

Samuhik सामूहिक पहल Pahal

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Environmental Education**

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Nature Learning for All: An Ode

Vena Kapoor

Is it easier or more difficult to write about a topic that you live for, love deeply and engage all your usable senses day in and out? The *nature* part comes more easily I think, the education part often gives me sleepless nights. For all of us working in the field of education, the prefix before this word changes - art, sport, science, maths, basic literacy, theatre, nature... We love the work with a stubborn passion and conviction.

Along with this work, we try to navigate the challenges of funding, logistics, bureaucracy and the disinterest (most often because of being overburdened) of key stakeholders that invariably gets thrown at us. Yet, we make sure we keep our deep belief and enthusiasm for our work intact, fiercely protecting it to make sure that the people in this journey along with us, and those who come after, will not flounder or waver, and always see the value that our engagement, interventions, however small, bring.

A few weeks back one evening I was pacing up and down on a friend's terrace. It was almost dusk. As I looked down from the 5th floor onto the chock-a-block houses and buildings of a residential locality in Bengaluru, I also saw hundreds of old, new, electricity, internet and cable TV wires and cables creating an impossibly untidy criss-crossed maze above the roads and between the trees and other vegetation.

I stared at the wires thinking about how horribly unpleasant they looked alongside the lovely tree filled lanes. "How difficult it must be for them to constantly have to manoeuvre this deadly maze," my friend said softly and a bit sad. My quizzical expression lasted for a few seconds and then it struck me, he was talking about the bats that we were seeing flitting through and above the trees.

I remember feeling fleetingly thankful at that moment to be surrounded by friends and colleagues who are also deeply empathetic to the natural world that lives alongside us, the only reminder that keeps me going every day in a world full of loss and ecological catastrophe. These are animals who have every right to live full and free lives on this planet, just like we demand. However, we almost never consider them in our human constructed planning of space and fickle comforts.

And then I looked up. Hundreds of fruit bats were flying gloriously overhead with determined purpose and along with them tens of the smaller insectivorous microbats flitting around almost mischievously a bit lower. I counted them as they flew overhead and in four minutes I counted more than 70. Such a fun exercise that was and also so marvellous!

Why had I not done this growing up? I was fortunate to have had lovely open terraces in many of the rented houses I grew up in. Would I have looked up at the skies and marvelled and been awed about the bats and birds that flew overhead at dusk starting out in their hunts or heading to their secret roosting sites if an adult at home or at school had pointed or guided me to do this? I'd like to believe so, because much later in my early 20's that was how I was finally introduced to nature around me.

I remember always loving animals and plants and was a fierce defender and protector of them - I had managed to gain that reputation even before I was 10. However, I had no idea how to channel this innate love into wonder, curiosity or exploration. I poured over and revelled over books, magazines and

documentaries that featured the natural world and its denizens featuring jaw-dropping animals, plants, birds and habitats from faraway lands.

What I did not know at that time was that different birds, squirrels would have been flitting just outside my own windows at home or school and numerous insects, spiders would have been hiding in plain sight, leading amusing, bizarre lives just around me. This realization continues to be a source of sadness and disappointment - I had lost so many years of not truly engaging with nature around me.

Growing up in a metropolitan city, I did not know of the option or possibility of unfettered explorations outdoors or having an 'interested in nature' family member, or a social circle of nature explorers who many of my friends and colleagues seemed to have as a child or teenager.

I make up for these lost times, with a vengeance now, and try and use every opportunity to point willing and unwilling adults and children to the numerous birds, millipedes, ants, spiders, beetles, assassin bugs, bagworm moths, silverfish, squirrels, fungi, lichen, parasitic plants, herbs that seem to want to continue living alongside us even in our most inhospitable concrete, smog-filled cityscapes and habitations.

We have examples from research projects in the West highlighting how children with more nature near their homes exhibit less psychological distress, and that access to nature as a buffering or interactive effect seems to moderate the impact of stressful life events on the self-worth of children.

At least one [study has demonstrated](#) that when urban children aged 9-12 were asked to make a map or drawing of all their favourite places, almost 96% of the submissions were representations of wild outdoor places. Carefully designed studies are showing us that given a choice most children prefer to

spend time in natural settings outdoors - and a disconnect from the same seems to negatively affect their well-being.

While these studies help us reinforce and reaffirm why we need to take nature education and experiential immersion in nature as part of our everyday lives and interactions, what does this mean for educators like us? How do we take those next steps of allowing people to see the immense value of engaging and being in love with the natural world and all its inhabitants? Moreover, how can we do this with kindness, empathy, sensitivity that captures everyone's socio-economic reality and lived experiences along with the reality of the competing onslaught of insipid rote learning and capitalist market forces?

As educationists we know (like in every subject that we are engaged in) that hearing, learning new terms and concepts alone may not necessarily mean understanding them. Moreover, cognitive understanding does not automatically lead to strong attitudes. Feelings and emotions (the affective domain) have been shown to be crucial in understanding how children think and learn. Even a cursory scan through the textbooks schoolteachers, educators rely on and use as tools to learn and teach highlights how devoid they are of the affective domains.

Another [study](#) situated in Mexico and the UK demonstrated that using hands-on activities to experience and learn a new environmental or nature term is more likely to result in understanding of concepts in nature, and connections in nature, compared to only the using of a textbook by a teacher educator. How can we therefore push ourselves to teach and learn in more enjoyable ways, using different tools, experiences and keeping abreast with research findings from across the world and in different disciplines that may be relevant to our work? Our engagement and teaching needs to be creative, interested, inclusive, equitable and learner-centric - that

Some Essential, Wonderful Readings on Nature Education

1. Look, Don't Touch - David Sobel: <https://orionmagazine.org/article/look-dont-touch1/>
2. Place-based learning of science: Experiences in integration - Arun, Poornima and Nishant, (2021): <http://publications.azimpremjifoundation.org/3391/>
3. A Pedagogy for Ecology - Ann Pelo: <https://rethinkingschools.org/articles/a-pedagogy-for-ecology/>
4. The Ecosystem of Learning - Yuvan Aves: <https://vikalpsangam.org/article/the-ecosystem-of-learning/>
5. Connecting Learning to the Natural World - Nature Classrooms: <https://cdn.azimprejiiuniversity.edu.in/apuc3/media/publications/downloads/magazine/i-wonder-Issue-7-Dec21.pdf>
6. Towards a Curriculum for 'Belonging' - Yuvan Aves: <https://www.compassion-contagion.com/manifesto-for-the-future/towards-a-curriculum-for-belonging?rq=Yuvan%20Aves>
7. Leave No Child Inside- Richard Louv: <https://orionmagazine.org/article/leave-no-child-inside/>
8. A Sense of Wonder: Cultivating an Ecological Identity in young Children—and in Ourselves - Ann Pelo (2014): Canadian Children Vol. 39 No. 2.
9. Close Encounters of a Natural Kind: Nature-based Curriculum from Intent to Action - Thejaswi Shivanand (2012): <http://www.journal.kfionline.org/issue-16/close-encounters-of-a-natural-kind-nature-based-curriculum-from-intent-to-action>

which will allow for educators and learners to develop, understand, appreciate and feel a sense of wonder and amazement - the facets of attitude, skills, values and knowledge for nature and for the environment.

We have a huge advantage in that nature is all around us, irrespective of where we are physically. If we look just a little closer, shutting out the busy bustling noisy things around us, there will always be something to discover and marvel at arm's distance or closer! Climbers, shrubs, wayside 'weeds' will be home to numerous insects, spiders building their homes or finding things to hunt and feed on; cracks on the curbs, walls will have small fig plants peeking out as if in defiance; ceilings and corners of rooms will have the common cellar spiders doing their routine push-up exercise routines; wasps and bees will be hovering around looking for little holes and gaps in our human-made structures to encash their paralyzed food

cache for their young ones and of course there are always the sometimes soothing and hilarious and sometimes raucous and annoying calls of birds, crickets, frogs and toads to remind us that other beings that are very much part of our physical spaces also communicate with each other!

As Poornima and Abhisheka in their interview with us for this issue and Yuvan in his latest [article](#) remind us, nature and nature learning can also be a wonderful leveller that can cut across class, caste and gender. There are numerous examples from the natural world where our often normalized, accepted, human-defined, patriarchal gaze and actions are completely and gloriously flipped; where accessible spaces and the use of them, the actions of turning rocks, scooping mud, nurturing and planting seeds and saplings can potentially break down barriers, conversations and acceptance - small acts of joy and rebellion that we can all collectively



marvel at and be delighted by when that wriggly earthworm gets dislodged with our collective churning, scooping of earth mud under our collective feet. We cannot afford to have millions of young people growing up (like I and many others did of my generation and before) disconnected, uninterested and unaware of the natural world - a world that is so full of delight, wonder, amazement, discovery, awe and so deeply intrinsic to our physical, spiritual and mental lives.

This issue of Samuhik Pahal was put together and worked on with the same joy and happiness we experience and throw around in the nature education work that we do and love. We wanted to draw the attention of the educator to the possibilities of using, engaging with nature as a powerful, heart-warming learning/pedagogical approach and tool in all the education work each of us engage in. We hope that you the reader educator will be awed and inspired by the insights, approaches and passion that the nature educators we spoke to, wrote and shared their ideas and tools with us.

Do immerse yourselves in their stories, insights, share your own and engage,

collaborate with each other when possible. We certainly learned many new exciting things from this listening, curating, and collaborating. We go forward with a renewed urgent energy and hope to make nature and nature learning an important part of our being, a part of each of our life journeys, an important perception of our selves and our vocabularies, a part of our daily rituals, of our stories, our imagination, our identities, our love and as our obligation. We go forward with a deep hope and wish that we would pass this on to the children, young adults and communities we teach and work with. Do join us in this journey and may our tribe grow!

Vena Kapoor is an ecologist and conservationist working in the field of nature learning and outreach and she does this through the Nature Classrooms Program at NCF. She also conducts workshops, talks and walks on the wonderful, fascinating world of spiders, insects and on nature learning.

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Climate Change in the Classroom

A Case for Utilizing Citizen Science in School Education

Geetha Ramaswami

Scientific enquiry has long been the domain of highly trained professionals. Often, the outcomes of such research are paywalled within highly specialized scientific journals. These are, more often than not, written in jargon that may be accessible only to researchers working in that specific field of enquiry. This may lead to the exclusion of non-trained persons from directly using or benefiting from scientific research.

Citizen science overcomes this exclusion by providing opportunities for members of the public to voluntarily participate in one or more of the different stages of scientific enquiry – identifying a scientific problem of interest to the community, collecting information to address the problem, curating and analyzing data to infer patterns and utilizing outcomes of such research in developing robust solutions. Citizen science has tremendous scope to achieve transdisciplinarity across environmental, health and social sciences.

Engaging volunteers in citizen science projects gives them an opportunity to closely interact with the natural world, while collaboratively addressing a collective problem. Biodiversity citizen science – projects that are specifically targeted at observing and quantifying aspects of biodiversity – is now recognized as a powerful tool in creating awareness and asking questions about the environment, ecology and conservation.

Citizen scientists in such projects usually span a range of age groups, and depending

upon the complexity of the question being addressed, can also involve observations and contributions from children, especially school-going students. The value of integrating citizen science in mainstream school curriculum has been recognized for not just promoting scientific literacy, awareness and community engagement, but also self-learning and attachment to nature. Biodiversity citizen science projects also influence individual learning outcomes among school children, including an increase in interest, motivation, skill and positive attitudes towards nature.

In India, biodiversity citizen science is emerging as a bridge between education and biodiversity assessment, and is being applied to understand and address environmental problems, including climate change. Global-warming induced climate change is a slow, large-scale environmental process, and usually perceivable through the unusual frequency and magnitude of weather phenomena. Children often get acquainted with the idea of climate change through environmental studies curricula in schools,



Citizen Scientists Using Smart Phones to Record Tree Behaviour

Pavel Ghosh

which focus on fossil fuel combustion and alternative energy sources - yet another set of facts to remember and recall during an examination.

Climate-change awareness is also overwhelmingly focused on negative and catastrophic impacts, especially on humans. While it is imperative that children be aware of the impacts of overusing limited sources of energy, a more hands-on and compassionate approach to understanding climate change through observing and interacting with biodiversity in their surroundings, may create better opportunities for inculcating attitudes of guardianship towards the environment.

An easily observable and documentable phenomenon that is highly sensitive to climate change, is phenology - the study of seasonal, cyclical changes in living organisms. Tree phenology gives valuable information about aberrant temperature and precipitation through changes in the timing of leafing, flowering and fruiting. Alterations in tree phenology can affect life cycles and phenology of all other organisms downstream in the trophic chain, and these cascading impacts are more apparent in temperate systems.

For instance, temperate trees respond to rising global temperatures by advancing the timing of leaf and flower emergence to coincide with global-warming induced earlier onset of the spring season. Early emergence of new leaves in temperate oaks has led to the early emergence of invertebrate larvae that feed on these leaves, which in-turn has led to early nesting in songbirds that feed these larvae to their young.

A similar understanding of the link between climate change, tree phenology, and trophic interactions like the example described above is unknown from ecologically complex tropical regions of the world, including most of India. To begin with, temperature seasonality of tropical regions is very

different from that of temperate regions. There is no metabolically costly winter season, and trees can grow throughout the year. Climate change signals in these areas may thus reflect in the seasonality of other weather patterns, such as rainfall. In order to infer climate change impacts on ecological systems, one must gather information at very large spatial (country-wide) and temporal (decades) scales.



Resley Roy Pariang

Flowering Himalayan Cherry in Meghalaya. Increasing Temperatures Due to Climate Change May Be Affecting the Flowering Behaviour of this Himalayan Species

In India, long-term phenological information is available from a few forest habitats only, on species that are not very widespread, or restricted to protected areas such as wildlife sanctuaries and national parks. In order to overcome this information gap, citizen science is a wonderful and reliable mechanism to generate information over large spatial scales and over the long term.

Citizen scientists, including school children, have been collecting and contributing information on plant phenology around the world. The USA National Phenology Network (www.usanpn.org) monitors the phenology of plants and animal species to understand how the seasonality of organisms has changed in the present as compared to historically known baselines. Data collected in the project shows an advancement in spring leaf phenology of select plant species across the US in the year 2021 as compared to historically known behaviour of these plants.

There is a spatial difference in the advancement and delay of plant phenological behaviours across the US as demonstrated by data contributed by citizen scientists. Information like this can help scientists and policymakers assess impacts of climate change on vegetation. It can also act as an excellent pedagogical tool in involving citizens in the documentation and understanding of climate change and its effects on all life forms.

SeasonWatch is a citizen science initiative tracking the phenology of 149 common tree species across India. Since the project started in 2010, over 5.5 lakh observations on >1,80,000 trees have been contributed by >1,500 individuals and thousands of students from over 1,600 schools. SeasonWatch is accessible to citizen scientists through a website (www.seasonwatch.in) and through a free Android mobile phone application (<https://play.google.com/store/apps/details?id=seasonwatch.in>).

The website and the app allow users to register themselves with the SeasonWatch network, register a minimum of one tree and make observations about the phenological status of a registered tree on a weekly basis. Data from 2011-2021 on the seasonality of the most observed, culturally beloved species such as Mango and the Indian Laburnum, especially in Kerala, have revealed high variability in the peak timing and quantum of flowering and fruiting of these species. Therefore, long-term observation on more trees is essential and important to draw correlations with the contemporary environment and to predict changes under future climate scenarios.

Summaries of species' seasonality are available publicly (<https://www.seasonwatch.in/sw-user/explorepatternonmap.php>), and raw data are also available to the larger public upon request. Crucially, the project provides children and adults an opportunity to go outdoors regularly, and to meaningfully

contribute to scientific research while understanding the larger context of climate change.

SeasonWatch is primarily driven by educators (i.e., schoolteachers and teacher trainers) and students. Nearly 85% of all data that comes into SeasonWatch is contributed by school students, especially from Kerala. Schools offer opportunities for teachers and students to make observations over the long-term in wooded campuses. In Kerala schools, the same trees have been observed for up to 8 years by different batches of students.

At SeasonWatch, we do not engage directly with children. Instead, we train educators in making observations. They, in turn, train students in their classrooms, typically grades 6th to 9th. We identify exceptionally motivated educators, and provide them with opportunities for capacity-building through workshops and resource-sharing.

Since 2018, SeasonWatch has engaged with educators through annual meetings where they are provided training in concepts like sampling and statistics, using art in exploring



A Flowering Indian Laburnum Tree. Citizen Scientist Observations Have Contributed to Our Understanding of Erratic Flowering in This Iconic Indian Tree species.

nature, and immersive experiences in nature (reports available [here](#) and [here](#)). We also have formal conversations with educators and seek feedback on their experience in using citizen science in teaching concepts within their classrooms.

Schoolteachers find great value in using biodiversity citizen science in explaining concepts in schools such as plant-animal interactions, life cycles of organisms, and even bird migration. Schoolteachers have communicated to us the need to integrate SeasonWatch into mainstream curriculum to inculcate skills such as identification of species, systematic observation, and handling data, in addition to creating a sense of attachment towards nature among their students. Teachers also recognize several curricular links, especially in middle and high school Biology, with SeasonWatch. We recorded anecdotes from government schoolteachers who participate in SeasonWatch from Meghalaya, Tamil Nadu, Puducherry and Kerala to understand the utility of citizen science in school education (The relevant video is available here: <https://www.youtube.com/watch?v=OyEPDbVK-JA&t=560s>.)

Going forward, SeasonWatch wishes to use this treasure-trove of educator experience to create and curate teaching and learning resources to learn about the environment in a hands-on way. One way to achieve this would be to engage with educators regularly, understand their requirements, and co-create resources that utilize citizen science as a pedagogical tool. At SeasonWatch, we believe that everyone has a right to practice science. Providing children with the opportunity to observe nature regularly is a way of empowering them to take constructive action in the face of global problems like climate change. We hope that in the coming years our community of practising educators will grow to include many others from across India. We plan to achieve this by making multilingual resources accessible to those who wish

SeasonWatch Weblinks

Anyone can contribute information on tree seasonality and become a citizen scientist with SeasonWatch. For more information, please visit the website - www.seasonwatch.in, or watch a tutorial on how to make observations using our Android app.

to bring a documentation component to understanding the environment in their classrooms.

Citizen science projects like SeasonWatch offer immense scope to learn about the environment in the classroom in a participatory, rather than instructional, manner. We hope that educators and students join and contribute to the myriad citizen science projects in India, bringing valuable new scientific insights - one observation at a time.

Geetha Ramaswami is an ecologist with a keen interest in all things plant. She has a PhD in invasive plant ecology from the Indian Institute of Science, Bengaluru, and research experience in how invasive plants interact with native fruit-eating birds. She currently leads SeasonWatch and has been contributing tree seasonality information to the project since 2017.

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Interacting with Teachers Through the Ubiquitous Zoom Screen During the COVID-19 Pandemic in 2020.

How Lifelong Learning in Nature Education Translates to Practice

Aravind Kudla in Conversation with Mythreyi K

“Environmental Education is regarded as the embodiment of a philosophy which should be pervasive, rather than a subject to be taught and learnt.” - Joy Palmer in ‘Environmental Education in the 21st Century: Theory, Practice, Progress and Promise’

I first came across Aravind Kudla (Aravind Sir, as I know him) while doing an evaluation of resources created by ‘Early Bird’. Aravind had been using Early Bird’s flash cards, posters and pocket guides to teach his students birding. He introduced me to *Makkala Jagali*, an online magazine in Kannada, curated for the use of teachers and students across Karnataka.

He writes Hakki Kathe (bird stories), for this magazine every week. Later that year, a newspaper article in a local Kannada daily reported that Aravind Sir’s school had won the Wipro earthian Award for 2021-22. We had been corresponding regularly, exchanging resources and ideas that not only helped me learn more about nature education but also inspired me as an educationist.

Nature education comes effortlessly to Aravind, a government schoolteacher. The school he teaches in is located in the lap of the Western Ghats at Moodambailu, a small village in the Dakshina Kannada district of Karnataka. He has imbibed the knowledge, skills, attitudes and behaviours necessary for nature learning to the extent that it has become a way of life for him.

What do these necessary aspects of nature education entail? How has he managed to learn them and put them to practice in the classroom? Here is a peep into Aravind’s

Aravind Kudla is a TGT and in-charge HM at Moodambailu Primary School, Dakshina Kannada, Karnataka.

His YouTube Channel with various resources on nature education can be found [here](#).

The Facebook page on his school can be found [here](#).

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journey as a teacher and a lifelong learner in nature education.

Aravind has always been interested in trekking and other outdoor activities. When he got his first posting as a teacher, he found himself in a school, located at the tip of a hillock bordering the Kudremukh National Park. Surrounded by hills, forests and lush green environs, he would cycle to his school each day to teach mathematics for 8th, 9th and 10th grades.

“The workload was not much,” he tells me.

“I would teach mathematics in the three classes, then take a few non-scholastic and free periods each week. The rest of the time was spent exploring every nook and cranny of the diverse wilderness around the school,” he says.

One day, he decided to cycle all the way down to Mangalore (where he hails from) through the Kudremukh Ghat from Samse, where his school was located. On this journey whilst cruising through nature, he realized that he wanted to capture some of his observations and missed the presence of a camera. He

borrowed a point and shoot camera to take pictures of plants, flowers and everything around him during his free time. In a couple of years, he had saved enough money to equip himself with a more efficient camera and could be seen pottering around in the hills and valleys around his school. "If someone at school asked, where is Aravind? The answer would be...Sir is on some hilltop with his camera," he muses.



Aravind Kudla

A Juvenile Pigeon Found by School Students

His students soon began to follow him around on his short trips into the jungle. They had innumerable questions for him, "Why did you take a photo of that particular insect? What was this flower? If all leaves were leaves, why did they have different shapes?" While the time for his peaceful getaways had ended, he is delighted to share his knowledge with the students and, more importantly, even open to learning from them.

"These students came from agrarian backgrounds. They knew so much about plants, what could be eaten, how to eat it, what is medicinal, which plant the cows do not eat, etc. It was more than I could ever learn from a book or the internet," he tells me. "Back then in 2010, the internet was accessible only through computers for us. Smartphones had not yet become popular. Samse did not even have a phone network to make calls," he says.

Two years later, Aravind found himself as a high school teacher in Moodambailu Government School, still surrounded by

nature and this time with the internet and phone being easily accessible. He began to attend workshops on identifying plants, birds, frogs and insects. He volunteered to do tiger surveys with the forest department while teaching, participating in theatre-based activities and spending time with his beloved family. Each time he went to do these activities, he found himself new contacts, friends and well-wishers.

"Most of the people who attended these biodiversity identification workshops were engineers and techies from Bengaluru. They would tell me, "Oh! You are a teacher? It is awesome that you are learning this. You can now reach out to so many students and teach them about it too! Tell us how we can support you," he says.

Through his vast network of people and organizations, built over time, Aravind has been able to harness human, material and financial resources to perform various activities in his school. He himself has been a resource person for talks on bird watching and other nature based activities in various government schools in the District.

His colleagues from other schools were soon asking for more information about the activities he conducted for his own students. This encouraged him to open a Facebook Page on behalf of the school to communicate with his network easily. If you take a look at it, you can have a glimpse of the narratives from various nature based activities conducted in his school. Not only is nature education being implemented, it is linked with the performing and visual arts, literacy, mathematics, science and local cultural activities. It focuses on helping students to reflect on their day-to-day experiences.

Aravind soon realized that he could convert his photographs into teaching learning material. A fellow teacher suggested that he add short snippets of information along with

his photos. Later, when he became part of the group that planned *Makkala Jagali*, they asked him, “Sir, why don’t you write about birds for children?” Hence, began *Hakki Kathe*. He extended the idea of putting his experiences in the form of a narrative and thought about making short videos of bird behaviour to encourage his students to go beyond identification. If you look at one of the videos, you will observe that each is a snippet of a particular bird behaviour that you may use individually or as a set to teach children about birds. “During the lockdown through COVID-19 times, sharing resources like these with the teaching community became even more meaningful,” he says.

Communicating his observations through writing was not as easy as Aravind had thought. Putting his observations in the form of a write up or a video made them concrete and fixed. Hence, he had to ensure that he got all the facts right. The narrative and language had to also cater to a diverse audience across age groups, and keep them interested enough to engage with the content. Curating each article involved research, use of his photos, and reflections in the manner of communication, which enhanced his learning.

He recognized that ‘communicating observations’ was an important skill in itself for students to acquire. He also came to value the ways in which it enhanced their learning. Soon he had his students making daily observations about nature around them, writing about it in their own words or by using drawings. He encouraged them to go beyond identifying an organism. “What was it doing?” He would ask them. “Go, see what it is doing and come back,” he would tell them.

He recalls a recent incident in which students came running to him and said, “Sir, we saw a Malabar Giant Squirrel today! We had gone to pluck mangoes and we saw it. You know what it did? It ate the peel of the mango and left the pulp as is! What a waste sir. Now even we can’t eat it.”



Aravind Kudlia

Collection and Segregation of Leaves by a Student

This narrative had several implications for Aravind as a nature educator. First, he explored the range and distribution of Malabar Giant Squirrels across the state, to check if, indeed his students had seen one. Next, he began to ask ecologists from his network, if the behaviour students had noticed, could indeed be observed in the squirrels. Lastly, he came across farmers in the village and when he mentioned this incident while talking to them, they told him, “Yes, it is true! These squirrels eat all the peel and waste the pulp. The children want to eat the fruits. Of course they are mad that the squirrel got there first.”

“The manner in which students came about this observation fascinates me. These squirrels are arboreal and move 10-20 meters above the ground. They are not in the way of the students for them to be easily sighted. The children happened to come across the squirrel while doing an activity they were interested in (plucking mangoes) and made an observation of the behaviour because it impacted their interest,” he reflects.

The more the students began to explore and bring observations like these to Aravind, the more he thought about documenting these and putting them together in some form. An opportunity was given to take this idea forward when a friend suggested that these nature-based observations could possibly take the form of a ‘biodiversity library’. Aravind then thought that creating an online

forum for this might be practical, as children would be able to access it from anywhere.

This project is currently in the planning stage. Various logistical aspects, including the manner in which students should access it and the degree of access in terms of students uploading and managing data, are being discussed and worked out. Not only does Aravind look at integrating school subjects with nature learning, he also extends the same to help students acquire relevant skills related to computers and the internet.

“You teach mathematics right?” I ask him. He laughs and says, “Yes, I do teach mathematics. However, how can any subject be limited to the discussion of just its own methods? Students make meaning out of it by linking it with their surroundings. The surroundings of my students are green, brown, full of movements and sounds, smells, rain and other things. How can I not converse with them about these things if they ask me? They process everything at once, not maths, science and history,” he tells me.

“A student once came to me,” he says. “The student said, ‘Sir! I killed a garden lizard today. Threw stones at it and completely killed it. Did you know that it burns a lot if you get bitten by a garden lizard?’” I told the student, “Well...is it completely dead?” “Yes sir!” He replied. “Well, good. Now go bring it back to life.” I told him. “What?” He asked me. “You took an action that had a consequence on something else, not just on yourself. So can you undo that action or reverse the consequence to bring things back to their natural state?” “No,” the student reflected. I asked, “Do you know for sure if a garden lizard’s bite causes burning? Does it even bite in the first place?” “No sir,” he replied. “I heard it from someone and assumed it to be true,” he said, reflecting on it. “Then perhaps you should explore and find out more before taking an action next time,” I told him as I consoled him, he tells me. These are the kind of events and experiences that students must

process with their peers and with us, not just subjects mapped as separate chunks,” he tells me.

Aravind’s reflections on learning are not just limited to himself and his students. He observes his daughter as she learns to say her first words while gathering a vocabulary and links it to Piaget’s theory of cognitive development. “She looks and learns the word, starts recognizing things around her, then links it to other things she has learnt to recognize, while building concepts. Observing her process of acquiring knowledge through thinking, navigating through experiences and feeling through senses is a lesson for me in how to go about teaching my students,” he tells me. The manner in which his students learn, and his daughter trying to make sense of the world around her, reinforce for him the point that everything is interwoven and linked in the minds of children and exists in a state of dynamism. Just like things are in reality.

“Somehow our education system destroys this thought process and makes them process everything as individual units. A few here and there might be able to grasp the process and re-construct this thinking. However, most end up acquiring tunnel vision at the end of which a job is visualized,” he muses.

“What can we do to help children retain their intuitive and justified thought process of linking all their experiences, reflecting about them and seeing the world through that lens?” He seems to be asking himself these questions more than directing them towards me. I listen to him open-mouthed and say, “But sir, you are already doing it!”

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Nature and Environment Education

Some Experiences

Sanskriti Menon

Love and respect for nature is a foundation for responsible human behaviour. This view has informed several nature-education programs at the Centre for Environment Education (CEE), based in Ahmedabad in the State of Gujarat. It has perhaps shaped our conception of Environmental Education (EE) and Education for Sustainable Development (ESD) as well. From the very beginning in 1984 when CEE was founded, it was recognized that providing opportunities to experience nature is a powerful approach in the repertoire of environmental education. Since nature is all around us, opportunities for nature education abound. The educator's creativity and challenge lie in how to use these opportunities and structure the learners' experience in diverse formal and non-formal learning settings.

Here, I share some of the main approaches and programs of nature and environment education at CEE. First, a brief introduction to the organization itself: CEE was founded in 1984 under a scheme for setting up centres of excellence of the then Department of Environment, Forests and Wildlife of the Government of India. The Nehru Foundation for Development, founded by Dr Vikram Sarabhai, was the parent trust that partnered with the Department to foster the creation of CEE as an independent professional organization.

From the very beginning, the necessity of locale-specific EE and partnerships was realized. This led to the creation of projects, programs and offices in different regions, contexts and thrust areas of work. These include formal education, urban and rural programs, experiencing nature,

interpretation, education for biodiversity conservation, water management, waste management and circular economy, environment management, climate change, etc. I hope the initiatives shared in this article will provide a flavour of all that we do at CEE.

Formative Influences

Kartikeya Sarabhai, founder Director of CEE, talks about some of the formative influences for CEE from the 1970s and the 1980s. He speaks about the interactions with Romulus Whitaker, Founder, Madras Crocodile Bank who demonstrated the way careful and guided interactions with snakes could change fear into fascination, and to learning about their close connection to humans. It can lead to conversations about traditional knowledge of communities in conservation.

He says, "We set up Sundarvan (<https://www.sundarvan.org/>) in Ahmedabad as a nature education centre and to house rescued animals including snakes. Rom also visited Sundarvan and it was wonderful to learn from him how an educational experience



Poster Depicting 200+ Local Mango Varieties Documented by Students from 90+ Schools for a CEE-Government of Maharashtra Program

could be created around snakes”. Kartikeya bhai describes how after Sundarvan opened, “People would queue up because of the interpretation, interaction, and experience that educators offered here”. Sundarvan is also a bat roosting site. You might find an educator who, conducting a bat awareness session, narrates how “Bats fly out in the hundreds to feed every evening ... about now”, cued to the moment when the bats start to flutter about and take off for foraging, much to the surprise and delight of the visitors!

Lavkumar Khacchar mentored CEE’s nature camping programs in different ecosystems, including the coast, a forested area and in a mountainous region. Here too, alongside the fun and adventure of a camp and camping activities, the idea was to gain insights into the diversity of ecosystems, how they work and the human relationship with the natural environment.

We have observed that all these experiences shape children’s perspectives and values towards the environment in the long term. Dr Salim Ali visited when the CEE campus was being set up and connected us to bird watching. CEE went on to publish a series of bird books by Lalsinh Bhai Raol in Gujarati. Lalsinh ji’s educational approach was much more around the behaviour of birds and not only on physical features to identify them.

Nature Interpretation Centres

Developing nature interpretation centres is another EE approach that uses the opportunity presented by lakhs of visitors every year at natural heritage sites such as tiger reserves, national parks and wildlife sanctuaries. When the first nature interpretation centre at Kanha National Park was to be developed, a team from CEE met H S Panwar, Park Director, to ideate on the content, exhibits and methods of visitor engagement.

A defining moment was when some visitors, disappointed at not having seen a tiger, said

“We did not see anything!” It became clear that the visitor centres would need to build on the anticipation and excitement of seeing a tiger to create an appreciation of what forms a healthy tiger habitat. Nature interpretation centres thus provide visitors with an educational experience of the natural habitat including the key species through interactive exhibits and audio-visual experience.



Aquatic Plant Study at Navegaobandh

CEE

From Nature Education to Education for Sustainable Development (ESD)

Camps, nature walks and bird watching can evoke wonder and awe regarding the intricacies of nature, with learning in the affective domain, and a connection with nature. An emotional and psychological connection with nature is distinct from a technical understanding of the environment, of say the water cycle or biotic-abiotic interactions. Environmental education must of course move beyond ‘love for nature’, given the challenges of climate change, pollution, biodiversity loss, the inequity of impacts and the need for justice in societal arrangements to deal with environmental crises.

Responding to these imperatives are two new resources developed by CEE and members of the [ESD Expert Net](#): Ten Steps to Systems Thinking using the UNESCO (2017) framework of sustainable development competencies with a focus on systems thinking competence for teachers of secondary and higher level students (as detailed in [Education for](#)

[Sustainable Development Goals. Learning Objectives](#), p 10), and *Handprints for Change: A Teacher Education Handbook*, that uses real stories on biodiversity, water, lifestyles and climate change to foster self-reflection and critical thinking on values of one's own and that of others' for 'Ethics-led Action Learning' for primary and middle school teachers.

Yet, the emotional connection is perhaps even more important now for young people, especially in cities, living with climate change, and an increasing sense of fatalism. What then are the most appropriate approaches in the present day? Younger environment educators (and others) must evolve these. They may build on the emerging EE approaches and what's worked well so far. They may also perhaps devise radically new approaches with emerging methods of networked learning and action. In my view, values of inclusion, equity, empathy, respect and collaboration will be essential as day-to-day life becomes more uncertain and planetary risks increase.

Even from an instrumental perspective, experiencing nature, learning about interconnections in nature, and how to observe the natural world, will be essential in dealing with the impacts of climate change. My colleague Satish Awate, as part of a study on the livelihoods of wild honey gatherers, recently explained how with an increase in the number of cloudy days, there are significant damages and changes in the flowering cycle of certain plant species.

Honey collectors report a drastic reduction in the number of rock bees (*Apis dorsata*). The smaller *Sateri* bees (*Apis cerana*) locally contribute almost 3/4th of the honey harvest. These bees migrate from the Western Ghat forests to fields in the Deccan Plateau region. With unavailability of adequately large cavities bearing trees in the region, they are now reported to nest in the black cotton soil. With untimely rains, their sub-soil nests flood and the bees perish.

It's not very clear yet what we can do about climate change impacts on biodiversity. However, observing changing interrelationships, adaptations and survival in other species is essential for us humans to learn how to adapt to and live with the impacts of climate change. And thus, there is perhaps an even greater need to strengthen non-formal approaches of nature education.

Public Debate as ESD

Several years ago, the proposal for the public release of genetically modified edible crop varieties starting with Bt Brinjal provided an unexpected platform for a large outreach on India's biodiversity wealth, and the debate about genetically modified organisms (GMOs). CEE suggested to the MoEF that the proposal should be publicly deliberated given that farmers, consumers and health professionals, who were some of the main stakeholder groups, had not had any opportunities to contribute on the issue and the debates around it.

Working with experts from academia and the community, CEE prepared information material about the issue, the diversity of brinjal, and the different perspectives on GMOs, and facilitated several public consultations that were chaired by the then Environment Minister. For several weeks, biodiversity was front-page news in India. The proposal for the release of Bt Brinjal was shelved, while the debate served to enhance awareness about biodiversity. Even now, when the topic of GMOs comes up, one might find people remembering the rich wild and cultivated diversity of brinjals in India.

Teacher Support

CEE's efforts to integrate nature and environment education into school curricula started with the *Joy of Learning* manuals for teachers, developed for the NCERT, with over 150 activity or lesson plans for EE. *Joy of Learning* has been translated into several Indian languages and disseminated through

various state education departments and other partners. Since then, over the years, the school programs team have developed several thematic activity packages, lesson plans and project-based learning materials disseminated through a range of teacher-support programs.

A personal favourite has been the EE Bank design of teacher orientation and support. The EE Bank approach includes a discussion on the need for environmental education, demonstrations of some approaches, access to a database of approaches, activities, lesson plans, and resource materials, and a curated and customized process of helping educators develop their own programs and materials, suited to their own needs.

The EE Bank exemplifies the ‘sari approach’ that Kartikeya bhai often talks about in describing locale-specific EE. India has a beautiful variety of saris, diverse in patterns, weaves and materials. However, the sari is not a stitched and fitted garment. The wearer decides how the sari is draped. Environment education material for educators may emulate the sari, in providing ideas and approaches, but not being overtly specific, leaving it to the educators’ creativity to finally use the EE materials in ways they feel fit for their own teaching-learning situations.

Locale-specific EE Programs

CEE colleagues in different regions have developed nature education and action programs around endangered species like the Ganges River Dolphin, the Asian Elephant and sea turtles. They have especially reached out to schools and communities around the habitats of these species.

With sustained outreach and policy dialogue in Goa, there is greater protection of turtle nesting areas. School nurseries and mini-forests were developed in schools in UP as a part of the Children’s Forest Program demonstrating the importance of nurturing trees from a young age and developing

an understanding of the importance of biodiversity and local species.

The importance of restoring urban ecosystems and using these as sites for Environmental Education has been demonstrated by CEE’s own 14-acre forested campus in Ahmedabad and the *Lokvan* developed in the city. Nature trails, bird watching, botany and microbiology projects are but a few examples of how biodiverse natural spaces can spark learning.

In Maharashtra, over the past few years, CEE and several partners implemented the Maharashtra Gene Bank project that was supported by the state government through the Rajiv Gandhi Science and Technology Commission. This initiative fostered a collaborative process among grassroot workers, social scientists and marginalized communities on knowledge generation, documentation, validation and propagation of successful community-driven practices of biodiversity conservation.

Project themes included on-farm conservation of crop genetic diversity and livestock genetic diversity, conservation and sustainable use of indigenous fish and shellfish diversity in selected fresh water bodies, conservation of grassland and savanna biodiversity, eco-restoration of community forest lands, and ex-situ conservation of marine biodiversity. The component led by CEE was on biodiversity education and participatory management of information pertaining to the conservation efforts.

CEE designed a state specific bio-cultural diversity curriculum through a consultative process and mentored teachers and grassroots educators at the conservation sites towards state-wide testing of the curriculum. To support this process, it undertook development of communication materials, field guides, and educational methods such as habitat-linked, project-

based learning (H-PBL), local ecosystem mosaic studies, conservation actions, activities to recognize and document the communities' use of and relationship with bioresources for food, medicine, livelihoods, culture etc. and changes therein.

School-based EE

At the national level, the Paryavaran Mitra initiative of CEE was launched by Dr APJ Abdul Kalam in 2010 to enhance youth



CEE

Interpretation

leadership and inculcate sustainability competencies. A pedagogy of explore-discover-think-act-share is encouraged. Teachers may support an eco-club or engage the entire school and community. 'Strengthening Environment Education in the School System' was an important mainstreaming initiative of the then Ministries of Environment and Forests and of Human Resource Development with support from World Bank around the year 2000.

The project, led by CEE, involved creating a framework for reviewing textbooks and then using it with textbooks of all state education boards and those of NCERT. This stupendous review exercise of over 1,000 textbooks was done by the Bharati Vidyapeeth Institute of Environment Education and Research. Gaps, errors, misrepresentations in text, images, exercises, activities etc. were identified. Following this, an effort was made by

about fifteen states to address these gaps and errors. As syllabi and textbooks are periodically revised, new textbooks have replaced those developed under this project.

However, the process of review of textbooks, the deliberations and workshops conducted, and the growing realization of the need for EE were perhaps the most enduring gains from the project. Though 'protection of the environment' had already been recognized as a 'core curricular area' in the [National Education Policy of 1986](#) (pages 6, 136 and 159), this project helped improve the understanding of how EE may be integrated into textbooks and formal curricula.

A national curriculum framework development process began around 2004, under the chairmanship of Professor Yashpal with several focus groups. [The Habitat and Learning Focus Group](#), chaired by Dr Madhav Gadgil, which included CEE, suggested an infusion of EE into the syllabus, textbooks, and curriculum, recognizing the Honorable Supreme Court's order emphasizing compulsory EE at all stages. The committee also recommended project-based learning, and the use of the school campus and surroundings as a learning habitat and one in which good environmental management practices could be implemented.

In Maharashtra, it was decided to create a separate subject for environment studies, from the 9th till the 12th standards. I was fortunate to be associated with the board of studies for environment education and contribute to the preparation of textbooks for the state board. A unit on systems thinking was introduced in the 11th standard which is probably a first in India.

However, the inadequacy of teacher orientation programs, the fact that EE remained a 'graded' subject which everyone is expected to pass, and the focus on marks obtained in the 'main' subjects that drive rote learning, have not been conducive for EE.

While efforts continue for more meaningful EE in the school system, there is great joy and learning from the Planet Discovery Centre, a pre-school initiated by CEE a few years ago, affiliated with the North American Association of Environment Education and Nature Start Alliance. The premise of the school is to use EE approaches to encourage inquiring minds, curiosity and wonder.

The CEE campus, situated on a sandy *tekra* (hillock or dune) that has had protection and plantation of local species since the 1960s, provides rich opportunities for nature-based learning. As children learn to care for themselves and others, they also begin to learn to care for the world around them.



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Web of Life Pashan

Experiences and learning about nature in early childhood build a foundation for lifelong environmental literacy and care.

Some Challenges and Ways Forward

The transformation needed in formal education has not quite materialized, despite the efforts of many committed organizations and individuals across the country. NCERT is developing a new curriculum framework, which it is hoped will be more in tune with the challenges the world now faces, and which children will need to deal with.

However, on-ground change will be limited without adequate budgetary support for the basics for education including improvements to school buildings and learning resources,

appointment of adequate numbers of teachers, and their capacity building, especially in marginalized and vulnerable areas. A nature camping experience for each child is highly desirable as are activities in and around the school, and day visits or excursions to natural ecosystems.

There is a great need for support for innovation and research in EE and ESD. Over the last three decades, environment and development challenges have rapidly become more severe and complex. As a community of educators, our organizations, networks, and research products should examine how well we are doing and what we could do better.

We also need to advocate for education for sustainable development (ESD). With nature education as an important component, ESD is an integral part of other drivers of change, such as legislation, technology, enforcement, and indeed, public opinion and advocacy campaigns.

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Connect On:    

Voices from Nature Education Practitioners and Thinkers from Across India

Collated by Nature Classrooms - Nature Conservation Foundation

“I wish that singing contests between neighbouring koels were as closely followed as IPL matches; and that the amorous behaviour of Giant Wood Spiders was as much in the news as the latest tweet from the celebrity of the hour.” - **Suhel Quader, Nature Conservation Foundation**

“I hope someday learning from nature finds its way back into our culture... That someday we are able to bridge the growing disconnect between us and nature and our heads and our hearts.” - **Neha Kandalgaoakar, Journeys with Meaning**

“I hope for a time when nature education is neither drab nor obligatory, but instead filled with the true extent of wonder, colour and diversity that the natural world has to offer. Approaching these goals from a point of building environmental literacy and curiosity, rather than simply advocating for the environment, could help ensure that people care enough fundamentally to conserve our ever-changing worlds.” - **Ishika Ramakrishna, Centre for Wildlife Studies**

“We strongly believe that if children experience the natural world intensely, holistically, they’ll connect with it, feel one with it, and only then will they think about protecting it. Establishing this connect with one’s natural world, not just as an intellectual exercise but with all one’s senses is a crucial function of education, according to us. It is the foundation to addressing some of the challenges we are facing in today’s world. We were left with no doubt then, that if we were to strive to do meaningful work in education, EE had to be a core area of our work.” - **Jamuna Inamdar, Aripa Foundation**

“Information about conservation has to be locally relevant. It has to be context-specific. For example, a child in Assam should not be taught the same thing as a child in the Western Ghats. These are completely different landscapes. So when you want children to get interested in conservation, when you want them to understand animals better, and know a lot more about the animals around them, you have to develop context specific, locally relevant content and methods with a focus on the landscape the child is placed in.” - **Sumit Arora, Wild Shaale**

“As an educator I am often in confusion when with children and nature. I have often asked: Can I teach them to observe nature? Should it be open-ended observation or should one intervene? Does nature observation mean acquiring a skill? Does this mean intervention from another who is skilled? Intervention in the form of guiding a specific skill—holding binoculars, giving pointers in sketching and note-taking, providing names of plants, birds, insects—is perhaps useful in documenting and understanding the experience in some common, shared manner. It is also often felt that children must engage with what they encounter, and that directing them is conditioning and narrowing their experience in some sense. An open, guided strategy is perhaps the best way forward to introduce the natural world to children!” - **Thejaswi Shivanand, Centre for Learning**

Of Birds, Bees & Trees

Reflections and Insights from Four Passionate, Inspiring Nature Education Practitioners

Abhisheka Krishnagopal, Yuvan Aves, Poornima Arun and Surendhar Boobala, in Conversation with Vena Kapoor

I had deep dive discussions with four very inspiring educators who have been working in the space of nature education and outreach for many years. **Abhisheka Krishnagopal, Yuvan Aves, Poornima Arun** and **Surendhar Boobalan** have had unique journeys, paths that have led them to being passionate, infectious, deeply reflective and effective nature educators.

They come from very different backgrounds, work in different geographical spaces and have been engaging for many years with diverse sets of audiences. I posed questions to the four educators.

I hope you enjoy their wonderful inspirational reflections, personal journeys and the ideas they share with us about nature education - the nuances, challenges, their aha moments, what keeps them motivated and hopeful despite the current state of the world. My conversations with them left me inspired, hopeful, delighted and thankful - feelings that often escape us these days.

As nature education practitioners what is your most memorable experience with children or adults when you have introduced them to nature for the first time?

Abhisheka Krishnagopal: I think most people are aware of nature and do not need an introduction to it. However, I think they end up not thinking too much about it, and this is what we need to change. To actually make people see nature and to make a connection

with it in different ways. One memorable experience that stands out for me is when I happened to attend a PTA meeting in a school in a remote part of Karnataka.

I was about to begin a few nature education sessions for the students there. Their parents were mostly farmers working in agricultural lands. When I gave the introductory talk, the parents were there as well. Conversations around topics such as pollination and dispersal became animated and interactive.

These farmers later told me that even though they had been working in these agricultural systems, they often did not make the connection or thread together the important natural phenomenon that allows for systems to function and how interconnected nature and we humans were.

From my experience, to get adults hooked to making comparisons with human social dynamics, roles and behaviour (including gender) with what happens in the natural world is a great way to start. For example, highlighting how most bird species equally share parental duties, how the females of many species actively choose, and reject, males to mate with.

Yuvan Aves: Young students seem to love to be shown the life cycles of various creatures. Every time I take a group of students outdoors, I try to find a water body close by and show them dragonflies and frogs etc. Then we have animated discussions around these observations. I firmly believe that

everyone has an intrinsic motivation to learn about and connect with nature. We lose this along the way. I remember one of my students who had no interest in reading or intellectual learning from her textbooks after being exposed to one such nature session around a water body, sat her parents down and excitedly explained in detail about the life cycles of insects and frogs etc.

Poornima Arun: I love to see how the various elements of nature touch children in different ways. The delight when drops of rain fall on their faces, how their eyes shut when they glance towards the sun, when they climb rocks, smell the flowers - these are so spontaneous and genuine - and nature provides that connection and allows them to absorb, reflect and to be enchanted!

One of my students was from a family of goat herders. She had no interest in reading and writing. However, birds, bird names and bird watching fascinated her. Moreover, because of this fascination, she taught herself to write



Nature Classrooms

down birds' names, including writing how the calls of the birds were. For me as a teacher, this was such a special thing to witness. I have seen kids from urban landscapes terrified of clambering over rocks, start developing confidence when they see other kids, adults do it. Therefore, we need to be patient, because things do not happen in silos, changes happen in a continuum.

Surendhar Boobalan: Once when I was taking a class, my students stopped me mid-sentence and said, "Sir, please stop the class. There is a bird calling and we want to listen to it. What bird call is that sir"?

I was proud and very happy when this happened. Only a few days before that, I had started telling them about birds and taken them for a short walk close to school. They had watched a few birds and we discussed their calls. This particular call was of a *Koel* bird and the students got very excited.

I used this opportunity to introduce them to other birdcalls as well. I realized how useful it is to use binoculars or a spotting scope when introducing birds to children and adults for the first time. These tools really make people gasp and amazed, and open up very interesting conversations. I currently give them my personal binoculars and spotting scope. However, I wish every school keeps at least binoculars as an important educational tool.

What do you think about the current school EVS curriculum, the opportunities it offers and the gaps therein?

Abhisheka Krishnagopal: I think that since EVS has been made mandatory, it has given nature education an opportunity and space to be a part of school learning. As a community, we often do nature education outside of school timing and spaces. However, India being such a large and diverse country, there are challenges in trying to make

the curriculum more locally relevant and appropriate. This needs to be the starting point to make for a more meaningful, deeper connection with nature, especially with young students.

Yuvan Aves: I am unsure about this because the big gap that I see in our nature education interventions and in the current curriculum in highlighting and allowing for an emotional and spiritual connection with nature. All curricula in our country typically also lack a continuum, and the objective for learning unfortunately is only to take tests at the end of the year.

Poornima Arun: Since we are an alternative school, I luckily have the opportunity to look at different textbooks and curricula and trial out what I think will work in our school space. While some have very interesting project ideas, many do not have an emphasis on experiential learning.

Crucially, I also think that textbooks and curricula lack the voices and experiences of teachers. The voices of teachers are completely absent. This is a shame. Getting them to share their experiences and their own ideas will really add value to the textbook approach and content.

Surendhar Boobalan: In Pondicherry, we follow the NCERT books and curriculum in the primary classes. I find the curriculum, approach and content really good and I enjoy teaching EVS to my students with these books. The challenge is that most teachers are not aware. They struggle to transact lessons effectively and the way it is intended.

There is an urgent need to conduct sustained teacher training to use these textbooks and transact the curriculum. Unfortunately, after the fifth standard, we change to the State Board curriculum. Then both students and teachers find it difficult to engage with the subject.

How can teachers and schools with very little or no access to outdoor spaces engage with nature education? What are your recommendations for this?

Abhisheka Krishnagopal: We can think of and design activities that can be conducted indoors. Reminding ourselves that even the most concrete spaces have something around to look and marvel at - insects on walls, small plants growing through pavements. Trees are everywhere around us, and they are great resources with which to start conversations about nature.

To engage with nature, the skills of close and sustained observation are very important. I learnt this in art school. After this, I started using the same technique for my nature education work and it works very well. For example, once the child gets into the habit of observing all that is around, even a small shrub growing at home, or on the way or just outside the school, can be looked at and observed carefully. The rewards from this will be immense.

Yuvan Aves: This can be challenging. Given the various social-economic pressures that students and teachers face, we should still try to identify spaces and possibilities. Young students must be allowed to explore as much as possible. We need to allow and push for this unfettered access in areas in which students feel safe. A wonderful thing about nature education is that it supports and nurtures all kinds of learners. It allows for different learning styles, and it offers a sense of place.

Poornima Arun: I believe that any space, however small, can be a space to engage with nature. For example, even small spaces will have ants, spiders, etc. And there are so many learning opportunities and stories about them that can be shared and discussed in class. We need to empower teachers to feel confident to develop their base knowledge

about nature and be mindful of not being too prescriptive. Teachers must themselves experience nature, and the potential of nature learning, before we expect them to teach their students.

I also firmly believe that we should try our best to include the non-teaching staff in schools to join us in our nature learning experiments as well and function as facilitators. I have seen this work so well in my own school. I also think that an element of physical labour - the act of moving and digging soil, composting, climbing trees and rocks, using your hands and legs as much as possible - should be a part of our nature education interventions.

Surendhar Boobalan: Even in a small space in a city, nature education can be carried out. For example, small potted plants can be brought into the classroom or one can ask students to bring a few as well. We can also bring a lot of visual material to the classrooms in the forms of pictures, videos, posters and design nature activities that can be implemented even in small spaces.

What is your favourite go-to tool(s) when you want to introduce and engage people with very little to no knowledge, or who have had no opportunities to engage with nature?

Abhisheka Krishnagopal: The first tools I like to use are subjects that create a sense of wonder and excitement for the audience. There are so many stories in nature that one can borrow from and narrate. For example, I love to narrate the story of the association of the fig tree and the fig wasp and of the amazingly complex lives of social insects.

I try my best to spend some time and explore the areas around me before I start any sessions. It is useful to pepper in personal stories as well, as they can make a nice impact. The most important thing is to try to ensure a sustained engagement with the groups you are interacting with, as much as possible.

Yuvan Aves: This depends on the audience and the group size I am engaging with. If students have been prepped and made to feel confident, I believe in self-directed learning as well. We also need to make sure that our engagement is sustained.

Poornima Arun: Allowing for experiences and conversations that make strong connections with the non-human world is important. Guilt about the state of the world, what we are doing to it, does not work, especially for young students; we need to avoid this. I try my best to look for local and immediate examples around me and the students.

Surendhar Boobalan: I love using the Early Bird flashcards. They are designed so well and make for such a rich and interactive teaching-learning tool. I also wish every school could be provided with binoculars. It is amazing how it can change the perspective of children and adults to the world of birds and bring out a sense of wonderment to see things so clearly through it.

What has been your own journey as a nature educator? Are you optimistic about the small local interventions that we as individuals and organizations are attempting in the midst of a serious loss of nature, and during a time of climate change crisis?

Abhisheka Krishnagopal: I have now started believing that every kind of intervention is important, be it nature walks or wildlife rehabilitation centres. Every effort is important. Nothing is too small or big. It is also useful to occasionally remind oneself about our own strengths, skill sets and the kind of personality we have, and use that understanding to carry out interventions that we are comfortable with.

Yuvan Aves: Due to various personal reasons, I left the formal schooling system for a while. I started teaching instead in a school when I was 16 years old. Some very early experiences and acceptance by my mother of my various quirks and her allowing

me to bring home various animals helped me engage with and be amazed with the natural world. I want this for my students. Much of what I read in books and papers also deeply influences me and my teaching of nature. I am also an activist and want to instil the spirit of activism (trying to remove the negative association that the word now unfortunately has) in my students as well.

Poornima Arun: For the last 30 years, I have worked in the area of ecological restoration with the aim to engage with human dignity as well as ecology. In the beginning, through Bombay Natural History Society, I took children who used to live on the streets and from very underprivileged backgrounds for nature walks inside Borivali National Park. For me, it was delightful to witness first-hand how nature provided for internal observation and healing for these children.

I also believe that it is very important for children to use their hands in the soil, dig, collect seeds, see plants grow from seed to sapling and then finally to plant and nurture them. This whole process is important for them to experience and understand. For marginalized children, the process of participating in these meaningful acts can also translate to human dignity and confidence building. Moreover, this translates to dignity of labour for everyone as well.

These are the areas I am deeply interested and entrenched in. Nature education definitely provides these opportunities for teaching learning. I have also recently been part of a collective where we are designing and delivering a climate change curriculum for 9-12th grades. This curriculum can also be used at the university level.

I personally contributed to a chapter on 'Women and the Environment,' a topic about which I am passionate. This chapter includes looking at and discussing how patriarchy has been contributing to acts of destruction and debating these ideas within the topic to get students to reflect, engage and debate.

Surendhar Boobalan: It was completely by accident that I was introduced to birds and bird watching about 9 years back. I was amazed by what I saw and had not noticed until then. I am now a passionate bird watcher and nature educator. I use any chance to try and instil this in my own students and colleagues. Yes, I am still very optimistic. I really believe that even small interventions and changes can have impact.

Should nature education have measurable outcomes? Should our interventions be monitored and evaluated? If yes, then how? In addition, any other reflections that you would like to share with our readers?

Abhisheka Krishnagopal: Our best feedback will be from the reaction of the groups we are working with. These often cannot be measured by metrics on reports and paper. Feelings and emotions are difficult to measure using conventional evaluation tools. I think there is great value and importance in evaluating the resources we are creating though. We often design and use them thinking and convincing ourselves that they will work. However, this may not be the case.

Even simple, straightforward tools like pre and post questionnaire surveys are good ways to start keeping in mind that each target audience will be very different, and each one will come with their own contexts. We, therefore, should be sensitive to differences in culture and avoid going into a space with our own perspectives. I must add that we need to allow space and time for silence and reflection. We often forget to do this in a rush to conduct activities and reach as many people as possible.

Yuvan Aves: Assessing our outcomes is possible. When and where there is an opportunity to do this, we should plan and design our interventions accordingly. As educators, the most important thing is that

our learning objectives should be clear. We should also remember that we need to constantly assess ourselves and always be learners as well.

Poornima Arun: Yes, we need to acknowledge and accept knowledge in all forms and differences in personalities. As a community, we need to come up with creative ways of assessing and evaluating our interventions and teaching tools.

We should also be able to allow for abstract assessments as a way of feedback and reflection. There is too much emphasis on the written word. We need to also design and make available textbooks that have an oral component. There is a large community of people with a rich tradition of oral history. These voices are completely missing.

Surendhar Boobalan: Monitoring and evaluation is very important. Without this, we cannot improve. We could, for example, look for behavioural changes in the students we teach and their interest in nature even outside of school. One scaling system will not fit all though.

We need to trial out a few tools and figure out what will be the best for us in our space and our groups. Working with a small target group in a sustained engagement for long periods of time is much more important and effective than engaging with a large set of people just once or occasionally.

Abhisheka Krishnagopal is an artist, ecologist and nature educator based in Bengaluru. She is currently associated with the Education and Public Engagement Program of Nature Conservation Foundation (NCF), Bengaluru. abhishekagopal@ncf-india.org

Yuvan Aves is a writer, naturalist, educator and activist based in Chennai. His interests include reimagining an earth-centric and child-centric education, reciprocities

between languages and ecologies, and ground-up processes of change and politics. He is the Founder-Trustee of Palluyir Trust for Nature Education and Research. yuvan.aves@gmail.com

Poornima Arun is a founder member and head teacher of the Marudam Farm School in Tiruvannamalai, which started in 2009. She is involved in all aspects of running the school — from curriculum development to teacher training and administration. She has been involved in creating innovative approaches to science in her classrooms for the past 20 years. She is an active member of the Alternative Education Network since the past seven years, and was instrumental in starting a Tamil Nadu chapter three years back. poornima.arun12@gmail.com

Surendhar Boobalan is a Government Primary School Teacher and a nature educator based in Puducherry. sureboo@gmail.com

Vena Kapoor is an ecologist and conservationist working in the field of nature learning and outreach and she does this through the Nature Classrooms Program at NCF. She also conducts workshops, talks and walks on the wonderful, fascinating world of spiders, insects and on nature learning. vena@ncf-india.org



Resources for Nature Education

Roshni Ravi

What are some resources we can use to introduce people to the wonders of the natural world? Here, we feature nature education resources in diverse formats, from different parts of India, for a wide range of age groups and learning levels. We also share a glimpse of the resource creation process for some of these to inspire you to create your own materials keeping your local contexts and audiences in mind.



Talking Birds: Early Bird's mobile-friendly, interactive poster series featuring Indian birds in different habitats, with their calls

Type of Resource: Interactive Digital Posters

Published By: Early Bird, Nature Conservation Foundation (NCF)

Languages: 10 languages: English, Assamese, Bengali, Gujarati, Hindi, Marathi, Kannada, Malayalam, Tamil, Telugu

Who is this resource for?

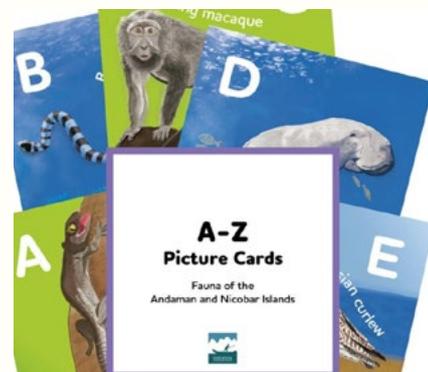
Beginner birdwatchers, children and adults!

About the Resource: Early Bird's interactive digital posters can be accessed on any device - from mobile phones to laptops. The posters feature photographs of common Indian birds across different habitats. Clicking on any bird allows the user to see its enlarged photo, name and some interesting facts about it. You can listen to and learn the bird's call as well!

Resource Story: In collaboration with photographers, illustrators and designers, the team at Early Bird have created several resources including flashcards, posters and activity sheets to introduce people to birds that can be easily seen around us. Initially, they created posters of birds in different habitats that could be easily put up in classrooms. Interactive digital posters were created in collaboration with Mapunity to popularise Indian birds in a format suited for virtual learning.

Link to Resource/Contact: Interactive Posters <https://www.early-bird.in/interactive>

Contact: team@early-bird.in



A-Z Picture Cards: Fauna of Andaman and Nicobar Islands

Type of Resource: Flash Cards

Published By: Dakshin Foundation

Languages: English

Who is this resource for?

For early readers and anyone wanting to know about the wildlife of Andaman and Nicobar Islands

About the Resource: These A-Z picture cards feature animals seen in and around the

Andaman and Nicobar Islands. This resource was developed to make foundational literacy and numeracy accessible through place-based education for children in the islands.

Illustrations and interesting facts about 26 land and ocean creatures are featured on these cards - one for each letter of the alphabet! From diet to habitat, the cards are packed with little information nuggets about the islands' wildlife and can be used to play games and quizzes.

Resource Story: This resource was designed by the Environmental Education team at Dakshin along with illustrator Subhadra Sridharan. The cards will serve as a supplementary resource to the Treasured Island books – a contextual and place-based environmental education curriculum about the islands. The team also sees the cards as a response to the needs of curious students and teachers who want to get to know the animals they spot around them better!

Link to Resource/Contact: <https://www.dakshin.org/a-z-picture-cards-the-fauna-of-the-andaman-and-nicobar-islands/>

introduce the unique mangrove habitat and its plants and animals to children and young adults.

The book features maps, simple experiments, illustrations and a glossary to learn about mangroves not just in Odisha but other parts of India as well. Children get the opportunity to closely observe what they learn in classrooms on visits organized to mangrove nurseries and forests. The use of songs, puzzles and flashcards along with the book makes this learning experience joyful for students.

Resource Story: The team at Chale Chalo has been working on mangrove regeneration, conservation and education since 2005. The book was developed after many visits to the forests to spark curiosity and interest among school students and teachers about mangrove ecosystems they lived so close to.

Conversations with the Forest Department and local communities contributed significantly to this resource.

Contact: Ranjit Swain, Director, Chale Chalo | chalechalo@rediffmail.com



The Magic of Mangrove: An introduction for young people to the mangrove forests of Odisha

Type of Resource: Activity Book (available as PDF/ hard copy)

Published by: CHALE

CHALO, Bhubaneswar, Odisha

Languages: English, Odia

Who is this resource for?

13 years and above. Originally put together as a resource for eco-clubs in government schools in Odisha.

About the Resource: A book that uses activity-based teaching-learning methods to



Shell Shocker: a card game on the turtles and tortoises of India

Type of resource: Card game

Published by: Turtle Survival Alliance India (TSAI)

Languages: English

Who is this resource for?

Ages 10 years +

About the Resource: Can a card game help you learn about turtles and tortoises? 'Shell

Shocker' is an innovative card game that presents interesting facts about the many tortoise and turtle species found in India. A fun and accessible game that can be played in small groups, each card presents opportunities for players to learn about the shell length, weight, diet, clutch size, habitat as well as conservation status of these creatures.

Resource Story: This resource was created by the team at Turtle Survival Alliance India. The game took shape during the lockdown and was brought to life over several online meetings and the efforts of a multidisciplinary team. The cards are packed with information. These can also be used as handy field identification guides by budding biologists and students!

Link to Resource/Contact: If you are a school, library or learning centre write to tsa.indi-aprog@gmail.com for copies

Purchase link for individual copies: <https://www.pashoopakshee.com/product-page/shell-shocker-card-game>



Trees of Mangar Bani: An illustrated guide and activity book

Type of Resource: Guide and Activity Book

Published by: Sanctuary Nature Foundation (Mud On Boots) and Mangar Eco Club

Languages: Hindi and English

Who is this resource for?

Members of the Mangar Eco Club and visitors to Mangar Bani

About the Resource: A bilingual resource, this book features 12 iconic tree species found in the Mangar Bani sacred forest on the outskirts of Delhi.

The book puts a spotlight on each tree through illustrations and interesting natural history and cultural information about the trees of Mangar. You will find descriptions of tree parts (that may help you put a name to a tree), information about a tree's flowering and fruiting patterns, details about a tree's preferred habitat, as well as the ways in which people use and relate to these trees.

Along with this, the book also has fun art activities and games that are sure to help you explore, know and connect with nature around you!

Resource Story: This book was the outcome of a collaborative project between Sanctuary Mud on Boots fellow Sunil Harsana and independent illustrator and designer Labonie Roy. The resource was designed for children of the Mangar Eco Club as well as for visitors coming to the Mangar forest. The intention was to encourage learning about their surroundings and the local ecosystem using an easily accessible booklet. This bilingual book also helps readers learn new words in either language.

Link to Resource/Contact: Visit Mangar Bani and strike up a conversation with Sunil Harsana to get your hands on a copy or write to Labonie Roy labonieroy@gmail.com



Wildlife of Pakke: Colouring Book and Nature Journal

Type of resource: Activity Book (available as PDF/hard copy)

Published by: Eastern Himalaya Program,

Nature Conservation Foundation (NCF)

Languages: English

Who is this resource for?

Children and grown-ups who live in and around Pakke Tiger Reserve; but also for anyone who wants to know more about the wildlife of Pakke!

About the resource: A unique resource designed to encourage deeper engagement with wildlife through colouring and nature journaling. This activity book has colouring pages featuring simple and detailed drawings. The book is designed with the intention to help the user explore and enjoy the colouring process. Along with drawings there are blank pages to record observations and notes. Both commonly found wildlife and rare species like clouded leopards are featured in this book.

Resource Story: The Eastern Himalaya team at NCF organizes nature camps with school children in and around Pakke. This resource emerged during the pandemic when they could not organize these programs. The resource seeks to encourage children's creativity and imagination and to capture their own experiences of spotting wildlife around them.

Link to Resource/Contact: <https://www.instamojo.com/NCF/wildlife-of-pakke-colouring-book-and-nature--b28a6/?ref=store>

Saniya Chaplod | saniya@ncf-india.org



Birds of Kyari

Type of resource: Guide/ Information Booklet

Published by: Kyari Ecoclub and Titli Trust

Languages: Hindi and English

Who is this resource for?

For school eco clubs in Uttarakhand

About the resource: A booklet made by children for children documenting the bird diversity of Kyari village located at the edge of Pawalgarh Conservation Reserve,

Uttarakhand. This resource is a showcase of delightful illustrations and stories of Kyari's common birds created by children. A truly collaborative effort that captures children's experiences into a learning resource for other beginner birders.

What it takes/Process: The children of Kyari eco club began documenting the birds they spotted on their nature walks. They translated their observations and learning into drawings and stories that are featured in this booklet.

Link to Resource/Contact: <https://wiprofoundation.org/resources/birds-of-kyari/>

Sanjay Sondhi sanjay.sondhi1@gmail.com

We hope these curated resources have inspired you to not just find contextual resources to help you learn and connect with your immediate surroundings but perhaps also given you ideas to create your own resources along with your students!

Here are a few nature education resource repositories and organizations for further exploration:

Nature Vidya developed by Nature Science Initiative <https://www.naturevidya.org/>

Palluyir Trust for Nature Education and Research <https://palluyirtrust.org/>

Round Glass Sustain's Infographics & Explainers <https://roundglasssustain.com/explore-infographics>

Zoo Outreach Organization <https://zooreach.org/>

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Bhaskar Sati

Roshni Ravi is an educator interested in conversations that lie at the intersection of nature, arts, mental health and teaching-learning. She currently works as Project

Coordinator at Nature Classrooms, Nature Conservation Foundation.

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How Books Can Help Find Our Way Back to Nature

Bijal Vachharajani

I was all of seven, when I went crawling on all fours across a patch of Lodhi Gardens in Delhi. I was looking for a four-leaf clover. I don't think I even knew what a clover leaf looked like, but I was determined to find one. After all, I had read about it in my book. Spoiler alert: I didn't find one. However, I met lots of ants, beetles and a rather alarmed praying mantis.

For me, this is what my childhood books did; those stories whisked me away into a magical world where nature came alive through words and illustrations. Where children explored

the woods near their houses, had adventures while rescuing animals, and had long picnics by babbling brooks and rolling hills. It sparked in me, what turned out to be, a lifelong love for nature and wildlife. After all, Richard Louv wrote exactly that in *The Last Child in the Woods* – “Reading stimulates the ecology of the imagination.”

Today's readers have access to a dazzling array of books, from picture books to middle grade stories to young adult novels. Stories that celebrate local flora and fauna, highlight the work done by amazing eco-champions,



that bring to the forefront issues of climate change, and that infuse a sense of wonder about the natural world in children.

As a commissioning editor at Pratham Books, a not-for-profit publishing house based out of Bengaluru, my day job is to dream up picture books. Our talented team works with a wonderful motley crew of writers and illustrators to bring nature back into stories. We have teamed up with scientists, researchers and subject matter experts to create these books, a lot of which go into our STEM Library-in-Classroom kits, in our mission to reach the last mile child.

A Butterfly Smile by Mathangi Subramanian and Lavanya Naidu tells the story of Kavya, who has just moved from her village to a city with her family. Struggling to fit in, Kavya discovers a special connection with butterflies, as she understands their migration stories, and finds resonance with these.

Then there are the books by wildlife filmmaker and photographer Radha Rangarajan that can be read for free on StoryWeaver, like all of Pratham Books' titles. Radha's stories take readers into the world of oft-overlooked flora and fauna. Whether it's a hermit crab looking for *A Suitable Shell* in a trash-strewn beach or inviting children to look at all around them for nature stories in *The Other Way* or different pugmarks in *Who Just Went By?* One of my favourites is *Uh-Oh*, a book she co-wrote with Aparna Kapur. Illustrated by Kalp Sanghvi, each page in this clever book becomes a little interactive tableau that explores defensive mechanisms in nature. Similarly, Vena Kapoor and Pia Meenakshi's book *Off to See Spiders* introduces different species to children in a fun and accessible manner, while Rohan Chakravarty's *Making Friends with Snakes (but from a distance)* is a unique comic book on these reptiles.

The underwater world comes alive in books such as Rajiv Eipe's *Dive*, Sheila Dhir and Anjora Noronha's *Goby's Noisy Best Friend*, and Sejal Mehta and Pia Meenakshi's *Whoop, Goes the Pufferfish*. Written by marine

biologists Shreya Yadav and Divya Panicker, *The Night the Moon Went Missing* touches upon bioluminescence and *Razia Learns to Swim* is centred around how different creatures move in water.

When I first joined Pratham Books in 2017, my team and I worked with Sejal Mehta and Rohan Chakravarty to create a set of Phone Stories - *Watch Out! The Tiger is Here; Did You Hear?; Wild Cat, Wild Cat; and Who Ate All That Up?*, audio visual books that can be accessed as e-books on StoryWeaver, as YouTube videos, as audio on Soundcloud, and as MP3 files on WhatsApp. All for free. All this, apart from their print avatars of course. During the month-long campaign that year, the set of four books reached over 2,800 Schools/ Centres and teachers, impacting over 56,000 children.

For the last couple of years, we have been creating picture books that highlight the climate crisis – from its impact on habitats and species in mine and Archana Sreenivasan's *PS What's up with the Climate* to livelihood impacts in Uddalak Gupta and Ruhani Kaur's *The Grass Seeker* to the basics of climate change in Bibek Bhattacharya and Joanna Davala's, *Our Beautiful World*.



Pratham Books

By publishing them under Creative Commons, we have been able to provide open access to our books, enabling educators and translators in India and around the world to translate the books into multiple languages for their use. For instance, *Watch Out! The Tiger is Here* is available to read in 79 languages; this is crucial. For instance, author

Robert Macfarlane discovered that nature words were being left out of newer editions of the *Oxford Junior Dictionary*.

This is not surprising, given that we are suffering from, what Peter H Kahn Jr. and Thea Wess describe in their paper *The Importance of Children Interacting with Big Nature*, as environmental generational amnesia. They define this as – ‘The problem of environmental generational amnesia is that nature gets increasingly diminished and degraded, but children of each generation perceive the environment into which they are born as normal. Thus, across generations, the baseline shifts downward for what counts as healthy nature.’



Pratham Books

This is why green literature, especially children’s literature, is a response to turning the tide when it comes to climate change, habitat fragmentation, and our collective environmental amnesia. Macfarlane teamed up with author Jackie Morris to create *The Lost Words*, a stunning illustrated poetry anthology that urges people to conjure up spells to bring back lost and forgotten nature words such as otter, kingfisher and acorn. This is why I wrote *A Cloud Called Bhura* and *Savi and the Memory Keeper* – to be able to tell stories about the climate crisis, and lure readers back to nature, to remember, to celebrate, to cherish everything on this planet we call home.

In an interview, the writer on the hill, Ruskin Bond, once told me, “Perhaps, many who have read my stories might have been influenced by my feelings for the natural world. In my stories there is a certain respect for the world of animals, trees, birds and everything that’s part of the natural world.”

Or, that author Lauren James, who wrote the compelling *Green Rising*, formed the Climate Fiction Writers League – ‘... a group of authors who believe in the necessity of climate action, immediately and absolutely.’ In that group, you will find some of the finest creators of climate stories from different parts of the world, connected in their commitment to nature.

Bring their stories to your classroom, your home bookshelves, and your community library. In India, you will find nature writers and illustrators such as Ranjit Lal, Rajiv Eipe, Deepak Dalal, Arefa Tehsin, Priya Kuriyan, Harini Nagendra and Seema Mundoli. And all the ones mentioned in this story, and many more. Read their books, invite them to talk to young minds, share their experiences, and celebrate nature through stories.

As James puts it on the league’s website – ‘Fiction is one of the best ways to inspire passion, empathy and action in readers. Our works raise awareness of climate change, and encourage action at the individual, corporate and government levels.’

So, read these books, and take children out into nature. It can be a park, a tree, a forest. Even cloud watching from your window. Everything is nature, after all. Including us.

When **Bijal Vachharajani** is not reading a children’s book, she is editing one. She is a commissioning editor at Pratham Books and is the author of multiple planet-friendly books including *A Cloud Called Bhura* and *Savi and the Memory Keeper*.

Connect On: 

Nature Education as a Conservation Tool

A Personal Narrative from Kas Plateau, a UNESCO Natural World Heritage Site

Prerna Agarwal

Come monsoons, and the carpet of wild flowers attracts thousands of visitors every year to Kas plateau, a UNESCO natural World Heritage Site, situated in the Western Ghats of India. A place of astounding botanical significance, this rocky plateau supports around 250 flowering plants, with mind boggling adaptations - carnivory, parasitism, desiccation tolerance - to survive this habitat of extreme environmental conditions that spares no one. Interestingly, many of the plants are endemic to this

region, which means species found nowhere else in the world! This place of 'Outstanding Universal Value' changes colour every few weeks in the monsoon season. However, all was not well with Maharashtra's wild flower paradise when I started working as an independent researcher in 2012. This ecologically fragile area faced a serious threat from mass tourism. Habitat destruction due to unregulated visitor movement, vegetation trampling and traffic congestions were the major threats.

Prerna Agarwal



Lush green studded with ground white orchids in June-July



Raman Kulkarni

A carpet of pink Balsams (*Impatiens lawii*)

Pratik Joshi



Interspersed with purple bladderwort- a carnivorous plant (*Utricularia purpurascens*) and white (*Eriocaulon sedgwickii*) in August-September



Prerna Agarwal

In October covered with the Sonkis and the Smithias

The various threats due to mass tourism faced by Kas plateau in 2012 when the author began her work

Prerna Agarwal



Prerna Agarwal

Satara Forest department



Satara Forest department

This photo story will take you on my personal narrative of how as an Inlaks Ravi Sankaran Scholarship fellow in 2014, I experimented with various nature education tools to sensitize tourists and local communities to conserve the natural heritage of Kas plateau.

In the initial phase of the project, a series of meetings were conducted with the Maharashtra Forest department officials and Kas plateau Joint Forest Management Committee (JFMC) members, to plan the project through stakeholder participation. Through these discussions and my own observations, the key on-ground challenges identified were: 1) Lack of well-trained guides to meet the growing demand; 2) Visitor sensitization regarding the uniqueness of the plateau through well designed signages in Marathi as well as in English; and, 3) Absence of designated paths to regulate visitor movement in order to reduce vegetation trampling.

To bridge these gaps and to design effective outreach material, I first spent a few months understanding the traditional ecological

knowledge of the various plants found on the plateau. I realized that the local names of plants used at Kas (though these were in Marathi too) were different to those used popularly by the botanist/naturalist community. I kept jotting down these names as and when I came across anything new.

On one such exploratory adventure, I was invited to attend Ganesh Puja at a beautiful scenic village called 'Kaasani' at the foothills of Kas plateau. I could not have thanked my hosts enough for having invited me to the village at that time of the year. This was the first time I experienced Kas plateau's local culture. Right from making a mini model of the plateau as part of the Ganesh festival decoration, to using a balsam flower species called 'Gauri terda' as an offering, to worshipping the purple coloured Bharangi flowers (*Rothea serrata*) as an avatar of Lord Shiva.

That day, as I saw these cultural practices first-hand, I felt I needed to change the narrative of 'nature experience and outreach at Kas' from a pure ecological one to one that was more inclusive by integrating the cultural

Purna Agarwal



Purna Agarwal

stories this landscape was brimming with. Once the visitors would read these stories, I thought they would feel more connected to the landscape, rather than being bombarded with just botanical names. The idea was also to instil a 'sense of pride' towards this UNESCO natural heritage site in both the local communities and in the visitors.

Finally, all the information collected during 2012-2014 was compiled in a pictorial booklet as a tool to be used by the guides while conducting tours in the area. The guides suggested that we keep the paper size large so that they can show the flower images (which are otherwise quite miniscule) to large groups. The paper size thus chosen was A4 and every page was laminated to make it waterproof. Additionally, the botanical names were written in Devanagiri script to enable the guides to use these technical terms.

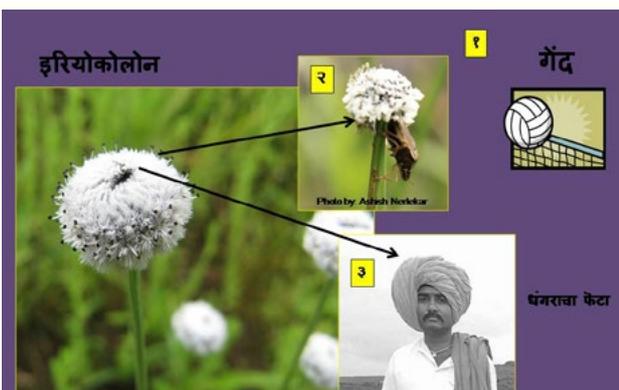
"The booklet is very useful for me. In addition to showing enlarged images to the group, I use it as a revision tool at the end of the tour. I flip through the pages with my group to revise all the plants they see. Also, the booklet acts as a truth proofing with the tourists. When they see that I am saying the same names

as mentioned in the booklet, they become more confident about the information I am providing them." said Ashok Kurale (a local 35 years old guide and a JFMC member). Another senior guide Dhondiba Aatale, who is 75 years old, mentioned, "I cannot read. So the booklet that was given to us was extremely helpful as it was pictorial." The guides found this booklet extremely useful, and requested to include photographs of butterflies and birds included in it too. We brought out a revised version with these additions.

Nature Guide Training

In addition to the booklet, a two months long guide training program was conducted which included soft skills training too. To objectively assess the success of the program, a pre and post test was conducted. Most guides scored higher in the post test, and gave positive feedback for the training program. The guides said that the mock tours helped them gain much needed confidence.

"I start my tour with an introduction. Then, I ask the visitors from where they have come. I check with them their interests. I first see what their interest is. Accordingly, I conduct the tour. I do not mention the 'Dos and Donts'



A page from the booklet created for the guides



Purna Agarwal



Prerna Agarwal

in the beginning. Instead, whenever I see someone go off the path, I ask them to stick to the path and inform them that if the flowers are trampled, they will not grow back,” says Sopaan Bhosale, a 40 years old guide who conducted 10 trips in 2014.

The High Value Low Impact Trail

In an attempt to regulate tourist movement in the main tourism zone, it was proposed to demarcate an informal (~5 feet wide) trail on an existing path. Visitors were encouraged to use this path by strategically placing signboards and having stationary guides who acted as guides as well as guards. Most plant species preferred by tourists could easily be seen along this trail. Hence, it was proposed as a ‘high value low impact trail’.

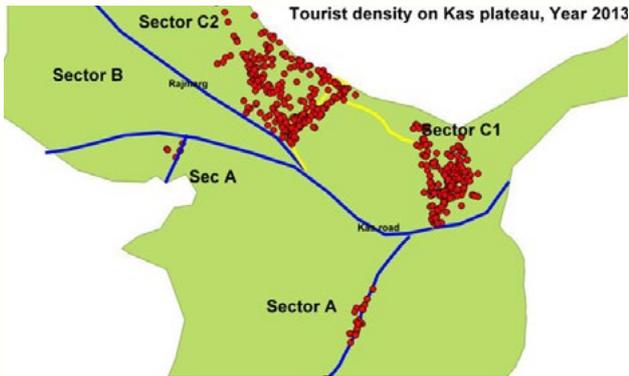
Open Interpretation Center

An open interpretation center was developed on an experimental basis by installing 24 boards, out of which six boards provided awareness messages using local deities, e.g.,

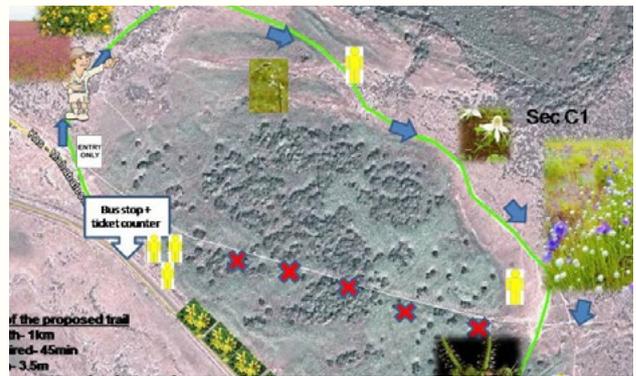
take the blessings of Kasai Devi by walking only on the path. Fourteen boards were information boards of different plant species, and four boards were of maps of the plateau showing different trails open to the visitors. All boards were in English as well as in Marathi. The earlier boards were either only in Marathi or entirely in English, thus limiting



Prerna Agarwal



Prerna Agarwal



Prerna Agarwal

The proposed high value low impact trail

their audience. The 24 boards were put up at strategic locations on the plateau.

After seven years, today, the management of Kas plateau has improved significantly, thanks to the sincere efforts taken by the Satara Forest Department and the JFMC members. However, newer challenges of visitor management continue to crop up.

In my experience from Kas plateau, I feel a diverse set of nature education tools have to be used rather than focusing on only one kind to connect with a range of stakeholders. Nature tourism is a double edged sword. Only by evolving with the changing times and through innovative, locally-relevant ideas can nature education serve as a powerful tool for nature conservation.

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Prerna Agarwal



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A Nature Education Program in Pakke, Arunachal Pradesh

Bringing Children Closer to Their Forests

Saniya Chaplod

A forest bustling with more than 4,000 species of wild plants and animals, and possibilities of finding many more undiscovered species in its interiors is surely worth admiring and cherishing! At least that is what one would imagine. But, if you are a Nyishi child residing around this place, this might be something you have grown up around and not realized the wonders and value of this amazingly rich treasure trove called the Pakke Tiger Reserve (PTR). Nestled in the easternmost state of India – Arunachal Pradesh, this living rainforest harbors many rare species of flora and fauna. This region is also home to the Nyishi tribe who inhabit several small towns, villages and settlements in the adjoining forests.



Saniya Chaplod

I came to this fascinating forest in 2016 to join the Eastern Himalaya Program of Nature Conservation Foundation (NCF). NCF has been actively engaging with local communities in this landscape for more than two decades, besides being involved in long-term research and conservation projects. As soon as I arrived here, the forest engulfed me, and what was to be a year-long stint of observing individual fruiting trees and documenting the interactions of various

fruit-eating species quickly transformed into a long term engagement. After this project, I became interested in engaging with nature education. In the past, our team had conducted nature education activities with students from local schools on various occasions. However, these had been sporadic and not planned systematically. One thing that stood out during our conversations with these students was that even though they lived near the protected area, most of them had never been to the tiger reserve. Thankfully, most of these students were eager and curious to visit and explore these forests.

The local children live in houses surrounded by forests and learn some of the ways of the forest, wild animals and plants from their elders. This knowledge is now typically more utility-based, unlike the older generation in the community who were also physically, emotionally, culturally and to an extent, spiritually connected to these forests. From our engagement with these children over the years, we realized that while they were more connected with nature and the animals found in their areas compared to their peers in urban India, there seemed to be a negative attitude towards some species. These species were often those that were hunted by the elders in the community or involved in frequent conflict with humans. Many children also frequently carried catapults to hunt birds.

We wanted to build a long-term, systematic engagement with children for nature. Thus, we began a formal Nature Education Program in 2017, that emphasizes long term engagement with not just the school children



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Saniya Chaplod

but also their teachers to facilitate a deeper emotional connection towards these forests and its creatures. It began with establishing nature clubs in schools and designating interested teachers as coordinators to ensure a long term framework for what was to follow.

The springboard component of the program are nature education camps. Students from classes 5-9 from seven local schools (both government and private) attend one-day and three-day nature camps inside the Tiger Reserve annually. Students attending the one-day camp in year one, would attend a three-day camp the following year. We conduct year-round activities in the park, villages and school campuses to ensure continued engagement. We also started by offering two orientation and training workshops for the teachers and field staff



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Saniya Chaplod

including Nyishi tribe members who work with us as hornbill nest protectors, and the frontline staff of the PTR, Arunachal Pradesh Forest Department.

These camps are based on three modules. Each module has a different set of connected activities that can be categorized broadly into cognitive (observational knowledge-based), ethical (value-based) and emotional. The cognitive module drives home the learning about important ecological processes such as energy flow and food chains, cycling of materials such as air, water and soil and adaptation and change. This is done through specially developed activities and games.

They also get to know about the different organisms in the forest, through close observations and by learning about their roles at the community-level, e.g., food



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Saniya Chaplod



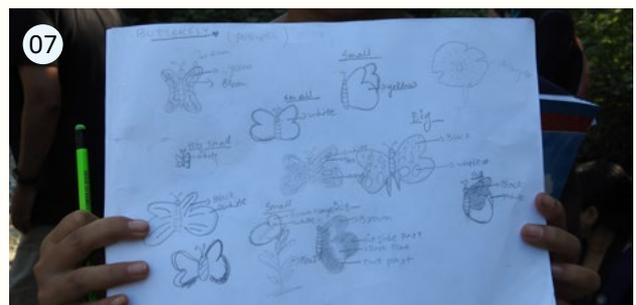
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Saniya Chaplod



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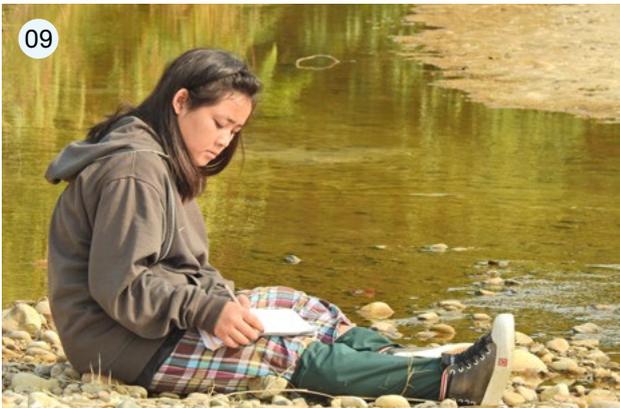
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Saniya Chaplod



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producers, pollinators, decomposers, seed dispersers and soil builders. The other sets of activities are designed to create an emotional connection and to develop positive feelings for all life forms including their own.



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For example, the tree hugging sessions often bring out a range of emotions amongst the students and teachers. We do this during every camp, but each time I hug a tree I feel a strong sense of belonging. I have seen many people (students and adults) get teary-eyed after this session and they also share their experiences with us. The primary aim of this education program is to evoke a sense of connectedness towards nature and not to just give them information/facts on various processes and species. It is based on the pedagogy of experiential education.

In the five years that I have been part of the program, we have seen considerable changes in children's attitudes from the first day of the camp to the third day. Besides the formal collection of pre and post feedback questionnaires, we also gather feedback through sharing sessions after each activity

in the form of drawings, notes, poems and verbal experience sharing.

Working with these students and their teachers has given me a lot of hope for the future. If we can build a community of such aware and interested teachers with a shared vision towards nature education, we can build a community of environmentally conscious young adults and students.

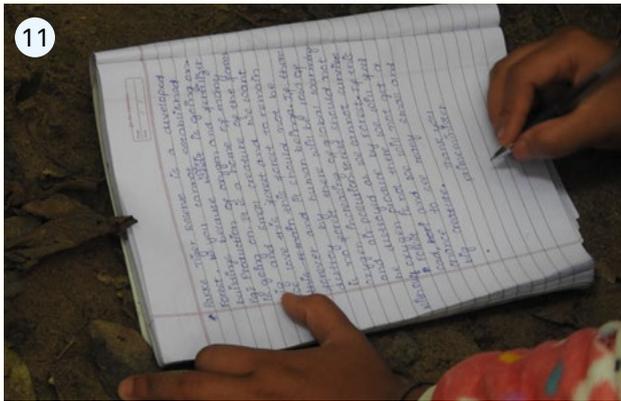
Wildlife conservation and hornbill conservation have become buzzwords in the villages around PTR. The continuous presence of several NGOs and the forest department, regular interactions with the communities and schools have ensured awareness about conservation in the region. But, awareness may not always translate into action.



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Besides, a whole range of threats continue outside PTR due to large-scale tree felling, stone crushing, and conversion of forest land to cash crops. Even though the program does not believe in transferring the burden of action to these young students, we aim to nurture positive connections with the natural world developed through these camps so that whatever they do in life later, comes from a place of concern, love and respect for nature. We are moving forward with the hope that more teachers and students excitedly meet the forest and its denizens and begin a journey of reconnecting with nature.

Note: The Nature Education Program modules were conceived by Dr. Pranav Trivedi, a nature educator with many years of experience in the field. He also conducted these modules for the initial years of the program.



Captions:

- 1 One of the trails inside Pakke Tiger Reserve (PTR), Arunachal Pradesh
- 2 Teacher training workshops for school teachers, forest department staff, NCF staff and a few local community members are conducted for them to reconnect with the natural world themselves before they take these experiences to their students.
- 3 Our camping site at one of the FD camps inside PTR. These camp sites are electrically fenced by the FD due to frequent elephant movement for the safety of field staff.
- 4 Students learn about photosynthesis by playing a game called 'kitchen of the forest'.
- 5 We stop to observe many smaller creatures to appreciate them and talk about their roles and interaction with other creatures.
- 6 One of the students' favorite activities is a walk through a dense trail with their eyes closed to reach this beautiful pukhri (Assamese for pond) inside the forest. This helps create an element of excitement and surprise and for them to experience the sounds of the forest as well.
- 7 Students make a note of their learnings and sightings in the forest through art and nature journaling which also helps them observe things more carefully.
- 8 A very simple yet powerful activity of hugging giant rainforest trees and being one with the forest.

- 9 A session called 'magic spot' at the end of each day where students are given some time in solitude to reflect upon their day and share their feelings and experiences later during a bonfire.
- 10 From being hesitant to sit on the ground on the first day of camp to climbing trees and taking a nap on the river bed by the third day.
- 11 During one of the activities, the students find a notice from the regional authority to convert some part of the forest into a developed housing society claiming that the said patch of forest is of no use and under-developed. The students then form groups and mark all the processes that are taking place in that forest patch, such as food production, decomposition, soil formation and air purification. Then they sit together to write a letter explaining the importance and complexity of processes taking place there and urging the authorities to reconsider the decision. One of the batches came up with this letter that was addressed to the Prime Minister.
- 12 A bunch of excited students during one of the camps in 2017 inside PTR.

Saniya Chaplod is a wildlife researcher, nature educator and wildlife artist working with the Eastern Himalaya Program of Nature Conservation Foundation. She coordinates the Nature Education Program with schools around Pakke Tiger Reserve, Arunachal Pradesh.

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Foundational Practices in Environmental Education

A Story Set in the Indian Scenario

Mythreyi K

The emergence of Environmental Education (EE) interventions in our country dates back to 1964, when the Kothari Commission called for bringing it into the formal stream of subjects taught in schools. Objectives mapped then, and still relevant to date, stressed on children being exposed to a combination of the natural and the social worlds. Learning about, through and for the environment using the methods of science became the crux of environmental education in India. However, unlike mathematics or science, developing a single syllabus in EE for the whole country did not make sense.

EE not only involves content based in the natural sciences but is also closely intertwined with the manner in which humans interact and develop a relationship with the natural world. This feature requires EE to be nuanced, contextual and place based to cater to the needs of each unique community and the natural world immediately around them. It needs to address the manner in which interactions between human communities and the natural world manifest.

Therefore, in a country like ours with its large diversity of people, cultures, landscapes, biodiversity and natural spaces, a single syllabus by the NCERT could never hope to cater to the needs of all. Hence, the government chose to create overarching curricular goals and handed over the responsibility of catering to specific needs of different communities and places to locally

based Non-Governmental Organizations. Let us look at the manner in which a few organizations in the country have worked through the decades in the area of Environmental Education.

Systemic Thinking in Environmental Education

In 1987, Uttarakhand Seva Nidhi Paryavaran Shiksha Sansthan (USNPSS) was appointed a nodal agency by the MHRD to implement locale based EE programs in schools in Uttarakhand. This organization has more than three decades of experience in the field. In 1988, they created a course in EE called 'Our Land Our Life' that focused on village land rehabilitation and sustainable management.



USNPSS

This course was locale specific and used the village and its surrounding areas as a laboratory for students to explore and learn. The approach to creating this course was based on 'systems thinking' rather than looking at EE as a single discipline. In any given subject, one conceives a linear causal relationship between two phenomena.

However, the trans-disciplinary nature of EE involves looking at the feedback loop and divergences caused by a single phenomena.

For example, trees cut in a neighbourhood not only have an immediate impact on its surroundings, but also cause a disturbance at various other levels including, for example, habitat loss for animals and soil degradation. In this course, developing quantitative skills and scientific temper was given focus along with elements that involved qualitative analysis as well. For example, children were encouraged to perform activities like measuring rainfall and firewood use, while also interacting with their elders about the manner in which life was in their times and how it had changed through time.



USNPSS

The content of the course was focused around addressing land degradation, as that is the major issue faced by the community. The idea was for children to learn skills and concepts to improve their own situation in the village. The pedagogy involved encouraging children to work on the activities given in the workbook in small teams, facilitated by teachers. This approach was different from the instructional method that teachers had been used to until then. It involved not only stepping back and allowing students to explore and construct knowledge on their own, but also grasping the philosophy behind systems thinking as opposed to looking at EE as science or social science in order to help students learn.

During 1988-1992, this course was tested in schools from classes 9-10. In the next decade it was implemented across a number of schools, reaching students through in-service teachers trained in its pedagogy. Workbooks were published in the local language. In 2002, it was introduced as a separate subject and formally included in the regular school curriculum by the Department of Education of the Government of Uttarakhand (GoU).

The initial team at USNPSS involved people from different backgrounds and not just educators. Their focus was on looking at the local environment and livelihoods of people, and consequently the manner in which an education program could be designed based on these. The issues that are usually perceived when people think about the environment are associated with conserving biodiversity, increasing tree cover, reducing pollution, global warming, and in recent times the overarching idea of climate change interweaving all of these problems.

“But, when these issues are examined from ground up, the livelihoods of people are affected,” says social worker and environmentalist Dr. Lalit Pande, founder of USNPSS, who was honoured with Padma Shri, in 2007, for his contributions to environmental education.

The organization began their work in EE by examining the needs of the community. This involved taking into consideration their livelihood, which consisted of agriculture and cattle rearing. The manner in which people here connected with the land around them for resources like soil, water, the ways in which biodiversity and the ecosystem had an impact on local practices, along with insights on how interactions between these elements panned out, were central to creating the EE course.

Dr. Pande says that, “While many development programs have a top-down approach to implementing their ideas, we worked with the core philosophy that people

have to learn to identify their own problems and learn to solve them. Here we challenged the local community to take agency of the issues they were facing and come up with their own solutions.”



USNPSS

USNPSS's EE program is not restricted to just the course and the workbooks. They also have a Balwadi program. They have identified and energized various local NGOs to undertake awareness raising activities combined with action oriented projects. USNPSS's approach is a long term, sustained effort that works with the core philosophy of creating a population that is knowledgeable, aware and concerned about their environment. They strive to ensure that the community have internalized the need to take action towards addressing environmental issues in a conscious and systematic manner.

Communicating the Nuances in Environmentalism and Conservation through Environmental Education

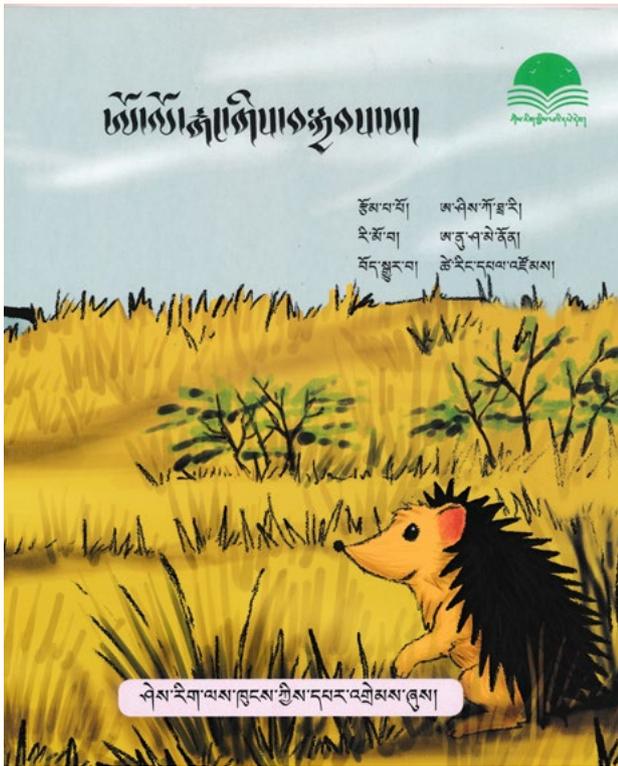
Kalpavriksh has been working on environmental awareness, campaigns, research and other areas in environment and development since 1979. Their team has also been involved in EE by creating awareness through slideshows, talks, nature walks, and conducting nature clubs in school and colleges. Kalpavriksh's foray into locale specific education began in the 1990s when they were invited to create locale specific EE programs by various organizations.

Backed by two decades of experiences in the field, they set out to create custom

made programs that took into consideration local stakeholders, biodiversity, along with development issues that the stakeholders faced. Initiatives at Andaman and Nicobar Islands, BRT Sanctuary, Ladakh, Bhimashankar Wildlife Sanctuary and Kutch unfolded in the following years. “The approach and methods used in each context was different,” says Sujatha Padmanabhan, who has been a member of the organization since 1983. Each local NGO and region have had their own specific needs and Kalpavriksh has worked to respond to these.

In the Andaman and Nicobar Islands, the key issue was the people's alienation from their surrounding biodiversity and environment. Many people who had lived all their lives on the islands had never taken a dip in the ocean or had the opportunity to witness its diverse coral reefs. Hence, Kalpavriksh, along with the Directorate of Education, decided to create an Environment Education textbook that drew its content from local biodiversity and involved experiential activities for children. The outcome of this program was 'Treasured Islands', an illustrated, activity based manual for teachers to be used as a guideline for implementing EE in the Andaman and Nicobar Islands.

Snow Leopard Conservancy-India Trust, requested a program from Kalpavriksh for the Ladakh region. The organization had done some EE work sporadically till then, and wanted to conduct more sustained programs with children from villages that faced conflict with snow leopards. “So with that program we thought here's an opportunity! Let us not look at just snow leopards. Let us look at Ladakh's wildlife, biodiversity and its people as a whole together and attempt to communicate the same. If we are going and interacting with children then let the focus not just be on one charismatic species,” says Sujatha. Snow Leopard Conservancy also wanted Kalpavriksh's involvement in training the local educators who would take this forward and later do monitoring and evaluation of the program as well.

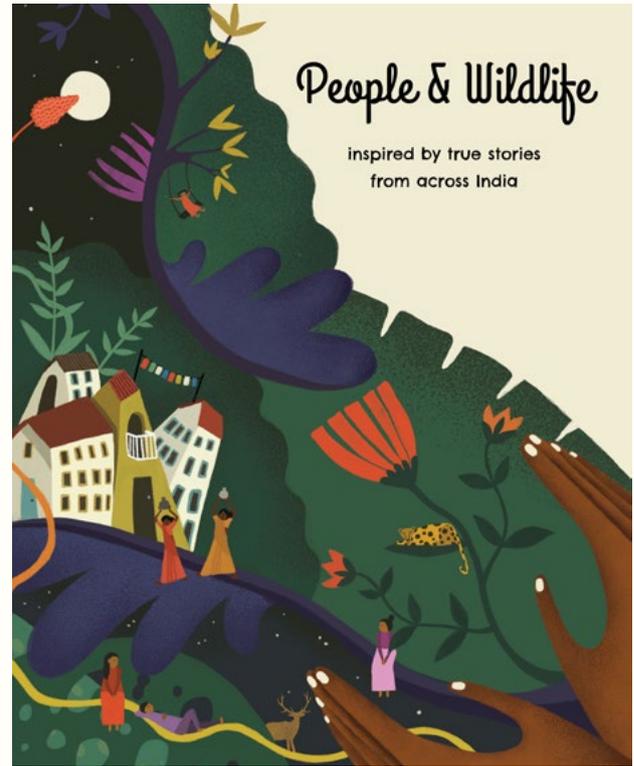


Kalpavriksh

Kalpavriksh co-created and produced learning materials. During the course of curating this program, Sujatha wrote Kalpavriksh's first nature based children's story book 'Ghost of the Mountains'. She had already written 'Chuskit Goes to School' for another NGO that worked on inclusive education in Ladakh. Kalpavriksh had also started publishing a series of nature-based stories for the 'Young World' supplement of the newspaper *The Hindu* and for other newspapers and magazines as well.

Kalpavriksh got a request by a network of local NGOs that specifically wanted them to create educational material based on the ecosystems of Kutch. The state government, along with local NGOs, had initiated a program of setting up learning centres across government schools to encourage foundational learning in primary schools. Hence, Kalpavriksh created tools like reading cards, storybooks and other learning material based on the ecosystems and wildlife of Kutch for these learning centres.

These stories were translated into Gujarati. One of these focused on encouraging children to learn about the ecosystems and another

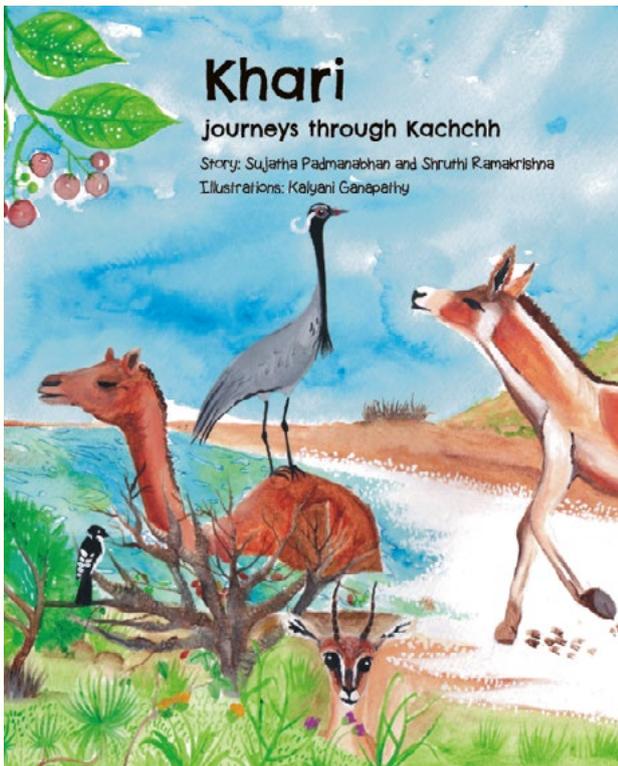


Kalpavriksh

to learn about wildlife in the region. These were systematically field tested in different schools, in Bhuj, in the areas immediately around Bhuj and in some places a little farther off, to understand how children and teachers from different areas responded to the content.

In 2017, Kalpavriksh got an offer from the TATA Trusts through their Parag initiative (which works towards inculcating and enhancing literacy across the country) to publish books based on nature and the environment for children. After much deliberation, Kalpavriksh took up this offer with the idea of reaching out to a wide audience. Backed with research and experience of about three decades in the field of environmentalism and development, Kalpavriksh realized that they had an opportunity to bring in certain nuances about environmental issues through their stories.

The book 'People and Wildlife' exemplifies this idea. It contains stories of community based conservation efforts across the country. The narratives contained in the book include conservation efforts that range across rural and urban landscapes.



Kalpavriksh

These emerge from traditional beliefs and practices and make efforts to include diverse approaches that encompass different regions and states. 'Pedro and the Big Boom' brings in issues related to mining in Goa. 'Saving The Dalai Lama's Cranes' is about issues with a proposed dam that would threaten the wintering habitat of black-necked cranes.

Kalpavriksh primarily publishes books in English. Many of their books have been translated into Tibetan, Hindi, Marathi, Kannada, Telugu, Gujarati and Nepali by regional publishers and local NGOs. The language and illustrations in Kalpavriksh's books are carefully curated to communicate the complexity of the environmental issues in such a way that children can visualize the manner in which it manifests, learn about it, and think and process the nuances in each scenario.

These books are also a window into the diverse ecological landscapes and cultures that are part of our country. Children in one part of the country can learn about happenings in other regions through these stories. Kalpavriksh hopes that making them aware at such a young age might lead

towards developing respect for diversity and aid in cultivating environmental resilience.

Inculcating Biocentrism through Environmental Education

Changes occurring in any field of study inform the manner in which educational practices pertaining to it pan out. For example, science curriculum is informed by changes occurring in the field of science and technology at the global scale. Similarly, EE has been informed by the changes in philosophy and approach to environmental science and conservation in the past couple of decades. The initial philosophy of EE was anthropocentric with the idea of people protecting the environment. People perceived the environment as 'the other' and themselves as not belonging to it.

In recent years there has been a shift in this thought process. The philosophy has changed from anthropocentrism to biocentrism, which encourages people to think of themselves as being part of the environment and the ecosystem and working towards addressing issues in a holistic manner. The Wild Shaale Program at Centre for Wildlife Studies has engaged with this philosophy in EE.

Centre for Wildlife Studies (CWS) has worked in the field of wildlife research, *in situ* conservation and related policy issues for the past 37 years in our country. Dr. Krithi Karanth who heads the organization has been part of studies on Human-Wildlife Conflict (HWC) in various parts of the country in the past couple of decades. Through her research, she has identified that children living in the areas where HWC exists are deeply affected by it. However, the focus of HWC mitigation measures are usually on addressing socio-economic impact and its effect on families as a whole. Its impact on children is generally not given much importance.

"The distress caused to children belonging to these families when they are pulled out of school to guard their crops, staying up all

night worrying about a family member who has gone to guard crops or schools being shut down due to the presence of an elephant in the vicinity, were never taken into account. No child should have to go through that...,” says Nitya Satheesh, Senior Program Manager at Wild Shaale, Karnataka. Wild Shaale is an EE initiative by CWS specifically designed to create awareness amongst children about HWC and equip them with coping mechanisms to deal with the same.

The children impacted by HWC have no factual information on wildlife they come into contact with on a daily basis. They do not understand why animals behave the way they do or the manner in which the actions of the community might cause animals to behave in certain ways. Hence, Wild Shaale was started in 2018 to create an EE program which was locale specific. Its approach is to help students understand that the animals causing conflict are not ‘the other’ and separate from their lives, and that, the community and the wildlife in the vicinity form the ecosystem together. Thus, Wild Shaale envisages a biocentric way of looking at human-nature interactions.

The Wild Shaale team goes to schools that are present in regions with HWC and conducts informal sessions with students. Through multiple sessions, they teach them about the ecology and behaviour of local wildlife, various elements of the environment, and how these interact with each other. The team also shares with the children basic dos and don’ts to follow when staying in close proximity to wildlife. “For example, if there is an elephant in the village, don’t step out of the house. The animals are wild and might retaliate if you attack them. Children need to stay safe. Their safety comes first. To do this they need to know what they are dealing with and understand the behaviour of these animals,” says Nitya.

The Wild Shaale EE program is based on experiential learning frameworks. The

pedagogy involves an interactive exchange of information, followed by activities that help children reflect on their learning. For example, they are taught that an elephant needs to consume about 150 kgs of food each day. Then they are given the prompt - how would you go about consuming that much amount of food each day? Where would you find it? Would it be available in one place or will you need to find it by other means? Such a prompt will encourage children to put themselves in the place of an elephant that might have come to their fields looking for food and analyse the situation from its point of view.

After learning about elephants’ dietary requirements, they are made to play a game in which all children become elephants. They then have to forage for food (which is limited) competing with their classmates who are other elephants. Such a session equips the children with information and allows them to reflect on their learnings from different perspectives. They also use art and storytelling to engage with children. The Wild Shaale team works towards building connections with children as well. They value the manner in which children respond to these activities and make close observations, which will then feed into monitoring and evaluation of the Wild Shaale interventions as a whole.

One of the biggest challenges Wild Shaale has faced is in coming up with culturally relevant tools for engaging with children. “What works in western countries will not work in India or cater to the rural Indian context and the HWC scenario present there,” says Nitya. While they draw their inspiration from western ideas, they are aware of what might and might not work for the communities they work with. They have worked over the years towards developing the program, piloting it and changing it as needed. Their efforts towards measuring the impact of their program focus on helping others set up similar programs across the country.

Teacher Engagements for Enhancing Environmental Education

Aripana Foundation is based out of Darbhanga, Bihar. Established in 2017, their first foray was into the creation of children's literature focused on including the mother tongue of children in their education. The team at Aripana Foundation quickly came to understand that the geography where they work in, that is the Mithila region of Bihar, needs to be accounted for while engaging with communities. "Seven rivers run across the plains of Mithila and the region is ravaged by floods every year. The culture and practices of its people are shaped by water," says Jamuna Inamdar, program director of the Education Initiatives at Aripana Foundation.

Hence, it was clear from the beginning that environmental concerns become a pervasive subject to be addressed across all the interventions that Aripana Foundation would take up and pursue. While wanting to take up EE, for a small and fledgling organization it appeared to be a daunting task due to its

scope. In 2019, they applied for the Wipro Sustainability Educators Program and took up the implementation of the Wipro earthian Program in government schools. The Wipro earthian program, with its structured approach to EE, well-developed content and pedagogy, calendarized sessions that are ready to go into the classrooms, and most importantly trialled and tested for almost a decade, created the perfect opportunity for Aripana Foundation to segue into EE.

"While implementing Wipro earthian does not require much more than a genuine interest and a sustained four month commitment by the teachers, there were other issues that cropped up" says Jamuna. The pandemic hit and any hope of implementing an experiential, activity-based module like Earthian diminished.

However, a teacher who did composting on her terrace decided to invite students to her own home and through 2-hour sessions spread over two and a half months completed the whole 'Waste and Sustainability' module



from earthian. “Later, when the schools re-opened, both students and teachers were overwhelmed with various issues. But, there was a teacher who said that she would set aside 2 hours each week to implement the Wipro earthian Program,” says Jamuna.

Encouraged by the manner in which teachers battled various problems in order to give the children an experience of a meaningful program such as Wipro earthian, Aripana Foundation decided to support and engage with teachers in order to equip them with necessary skills and devise ways of reducing their burden. They came up with the novel idea of making teachers conceive the modules of Wipro earthian as part of the existing curriculum rather than as a separate set of lessons.

This involved mapping the Wipro earthian modules to existing chapters in Science for 7th and 8th grades. For example, the chapter ‘*Gandhi jal ka niptan*’ (Wastewater Management) in 7th standard science textbook could be linked with water purification and waste related activities from Wipro earthian. Soon teachers were effortlessly combining modules from earthian with their Science classes. Teachers were also encouraged to reflect on the manner in which this combination enhanced the experience of learning for the children and themselves.

However, having had an output oriented training, many teachers looked at the idea of successfully executing the earthian program as having tangible ‘good or the right’ results. Aripana Foundation played a major role in building the attitude that ‘trying’ was key to learning amongst the teachers. Any process that emerged from attempting earthian was a successful result.

If an activity failed, then the teachers were encouraged to write about the manner in which it failed and reflect on how they could do it next time. They managed to incorporate scientific temper into the process of EE



Aripana Foundation

rather than it just being limited to a ‘skill’ for the students to acquire.

Aripana Foundation understood the needs of the teachers through these experiences and decided to start engaging with teacher capacity building for EE in a sustained manner. Their approach involved co-creation and co-learning of EE with the teachers. Using their contacts from the Wipro Sustainability Educators Network, they collaborated with Nature Classrooms to conduct workshops for teachers and their own team members in Nature Learning. They followed up on the ideas that emerged from this workshop and supported teachers with resources to implement their ideas.

“One of the key realizations that we had while engaging with teachers on the subject of Nature Learning was that most of the teachers come from rural backgrounds. They are still connected to their roots. Memories of interacting with nature are fresh in their minds. What better than to have teachers in EE than those who have had encounters with nature. What if we give teachers an opportunity to relive their own experiences, to recount how much nature has played a role in shaping them as individuals and then maybe further think about what we can do with these experiences as educators so that the children they teach don’t miss out on similar opportunities?” says Jamuna.

During one of the brainstorming sessions with the Nature Classrooms team on the manner in which they could manifest these

reflections into practice, they came up with the idea of taking teachers out on a nature picnic. This idea was a pioneering attempt at moving away from traditionally established 'teacher training programs'. Usually teacher training programs involve an expert who would deliver content and methods to an audience of teachers in a formal space. The nature picnic solely focused on providing the teachers an experience of interacting with nature for their own sake.

Teachers engaged in activities and reflections surrounding their own experiences, rather than look at it through an educational lens. The stress of having to take every learning to the classroom was taken away and attention was given to providing them a fulfilling nature based experience. "However, many teachers did not understand the underlying value of this process. They were perplexed that no particular knowledge was imparted and no teaching techniques were taught during the session," says Jamuna.

While the team at Aripana Foundation was initially taken aback and disheartened hearing this, they took it in stride and reflected on what might have occurred to give the teachers this impression. The team soon realized that their focus had been on the experience of being amidst nature and not any particular outcome or take away.

Teachers are used to being given methods and deliverables during training sessions all their lives. In this case, the journey itself had been the goal, the act of manifesting the nature picnic, collaborating with teachers, building connections with them and encouraging them to reflect on their nature experiences had been points of success.

Aripana Foundation's journey is a lesson in persistence and reflective learning through various experiences. They continue to work in taking EE to government schools, engaging with children and teachers. They

are looking at taking their learnings and starting a systematic engagement with local communities in the near future.

In Conclusion

While the approaches of these organizations perhaps may be easily summarized in a paragraph, their journey is filled with rich narratives. These journeys are tales of systematic, consistent hard work with pitfalls and challenges. These involve not just overcoming a plethora of challenges related to Environmental Education but also addressing the changing times. These organizations have also been alert to catering to the needs of the dynamic relationship between the communities and their environment while taking into account the environmental movement at a global scale.

You may reach out to the organizations

featured in the story at: sevanidhi.almora@gmail.com (USNPSS), kalpavriksh.info@gmail.com (Kalpavriksh), outreach@cwsindia.org (Centre for Wildlife Studies) and <https://www.aripanafoundation.org/contact-us/> (Aripana Foundation).

Mythreyi K is a budding educationist who seeks to immerse herself in understanding the multidisciplinary aspects of Environmental Education and attempts putting them into practice.

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Aripana Foundation



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