequent plantation drives on the Campus, and by blessings of the universe, the divine energy, and Mother Earth, the plants are flourishing.

It is anticipated that the Campus will get more plants and vegetation inside it soon, enhancing the living conditions and security required by the various organisms in order to settle.

In this report of January 2025, it is anticipated that in the next edition of this report, there will be an increase in the vegetation, sparse lands, and organism numbers on Campus.

