

# Samuhik सामूहिक पहल Pahal

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Citizen science

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# The promise of citizen science



Disappearing Dialogues

**M**odern Science as we know it today, emerged as an organized, programmatic, institutional phenomenon only in the last 150 years from an earlier, diffuse phase of individual explorations by gentleman scientists in Europe. In this transformation, the scientific paradigm explored many deep questions that ranged from the origins of the universe with telescopes in remote parts of the world, life in the deepest part of the oceans using submersibles, the smallest particles that make up atoms using giant particle colliders and the oldest rocks using microscopes and radioactive clocks. Institutional science allowed the space and funds for focused studies of this kind.

As the 20th century drew to a close, certain problems of scale emerged that boggled the

most creative scientific minds. They started asking that if only throwing increasing amounts of money, technological and people resources could tackle the problem.

These involves problems like mapping all the innumerable space objects in the solar system and its neighborhood, observing the impact of climate change on plants simultaneously across different bioclimates of the world, and documenting the distribution and abundance of birds in different parts of the earth.

In each of these areas of interest to the scientists were amateur communities of astronomers, plant enthusiasts and birdwatchers, who had specific and deep interests in observing and documenting areas of their interests in many ways. The scientists seized the opportunity presented by this



diffuse but committed network of volunteers and roped them into formal scientific endeavours.

They co-created frameworks of data gathering and reporting, quality control, data analysis and sharing with the amateur groups. In the process, over a period of time, emerged the phenomenon of 'citizen science'.

Citizen science is an approach to research that partially delinks it from an institutional location. It widens it to a much larger community of participation by interested citizens across the globe. The problems addressed by this phenomenon are typically ones of scale that would have otherwise required heavy resource mobilization and infrastructure creation.

The power of citizen science lies in the amalgam of individual motivation to learn and participate in individual and group activities with a wider intent of generating quality scientific data at scale. As time has progressed, citizen science has begun spreading its wings to include people from non-mainstream backgrounds in rural areas and children in schools and community spaces. These groups participate in data generation, and sometimes even in analysis and publication.

Science, in this manner, has evolved to have participatory, community-oriented spaces of exploring natural phenomena. This has the potential to transform the manner in

which science is perceived and experienced in an increasingly fractured world, where suspicion of the scientific endeavour has increased in the last decade. It remains to be seen if the support for scientific enquiry and a constitutional commitment to scientific temper can be supported with strength by the citizen science movement.

Schools, colleges, libraries and community learning spaces can all participate in the citizen science movement. This has been repeatedly demonstrated by several examples from across the world, including India.

The opportunity here is to make science a widely accepted way of looking at the world, which uses an evidence-based investigative process. There is also a potential for participants in citizen science projects and spaces to understand science as one of many, and valid, ways of understanding the world around us.

Citizen science has the potential to impact real problems like climate change that are in the forefront of global natural, social, economic and cultural upheaval today and in the decades to come. In our work with children, citizen science has a way to arrive at exploring a consensus on our future as a planet.



Young Creators Lab



# A new future for the knowledge generation – citizen science

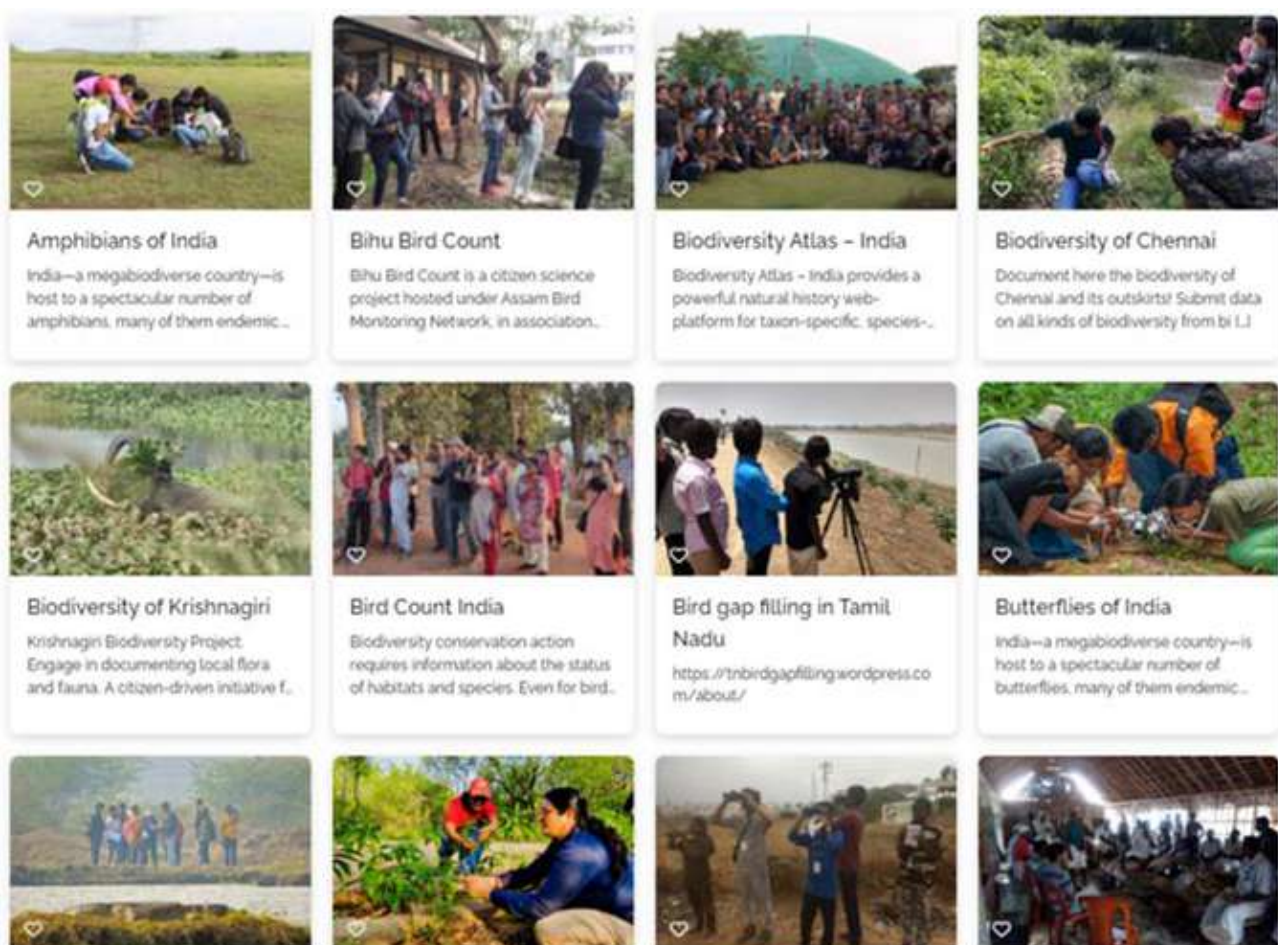
Geetha Ramaswami

**W**hile walking with Joel Mathew, a fourth-year undergraduate student at the National Institute of Science Education and Research (NISER) campus in Odisha, one is likely to see the iNaturalist app open on his smartphone. “I love using iNaturalist to identify flora and fauna around me,” he says. When asked about why he uses iNaturalist, he shares, “I love that I can create projects on this app and quickly share rare observations with others. The option to comment under each observation helps me communicate with the entire citizen science community in one go!”

iNaturalist is a biodiversity citizen science project. It is one of many in the world. It primarily documents biodiversity through images.

Scientific research conducted by non-professionals or amateurs is known as ‘citizen science’ (cit sci). This often involves the collection and curation of information about the natural world.

Citizen science empowers people to co-create scientific knowledge for the benefit of the larger society. It takes science from the jargon-filled pages of journals to the



fingertips of practitioners and users of this information. Today, citizen science encompasses a wide range of disciplines. These span from monitoring climate change and tracking disease outbreaks to crowdsourcing astronomical discoveries. It plays a vital role in increasing public engagement with science, enhancing research capabilities, and democratizing knowledge creation across the globe.

Non-professionals have long collected data about the natural world. This is in no way a recent practice. Humans are curious and exploratory by nature – as we should be – since this is vital for survival in the natural world. Curiosity, documentation and experimentation is how humans knew so much about growing food, tracking weather, geography and astronomy, even before these became branches of intense scientific enquiry.

Take the case of the iconic Japanese Sakura tree, for instance. In current times, it has become the poster child of changed tree seasonality because of climate change. It is a culturally important tree, which has been observed and recorded in informal ways since 800 AD!

Thanks to 1,200 years of records of its flowering chronology, we now know that the climate has most certainly changed after the industrial revolution. This reflects in the tree flowering much earlier in the past 200 years than in the millennium before that.

Among the different ways of observing the natural world, documenting biodiversity lends itself particularly well to citizen science. Some of the earliest documented citizen science projects – such as the Audubon Society's Christmas Bird Count, which began in 1900, documented bird densities.

Non-professionals have for long assisted professional scientists, especially with the exploration of the natural world. In the 18th

and the 19th centuries, naturalists and astronomers utilized the skills of local guides and amateurs to identify and collect species for description, and map stars, respectively.

The term 'citizen science' came into being only in the later decades of the 20th century. With increasing access to the internet and simple observation protocols, citizen science has truly taken off in the past four decades across the globe.



Nature Conservation Foundation

Technology makes citizen science easy

Changes in the way people live and interact with their environment have additionally created a 'nature deficit', where there is little to no opportunity to engage with living beings other than humans. Unbeknownst to us, this deficit has gradually created a vacuum in our well-being. Biodiversity citizen science is an opportunity to spend time outdoors and observe living beings, and marvel at the beauty of the interconnectedness of life.

Handheld technology, widespread training, support and troubleshooting, and access to the skills of experts have all made citizen science a powerful tool in gathering scientific



data at scales that were earlier unimaginable. Take the example of iNaturalist yet again – think of a species, any species, and type in the name as a search keyword on the platform. What one gets is a world-wide map of that species, contributed by thousands of people from across the world, verified and validated by experts. A handful of scientists working in their specialist silos would take decades, if not more time, to match the scale and robustness of this data!

Most people find plants terrifying in their indistinguishable greenness, even though they are present everywhere, and everyone is taught from a very young age that we owe our existence to these magnificent beings. But millions of images of thousands of plant species contributed by enthusiasts everywhere have made robust learners out of the AIs of projects like Pl@ntNet, and made plant identification anywhere a breeze. Gone are the days of trawling through regional floras that were exclusive and unavailable for the masses, and aren't we all glad about that!

Citizen science in India is newer still. Biodiversity citizen science projects are fairly

easy to join and contribute to. India's diverse ecoregions, habitats, flora and fauna make it a delight to document the natural world right from our backyards, especially birds.

There is a literal Great Backyard Bird Count that bird enthusiasts can participate in and that contributes to the global understanding of bird populations. The Asian Waterbird Census is touted as the very first citizen science project of India, conducted across wetlands with the aim of raising awareness on water birds. Both these are international events facilitated entirely, or in part, by the citizen science platform eBird and its India counterpart Bird Count India.

India Biodiversity Portal (IBP) and SeasonWatch are two completely home-grown citizen science projects. Their aim is to document biodiversity and changes in plant seasonal behaviour respectively.

IBP, much like iNaturalist, is a veritable compendium of biodiversity images. Some of its resources – like the plant species information pages – often act as accessible stand-ins for local floras with plant names, descriptions, distribution, and seasonality information all available in the same URL!

SeasonWatch tracks seasonal changes in trees across India, with the aim of understanding climate change. This is based on the assumption that as the temperature and rainfall patterns of the world change, so do the timing of leaf-out, flowering and fruiting of trees.

The data from this project are available as interactive elements on the project website. Here, contributors, or anyone with curiosity, can explore the effects of the environment on the seasonal behaviour of select trees. This type of information has the potential to act as early-warning for people whose livelihoods may be dependent on the seasonal production of flowers and fruits.

Citizen science data when curated, processed, analyzed and disseminated in the



Nature Conservation Foundation

Observing biodiversity around can inform adaptation

proper way, can find practical applications even for people who do not contribute information! One of the most effective uses of citizen science biodiversity data has been in the form of reports such as the State of India's Birds (SoIB), which has immense application in species conservation, habitat protection, and policy development.

The SoIB is a neat, interactive compendium on the ranges and population dynamics of birds from across India over 20 or more years. These trends can help us identify birds that are most vulnerable to human-made changes.

MYNA (Mapping Your Neighbourhood Avifauna), based on eBird data, is another such interactive tool. It can help the beginner birder or the curious data explorer find out what birds they are likely to find in their locality. I personally love demonstrating this tool to undergraduate students, and enjoy seeing their faces light up with cheer when they see their neighbourhood birds!

These resources are available online and free of cost. They also have supporting documentation for use. All of this make these data 'products' invaluable education tools.

In 2020, the role of citizen science in building public knowledge was acknowledged by Government of India. Under the aegis of the Biodiversity Collaborative (a network of institutions and individuals committed to making biodiversity data accessible for application in conservation, sustainable development, and human well-being), the Cit Sci India Conference came into being.

This entirely online conference has been one of the most accessible platforms for citizen science practitioners to share and learn from peers not just during the conference, but beyond that through a Discord community. Hundreds of participants, from ages 10 to 70 years, have met annually for the past five years to exchange stories, learnings and data, while debating and discussing emerging concerns.

For instance, technology is evolving at a rapid rate, and contributing to citizen science may threaten contributor privacy. What steps can cit sci projects take to ensure contributor privacy is upheld? What are the best practices to verify, store and share cit sci data? How can practitioners ensure that data contributors get fair attribution for their efforts, and that data are used in only those ways that are beneficial to biodiversity and society? Who gets access to voluntarily collected data? Is it OK to make paywalled products based on these data?

These, and many other, concerns have formed the bases of lively discussions and creative solutions during the Cit Sci India conferences. If the enthusiastic banter on the community group is anything to go by, one can safely assume that citizen science as a concept is here to stay.

In conclusion, I would like to invite all the readers of this article to join a citizen science project and become part of a knowledge creation movement that is uniting humanity like no other! Like Joel, you could start small, with a biodiversity documentation app on your smartphone - and really see that ant or sparrow or peepal tree outside your window!

**Geetha Ramaswami** is a plant ecologist with a special interest in invasive plants, plant phenology, and citizen science. For her PhD and post-doctoral research, she studied invasion by the woody plant - *Lantana camara* - in diverse forest, rural and peri-urban habitats across India. She currently heads the all-India citizen science project SeasonWatch aimed at understanding tree-seasonality through large-scale scientific documentation by non-professionals. She is interested in taking science out of jargon-filled journal silos, to people - where it can really make a difference.

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# Engaging communities through mushroom cultivation: reflections on a citizen science journey

*Shrey Gupta*

**E**co Vigyan Foundation has been working with schools across Himachal Pradesh to introduce teachers and students to the fascinating world of fungi. Among these, the schools in Nalagarh have embarked on a particularly inspiring journey.

It all started with simple mushroom walks in the forests. Soon it turned into a larger exploration of fungal diversity and hands-on learning.

Encouraged by their curiosity, participants began documenting their findings. They have been able to create school-based mushroom repositories. Over time, this engagement has evolved into cultivation initiatives that have brought mushrooms from the wild into classrooms.

## **Citizen science and community engagement**

At Eco Vigyan Foundation, we view citizen science as a participatory approach.

It empowers individuals—especially students and teachers—to actively engage with scientific inquiry and environmental responsibility.

By democratizing knowledge and making scientific exploration accessible, citizen science bridges the gap between academic research and community-based learning. Our work in Himachal Pradesh embodies this philosophy by encouraging curiosity-driven, hands-on learning experiences that connect scientific principles with real-world applications.

We believe that when individuals document biodiversity, experiment with sustainable practices, and share their findings, they become both knowledge producers and environmental custodians. Through mushroom cultivation, students and teachers have moved beyond passive learning to become co-creators of knowledge. They



Eco Vigyan Foundation

are developing an intimate connection with local ecosystems, while addressing larger questions of sustainability, nutrition, and resource management.

## **From exploration to cultivation: the workshop experience**

The transition from mushroom identification to cultivation was driven by a fundamental question—how can edible mushrooms become a part of our daily lives?

To answer this, we have designed structured workshops. These blend conceptual learning with practical engagements. Each workshop follows a structured format. We share this here.

**Introduction to fungi and their ecological role:** Teachers learned about fungal biology, ecological functions, and the importance of fungal diversity in local ecosystems.



Eco Vigyan Foundation

**Mushroom identification and documentation:** Using field guides and local knowledge, participants documented fungi in their surroundings. The process reinforced observational skills and species identification techniques.

**Hands-on cultivation training:** Teachers were trained in cultivating oyster mushrooms using agricultural waste such as straw and cardboard. This made the process both sustainable and cost-effective.

**Monitoring growth and understanding fungal life cycles:** Teachers and students tracked the stages of mushroom growth. In the process, they developed an applied understanding of fungal reproduction and metabolism.

## **Harvesting and reflecting on the process:**

The culmination of the workshop involved harvesting mushrooms and discussing their economic and nutritional significance. The participants brainstormed ways to integrate this knowledge into the school curriculum.

## **Cultivating curiosity and knowledge**

Through this pedagogy, the goal was to equip teachers with skills related to cultivating mushrooms. Equally importantly, they also developed a deeper appreciation of fungi as an essential component of ecosystems.

The hands-on approach provided experiential learning opportunities. Through these, theoretical knowledge was reinforced through direct observation and experimentation.

The shift from exploration to cultivation was fueled by curiosity and a willingness to experiment. Within two months, the schools harvested 10-12 kilograms of mushrooms. This offered the students and the teachers insights into fungal life cycles, economics, and nutritional value.

## **Teachers' reflections on their experiences**

“When the students saw a picture of oyster mushrooms, they were intrigued. They had only ever encountered button mushrooms before. So, the hands-on activity became an exciting challenge. They asked questions, experimented with different methods, and learned so much in the process.” – Kavita Bansal, Shivalik Valley School, Nalagarh

“We discovered a practical and affordable way to grow oyster mushrooms. And the students, especially the girls, found immense joy and excitement in the process.” – Sachin Talogta, Government Girls Senior Secondary School, Nalagarh

“From a single batch, we managed to get four successful harvests! This success has inspired us to continue mushroom cultivation as a regular activity at our school.” – Ranjan Walia, Government Model Boys Senior Secondary School, Nalagarh





“Nature holds many secrets. And through mushroom cultivation, we have uncovered some of them, right within our school premises.” – Chandresh Rana, Government Senior Secondary School, Bariyan

## **Beyond cultivation: building a community of learners**

The cultivation of mushrooms extended beyond science. It nurtured a sense of connection with nature. It also offered insights into sustainable agricultural practices.

Teachers, in collaboration with students and with ongoing support from Eco Vigyan Foundation, explored ways to optimize growing conditions. They used locally available resources. This reinforced concepts of ecological balance and resource efficiency.

The participants learnt practical cultivation skills. They gained awareness of waste management and food security. They were also exposed to the potential of mushroom cultivation as a sustainable livelihood option.

This hands-on approach to learning proved to be both fun and transformative. It opened doors to new ways of thinking about food production and environmental responsibility.

## **Mushroom cultivation as citizen science**

This initiative is an example of the power of citizen science in encouraging community-led research, innovation, and ecological

responsibility. Students and teachers have been able to enhance scientific literacy in mushroom cultivation. In the process, we are nurturing a participatory model where communities become active stakeholders in knowledge creation.

The process of observing, documenting, experimenting and refining cultivation techniques embodies the core principles of citizen science—curiosity, collaboration, and shared learning. As we move forward, we envision expanding this model to more schools, inspiring future generations to engage with science in meaningful and impactful ways.

**Shrey Gupta** is an environmental microbiologist by training, with more than eight years of self-taught and academic experience. He is an ardent promoter of harmony between self and nature. He has been demystifying the world of fungi for communities across age groups and educational status. He is the co-founder of Eco Vigyan Foundation. Through this nonprofit organization, he envisions a culture of sustainability and learning through nature in schools.

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# Empowering conservation through education and community engagement

*Suhirtha Muhil M*

**C**onservation is a purpose-driven endeavor. For any conservation institute, it quickly becomes evident that the journey will seldom be alone. Meaningful solutions can be reached only with the involvement of people and communities.

Nature Conservation Foundation (NCF) recognized this idea in its vision statement – “Where nature and society flourish together”. It recognizes that both scientists and communities could learn from each other’s knowledge and fill in the gaps that are needed in achieving solutions that benefit nature and humans alike. This vision is reflected in many of the ongoing projects through education and community engagement.

## **Community engagement**

NCF’s engagement with communities began with efforts to reduce human-animal conflicts. Human-elephant conflicts in the Anamalai Hills of Tamil Nadu and in

Karnataka’s Hassan district have been studied over several years now. Long-term research is key in these eco-diverse landscapes.

Here elephant movement is tracked with the help of local communities and State Forest Departments. This information is then shared with local residents through SMS, voice call alerts, GSM-based digital information boards, and alert light beacons. Over the years, these efforts have greatly reduced the human fatalities and injuries in these two landscapes.

In the trans-Himalayan region, the High Altitudes Program has supported snow leopard conservation by studying their behavior and ecology. It compensates local communities for livestock losses due to depredation by snow leopards and supports the creation of predator-proof enclosures. Communities actively monitor snow leopards and other wildlife. Women in Spiti are now trained in wildlife monitoring and camera



SeasonWatch

Bird Count India’s recent field work in Punjab



trapping, a role men have predominantly undertaken in the past.

In these landscapes, where grazing is the main livelihood, communities traditionally built 'Shangdongs'. These are traps used to kill black wolves, primarily to protect livestock. Today, many of these 'Shangdongs' are being converted into stupas, Buddhist structures where people can pray.



SeasonWatch

'Birding Buddies Workshop' by Early Bird

In the Eastern Himalayas, the Hornbill Nest Adoption Program has collaborated with members of the Nyishi tribe to monitor hornbill nests. The tribe observes the nests during the breeding season and nest sites are monitored for occupancy every year.

Hornbill Watch, a citizen science initiative launched in 2014, allows individuals to record sightings and images of the nine hornbill species found in India by sharing information about the birds. Similarly, with the help of local communities and their traditional knowledge, camera traps have been placed to study the behavior of the Chinese Pangolin.

## Nature, culture and climate change

In the face of climate change, researchers notice how language, culture, and people's connection to the environment are evolving. They have taken steps to document these

changes and raise awareness about these issues.

In the remote high altitudes of the Himalayas, local folktales and stories are often confined to small, isolated locations, giving them unique identities. To bring these tales to a broader audience, 'HimKatha', a biannual magazine, was launched. It highlights the importance of preserving the Himalayan ecosystem, while documenting stories and folktales from the region as remembered from one generation to the next.

In the Himalayan belt of the northeastern states, storytelling helps young children connect with their indigenous languages. Researchers there believe that as traditional cultural activities (like bamboo home-construction) reduce within the community, the words and terms associated with these practices are also at risk of being lost. To preserve the local language and culture, a group of locals who are working on conserving nature and culture, are engaging children through storytelling and plays.

In the Lakshadweep Islands, researchers and local communities engage in participatory dialogues to share knowledge, address knowledge gaps, and understand community perceptions of nature. These efforts facilitate better communication between researchers and local people about the impacts of climate change. These also emphasize the sustainable use of limited natural resources such as freshwater, fish, and coral reefs. All these efforts and interventions aim to positively impact the livelihoods of local communities.

## Making early connections

It is believed that knowing and understanding a place creates connections and attachment in its people. This sense of attachment to trees, rocks and animals around people is fostered by their connections to nature developed from childhood.

The deeper this bond, the more empowered people feel to take action toward protecting and preserving their place. It is, therefore, necessary for outreach programs to be place-based and locally contextualized.

The Nature Camp Program held at the Pakke Tiger Reserve takes school children living adjacent to the forest reserve to experience the forest. During the one-day camp, children engage with the forest through games, journaling, reflecting, sitting by the river, touching the soil, observing insects, and hugging trees.

The tree-hugging activity, in particular, is known to be one of the most profound and moving experiences for both children and teachers. Some of the children get to go on three-day camps at a later stage, an opportunity they all look forward to.

The impact of place-based educational camps conducted by local NGOs and schools, such as those in Madayippara, Kerala, where local students explore laterite hill rock outcrops rich in distinctive flora and fauna, is currently being studied. Understanding how

these camps influence children's perspective toward nature will help in designing better environmental educational programs.

Several programs at NCF reach a much larger audience across India. These foster a broader, more general understanding of ecology. Simultaneously, these also cater to regional requirements through the curation and development of teaching-learning resources.

The [Early Bird Program](#) aims to cultivate a love for nature among young people through the lens of birds. The program produces engaging educational materials like flashcards and region-wise pocket guides. It holds workshops for young children on bird observation. It also conducts many informative webinars for youngsters and educators.

These resources have been well received by educators, and have reached the remotest corners of the country. Recently, EarlyBird has partnered with Government of Karnataka to train 6,000 librarians across all the districts and panchayats to engage children in bird observation and nature-based activities.

NCF's [Nature Classrooms](#) initiative integrates nature into classroom lessons in meaningful and practical ways through capacity building programs with teachers and educators. It emphasizes that nature-based education should be contextual, age-appropriate, and locally and culturally relevant. The initiative's resources aim to support and enrich Environmental Studies (EVS) curricula in primary schools. Recently, their nature-based learning methods were incorporated into NCERT's primary school EVS books.

The [SeasonWatch Program](#) was created for everyone to observe tree seasonality. Most recently, team SeasonWatch developed a [curriculum-adjacent, activity-based resource](#) for middle- and high-school educators to work with children in understanding the impacts of climate change in and around their schools.



SeasonWatch

SeasonWatch program for primary school students at Irala, Andhra Pradesh





SeasonWatch

Talking about islands in Kavaratti School

Environmental anxiety is an emerging concern in ecologically fragile areas already beset by difficult living conditions. The SeasonWatch Climate Change Educators Resource serve to document these changing ecologies in an age-appropriate and curiosity-driven approach, ensuring that children's well-being is not affected.

MigrantWatch, launched in 2007, was a citizen science initiative aimed at monitoring migratory birds. Over time, it evolved into birders submitting their observations to the global eBird platform. Another bird-focused citizen science program was Citizen Sparrow to gather information on the disappearance of sparrows from cities and other habitats.

This one-time study based on reports from people recorded a decline in sparrow populations across the country in 2012. However, more recent analyses of sparrow populations from eBird data suggest that sparrows are in fact thriving at least in some types of habitats.

At the heart of all these programs is the human effort committed to bringing science closer to society. With every effort toward a positive change, the people involved navigate numerous challenges.

These include working with local communities and bringing everyone onto the same page, understanding different

perspectives, and earning the trust of locals while showing genuine intent to support them. One must also navigate bureaucratic systems, and convey the complexity of issues to find meaningful solutions.

These are changing times. On a personal level, researchers and educators often carry the anxiety of what the future holds.

Rajeswari BT, a researcher from the Ocean Team in Lakshadweep, shares, "It affects me directly. However, I am not stuck there."

Achili, from the Eastern Himalayan Program, reflects, "I was happy when I was ignorant." However, she finds hope in the nascent positive attitudes of the children she works with.

Researchers and educators like Saniya Chaplod, Jithin Vijayan, Mittal Gala, Abisheka Krishnagopal, Rajeswari B.T., and Chamili all agree. They continue their work because they enjoy and love what they do. With this drive, the journey moves forward.

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# ReefLog: bridging depths - citizen science for marine life conservation in India

*Samar Ahmad*

**T**he history of conservation in India and elsewhere demonstrates a consistent truth: initiatives that engage citizens and communities tend to have deeper and longer-lasting impacts than purely research-focused and data-centric projects. Globally, citizen science initiatives across various taxa have demonstrated the power of community-driven data collection, often influencing policy decisions.

From the lush seagrass beds of Palk Bay to the vibrant coral reefs of the Andaman and Nicobar Islands, India's coastal waters host a stunning array of habitats. These ecosystems

support charismatic species like whale sharks, green turtles, and dolphins, as well as ecologically critical fish, like parrotfish, barracuda and groupers.

Despite this diversity, much of India's marine biodiversity remains undocumented. There is limited spatial and temporal data, presenting both opportunities for discovery and conservation challenges.

Many reef systems have likely suffered severe degradation due to human activities over recent decades. To effectively implement conservation strategies in these vital





habitats, it is imperative to first understand their current condition.

Recognising this need, Dakshin Foundation conceptualized 'ReefLog' in 2015 as a citizen science program designed to connect recreational SCUBA divers with marine science in India. By encouraging divers to participate in ecological monitoring, ReefLog actively involves certified recreational SCUBA divers in collecting valuable data on reef species.

Currently active in the Andaman Islands, this citizen science initiative seeks to generate long-term datasets essential for conservation. It also aims to foster ecological awareness among those who witness the underwater world's fragility and beauty firsthand.

These contributions extend beyond what scientists and researchers alone can achieve. Regular monitoring also enables the early detection of sudden shifts in reef conditions, which can signal the need for rapid conservation interventions.

**In India, where marine biodiversity documentation began relatively late, CitSci initiatives like ReefLog fill a crucial gap**

ReefLog focuses on monitoring key indicators of reef health, such as fish and invertebrate population counts and species diversity. The abundance (or lack) of certain species gives us crucial data on the health of a particular ecosystem. These species often play a crucial role in the marine food web - by controlling the numbers of their prey or keeping algal cover on the reef in check.

To make data collection accessible, our team – a collaborative group of biologists, conservationists, divers and artists – has developed easy-to-use underwater survey slates with illustrations of fish and invertebrates. This is complemented by educational materials.



Dakshin Foundation

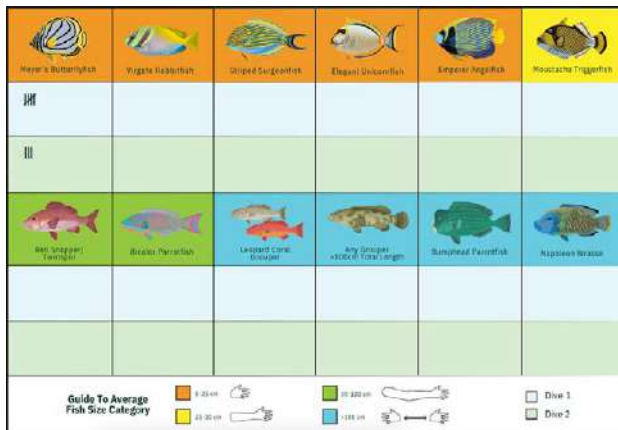
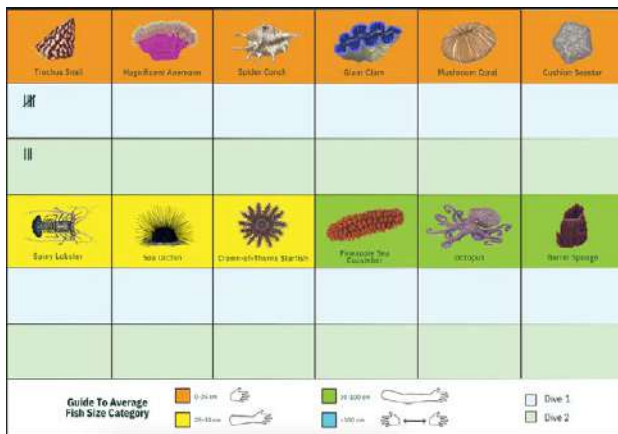
ReefLog survey orientation with dive professionals: building skills for reef conservation

Twelve species of fish and invertebrates from each geographic region have been carefully chosen. This selection is based on their trophic level, ecological importance, and ease of identification, even for novice divers. With the help of these, divers document their observations. These can later be uploaded to the ReefLog website - [reeflog.org](http://reeflog.org).

**Every diver is a conservationist, and every dive can contribute to ecological research**

The success of ReefLog hinges on its ability to create a sense of ownership among participants. Divers, who already rely on healthy reefs for their occupation or hobby, are natural allies in conservation.

Many dive shops readily embrace the initiative. They recognize that their livelihoods depend on the health of coral ecosystems. This mutual dependency has fostered an atmosphere of collaboration, with dive shops often becoming ambassadors for the program.



**ReefLOG** Diver Name: \_\_\_\_\_ Location: \_\_\_\_\_

☐ Dive 1 ☐ Dive 2

**Dive Log**

|   |   |   |
|---|---|---|
| <b>Reef Species</b><br>1. Sharks<br>2. Rays<br>3. Sea Snakes<br>4. Marine Mammals<br>5. Sea Turtles | Date & Time:<br>Total Dive Time:<br>Maximum Depth:<br>Average Depth:  | <b>Dive Site:</b><br>Habitat:<br>Primary Substrate:<br>Temperature:<br>Currents:<br>Visibility: |
|   | <b>Dive Site Info</b><br>Dive Site:<br>Habitat:<br>Primary Substrate:<br>Temperature:<br>Currents:<br>Visibility: | <b>Reef Species Groups</b><br>Large Groupings:<br>Small Groupings:<br>Other Notes and Comments  |
|   | <b>Reef Species Groups</b><br>Large Groupings:<br>Small Groupings:<br>Other Notes and Comments                    | <b>Reef Species Groups</b><br>Large Groupings:<br>Small Groupings:<br>Other Notes and Comments  |
|   | <b>Reef Species Groups</b><br>Large Groupings:<br>Small Groupings:<br>Other Notes and Comments                    | <b>Reef Species Groups</b><br>Large Groupings:<br>Small Groupings:<br>Other Notes and Comments  |

ReefLog fish and invertebrate survey slates tailored for the Andaman Islands

One of the most inspiring aspects of this initiative has been the firsthand verbal accounts shared by seasoned divers and fishers. Their observations of reef changes over decades, though undocumented, provide invaluable context for our monitoring efforts.

During a visit to a dive centre, a diver with 28 years of experience recalled, “I remember this site being full of vibrant staghorn corals before the 2004 tsunami. Now, all I see are large barrel sponges taking over.”

Similarly, another diver observed, “We used to spot only five or ten giant snappers here. But now there are hundreds. It’s like the whole ecosystem has shifted.”

Through periodic reports, ReefLog aims to incorporate such narratives into a scientific framework. This will help in preserving these insights for future generations.

**The more people engage with and rely on an ecosystem for their activities, the more likely they are to take an active role in preserving it**

The program has garnered support from dive shops and the water-sports community. However, it is not without its challenges.

For instance, there is a learning curve for both dive instructors and recreational divers to carry out a ReefLog dive. Additionally, the process of data submission relies on participants to upload their observations post-dive. This cannot be completed in real time during dives. This is unlike terrestrial citizen science programs.

Ensuring consistent and uninterrupted data entries has been an ongoing challenge. This is compounded by the voluntary nature of participation.

Another major limitation is the accessibility of diving itself. This remains an expensive activity. This restricts ReefLog’s reach to a relatively small demographic.

We collaborate with dive shops and use educational tools like our training manual to train participants on survey skills and the rationale behind citizen science. In the process, we aim to maximize participation. We also try and ensure that divers understand the value of their contributions to marine conservation.

Since ReefLog relies on participants with a specific skill such as diving, we need two levels of engagement. The first level is with dive companies and professionals who act as facilitators. The second level is



with recreational divers who are the end participants.

The program also uses outreach efforts like webinars, articles, and educational materials. Through these, ReefLog serves as a stepping stone for broader involvement in marine education and conservation.

### **Every dive matters, and no contribution is too small**

India's coral reefs and marine ecosystems face mounting threats from climate change, pollution and overfishing. This underscores the urgent need for innovative conservation efforts.

Citizen science initiatives like ReefLog can play a pivotal role in this context. They can help in addressing these challenges by fostering a network of engaged stakeholders dedicated to preserving marine biodiversity.

ReefLog leverages the enthusiasm and skills of the diving community. In the process, it helps to transform recreational diving into a meaningful opportunity to document marine life. It generates critical long-term datasets and builds a robust foundation for informed conservation strategies.

Participation in ReefLog facilitates data collection. It also instills a profound sense of ecological stewardship among participants. This is a critical step toward ensuring the sustainability of their livelihoods.

For many divers, the initiative serves as a gateway to marine conservation. It encourages them to give back to nature after having benefited so much from its bounty. In this way, ReefLog bridges the gap between scientific research and community-driven conservation, transforming individual contributions into collective impact.

With continued collaboration and expansion, ReefLog envisions a future where citizen science becomes a cornerstone of marine conservation in India, ensuring the resilience of these ecosystems for generations to come.

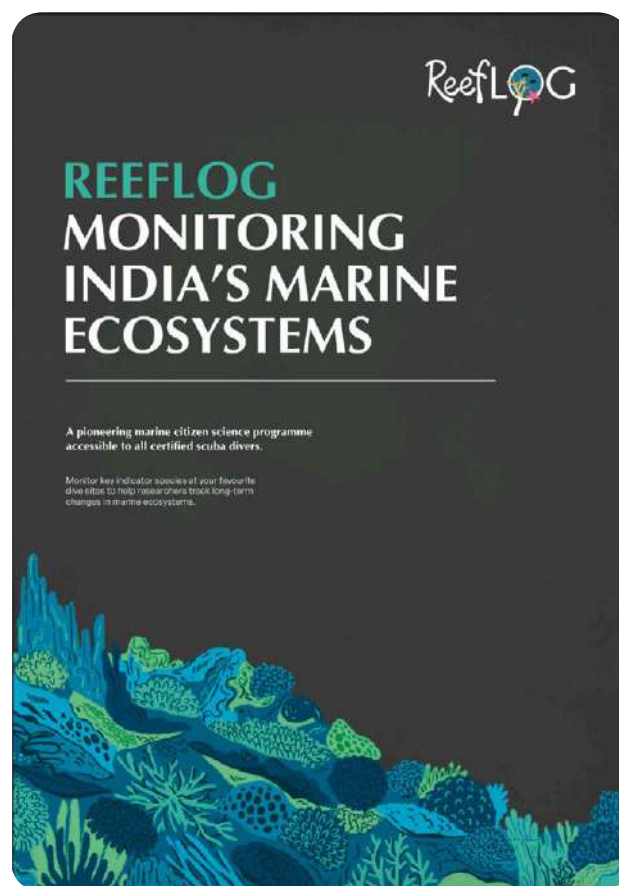
We invite every diver to join us in safeguarding our underwater heritage – one dive at a time.

**Samar Ahmad** is part of the Marine Flagships Program at Dakshin Foundation, where she is helping the organization build ReefLog. She is a certified advanced open water diver with academic interests dedicated to exploring and understanding coral reef dynamics.

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Training manual for SCUBA divers: an introduction to ReefLog and its importance for reef conservation.

# From canopies to classrooms: the SEED program and SeasonWatch in Kerala

*Muhammad Nizar K*

**S**easonWatch is an all-India citizen science project that tracks the seasonal changes in trees to understand climate change. Trees are fantastic indicators of larger changes like the lengthening warm season, or erratic rainfall - because they change their timing of leafing, flowering and fruiting according to the seasons.

Thousands of schoolchildren from Kerala have contributed up to 85% of the eight (8) lakh observations on trees on SeasonWatch since its inception in 2010-11. This has been helping scientists get a better understanding of how increasing temperature and unusual rainfall patterns are affecting culturally beloved trees like mango, jackfruit and tamarind.

## Monitoring the environment in schools

This effort has largely been possible because of a long-term partnership with the Mathrubhumi-SEED (Student Empowerment for Environmental Development) program. SEED aims to create environmental awareness among students in Kerala.

A chance meeting between Ullas Ponnadi of Wipro (Kochi) and G. Anand (GM-HR at Mathrubhumi), led to the collaboration of SEED and SeasonWatch. Kerala has been a significant contributor to the project with enthusiastic participants till date, thanks to this collaboration.

“The future of the world depends on our children”, says Pramod Kumar, State Executive for SEED. “The SEED program aims

to instil environmental awareness among the younger generation, encouraging them to preserve and protect our planet”, he adds.

SEED is a collection of eco-club activities aimed to create awareness about the environment among school children from over 5,000 schools. These engage them in developing hands-on understanding and finding solutions for environmental problems.

SeasonWatch, thus, found a permanent place in the basket of SEED activities. The main aims of the project in Kerala have been to provide children with opportunities to go outdoors regularly, engage with nature, develop a scientific temper, build curiosity, and marvel in the interconnectedness of life.



Learning to love trees in schools

SeasonWatch



“The SeasonWatch project is an integral part of the SEED initiative. By involving children in hands-on ecological research, it enhances children’s knowledge of nature’s intricate patterns. It also nurtures a sense of responsibility toward the environment”, Pramod shares.

During the 2010-2011 academic year, as the Kerala coordinator for SeasonWatch, I had the opportunity to train nearly 300 Mathrubhumi officials for outreach all over Kerala. By visiting schools and conducting workshops for teachers and students, I was able to understand the motivation of teachers and students to join a citizen science program. I used this to deepen the engagement in schools that year.

SeasonWatch demands a heavy commitment from teachers and students alike. They need to monitor registered trees every week of the year, for as many years as possible. One-on-one engagements with SEED schools have ensured that this commitment does not falter.

## **A decade of learning through observation**

In the years that followed, the SeasonWatch program became a popular and coveted SEED activity. It was popularized even more

by regular coverage in the Mathrubhumi newspaper and other print and online media.

Mathrubhumi publications have some of the widest readership in Kerala. State-wide recognition in these publications continues to play a crucial role in keeping both students and teachers engaged and excited about the program.

This kind of visibility helps maintain enthusiasm. It also spreads awareness to a broader audience, inspiring other schools to join in. Schools also compete for state and district level distinctions in SEED activities through an annual report. This has created the opportunity for healthy competition between schools.

SEED gives awards to five schools and five teachers at the state level to keep enthusiasm high. Recognizing teachers’ efforts with digital tablets for the schools, not only rewards their hard work but also encourages continued participation and dedication to the program.

As the decade advanced, so did technology. SeasonWatch materials were distributed on a CD in the 2012-2013 academic year, making resources much more easily accessible to the 5,000 schools involved. This was the



SeasonWatch

It all starts with pen and paper



Mango is a beloved tree

beginning of an era of committed teachers who now started utilizing the SeasonWatch online portal to upload data collected by students in notebooks.

The outreach network and the SEED community were so effective in 2011-2014 that 290 schools monitored 4,060 trees, and uploaded 50,500 observations. This was in a pre-mobile internet, pre-app era, where data collection and uploading were decidedly more tedious than these are today.

This was a remarkable achievement indeed. Participation has since then continued to grow consistently year-on-year, and the increase in teacher and student participation is a testament to the program's success and the dedication of all involved. In 2016, SeasonWatch's Android phone app was introduced. In 2018, the app found widespread use with the introduction of a one-time observation feature during the quarterly Tree Festivals.

Participating in SEED activities has contributed to children's 'ecological intelligence' tremendously. The ability of students to identify local trees and understand their flowering and fruiting seasons is a significant achievement, fostering a deeper connection with nature.

I am always delighted to hear about students who have developed a passion for nature

and are currently pursuing higher studies in specializations like the ecology of trees, butterflies, etc. Their journey is a shining example of how SEED activities can shape future generations of environmental stewards.

To date, their beloved Kanikonna (Cassia fistula) tree that flowers around the Malayali new year in April remains a fascinating icon of changing tree seasonality. Of late, it has started showing aberrant flowering patterns.

PV Prabhakaran, teacher at GHSS Kannur, shares, "SeasonWatch has helped teachers and students study tree seasonality. It has also helped us observe birds, butterflies and moths seen on trees, and unusual flowering in trees. This has helped build a career path in ecology for some of our students."

An experiment conducted by students at CMGHSS Kuttur is a remarkable example of a hands-on scientific investigation of why the Kanikonna tree was flowering irregularly as observed by SeasonWatchers. They designed an experiment around trees from in and around their school campuses wherein a control group of trees were not given any additional watering, and an experimental group of trees were regularly watered. Students observed these trees over a period of one year, and combined it with insights from data over the previous three years.

The trees that received regular watering bloomed in April, which is the expected flowering time for Kanikonna. The trees not receiving additional watering continued to flower irregularly throughout the year. The students concluded that consistent watering seemed to regulate the flowering time of the Kanikonna to its traditional season, April.

This finding suggests that environmental factors, such as water availability, can significantly influence the seasonal cycles of plants. This experiment was a valuable hands-on learning experience for the



students, teaching them about scientific observation, data collection, and analysis.

The findings contribute to the understanding of how climate change and local environmental conditions can affect plant life cycles. This experiment is an example of how citizen science, when made a part of programs in school education, can inspire young minds, contribute to scientific knowledge, and foster a deeper appreciation for nature.

## Challenges and opportunities

Every year, teacher coordinators of eco-club programs tend to change. While this change posed challenges in some schools, the SEED and SeasonWatch teams were able to address these issues effectively through regular follow-up communication, troubleshooting, and support. The commitment and perseverance of everyone involved play a crucial role in overcoming challenges and ensuring the success of the School Eco-club Program.

SEED's teacher training programs are crucial in ensuring that both new and returning teacher coordinators are well-prepared and engaged. The program reaches approximately 4,000 teachers every year.

This helps in spreading environmental awareness. It also brings new students and teachers into the fold, fostering a stronger and more informed community.

During 2020-2022, like everything else on planet earth, SEED activities were also affected by the Covid-19 pandemic. One impact of this isolation of the school unit was the rapid uptake of technology to support education in Kerala.

The increased tech-savviness among teachers, students and parents now undoubtedly makes it easier for them to contribute to SeasonWatch and other app-based citizen science projects effectively.

Gaining the attention of students after the pandemic gap in school has been challenging and many teachers have expressed similar issues with student engagement.

To capture their interest, I began asking nature-oriented questions, and learning through enquiry during my outreach visits to schools. This has had the desired effect of invoking curiosity for nature among at least a few students.

The SEED and SeasonWatch programs have made a lasting impact on environmental education in Kerala. The success showcases the power of collaboration, dedication, and innovative approaches to learning. The enthusiasm of students, teachers and coordinators alike has fostered a deeper connection with nature, inspiring the next generation of environmental stewards.

**Muhammad Nizar K** is a Project Manager at SeasonWatch, where he coordinates student-led efforts to monitor tree phenology. He is trying to inspire the next generation of nature enthusiasts, equipping them with the skills and knowledge necessary to become effective stewards of the natural world.

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SEED executives meet teachers

# Kolkata's future and the East Kolkata Wetlands: nurturing a fine balance

*Nobina Gupta*

## Introduction

**T**he East Kolkata Wetlands (EKW) is spread over 12,500 hectares on the eastern fringes of Kolkata. It is a unique natural treatment system of the city's wastewater restoring the ecological balance. It is the largest stretch of sewage-fed wetlands in the world, a Ramsar site sustained by the collective practices of the peri-urban wetland community. They see wastewater as a nutrient, something to be preserved, as it enhances livelihood opportunities.

With this ethos, the community works meticulously to use wastewater through an elaborate set of management practices to perpetuate their livelihood security. They treat the city's sewage through fish farming, vegetable growing, paddy cultivation and animal husbandry.

Thus, they perform the threefold functions of producing food, treating sewage and helping drainage. They undertake all of this, along with maintaining the rich biodiversity that sustains Kolkata's ecological balance.

Working within the unique socio-spatial context of the EKW, particularly with the youth and children, I have come to realize the vast repository of traditional knowledge, culture, indigenous practices, and skills embedded within these local communities. Unfortunately, much of this treasure is gradually fading, often unnoticed.

While we are caught up in complex global dialogues about climate change and sustainability, we tend to overlook the wealth of wisdom already existing

within the communities. These age-old, tested practices—rich in both cultural and environmental relevance—remain undervalued and underappreciated, yet they offer invaluable lessons for navigating today's challenges.

A few questions have constantly occupied my mind. How can schools provide a platform for local identities to emerge and flourish? Is there a way to incorporate and address the pressing issues these communities face in their daily lives and immediate environments? And more crucially, can education and community engagement become catalysts for socio-spatial transformation over time?

The need for recognizing and adapting traditional knowledge in the context of



Disappearing Dialogues



modern education could be the key to bridging these gaps. By fostering local pride and integrating indigenous wisdom with contemporary learning, we could pave the way for sustainable practices that are both culturally rooted and globally relevant.

Disappearing Dialogues



Fishing

## Disappearing Dialogues Foundation

In the past eight years, Disappearing Dialogues Foundation (DD) has collaboratively engaged in working in EKW to facilitate environmental awareness and their conservation engaging community youth. The research design was done in phases incorporating and correlating the responsiveness of children from middle and high school, the EKW community and collaborators, and supporting organizations.

Designed as a sequence of collaborative, participatory processes, the engagements explore notions of ecology, environment, everyday practice, the importance of collective action, and the contribution of the community to the city. The outputs of the various workshops and initiatives culminate into various exhibitions and events that foreground the issues to a wider group of citizens of Kolkata.

This helps to scale up an awareness of real issues. It also creates trajectories in which a wider group of concerned citizens can get involved. The process creates precedents for educational institutions as well, to assimilate

certain local practices into their curriculum to make it more relevant and grounded.

## Processes

**Wetland Nature Explorers Labs:** These research-based workshops have involved travelling around the wetlands and along the wastewater canals - collecting samples, and recording data and observations through drawings and writings. This process has delved into a personal study of where, what and how elements within the wetland biodiversity exist and benefit everyday life, making the youth understand and value the ecological wealth of the EKW instilling a sense of pride.

**Creative Ecology Labs:** These labs aim to unleash the inherent talents of young learners. These challenge their backgrounds and enable them to think and express about present issues in a critical, free and reflective manner. Through the process of collective art making, collective dance, and pictorial storytelling, tool of dialogues have been evolving to help share experiential and often subliminal learning.



Nature Journaling Workshop

Disappearing Dialogues

**KnoW Waste Labs:** There is a change in the kinds of items consumed and thoughtlessly disposed of by city dwellers, and a mushrooming of illegal waste sorting points within the wetlands. KnoW WASTE Labs are facilitated to raise awareness and to promote waste management and waste reduction. These engage the wetland community youth



Performance

through multidisciplinary activities. The aim is also to evolve new alternatives of utilizing local waste and develop a new language of artistic engagements and field action.

**Community Labs:** The women of the EKW community are guardians of culture. It is of paramount importance that we appreciate, celebrate and co-create new dialogues to value their everyday practices. Through a lens of archival research and sustainable designs, we have been working with them to celebrate and expand their horizons.

We have been collaboratively working on authentic recipes from wetland edibles, and handicrafts such as kanthas and palm leaf woven mats. A particular focus has been on processes for sustainaining cultural practices that hold the families and communities together.

## Challenges

Some of the key challenges we have faced on our journey so far include maintaining ongoing inspiration and deepening engagements with children, schools, and the public for conservation practices over time. One significant hurdle has been in getting people to recognize and believe in the intangible benefits of conservation through innovative techniques and alternative learning methods.

Another challenge is highlighting the qualitative impact of integrating art and

ecology on young minds. Additionally, securing consistent funding each year to effectively run the program, maintain an equipped team, and bring in specialized experts for workshops, youth capacity building, and empowerment has proven to be a continual effort.

Creating meaningful partnerships with local communities and stakeholders is critical to ensure the sustainability of our initiatives. Overcoming the resistance to change in conventional educational systems and introducing alternative, hands-on learning experiences is a constant struggle. Measuring the long-term impact of our initiatives on both the environment and the individuals involved, while ensuring these efforts translate into actionable change, also remains a key challenge.

The success has been to see the gradual evolution in the community youth through their artistic and aesthetic understandings, and their transforming body language, personalities and communication skills. I have always envisioned that the youth of EKW will someday articulate their own stories and lead movements to conserve their socio-cultural heritage.

Unfortunately, EKW is currently under severe threat. The growing urban center, far from acknowledging the EKW's role in maintaining ecological balance, views the area as real estate in waiting. A lack of awareness and understanding about this natural heritage detracts from an acknowledgement of the interdependence of Kolkata and the EKW.



The East Kolkata Wetlands



Development pressure and environmental threats render this socio-spatial landscape fragile, susceptible and vulnerable. The city mostly ignores these connections, exploiting the already marginalized community, rendering them all but invisible. This fragility, in recent times, has led to widespread discontent and shifts in everyday practices for short-term survival.

This is a critical issue. These disappearing sustainable practices could mean a disruption of the symbiotic existence of the EKW and Kolkata. This balance will be difficult if not impossible to re-establish.

The wetlands are passing through a crisis, as is the community. The wetland ecosystem holds the key to our city's sustainable future. Kolkata's citizenry must educate itself to understand the value of this living heritage.

## Learnings from “Symbiotic Cohabitation”

Nurturing cohabitation is crucial for preserving biodiversity, ensuring sustainability, and promoting community well-being. We at Disappearing Dialogues have been trying to initiate public participation to foster change.

As an outcome of the long-term engagement and co-creation of DD with the EKW community, I curated an exhibition titled, “Symbiotic Cohabitation” in 2024 with the Goethe Institut, Kolkata, which is now travelling to Santineketan. The vision was to advocate for the preservation of the

environment, by recognizing the manifold species in our ecosystem, and acknowledging the interconnectedness of elements in everyday life. Exploring connections to our daily lives, the process aims to inspire action for sustainable practices benefiting locals, the community as a whole, and humanity at large.



Disappearing Dialogues

As global water scarcity intensifies, safeguarding habitats like wetland ecosystems and water bodies becomes increasingly critical. The exhibition unveiled a poignant narrative on the vulnerable state of the EKW and the urgent need for societal awareness.

The “House of Cohabitation” and “Wetland Herbarium”, - two key components of the exhibition - created an immersive sensory experience. These invited visitors to rediscover the forgotten symbiosis between humans and nature. Through touch, smell and observation, they reconnected minds and souls with disappearing knowledge sources, sustainable practices, and traditional beliefs.

The Wetland Herbarium emphasizes the critical role of plants in ecosystem stability. It promotes plant sensitivity to counteract “plant blindness.” This intimate album showcases ethno-botany, aquatic/remedial plants, edible plants, nectar plants, and weeds. Thus, it highlights the importance of conserving biological resources for a sustainable future.



Disappearing Dialogues

The emotional connection that art fosters is a powerful way to convey and capture details and insights that data and information alone often cannot. Working with communities and youth to simplify complex scientific concepts, while blending them with traditional knowledge, has been an enriching and rewarding experience.

The process of creating engagements that express these ideas through art has been equally challenging and fulfilling. In today's digital age, the sensory experiences that art provides help activate the mind, encouraging people to become more proactive and engaged in their everyday lives.

A series of collateral activities offered immersive guided walk-throughs and hands-on encounters. Related workshops such as 'Earthen miniatures', 'Nature's organic palette', and 'Starry starry night', highlighted working hands-on with earthy elements, night gazing, watching nocturnal species, relishing wetland edibles, and making vibrant organic pigments from flora and fauna of the wetlands, etc. We share a few details of these processes here.

**Earthen miniatures:** This was a workshop that focused on moulding miniature forms. It involved working hands-on with earthy elements. This mirrored the symbiotic relationships being explored within the

exhibition. It was conducted under the guidance of young potter Aahiree Banerjee.

**Nature's organic palette:** This workshop was conducted under the guidance of expert artist Ms Arunima Chowdhury. It focused on understanding the making of vibrant organic pigments from natural elements. It also involved creating drawings reflecting the essence of the herbarium, and the flora and fauna of the wetlands.

**Starry starry night:** This was an immersive experience in Naskar para in the East Kolkata Wetlands post sundown. It was a blend of night gazing with an expert, watching and listening to nocturnal species, and folk music by local performer Kalpana Sardar. The participants also partook delightful local cuisine of wetland edibles prepared by community women.

These multi-dimensional engagements bridged gaps between urban dwellers and communities. The exhibitions advocated for preserving the EKW's rich ecology and acknowledging the manifold species in our ecosystem by integrating the wetlands' traditional wisdom into the city's narrative.

## JolaBhumi Utsav

We have been celebrating JolaBhumi Utsav for the past seven years to mark World Wetlands Day. Through this, we curate a



Disappearing Dialogues

JolaBhumi Utsav





Collecting things

platform aimed at empowering the youth to raise their voices for wetland conservation and climate action.

This event brings together changemakers, environmentalists, and community leaders to inspire collective efforts for a sustainable future. It has been helping us raise environmental awareness among the youth. It also builds constituencies amongst Kolkata's citizens for the conservation of the unique East Kolkata Wetlands.

In the process, we have been working with practitioners from different fields, institutions and organizations. They have been collectively engaging with the arts as a catalyst to initiate dialogues and generate engagements each year.

## Collaborations

As a part of the work, Disappearing Dialogues has been collaborating with experts from various backgrounds that makes its initiatives in the intersections of public and social art, nature education, environmental activism and community work possible. These co-travellers include Abhisheka K Gopal (artist and ecologist), Shweta Raina (visual artist), Shashwati Garai Ghosh (performing artist), Anindya Sinha (primatologist), Sujana Chatterjee (from Bird Watchers Society), and others.

In this process, we have also worked with many important institutions such as the

Environment Department of East Kolkata Management Authority, the German Consulate, Goethe Institute, Yeast, and Delhi Art Gallery.

We have also engaged with more than 28 schools in the process. These are located across Kolkata and the East Kolkata Wetlands.

## In conclusion

Disappearing Dialogues believes that conserving the wetlands is a collective responsibility, as it holds the key to Kolkata's sustainable future. Overexploitation, encroachment and pollution of the wetlands harm both the EKW and Kolkata's environment and future sustainability.

Thus, we are striving to amplify the dialogue of managing urban development and lifestyles to protect the natural heritage of Kolkata from disappearing.

**Nobina Gupta** is a social arts practitioner, educator and the Founder-Director of Disappearing Dialogues. An alumna of Kala Bhavan, Santiniketan, her work has been showcased widely both in India and elsewhere.

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Paper-making workshop by Anupam Chakraborty

# The many ways of democratizing knowledge through citizen science initiatives

Aastha Maggu

**C**itizen science (cit sci) platforms play a crucial role in making scientific research more democratic and accessible by enabling public participation in data collection, analysis and discovery. These initiatives empower individuals, regardless of their background or expertise, to contribute meaningfully to scientific knowledge across diverse fields such as astronomy, ecology, archaeology, and biodiversity conservation.

Platforms like Bird Count India, eBird, Globe at Night, Heritage Quest, and Zooniverse, bridge the gap between professional researchers and the public. This process ensures that valuable scientific data is collected at a scale and detail that would be impossible otherwise. These platforms foster collaboration and engagement. This enhances scientific research and cultivates a deeper public appreciation for science and conservation efforts.

This article provides an overview of a few citizen science platforms. It starts with a brief discussion of 'First steps', a book that offers a thorough exploration of the rapidly growing field of citizen science in Indian ecological research.

## Book notice

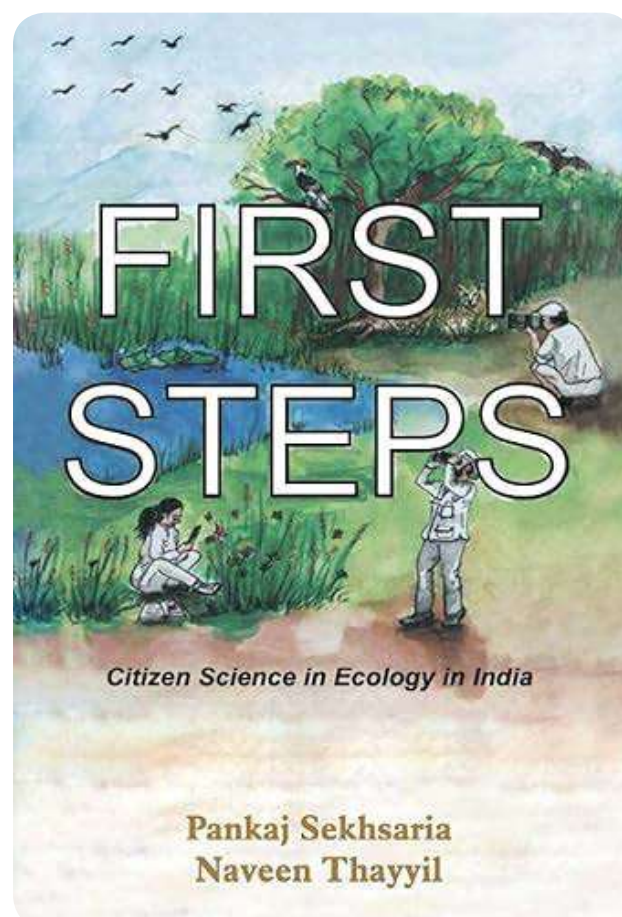
Pankaj Sekhsaria and Naveen Thayyil. 2022. *First steps - citizen science in ecology in India*. DST Centre for Policy Research, IIT Delhi, and AuthorsUpFront. [Rs. 250]

'First steps' is a compact 150-pages long book. Drawing from 18 months of research, the authors document, map and analyze

17 citizen science projects from across the country. In the process, they shed light on their origins, trends, challenges and pathways for growth.

This second-order study is situated within the broader frameworks of Science and Technology Studies and the Sociology of Knowledge. It delves into the underlying assumptions, methodologies, and institutional structures that define citizen science initiatives in India.

The book has a distinctive format. It blends narrative descriptions with structured tables.





This ensures that readers can engage with its insights in a flexible and accessible manner. By examining key developments through these 17 projects, 'First steps' provides a foundational understanding of the evolution of citizen science in India. It also offers perspectives on future direction in ecological research.

## India-based platforms

**Bird Count India:** This is a citizen science initiative dedicated to collecting and sharing data to understand and conserve India's bird populations. By engaging birdwatchers across the country, it facilitates both casual observations and systematic surveys to generate valuable knowledge.

Through collaborations with individuals, institutions and organizations, Bird Count India functions as an umbrella for a broad network of groups working toward the common goal of making bird data publicly accessible at fine spatial and temporal scales. This collective effort contributes to conservation of birds and ecological research across India.

**Citizen Science India:** It is a platform that brings together projects where the public collaborates with researchers to contribute to scientific discoveries. Covering diverse fields such as biodiversity, ecology, climate change, and social sciences, these projects empower individuals to collect data, analyze findings, and engage in meaningful research.

Participants, regardless of background or expertise, can contribute by observing wildlife, recording environmental changes, and assisting with data classification. This collective effort enhances scientific knowledge.

This also fosters public engagement with research. Citizen Science India serves as a hub for such initiatives, connecting volunteers with impactful projects across the country.

## Global platforms

**eBird:** It is a global citizen science platform that harnesses the knowledge of birdwatchers to advance research, conservation and education. By collecting and archiving bird checklists, eBird provides freely accessible data to drive scientific discoveries and conservation efforts.

The platform enhances birding experiences with tools for managing lists, photos, and audio recordings. It also provides real-time species maps and sighting alerts.

eBird gathers over 100 million bird observations annually, with participation growing steadily. This makes it one of the world's largest biodiversity-related science projects. It is managed by the Cornell Lab of Ornithology. The platform thrives through collaborations with organizations, experts, and birding enthusiasts worldwide.

**Globe at Night:** This is a global citizen science campaign that raises awareness about light pollution. It does this by inviting people to measure night sky brightness and submit their observations online.

Light pollution impacts energy use, wildlife, human health, and our ability to see the stars. With over 200,000 measurements from 180 countries collected over 14 years, Globe at Night is the world's most successful light pollution awareness initiative, empowering individuals to contribute to science and conservation.

**Heritage Quest:** This is a citizen science project in the Netherlands. It engages volunteers in assisting archaeologists in the search for undiscovered archaeological heritage.

This initiative demonstrates how citizen science can extend beyond the natural sciences into fields like archaeology. It showcases the potential for similar projects in other regions, including India.

**iNaturalist:** In this platform, every observation contributes to biodiversity science, from rare species to common flora and fauna. Submitted data is shared with scientific repositories. These include places such as Global Biodiversity Information Facility (GBIF). This supports research and conservation efforts worldwide. Participation is simple. Volunteers need to observe and contribute to scientific knowledge.

**Uniseller:** The Unistellar community is dedicated to citizen space science, where amateur and professional scientists collaborate to explore the universe. Since professional astronomers cannot gather all the necessary data alone, citizen scientists contribute by observing, collecting and analyzing astronomical information. Driven by curiosity and passion, these volunteers play a crucial role in expanding our understanding of space.

**Zooniverse:** It is the world's largest platform for people-powered research. It enables volunteers to assist professional researchers in making new discoveries. Open to anyone, regardless of expertise, Zooniverse allows participants to analyze real scientific and historical data from their own computers.

Volunteers contribute to projects spanning the sciences and humanities. This helps accelerate research that would otherwise be impractical.

A key part of Zooniverse is its discussion forum, Talk, where volunteers collaborate with researchers and each other. This forum allows for quick tagging, in-depth analyses, and even unexpected discoveries through collective insights. By engaging in discussions, volunteers play an active role in shaping research and advancing scientific knowledge.



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School children birdwatching in the Anaimalai Hills





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