CHAMPIONS OF CHANGE

Essays on T N Khoshoo Memorial Awardees

REVIVING INDIA'S ECOSYSTEMS

www.tnk.atree.org

CHAMPIONS OF CHANGE

Essays on T N Khoshoo Memorial Awardees

www. tnk.atree.org

PUBLISHED BY
Ashoka Trust for Research in Ecology and the Environment (ATREE)
Royal Enclave, Sririamapura, Jakkur PO
Bengaluru 560064, Karnataka, India
www.atree.org
Tel: +91 80 23635555 | Fax: +91 80 23530070

First published 2017
Current edition 2024

First edition design and layout: Kena Design
Current edition cover design and layout: Teerath Rawat

First edition authors:
A. Siddharth and D. Biswas

Current edition:
Maithreyi M.R.

Ashoka Trust for Research in Ecology and the Environment

T N Khoshoo Memorial Award and Lecture

FOREWORD

We often feel there is not much to celebrate about the state of the environment. But there is. Were it not for the commitment of dedicated individuals and communities to resolving environmental problems, our environmental crisis would undoubtedly be worse than it is. This book celebrates the work of some of the inspiring individuals, organisations or communities, whose contributions to protecting the the environment have been extraordinarily rich and diverse. First among such individuals is of course Dr. T.N. Khoshoo, an eminent, internationally recognised world-class botanist. A graduate of Punjab University Botany Department, my own alma mater, Dr. Khoshoo's contributions to the environment were enormous. Dr. Khoshoo started his career as an evolutionary botanist, but by the end of his career, as a Secretary of the Environment and Forests, Government of India, he had become the country's chief policymaker for the environment. As Raj Khoshoo, his son, recounts, Dr. T.N. Khoshoo showed that the only limit to our imagination and creativity is the one placed by us, not necessarily by our earlier training and experiences.

The family and friends of Dr. T.N. Khoshoo set up the T.N. Khoshoo Endowment Fund at ATREE to honour and celebrate the memory of one of our country's most brilliant botanists, who later became our principal spokesman for sustainability.

Every year the Fund honours an individual by inviting him or her to deliver the T.N. Khoshoo Memorial Lecture or lead a panel discussion. Every year, the Fund also allows us to recognise the work of an individual, orgnisation or a community as worthy of the T.N. Khoshoo Memorial Award in Conservation and Sustainability.

Over the last years, the Khoshoo Endowment Fund has recognised individuals and organisations doing extraordinary work as recipients of the Khoshoo Award. The individuals profiled in this book come from a diverse range of fields, from biodiversity to water to ecological restoration. Their work integrates biodiversity conservation with the arts; energy access with livelihood security; history and politics with environmental concerns. Their diversity of approaches reflect the breadth of vision that Dr. T.N. Khoshoo showed in his own work. India is home to many individuals whose work in protecting our environment is path-breaking and exemplary. However, our environmental heroes often remain unsung. This volume explores the work of a few exceptional people, including key facilitators of an organisational or community work, the Khoshoo Endowment Fund has honoured. All of us at ATREE hope that the stories told here will inspire many to enter and excel in the environmental arena. And we all look forward to telling and hearing many more such stories in the years to come.

Kamal Bawa
President, ATREE and
Distinguished Professor
University of Massachusetts, Boston
November, 2022

ACKNOWLEDGEMENTS

This book would not have been possible without the involvement and support of many people. We want to take this opportunity to thank everybody involved in bring this book to life.

The idea for this book came from Rajiv Khoshoo, who wanted to honor the legacy of his father, Dr. Triloki Nath Khoshoo and his contributions to environment and conservation. The idea to compile the stories and vignettes about the research life of the past winners into a book would not have been possible without that first spark of an idea. The encouragement from Rajiv Khoshoo, Professor Kamal Bawa and Dr Kartik Shankar was invaluable in bringing this year-long process to a successful end.

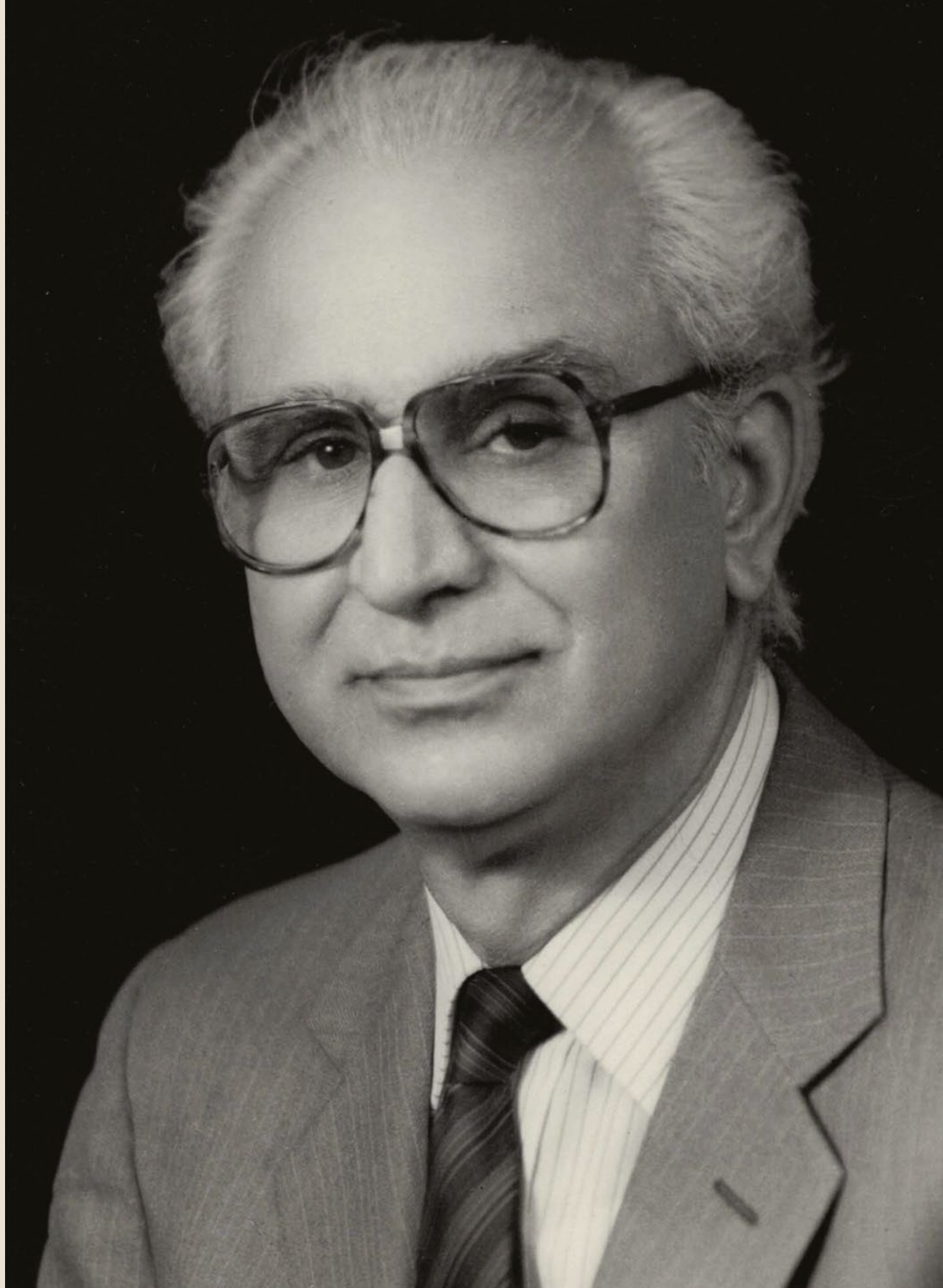
We record our thanks to all the past awardees who took time out of their busy schedule to reply to our many emails and phone calls. This book would not have been possible without their enthusiasm for this project. We want to thank them all for their involvement in the book. They generously shared their stories and pictures which allowed us to peek into their many academic adventures.

We would like to thank Geetha K Wilson, Kumkum Nadig (Kenadesign), Prachi Prabhu (Kenadesign), Smitha Shivaswamy (Ideasutra), and George (Ideasutra) for creating the illustrations and design layout for the book and we would like to also thank Payal Pruthi, Aditya Harikrishnan and Smrity Ramavarapu for giving their inputs on the design and layout of the book. Our gratitude to Neeta Deshpande and Cecilia Scott for copy editing the chapters.

Finally, support for this book came from ATREE.

Remembering Dr T N Khoshoo,
my father

Rajiv Khoshoo



Facing page:
Dr. Khoshoo at a Botanical Garden.

My earliest memory of my father is when he worked as a junior lecturer at Punjab University. It was the early 1950s. I remember my mother arguing with him about the money he spent on postage to receive research publications from abroad. India was a young republic, and staying abreast with research around the world was a difficult task. Years later, when I recalled this memory, he said, “Son, you need to spend twenty percent of your time and money in pursuit of excellence, not money. Money will come by itself.”

My father was popular with his students but had a challenging time with the senior faculty. He did not believe in ‘playing the research game’ that meant crediting senior faculty who had not contributed to his research. As a result, he had to wait for eleven long years before he was allowed to publish his doctoral thesis. His examiners were two giants in the world of plant genetics – Professor G. L. Stebbins, Department of Genetics, University of California and Professor C. D. Darlington FRS, Department of Botany, University of Oxford. They acknowledged the remarkable work my father had accomplished.

“I find it to be a most excellent piece of work - truly exceptional in originality, initiative, and thoroughness of execution and, with a few minor exceptions, entirely accurate. Any university in the States, as well as in India, should consider itself proud to have a student capable of executing such a thesis.” Professor Stebbins

“The candidate’s interpretation shows a thorough grasp of the relevant literature and a reasonable amount of speculation.” Professor C D Darlington FRS, University of Oxford

Their comments saw the fruition of eleven years of hard work.

> "Dr. Khoshoo is one of the best products of this laboratory in recent years. He is a capable young man who can now be trusted with high-level investigation."
> Professor P N Mehra, Punjab University

Many years down, when I asked my father about this challenging phase in his life, he said, "Son, three-quarters of your life is wasted on what others think of you. If you focus on yourself and what you think is right, therein lies the path to success."

My father began his career at Panjab University in Amritsar on a note of hope for the country, a hope he held on to throughout his life. I remember when we moved into the university, we were the only tenants in the huge residence of the Indian MP from Punjab, Gyani Gurmukh Singh Musafir. As a child growing up in a newly independent India, I observed the mutual respect shared by my father, a hardworking young researcher, and Gyaniji, a learned Sikh and prominent national figure. We experienced national politics right in our home as Gyaniji became the chief minister of Punjab.

When the university moved from Amritsar to Chandigarh, we shifted our base. Soon after, my father was offered a new assignment as the head of the newly formed botany department at the Jammu and Kashmir University in Srinagar. We were now back in our ancestral home, living in a joint family. At least thirty people ate together every day, including cousins, uncles, friends, colleagues, family priests and two families of domestic helpers. It was an extraordinary time to grow up and be part of a large family. My father enrolled us in a school where outdoor activities were valued, so we could enjoy rock climbing, hiking and swimming in the pristine Dal Lake. However, my father's experience in his new job was quite the opposite, for he disliked administrative work, which took him away from his research. He moved to the National Botanic Gardens in Lucknow as an assistant director, a temporary position with no guarantee of permanent employment but one which gave him great satisfaction.

Dr. T N Khoshoo as a young researcher.

We watched Dr Khoshoo take on many challenges and finally win recognition as the institution director, which he then transformed into the National Botanical Research Institute (NBRI) under the Council of Scientific and Industrial Research (CSIR). In the years he spent at the NBRI, my father made it a point to interact with people from all walks of life – from the many gardeners to important visitors – with the same interest, intensity and care. It was at NBRI that he did his pioneering work in transforming arid land into a thriving biosphere. Dr Khoshoo caught the attention of eminent scientists in India like Dr M. G. K. Menon and Dr Swaminathan, who were at the forefront of the green revolution. While forestry was in the family DNA, it is here that the concept of sustainable development evolved in his mind.

My father belonged to a large family of Kashmiri Pundits that boasted of influential ancestors dating back to the seventeenth century. One of them served as a mint officer during the rule of Mughal Emperor Shah Jahan (1628–1658) when Ali Mardan Khan was the governor of Kashmir. Ali Mardan Khan honoured him with a royal decree for his honesty and sincerity. Since he was able to do everything efficiently with his left hand, the ancestor was nicknamed Khoshoo, which means 'left-handed' in the Kashmiri language. Khoshoo became the family surname after they migrated from Sopore to settle down in Ali Kadal, a suburb of Srinagar.

Another noted ancestor was Rishipeer, the son of Pundit Govind Joo Khoshoo of Ali Kadal, who became a saint of very high spiritual order during the rule of Aurangzeb (1658–1707). Aurangzeb, a staunch Muslim, gave him the title Peer Pundit Padshah (peer means a Muslim ascetic, pundit a learned Hindu and padshah a king). This was a unique recognition of religious integration at a time of tremendous religious strife in Kashmir.

My father always reminded us of our rich heritage. He and his siblings had been brought up to believe that one must always strive to do one's best. It was evident in the successful career paths they carved for themselves. Two of my father's elder brothers were the chief conservators in the Jammu and Kashmir forest service, and another brother was a nationally recognised physician for his contribution to controlling leprosy.

At a very young age, I was introduced to Aldous Huxley, Rabindranath Tagore, and Swami Vivekananda. Peering through a microscope was a regular feature of my childhood; my father taught me about chromosomes and genetics. The most moving memory of those years is when I saw my father's eyes moisten while reading one of Tagore's poems, "Where the mind is without fear", which ends with "Into that heaven of freedom, my father, let my country awake." That book of poems still remains at my bedside today.

One day, my father came home and announced that Prime Minister Indira Gandhi had called him to Delhi. During their meeting, Smt. Gandhi said she would like to see him start the Department of Environment. Though this

Dr. T N Khoshoo with Indira Gandhi.

was an unexpected development for him, my father saw in it the seed of another adventure. He had been greatly influenced by the integrity of William Ruckelshaus — the first head of the US Environmental Protection Agency (EPA) — and put forth the condition that the new department should not be responsible for any licensing. Instead, it should focus on policy and research. In doing so, he wanted to remove the potential for corrupt practices related to industrial licensing.

Dr Khoshoo's tenure made a lasting contribution to the Indian government's policies on environment, wildlife, and forests. In 1992, he was awarded the Padma Bhushan for his work — a proud moment of his life. In 1996, he was honoured with the United Nations Environment Programme's (UNEP) $200,000 Sasakawa Prize for his pre-emptive strategies based on sound scientific analyses that resulted in policies to help insulate the country from further environmental damage. After the princess of Thailand awarded him the prize on behalf of the United Nations, I reminded him of the life lesson he had

Dr. T N Khoshoo receieving the Padma Bhushan.

Facing page:
Dr T N Khoshoo being awarded the Sasakawa Prize.

imparted to me when I was a teenager, that money for everyday life "would come by itself". By this time, I was addressing him, like everyone else, as Doctor Shahib. I said, "Tonight you made more money than you had earned in your entire life." The statement was more for impact, not comparison. He smiled in understanding.

After this stint in a government institution, Doctor Sahib worked as a CSIR distinguished scientist on the environment, ethics and sustainable development. In his presidential address to the Indian Science Congress in 1986, he quoted the Isha Upanishad: "The whole universe, together with its creatures, belongs to nature. Implicit in this thought is the understanding that no creature is superior to any other and that no human being should have absolute power over nature. One can enjoy the bounties of nature by giving up greed." Doctor Sahib had begun to draw on timeless wisdom to address contemporary issues about sustainable development. Sidarth (Sid), his grandson, received a 220-page signed copy of his address to the Indian Science Congress, with pages containing the words 'acid rain' highlighted, as Sid was doing a project on

the topic in sixth grade. Such was my father's attention to detail. His only advice to the grandchildren Sid, Tushar and Amrita was to "focus their lives on excellence".

After a few years as an International Fellow of the World Resource Institute and as a recipient of the Jawaharlal Nehru fellowship, he was provided facilities and staff by The Energy and Resources Institute (TERI), which enabled him to pursue his writing on the relationship between the environment, development and ethics. The essence of his thoughts reflects in his writings, as quoted below:

"The enemy of our environment is within each one of us, because we want more and more at the expense of nature and consume more than our share of materials. Furthermore, ecological security is equally, if not more, important than economic security."

From the book 'Mahatma Gandhi, An Apostle of Applied Human Ecology' written by Dr TN Khoshoo.

"The concept and scope of ecology is ever widening and becoming all-encompassing. The ecological crises facing the world are basically an outward expression of the inner crisis in the mind and spirit of the human race."

'Dharma of Ecology' written by Dr TN Khoshoo, Current Science, November 10, 1999

"What distinguishes humans from all other life is ethics, morality, and spirituality. This is because it is a thinking species. A society is an extension of individuals; if individuals are greened, then in course of time, the society as a whole will follow suit."

'Human Race at the Crossroads' written by Dr TN Khoshoo, Current Science, November 25, 2000

My father was in poor health during the last few years of his life before he passed away in 2002. I visited him every few months of those final years. We talked about diverse topics at length and I could see he had come full circle from being born into a pundit family to becoming one. A pundit, by definition, does not desire money while performing his duties, and, more importantly, he goes back to ancient wisdom as a guide to salvation. In fact, in his last conversation with me, he expressed his desire to come back as a Sanskrit scholar.

The Khoshoo family is indebted to Dr Kamal Bawa, one of Dr Khoshoo's distinguished students and Chairman of the Ashoka Trust for Research in Ecology and the Environment (ATREE), for his unabated support to the Khoshoo Endowment Fund over the years. Dr Khoshoo was one of the original trustees of ATREE and admired Kamal Bawa because he saw in him the same passion, motivation and wisdom that drove him during his lifetime. Our gratitude and thanks to Dr Gladwyn Joseph, Dr Balachandra, Dr Kartik Shankar, Dr Sharadchandra Lele, Nitin Pandit, Vamsidhar Pothula and Anita Arjundas for their contributions over the past decade to keep Dr Khoshoo's spirit alive. Finally, we would like to thank the original authors, Dr Biswas and Ananda Siddhartha and the current ATREE Communications team, Jaya Peter, Teerath Rawat and Namratha Murali, for this edition of the book elaborating on all the keynote speakers in addition to recognising the Khoshoo awardees for their contributions to research, policy and action.

DR. RAMAN SUKUMAR

TN Khoshoo Memorial Award for his work on the conservation of Asian elephants

2004

After he enrolled for his PhD in the early 1980s, Raman Sukumar discussed possible topics for his doctoral research with his mentor, Professor Madhav Gadgil. Later Sukumar spent some time pouring over the hot topics of the moment, which included the sexual selection in peacocks and the social organisation in babblers, Professor Gadgil casually mentioned one day that no one had studied the conflicts between elephants and people. That suggestion was the turning point in Sukumar's life. "Without this suggestion, I doubt I would have ever entered the world of the elephant," Sukumar says.

Sukumar grew up in Adyar in Chennai. In his early teens, his dream was to become a pilot. He was intrigued by space. The landing on the moon couldn't have come at a better time. He was fourteen when this happened. However, two years later, his interests suddenly switched to nature and the environment. He had decided at that point that the usual career path towards becoming a doctor, engineer, or civil servant was not for him. He decided to pursue science instead, focusing on botany.

This switch came about partly because he enjoyed reading books, especially those that reflected on the environmental crisis. The area he grew up in also had a role to play. Adyar was a delightful place for naturalists. There was the Guindy forest, the Adyar estuary, and the beaches, each a unique environment that hosted many interesting species. The tree cover on the Theosophical Society campus spread beyond its boundaries. "It was a nature's paradise for a city dweller!" Sukumar proudly points out that many of today's naturalists trace their roots to Adyar.

Sukumar's family is from southern Tamil Nadu, from an area very close to what is now the Kalakad Mundanthurai Tiger Reserve. His grandparents lived there, and Sukumar visited them often. These visits were spent wandering in the forest and also bathing in the Manimuthar falls whenever he felt like it. In his early years, the visits to his grandparents' house was the only time Sukumar spent extended periods of time in forests.

STUDYING THE INDIAN ELEPHANT

After finishing his bachelors and masters in science from the University of Madras, Sukumar enrolled for his PhD at the Indian Institute of Science in Bengaluru. Professor Gadgil's suggestion to study elephants had struck a chord with him, as he had been fascinated by elephants as a child. He recounts, "I loved elephants so much that, years ago, when I was a host at a local radio station, the first song I played was my favourite, `Baby Elephant Walk' from the movie *Hatari.* This fascination unconsciously played a role in my choosing the elephant. I was keen to do research on a large mammal." He quickly adds with a caveat, "Honestly, at that time, I don't think I understood the dimensions of this interaction, for obvious reasons. To me, the word 'elephant' was exciting."

There was very little literature available on elephants at the time, but he was confident that he could pursue his chosen field of study. He had read the few books there were on the species, including Iain Douglas-Hamilton's *Among the Elephants* and M. Krishnan's natural history notes on elephants.

Once Sukumar chose the topic, his interest in geography and exploration took him to the Biligiriranga (BR) Hills, where his PhD work was based. His field work proved very valuable in helping him understand the dimensions of the conflict. He spent plenty of time observing elephants — especially males — ravaging agricultural crops and recording the poaching of bulls for their

precious tusks. This helped him develop a basic understanding of the animal's ecology and its interactions with people. Early on, he discovered that habitat fragmentation increased the chances of elephants accessing cultivated fields. Crops that the elephants found tasty and nutritious brought them from the forests into the fields. The ensuing conflict had complex dimensions that had to be resolved if humans and elephants were to coexist.

Sukumar also realised that a long-ranging animal such as the elephant could not be confined to any single protected area, but could only be protected by managing it across landscapes. This landscape-level approach to conservation, specifically concerning the Nilgiri-Mysore-Wayanad landscape, is one that he has championed for many years.

His early work showed that the landscape he studied, beginning with the Brahmagiris right through to Mudumalai, Nagarhole, and Bandipur and then up the BR Hills and the Cauvery Wildlife Sanctuary, is interconnected through a series of corridors. The focus of working in this landscape helped raise its profile at the time. This led to better protection over the years, along with a number of key corridors being established.

The work he put into this landscape also ensured protection for several other species, including another flagship species, the tiger. Before his work, tiger conservation was focused on individual protected areas and was not carried out at the landscape level. This meant that the movement of tigers between the different protected areas did not receive much attention. Now, thanks to the importance given to this landscape, species numbers have rebounded. Since the 1980s, tiger populations have increased three- or four-fold in this area, which boasts the largest tiger population not just in India, but in the entire world. This is in addition to a whole host of other species, including the Gaur (Indian bison), the Dhole (Indian wild dog), and many other charismatic large mammals. Championing this landscape and witnessing the result of his efforts gives him a great sense of achievement.

His work with elephants has led to many surprising discoveries. He says with an air of amazement, "Their cognitive capabilities are just astounding. They

Long-ranging animals such as the elephant cannot be confined to any single protected area, hence the need for landscape-level management.

© Kalyan Varma

are capable of such great levels of complexity of behaviour in any given situation that they come across. They can often anticipate the next move of a human and act accordingly. This is especially true when they come out of the forest to raid crops. They outmanoeuvre humans with ease."

One of his many interesting experiences with elephants was when someone told him that there was an elephant on top of a building. He did not believe it, but when he was shown a photo, he was amazed. The residents had been drying tamarind on the terrace of their house, and, in the meantime, a young elephant had casually climbed up the staircase on the side of the building and was happily feasting on it.

There are some common beliefs about elephants that Sukumar is dismissive of. Most people speak of how bulky elephants are. However, digging a trench to keep them in or out, depending on the circumstance, does not always work. He insists, "I can show you photos of elephants getting into and clambering out of trenches. People think that only elephants trained in circuses can achieve such a feat, but this is not the case."

WORK ON ELEPHANT CORRIDORS

In 1989, Sukumar was invited by the Indian government to serve on a task force to plan for Project Elephant — the country's second major flagship conservation programme. He not only gladly agreed but also used the knowledge accumulated from his field work in the previous decade to define elephant reserves and landscapes in southern India. The action plan for Project Elephant provided a balanced framework for conserving elephants across landscapes, mitigating conflicts, and protecting the species from poachers.

This opportunity with the government did not reap immediate dividends for one of Sukumar's pet projects — securing corridors in the Nilgiri-Mysore-Wyanad landscape. It took an entire decade before change occurred on the ground. Working through two conservation NGOs he has been closely associated with, the Asian Nature Conservation Foundation and the Wildlife Trust of India, he took up the slow and challenging task of strengthening the most critical corridors. The first corridor tackled was in Bandipur National Park in Karnataka, where a very narrow passage was eventually widened in 2002 by the government with funding from Project Elephant. This was possibly the first successful strengthening of an elephant corridor in the country.

The next corridor that was addressed was in a different part of the state; in this case, a 25-acre parcel of uncultivated land in Kollegal division was purchased through privately-raised funding and handed over to the government. Attention was then turned to a more complex situation in the Brahmagiri range in the state of Kerala. A number of small settlements within a narrow strip of forest connecting two protected areas were being badly affected by depredation of cultivated crops by elephants. Many of the local farmers were more than willing to give up their land for an alternative location that was safe from elephant incursions.

Any human displacement has to be approached in a socially sensitive manner; they were thus offered two alternatives – either the farmers' land would be purchased at market prices or the farmers would be resettled outside the corridor at a place of their choice and in a house designed and approved by them. This approach proved to be a resounding success. While some opted to sell their land, others took the second option. Since then, experiments with other alternatives such as community management of land to allow the passage of elephants in northeastern India have been conducted.

Over the years, ten key corridors have been established across the country, which has demonstrated that environmental change can also be socially responsible. This achievement has given Sukumar a great degree of satisfaction.

Outside India, he has worked with the International Union for Conservation of Nature (IUCN) and the Asian Elephant Specialist Group. The latter developed a detailed framework for elephant conservation in several countries in Southeast Asia, including Burma, Cambodia and Vietnam.

A MIXED BAG

Working in the field of elephant conservation has been a mixed bag for Sukumar. Often, things didn't happen at the pace he had expected. Ideas and plans didn't always translate into immediate action. It often took ten to twenty years for them to percolate down to the ground and for things to begin to happen. Furthermore, success often came too late, because new challenges emerged in the interim.

The ecologist narrates the example of elephants from Jharkhand moving to southern Bengal. What started off with 50 elephants has today risen to a shift of over 200 elephants, many of which have now settled in this new territory. In 2015 alone, 71 people were killed by wild elephants. Now the situation is out of control. Measures suggested when this problem initially cropped up could have prevented the dire situation today.

"This example demonstrates the fact that we still have not come to grips with elephant conflicts across the country. This is partly due to the lack of a policy level approach to mitigating conflict." In addition, there are many

complexities on the ground in which different issues are entangled: the need for animal welfare, animal rights, legal matters, and other challenges in the field, such as how to outwit elephants and manage abundant populations. Furthermore, unexpected climatic factors have forced elephants to leave forests in search of food and water. These various factors add up to a very complex situation.

However, Sukumar has taken these difficulties in his stride. Being an optimist, he believes that conservation as a field has attained a certain level of maturity. “While the elephant is safe in the south, the same cannot necessarily be said in the north of the country,” he says.

IN OTHER FIELDS

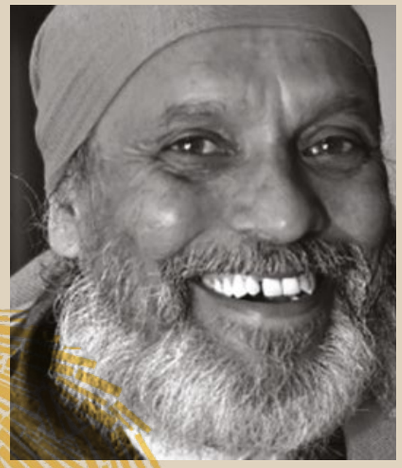
Studying the elephant has also led him to delve into other areas of research, such as tropical forest dynamics and climate change. The impact of climate variability on elephants is of special concern to him. He is worried about the potential for an escalation in conflicts. “Elephants come out of forests in much larger numbers during periods of drought. They do have a certain degree of tolerance, since they are even found in near desert-like conditions in Africa, but in this case, we need to remember that these traits have evolved over very long periods of time. One needs to be wary of the fact that we are still not entirely sure about what kind of effect higher temperatures will have on forests and the kind of stresses that will emerge as a result, he cautions.

In this context, an initiative that Sukumar has been pushing for, known as the Long Term Ecological Observatories, has finally come to fruition. Prakash Javadekar, the former Minister of State for Environment, Forest, and Climate Change, announced at the COP21 conference in Paris in November-December 2015 that these observatories will monitor the effects of global warming on eco-sensitive and biodiverse regions throughout the country. Having floated the idea in 2009, Sukumar is thrilled that the project is finally going to be launched later this year. Apart from authoring the report, he has also been named as the national coordinator of the programme. This is especially important since reliable long-term data on the effects of climate change on

> “It is a fact that we still have not come to grips with elephant conflicts across the country. This is partly due to the lack of a policy level approach to mitigating conflict.”

forests does not exist. He started the first observatory in the country when he set up a 50 hectare plot in Mudumalai in 1988. Data collected since then has provided valuable insights into the changes in these forests.

All said and done, what Sukumar finds most exhilarating and satisfying above all is to be in the field, quietly observing an elephant herd at a water hole, as its members, young and old, go about their daily business of feeding, drinking, bathing, socialising, and communicating. Writing books has also provided him with a great sense of joy. Five books are credited to his name, and he hopes there will be many more to come.



ANIL P JOSHI

TN Khoshoo Memorial Award for his contribution to the conservation of Himalayan biodiversity

2005

Long before the liberalisation of the Indian economy, Anil P Joshi could see the ominous signs of an ever expanding divide between the rural and urban areas. Early on in his life, he chose to focus all his energies on trying to ensure that people in the rural areas were made self-reliant and did not get a raw deal.

Anil grew up in a lower middle class family in Kotdwara, then a small village in the state of Uttar Pradesh, now in Uttarakhand. With seven children to take care of, Anil's father worked a number of different jobs, from farm labourer to tailor, to provide for the family. Initially an average student, Anil matured during his bachelors programme. After obtaining his MSc and PhD in environmental science, he joined the Kotdwara Post Graduate College, where he taught botany.

This period was a troubling one for Anil because of his realisations about his own situation and those of others around him. Two major concerns affected him during this period. First, coming from a rural background, the quality of education he had received was quite mediocre. This was in part due to his father's meagre earnings. Second, the unequal relationship between producers and consumers disturbed him. People living in rural areas were primarily producers, while those in the urban areas were consumers. He believed that the inequality stemmed from the fact that the urban dwellers possessed scientific knowledge that they did not share with their rural counterparts, while also being more powerful both economically and socially. If rural areas had access to the knowledge available exclusively in urban centres, it would ensure better productivity and profits for villagers.

Plantation at Majhada Village

Anil thought about these two issues deeply, which finally led him to initiate a process with his MSc and PhD students. "We started out by visiting villages and training people there on how to get a better return from their resources, as well as educating them about technology that may be of use to them", he recounts. "Over time, we even helped them develop their own technology. These technologies applied not only to farming but also to a variety of other uses," he explains. For example, technology and processes to harvest and productively use lantana, an invasive weed, were developed. After being treated, lantana sticks were used to make furniture, and the leaves and flowers were used to make incense sticks. By bringing technology and scientific knowledge to the villages in Uttarakhand, the organisation was able to help them become more self-reliant.

Resource eduction for future generation

AN ORGANISATION IS BORN

These initiatives slowly picked up steam, and, in 1979, Anil and his team decided to formally name their group the Himalayan Environmental Studies and Conservation Organisation (HESCO). He proudly states, “We are one of the oldest organisations working on social change; we were there even before the culture of NGOs prevailed. This organisation was formed with my students and teachers, and the villagers were my driving force.”

When HESCO was formed, Anil made a conscious effort to register it as a society and not an NGO, because of his belief that NGOs go against Gandhi’s concept of social work. Although he started reading Gandhi quite late, Anil and others at HESCO have been guided and deeply influenced by the teachings of Gandhi and Vivekananda. A central belief within the organisation is that in order to help common people, one should live among them and understand how they live.

> “As an organisation, we could reach a couple hundred villages, but our aim was to reach thousands of people all over the country. Working with the government was a logical step.”

Top: During cycle yatra, discussion with farmers

Right: Gaon Bachao Yatra: Campaign to save village

Some of HESCO's other initiatives include the up-gradation of a water mill for power generation and groundwater recharge and rainwater harvesting systems, the latter of which has been adopted by the forest department to combat forest fires. The organisation has also started encouraging the reintroduction of traditional methods of farming, which are not as harmful to the soil as conventional methods. Planting forest and fruit tree species together, which has the twin benefits of contributing to the ecosystem and supporting the local economy, has also been encouraged.

Anil believes that these kinds of farming systems that contribute to both the environment and the economy need to become more widespread. In his work on creating linkages, he also inspired local shrines to promote offerings of crops that would benefit the local economy. This practice has been adopted in the shrines at Badrinath, Kedarnath, and Yamnotri, as well as the Vaishno Devi shrine in Jammu and Kashmir, which provides 4-5 million rupees in employment annually. This is done by employing rural women in the surrounding areas, who make *prasad* (religious offering of food) from corn grown around the shrine.

ENGAGING WITH THE BUREAUCRACY

Before many of these initiatives were put into practice, Anil and his team realised that only a few people were making use of the technologies that they had developed. "This is when we began to work with the government, because it had a much wider reach," he says. "As an organisation, we could reach a couple hundred villages, but our aim was to reach thousands of people all over the country. Working with the government was a logical step." This collaboration with the government has not stopped the organisation from opposing some of its policies, which were ignoring rural areas in Uttarakhand and across India. In an effort to spread awareness about crucial issues in rural areas, they organised many cycle yatras that crisscrossed the Indian subcontinent, one of which was from Kanyakumari in the south to Kashmir in the north.

"The aim of these yatras was to highlight the growing disparity, economic and otherwise, between rural and urban India," Anil explains. The second important issue the organisation began to raise was related to GDP, which seemed to be the only way of measuring growth. "If you look critically at this issue, you realise that the GDP is an indicator of the economic status of only a handful of people who are in the cities, since they contribute disproportionately to the GDP," he says scornfully. His contempt for the use of GDP as a measure of growth is based on the fact that its cost to the ecology and the environment in rural areas, both of which are essential to meet basic human needs, is enormous. "We have lost 60 billion tonnes of top soil in 450 years, and our forest cover has reduced dramatically. Fresh water sources like our rivers are also getting depleted. All of this has happened after the industrial revolution," he states. It is in this context that Anil and his colleagues started asking questions about the impact of growth on the environment, the reduction in forest area and its deterioration, and air pollution. These questions led them to seek an alternative way of measuring growth, which further led them to the concept of the Gross Environment Product (GEP).

> "Government functionaries are elected by the people of the country. They should have the interest of the people in mind, and if not, something should be done about it."

Changes needed to be brought about in the administration not only to rectify the ignorance of rural areas, but also to ensure that the landscape was not destroyed in the mindless race to develop. "Government functionaries are elected by the people of the country. They should have the interest of the people in mind, and if not, something should be done about it. For example, last year the Congress was in power in Uttarakhand. I opposed this government for the simple reason that they didn't listen to people in rural areas. This has been the case for previous governments as well," Anil explains.

As a response to this neglect, he started a movement known as Gaon Bachao (Save Our Villages). The group travelled all over the state for two years and

“What we don’t realise is that a stable economy is dependent on ecological stability. Therefore, if we want a strong economy, we will have to be serious about the environment as well.”

organised meetings about these issues. He goes on to state, “The BJP got 57 seats not only because of Modi, but also because of this movement that was critical of the Congress government. These yatras and meetings delivered a message to the current BJP government that the rural areas cannot be ignored.” HESCO has warned the current government that it must not ignore rural areas. Anil believes that as long as his organisation is honest with people, they will support the movement and strengthen it.

Emphasising the importance of caring for the environment, Anil says “What we don’t realise is that a stable economy is dependent on ecological stability. Therefore, if we want a strong economy, we will have to be serious about the environment as well.” This has led him to confront the government many times about why permissions were given to industries to set up their factories in mountainous regions. “Our industries are our forests and our water resources. If we regenerate our water resources, it is an opportunity to create employment as well. The problem is that the government has begun to monetise these resources that sustain life and bring in industries that destroy them,” he laments. In this context, he explains that it is easy to see why climate change is real and attributes it to the aggressive economy.

According to him, combating this approach is possible if locals are involved in eco-preneurship. “If you raise a forest, you will reap the harvest your whole life. Unfortunately, Uttarakhand is trying to copy Punjab and Haryana in terms of growing paddy and wheat. This will never work, because these crops are more suited to those areas. For us, rearing forests, saving water, and providing air can be our eco-preneurship. Fortunately, the government is slowly catching on,” he says hopefully.

Apart from the people of the hills who inspire him, his main driving force has been the circumstances in which he grew up. He yearns for a future in which there are no artificial differences between people in rural areas and those in urban centres. With more than four decades of work behind him, he feels that he has been able to bring about some substantial changes in the rural landscape. “We are happy when the people we work with are satisfied with our interventions. We feel a sense of accomplishment,” he says, reflecting on his work.

His phenomenal work in rural areas has not gone unnoticed. He was awarded the Padma Shri in 2006 and continues to work with various government departments to ensure a better future for rural areas.

NAFISA BAROT

TN Khoshoo Memorial Award for her work on rural livelihoods and water conservation

2005

Born into a lower middle class Bohra family, Nafisa Barot was fascinated by village life. In the few years when her family was living in Jamnagar, she accompanied her father, who worked as a radio engineer for the government, on his trips to the nearby villages where he installed radios for the community. “These visits to the villages really interested me, especially the cows coming back in the evening with their bells ringing. I didn’t understand the issues in the villages at that time, but I was just fascinated by what I saw,” she says.

Her school and college years, some of which were distressing, left a deep impact on her and influenced her choice of vocation later in life. Being discriminated against for being a Muslim and a girl served to toughen her resolve. One such experience occurred when she was in Baroda studying for her undergraduate degree. She was forced to change her room seven times in six months because of her religion. “What happened on some occasions was that I would shift into the room at night, and in the morning, they would say, ‘Oh, sorry, we didn’t know that you’re a Muslim’”, she narrates. She could not believe what she heard and, the first couple of times, consoled herself that the landlords were probably just conservative. But her troubles did not abate. “The last room that I stayed in was when I was writing my exams,” she continues. “It was part of a house that was sealed off by the corporation because it was too dangerous to live in. The room was on the first floor, and the owners said that the front door was locked but that I could go in from the back. I would always sleep near the door. Every time a truck would pass by, the whole building would shake, and I thought the building would collapse,” she remembers.

A NEW CHAPTER

After graduating from college, she joined the Ahmedabad Study Action Group (ASAG), an organisation working on rural housing and development. The short period during which she was with the organisation, set her on course to work on the issues of development, empowerment, and change. It was here that she met three women with whom she would go on to found Utthan, an organisation that works on issues of gender justice, peace, and equality. During her time at ASAG, she and her colleagues were tasked with formulating a block level plan for Dhandhuka, a taluk in central Gujarat, at the behest of the Janata government. The administration had decided that block level plans should be implemented by NGOs who were working on the ground, instead of block level officers who were sitting in their offices. The plan that they submitted, known as ‘the people’s plan for development’, was ridiculed because it called for public participation from stakeholders on the ground. “Today, public participation is a buzz word, but at that time, it was unacceptable,” she says.

Being a saline area, Dhandhuka needed a holistic development plan instead of specific targets like the digging of ten borewells. Annoyed by the government’s dismissive attitude towards the group’s proposal, they began working in the area, recognising the wealth of traditional knowledge they encountered. Mahiti, a sister organisation, was formed, which since has matured into a self-reliant organisation led by local leaders. Utthan and Mahiti initiated many movements which challenged patriarchy, feudal exploitation, and caste discrimination at the grassroots level. A women’s movement that sought to assert their right to safe drinking water also emerged.

Before setting up Utthan, Nafisa spent a lot of time with Professor Ravi Matthai, the pioneer of the Jawaja experiment in rural livelihoods and

Top Left: Building Brides

Top Right: Lined Pond

Left: Women resolving to give memorandum with several demands to the collector

> "We put forth the view that people's alternatives such as rainwater harvesting and recharging needed to be put into practice, but the government did not accept our view since it was critical of their functioning."

empowerment. "Interactions with Professor Matthai were very valuable to me and Utthan, since we have imbibed his values and understanding in our work", she recounts. "He said that unless you build communities from within, nothing is going to change." These words of wisdom have stayed with her throughout the years.

The journey with Utthan and Mahiti was a great learning experience for Nafisa in terms of mobilising communities and addressing issues of gender equality. From the Bhal area of Dhandhuka, roughly 80% of the population migrated for work. To understand the reasons for this large-scale migration, she and her team spoke to different people from the region. Interestingly, their responses varied based on their gender and position. The government had almost given up on the area. While the men wanted to prioritize employment, the women said that any change had to begin with access to drinking water. This proved to be an eye opener for the team, not only with regards to women, but also the struggles of Dalits and the poor.

RISING TO THE CHALLENGE

One of Utthan's first major interventions focused on raising its voice against centralised piped water supply and promoting local water resources instead. Villages in the area were supposed to get water sourced from over 100 kilometres away through a World Bank-funded pipeline. Unfortunately, villages at the tail end of the pipeline got water only intermittently, which often led to violent confrontations. Traditional ponds in the area had also run dry as a result of wealthy farmers digging borewells to irrigate their cash

Adivasi family with crop

crops. Deepening the ponds would not have solved the groundwater issue because of the rising levels of salinity in the shallow aquifers.

After interaction with the community, the group came to the conclusion that any resolution to this problem had to be initiated by them and that it was futile to depend on the government. “We took up 20 hectares of ‘waste land’ from the government for experimentation. Using traditional knowledge from the area, we dug a pond and lined the bottom and sides of it with Low Density Polyethylene (LDPE). This was covered with a layer of ‘sweet’ (salt free) soil on the bottom and brick and lime on the sides. This project was undertaken with help from the Indian Petrochemicals Corporation Limited (IPCL) because the government was sceptical about funding a project proposed by rural women,” she says. Through these first steps, the group entered a landscape mired with conflicts around policies, caste, feudalism, and patriarchy.

Nafisa Barot at a protest march organised for violence against women

In the early 1990s, the organisation produced a report based on a state-level study of the drinking water situation. In the meeting that followed, the inclination towards the centralisation of water supply was discussed. “The problem with the system was that increasing amounts of money were being spent without any resolution of the exacerbating issues. We put forth the view that people’s alternatives such as rainwater harvesting and recharging needed to be put into practice, but the government did not accept our view since it was critical of their functioning,” she explains.

This study was the beginning of Utthan’s work in Bhavnagar to resist another planned centralised water supply system. A state level network called Pravah (which means flow) was also formed at this time. Their focus expanded to Amreli when they heard of plans to set up a copper smelting plant in the region. Along with other organisations, Utthan mobilised people in the area

> “The problem is that the government is constantly blaming the community for being a certain way. If there is no awareness and equal opportunity for capacity building, how are people supposed to do the right thing? ”

against the plant and took the issue to court, where they obtained a stay. This intervention was only the beginning of the fight against large industrial projects. They were also part of the struggle against the Nirma cement plant in Bhavnagar, which is still being fought in court. In addition, they organised local women to protest against the construction of a nuclear plant in Mithivirdi (also in Bhavnagar), the first after India and the U.S. signed the civil nuclear agreement in 2008. Farmers in the region mounted a stiff resistance to the project, due to which it has now been moved to Andhra Pradesh.

After the communal violence in 2002, Utthan began working in the Panchmahal and Mahisagar districts for peace and justice. These processes have continuously highlighted the idea that peace cannot be possible without justice. Utthan has also continued its work on the livelihood security of vulnerable communities. This has taken on a new dimension in the context of climate change, sustainability, and the current pressures of genetically modified seeds. For these communities, livelihood security includes food security, natural resource management, and addressing the impacts of climate change.

Nafisa continues to be a constant source of encouragement for those working within and beyond the organisation. Her determination to bring equality into society has ensured that she has never backed off from any issue. Over the decades, she has worked persistently on a diverse set of issues, such as access to safe water, sanitation, hygiene, and livelihood security, as well as gender equality, justice, and peace. When asked how difficult it was to change

Top Left: Nafisa Barot in conversation with Devuben Pandya who took charge of the leadership of Mahiti in 1994

Top Right: In conversation with women understanding issues related to water

Middle Left: Protest against Nirma for grabbing Land and Water resources.

Middle Right: Shared platform and represented voluntary sector with Honorary then Prime Minister Shri Atal Bihari Vajpayee at the All India Conference on the Role of the Voluntary Sector.

Left: In conversation with inland fishing communities who were involved in rearing lobsters and crabs.

mind-sets, which is essential to bringing about any social change, she throws a question back, “Whose mind-set?” She explains that it was hard to change mind-sets across the board, from those of policy makers to communities on the ground. However, she does admit that convincing policy makers was much more challenging, especially so because of the lack of a holistic approach. Issues of gender, caste, and disabilities were swept under the rug, and quantifiable targets were given prominence instead.

She also criticises the government for ignoring the sustainability of projects. “The problem is that the government is constantly blaming the community for being a certain way. If there is no awareness and equal opportunity for capacity building, how are people supposed to do the right thing?” she questions. “There are so many good examples that demonstrate that with the participation of the community, especially of women and the marginalised, substantial change can be brought about. The work of Gram Vikas, an organisation working on issues of water and sanitation, is a perfect example of what can be achieved with community participation.”

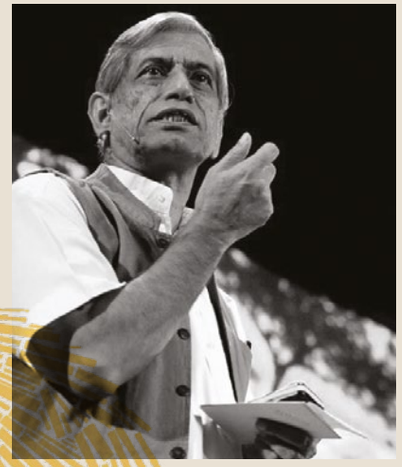
OVERCOMING HURDLES

Running an organisation like Utthan has been a constant struggle. Challenges have included perpetual confrontations with the government and vested interests, difficulties in finding funding, and problems that crop up on the ground. When funding was hard to come by, what heartened her was that her team stuck with the organisation. “I was very touched by this, because it highlighted the strength of the organisation and its values and approach. It also showed solidarity. This is a huge achievement. All our other achievements were possible only because of this solidarity.”

When asked about her memorable experiences of working in such a demanding terrain, she remembers one involving a fact-finding mission to evaluate the water supply situation on the ground. “When the government representatives came to the village, some of the villagers said that they were getting water and that there was no problem,” she narrates. “But all of a sudden, a group of women barged into the meeting, surrounded the representatives, and demanded that they visit some houses to see what the real situation was. They took one of the representatives to their house and told him what was happening. This is not something we had planned, but is very demonstrative of how the women were empowered,” she says, her voice full of pride.

Another memorable experience was during her visit to a village called Jhankhi. “I will never forget what I saw,” she begins. “There was a four year old child who was extremely dehydrated and looked like she was going to die soon. I asked her mother to bring some water. She left and returned half an hour later with half a glass of muddy water. I knew there was a water problem in the area, but I asked her to get more water. She only got a little more. I got angry and asked her what kind of a mother she was for behaving like this. She immediately broke down. A lady beside her told me that the mother had given the water that she had been keeping for the following day. I just started crying and gave her whatever water I had. This is something that has always remained with me. After a couple of days, the child died.”

Since stepping down as director of Utthan in 2016, Nafisa continues to mentor the team on various issues and assists in fundraising. Her passion for theatre has also been rekindled, along with her desire to start writing again. “I have been thinking about the experiences of my life and trying to explore how other people can benefit and be sensitised by them,” she says.



ANUPAM MISHRA

TN Khoshoo Memorial Award for his contribution towards documenting traditional water harvesting

2006

Anupam Mishra was born to Bhawani Prasad Mishra, the famous Hindi poet and author. After graduating from college, he worked as a writer and activist with the Gandhi Peace Foundation in Delhi, of which he was one of the founding members. During his time with the foundation, he served as the editor of its bimonthly publication — *Gandhi Marg.*

Widely known as a Gandhian author and an environmentalist, his most notable contribution is in the field of water conservation, traditional rainwater harvesting techniques, and water management systems. One of his first books, in which he chronicled the Chipko movement in the 1970s, was the result of time spent working with the Gandhian environmentalist and social activist Chandi Prasad Bhatt.

His exposure to the age-old practice of water harvesting came about quite by chance. At the age of 28, he made a first visit to a desert town in Rajasthan to deliver a letter for the foundation. In the village, he came across a peculiar stone structure. Upon enquiry, he was told that it was a *kund,* a structure built to collect and store rainwater. Every house in the village had one. Amazed at this ingenuity, he felt the need to learn more about these structures, as well as other such traditional water harvesting systems.

FIELDWORK, RESEARCH, AND ADVOCACY

Anupam's curiosity took him all over rural India. These learnings and experiences became the subject matter of several books. His most influential book, Aaj Bhi Khare Hain Talaab (Ponds Are Still Relevant), was a product of eight years of meticulous fieldwork on traditional pond and water management, which included his involvement in addressing the drought in Rajasthan in 1987. Although published a couple of decades ago, it is still considered a gospel for environmental groups, development agencies, and policy makers working on water management systems involving ponds. Magsaysay award-winner Rajendra Singh says that the book was born out of the water conservation movement and helped expand its ambit. "It encourages you to get involved," he states. It has been translated into nineteen languages, including braille.

In his time traversing the driest parts of rural Rajasthan and the rest of the country, he believed strongly in and advocated for decentralised water storage systems such as *baolis* (step wells), *kuis* (wells with small diameters), *chaals* (small water bodies along a slope), and *johads* (tanks fed by earthen check dams) that could sustain communities through droughts.

While delivering the fifth Siddharaj Dhadda Memorial Lecture, Anupam spoke about traditional water management systems. "The gazette notifications indicate that 99.7% of the households in Jaisalmer had rainwater harvesting and storage systems. The households were self-sustainable in terms of water supply, even though other signs of development such as roads or buildings were not there then. I have a long association with Rajasthan. It is here that the traditional methods of water conservation have been kept alive," he noted. "The *kadins, talabs, nadis,* and *anicuts* have existed in western Rajasthan for the past 4-8 centuries, and they remain stronger than the modern-day cement structures constructed by government agencies."

He spent over three decades learning about indigenous water management systems and longed for a day when the country as a whole would become self-sufficient in terms of water supply and would have the know-how to preserve this precious resource. It is no surprise that when the government announced the Ken-Betwa River linking project, he criticised the government in an article,

> "The *kadins, talabs, nadis,* and *anicuts* have existed in western Rajasthan for the past 4-8 centuries, and they remain stronger than the modern-day cement structures constructed by government agencies."

pointing out that "better rainwater management should also be given a chance to meet the requirements of the area expected to gain from the Ken-Betwa link." It would only be fair competition, he asserted. After having spent around two decades researching rainwater management, he estimated that the Bundelkhand region could meet its water requirements with an investment of Rs. 10 crore, which was only a fraction of the financial commitment the Indian government was making to river linking. He had already witnessed the efforts of 700 villages in Alwar, Rajasthan to improve their water availability with an expenditure of only Rs. 5 crore.

He lamented that because the Indian government had promised to supply water to the towns and villages, people were now ignoring their traditional, time-tested techniques of water conservation. He also bemoaned the fact that water policies were always designed for the short term, since governments were in power for short time periods. The traditional philosophy of water conservation, on the other hand, was passed down through generations and should not be lost. In an interview, he cited the example of Punjab, which made the mistake of growing rice in an unsuitable terrain. Today, along with alarming groundwater depletion, the state is also experiencing water-logging. "After just twenty years, farmers in Punjab are now seriously thinking of doing away with rice cultivation," he pointed out. "This is a very short period for the human race. In politics, it may be the lifespan of three governments, but for farmers, it is not even one generation, and now many of their fields are destroyed."

SELF-SUFFICIENCY IN WATER

His travels and experiences taught him that Indian societies were water literate, and it was these learnings that he believed could be utilised to improve the present situation. Through his many books, he stressed that traditional water management systems had sustained people for centuries even in very remote areas, and it is important that we learn from these examples. While he did emphasise that we should follow these systems, he believed that in the current scenario, the gap between modern water management technology and our heritage of water harvesting must be bridged.

His advice and encouragement has greatly benefitted many villages by making them close to being self-sufficient in their water needs. A notable example is the hamlet of Lapodia, 80 km from Jaipur, which is renowned for its pioneering water harvesting techniques. He had the distinctive ability to create bonds between people and their environment. However, he was always quick to caution people that water security and insecurity are products of both nature and culture. There could be water insecurity in high-rainfall regions, as well as sufficient water in low-rainfall regions such as Rajasthan.

His dedication to water has not gone unrecognised. He was conferred the Indira Gandhi Paryavaran Puraskar in 1996, an environment award instituted by the Ministry of Environment and Forests. He was also awarded the Amar Shaheed Chandrasekhar Azad National Award in 2007 by the Madhya Pradesh government, as well as the Jamnalal Bajaj Award in 2011.

Many people remember his dedication and constant words of encouragement, including Himanshu Thakkar, who heads the South Asian Network on Dams, Rivers and People (SANDRP), and Peeyush Sekhsaria, an architect and amateur naturalist.

In a two-part article on Chandi Prasad Bhatt in The Hindu, Ramachandra Guha wrote about Mr. Bhatt and Anupam Mishra, stating: "In them lives a spirit, of quiet service, that once existed freely in our politics and our activism, a spirit that has been completely excised from one sphere and remains gravely threatened in the other."

DR. B R RAMESH

TN Khoshoo Memorial Award for his work on vegetation ecology, vegetation mapping and conservation

2007

Born into a humble family supported by his father, who was a *Shanubog* (village accountant and document writer), B R Ramesh spent most of his childhood in the semi-Malnad area of Karnataka. Growing up in Kadur, near the foothills of the fascinating Bababudangiri hill range, he had the opportunity to observe the biodiversity in this lush landscape. This passion led him to pursue a bachelors in Chemistry, Botany and Zoology and a masters in Botany. Following his masters, he joined Fr. Cecil J Saldanha, who had initiated the Karnataka Flora Project, part of which entailed extensive fieldwork to collect plants from various parts of the state. This taught him about the importance of experiential, rather than just classroom, learning. He says shyly, “It is ironic that I have become a well-known plant taxonomist despite nearly failing angiosperm taxonomy during my MSc course.”

In 1982, he joined the French Institute of Pondicherry (IFP) as a botanist. At that time, IFP was the only institute working on forest ecology and vegetation cartography. He proudly states, “For the first time in India, we prepared vegetation maps using satellite images. I had a great opportunity to work with Dr. Meher-Homji and Dr. Pascal, both stalwarts in the field of forest ecology and bioclimatic studies.” With a strong background in plant taxonomy, he started working on forest trees in the Western Ghats, studying their distribution pattern, functional ecology, dynamics, and status at the regional, landscape,

Canopy rafting using helium balloon (Cambodia)

and forest community levels. As a result of this research, he has put together vegetation maps, as well as a distribution atlas of endemic tree species. This has become reference material for numerous contemporary researchers who are in need of this baseline data.

LONG-TERM MONITORING OF THE WESTERN GHATS

He is one among a handful of people in India doing long-term research in the Western Ghats, and his continuous monitoring of this landscape has helped him understand the temporal changes and the major factors driving them. His work on vegetation maps has highlighted the fact that there was a nearly 12% forest loss in the two decades after 1977, which was quite substantial in the coffee belt in the section of the Western Ghats that is in Karnataka. He also discovered that Kerala, which is known for its greenery, surprisingly had only 24% of its total geographic area covered by natural vegetation.

When asked how he would rate conservation in the country today, he maintains that India probably has one of the best forest acts and policies in the tropical

world. “These policies, which have evolved over more than a century, have gone from productive forestry for revenue generation to wildlife protection and finally to conservation through participatory forest management,” he explains. The various Forest Departments in the country are the custodians of nearly 90% of the forest areas in the form of reserve forests and protected areas. However, in some areas such as the part of the Western Ghats within Karnataka, substantial sections of the forest have remained under the revenue department, with dual control. One of his studies has shown that there has been a nearly 19% loss in the revenue forests compared to 4.4% in the reserve forests.

With the constant pressures that forested areas and wildlife face, he is a little unsure about what the future may hold. “The existing forest policies, on paper, seem sufficient in terms of providing protection to wildlife. However, the shoddy implementation and vested interests of the implementing agencies and policy makers, coupled with the mindless developmental agenda, may endanger the future of wildlife,” he warns.

Ramesh’s review of the protected areas in Kerala has shown that there are large gaps in the protection of high conservation value areas. This was established using indicator values like species richness and endemism for Rare, Endangered, and Threatened (RET) species of both plants and animals inhabiting unique ecosystems. The study also enabled him to identify conservation and community reserves as a step towards participatory management.

A unique initiative that Ramesh and his team worked on was formulating strategic plans at the landscape level. Forest management in India has been guided by working and management plans that are prepared at decennial intervals. Most often, these management practices cover forest administrative divisions rather than landscapes or ecological boundaries.

To rectify these shortcomings and address the challenges posed by increasing demographic pressure, heterogeneity of land cover, and changing land use, Ramesh and others proposed a novel approach of comprehensive management at the landscape level to the Kerala forest department. Considering the current

> “GIS-based maps are ideal for biodiversity informatics. Biodiversity and ecosystem data need to be both geo-referenced and species-referenced. Species distribution models are crucial to predicting the species distribution pattern. Hence, spatial information is key to decision making and planning for conservation.”

system of forest management and the changes in policies at the national and international levels, the landscape study highlighted the complexities involved in developing an integrated forest landscape management strategy by analysing flora and fauna, as well as the areas that witnessed human intervention.

Using the principles of landscape ecology, the southern part of the Western Ghats in Kerala was divided into different landscape units. Among these, two representative landscape units in the Western Anamalai region were chosen to explain the influence of physical factors and bio-climatic and anthropogenic pressures on the characteristics of natural vegetation and the distribution and abundance of animals. Highlighting patterns of resource utilisation by stakeholders within a given radius, the study identified management zones with resource potential, emphasised the importance of conservation, and discussed major hindrances to biodiversity conservation and sustainable development. Strategies, action plans, and compatible institutional mechanisms were put in motion to manage these areas and to mitigate the prevalent threats. This study was published as a book and could serve as a generic guide for a landscape-level forest management approach, as an alternative to the current system of working and management plans.

Above Left: Canopy view of inumerable epiphytes on branches

Above Right: Windswept mountain of Megamalai

TECHNOLOGY AND BIODIVERSITY

Ramesh's passion for taxonomy led him to develop a computer-aided identification tool that helps researchers identify the tree species of the Western Ghats using a graphical interface. He maintains that technology has been of immense help to him. A lot of emphasis has been placed on the need for reliable data. He states, "GIS-based maps are ideal for biodiversity informatics. Biodiversity and ecosystem data need to be both geo-referenced and species-referenced. Species distribution models are crucial to predicting the species distribution pattern. Hence, spatial information is key to decision making and planning for conservation."

The wealth of knowledge he has developed is being put to good use. Since his time with the Karnataka Flora Project, Ramesh has been heavily involved with a number of online portals that are repositories of information on species and their diversity. The Western Ghats portal is one. He says that this portal is an open source platform that provides freely available online content. The content is constantly updated through the participation of a wide range of stakeholders, from those in the government to civil society organisations, academics, and wildlife enthusiasts.

He provides a fitting example for the use of the platform. "If somebody wants to work on a plan for tiger conservation, they would need to get information on the population structure of its prey base, as well as the availability of food and water for herbivores. As a one-stop platform, the portal could ideally provide crowd-sourced comprehensive information on tiger range, herbivore density, status of vegetation, and water resources. By superimposing these various data sets, the carrying capacity of tiger habitats for conservation planning could be evaluated. The technical team is currently working to further enhance the capability of the spatial analysis infrastructure of the portal," he explains.

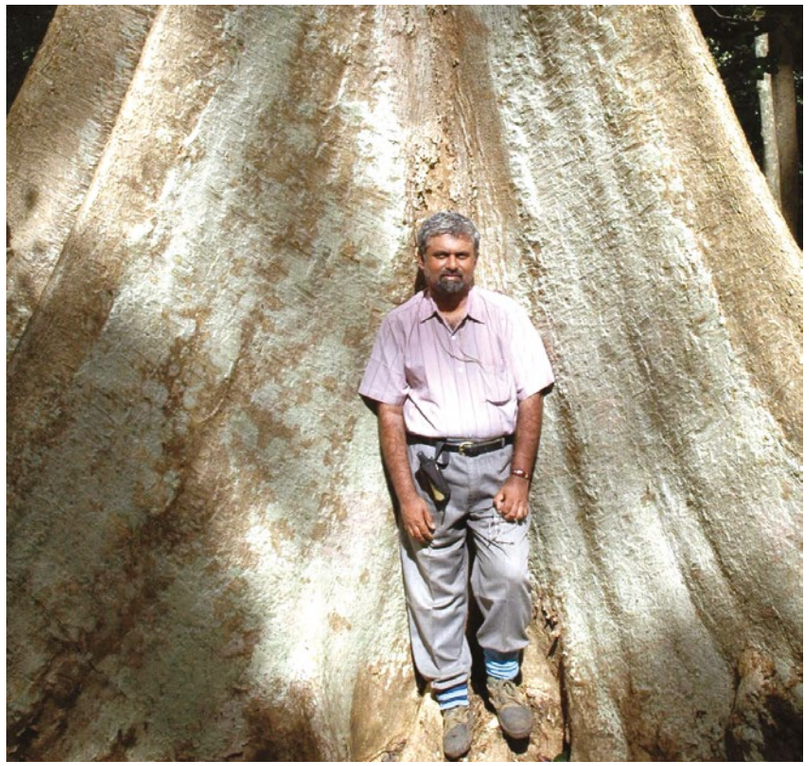
"As a one-stop platform, the portal could ideally provide crowd-sourced comprehensive information on tiger range, herbivore density, status of vegetation, and water resources."

The challenge that Ramesh and others managing the portal face is that driving participation in a diverse country like India is quite difficult. It requires innovative ideas to cater to the needs of all the different stakeholders. It also requires human resources and constant funding to keep pace with the changing technology and updating of content.

Throughout his life, he has seen conservation efforts focused primarily on animals, especially the charismatic species. By way of his work and the studies he has carried out, he has brought focus to forest trees from the perspective of ecology and evolution, rather than just commercial consideration. However, he regrets that although he has worked with several students and post docs, he has not been able to officially guide a PhD student yet due to lack of time.

UNFORGETTABLE EXPERIENCES

Ramesh was never one to shy away from going to the field. He enjoyed every minute he was there. Mapping the Western Ghats gave him the opportunity to crisscross southern and central parts of the mountain range in an old British



Top Left: Misty Shola

Top Right: Rolling hills of Annamalai

Right: Clasping Buttress

Landrover. Going further back, when he did not have the luxury of carrying out his work in a car, he walked about 20 km every day, climbing up and down hills. All the walking trails mapped by the group were on 1:50,000 scale topography sheets. After finishing this research, he calculated the distance travelled on foot, and to his amazement, he discovered that it was more than 2500 km!
Walking the Western Ghats,

Ramesh has had his fair share of unforgettable experiences. The one that takes the top prize is when he came face to face with a gun-wielding Veerappan and his gang at Biligiriranga Hills. It was only later that he realised who they were. “At that time, he was just an ordinary poacher,” he said in jest. Other chilling experiences include being chased by a Gaur in MM hills and coming across a huge leopard at Avalanche in the Nilgiris. A harrowing experience was when he was crossing the Mundathurai Bridge in a Landrover during a cyclone; only seconds after he made it safely to the other side, it collapsed. He has had many positive memories as well. Among them are the hospitality and kindness of the tribal communities who accompanied him and his team in the field.

After officially retiring in March 2016 as director of research at IFP, he has continued to work on some of its externally funded projects. He is currently coordinating the Assam Biodiversity Portal Project in collaboration with Strand Life Sciences and ATREE.

REBECCA PRADHAN

TN Khoshoo Memorial Award for her efforts in environmental conservation in Bhutan

2008

“When I open my eyes in the morning, the first thing I like to do is listen to the familiar tune of the Blue Whistling Thrush. Nature has taught me so much and all of it absolutely free,” says Rebecca Pradhan, a senior ecologist at the Royal Society for Protection of Nature (RSPN) in Bhutan.

Having a grandfather who was a botanist and parents who were naturalists, Rebecca had the privilege of a perfect environment to nurture her interest in the natural world. Her fascination for nature started very early on. Originally from Kalimpong, West Bengal, she shifted to Bhutan when she was 18, after marrying a Bhutanese forester. Ever since then, she has worked towards documenting and preserving the flora and fauna of Bhutan. Her knowledge of the plants and animals of the Himalayan landscape has accumulated from her years of experience in the region. “Most of what I have learned is from nature,” she says.

Her career in conservation began when she joined the Royal Government of Bhutan, where she served as the head of the herbarium and the forest research library. Following this stint, she joined the Royal Society for Protection of Nature (RSPN), where she still works as a senior ecologist. She was fortunate to be given the opportunity of receiving a fellowship in botany from Harvard University with its Arnold Arboretum.

In 2016, she was recognised as one of the biodiversity ‘hotspot heroes’ by the Critical Ecosystem Partnership Fund (CEPF) for her dedicated work on protecting the critically endangered white-bellied heron in Bhutan.

Apart from working on the preservation of these pristine environments, she also works with community members and teaches schoolchildren in her spare time. She says very humbly, “I love working in the forest and with people from all walks of life. It gives me opportunities to share what little I know and also learn from them. I love teaching children whatever practical knowledge I learned from my grandfather and parents. My knowledge of nature is the greatest gift I received from my grandfather and parents, and I like to pass it down to children.”

She is heartened by the fact that over the years, the number of Bhutanese birders, flower lovers, and particularly flower gardeners has increased, as gardening in particular has become popular.

Work on the white-bellied heron

In 1991, along with Tim and Carol Inskipp, Rebecca began observing the white-bellied heron in Bhutan, a bird species that the IUCN (International Union for Conservation of Nature) has listed as critically endangered, with an estimated

> “I love working in the forest and with people from all walks of life. It gives me opportunities to share what little I know and also learn from them. I love teaching children whatever practical knowledge I learned from my grandfather and parents.”

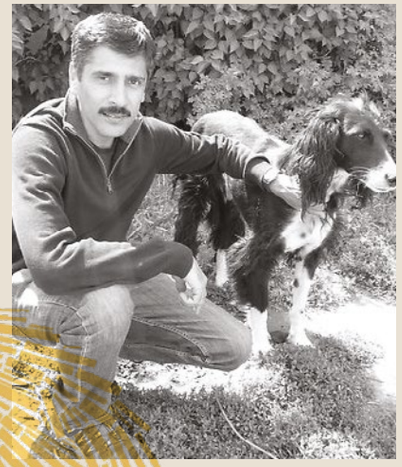
global population of 60 individuals. With very little scientific information or local observational records available she wanted to research and find out more about the bird and its habitat. With the bird being recorded only in Nepal, India, Bangladesh, northern Myanmar, and Bhutan, she has had her work cut out.

She and her team at RSPN have worked towards increasing the awareness of this species through educational programs, as well as mobilising the local community to help conserve its habitat. Understanding the biology of and the associated environmental attributes connected to the white-bellied heron has been quite challenging. She says, “The more I learn, the more I feel I need to learn. It is like reading through an enchanting story with the concluding chapter not yet in view. I still have to do more work on it. I am thankful to CEPF for recognising my work, and I hope it will help me raise funds to save the white-bellied heron.”

Her dedication to her work has not gone unrecognised. In 2016, she was recognised as one of the biodiversity ‘hotspot heroes’ by the Critical Ecosystem Partnership Fund (CEPF) for her dedicated work on protecting the critically endangered white-bellied heron in Bhutan.

A recent development in her work towards saving the heron is the establishment of a captive breeding centre that will allow researchers to understand the bird’s ecology, catalogue its habitat, and make use of satellite telemetry, as well as facilitate advocacy and spread public awareness throughout the country. Excited by this new venture, she hopes to be able to release two captive bred chicks into a safe habitat before she retires. All through her career, she has been singularly focused on protecting nature. “Other than my love for nature, I never had any particular ambition, nor did I ever aspire to become a hard-core conservationist. Whatever I am today, I believe, was God’s plan. Today I feel blessed to be a Bhutanese citizen,” she says.

Rebecca has also authored several publications, including *Threatened Birds in Bhutan, Wild Rhododendrons of Bhutan, Wild Lilies and Poppies of Bhutan,* and *Basic Gardening Book,* along with various articles on different species of flora and fauna.



DR. CHARUDUTT MISHRA

TN Khoshoo Memorial Award for his work on understanding pastoralism and resource use, and the ecology of human-wildlife conflicts

2009

In a country like India, conservationists and managers of protected areas face a herculean task trying to safeguard the country's biodiversity. Overexploitation of resources by locals poses a serious challenge to conserving biodiversity. This is especially so in remote areas such as the Himalayan region, which harbours species that most of the Indian subcontinent is either ignorant or unaware of. Charudutt Mishra took on these challenges and has brought about substantial changes in these landscapes.

Having grown up in Delhi, he completed his masters from the Wildlife Institute of India and went on to do a PhD in Ecology and Natural Resource Conservation at the University of Wageningen in the Netherlands. The topic of his PhD took him to the Himalayas, where he first understood the conflict between pastoralists and snow leopards. Recognising the animosity the people of the region had towards this elusive yet deadly predator, he realised he had to come up with a plan to ensure that the already endangered snow leopard was not threatened even further. In order to achieve this, the interests of the locals also had to be taken into consideration.

His solution was to convince the locals to set aside rangeland that would help in the recovery of population of wild herbivores such as the *bharal* (Himalayan blue sheep), one of the primary prey species of the snow leopard in the

region. During this period, he started another initiative with youth in the villages — India's first community-managed livestock insurance programme. This scheme aimed to compensate people for the loss of livestock due to attacks by wild carnivores at current market prices for the animals. Although these initiatives took some time to be accepted by the villagers, constant interactions with them proved very effective.

The populations of wild herbivores have witnessed a manifold increase, and people's attitudes towards carnivores are changing. First initiated successfully in the Spiti Valley in Himachal Pradesh, this programme has now been replicated in other areas as well. The key part of this programme is that both the humans and animals involved have benefitted from it. The increase in the population of bharals has had a direct impact in terms of a reduction in the number of attacks on livestock. Setting aside land for regeneration has had a positive impact on the snow leopard and other wildlife species as well, such as the Himalayan ibex, stone marten, Tibetan wolf, and bird species such as the Himalayan griffon and the golden eagle, among others.

PEOPLE-CENTRIC CONSERVATION

Ever since he began his work, Charudutt has become increasingly convinced that successful conservation must be centred on people. His view has persisted and grown even stronger with time. Through his research, he has authored several papers on the complexities and conflicts that exist in these fragile landscapes dominated by humans.

He is one of the founders of the Nature Conservation Foundation (NCF), as well as the science and conservation director of the Snow Leopard Trust. The former is a wildlife conservation organisation that also strives to safeguard livelihood and development options for local communities, while the latter is responsible for guiding research and conservation programmes in the snow leopard range countries of Asia.

Charudutt also serves as the executive director of the Snow Leopard Network, a worldwide organisation of leading snow leopard experts and over 500 member individuals and institutions. In 2003, he was involved in a post-conflict wildlife assessment in Afghanistan on behalf of the United Nations. During the same year, he was also a member of the historic expedition that discovered the Arunachal macaque (*M. munzala*), a new species of monkey.

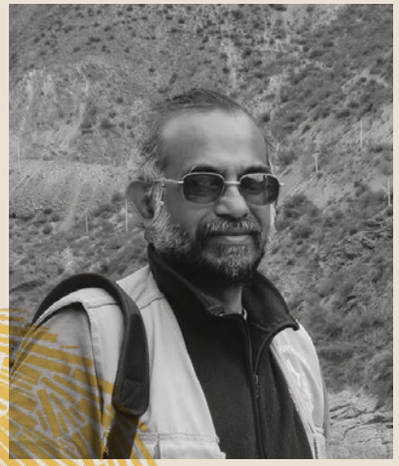
His work on people-centric wildlife conservation in the Himalayas won him the Whitley Gold Award in 2005, as well as the Golden Ark Award in 2008. He serves on the editorial board of the journal Animal Conservation and is a member of the IUCN's Cat Specialist Group.

Along with NCF, he is bringing together various conservation approaches in the Himalayas and using these to formulate a participatory national conservation policy for wildlife at high altitudes. This initiative, which is being carried out in coordination with the government, also aims to put in place a strong education programme that will supplement the work on conservation. Called 'Project Snow Leopard', this approach towards conservation in high-altitude areas is being developed with the forest departments of the five Himalayan states. It uses the snow leopard as a flagship species, much like the efforts towards tiger conservation across the country.

> "Recognising the animosity the people of the region had towards this elusive yet deadly predator, I realised that I had to come up with a plan to ensure that the already endangered snow leopard was not threatened even further. In order to achieve this, the interests of the locals also had to be taken into consideration."

Years of hard work by Charudutt with the government finally paid off in 2009 when the Indian government launched Project Snow Leopard, committing to conserve this endangered species.

The project is being implemented in the five Himalayan states of Jammu and Kashmir, Uttarakhand, Arunachal Pradesh, Himachal Pradesh, and Sikkim, with assistance from NCF and the Wildlife Institute of India. This effort was taken to the global level in 2013, when Charudutt played an instrumental role in bringing together the governments of all twelve snow leopard range countries for an international summit in Kyrgyzstan. The summit was momentous because it resulted in landmark commitments to protect the snow leopard, while also acknowledging the importance of community involvement in the species' conservation.



ASHISH KOTHARI

TN Khoshoo Memorial Award
for his contribution to the field of conservation

2009

It was 1979 and the site of focus was the Delhi ridge forest, one of the few places birders and others nature lovers from the national capital flocked to. Ashish Kothari and some of his friends who enjoyed birding in the area were shocked at the steady destruction of the forest by roads, construction, and garbage being dumped. Not wanting to bear silent witness to this crisis, Ashish and his friends, most of them still students, started a campaign with other students and local residents to save the ridge. It was at this point that a decision was made to come together as a group to deal with such environmental issues in a more systematic manner. Kalpavriksh, an environmental NGO of which Ashish is one of the founding members, was thus born.

Ashish's activism started very early on. Influenced by his family members, who were involved in human rights activism, socially relevant research, and work with underprivileged children, he engaged on issues of wildlife and animal rights starting from his school days. Not many school-going children would be able to boast that they had met with the prime minister of their country to voice their dissatisfaction against a certain policy, let alone see the leader in person. But in the 1970s, that is precisely what Ashish and a few of his friends did. This meeting with the then prime minister, Morarji Desai, was to register their protest about the export of rhesus

With forest staff and other participnats of Uttarakhand Birdwatching Camp, Sitabani, 2013

macaques to the U.S. for research experiments. Although the exports had already been stopped, the group wanted to ensure that they would not be started again. They followed this up with another protest staged outside the Saudi Arabian Embassy to draw attention to the fact that the Indian government had given permission to the Saudi Arabian prince to hunt bustards and floricans. These engagements paved the way for Ashish's life in activism in the fields of environment, development, and conservation.

Ashish and Kalpavriksh's work on forests and wildlife benefited from a broadened perspective soon after the organisation was founded. During trips in the early 1980s to the Tehri Garhwal region where the Chipko movement was born, the group realised the socio-political issues that encompassed forests. This realisation was soon followed by the incident of firing at the Keoladeo Ghana National Park in 1982, in which 6-7 villagers

Trekking in Neyyar Sanctuary, Kerala 2011

were killed when defying a sudden ban on the entry of cattle into the park. Kalpavriksh conducted an immediate investigation into the incident and wrote a report. This episode represented a growing conflict over rights to natural areas wherein people who needed the resources the most were being deprived of them. It was then that the relationship between conservation and people became very crucial for the organisation. This sparked their analysis of conservation policies, which was an eye opener. They realised that the government was unnecessarily pitting humans against wildlife. Since then, Kalpavriksh has advocated inclusive, community-based approaches to conservation and especially highlighted the phenomenon of community-conserved areas.

From 1983 onwards, the organisation worked on these issues in the Narmada Valley and joined the Narmada Bachao Andolan after the movement took root in the region. Their engagement with this movement was the beginning of their fight against development and forest-related displacement. “Whether it is in the Narmada Valley or the various forests all over the country, displacement has been a constant in India’s quest for joining the league of industrialised, so-called ‘developed’ countries,” he says. In producing the first report on displacement in the Narmada Valley in 1984, Kalpavriksh questioned whether the project was indeed development or destruction. “Are we a country that believes that some people can be sacrificed for the greater good?” he questions. “As an organization, we believe that it is fundamentally not acceptable or necessary to displace some people for the benefit of others.”

With members of Kalpavriksh in Pune, January 2017

INITIATIVES

The presence of a myriad of contradictory laws and policies in the country has not deterred Ashish from persisting in his line of work. Beginning in the 1990s, an attempt was made to build a platform for dialogue. Known as Building Bridges for Conservation, this platform was an effort to create a common ground for people involved in human rights and conservation, those in academia, representatives from the government, and others interested in these questions. Due to the group’s work, misconceptions that people from different fields had about one another were cast aside, which led to greater understanding. Unfortunately, this initiative ran out of steam after a few years. “A concerted effort to make significant policy changes was missing, but at least some level of greater understanding and dialogue

was achieved," Ashish points out. "Looking at this more positively, there are organisations, especially some of the younger ones like NCF and ATREE that are aware of the nuances in this area."

Since these organisations do have a better understanding of the realities, he feels that there is a need for a collective push by them for policy changes to ensure that humans can coexist with wildlife. Another attempt at a collective process was known as the Future of Conservation. This was a network of organisations and individuals committed to effective and equitable conservation of biodiversity. As part of this initiative, a series of meetings was conducted and documents were developed on the kind of approaches that could be adopted regarding critical tiger habitats, critical wildlife habitats, and the relocation of people. However, this did not go very far due to an unresponsive government, though a set of documents that has potential positive use was prepared.

Ashish and others in the field have also been engaging with international groups such as the International Union for Conservation of Nature (IUCN) and the United Nations Convention on Biological Diversity (CBD). According to Ashish, this has been a lot more satisfying and productive, since they have helped generate major paradigm shifts in global conservation policy towards co-management and community-conserved areas. This includes the inclusion of people-centred conservation governance in the policies of the IUCN and the CBD and the creation of a global network called the Indigenous Peoples' and Community Conserved Territories and Areas (ICCA) Consortium. "Such policies must be used to put pressure on the Indian government, since it is a signatory to these international treaties and can therefore be questioned about the lack of change in the country.

There needs to be action on the ground as well. For example, the 2006 Forest Rights Act (FRA), although revolutionary in spirit, has not been allowed to live up to its potential. Only two percent of what can be recognised as Community Forest Rights has reached people," he says in dismay. He adds with a word of caution, "Of course, this doesn't mean that communities will automatically start conserving forests, so work needs to be done with them in a mutually respectful manner, putting together various kinds of expertise and experience to figure out the best forms of governance, management, and sustainable use."

Change on the ground for communities will require transformation that transcends policy. "Until and unless the hegemony of the forest department and its ineffective conservation mind-set is altered, nothing will change," he asserts. Fundamental changes are required in the methods adopted to manage and govern forests as well as train staff, including the Indian Forest Service curriculum. In addition, an effort must be made to reconcile contradictory laws and policies. For instance, the Forest Conservation Act, the Indian Forest Act, the Wild Life Protection Act, and the Forest Rights Act appear to be in conflict with one another in some crucial respects.

MISCONCEPTIONS

In his work with communities dependent on forests and other ecosystems, Ashish has come to realise that the forest department and large sections of the public have many misconceptions about their way of life. The most common is that forest dwellers are illiterate and do not have an environmental sensibility because they are not educated. "This is a very strong bias, particularly among the urban middle class, including many environmental groups," he states. A second belief of the middle classes is that some of the practices of forest dwellers, such as collecting timber for fuel or grazing their cattle, are unnecessarily destructive. Ashish counters this by saying that we as a society have internalised the British approach to forestry to such an extent that we now believe that any action of the locals is destructive. Conversely, we are blind to our own more destructive lifestyles simply because we may not be directly cutting the trees we use.

In urban areas, people are also entirely ignorant about the traditional structures and social fabric of tribal communities. They are not aware of the fact that tribals have their own institutions, knowledge systems, and practices related to natural ecosystems, which include regulations or rules about resource use in terms of when to hunt and when not to, when to

collect forest produce and how it needs to be harvested, and so on. “A lot of these rules may not be in practice today for a variety of reasons, but they did have them in the not too distant past, which maintained the forest ecosystems. And many still retain them or are bringing them back when their benefits are recognised,” he says. There is also the widespread notion that tribal communities cannot coexist with wildlife, especially tigers.

It is no wonder then that Ashish feels that some of India’s legislation, although good in spirit, is undone by regressive mind-sets. With the Forest Rights Act in existence for a decade, he says he continues to be amazed by the ability of the Indian government to create positive and progressive policies but not implement them. Nevertheless, according to Ashish, it is better that acts like the FRA exist, as opposed to not having them at all. In many parts of India, the FRA has created possibilities for significant changes in the governance of forests and more effective conservation as well. This has also been made possible due to the strengthened ability of communities to stop destructive ‘development’ projects like mines and dams. “This change has come about through sheer hard work and persistence and is not an automatic by-product of the Act,” he says.

Kalpavriksh continues to work on the Act and the potential changes it can lead to in the future. “Of course there are problems with it, but overall, it is a positive policy space. This is good for changing governance but also for challenging destructive development. We will continue to support it, but there is the huge challenge of actually getting it implemented,” Ashish says.

While he is positive about the potential of the Act, he questions why it was not taken a step further. “Why should it not be a natural ecosystems rights act, so that fishing and coastal communities, pastoralists, and others can have the possibility of claiming community rights? We have never been comfortable with individual rights, but community rights should be available to all ecosystem based communities. The lack of this thought process has been a big failure on the part of civil society movements. There has been a constant focus on forests since the time of the British, which is why there is a forest department but not a grasslands department or a coastal conservation department. Unfortunately, this is the case with civil society as well, which focuses on forests excessively, just as there is a predominant focus on large animals to the exclusion of plants and small animals, many of which are severely threatened. This is a major weakness,” he laments.

> “Raising the issue of the Narmada project before the movement started was important, as was our continued involvement. Though we did not succeed in stopping the project, the larger debate on development was highlighted,”

PUSHING FOR ALTERNATIVES

For the last 3-4 years, he has taken a step back to look at the larger picture of environment and development policy and research alternatives to development. This led to a book he co-authored with ecological economist Aseem Shrivastava, titled Churning the Earth: The Making of Global India. It charts India’s story of growth, including its ecological, economic, and social impacts and possible alternatives to development based on experiments within the country that emphasise ecological sustainability and socioeconomic equity.

“In the current global context, putting alternatives into practice is a possibility, but this is extremely difficult and will take a lot of time. There are thousands of places where people are either resisting the destruction or creating constructive alternatives. The question is whether we will be able to understand, network, and collaborate to build a larger critical mass to bring about fundamental transformations in the structures that cause inequity and unsustainability. Without a concerted global effort, it won’t be possible,” he states. With this goal in mind, he helped initiate Vikalp Sangam (meaning the confluence of alternatives), a process that brings

together movements that offer alternative well-being pathways to globalised development, documents these, and makes the information available on a dedicated website. Internationally, he has been involved in creating a discussion network around the concept of 'radical ecological democracy,' linking it with radical alternatives in other parts of the world. The launch of a website to feature such alternatives has been recently announced. Ashish is also on the board of Greenpeace International and its Indian wing, contributes to several global working groups, and helps coordinate a multi-country project called Academic-Activist Co-Produced Knowledge for Environmental Justice (ACKnowl-EJ). He writes frequently in Indian and foreign publications on these issues.

A MIXED BAG

Achieving its goals in the overlapping fields of environment, conservation, development, and rights of indigenous peoples and other communities has not been easy for Kalpavriksh. However, the organisation has made significant breakthroughs. One of them was putting a stop to commercial logging in the Andamans. A positive judgment from the Indian courts was a big win for the organisation, which fought for the cause with two other organisations. There have been many other positive outcomes of their struggles, including stopping mining in part of the Dehradun region and the successful struggle against POSCO in the Niyamgiri hills, among others. In other aspects, such as the environmental education work of Kalpavriksh in many parts of India or the policy advocacy on conservation and livelihoods, it is harder to measure 'achievements,' as the results are often long-term and not necessarily concretely visible.

A long-standing engagement of Ashish and Kalpavriksh was the struggle against dams on the Narmada River. "Raising the issue of the Narmada project before the movement started was important, as was our continued involvement. Though we did not succeed in stopping the project, the larger debate on development was highlighted," he explains. Another shortcoming on the part of civil society organisations in India has been the dearth of vernacular literature. "We have gotten better in the last few years, especially in places like Maharashtra, but the dominance of English has its limitations,

With participants of the HImal Kalasutra Birdwatching Festival, April 2017

especially in terms of outreach," he says. Kalpavriksh as an organisation has chosen to remain small, which can be perceived both as a strength and a weakness. The benefit is a flat, democratic decision-making structure in which all members are involved without any formal hierarchy. Apart from the greater 'buy-in' of members in decisions, this also helps promote independent thinking and action. Many other members of Kalpavriksh are now known in their own right as activists, researchers, and authors. On the flip side, Ashish feels that it has also made the organisation less effective, because there are limitations to engagement on a larger scale. However, the decision to keep the organisation small was deliberate. "We felt that we needed to be democratic within the organisation, especially since we were talking about democracy in society," he explains.

Kalpavriksh: www.kalpavriksh.org
ICCA Consortium: www.iccaconsortium.org
Vikalp Sangam: www.vikalpsangam.org
ACKnowl-EJ: http://acknowlej.org

GIRISH SANT

TN Khoshoo Memorial Award for his policy-influencing work in the energy sector

2010

After growing up in Thane, Mumbai, Girish Sant went to IIT Bombay for a Bachelors in Chemical Engineering and a Masters in Energy Systems, which he completed in 1988. Like most other students at the institute, he was an active member of the mountaineering club, one of the many clubs in the institute. He was adept at both mountain and rock climbing and successfully completed many expeditions with his cohort. The group was the first to climb the Konkan Kada, a hill fort that is a part of the Western Ghats. His love for mountaineering regularly took him to remote parts of the Himalayas. These treks were also eye-opening since they gave him a glimpse of the harsh realities of these areas. His keenness for mountaineering even got him elected as secretary of the Institute of Mountaineering in 1985-86.

Towards the end of his masters at IIT, he regularly talked to his friends Ajit Gaunekar and Aniruddha Ketkar about working in a field of social relevance. During this period, he started spending time with Subodh Wagle, then a research fellow at the Center for Technology Alternatives for Rural Areas. With him, Girish furthered his understanding of appropriate technologies, rural society, and various developmental paradigms. These interactions helped him decide that he would work for the betterment of society and, in particular, focus on issues related to energy. The former goal, as expected, did not materialise immediately.

HIS JOURNEY IN THE ENERGY SECTOR

After graduating from IIT, Girish shifted to Pune, where he worked for a short period as a lecturer in an engineering college. During this period, he also conducted energy audits and worked on industrial consultancy projects. After this, he worked at the Systems Research Institute, a non-profit organisation working on issues of development. It was here that he started gravitating towards the broader social, economic, and environmental issues of development during collective reflection with his like-minded friends – an engineer, Shripad Dharmadhikary, and two doctors, Sanjeevani Kulkarni and Vinay Kulkarni. These interactions got him interested in issues that included the hazards of industrial pollution, such as the Bhopal gas tragedy, debates on economic, social, and gender inequities, and struggles such as that of the Narmada Bachao Andolan, which he engaged with in its early stages. It was during these discussions that he and the aforementioned friends had the idea of setting up a formal organisation for social engagement.

He held a firm belief that professional skills should be harnessed to address social issues. This led him and his friends to set up Prayas in 1994. Meaning ‘focused effort,’ the organisation is comprised of professionals working for the public interest, specifically to help disadvantaged communities. The group decided to work on the issues of health, energy, resources and livelihoods, and learning and parenthood. The focus of the wing of the group that worked on energy issues, led by Girish, was furthering public interest in the energy sector through research-based advocacy,

Around this time, Girish became acquainted with Professor Amulya Kumar N. Reddy’s alternate paradigm to promote ‘energy for sustainable development’. Known as DEFENDUS (Development Focused End Use Oriented), this approach put forth a comprehensive strategy to challenge the mainstream paradigm that was promoting many power generation projects across the country. He worked with Shantanu Dixit on this approach, who continued to be his colleague for the rest of his life. Together, they developed an alternative power plan for Maharashtra that integrated end-use efficiency and renewable systems. With this plan, the duo claimed that the states would only need half the generation capacity of the mainstream plan. With feedback from various sources,

Girish Sant at Durban COP 17-CMP 7 United nations Climate Change Conference, 2011

Panel discussion on Thermal Power Plants on the anvil at New Delhi, 2011

including power sector actors, activists, and others, they were able to gain a better understanding of the political economy of the energy sector.

Their plan, though well received by the power sector, was put forth at a time when it was witnessing an influx of big energy projects such as the Dabhol Power Company set up by Enron. Foreseeing inefficiencies in the ongoing development of the energy sector and its possible impact on the economy, Girish and Shantanu realised that they should examine the power purchase contract with Enron and its impact on different sectors. They discovered that it was riddled with problems such as high capital cost, unwarranted incentives, and unfair contract terms. Their analysis contributed to the informed discourse not only about Enron but also other large energy projects in the pipeline. These early experiences in communicating issues in the power sector to varied audiences shaped Girish's vision for the energy sector, as well as his push for alternatives.

PRAYAS

Girish and his colleagues established Prayas as an organisation that believed in teamwork and democratic functioning. Under his leadership, the Prayas Energy Group that began with three people grew to a team of fifteen researchers from varied backgrounds. His aptitude to connect with a wide range of professionals drew a number of senior researchers, as well as young engineers, into the team. His comprehensive approach to the study of the energy sector, emphasis on the need for strategic interventions, and focus on the interests of disadvantaged sections based on rigorous analysis and evidence became the distinguishing features of the organisation. He was of the belief that improving the efficiency and governance of infrastructure sectors such as energy would not only benefit the poor, but also save public funds that could be spent on other necessary services. His infectious enthusiasm motivated many young researchers to pursue policy advocacy in the energy sector based on public interest analysis.

Despite his many accomplishments through which he made a name for himself in the energy sector in India, he remained humble to the core, as is evident from the scores of tributes he received on the Prayas website after his demise. His mild mannerisms endeared him to many in the sector, often to those opposing his views as well.

INITIATIVES OF THE PRAYAS ENERGY GROUP

The organisation founded by Girish and others started engaging with the newly formed electricity regulatory commissions and civil society organisations to ensure increased awareness and participation in sectoral

Team at Prayas – Energy Group

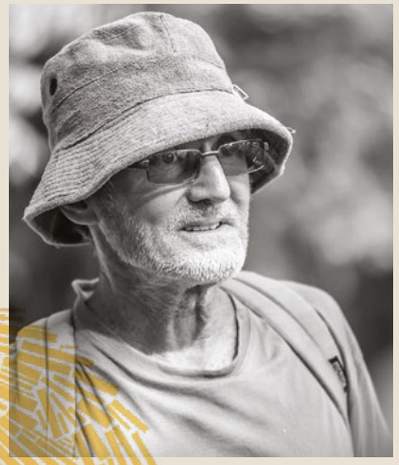
governance. Workshops were organised at the state, national, and Southeast Asian levels, which accelerated the formation and/or strengthening of civil society groups in Maharashtra, the former Andhra Pradesh, Tamil Nadu, and Karnataka. These groups took up regulatory interventions and citizens' awareness programmes and came out with publications including "Know Your Power: A Citizen's Primer on the Electricity Sector" and "A Good Beginning But Challenges Galore – A Survey Based Study on Electricity Regulatory Commissions," which were the first of their kind in the Indian electricity sector.

Another project taken up by the organisation under Girish's direction was a techno-economic analysis of three large hydroelectric projects — Sardar Sarvor and Maheshwar in India and Bujagali in Uganda. As with his previous work, the first two projects were analysed and their inefficiencies highlighted. Following this analysis, several technical and social alternatives were proposed. The analysis of the Bujagali project in Uganda highlighted issues similar to those related to the Enron project— inflated capital costs and a skewed power purchase agreement. This led to the renegotiation of the contract.

Based on their experience researching the Indian energy sector, members of Prayas took part in an international exercise with government and civil society groups from eight developing countries: Indonesia, the Philippines, Thailand, Brazil, South Africa, Tajikistan, Kyrgyzstan, and India itself. The aim of this exercise was to develop a toolkit to assess electricity governance. Girish also produced a report on Indian energy trends that were in contrast to those in other developing and developed countries. The report helped influence the discourse on the climate debate by bringing in equity, an important component. Through this process, he developed the 'triple-e' approach to policy making in the energy sector, which consisted of social equity, environmental sustainability, and economic viability. He also undertook several other projects that sought to bring about change that was socially, economically, and technically just in the energy sector.

Girish was part of several official committees, such as the planning commission's working groups for the 11th and 12th five-year plans, its steering committee on energy, its expert group on low carbon strategies for inclusive growth, and the Supreme Court-appointed committee on solid waste disposal. In 2008, he received the Distinguished Energy Alumnus Award of the Department of Energy Science and Engineering, IIT Bombay.

Girish Sant passed away in 2012. In a tribute to him, his colleagues wrote: "All of us have enjoyed working with Girish, analysing issues, and developing solutions. He played a pivotal role, and there is no way to replace him. However, he has also motivated and built a network of committed and competent individuals, within and outside Prayas, who are working on many pressing issues in the energy sector with the rigour and values that he strived for."



JOSS BROOKS

TN Khoshoo Memorial Award for his ecological restoration projects in Tamil Nadu

2010

Joss Brooks was born in September 1945 in Manchester, England into a family of socialists, educators, entrepreneurs, and craftsmen. Being born barely a month after the atomic bomb was dropped on Hiroshima and Nagasaki, he recollects growing up in a period when the world was experiencing deep trauma. His family were Quakers, a faith-based community that espouses pacifism, social equality, simplicity, and, increasingly, stewardship of the planet. His father was a conscientious objector during World War II. This was a difficult position to take, but not bearing arms is one of the fundamental principles of Quakerism.

Joss's early childhood was spent in Hereford. He remembers ancient chained libraries in the cathedral, rivers, wetlands, and big gardens, and collecting natural things as a young boy and keeping a museum in his room. He loved observing nature in silence with his mother.

His mother was a socialist who, after graduating from Oxford, lived in the slums of Birmingham in a communal house. His grandmother was involved in women's rights activism and helped with the founding of the Women's League for Peace and Freedom. His father wrote French textbooks in his early twenties, joined an expedition to South America in search of a lost city, and after the war, stood for parliament and specialised in adult education. This was an important intervention at the time, since people involved in the war were confused about how to make a living after it ended.

In 1953, Joss's father got a job as the director of adult education in Tasmania. For Joss, his three brothers, and his parents, the move was a welcome break from a battered and traumatised Europe. Australia, considered the lucky country, seemed a long way from home, but to a young boy, there were big open spaces and kangaroos. Life was good. This carefree childhood lasted until high school, when he started noticing underlying injustices in Australian society that were never talked about. When he graduated from high school, his parents and brothers moved to England for a year, leaving Joss behind to study law in Hobart.

"It was a great year full of new ideas, existentialism, Sartre, Genet, Camus, and Beckett. One started to question the lucky country, waking up to the thought —Oh, I am white, male, and British. And here we are, having destroyed so much of the natural environment and the ancient culture of the first inhabitants of the country, and we have a white Australia policy," he recollects. He spent a lot of time in the library exploring the histories of the first French and British explorers, as well as early settlers in Australia, and the record of the treatment of the Aboriginal populations.

Since his law course did not seem to address justice in the real world, a disenchanted Joss discontinued his studies and spent some time working as a lighthouse keeper on Maatsuyker Island, a small rocky home of marsupial mice off the southern coast of Tasmania. He was mostly on his own during this period, with books for company. He spent a lot of time reading Kafka and Schopenhauer. He later returned to a formal institution, the University of Western Australia, to study history, French, and philosophy. Here he immersed himself in theatre and writing and worked with Aboriginal communities by helping students get scholarships. There was only one Aboriginal graduate in the country at the time, and some of the treatment of the native people in the remote Christian missions shocked him.

During this time, he was actively protesting against the war in Vietnam. This continued until fate intervened. The Australian government drafted citizens for

Above Left & Right: Joss emphasized the importance of interacting and working with locals.

the war in Vietnam through a lottery system. Joss was called upon to fight in the war. This was when he decided to leave the country. He escaped by finding work on a ship that travelled to Acapulco in Mexico via Tahiti and later across the Atlantic to England.

Upon leaving England, he spent a number of years travelling in France, Istanbul, and Ethiopia, and later in India, which included time at the ashram of Ramana Maharshi. During his time in an ashram in Almora, he learnt the ways of living on the land and farming. This was his introduction to learning and applying ecological principles to the land. A few months later, he decided to go to Japan and join a Zen monastery, but on the way from Kerala to Madras, he had a dream in which a lady told him to go via Pondicherry. One evening, as he was walking along the roads of the former French colony, he met an old friend from Paris who invited him to watch a Charlie Chaplin movie at the ashram. He stayed on in the city for a couple of months and was later accepted by the Mother to join the young community of Auroville.

Coincidentally, Aurobindo Ghose, more commonly known as Sri Aurobindo, had lived for five years when he was a young boy in the 1880s not far away from where Joss grew up in Manchester. While seemingly insignificant at the time, Joss has gone on to spend most of his life in Auroville.

A NEW CHAPTER

Joss found the peace and calm he always yearned for in Auroville. “Growing up, we had participated in student revolutions and seen real possibilities of change in the 1960s. But we realised that to live as a part of society and be angry might be a bit dangerous. So there was a movement to walk your talk and practice what you preach. There was a desire to go back to the land and nature. Finding a place with the kind of focus and vision that Auroville had was freedom,” he says contentedly.

After reaching Auroville, there was no stopping him. Common sense led him and fellow residents to restore a degraded landscape. “My training in philosophy, history, and other subjects taught me nothing about surviving 45 degree heat,” he states very pragmatically. “Auroville was different because they spoke about being practical and bringing spirit into matter. Since it was a completely barren space, almost like a desert, we had a fresh slate to work with. We had to imagine a garden and begin planting.”

This phase in Joss’s life paralleled the development of Auroville itself. Information from old records and oral histories was collected about the landscape, and over the years, the area was transformed into what it is today. A lot of his present-day work stems from the work that he did during those initial

years. “We found out where the estuaries, wetlands, and bio-regions were by actually walking through these areas during both the monsoons and summers.” The growth of Auroville also led to the establishment of Pitchandikulam forest in 1973. Starting off as an attempt to restore sixty acres of eroded land in the green belt of Auroville, it has now become an institution in itself. Apart from housing a community of people, this evergreen forest also serves as a base for the Pitchandikulam Forest Consultants, who are dedicated to conserving and restoring the biodiversity in the region. There is also a wildlife research unit, an art studio, a nursery with indigenous species, and a medicinal plant conservation park, among many other initiatives.

Like the rest of Auroville, the Pitchandikulam endeavour started out with the aim of restoring the landscape. “Pitchandikulam is not a project. You don’t finish it in a stipulated amount of time and go on to something else. It’s a long-term engagement. We lived here. We didn’t live in Pondicherry, work here, and go back there at night. What we have learned is that you don’t do things from far away, you live it. If you really want to look after the land, it will tell you what it needs. That’s what Auroville was about, understanding the land, connecting with the memory of the place, and acting accordingly. We were the gentle stewards, not the owners. That is one of the fundamental principles of Auroville: it doesn’t belong to anybody. It belongs to the community. This is probably one of the most important elements of restoration ecology as well. People forget that. They want to own a piece of land or own a forest, but therein lies the problem,” he says.

“It’s so incredible that we have become very good at recording our own demise. But what’s the point?” he asks. “However clever we may have become in terms of hydroponics or vertical gardens, in the end, are we getting our hands dirty?” He strongly believes that there is a fundamental problem with the maddening urban sprawl. Hunter gatherers related to the land at a very basic level. They were part of it. To realise this and reverse environmental degradation, we need to begin caring for the land. This desire to care for the land has led him to partner with people all over the world, especially in Tasmania, in order to restore land.

Looking back on the years he has spent in Pitchandikulam and Auroville, Joss cannot imagine any other line of work he would rather be involved in. “It’s almost scary to think of not having a relationship with the land,” he says. He says he feels a connection with the land every day, more so when he goes away for a couple of days and comes back. “To come back to the land you have cared for after a long time, or walk quietly through it at night is very special. The place welcomes you. That’s the special thing that most people have lost, haven’t they?”

CONSULTANCY AND RESTORATION

The Pitchandikulam Forest Consultants group grew out of the need to

Below: Interacting with forest department staff.

Below Right: Joss contributed to restore the degraded landscape which Auroville is now situated on.

Joss interacting with a womens group.

take restoration ecology beyond the boundaries of Auroville. “There was a realisation that we can go on planting trees around Auroville, but what was happening around us was quite scary.” One of their biggest and most well-known projects has been the restoration of the Adyar Creek and Estuary, a 58-acre patch of land in the heart of Chennai. Over the years, this area had become a dump yard for garbage and debris. “When we gave the concept master plan of the Adyar Wetland Park to the government of Tamil Nadu, we didn’t know what we were getting into,” he admits.

To begin with, they had the monumental task of removing 60,000 tons of garbage and rubble from the site. In addition, the area had to be cleared of large amounts of water hyacinth and Prosopis. Once done, they went about greening the area by planting 90,000 seedlings of 172 indigenous species on laterite soil transported from Auroville. Water bodies were also added, and now it has been transformed into the biodiverse Adyar Eco Park or the Tholkappia Poonga. The area boasts a nursery, models for solid waste management and renewable energy, and, most important, an environmental education centre that Joss insisted should be integrated from the beginning. “When we started the work, we said that we would not do it unless we had an exhibition space during the creation of the park. This would provide an opportunity for people to come and see what we were doing, give their inputs, and get involved,” he says. Transforming the 58-acre patch was the first phase of this project. In the second phase, currently under way, the aim is to restore a 300-acre area further up the Adyar as well as along the Cooum River. “Both of these rivers are linked to the flooding, drought, and increasing salinity creeping into the surrounding areas, which makes it a very important intervention,” Joss explains. Apart from their work on restoration, another important intervention was to work on a gentle and persistent attitudinal change among the different stakeholders, from those who live in penthouses to those in the slums, from the shopkeepers to the fishermen. Everybody had to be taken into confidence.

During the final stages of the first phase, a new dispensation came to power in Tamil Nadu, which posed a problem for Joss and his team since it was not clear what the new government wanted. This change also had a direct impact on the project since it was not realised exactly the way Joss had envisioned.

Restoration work done at the Adyar Poonga, in Chennai, Tamil Nadu.=

Looking back at it he says, “During the three years we had been creating the Poonga we engaged with the surrounding community in many ways, from school programs and waste management initiatives to multiple contacts with community groups, one of which was the formation of a dynamic Friends of the Adyar Poonga. All this stopped with the change of government. The Environmental Education/knowledge Center which was to be a training and research facility for the ongoing Eco Restoration of Chennai waterways was not built,” he said dejectedly. However, to put a positive spin to the issue he said “The good news is that we are still looking after the Poonga and the additional 300 acres. We are also developing more innovative education programs and implementing them in and around the Poonga.”

A FUNDAMENTAL CHANGE IS NEEDED

Looking at watersheds holistically, and especially when reflecting on the floods of 2015, Joss says that much more work needs to be done. “Part of the problem during the floods in Chennai was that encroachment was rampant, which was coupled with the issue that some of the canals were not big enough to carry that quantum of water. However, the main problem was upstream in Kanchipuram, at the top of the watershed. All the little forests that served as

Joss interacting with school students at Pitchandikulam.

natural silt filters had been cut down. This led to a dramatic increase in siltation in the big yeris (village tanks), leading to a reduced storage capacity and decreased groundwater recharge." Planting and bringing back the vegetation, along with desilting of the yeris, can have a positive impact not only in that area but downstream as well.

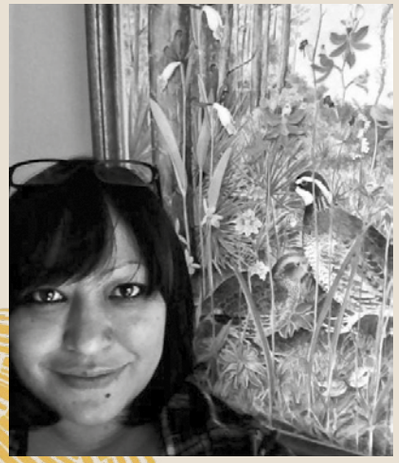
"All of this is common sense," he says. "What we need to do is get back to the land, understand it, and plant the right plants in appropriate places. If we do this, a lot of the problems of drought and flooding can be avoided."

Other initiatives

Apart from the work on the Adyar Eco Park and the Cooum River, Joss and his team have also collaborated with the Tamil Nadu government to set up an institute next to Auroville. It was established in 2015 after the government acknowledged the need "for new approaches and thinking in rural development based on the principles of sustainability." The institute provides training programmes for government officers, policy makers, and local communities in organic farming, sustainable architecture, and ecological design.

Another movement he has been a part of is an initiative called the Global Ecovillage Network, of which Auroville is a member. This network is comprised of thousands of communities worldwide that are "consciously organised through locally owned, participatory processes in all four dimensions of sustainability (social, culture, ecological, and economic) to regenerate their social and natural environments." As a part of the network, a course known as Ecovillage Design Education was conducted at Pitchandikulam for people from all over the world. "If more and more communities get into this, it could be a way out of the industrial military madness that surrounds us," he says optimistically.

Joss reflects that at Pitchandikulam, he has brought some of the threads of his ancestry to his work. "Everything you are supposed to be, what you signed up to be, your genetic material – you are all the stuff your parents have been dealing with." Socialist and environmental ideas from his mother and grandparents, the promotion of adult education by his father, and craftwork and entrepreneurship from his grandfather — all these threads run through his work at Pitchandikulam.



HEMLATA PRADHAN

TN Khoshoo Memorial Award for her work on botanical art

2011

It is not often that a toddler is taught the names of species of birds, insects, trees, plants, and flowers soon after they utter their first words. For Hemlata Pradhan and her siblings, being born into a family that was renowned in the field of horticulture meant that the development of an interest in nature was a natural progression.

Her father, himself an ardent orchidologist, botanical illustrator, and author from Kalimpong in West Bengal, was a hard task master who ensured that his children got a head start. His desire to teach them all that he knew meant that he also took them on regular trips to the nearby Laval and Kaefer forests, where they would spend hours observing the natural world. Most weekends were spent hiking down to their small farm near the Relli River, where they would plant trees and plants, play in the muddy paddy fields and stacked hay, and splash around in the nearby streams, which used to be full of crabs and fish. Her father's passion was supplemented by that of a shaman who worked as a caretaker on the farm; he narrated folk tales, invoked chants, and also taught them about medicinal plants.

Over time, Hemlata developed an interest in nature, especially through drawing what she saw. She recollects being very fond of drawing anything that caught her fancy, so much so that her school books would be covered in doodles by the end of the year. All these experiences played a vital role in generating a keen interest and fascination with the natural world.

Far Left: Hemlata studying a Saphrophytic Orchid in its habitat.

Left: Studying the habtat of Paphiopedilum fairrieanum

She began painting flowers at the age of eleven. One day, two years later, she chanced upon some of her father's field illustrations of orchids and rhododendrons. It was at this point that she realised that what she enjoyed most was drawing plants – flowers, in particular. Being born into a family that had been raising orchids for five generations also influenced her passion for flowers, especially orchids. Experimenting with the various colours and hues to arrive at the perfect depiction of an orchid is what excited her the most. When Hemlata was thirteen years old, she joined a school started by a Scottish missionary in Kalimpong, where she received her first lessons in drawing and painting. Upon completing her 10th standard and wanting to continue pursuing botanical art, she realised that there were no options to pursue natural history illustration in any of the art colleges in India. This was troubling, since India once possessed a rich legacy of proficient illustrators of the natural world.

After finishing her 12th standard, she enrolled for a bachelor's degree in fine art at Kala Bhavan in Shantiniketan, West Bengal in 1993. Though she had made up

Above: Senior students of Hemlata with their artwork.

Right: Students creating paintings from their studies of bees and lilies.

Bottom Right: Students creating wall murals using natural colours.

her mind that she would specialise in painting, her professors convinced her to specialise in printmaking, since her grades were higher in that subject. Left with no choice, she took her teachers' advice. "Printmaking was fun," she says, "and I enjoyed all the new mediums like lithography, etching, serigraphy, etc. I especially loved etching because it required meticulous handling — quite similar to botanical art techniques — and found that I could actually portray plants well using this medium." In the meantime, she also started looking around for courses that specialised in botanical illustrations.

The Royal Botanical Gardens in Kew in the United Kingdom had a diploma course, but was offering it only to Margaret Mee scholars from Brazil. However, once they saw her potential and desire, she was offered a seat. With a grant from the Elizabeth Greenshields Foundation, she completed her post-graduate diploma in botanical illustration and went on to do a Masters in Natural History Illustration and Ecological Studies from the Royal College of Art in the UK. She says, "Sadly, we were the last batch of students (2000–2004) to complete this course, after which it was discontinued."

It was during her masters that a certain development pushed her into concentrating on botanical illustration full time — the construction of the Teesta hydro-dam project, which was very close to the Mahananda Wildlife Sanctuary in North Bengal. This ravaged the surrounding landscape, destroying thousands of trees, plants, and orchids. "I was heartbroken to see what had happened when I returned home. Seeing this deterioration made me realise that we wouldn't have much nature left if we continued on this path of development. It was during this period that I became conscious of my responsibilities towards nature as a botanical artist. I had to start documenting plants before they were lost," she explains.

In documenting plants and flowers, Hemlata says, her aims were to highlight them as important and urgent subjects for conservation, immortalise the plants on paper, assist the conservation biologists in their work, help bridge the gap between art and science, and, finally, raise public awareness of India's flora and fauna.

Hemlata developing a painting in her studio

Throughout her life, she has continued to painstakingly document orchids and other plants. Key in this process is her time in the field, where she spends extended periods studying the subject, making multiple sketches, and studying the surrounding environment — the plants, rocks, algae, and climate. After this, she starts painting. She prefers water colours to impart hues to plants, even though it is a challenging medium to work with. This gives her paintings the softness she desires. This step is followed by the detailing, which takes a lot of time. Given the number of different stages involved in a painting, as well as the painstaking process, it often takes her a year to finish one.

FULFILLING A DREAM

Apart from painting plants and flowers, ever since she graduated from her masters, she dreamt of establishing a school that combined art, conservation, and education. In 2003, this dream was realised when she started a charitable trust called the Himalayan Trust for Natural History Art. Since 2011, the trust has been running a school known as the Himalayan Institute for Natural History Art, which holds various hands-on workshops and classes with the help of visiting

Hemlata's creation of Paphiopedilum venustum new in habitat

tutors and volunteers from all corners of India. The trust supports art education for fourteen underprivileged children aged seven to fourteen from the villages around Kalimpong.

Talking about the school, she says, "My philosophy in teaching developed from my belief that art could also be a means to help provide a holistic education to children at the grassroots level, preparing them mentally, physically, and consciously to meet the challenges of day-to-day living, as well as their studies. It is also a way to make them environmentally conscious, while also helping them earn a livelihood in the future."

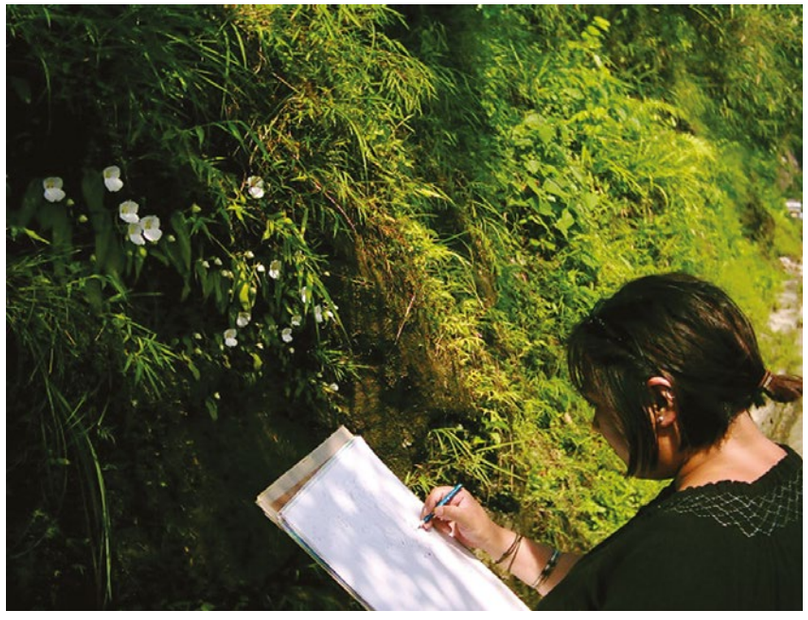
Students come to the school in the evenings and weekends and on holidays and are taught how to observe, as well as document, nature using different methods and techniques. This has the double advantage of honing their artistic skills and giving them a better understanding of and building a connection with nature. Setting up the school was a challenge. The children who come to her school are a mix of school-going children and those who work with their parents and

Above: Hemlata's creation of *Calanthe silvatica* in habitat.

Above Right: Studying the habitat of *Anthogonium gracile* (painting in collection of Kew Gardens, U.K.)

help out at home. As a result, most of them had not used art materials before they came to the school. This was made even more challenging by the fact that many of the parents felt that this was a waste of time and that the children should instead do something more 'productive'. She countered this problem by making three thumb rules. One, the students were asked to come to the classes with a mind free of all the worries and problems of their lives. They were asked to enjoy the time they spent there. If they wanted to, the students could talk about their problems after class, and solutions could be worked out together. Two, the students were supposed to maintain their sketchbooks with respect and dedication. And three, the work assigned by their regular schools and their chores at home had to be completed before they sat down to work on their art.

She says the third rule was added recently when she found out that the children were deliberately skipping their regular classes, as well as their chores at home, so that they could spend more time at the art school. Although she was overjoyed that the students liked art so much, she made it clear that these classes should not interfere with their regular studies and their daily chores. These simple changes have ensured that the school has had a big impact on the children, which she hopes will last throughout their lives.



Above: Hemlata's creation of *Diplomeris hirsuta* in habitat.

Left: Hemlata studying the habitat of *Dimplomeris hirsuta.* It took her one year of field trips and studies to create the painting. (shown above)

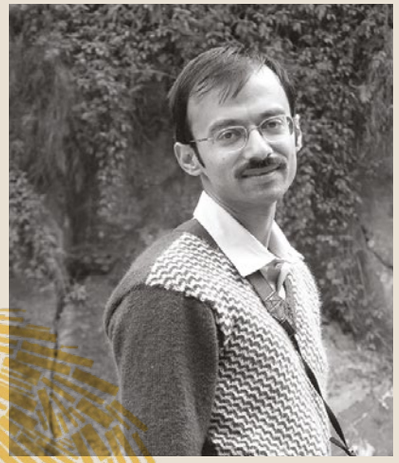
Above: Hemlata's creation of *Dendrobium jenkensii* in habitat.

Bottom: Hemlata's student transfering her sketches of birds on to clay pot

RECOGNITION

The first stage of her dream of setting up an art school is almost complete — she is working on getting it registered. In addition, she is also currently working on getting natural history illustration recognised as a fine arts subject in India. What began as a hobby for her early on in her life became her vocation, which she has practised for almost twenty years. Her passion for botanical illustration and her expertise in it won her the Royal Horticultural Society's Gold Medal in 1999, as well as the 18th World Orchid Conference Gold Medal for her paintings of Indian jewel orchids and Indian wild orchids.

Most of her paintings are displayed in the Royal Botanic Gardens in Kew, England, as well as in the British Museum's Clore Education Centre in 2009. They have also been used on six postage stamps in Bhutan. Her illustrations have also appeared in books such as Orchids of Bhutan and Hundred Beautiful Himalayan Orchids and How to Grow Them.



DR. SANDEEP TAMBE

TN Khoshoo Memorial Award for his efforts in sustainability and community-based governance of common property resources in Sikkim

2011

Career choices, especially at a young age, can be quite challenging. Familial pressures can be formidable, and one often tends to stick to the path one initially started out on. In the 1980s, career options were limited, and motivated students usually opted for either medicine or engineering. Sandeep Tambe chose the latter and joined IIT Mumbai, but from then on, took the path less travelled.

Sandeep and his two sisters grew up in the steel cities of Rourkela and Bhilai, where his father was employed with the Steel Authority of India Limited (SAIL). However, they always spent their vacations in their ancestral village, Nakaval, in the Mandla district of Madhya Pradesh. This village opened up a new world to Sandeep and his sisters, and offered everything to capture a child's imagination — rugged mountains, dense forests, tranquil rivers, giant banyan trees, large tracts of agricultural farmland, and rich tribal culture. They spent their holidays with their doting grandparents immersed in this idyllic setting, farming large tracts of land, trekking in the adjacent Satpura hills, swimming in the Narmada River, herding cattle, and sleeping under starlit skies in a landscape dotted with hamlets of the Gond and Baiga tribes. Sandeep's love of the outdoors and experiential learning of rural livelihoods and tribal life came together during these formative years.

NEW BEGINNINGS

Joining IIT Mumbai in 1990 paved the way for Sandeep's future career by nurturing his passion for wildlife conservation in ways beyond academics. The lush environs of the campus in Powai with its verdant lakes enthralled him, while the rich birdlife and the occasional leopard sighting heightened his interest in wildlife. This interest was supplemented by an active wildlife club that organised regular trekking and birding trips to the Sahyadri Mountains and other wildlife areas. What got Sandeep hooked though was not just visiting and enjoying these wildlife areas, but the challenge of protecting them. He realised that merely touring these wildlife areas was not enough — he wanted to give back to nature and society by protecting and conserving these areas. He decided to make his passion his profession, and this led him to join the Indian Forest Service (IFS). While he cleared the exam with ease, the tougher challenge lay in convincing his parents, who were against him taking up the job, as they felt that he would not be able to cope with smugglers, wildlife poachers, and timber mafias. It took a year of convincing, joint visits to wildlife areas, and interactions with forest officials before they finally gave in.

THE FIRST PHASE

After graduating from the National Forest Academy, Sandeep was assigned to Sikkim, where he served for sixteen years. For the first eight years, he was with the forest department and worked in the Khangchendzonga landscape on wildlife conservation. Being lucky to get a posting of his choice, he soon realised that the situation on the ground was far from what he had imagined. Protected areas were notified but largely only on paper, poaching was rampant, the habitat was getting fragmented, and the local community had no say in conservation. He had very few staff, poor infrastructure, and limited financial resources. Working in the state of Sikkim had more than its fair share of challenges. On one hand, it was a global biodiversity hotspot, but on the other, it did not have a history of conservation. He had his work cut out for him.

Serving as the Divisional Forest Officer (DFO) for two districts of Sikkim, South Sikkim and West Sikkim, he decided that the best way forward

Developing a participatory ecotourism plan in the buffer villages of Khangchendzonga National Park

Enabling effective social audits to make public programmes accountable to the people.

for conservation was to forge partnerships with the local communities. Accordingly, eco-development committees (EDCs) were formed that raised awareness at the village level about the need to conserve forests and water resources. Sandeep says, “They became our agents of change and partners on the ground.” His first major initiative was to gradually wean the herders away from grazing their cattle in the forests. Years of uncontrolled grazing had led to the fragmentation of the old-growth forests. The EDCs played a major role in raising awareness in the village and highlighting the issue of equity: only a few herders were benefiting at the expense of the whole community. This process of institution building at the village level, honing their capacities, increasing awareness, reducing threats to the wildlife areas, and monitoring the impacts took eight years of hard work. After several rounds of negotiation, and with the government providing compensation and enforcement of terms as well, the forests in the Khangchendzonga landscape finally became cattle free.

The time and effort that Sandeep and his team put in was well worth it. “Looking back now, we can see that nature has started healing itself,” he says. “In the temperate belt, the oak, hemlock, and rhododendron forests have regenerated. In the alpine areas, with reduced competition and higher fodder availability, the blue sheep population has increased, and even the elusive snow leopard has been spotted on a few occasions.” It has been made possible to rewild large areas together with the community. The conservation status of 5000–6000 square kilometres of a biodiversity hotspot has improved significantly.

Now, after many years, when they look back, the ex-herders are grateful that they left pastoralism, as they are now a part of mainstream village society and their children are going to schools and have access to health facilities. Nature tourism has grown by leaps and bounds, providing an additional source of income for the villagers, while the tourists are also able to have a better experience.

He also initiated community-based initiatives for participatory conservation of lakes in Sikkim that were popular among tourists. The lake conservation guidelines were framed, following which the Pokhri Sanrakshan Samitis (PSS) were formed for the Tsomogo, Khecheopalri, and Gurudongmar lakes. They collect a nominal fee from tourists and ensure that the surroundings are kept

clean, sanitation facilities are well maintained, and the lakes are conserved. The fact that these samitis are functioning even today gives Sandeep a great sense of satisfaction.

THE SECOND PHASE

The next eight years of his life were spent with the Rural Management and Development Department in Sikkim. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) programme had been recently launched in the country, and Sandeep was appointed to oversee it. This proved to be quite challenging for him, not because he was unfamiliar with the issues, but because of two main reasons. First, a huge amount of funds was devolved to the gram panchayat under this programme, which meant that capacity building was needed, transparency and accountability measures had to be embedded, and grassroots democracy had to be strengthened. Second, a lot of these villages were remote and mountainous and were therefore difficult to access.

Women were enabled to participate in this programme in large numbers as projects started in every settlement. The MGNREGA programme is unique in the sense that it has a bottom-up planning process, and the villagers can decide which scheme is most suited for the village, be it water conservation, land development, irrigation, rural connectivity, plantations, or animal sheds, among other activities. In the initial few years, mostly playgrounds and footpaths were built, and the women received wages. However, Sandeep felt that there was something missing. While the scheme functioned like a safety net and ensured that households did not fall deeper into poverty, it did not actively lift them out of poverty either. This spurred him and his team to tailor the programme to create income-generating assets on the lands of the poor. Instead of just constructing community assets like footpaths and playgrounds on this land, they could also build horticulture plantations, water storage tanks, cattle sheds, and pig sties.

To implement this vision, a state level pro-poor policy called the Gram Panchayat Pro-Poor Perspective Plan (G5P) was framed. According to this policy, fifty percent of the MGNREGA funds allocated to a village would have to be spent on creating livelihood assets on the lands of the poorest twenty percent of households in that village. These poor households were identified through a participatory process at the village level. The poor now started benefitting twice over. Apart them from them receiving wages, income-generating assets were also created on their lands. The orientation of the

Participatory conservation planning in villages adjacent to the Khangchendzong National Park.

Linking practise, policy and science with community support.

programme shifted from providing large public works to creating such assets on the lands of the poor. “This policy was framed in 2010, and within two to three years, we could see the difference on the ground,” he says.

From a public works perspective, the programme transformed into a people’s programme. The people now saw that they had a direct stake in it and started contributing wholeheartedly. In order to strengthen transparency, effective social audits were coupled with the programme. Civil society organisations were trained to facilitate these audits, in which the expenditure records of the programme were read out publicly in the gram sabha. Wherever irregularities were identified, recovery was made from the erring functionary. The higher probability of getting caught and the fear of being publicly named and shamed significantly reduced corruption. Recent evaluations have rated Sikkim as one of the best performing states in terms of livelihoods promotion, transparency, and accountability in the country.
The second programme initiated by Sandeep focused on reforms in the rural housing sector. Changes were brought about so that the process of building houses, which was earlier controlled by contractors, was now driven by those who would occupy them. The owners would be provided funds in instalments based on the stage of construction and would take the lead in building their houses. Post the devastating Sikkim earthquake in 2011, large-scale owner-driven housing reconstruction was successfully taken up. “When the owner takes charge of building his own house, the quality is much better,” says Sandeep candidly.

During the latter part of his eight-year tenure, he was approached by some farmers who told him that water shortage was the main hurdle standing in the way of their livelihood security. “We realised that in large parts of Sikkim, the villagers were solely dependent on mountain springs for water security. Each village would be situated downstream from a cluster of springs that were tapped by gravity flow. The water from these perennial springs had slowly started drying up, and many of them had become seasonal. During the summer months, when these springs dried up, women had no option but to go downhill to a bigger spring to collect water and trudge back uphill. This created a lot of hardship for the whole family, as women could not take

up livelihood activities and children were often late to school,” he explains. When he examined the experiences of other Himalayan states for possible solutions, he found none. He decided that a solution had to be formulated within Sikkim and partnered with various organisations in the process. “We found that the springs were drying up not only because of changes in land use, but also due to a shift in rainfall patterns,” he elaborates. “Monsoon rains, which earlier came as a light drizzle lasting for a few weeks, had become torrential. Winter rains had all but disappeared. This concentrated rainfall was resulting in higher surface runoff and reduced natural recharge of the springs.” His team was trained in geohydrology to identify the recharge areas of the springs. This was followed by digging trenches and ponds in the recharge areas so that the surface runoff could be caught and the groundwater recharge augmented. This spring revival initiative was called Dhara Vikas (spring-shed development), the funds for which came from the MGNREGA. The emerging results are encouraging, and the seasonal flow of the springs has improved compared to previous years. This initiative

Above Left: PM Award on Civil Services Day.

Promoting organic vegetable farming by strengthening the water storage infrastructure.

Far Left: Receiving the state award for meritorious service from the Governor of Sikkim.

Middle: After being presented with the T.N. Khoshoo Memorial Award by Elinor Ostrom.

Left: with the national award team in Delhi.

caught the attention of the planning commission, which recommended it to other Himalayan states. “Many states came on exposure visits to learn from our Dhara Vikas initiative and have now started their own spring revival programmes,” he says proudly.

A TIME FOR REFLECTION

Since leaving the rural development department in 2015, Sandeep has become a professor at the Indian Institute of Forest Management in Bhopal. This has given him time to reflect, document, and share his experiences with the younger generation. When asked why he chose to implement the lesser used approach of participatory conservation, he replies that partnerships are needed for effective conservation. “People working in this field tend to bracket themselves strictly as wildlifers or as those working for communities. A common ground needs to be created where different stakeholders can meet and work together. It was not so stark twenty years ago, but this polarity has been increasing day by day. I see a lot of common ground between conservation and the livelihood security of the local communities. If partnerships can be forged among wildlifers, social activists, academicians, activists, and government departments, a collective and substantial change will be possible,” he concludes.

This integrated approach to conservation and livelihoods, of learning from practice, integrating this knowledge with science, and then formulating policy prescriptions is what he teaches his students as well. This method was used when implementing the spring revival initiative, the cessation of grazing in forest areas, and the G5P pro-poor policy. Learning from the ground was combined with science, after which a policy was developed so that the solution could be institutionalised and scaled up.

Sandeep has derived great satisfaction from his initiatives. His team has received accolades at the national level from the prime minister for doing exemplary work under the MGNREGA. “Villagers who had only dreamt of visiting Delhi shook hands with the prime minister on his first visit to Sikkim. This was a proud moment for me,” he says. Furthermore, many of

“There are a lot of different stakeholders: government departments, NGOs, local communities, academicians, and many more. Each one of them brings something unique to the table. Multi-stakeholder partnerships are essential to achieve common goals and sustain initiatives”

the paraprofessionals who were trained in spring revival are now travelling to other states to share their knowledge. He is happy that his learnings are now being shared across the Himalayan landscape and that the outcomes are being scaled up as well.

Sandeep’s journey has not been without its challenges. Bringing together a passionate team motivated towards a common goal and building capacity took a lot of time and effort. “If you have a good team, achieving your goals becomes that much easier,” he says. In addition, Sikkim was and continues to be blessed with committed political leadership, without which bringing about change is difficult, he believes. Nevertheless, forging partnerships between diverse stakeholders was another hurdle he had to overcome. There are a lot of different stakeholders: government departments, NGOs, local communities, academicians, and many more. Each one of them brings something unique to the table. Multi-stakeholder partnerships are essential to achieve common goals and sustain initiatives, he emphasises.

Looking back on his postings, Sandeep feels lucky to have been in them long enough to be able to complete the cycle of initiating and successfully implementing projects. Typically, government postings last two or three years, which makes it difficult to complete a cycle and bring about sustainable change.

Elaborating on the changes that he is witnessing, he states, “It is good that the media is becoming more pervasive in people’s lives, because people are becoming more aware about the issues of conservation and the environment. However, this needs to be translated into cultivating passionate changemakers who not only understand environmental issues, but are also willing to rough it and work on the ground in difficult conditions”.

He hopes for a future in which the developmental discourse can be altered to ensure that healthy forests and happy people coexist. Where the local community has better health, nutrition, and educational facilities, the wildlife, as well as habitat, are also protected. Usually in the tussle between conservation and livelihoods, there is only one winner. Sandeep aspires for a win-win situation.

“When I was in college, I read Mahatma Gandhi’s My Experiments with Truth. That had a big impact on the choices that I made in my life. Gandhi transformed the freedom struggle into a people’s movement, and this message has stayed with me. His commitment and compassion for the poor touched me. All these ideas influenced me and have stayed with me throughout my career,” he says thoughtfully.

DR. VIDYA ATHREYA

TN Khoshoo Memorial Award for addressing leopard-human conflict in dense human-dominated landscapes

2012

Not many children have been raised in a family where both parents loved and cared for animals, whether they were injured cats, bulbuls, or other animals. Vidya Athreya's love for animals and the natural world was instilled at a very young age.

Growing up in Mumbai, Vidya finished her schooling and, not sure what to do next, enrolled herself in a Bachelor of Arts programme. In her first year of college, she participated in a nature camp organised by the World Wildlife Fund (WWF) in the Anamalai Hills in Tamil Nadu, during which she realised her calling. Back in Mumbai, she started spending at least one day a week at the Bombay Natural History Society (BNHS) and made trips to Sanjay Gandhi National Park (SGNP) on the weekends. She wanted to get into the natural sciences, but there were not many options at that time, around three decades ago. Luckily, she chanced upon the Salim Ali School of Ecology in Pondicherry, from where she completed her masters. Field work for her dissertation took her back to the place it all started, the Anamalais, to study strangler figs. This is where her focus on studying interactions between different species took root. She then spent some time at the Wildlife Institute of India as a junior fellow. Her fascination for cats led her to do a couple of projects on the clouded leopard and the Asiatic lion. After another masters from the University of Iowa on strangler figs at the Smithsonian Institute in Panama, Vidya came back to India and set up base in rural Pune, with her young daughter and husband, who was working on a radio telescope located there. This area also happened to be facing intense human-leopard conflict; attacks were taking place on a regular basis. Since she was an ecologist and had worked on large cats, her friend Sanjay Thakur insisted that he would help her understand the reason behind the leopard problem if she would be part of a project on it. Having agreed, she was joined by three other colleagues, and they got to work. This project kick started her efforts in understanding human-leopard interactions.

THE MANY LAYERS OF WORKING IN THE FIELD OF CONSERVATION

On the whole, India has always been a country that has been accepting of its wildlife. "This is why, despite having more than a billion people, we have the world's largest population of elephants, tigers, etc.," she points out. Mumbai is illustrative of this coexistence. Within the bustling metropolis is a national park with leopards, deer, wild boar, langurs, and a whole host of other species. While one marvels at this coexistence, there are many challenges. In particular, leopards that reside within the park are sometimes seen along the boundary or within the residential complexes that border the park.

When asked about how we should deal with this delicate situation, Vidya replies, "It was challenging until I realised that in order to handle this situation, we needed a people-centric approach and not a leopard-centric one. If we went out there and said that the leopards needed to be saved, no one would listen to us. But if we tell people that we are here to help them so that leopards do not hassle them, then they will be more receptive."

The first step in this initiative was to identify the key stakeholders — the forest department, media, police, important institutions surrounding the park, and people living in the vicinity who might come across the big cat. Luckily, the forest department was very proactive and interested in changing the way the leopard situation was being handled in Mumbai. They, along with interested citizens, started holding interactive sessions to sensitise the public on how to react when a leopard was spotted. This was easier said than done, but possible nevertheless. It required the forest department to be willing to engage, as well as a group of people who were willing to work together to bring about change.

Her work often took her to remote villages where locals often narrated fascinating encounters with leopards

Ajoba being collared

As the media often demonises leopards and labels them as man-eaters without considering the repercussions, the forest department was open to holding workshops for the press clubs in Mumbai to sensitise journalists. However, Vidya believes that if these workshops are not conducted on a regular basis, they will not yield the desired outcome. Moreover, as a result of the high attrition rates in media houses, almost every entry-level journalist wants to write about conflict in a very simplistic and one-dimensional manner, she says. She has made efforts with the press in other states of India as well. However, her hope for the long-term future is that the Press Trust of India or another national body frames guidelines for reporting on issues related to human-wildlife conflict, as they have done for coverage of communal riots.

While the press is often blamed for creating hysteria, one has to go to the root cause of the issue to understand it better, according to Vidya. There are times when the forest departments themselves are to blame for creating conflict. There have been many instances where leopards were being captured and translocated to other areas, which have unsurprisingly coincided with high levels of attacks on humans. “These ideas about relocating a leopard come from ideas of management that are not well thought out. Leopards are highly territorial animals and know their territory inside out. They know how to avoid people and where to get food and water. If an animal that has been living around a semi-urban or village landscape is captured and relocated to a forest, when it has never lived in a forest all its life, it will probably be scared of the trees, the Sambar deer, and the resident leopards, just as if we were to take an urban resident and put him in a forest. Our experience shows that the first thing the leopard will do is go to nearby villages. Many of the forest villages protect their livestock, and they don’t have too many dogs or garbage. As a result, the most common and smallest living beings the leopard will find are children. This is a recipe for disaster. We have had instances where the translocated leopards have attacked people for the first time in the history of that place, even though there were resident leopards that had never attacked people in the area,” she points out.

She adds here that public opinion about leopards is largely shaped by the media. While there are countless stories of humans interacting with leopards and other wildlife on a daily basis, it is the most negative encounters that are

portrayed. Vidya goes on to narrate a story of an interaction she had with a farmer: “I was walking along a road one day and came across a farmer who was working in his field. He told me that his wife had been washing vessels at dusk outside their house the day before. The house was on slightly higher ground than the adjoining maize field. After she finished washing the dishes, the woman threw the water onto the field and inadvertently onto a leopard, which was walking below. The leopard growled, at which point the farmer’s wife screamed and ran into the house.” Vidya continues her story: “We were all laughing at this, including the farmer himself. Where is the conflict and drama that is portrayed? These are the kind of interactions that happen on a daily basis.” She adds remorsefully, “It is so sad that urban India does not interact with rural India. Our lives are so much more enriched when we do. The people I have met in rural areas are so incredible!”

However, it is not just in rural areas that she has come across people who have amazed her. In Mumbai as well, she had an unforgettable experience. She remembers an elderly leopard named Ajoba, meaning grandfather in Marathi. He was the first leopard that had a tracking collar put on him. His collar, however, fell off after some time, which meant that he could no longer be tracked. “I was suddenly woken up one night by a forest officer who said that they had a leopard that had been hit by a vehicle,” she continues. “A passer-by who was an animal lover stopped and put the 70 kg leopard into his boot and drove to the Sanjay Gandhi National Park. How amazing is that! When he died, random people who had not even seen him before cried, which shows the extent animals can affect humans.” Ajoba had walked 125 km in 25 days and was heading for the park when he got hit. His story captured the imagination of many people in Mumbai and was later made into a Marathi movie with the same name.

EVOLVING NARRATIVES

Having spent an enormous amount of time working in the field of interactions, Vidya has found that her understanding of conflict has evolved since she started working. Initially, her belief was that leopards had no business being in farmland. However, as she spent more time in the field, it dawned on her how egoistic she was. “Who was I to decide these things? That’s not my job. As a scientist, I am supposed to view and present the situation in a holistic way. But when we are

> “India has always been a country that has been accepting of its wildlife. This is why, despite having more than a billion people, we have the world’s largest population of elephants, tigers, etc.”

younger, we tend to start off with biases that we seldom let go of. What I also realised was how many different kinds of relationships Indians have with wild animals, which is not in the narrative of conservation biology that is taught to us. A lot of our training comes from western concepts of conservation. Social sciences and the human dimension are missing in the way conservation biology is researched and practised today. How can you study and aim to work on conservation biology in a land of a billion people by pretending that humans don’t exist?” she asks.

This insular approach to conservation is apparent when one looks at the species that are given importance. Tigers and elephants get all the attention. She has found that this lopsided focus is present even when trying to access funds to study and work for leopard conservation. The common narrative is that leopards are not endangered and therefore do not need as much protection and attention as some other animals.

However, she does hope that there will be a positive change thanks to the recent proposal to replace the National Tiger Conservation Authority with a broader National Wildlife Conservation Authority. This could bode well for other species that have not been getting the attention they deserve.

This is a step in the right direction, but her past experience has shown that there needs to be a systemic change for wildlife to be given the importance it deserves. Having been involved in framing guidelines on managing human-

Above Left: Interacting with people in rural areas has been extremely enriching for her.

Above Right: Farmer and wife curious about camera images.

leopard conflict, Vidya believes that the main issue is that enforcement of the law is severely lacking. There is also the issue of corruption in India. “There is so much money involved that the actions that are taken are more determined by how much money is available than by whether that action really needs to be taken or not,” she laments. “There is a lot of chest thumping in the field of conservation, where, until recently, emotions have trumped facts and science,” she adds.

THE HIGHS AND LOWS

In her journey working on interactions, one of her proudest moments was the ‘Mumbaikars for the Sanjay Gandhi National Park (SGNP)’ project. It took off in 2011 with a very dynamic field director, Sunil Limaye. The main objective of the project was to use basic scientific methods and involve interested people in Mumbai to better understand the beauty, importance, and challenges the leopards and the park faced. This was an effort to focus on the positive action that Mumbaikars could take to better manage the park. Vidya, who was helping with the project, states, “There was so much positive energy that came through this project. The amount of support it received and the desire of the citizens to do something for the park they loved really came through as well. I am really proud of this.”

On a more personal level, Vidya has often faced gender discrimination, not by those in the forest department with whom she interacted a lot, but surprisingly by her own male peer group. The typical chauvinism and high handedness often got to her when she was younger, and she often gave those who treated her in a demeaning manner a earful. But over the years, she has learned to shrug it off. “It is quite sad. If you get it from people you expect it from, then it’s manageable, but if you are discriminated against when you least expect it, then it is much worse. The unfortunate thing is that India is still a very chauvinistic society,” she says.

CURRENT ENGAGEMENTS

Over the last few years, Vidya has taken a step back from field work and is focusing more on nurturing a second generation of people working on human-wildlife interactions. Under Project Waghoba, she and her team are working in Himachal Pradesh, Uttarakhand, West Bengal, Karnataka, and Maharashtra. She is undertaking this work as a senior research fellow at the Wildlife Conservation Society.

Crucially, Vidya points out that she has never heard anybody talk about the Indian model of conservation. Conservation biologists, the media, conservationists, and even managers always talk about South Africa, Europe, and the U.S. and their respective models of conservation. She feels that the Indian model of conservation is the most successful, yet it does not get its due. “I think we need to start focusing on our own model of conservation. Very few people are recognising the fact that our model should be researched more. We need more awareness about our own situation and to look within for solutions to our problems,” she says.

AVANI

TN Khoshoo Memorial Award for its focus on community self-reliance and local, sustainable solutions

2013

The mountains have a way of luring people to them, especially those who do not fit into the daily rat race. For Rashmi Bharti and Rajnish Jain, their move to the hills was accelerated in the early 1990s as a result of their experiences at the Osho commune in Pune, where they met and later got married. Influenced by the commune's tradition of integrating one's life and work, they yearned for an alternative lifestyle. They headed for the hills and worked for a short period in Kumaon with a community-based NGO. It was during this time that they came up with the idea of forming an organisation focused on improving quality of life, creating sustainable livelihood opportunities, and nurturing the surrounding environment. With very little background in working with communities, they had to first understand their task better.

On their return to Pune, they were introduced to Bunker Roy, founder of the revolutionary organisation Social Work and Research Centre, commonly known as the Barefoot College. Under his tutelage, they learned about working in the field of rural and community development. Having gained some insights into working in this field, they moved to the Pithoragarh district in the state of Uttarakhand. Once there, they started the Kumaon chapter of the Barefoot College in 1997, later registering it as Avani in 1999. Their first intervention centred on promoting the use of solar energy. However, making inroads into the community to promote solar energy's use

Rashmi Bharti and Rajnish Jain who founded Avani in 1999

was not easy. To begin with, the couple electrified their own house with solar energy. Once the community was convinced that this was a viable option, the organisation started off by working with a few families. Over time, this number grew, and the organisation has now helped electrify more than 25 villages. Rajnish states, "Apart from bringing technology to the area, it has also created employment opportunities by training people in fabricating and maintaining solar systems."

Although the use of solar energy continued to spread throughout the country, they realised that the people accessing this technology came from the middle income group and the wealthier classes. "The poor were not willing to pay or did not have the means to pay even Rs. 30 a month," says Rashmi. "This got us thinking about increasing the income of this demographic. That's when we started working on reviving the traditional craft of spinning, weaving, and naturally dyeing Tibetan wool and silk, which was once flourishing amongst the Bora Kuthalia and Shauka communities in the region." The decline of the traditional handspun mats coincided with the popularisation of machine-made plastic mats. As a result, the community's interest in and need to make the traditional mats declined. Young men either migrated to the cities for work or remained unemployed at home. With this being the state of affairs, the organisation aimed to create livelihood opportunities.

Above and Above Right: Harvesting of Indigo leaves

REVIVING A TRADITIONAL ART

Building on the principles of sustainability and local empowerment, Rashmi started off by working with adolescent girls who were dropping out of school at the secondary educational level. Reviving this cottage industry had multiple benefits for the young girls working with them — a better standard of living, increased income, and delayed marriages, which in some cases were put off for eight to ten years. Apart from working with adolescent girls, they also engaged with the elderly women who were widows or who had been abandoned. For them, the work brought about a sense of independence and confidence.

When this project began with a handful of weavers, the couple realised that the women used only a couple of natural dyes derived from two different plants. Chemical dyes were increasingly being used. Using the traditional knowledge of plants in the region, Rashmi worked with the women to expand the range of colours, emphasising that they should be natural dyes. Today, dyes are extracted from over eighty plants, including turmeric, indigo, marigold flowers, walnut leaves, rhododendron, and many others. Some of these plants, such as indigo, are beneficial to the soil because they are nitrogen fixing plants and thereby improve the quality of the fields for plants grown along with them in a mixed cropping system. Apart from these plants, Chromolaena (earlier classified

Soaking of Indigo leaves

under the genus Eupatorium) and some other plants that are considered invasive were also used. While they were useful sources for the natural dyes, uprooting these plants had the double benefit of employing people and removing this species from the landscape.

The initiative began with a year of experimentation to find out if textiles could be worked with and production scaled up. Initially, Avani engaged with twenty families who made traditional carpets. Some changes were made; new designs were tried out, and emphasis was placed on using handspun wool instead of chemically dyed machine yarn. After this initial period, the couple turned their attention to improving the quality of spinning, so that the fabric that was produced was usable for garments. This process, which took close to three years, has reaped rich dividends for the unit. From working with twenty families, Avani currently works with more than a thousand artisans in over one hundred villages in two districts.

In 2005, Avani launched the producer-owned Kumaon Earthcraft Self-Reliant Cooperative (KEC). Their products include shawls, sarees, home furnishings, and other items made by Kumaoni artisans. They also make raw natural colourants for cosmetics and pharmaceuticals and eco-friendly art supplies for children.

Above and Right: Indigo dye oxidization process, and, indigo dyed fabric with indigo leaves and the dye.

Above and Left: Solar electrified village and AVANI solar power plant.

Right to Far Right: Spinning, Weaving and Reeling

These products, which are sold in both the domestic and international markets, have received numerous honours and awards. These include the UNESCO Seal of Excellence for Handicrafts for six of their naturally dyed silk fabrics and certification for the absence of pentachlorophenol and amines by the Ministry of Textiles in Mumbai, among others. With its emphasis on conservation and the sustainable use of natural resources, the cooperative has ensured that all their materials are sourced locally. This includes everything from the planting of trees and sericulture to spinning, weaving, and natural dyeing of the fabric and, finally, making the finished product. This framework has ensured that every stage of production provides livelihoods to people with different skill sets. Wherever energy is required in these processes, solar power meets their needs.

ENERGY

Another recent initiative by Avani is that of using pine needles as cooking fuel and making electricity from them through gasification. The abundance of pine trees in the hills of the region has been a threat to this fragile ecosystem. Not only does it obstruct the growth of other trees and shrubs, but pine needles also litter the forest floor and are highly flammable, leading to forest fires during the dry season.

With this in mind, Rajnish thought of a plan to generate electricity using the abundant pine needles. The needles are collected, the resin from within is extracted, and, when heated, produces sufficient gas to generate power. Locals who are employed to collect pine needles are remunerated both in the form of cash and cooking charcoal, the latter of which is a by-product in the power generation process. The collectors can make up to Rs. 600 per day, as opposed to the government mandated daily wage of Rs. 300, and spend 25% of what they earn in two months to pay for the whole year's supply of charcoal. Recently a 120 kW power plant was set up in the village of Chachret and, when ready, will provide electricity to one thousand families. The organisation

Above and Right: Rural technicians.

has signed a 20-year Power Purchase Agreement (PPA) for this plant, as well as the two pilot plants of 10 kW capacity each, with the Uttarakhand Power Corporation Limited (UPCL), the only power utility operating in the state. Each 10 kW power plant can meet the electricity requirements of up to twenty families year-round.

This initiative has been of immense help in the state, which has seen fires ravage thousands of hectares of land. The removal of pine needles from the forest floor prevents litter fires on the ground, along with the spread of fires that destroy the area. In 2011, Avani registered Avani Bio Energy, a sister company dealing with the electricity generation.

This initiative has been so successful that, in 2012, the Acumen Fund, a venture capital fund, invested Rs. 1.3 crores in Avani Bio Energy. With this investment, the company is building an additional twenty plants of 10 to 30 kW capacity that will provide electricity to more than 58,000 people. This shift is expected to have a twofold effect: 1) It will enable thousands of people to switch from using kerosene to pine needle charcoal, and 2) The region will also see a reduction in forest fires.

Under the guidance of Rajnish and Rashmi, the social and environmental impact that the organisation has had has increased every year. Throughout their work, they have found that focusing on local skills, resources, and management has reaped dividends. This thought process is backed by a strong responsibility and respect for the environment, as well as sensitivity towards the cultural context of the villages they work in.

What was initiated as a means to assist in income generation in two villages has grown into a movement where products of the communities in Kumaon have become a brand in themselves. The couple hopes that this initiative will reach out to an increasing number of people.

The organisation is also a founder member of the World Mountain Peoples' Association, formed in 2002 during the first World Mountain Forum to create a platform for mountain territories to network and make their voices heard at the national and international level.

DR. MAHESH RANGARAJAN

TN Khoshoo Memorial Award for his contribution to the understanding of nature-society interactions through history, politics, and environment

2014

The late 1970s and early 1980s were a period of enthusiasm for wildlife and the environment for students in Delhi. Whether it was fighting to save the Delhi ridge forest or making a plea to the then foreign minister, Atal Bihari Vajpayee, to save the Great Indian Bustard, well-wishers of the environment made their presence felt. Mahesh Rangarajan was one of the many concerned students who participated in these protests.

His interest in wildlife and the environment took root when he was still quite young. Growing up in Delhi, he often visited the zoo and spent hours bird watching. After finishing his schooling, he graduated with a BA in History from Hindu College and then went on to do another BA as well as an MA in Modern History from Balliol College, University of Oxford, where he was a Rhodes Scholar.

Hindu College was an exciting place to be if one had an interest in nature and the environment. An active nature club laid the foundation for many of the students who have gone on to become stalwarts in the field of environment and development. Some of these include Satyajit Singh, author of Taming the Waters: The Political Economy of Large Dams in India, a book on the development of state-planned irrigation in India; Rajeev Bhartari, former field director at Corbett Tiger Reserve; Arun Agrawal, a political scientist, editor of the journal World Development, and author of the book Environmentality: Technologies of Government and the Making of Subjects; and Aseem Shrivastav, an ecological economist, activist, and co-author of the book Churning the Earth: The Making of Global India, among others. “In those days, Hindu College, along with other colleges and institutions in Delhi, was a hub for all these activities,” Mahesh states.

In the struggle for the ridge, he recalls that although a number of rallies were held, not much headway was being made. Finally, the group met Indira Gandhi and gave her a memorandum, which resulted in the ridge being declared a protected forest. This initiative has ensured that the national capital continues to have a substantial amount of concentrated green cover in the city centre. Those initial years of activism proved to be very formative for him.

During the process of the campaign to save the ridge, Mahesh, along with Ashish Kothari (recipient of the Khoshoo Memorial award in 2009) and many others went on to set up Kalpavriksh, a voluntary organisation working on environmental and social issues. After the formalisation of the organisation, the group travelled to Tehri Garhwal, where the Chipko movement began and evolved, and were in constant contact with Sunderlal Bahugana. After stepping back from Kalpavriksh, Mahesh was involved with the first Centre for Science and Environment (CSE) state of the environment report in 1982.

This was followed by stints with the World Wildlife Fund, as well as with Dunu Roy and what came to be known as the Shahdol Group, an organisation working in the space of natural resources. In this period, he became interested in current affairs and ongoing social and political controversies. These experiences culminated in his pursuit of a doctorate on forest policy in central India.

HISTORY AND INDIA

Mahesh specialised in environmental history and has this to say about his field of expertise: “I have not been a historian for a long time. Twenty to twenty-five years is an extremely short period of time.” He emphasises that for any country moving forward, acknowledging its history is important. “If you want to know how you got to where you are, whatever your present choices are, you need to

be informed by a sense of perspective about the past," he asserts, and goes on to quote James Baldwin: 'People are trapped in history, and history is trapped in them'. A historical perspective is needed to understand the various issues and controversies about the forest and who should control and protect it. This applies not only to forests but to marine resources as well. "There are different rival views about what constitutes nature, how to define the nature-culture relationship, the relationship between nature, cultural knowledge, and power, and so on, which makes working in the field all the more challenging."

In this context, India and its history is unique. "It is a country with a very large population confined to a small geographical area, a limited amount of freshwater, and an astonishingly diverse range of water bodies and landscapes. The conundrum that the country is facing today is how it can keep these cycles of renewal and repair intact, along with ensuring that a portion of these landscapes are protected. To understand how to do this, you need a sense of the past. We often have an unconscious sense of the past, but history is about making oneself conscious of the past. This is something that we need to do to a greater extent today because we are in the throes of very significant economic, societal, cultural, political, and environmental changes," he asserts. To be able to disentangle these various facets and make sense of their complexities, one needs an understanding of history; this will inform and better equip society in dealing with issues, he believes.

The February 2017 issue of Seminar, to which he contributed, touched upon some of these issues and also charted the country's experience with the environment. In the issue, the authors argue that the stepping up of the pace of environmental growth since 1980 has been followed by a shift in the nature of government from being the source of investment to trying to facilitate increasing amounts of private investment.

This shift has taken place as India has become more and more closely linked to the global trade exchange. He also maintains that there is a broad view cutting across parties and factions, particularly since the slowdown hit India in 2007, that growth has to come first, even if it happens at the cost of the environment. In this process, many of the protective structures, regulations, practices, laws, and systems put in place after considerable reflection between the 1970s and 2000 are undoubtedly either being dismantled or weakened.

"We are going through a cycle worldwide in which there is a retreat from environmental concerns. And it is also true that some of the environmental concerns do not pay enough attention to the livelihoods and rights issues or to the larger issues of basic human security and safety in unstable living environments."

This process has been apparent especially since 2011, during which time, irrespective of the political party in power, the country has witnessed a pronounced de-emphasis on conservation and the environment and has instead focused on restoring rapid economic growth. India is not the only country that has chosen to go down this path. "We are going through a cycle worldwide in which there is a retreat from environmental concerns. And it is also true that some of the environmental concerns do not pay enough attention to the livelihoods and rights issues or to the larger issues of basic human security and safety in unstable living environments." In response to these various changes in the last couple of decades, Mahesh says, "What we need is a wider environmental ethos and approach. Perhaps its absence has allowed this vacuum, wherein growth first, not necessarily development first, has acquired such momentum."

With the presence of humans on Earth for the last 60,000 to 70,000 years, it is only in the recent past that we have witnessed the extinction of large vertebrae. "How did this cohabitation work over so many years? By accident or by design? Was it a result of custom? Was it due to the absence of technology?

> “I think what is important here is the fact that we have had such a diversity of occupations and livelihoods. Everybody is not moving from the farm to the factory to the office, for instance. This leads you to ask why this is so and what is the environment that has sustained these livelihoods,”

Was it the ability of certain species to avoid one another? Have people not only taken apart natural ecosystems but, in some places, re-natured them? These are questions that come up when you look at the bigger picture. I think what is important here is the fact that we have had such a diversity of occupations and livelihoods. Everybody is not moving from the farm to the factory to the office, for instance. This leads you to ask why this is so and what is the environment that has sustained these livelihoods,” Mahesh explains. He is also quick to clarify that this does not mean that all these livelihoods should persist, but what must be looked at is what these relationships are and whether this provides space to explore other options.

‘NATURE WITHOUT BORDERS’

Mahesh is one among the many recipients of the Khoshoo Memorial Award who has held the somewhat rare stance of balancing people and conservation. This view is not too widely shared in the environmental community as a whole. He says his balanced approach stems from his exposure to a number of different sources, which include engaging with the Chipko movement and other similar groups elsewhere, the work with the Shahdol group, particularly with people affected by river and air pollution, and also an analysis of history.

Although he does possess this view, he points out that the coexistence of wildlife and people depends on the time and place. Given the uniqueness of the Indian subcontinent, there is space for each of the three divisions of ecology—reservation, restoration, and reconciliation—to function. However, what is important is who decides which model is the best fit for a particular ecosystem. It is in this context that Mahesh, along with M.D. Madhusudan and Ghazala Shahabuddin, published an edited book in 2014 entitled Nature Without Borders, which looked at conservation beyond protected areas. The book asserts that parks are not self-contained unless they are a part of a larger matrix of ecosystems where cohabitation has been worked out. “We were not saying parks were unnecessary, but rather that without this matrix, they would be unthinkable and unviable,” he explains.

His views have often put him at loggerheads with other academicians, who do not come from as interdisciplinary a background as he does. He admits that he has also found it challenging trying to give nature and the environment the importance they deserve in history. “There is still a long way to go. I think over the years, there has been enormous curiosity. There is a lot of positive support, but there are still an astonishingly small number of people looking into it, given the richness of the evidence and the complexities of the stories in the past and the present unfolding around us,” he elaborates.

At the end of the day, what he enjoys most about his work is the satisfaction he gets from researching, writing, thinking, teaching, and learning. His professional life has seen him chair the elephant task force, serve as the assistant editor of The Telegraph in Kolkata for a year, and serve as the director of the Nehru Memorial Museum and Library in New Delhi. He is currently a professor of environmental studies and history at Ashoka University in Haryana and also a guest lecturer at the National Centre for Biological Sciences in Bengaluru.

NAVROZ K DUBASH

TN Khoshoo Memorial Award for recognition of the impact of his work on Indian climate change policy and the international discourse on global climate governance

2015

Growing up in a country like India, there are a lot of stimuli to spark an interest in development-related issues. For Navroz K Dubash, this interest began early on in his undergraduate education, leading to a shift from engineering to public policy. Starting with an interest in development and public policy, he stumbled upon the link between environment and development when he got an opportunity to engage with the movement opposing the damming of the Narmada River.

When he was still a student, Navroz was part of a trip to the Omkareshwar Valley to interview people who had been displaced during the construction of a dam, to inform his thesis on the topic. This trip was organised by the environmentalist Ashish Kothari, a recipient of the Khoshoo Memorial Award in 2009. It was as part of this research that Navroz started interacting with a couple of American NGOs who were supporting the movement. After his studies, he approached a few of them to explore job opportunities and found an opening as part of an early global civil society initiative working on climate change.

This was an exciting time to be working on issues related to climate change, since it was the period leading up to the Earth Summit in Rio de Janeiro. There was a lot of interest in exploring how development and climate change issues

Moderator: Seminar on 'The Future of INDCs: How to Make National Contributions Effective in the 2015 Paris Agreement?', The Road to Paris: CoP21 Dialogues, organised by the Embassy of France. New Delhi, India, 2015.

were interconnected. Still in his early twenties, he was asked to put together and coordinate a global network of NGOs called the Climate Action Network that would put forward views from civil society in preparation for the summit. He grabbed this opportunity with both hands and participated in all the negotiating sessions, as well as interfacing with NGOs from around the world. This was a tremendous learning experience for him — his real entry into the field of climate change.

Having had a very hands-on introduction to climate change negotiations and policy, Navroz subsequently moved away from it, in part because he wanted to get back to some of the grassroots developmental issues he had started out working on. Among these was water, particularly groundwater in Gujarat. It was during this time that he wrote 'Tubewell Capitalism,' a book that examines the growth pattern of private tubewells and how the interaction of various forces has shaped groundwater commercialisation in the state. He also realised that a lot of the climate negotiations had become a side-show and that the politics and economics of development were not affected by these negotiations. "Issues such as how money was moving around the world for large power and dam projects were not being influenced by the climate negotiations at all. It was almost like a parallel discussion," he states. This started changing around 2007 in Bali, when the question of how developing countries would be brought more directly into conversations regarding climate change in the context of a

Session titled 'Leverage Up or Leverage Down? Exploring Elements of a Negotiating Approach', Centre for Policy Research Roundtable on 'Preparing for Paris: Should India Seek to Leverage Up or Leverage Down the Global Climate Agreement?'. New Delhi, India, 2015.

post-Kyoto era emerged. This was when he got back into the area of climate change, albeit again through a developmental lens. He continues to look at climate change from this angle even today and more specifically on how one brings the two together using the idea of co-benefits.

CLIMATE EQUITY AND MITIGATION

The potential impacts of climate change on the Indian subcontinent are still being pieced together. However, sporadic reports presented in the media seem to be keeping the focus on the issue alive in some quarters. While this could potentially create panic, what it should not do is drown out all the more short-term and immediate concerns that the country is facing, such as issues about open defecation, energy access, gender empowerment, caste, local air and water quality, etc. "It is important that climate change does not become some sort of meta-narrative that trumps all these other issues," he says. However, at the same time, he is quick to point out that it is likely that climate change will make solving a lot of the other problems much harder. "It could lead to further disruption of the monsoon, higher incidence of diseases, lower crop yields, and, in the worst case scenario, if there is not some human effort to check it, an existential crisis wherein the biosphere's ability to self-regulate will actually be called into question. Put simply, there will be a level of climate change that we cannot adapt to. That is why I don't see a trade-off between these things. Of

Speaker: Talk titled 'National Policies and the International Context - From Norm-Taker to Norm-Maker in Energy Policy?' at Inception Workshop, Centre for Policy Studies, IIT-Bombay. Mumbai, India, 2016.

Their willingness to contribute has reduced, since they themselves are growing at a slower pace and are simultaneously facing the problem of steadily increasing domestic social unrest," he asserts. He acknowledges that it is unfair that they are not doing more, but that is the reality. "Then the question arises, do we step up our efforts even though they should be doing much more? There are two answers to this. One, we cannot avoid investing in adaptation for our own citizens. Two, with regards to mitigation, which is actually a collective global action problem, the cost of engaging in it may be lower than what it was thought to be a few years ago. This is both because there are often, although not always, development gains from some mitigation actions — so-called co-benefits — and because of the declining cost of renewable energy," he explains.

Providing low-cost power derived from renewable energy sources to the Indian population not only makes economic sense, but also reduces air pollution, strengthens energy security, and reduces the dependence on imported fossil fuels. Navroz believes that these are arguments for us to be more proactive in addressing climate change.

Regarding President Trump's decision to back out of the Paris agreement on climate change, while many viewed this decision as possibly having a domino effect, Navroz asserts the contrary. He believes that this could in fact

have a galvanising effect. “Countries around the world have stepped up very strongly. The EU, China, India, France, Germany, and Canada have all made strong statements saying that there’s no question of renegotiating the Paris agreement on climate change. This is a very important signal to send. Even within the US, there has been an increase in the number of communities, cities, and states saying that their president does not speak for them, they take climate change seriously, and they are going to try and step up their actions to plug the gap.” Navroz is heartened by these developments, since they show real promise that other countries will indeed step up and take ownership over the Paris agreement.

A CHANGE IN MIND-SET

In the recent past, India has more explicitly stated that it takes the issue of climate change very seriously, which he welcomes. Earlier, there was talk of climate equity, but this did not fully account for the extent to which India would also be affected. India was content with the status quo being maintained, in which no country took action, while a more appropriate position would have been for the country to take steps, provided other countries take even more steps consistent with their higher levels of responsibility. Today, India asserts that it will take proactive steps but that developed countries should consider India’s position and do more. He is of the view that this thought process is part of a larger objective. “India is more vocal in its geo-strategic story these days and wants to be accepted as a world leader, and taking that position on climate change is now part of the deal,” he explains. “This has been supplemented by a dose of good fortune in terms of the declining price of renewable energy, which has made it possible to envision providing energy with less coal than was initially estimated. This has worked in India’s favour, because if we had continued to consume coal at the rate we had been, this would subject the country to tremendous international pressure.”

He is currently part of a committee that aims to study India’s long-term future in terms of energy and is projecting and fine-tuning India’s energy policies. While he does see the importance of having committees putting together frameworks and policies, he says, “It is hard to say that the committee process is the best vehicle for developing aggressive and far-reaching new ideas that will provide direction to policy making in India. I think there are other vehicles; the committee process is really a supplementary process.”

CHALLENGES OF WORKING IN THE FIELD OF CLIMATE CHANGE

There are certain narratives that Navroz believes invariably get blurred when working in this field. For instance, one of the problems he has encountered when telling the story of climate change is that people are constantly trying to draw lines between what is done for the climate, the local environment, and development. “Those lines often don’t exist,” he says. “This makes it harder to have a negotiation, but it’s more intellectually honest to understand that those lines can be blurred.”

In his time working within committees, he has found the Indian policy-making process to be quite opaque. Injecting ideas for policy makers to consider would often have to be done through networks, and spending time cultivating them takes time away from research. He has also realised that policy makers often want simple and, more accurately, simplistic black-and-white answers, which is often not possible in this space. “There also isn’t a great deal of policy appetite for being told that the problem is more complex than you are allowing for, and therefore more time is needed to both understand and put together solutions. That doesn’t help a joint secretary who has to make a decision in the short term. This is a tough situation to be in, trying to find a balance between having your answers considered and being intellectually honest,” he explains.

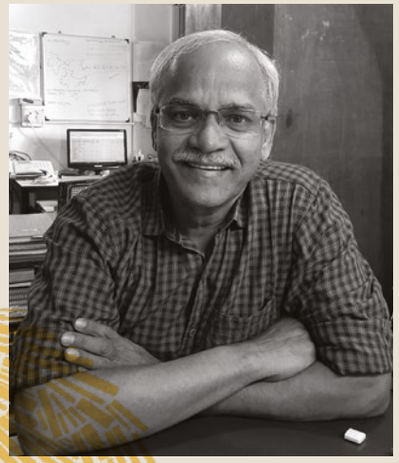
He acknowledges that climate change is still seen to be in the realm of policy makers and academics and that some of the experiential knowledge from the ground needs to be disseminated more widely. He gives the example of an article he read about how farmers in Himachal Pradesh have seen both the size and quality of apple cultivation change in certain areas and, in some cases, actually improve. On the flip side, unpredictable rainfall patterns have ruined crops. “This and many other stories are evidence of direct impacts on the ground,” he states.

There are challenges in popularising the concept of climate change, primarily because one is never sure whether the vagaries of the weather are due

> “Countries around the world have stepped up very strongly. The EU, China, India, France, Germany, and Canada have all made strong statements saying that there’s no question of renegotiating the Paris agreement on climate change. This is a very important signal to send.”

to climate change or because of other micro, local, and short-term factors. “I think that this attribution literature that tries to put a probability on the extent to which an event is caused by climate change might be one way people can relate to it more directly. But there’s no good answer to that question. I think unfolding climate change into a larger conversation about the importance of the environmental context along a spectrum — local, regional, global — would be a better way of trying to have the conversation, instead of trying to create a category by itself,” he explains. Having entered the arena of climate change through the lens of development, Navroz has also worked on the electricity sector and rural access to it. He is currently working on a project that is looking at the political economy of electricity distribution across fifteen states in India. Through this, he is trying to understand why distribution has remained such a challenge and why this is seen as a political hornet’s nest. He believes that one has to engage with politics and not pretend that it doesn’t exist.

When he started working in this field, Navroz wished to broaden and deepen the conversation about climate change in India. This has partially been achieved through mediums such as a book he wrote a couple of years ago entitled Handbook of Climate Change and India: Development, Politics and Governance. He is pleased with the book because of the range of opinions that it includes, some of which he disagrees with. “I think it is important in this area to have a little humility. If one is always trying to convince other people of one’s own point of view, but not in a way that engages with other points of view so that the best idea emerges out of a process of deliberation, then there are plenty of bad ideas that get through,” he says. “I am not in that advocate mode; I’m in the mode of trying to inform policy through discussion and reasoning, because what comes out of that process is naturally more robust.”



K J JOY

TN Khoshoo Memorial Award for recognition of the impact of his work in water management and governance

2016

More than 250,000 textile workers participated in the Bombay (now Mumbai) textile workers strike of the early 1980s. Fifty-seven of the sixty mills in the city closed down, and the three others were only partially functioning. The main demand of the workers was the abolition of the 1946 Bombay Industrial Relations Act, which did not allow the workers the freedom to form their own independent unions. There were also issues of poor wages and labour conditions. K.J. Joy was in the middle of his master's program at the Tata Institute of Social Sciences (TISS). He and some of the other students were supportive of the strike at a time when campuses were being radicalised.

After graduating from TISS, Joy and Nagamani Rao, whom he later married, had to choose whether to get into "professional" social work or do something else. They decided in favour of the latter and became full-time political activists in rural Maharashtra. They moved to the Sangli district and joined the then emerging mass movement — the Mukti Sangharsh Movement.

Most of the textile workers were from drought prone areas of the state — the Sangli, Satara, and Solapur belt — and from the coastal Konkan region. The lengthening of the strike resulted in a lot of the workers returning to their villages, where they were reacquainted with the issues that had forced them to migrate in the first place — drought and water scarcity. Although many of them had land, the lack of water forced a majority of them to work in employment guarantee schemes (EGS) provided by the government. This being the state of affairs, the workers were mobilised under the banner of the Mukti Sangharsh Movement to fight for timely payment of wages and against corruption in sanctioning projects and measuring the work for calculating wages, among other things. From 1984, Joy also became part of the Shramik Mukti Dal, a small, new Left political group established in Maharashtra in 1980, which aimed to bring about radical social transformation by addressing class, caste, and patriarchal inequalities, as well as environmental issues.

Over time, once people realised that issues surrounding water needed direct engagement, the demands of the movement gradually changed. During this period, a participatory study was conducted to understand the causes of the drought and the shifts that were taking place in agriculture and livelihoods. An outcome of the study was the people's agenda (also published as a booklet entitled Asud (meaning whip), deriving from the famous book Shetkaryanche *Asud* (The Whip of the Peasant) by Mahatma Jyotiba Phule, which sought to make tangible improvements on the ground such as drought proofing, as well as address equity concerns in water distribution and use. This work, carried out through the employment guarantee schemes, focused on soil and water conservation works and the construction of percolation tanks. "This process involved micro-planning at the village level, where the kind of work that needed to be taken up was collectively decided on. This process tied into my larger belief that unless knowledge and politics come together, no real change will happen. My foundation in work on natural resource management was established during this time," he explains.

From then on, the Mukti Sangharsh Movement experimented along with farmers on agriculture. Experiments were conducted for five years on biomass production to see how agriculture would fit into this larger ecosystem and also to enhance productivity broadly within the low external input sustainable agriculture (LEISA) paradigm. Rainfall, sunshine hours, maximum-minimum temperature, and evaporation data were collected and analysed to understand the requirements of different crops. "This period provided us a lot of learning on equitable access to water, different types of cropping systems, and agronomy, along with an alternative approach to drought proofing," he states.

Part of the indefinite hunger strike in front of Vite tehsildar for sanction of bali raja dam in 1995-96 - Joy is third from the right

With some of the activists of mukti sangarsh - joy second from right in the front row.

Joy's approach and that of Mukti Sangharsh Movement has been to mobilise people en masse and develop scientific, people-oriented alternatives to bring about change and establish their rights to resources. Another example of this approach was when the Mukti Sangharsh Movement successfully stopped the indiscriminate excavation of sand from the Yerala riverbed and built a small dam, known as the Baliraja Smruti Dharan (in memory of the peasant king, Bali Raja) across the river. By mobilising people to protect the river and its ecology, they built a small, 2 ½ meter-high barrage that became the first symbol of equitable water distribution in the area.

The construction of the Baliraja dam was one of the most satisfying moments of Joy's life. However, it was also a lesson. "When we started this struggle, we had a idealistic blueprint of equitable water distribution and a sustainable cropping pattern. But after the dam was built, because of the different dynamics between the people, it didn't really work out the way we had hoped."

THE SEARCH FOR ALTERNATIVES

In the late 1980s, many pro-people scientists and technologists in Maharashtra, such as K.R. Datye, S.A. Dabholkar, and Suhas Paranjape, as well as a number of political activists, came together to search for alternatives.

Until 1990, Joy was based in the Sangli district as a full-time activist. He then shifted to Pune and was part of the group including Datye, Paranjape and others that set up SOPPECOM (Society for Participative Ecosystem Management) to continue the work on participatory resource management, especially that of water, and biomass based renewable energy. Apart from work on the ground, SOPPECOM also engaged in policy advocacy. Joy remembers, "We were the first group to start participatory irrigation management in Maharashtra and India as a whole. In the build-up to this, a lot of policies and procedures needed to be changed and put in place".

Even with their determination to make participatory resource management and equitable water distribution more widespread, it was a difficult task. Opposition from the government and scepticism from friends within the Left movement meant that the odds were stacked against them. However, they overcame these hurdles, and today, participatory irrigation management has become widespread. Fifteen states have passed legislation making it compulsory. "Equitable water distribution is included in most policy documents now," he states.

WATER USER ASSOCIATIONS

In the period leading up to the formation of SOPPECOM, Joy and others

worked on forming water user associations (WUAs). This work started in the Ahmednagar District in 1987 when there was a lot of public discussion going on regarding why public irrigation systems were becoming so inefficient. “The gap between the potential created and the potential utilised was increasing quite steadily,” he points out. Among other issues, they realised that people at the tail end of irrigation projects such as the Mula irrigation project were not getting access to water, even though they were legally entitled to it.
This led to a pilot project in which 400 farmers with 700 hectares of land in a village called Chanda in Ahmednagar District were mobilised to form a water user association. Since there were no water user cooperative societies that existed at the time, they had to work with the government on formulating bylaws. After three years of efforts and dialogue with the farmers to convince them of the benefits, the WUA was finally established. A memorandum of understanding was signed between the irrigation department and the cooperative society in which the water quota for the WUA for kharif, rabi, and hot weather seasons was fixed. This WUA continues to function well.

With the success achieved in Chanda, SOPPECOM scaled up. Another fifteen societies were formed on a distributary of the Mula River, with the aim of forming a federation that would have more bargaining power. Unfortunately, since the government was not in favour of this process, it failed. Even though the federation could not be formed, Joy maintains that the fifteen societies together had a lot of bargaining power.

In the 1990s, SOPPECOM worked with Samaj Parivartan Kendra (SPK) in the town of Ozar in Nashik district to set up three WUAs in the area of the Waghad irrigation project. The Ozar WUAs went beyond the typical functions of WUAs as they innovated with volumetric supply and pricing, integration of surface and ground water, and local and exogenous water. “This is probably the best example of what participatory irrigation management can do. They have even brought groundwater under the purview of the water user associations,” he explains. This model has received widespread acclaim across India.

ENGAGEMENT WITH WATER CONFLICTS AND THE CHALAKUDY RIVER

Joy’s work has not been limited to Maharashtra. For the past ten years, as part of the work of the Forum for Policy Dialogue on Water Conflicts in India, which Joy coordinates, he has also been involved with a group in Kerala,

Field work in south africa among the venda community as part of livediverse research project-2009.

Feld work in tungabadra basin in 2008 as art of the striver project-2008

Jairam Rameshe releasing the report on allocations nd entitlements in New Delhi

Part of the Mahanadi basin_field work on behalf of the water conflict forum in 2013

the Chalakudy Puzha Samrakshana Samithi (Chalakudy River Protection Committee) that works as the Kerala state resource centre of the forum. This group has been working on the Chalakudy River, which has been heavily dammed and diverted. For the last 5-6 years, this group has been involved in developing an alternative reservoir operation model based on the premise that if the upstream hydro-power projects were modified, it would result in better downstream flows and could meet people's drinking water, irrigation, and environmental needs. A prolonged campaign ensued, which involved convincing the basin MLAs, who in turn took up the issue with the then chief minister of Kerala. The chief minister later asked the Kerala State Electricity Board to reorient the reservoir operation.

There have been other areas where he and the groups he is part of have put in a lot of effort, but the change on the ground was not as substantial. "What I've learned is that unless we work with socially and politically rooted groups, change is very hard to achieve," he explains.

CLIMATE VARIABILITY AND INTERSTATE CONFLICT

An increasing focus in Joy's work on water is the impact of climate change on water resources and people, which could give rise to new conflicts as a result of the reduction in riverine flows. Interstate conflicts over water that are already happening will get further aggravated over time. "The issue is that climate variability is not taken into account when planning water resources or even when drawing up water sharing formulas across states. So this is an area that our forum on water conflicts needs to work on," he elaborates. He also maintains that unless we change the way water distribution is being planned in terms of allocation across states and different uses for agriculture, industries, and urban areas, there is bound to be conflict.

To illustrate his point, he gives an example. "We find that especially with regards to interstate conflict, the Kavery is a good example. Interstate water sharing used to be based on what is known as a 75% dependable flow. This means that in a hundred-year period, for 75 years, the estimated water would be available. Now this has been brought down to fifty percent. This means that out of 100 years, you will have fifty years of estimated flows, and the other fifty years, you won't. This means that you are exposing the states and political parties to much more conflict because 50% of the years may be deficit years. This situation will also result in the available water getting used to a greater

Training programme for law students and professionals at National Law University, Delhi in 2015

With the activists in Odisha during a meeting in 2013

extent, which will in turn exacerbate conflict, as there will be less flexibility in terms of managing scarcity."

He says that the issue with inter-state river disputes is that the state makes decisions about access in a very bureaucratic and technical way, without considering the views of different stakeholders. Views of farmers and fishermen or other stakeholders are not taken into account, even though they have as much of a stake or more than anyone else. He and the forum on water conflicts he coordinates have been urging the government to democratise the functioning of the tribunals and bring in non-state actors, without which he believes the issues will never get resolved or socially accepted. "Unless there are genuine platforms for negotiation, like in some western countries, where knowledge can play an important role, very little change can be brought about," he emphasises.

"The problem in India is that there are two parallel tracks that never meet. The state continues to do what it has been doing, and so do civil society and academic institutions. If there is no effort to bring in the viewpoints of different stakeholders, and the state is left to its own devices, then issues not directly related to water, such as identity politics and language, will come to the fore, and water and related issues will become side-lined," he explains.

OTHER ACCOMPLISHMENTS

Apart from his work with SOPPECOM, Joy also had a short stint with the Centre for Interdisciplinary Studies in Environment and Development (CISED) in Bengaluru, where he was a visiting fellow. Here, he carried out a review of watershed programmes across the country. The technical report that came out of this effort became the basis for setting up a research consortium, Forum for Watershed Research and Policy Dialogue (ForWaRD), a collaborative venture of SOPPECOM, CISED, and the Gujarat Institute of Development Research (GIDR). ForWaRD was involved in a five-year rigorous, interdisciplinary research project on watershed development programmes in India.

Joy was also on the first committee, led by Ramaswamy Iyer, that prepared a draft water framework law as a part of the 12th plan working groups. He is currently part of a research project that is looking at climate change and hydro-power in the eastern Himalayas. This multi-institutional project is trying to problematise hydro-power being seen as clean, green, and cheap energy, as well as a climate-mitigating option. This work is being done on the Teesta basin in Sikkim and north Bengal and the Tamor basin in Nepal.

He is also part of the Lokabhimukh Pani Dhoran Sangharsh Manch (People Oriented Water Policy Struggle Platform), a network that is engaging with the state of Maharashtra on water policy issues. Maharashtra being the first state to

With the participants and resource persons of the Guwahati training programme in 2012

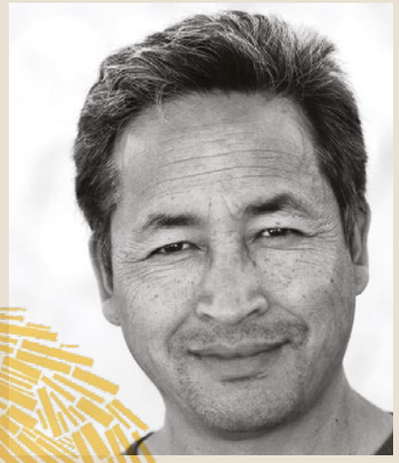
bring in a water resources regulatory act, in 2005, this network has played an active role on the ground in this regard.

Looking back on his life so far, Joy observes that the country has witnessed rapid and far reaching changes in the political scenario since the 1980s. In order to address the current issues, there is a need to develop creative alternatives in the context of people's aspirations. He says that in these challenging times, it has become imperative that platforms be created where socially conscious researchers and activists come together and work on issues. "Social movements are also at a crossroads today.

There is a need for an interdisciplinary perspective to work in the current climate. Unless this takes place, people's movements will not be able to progress together. With the BJP government in power, a lot of the laws on natural resources and social justice are being diluted. Moreover, organisations like SOPPECOM and others who are doing good work are not able to obtain the resources to do the kind of research, practice, and policy advocacy they want to engage in. This is a tough situation to be in, but we are all hopeful that things will change," he says.

The change in people's aspirations has also meant that it is much harder for him to find people who can play the dual role of researcher and activist. That combination was more prevalent in his generation but has become much less common in later generations.

A major factor in his unwavering drive to bring about change is his wife, who is also part of the movement and is a full-time activist. Having grown up in a family of activists, his daughter Manasi also grew up to be socially sensitive.



SONAM WANGCHUK

TN Khoshoo Memorial Award for developing an alternate model of education and taking steps to address water security in Ladakh

2017

With an altitude of between 3,500 and 4,500 metres, the mountainous desert region of Ladakh is stunningly beautiful. People have inhabited this landscape for centuries and have historically managed to irrigate their crops by melting snow and using glacial meltwater. However, this started changing in the early 1980s, when the effects of climate change started becoming more pronounced. Fluctuations in temperature and the amount of snowfall and rainfall created hardship for the local population. Agriculture was becoming increasingly difficult with a reliable source of water hard to come by. This prompted Sonam Wangchuk to step in and make small changes to address this issue.

FINDING HIS CALLING

The early part of Wangchuk's life was spent in a small village 70 kilometres from Leh. Since there was no school nearby, his mother taught him how to read and write. Other than this, he says he learnt about the world in a "holistic and harmonious way," by spending time playing in the fields and with the animals, jumping in the river, sowing seeds, and climbing trees. Such were these formative experiences coupled with his excitement at learning new things that he got promoted twice in a year when he finally joined a school.

After graduating from high school, Wangchuk joined the National Institute of Technology in Srinagar, where he studied mechanical engineering. During this time, he also began teaching secondary government school students on the side to finance his education. This experience was an eye opener regarding the appalling state of the education in the region. According to statistics from the Himalayan Institute of Alternatives (HIAL), an alternative university for mountain development he went on to establish, 95 percent of students failed their board exams in 1996. Over the next two decades, this number steadily decreased to the current rate of 25 percent. This change was brought about by a programme he founded in 1988 called the Students' Educational and Cultural Movement of Ladakh (SECMOL). Its main aim was to bring about reforms in local government schools. In 1994, he launched Operation New Hope, a collaborative programme amongst the village communities, government, and civil society. This involved the formation of Village Education Committees, which were instrumental in training teachers to ensure they were more child friendly, as well as rewriting and publishing textbooks which adapted to the local context in Ladakh. This initiative helped bring down the numbers of students failing their board exams.

The students who had a tough time passing their 10th standard board exams had the opportunity to go to a school run by SECMOL, located 12 kilometres from Leh in a village called Phey. Wangchuk says that the school is run by the students themselves. "Like a country with its own elected government, the students take it upon themselves to farm, raise and care for livestock, and ensure that any problems that arise within the community are dealt with in a democratic manner." With a nurturing and creative environment, many of the students have gone on to become teachers, entrepreneurs, film makers, and so on.

INNOVATIONS IN A HOSTILE ENVIRONMENT

With a background in engineering, Wangchuk has been teaching innovation at the school, where, along with the students, he has conceptualised and built low-cost solar heated buildings made of mud. The buildings insulate the students from the freezing winter temperatures, which can go as low as 25 degrees below zero, maintaining a comfortable 15 degrees inside the building. Another innovation of his that has gone on to win him worldwide acclaim and accolades is that of ice stupas. Realising the need for a more reliable source of

water supply in a region with acute water scarcity, he came up with a plan to store excess water that ran into the streams in the form of giant ice stupas. As temperatures rose in spring, the water would slowly melt and be a source of irrigation to the farmers when it was needed. This idea is not entirely unique. Others working in this field have created horizontal ice fields, but these are prone to rapid melting because of their large surface area. To address this limitation, Wangchuk built vertical ice towers instead, or what he calls the "artificial glaciers of Ladakh."

The ice stupas are built using a very simple method. Once a location for the stupa has been decided in the vicinity of a stream, a pipe brings the water to the spot lower downstream, making use of gravity. This downhill flow creates enough pressure to create a fountain at the site, which sprays water into the air. At temperatures of 20 degrees below zero, the water cools and freezes as it falls. Over a couple of days, a giant conical structure 40 metres high is formed. This conical shape is a prominent feature of the landscape in the desert regions of Tibet. It resembles Buddhist stupas used for meditation. This shape maximises the volume of water that is kept out of the sun, thereby slowing down the melting of the artificial glaciers. For Wangchuk, the shape also acts as a cultural bridge for the current generation.

Wangchuk's technique is a modern interpretation of the ancient practice of "glacial grafting," which was developed by the Hindu and Buddhist communities living in the Himalayas. In the hope of creating new glaciers, they would graft chunks of ice onto the sides of mountains. According to local folklore, villagers "grew" glaciers in an effort to keep Genghis Khan from making it across the Himalayas in the 13th century. "There has always been a tradition of making ice or artificial glaciers since ancient times," says Wangchuk. "I have been fascinated with this since I was a child."

Although seemingly simple, Wangchuk has had to overcome a number of hurdles before the technique could be perfected and put into use. To begin with, conceptualising how water could be stored vertically without a pump and electricity was a challenge. Once this was cracked, he faced the onerous task of finding funding. Luckily, crowd funding came to the rescue; through it, he raised $125,000 USD. A third issue was finding an honest vendor for the pipes needed. On his first try, he lost Rs. 25 lakhs because of a dishonest vendor who supplied him with low-quality pipes. Jain Irrigation came to his rescue by donating pipes for a three-kilometre stretch. With all this in place, the last hurdle Wangchuk had to cross was gaining the confidence of the locals. "The idea took roughly two years for the locals to accept. But once they saw that an ice mass of between half a million and one million litres was still standing in mid-May, they were convinced," he says proudly. This technique is currently being fine-tuned to ensure minimum human intervention.

It was this ingenuity that won him the Rolex Award for Enterprise in 2016. He is using the prize money he won from the award to set up another twenty stupas, as well as to expanding HIAL. The university has various departments looking for solutions in sectors such as climate change, income generation, and sustainable tourism. "It is a people's university, started with the support of the people of the world," he says. With an aim to create a sustainable ecosystem of constant innovation, Wangchuk envisages youth from different Himalayan countries coming together to research the issues faced by mountain people – in education, culture, and environment - and formulating ways to solve those issues through out-of-the-box ideas and practical application of knowledge. "The world needs real-world universities, 'doer' universities. We're going to set up one model of that in Ladakh. And if it is successful, we hope it'll have a ripple effect from New Delhi to New York," he says.

MOVING FORWARD

Once the technique of the ice stupas has been perfected, he aims to make use of it to prevent the overflow of glacial meltwater. As a result of the melting of the Himalayan glaciers, there has been an increase in the number of dangerous glacial lakes. This is a threat to lives and infrastructure downstream, because any weakness in these natural dams can cause a sudden flood that can destroy anything in its path. Although there are initiatives to get these lakes drained, limited resources and lakes numbering in the thousands have made addressing this issue a herculean task and one that requires ingenuity. "These have to be mitigated before they become a disaster," Wangchuk says. "Mitigation alone is good enough, but if these systems can be used as an asset, a man-made

resource downstream from the lake, then you are at least adapting to, if not solving, the climate change crisis".

Wangchuk's success with ice stupas has resulted in local governments in other areas approaching him to help set them up. Apart from Sikkim, his ice stupas are also in Switzerland and Peru. These two countries are using it to attract tourists, as well as a tool to adapt to climate change.

Apart from the Rolex Award, Wangchuk has also been the recipient of several other awards and titles, such as UNESCO Chair for Earthen Architecture for India 2014, 'Green Teacher' Award by Sanctuary Asia Magazine in 2005, and the Governors Medal from the J&K State Government in 1996.

Main building SECMOL campus. SECMOL is an alternative education institute

SECMOL Student

Student hall of SECMOL

RAJESWARI S. RAINA

T N Khoshoo Memorial Award
for her work on agricultural
knowledge, policy and sustainability

2018

Born into a matrilineal family in Trivandrum, Rajeswari S. Raina would often go into the paddy fields as a child with the workers for transplanting, harvesting and building bonfires for pest control. She recalls how keeping their grandmother pleased was the key to having fun.

As a teenager, Rajeswari began to notice how all intercultural work had been replaced by chemicals and pesticides. By then her father, who she describes as 'the most well-read farmer in the world', a former Intelligence Bureau officer, had opened a fertiliser shop in the village and had just two cows in his formerly well stocked cattle shed. Her mother devoted her time to a small *mahila samajam* (women's society), working with rural women on food processing, employment, and health.

It was when agriculture became a blurred background story at her home and they no longer cultivated paddy and bought food from stores that she decided to join an undergraduate course in the agricultural sciences. "Pampered by my maternal family and a slightly elitist school, it was Literature that I really wanted to pursue. My grand aunt would narrate stories from Scarlet Pimpernel to Indulekha and Battleship Potemkin almost every night. She had a knack to weave the sighs and angry lashing of the sea, the silence of trees and the gurgles of streams into her narrative. She gave them agency." But her father said that he would only let her choose a 'professional' course, and so she chose agricultural science over dental science, the only other professional course that she got admission to.

AGRICULTURAL SCIENCE AND ENVIRONMENT

Once she began her Bachelor's in agricultural sciences, Rajeswari noted that the care, cheer and camaraderie of farming she had seen in her childhood was missing. "It was not just the drab curriculum that bothered me. I was regularly kicked out of class for asking 'naughty' questions (especially in the soil sciences and agronomy courses) that I thought were innocent."

Dr. Raina presenting a paper at the National Seminar on the Future of Agricultural Development in India

She pursued her Master's in Agricultural Economics in Coimbatore. One evening, Rajeswari and her friend, who was doing her Master's in Entomology, cycled for hours looking for a breastfeeding woman among the farm workers. They collected milk samples from farm cows, goats and

Visiting the organic farm of Basavagaru in Bijapur, with Dr. Belli Revi, a dedicated extension officer in Karnataka.

women workers for her dissertation on toxicology. On analysing the samples, her friend found significant pesticide residue in all of them, but one breast milk sample was just poison. “We had to tell her to stop breastfeeding immediately. When we found her nursing her five-month-old baby, we realised that this injustice was built into what we were studying and into what we would do in our professional lives. The environment was not out there; it was in us, in our bodies, in the breast milk we feed our babies. This was all in the name of agriculture for food ‘security’. It was not just an oxymoron, it was a crime!”

But the politics of knowledge and policy-making became central to her life only after she started working on her PhD at the Centre for Development Studies (CDS) Trivandrum, on the economics of agricultural research in India. Endless days of collective reading and arguments with friends and getting to read Paul Baran, Polly Hill and Nicholas Georgescu-Roegen strengthened her resolve to study the relationships between agriculture, the state and the environment. “We had only one faculty member (John Kurien) who was committed to environmental concerns, but several teachers and members of the CDS Governing Board were interested in agriculture and public policy. So, I came into this world of environment-agriculture relationships ‘feet first’ like in a breech delivery. I was concerned about environmental problems, but was not working on them until the mid-1990s, a few years after I joined the CSIR system, in a lab called the National Institute of Science, Technology and Development Studies (NISTADS), the only institute with a mandate to conduct social studies of science and technology.”

THE RUSE OF FOOD SECURITY

In NISTADS, her work was located in the margins of deeply entrenched disciplines, almost parallel estates of economics, agricultural sciences, and ecology, which had neither the need nor intent to talk to each other. Her questions and publications in the social studies of science, written exclusively for the agricultural science audience, largely seemed a waste of time and energy. Only a few policymakers, practitioners and scientists found this work meaningful.

“My eye-opening moments came from two sources: the lingering agony of getting thrown out of a popular science movement in Kerala and the pain of being accused (by friends too) of questioning public sector science and public policy when it was private corporate research that was allegedly killing the farm sector and causing environmental disasters. I realised that I was talking to a group of highly qualified people whose education was exclusively about agriculture and its contribution to the economy. For them, food security was a ruse, and the environment was just an open mine that was available for exploitation forever. Among us, the privileged agricultural scientists and policy makers, there was an awareness that the environment also included the poor living out there, but there were no tools to include them in the environmental

At the book discussion “Democracy in the Woods” (OUP 2017), in Ambedkar University Delhi (AUD), with the author Dr. Prakash Kashwan, Prof. Suresh Babu, Prof. Asmita Kabra, and other faculty members.

problem, the conservation question."

INTERDISCIPLINARITY IN DISCOURSE ON AGRICULTURE

Rajeswari's work involves a couple of research themes focusing on the meanings of relationships between knowledge, policy and practice, especially in the agriculture-environment interface and in biological production systems. And institutions, rules, norms and ways of working, and the knowledge politics of sustainability and justice. This places her work in two interdisciplinary academic streams: Science, Technology, Society Studies and Institutional Economics.

Rajeswari notes that the agriculture sector faces several problems, but the most fundamental is that we no longer see agriculture in the environment. In the agrarian and rural development literature, agriculture is a sector, an economic and social activity that has to suppress and control the environment. "The lens and discourse is one of agriculture versus the environment. That is deeply problematic because what we know now as 'society' has been a part of and shaped by the environment in more ways than one. So when modern industrial agriculture causes soil or water degradation, loss of biodiversity or pollution, our losses are not just environmental. They simultaneously produce social and economic losses. We realise now that environmental loss also distorts and maims society. But domestic and international leaders are unwilling to address these relationships rendered invisible in economics and planned agricultural development."

WAY FORWARD

She suggests that there are two major changes necessary for agriculture to be sustainable and beneficial to our farmers and the environment. Firstly, our imagination of agriculture as a sector of the economy that has to eventually become minuscule in its contribution to GDP, and the share of the workforce, has to be replaced. We need, instead, an imagination of agrarian social metabolism in a village-centred economy (not a village economy) where prosperity and wellbeing of soil, water systems and biodiversity as well as human consumption and nutrition are central to national and planetary sustainability. India has the answers from Tagore, Gandhi and J. C. Kumarappa to Anil Agarwal, Sharad Lele, Jagdish Rao, P. V. Satheesh and several others working in the field like Dinesh Balam and the women in Deccan Development Society. There are millions to lead the way.

Secondly, we need to look to the East a little more carefully and deeply than the humanities and social sciences are currently engaging with. We also need to look inwards and cultivate the capability for self-reflection, anticipation and responsibility. When some of us accuse the agricultural sciences of not coming up with a single statement of accountability or even empathy when we witnessed lakhs of farmers' suicides in the predominantly rain-fed agriculture tracts, we forgot that the same lens of accountability can be turned towards ourselves, as researchers in the social sciences and humanities.

"Why should Punjab, with less than 600 mm annual precipitation and over 80% of irrigation using scarce groundwater, cultivate paddy? Even today, more than two years after the Punjab protests against the new Farm Laws, the land use pattern promoted as part of our national policy for food security is not questioned. We question the Minimum Support Price, the components of and modifications in the cost of cultivation, the irrigation and chemical-intensive production, dependence on the middle-men and public procurement, but assume that Punjab can and should continue to produce paddy." There is a need to strike a balance between nutrition and sustainable agriculture in the context of changing land use pattern. Rajeswari stresses that this is a policy problem that should ideally be debated in our Parliament sessions.

REFORMS IN POLICY

It was in 1998 that the Indian Council of Agricultural Research reported food grains such as rice and wheat produced in Punjab, Haryana and Uttar Pradesh as lacking in nine minerals (Zinc, Magnesium, Manganese etc.) and micronutrients. How has this evidence changed our policy?

Rajeswari has found that there is a cognitive dissonance within our agricultural policy. Food produced in India's green revolution belt at massive environmental and social costs is no longer nourishing. It is just starch and water. However, the

Left: With members of the International Science Council (ISC), Asia-Pacific Regional chapter, in Manila, November 2018.

Right: Dhruv Raina, spouse and Prof. in Jawaharlal Nehru University, Delhi and Shelley Feldman, co-author Synthesis Report, IAASTD, and retired Prof. Development Sociology, Cornell University, Ithaca.

ideal agri-food system built along agro-ecological principles is possible only if there is a policy commitment to democratic, gendered and decentralised planning and public investment; not subsidies.

"Kenya has counties where policies for ten key sectors are debated locally and decided within each county. This shows that we can learn to institutionalise the same here in India. There are conceptual and process lessons already from several experiments in sustainable agri-food systems coming in from Hubli (Karnataka) or Malkangiri (Odisha) or Sikkim or Andhra Pradesh as they turn to natural or agro-ecological production and consumption. Are we, as scientific communities and policymakers, willing to listen to these, work and learn from and with these communities?"

The implementation process faces many challenges but before we get to it, we must first overcome major hurdles like the prevailing mental models of agricultural development and theoretical frameworks of agriculture's contributions to economic growth. Punjab is still being incentivized with massive and exceedingly harmful subsidies to produce foodgrains (that contain just starch and water now) because, theoretically, agriculture is expected to make product, market and factor contributions to the economy, thereby enabling economic growth. Even if it has exhausted and all but destroyed the environment in the green revolution belt, it has to continue because it now contributes to the export market.

> "Research on how we changed the ways of working in the sciences for sustainability will be published, say 50 years from now. If I find mention, perhaps end up as a footnote in one of those texts, that would be a big accomplishment indeed."

Rajeswari's research highlights the problems caused by the centralization of agricultural knowledge and policy. "It has caught the attention of a few positive deviants among bureaucrats and ecologically and socially committed academics and civil society organisations, and I can perhaps claim today that it is being used meaningfully. If sustainable agriculture and resilient rural economies are gaining focus now, it is because of those hundreds of people who were inspired to reimagine the agriculture-environment question and work on the harmonious and just relations between them. I have good colleagues and friends at the ground level who believe in decentralised democratic engagement with the agriculture-environment question; that is an achievement I can claim with conviction."

"One finding that comes from my work is perhaps valuable to the cause of sustainable and resilient agriculture. It is the understanding that of all the consequences of the green revolution, its impact on agricultural knowledge and science and technology has been the most damaging. In small groups and some international networks, this finding has prompted some of my friends and collaborators to ask, 'how do we know?' and 'how do we make decisions based on what we know?' Some of us have been at it, organising forums enabling scientists, policymakers and practitioners to engage with each other in constructive ways. If I end up as a footnote in a text on how we changed the ways of working of knowledge about and for sustainability 50 years from now, that would be a big accomplishment indeed."

MEENA SUBRAMANIAM

T N Khoshoo Memorial Award
for her work on flora and fauna art

2019

When Meena's family moved from Bangalore to Kodaikanal and then to Palani Hills in 1987, she was struck by the rich biodiversity around her. Even as a child, Meena always had an opportunity to be close to nature. Holidays meant visiting wildlife sanctuaries and reserves. "No school vacation was complete without these trips."

Meena found herself drawn to books with rich illustrations of birds, other fauna and flora. She would cut and preserve these images to try and copy them later. Meena holds her mother, a prolific gardener and a collector of plants, as her biggest inspiration. "Though she never did any drawing, she was very good at embroidery and creating what we call 'maavu kolams' (rangolis) done with rice paste. While everyone focussed on traditional patterns, my mother would do ornate temple carvings of plants and motifs with the medium."

LEARNING TO DRAW

During her time in Palani Hills, Meena often visited Father K. M. Mathew, the Indian Jesuit botanist who founded the Palani Hills Conservation Council in 1985, to learn the names of curious-looking wild plants she discovered in the sholas and coffee gardens. She read the back issues of the *Journal of Bombay Natural History Society* at St Joseph's College, Trichy. Meena slowly started to draw plants. "Though I wasn't very good, I kept at it with due

Meena with her painting titled lotus pond

encouragement from Father Mathew. Sadly, in those days, botanical art was unknown to most, and some even called it 'grandma's art'."

As a self-taught artist, she found that there were no books she could access on the finer aspects of watercolour wash and technique. There were no YouTube videos at that time to guide her. But a local artist, Edwin Joseph, who lived in Vattakanal and painted much of the landscapes of the Palani Hills, guided her with simple words on the importance of light in compositions. Years later, she came across some paintings of the Victorian biologist and botanical artist Marianne North. These paintings deeply inspired Meena. "Though my work is nowhere like hers, I found her life very fascinating. A lone woman travelling by ship to distant continents and places and painting their flora and sceneries. She painted boldly and fearlessly,

> “Creating art is immense suffering and joy. As an artist, imagination flies, and to pin the vision one envisages into a medium, be it canvas or sculpture, it takes a lot of courage.”

depicting all the natural wonders from her travels.”
Meena was also inspired by Margaret Mee, a British botanical artist who painted plants from the Brazilian Amazon Rainforest. “I was in awe of her records of South American flora, especially orchids and her accuracy.” Margaret Mee was one of the first environmentalists to draw attention to the impact of large-scale mining and deforestation on the Amazon Basin.

EVOLUTION OF HER STYLE

Over time Meena evolved her own style. She describes it as a process born from experimentation. “I painted quite a few ghastly paintings that I hid or threw away. I was too ashamed to even gift them as they were truly ugly. Though I had worked with oils when I was younger, I preferred a water-based medium for canvas, and I found acrylic very versatile. One day I decided to do a very large canvas simply because I find small canvases limiting. The outcome was beyond my expectations and a moment of epiphany!”
Meena loved going into the field, be it the forests of the Western Ghats or the Northeast, and observing flora and fauna in their natural habitat. She began appreciating the play of light and shadow and gradually developed her own style.

She started with a doodle of the landscape, slowly populating it with elements from it. With each painting, she learned to work on controlling and releasing light as a key component in shaping biodiversity. Over time, she studied how to use trompe l’oeil techniques, how to add depth and dimension to her canvas and the power of wash and highlights.

Each work has a particular narrative to it. Assembling various species into a cohesive work with the right balance of passion and restraint is what gives her the greatest joy. “I tend to make bright paintings, which means I use bright focal points of light. I focus on shaping a world, both fantastical and mystical, that evokes a sense of wonder. My initial paintings sold immediately, and I never looked back.”

Forest friends

LIFE AS AN ARTIST

Meena describes the act of painting as very hard work. A great amount of discipline and focus is crucial, especially with very large paintings.
From stretching canvases and creating compositions to the final stages of finishing, it is a long and arduous journey. Her work requires her to keep abreast with the latest discoveries in plant and animal species of a region and to include them in her work. “I work from early morning to about three in the afternoon, with a short lunch break. I really like the dawn when everything is very quiet, the first light breaks and the White-breasted kingfisher, a resident here in Kumily, starts to call.”

As a commissioned artist, it is sometimes limiting when you have to work with motifs a client wants in a painting. “It can be frustrating when they ask for very brightly coloured backgrounds. I often suggest muted backgrounds, but when they are fixed on their ideas, it’s best to go along.” She then sits with the wish list and tries to work out how she would arrange the motifs. She finds that when she plays with a lot of light, it usually helps make paintings more effective. “It is difficult to work with photos from the internet, especially when representing the natural grace and curves of plants. Sometimes bird images too have bad distortions of colour, and it can be very difficult to maintain accuracy.” She keeps all the subject matter marked in before she starts painting so that there is no question of adding an extra bird or a leaf and getting carried away. “On one rare occasion I had a client pressing for more birds, and it’s probably one of my worst works.”

She recently completed a huge canvas with frugivorous birds and the fruit they dispersed for the Nature Conservation Foundation (NCF), which she describes as one that gave her immense satisfaction. Meena’s work has been on the cover of Sanctuary Asia magazine and Indian Birds. “For me personally, every painting is an opportunity to render something different from what I have done earlier. Each work has a deep personal connection. Those that are not so good, I accept them as part of my learning process.”

Meena is happiest when she is in a forest with her sketchbook, stocked with basic food and supplies to keep her alive. She likes to lose herself to the sound and the rhythm of the jungle, observe and record everything she sees, the birds and butterflies, the fungi and ferns, the orchids, the flowering and fruiting trees, the small mammals that feed on them and so on, so that when she returns to her studio, she can recreate a piece of her experience on to a large canvas. According to Meena, “creating art is immense suffering and joy. As an artist, imagination flies, and to pin the vision one envisages into a medium, be it canvas or sculpture, it takes a lot of courage,”

Frugivores and fruit dispersers

PRASHANTH N. SRINIVAS

T N Khoshoo Memorial Award for his contributions to Adivasi community health during the COVID-19 pandemic

2021

Prashanth N. Srinivas grew up as a city boy with most of his childhood spent in different parts of Bengaluru. He lived in the DRDO (Defence Research and Development Organisation) quarters, surrounded by many languages and cultures. He developed an interest in electronics and his father, an engineer at the DRDO, helped him nurture it. However, it was Biology that fascinated him most, prompting him to pursue it at St. Joseph's College, Bengaluru. "But those days, good marks in biology sadly did not mean that one became a biologist! I unwittingly found myself joining my peers with 'good marks' to do medicine."

THE CALL OF THE FOREST

The journey he began at the Mysore Medical College not only took him into the world of medicine, but also the forests nearby seeking birds and other wildlife. "Studying in Mysore meant that we were close to several forest areas such as Bandipur, Mudumalai, Nagarahole, MM Hills, Kodagu, Wayanad and BR Hills. Travelling to these places and observing wildlife in their natural habitats permanently transformed me. Fascination with wildlife, forests and with the people who live in and around nature became a lifelong passion, which continues to this day."

Becoming a "rural doctor" at BR Hills in Chamarajanagar district, Karnataka happened organically. The NGO, Vivekananda Girijana Kalyana Kendra (VGKK) located in BR Hills operated a mobile health unit that routinely visited remote locations across several forested areas in the district. This was a wonderful opportunity for Prashanth to apply what he had learnt in medical school and work with communities that do not attract enough doctors and health workers. It was a challenging task, which he felt up for.

"Studying in Mysore meant that we were close to several forest areas such as Bandipur, Mudumalai, Nagarahole, MM Hills, Kodagu, Wayanad and BR Hills. Travelling to these places and observing wildlife in their natural habitats permanently transformed me. Fascination with wildlife, forests and with the people who live in and around nature became a lifelong passion, which continues to this day."

VISION FOR PUBLIC HEALTH

"My work at VGKK helped me develop a vision of public health that continues to guide me today. It was there that I met inspiring people, not only doctors but also Adivasi youth and leaders who were involved in inter-generational struggles for rights over lands and livelihoods. What I thought would be a few years of adventure watching birds and doing some medicine in BR Hills became an initiation into a new kind of practising medicine and health. Health did not mean the expertise of a doctor and his medicines. It was the product of partnerships, coalitions and movements that required the doctors and experts to step out of their comfort zones and pedestals afforded by their academic training to become co-learners with the local communities in solving complex problems within which people's health was entangled. I could see first-hand through my work during those four years at BR Hills that social inequalities and historical processes often resulted in

Prashanth with doctors and health workers at BR Hills.

unequal and unfair accumulation of ill-health among some people."

He found that social identity markers like caste and class would determine who shall remain healthy and who shall not. Their access to healthcare, its quality and cost were all determined by many social determinants of health and healthcare. While social movements and activists were already involved in addressing these through community organisation and rights-based approaches, he felt that academia too can learn from them and integrate these values within its academic inquiry. The thought motivated him to pursue health policy and systems research, a field that seeks to contribute towards making health systems more equitable and just.

TOWARDS A MORE EGALITARIAN HEALTH PRACTICE

Prashanth believes that they need to build long-term partnerships that not only involve NGOs, CBOs and Adivasi social movements, but also the health and other government departments and academia. They also need to use approaches that empower communities and not researchers (such as data-intensive research that only generates excellent science but rarely results in transformative knowledge or in changing the practices in Adivasi health services). Along with this, we need to address the minuscule representation of the rich Adivasi diversity in our academia and health systems because,

Community health workers and data collectors training with Prashanth, Yogish and collaborators from the Mysore Medical College

ultimately, we cannot have Adivasi health priorities decided by non-Adivasi institutions. They would not be able to meaningfully integrate the lived experience of Adivasi history and life into their research agenda. He is hopeful that the recent renewed interest in health policy and systems research, that seeks to use knowledge to address issues of social inequalities, holds some scope to address this.

He advocates against seeking to change the mindsets of the Adivasis. Work by NGOs, activists and researchers has shown that there needs to be a shift in the mindset in medical colleges, academia and health centres and hospitals. Instead of trying to change the attitude of the Adivasi individuals, we need to look inward and try to understand Adivasi identity, Adivasi health and their social and cultural history.

Prashanth recalls, "There are so many failures; perhaps a lot more can be written about them than about our successes. For example, the way we assumed that sports-based wellness interventions would attract all genders equally. Or the way we tried the idea of support groups for de-addiction little knowing how to adapt it within our settings. Far too much time has been spent blaming individuals or communities for the lack of awareness. But the elephant in the room is the system and the service, which needs fixing, not the people."

Supporting a community health programme initiated by the Eastern Himalaya Program of Nature Conservation Foundation in eastern Arunachal Pradesh with the Lisu community

Prashanth has had several unforgettable experiences in the course of his work at Chamarajanagar. He has worked two stints there: one when he was a rural doctor at the VGKK Hospital and another, much later, as part of a participatory action research programme initiated towards improving the maternal health of Adivasi women in the district. There he had the opportunity to work with Dr Tanya Seshadri and build upon her work in creating a long-term field station. Their work together drew them close to each other for life.

LACK OF ACCESS TO HEALTH CARE, THE BIGGEST HURDLE

The field station enabled them to deeply understand the various health problems faced by the Adivasi communities. “One particular story I still recall is that of an adolescent Soliga girl from one of the remote settlements inside BR Hills Tiger Reserve. She had Type 1 diabetes, a kind of diabetes unlike the one seen in late adulthood. It starts early, sometimes even in the early teenage years. The problem of access was embedded in the system. The issue was as much about the distance from her settlement to the hospital as it was about prioritising connectivity like providing a road to the Badrinath shrine but not to an Adivasi village. Entangled within her story of poor access to basic needs were the social and historical drivers of why some people, some places and some neighbourhoods become disadvantaged. Much later, when I returned to BR Hills after my public health studies, she had passed on. A young life lost not because there was no treatment but because she had no access.”

Prashanth says that for him the greatest source of satisfaction is when they are able to get something done in terms of policy or affording a positive change in the way they practice. “For instance, during the second wave of the COVID-19 pandemic, we were able to meaningfully partner with the Zilla Budakattu Girijana Abhivruddhi Sangha (the district-level collective of the Soliga Adivasi people) and the Taluka Soliga Abhivruddhi Sanghas to have a more adapted response to Adivasi communities. This resulted in completely changing their attitudes towards vaccination and various other public health measures. It made us realise that instead of finding problems with specific communities or viewing their behaviours as requiring modification, sometimes changing our own approach and locating the problem within the system helps.”

Home-visits and community meetings are important parts of community health practice.

TANYA SESHADRI

T N Khoshoo Memorial Award
for her contributions towards health
care of indigenous communities

2021

CHARTING A CAREER IN COMMUNITY HEALTH

Tanya hadn't considered becoming a doctor but a traumatic experience of losing her classmate to a terminal illness prompted her to pursue Medicine. She went on to complete her undergraduate studies in medicine at the Kempegowda Institute of Medical Sciences, Bengaluru. She found herself drawn to Community Medicine. "From inspiring professors to engaging conversations on people's health, I found much joy and eagerness when working in the different community health initiatives. During my internship, we were posted at various government health institutions across Bengaluru. The experiences I had there and my learning of the state of public health services in early 2000 helped me decide on Community Medicine for my journey ahead."

She enrolled for postgraduation in Community Health and Development at the Christian Medical College, Vellore. The three years at Vellore saw her wearing many caps – doctor, data reviewer, social worker, counsellor, researcher, teacher and most importantly, a community member. There was no looking back. Tanya worked with the tribal communities of Jawadhu Malai and Dimapur in Nagaland, while also learning about health systems research at the Institute of Public Health, Bengaluru. In 2012, she moved to BR Hills in Chamarajanagar district and has, since then, worked as a community health practitioner, resident medical officer and community health researcher. Her job involved working with and learning from the Soliga people through her relationship with Vivekananda Girijana Kalyana Kendra (VGKK), a local NGO.

Engaging in health systems research while working in cities and viewing the field as a site for data collection did not sit well with Tanya. By trying various combinations over time, she eventually realised that working with the community while trying to learn through research from them was the only balance that allowed for relevant work and insightful learning. "Public health research also helps practitioners like me in continuing to work on problems constructively while learning from failures in an environment of testing and refining solutions." In Chamarajanagar, the Zilla Budakkattu Girijana Abhivrudhhi Sangha, a district-level tribal community collective, engages with the community through research, significantly at all stages of planning and reporting. VGKK is another organisation that has created a relationship of trust and worked on many of the basic health aspects over the last four decades. All these factors allow for a vibrant research environment in the district.

DISPELLING NEGATIVE PERCEPTIONS

During the COVID-19 pandemic, reports in the media sensationalising resistance by the tribal people to the efforts led to a false perception that tribal people were not cooperating or were still far removed from today's conversations on health. This led to a joint effort among the district administration, zilla panchayat, taluk and hamlet-level tribal people's associations along with the district tribal welfare office and local NGOs to engage closely with the tribal people. "We partnered to develop and implement customised solutions that allowed people to question and be informed of what is available, what is prescribed as per policy and how to engage with these solutions." These were similar to the conversations heard across all towns and cities in Karnataka. As soon as we began the conversations, the environment of fear that media reports of COVID-19 had created changed to one of engagement and informed decision-making. Tanya believes that we can only work on a problem when we understand it.

“The kind of work I do, it builds up inch by inch, and sometimes it seems like two steps forward and one back. But while walking through BR Hills or some of the other hamlets, I catch glimpses of old patients or their family members, who have grown up, moved on with their lives, and I recall all the adversity they faced during a health crisis and how they have overcome it. There are a few children now in school and growing up real fast – in them, I see the most change, and they are for me reminders of my achievements here.”

“There is an urgent need for collaborative, community-engaged research that brings together researchers, practitioners, community representatives and academics along with a research and funding environment to support the same. Typically, these kinds of research need to move beyond short-term descriptive nature to more long-term, implementation-focused, community-engaged approaches. Tribal health in south India is also one of the neglected areas in terms of funding. Its conversation includes relatively smaller numbers and a poorer political voice. Most tribal health research is hence limited to the Northeast or Schedule 5 areas.”

CHANGING MINDSETS

She feels that her mindset has changed significantly over the last decade of her work. “From viewing the community as a beneficiary in my work to engaging with them as my team members, my neighbours and my child’s teachers, my consciousness is being raised every day.” “There are times I

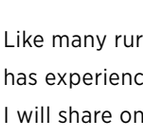
Tanya Seshadri with shikara Made Gowda and Prashanth Srinivas

secretly wish that everyone just listened to what we had to say as a health team. However, I have also witnessed here the adverse consequences of my decisions as a doctor on a family. As a community practitioner, I get to see the impact of a single decision over time on the same person, on their family, neighbours and so on. I do see a change in the approaches and attitudes of doctors, researchers and students when they visit or initiate work with us over time, which fills me with hope. Having partners from the community like the zilla or taluk sanghas is key to this.”

Tanya regretfully recalls, “Every day we lose people too early and for reasons that could have easily been prevented or corrected. So these failures are everyday lessons for me as a doctor and that keeps the researcher in me on her toes. I met a senior leader, Made Gowda from Monakai podu in the forests of the BR Tiger Reserve in my early days. I would meet him twice or thrice a year and enjoy long stories about the history of the Soliga people and their journey. I would keep looking for a project or ways to document his thoughts, but he passed away a few years back and those stories and

experiences are now lost forever. That I see as a huge failure. We are so busy fighting with everyday issues that often there isn't time to sit and pause and capture all that is known and felt."

Like many rural doctors working with tribal people in the country, Tanya too has experienced helplessness. "There are numerous such experiences, but I will share one from the second wave of COVID-19 last year. A 9-year-old Soliga child struggled from severe malnutrition in a remote tribal hamlet. She lived with her sibling and grandfather as her father had migrated for work elsewhere, which had been strained due to the lockdowns. Given the multiple challenges her grandfather faced, he was not able to and was not willing to focus his efforts towards her care as she lay on a bed in a COVID-19 hospital far away from the hamlet. The family's problems were exaggerated by the COVID-19 restrictions impacting her care. Yet the child found joy when someone played her favourite Kannada movie song in the COVID-19 ward. After weeks of slow recovery and on one stressful day, we lost her. "
"The kind of work I do, it builds up inch by inch, and sometimes it seems like two steps forward and one back. But while walking through BR Hills or some of the other hamlets, I catch glimpses of old patients or their family members, who have grown up, moved on with their lives, and I recall all the adversity they faced during a health crisis and how they have overcome it. There are a few children now in school and growing up real fast – in them, I see the most change, and they are for me reminders of my achievements here."



Tanya with the Adivasi children, her regular patients.

Soliga Adivasi leaders, C Mahadeva & C Madappa along with Dr. VIshweshvarayya, the District Health Officer of Chamarajanagar along with some of the staff of IPH Bengaluru at the field station in BR Hills

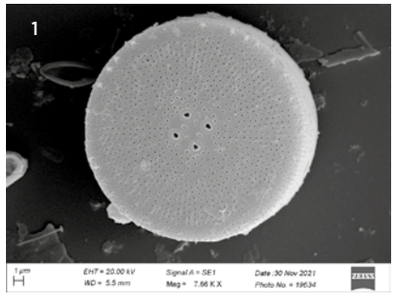
DR KARTHICK BALASUBRAMANIAN

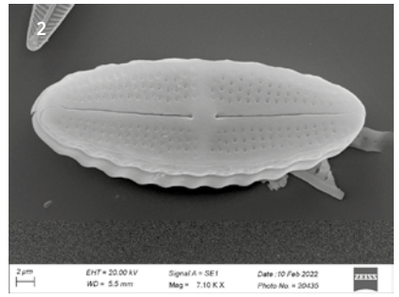
T N Khoshoo Memorial Award for his pioneering work on the taxonomy and systematics of freshwater diatom flora

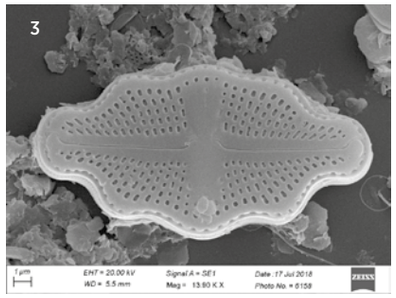
2022

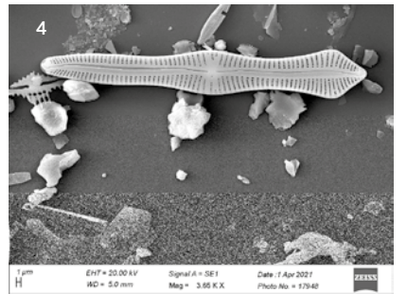
Growing up in Rasipuram, Tamil Nadu, Karthick dreamt of becoming a Station Master someday. These dreams didn't last too long as his teachers introduced him to the world of Zoology and Botany. Karthick was in 11th grade at Sri Vidya Mandir School in Rasipuram and that year saw him transforming from a below-average student to a topper. His father wanted him to become a software engineer, but Karthick's heart was set on Biology. He chose to pursue BSc in Microbiology at KSR College in Tiruchengode. There, he met his mentor, Dr Vivekanandan, who inspired him with stories of his PhD and postdoctoral days in Japan. Karthick shifted to Pudukkottai in Tamil Nadu to pursue Master's in Environmental Science, just as Dr Vivekanandan had done. However, he didn't find a good mentor/faculty who could help him with his Master's thesis.

He sat in an internet cafe in Trichy for days, researching good institutes where he could complete his Master's thesis and pursue his PhD. Karthick describes himself as a world-class spammer! He then wrote to hundreds of people with his Master's thesis idea .He got only two responses, one of which was from Dr T. V. Ramachandra from the Centre for Ecological Sciences (CES) at the Indian Institute of Science (IISc), Bangalore. He was given two weeks to prepare a presentation on wetlands. Karthick spent those two weeks entirely in a library. "At IISc, I gave a 30-minute powerpoint presentation. I couldn't speak English well and spent most of my time translating my thoughts from Tamil to English rather than thinking about the subject. The presentation was horrible; I didn't understand half of their questions. By the time it ended, I could tell that they weren't very impressed. While packing up my things, Dr Ramachandra asked me why I was carrying such a huge bag for a single day's trip. I told him I was carrying all the literature I had gathered at the library. He asked to see the books and, in a few minutes, told me I could work there."









1- Centric_Orthoseira roseanan

2- Achnenthes

3- luticola

4- Gomphonema (gompho means wedge shaped - latin)

Life at IISc was exciting as he saw legends in the field like Prof. Madhav Gadgil walking around in the campus. For his MSc project, he chose to work on water chemistry and phytoplankton in the Sharavathi River, Karnataka. His project required him to collect water samples to study algae and water chemistry. In mid-November 2003 he reached Sagara, a town near his project site at 4 am. Karthick recalls he had never felt so cold in his life before. "For my body that was Antarctica. I spilt all my tea because I was shivering the entire time. I could not understand what they said in Kannada and at that time my English was also like telegraphic language. But living there, I learnt

Karthick collecting diatoms using a phytoplankton net

Kannada in a month." He found a small fishing hamlet where many people from Mettur lived and they were the only ones he could speak to in Tamil. He had never been to a forest and was overwhelmed by everything around him.After completing his MSc thesis, Karthick joined Dr Ramachandra as a Project Assistant to study the water quality of the Aghanashini, Kali and Bhetki rivers of the Western Ghats in Uttar Kannada region for two years. The years spent at IISc with K V Gururaj and H. Sudhira, his colleagues, were instrumental in shaping his thinking. Many hours were spent sitting at the Tea Board at IISc, discussing and analysing what it is to "think like a researcher".

When Karthick collected water samples from the three rivers and analysed them, he observed a brown growth on the water samples. "The

> "The microbiologist in me wanted to know what it was. That was the first time I saw Diatoms. Under the microscope, they looked beautiful!"

microbiologist in me wanted to know what it was. That was the first time I saw Diatoms. Under the microscope, they looked beautiful!"

Karthick enrolled at Mysore University for his PhD and collected water samples for a year. In the following year when he began his analysis, he realised he couldn't do it alone as there was no one to help him in identifying Diatoms. "Since I was a 'skilled spammer', I wrote to many people. I found an email listserv called Diatom Listserv, which is like a group email. So I wrote a letter with the subject line 'A new baby to the diatom world' and said I needed help with my Diatom research." He got a few replies, and though he didn't realise it then, the people who wrote back were the top people working in the field. Among them was Dr Jonathan Taylor from South Africa. He was working on Diatoms in South Africa and said that he could help him with identification. They exchanged emails for a while, after which Dr Taylor asked him to come stay with him in South Africa for a month.

"I begged and borrowed money to take that flight to South Africa. I don't know how, but I managed. During my stay with Jonathan, I spent all mornings in the lab and stayed up all night doing 'copyright violations'. Jonathan gave me his lab scanner and I would scan all the books through the night. A month later, when I returned to India, I could still hear the sounds of the scanner in my sleep." Dr Taylor advised him not to identify Indian diatoms using reference books on European diatoms as each region is

Karthick's team conducting water quality assessment in Aghinasini river.

different. On his return to India, he had to throw out all his previous samples and identifications as he realised that his past work was not going in the right direction.

This journey marked a turning point in his life. When he left South Africa, Jonathan told him about his mentor from Poland who had trained him. Since then, Dr Taylor had been shouldering the responsibility of training other researchers. With Karthick, he felt he had finally shifted the weight of that responsibility. Now it was Karthick's turn to pass on his training to other researchers. Karthick has trained over 22 people in the last two months alone.

During his research, Karthick came across the work of Prof. H.P. Gandhi, who had studied diatoms extensively in India. When he went through all his papers on diatoms, he noticed that each one had different affiliations. So he had no idea how to contact Prof. Gandhi. Finally, he came across a paper that had his home address instead of institutional affiliation. Through the BSNL online directory, he tracked down eleven Gandhis living in the same

Prof. H P Gandhi

area. Finally, he managed to speak to Prof. Gandhi's son Pankaj Gandhi who requested Karthick to come to Gujarat and meet his father.

"I had a crazy drive for diatoms and was just running around chasing them." When he reached Junagadh, he was shocked to find that Prof. Gandhi had Alzheimer's and was bedridden and unresponsive. He introduced himself but got no response. Karthick decided to show him the images of the diatoms. By the third day, he continued to remain unresponsive to all the diatom images Karthick showed him. But when Karthick stepped out of the room for a moment to speak to his son about seeing some of his father's samples, Prof. Gandhi suddenly began speaking. In a flow, he named all the diatoms

that flashed on Karthick's screensaver.

The family was overjoyed as he hadn't spoken in years. Prof. Gandhi told Karthick about his childhood and his life. He was transferred very often because he was a straightforward man and hence the different affiliations for each paper. In the next few days, Prof. Gandhi gave Karthick all his work samples and passed on his knowledge very meticulously. "He passed away three months later. Prof. Gandhi was never recognised when he was alive and even his own family didn't realise the significance of his contributions. His work was way ahead of his time." Even today, when Karthick goes to international conferences, the first question they ask is whether he has met Prof. Gandhi.

Karthick returned to Bangalore with Prof. Gandhi's collections but was confused as to what to do with them. He wrote to Mr David Williams, the curator at the British Museum, who responded immediately and came to India to meet Karthick in a week. Mr Williams connected him with Professor Patrick Kociolek at the University of Colorado who later became his postdoctoral supervisor. Mr David Williams and Karthick organised the collections. Using this collection, Karthick worked on a manuscript and published his first diatom paper in 2009. Prof. Gandhi's collections are used to this day and papers are published every year about them. They have made many conceptual changes in our understanding of diatoms.

While preparing to go to the US for his postdoctoral position, Karthick received the ATREE Small Grant using which he started working on a book – an illustrated guide to Diatoms. After Colorado, he went to South Africa to complete his second postdoctoral fellowship with Dr Taylor. He was awarded a National Geographic grant to study the diatoms of the Western Ghats. In 2013 a book titled 'An Illustrated Guide to Diatoms of Peninsular India' authoured by Karthick was released at ATREE.

"Diatoms are an interesting and ubiquitous group of organisms, often referred to as living glass houses. They play a very important role in

Book by Karthick being released at ATREE.

indicating the extent of pollution of water bodies such as rivers, lakes and ponds. Diatoms are unicellular golden brown microscopic algae of various shapes that are abundant in nearly all habitats from freshwater to brackish water. They have a skeleton made up of silica and two valves that make them look like a soapbox or a baseball cut in the middle. While a number of microalgae are present in water, diatoms are unique because they are the only species having silica in their cells."

From a research point of view, diatoms are the base of the food chain and the primary food producers for the aquatic ecosystem. They generate around 23% of the oxygen we breathe. They have a lot of hidden biological evolutionary information and are relevant in palaeontology and hydrocarbon exploration. They are also used as a bio-monitoring tool. While there are more than 2 million species of diatoms distributed in different ecosystems, only 65,000 species are known as of now.

Diatoms are made up of silica cell walls. So when they die, the silica settles down. Silica doesn't degrade; over time, when the sea becomes land, these dead diatom cells accumulate and form diatomaceous earth. The famous

Swedish chemist Alfred Nobel used the diatomaceous earth to invent dynamite, which was used during World War 1. Alfred Nobel, in his will, left the bulk of his fortune to establish the Nobel Prize.

Diatoms are also used in biofuel production. “Cars will soon be able to run on diatom biofuel. They have high pharmaceutical value as well. Moreover, all vegan omega3 fatty acid food supplements are made using diatoms. Diatoms contribute to building a sustainable world by reducing the dependency on fossil fuels, and they can also be cultivated and used for carbon sequestration.” They release as much oxygen as they take up. Diatoms have applications in the process of brewing beers as well. Yeast needs to be filtered out of brewed beer before packaging and passing brewed beer through diatomaceous earth filters out all the yeast.

Karthick Balasubramanian currently leads the Diatom Diversity and Distribution Lab at the Biodiversity and Palaeobiology Group of the Agharkar Research Institute, Pune, India. His group works on the ecological and evolutionary processes responsible for the current diversity and distribution of diatoms in the Indian subcontinent. He is also interested in communicating science in English and Tamil to common people, especially school children, using diatoms to sensitise them about river conservation.

Prof. Patrick Kociolek with Karthick, during the book release at ATREE

DR DEEPAK MALGHAN

T N Khoshoo Memorial Award for his contributions to ecological and environmental economics

2023

In the heart of an industrial township in India, a young Deepak Malghan embarked on a journey that would lead him to the forefront of ecological economics. Born into privilege against the backdrop of a society shaped by caste, class and economic complexities, Deepak reflects, “These privileges set me up for a series of fortuitous accidents, including bumping into a set of incredible mentors.” Little did he know that his unwavering curiosity and commitment to justice would carve out a path of profound impact.

ROOTS OF CURIOSITY

Raised in a public sector-led industrialisation era, he was acutely aware of the disparities marking his surroundings. His physicist father’s complaints about budget constraints and the workers’ strikes on the shop floor became the catalysts for his early interest in economics. Deepak states, “My early interest in economics was driven mainly by things I saw around me.”
Yet, it was the unique integration of his public sector-run school that set the stage for his lifelong quest to bridge societal divides. He recalls, “At school, I was forced to confront the prejudices I was being socialised into. I thought economics would help me bridge the gap between the worlds inside and outside school.”

Deepak’s advisor Herman Daly and wife, Marcia along with Deepak’s daughter, Arunima.

DETOURS AND DISCOVERIES

Deepak found himself on an unexpected detour into electrical engineering during his college years. Little did he know that this deviation would prove instrumental in shaping his future. Surrounded by the theoretical aspects of engineering, guided by mentors who saw potential beyond the ordinary, he laid the groundwork for a journey that transcended disciplinary boundaries. In his own words, “During my early days in college, I was quite disinterested in any practical aspects of engineering. I largely survived electrical engineering because I had a very strong high school foundation in math and physics.”

THE MAVERICK MENTOR

A chance encounter with a visiting electrical engineering professor altered Deepak’s course. What began as a quest for a project on theoretical signal processing transformed into an introduction to renewable energy systems. The maverick mentor, with a formidable global reputation, became the guide who opened the doors to ecological economics. Deepak added, “If you wanted to cast this as the classical structure-agency dyad, I do not mean to undermine agency but [I wish] to shine the light on privileged structures that are so easy to gloss over.”

He introduced Deepak to another maverick – a tenured industrial engineering professor who had recently started an Appropriate Technology Centre. Besides being a thermodynamics professor, the centre's director was also a noted amateur naturalist, wetland ecologist and avid birder. Deepak's regular field trips with the director debunked his understanding of "nature".

INTELLECTUAL DEBTS

Deepak discovered the "remarkable lifework of the chemical engineer C. V. Seshadri – unarguably one of modern India's most extraordinary lives." Seshadri's musings on thermodynamics and society were foundational in shaping Deepak's thinking on ecological economics. He reflects, "It would be entirely accurate to describe the sum of my negligible contribution to theoretical ecological economics as no more than a mere footnote to C. V. Seshadri's utterly original insights." He hopes to repay his intellectual debts to C. V. Seshadri, in part, by writing a book-length intellectual biography in his honour.

From Deepak's vantage point, economics was the most obvious entry into the social sciences world. "Privileged Indians like me are good test takers, and I had little difficulty gaining admission into a top-ranked programme. In graduate school, I was soon bored as I felt like I was reduced to being the math tutor for my cohort. However, I had a set of remarkable mentors who empathised with my conundrums and helped me plot my way out of economics."

The proximate cause for Deepak's early interest in theoretical ecological economics was Georgescu-Roegen's magnum opus. A semester after he read Georgescu-Roegen, Deepak was sure he wanted to study with Herman Daly, one of the founders of modern ecological economics. However, Herman insisted that he should finish a graduate degree in economics before moving, with a promise to help Deepak with ecological economics if he remained interested after a year's break.

"The break year was more eventful than I had imagined in my wildest dreams. Beyond helping reaffirm my commitment to studying ecological economics, the break year also opened doors for two other disparate interests I have (intermittently) pursued – intellectual history and rural energy", Deepak recounted. Herman kept his word, and Deepak was back in graduate school studying theoretical ecological economics with him.

ECONOMICS OF BIODIVERSITY

At the heart of his work is the concept of the "Economics of Biodiversity", a notion Deepak aptly

Deepak presenting a talk at IIMB.

conveys even to a school child through a thoughtful analogy. He invokes a conversation with his daughter to explain the concept.

Deepak: "What would you do if you found a five-hundred-rupee note lying on a public street?"
Daughter: "I would pick it up and hand it to the police. I know I am not supposed to use it."
Deepak: "That is good, but what if you simply let the currency note there?"
Daughter: "Somebody else will pick it up."

Deepak: "Is it possible that if you do not pick up the note, nobody else will?"
Daughter: "No, that is simply not possible. Somebody else will pick it up and perhaps not even give it to the police."

This conversation, he explained, "shows clear parallels with why, as adults, we insist on using economics as the primary lens to understand biodiversity. My daughter cannot conceive of a world where if she did not pick up the note, no other child would because we adults cannot conceive of a world where poetry rather than economics would help us understand biodiversity."

ROLE OF ECOLOGICAL ECONOMISTS

Ecological economists, according to him, play a crucial role in shaping the sustainability

discourse. He notes, “the relative size of the economy and ecosystem becomes salient for the economic predicament.”

He highlights the ontological challenge posed by ecological economics to standard neoclassical models, emphasising that the human economy is an open subsystem of the larger ecosystem. This perspective becomes increasingly relevant as the world grapples with urgent issues like the climate emergency.

THE INTERSECTION OF ACADEMIA AND ACTIVISM

As Deepak delved into ecological economics, a commitment to justice emerged as a guiding principle. Privilege, caste and class became the threads woven into the fabric of his academic pursuits and activism. Recognising the need for resistance in polarised atmospheres, he became a vocal advocate for addressing caste-based environmental injustice.
In his own words, “Nuance is indeed difficult, if not impossible, in a highly polarised atmosphere. We must resist and push back on structures that produce polarisation.”

CASTE-BASED ENVIRONMENTAL INJUSTICE

One of Deepak’s central focuses as an activist and scholar is the exploration of caste-based environmental injustice in India. He unveils the palimpsest of environmental injustice with layers rooted in India’s caste society, colonial legacy, post-colonial state collaborations and the recent influence of neoliberalism. He urges a critical examination of these layers, advocating for a comprehensive approach to address environmental injustice. He describes it as, “the long shadow of injustice cast by colonialism.”

PROJECTS OF SIGNIFICANCE

The first, a historical exploration of “efficiency” as a central idea in the modern world, revealed the political economy and global diffusion of this pivotal concept. Reflecting on this endeavour, Deepak elucidates, “The efficiency imperative dominates both the scholarly discourse as well as praxis. Despite, or perhaps because of efficiency’s ubiquity, the historical political economy of how efficiency came to be one of the most central ideas of the modern world has not received adequate scholarly attention.”

The second, a collaborative effort to characterise environmental injustice in India, became a beacon for understanding the racialised pathways of caste and religion. Deepak expresses, “I am working with scholars from multiple institutions to set up an environmental justice lab. We are developing ‘PAIReD,’ an open data schema to combine census-scale ground data with satellite imagery.”

CHALLENGES AND TRIUMPHS

Working on socially relevant issues on the ground brought its challenges. Deepak found himself squeezed between the interests of the state and the market, yet the struggles of privileged academics paled in comparison to the daily battles faced by those on the frontlines of justice. A beacon of hope emerged in the form of his students, inspiring him to persevere.

In Deepak’s words, “Hope and optimism are two very different things. One can remain hopeful even when one is not optimistic. In the face of the grave ecological crisis surrounding us, it is crucial to distinguish between hope and optimism. My students help reaffirm this hope each year.”

HOPE AMID STRUGGLES

“In the face of the Citizen Amendment Act (CAA) protests, a virtual curfew was imposed in Bengaluru, and we were not allowed to get out of our campus. The police even briefly detained some faculty members who defied their orders. In a moment of epiphany, students on my campus spontaneously organised a protest within the campus, knowing well the potential consequences. Witnessing their courage and conviction was a powerful moment for me. It reinforced my hope in the younger generation’s commitment to justice and change.”

NAVIGATING INCREASED POLARISATION

In the face of heightened polarisation, Deepak underscores the importance of resistance. He emphasises the need to push back against structures that perpetuate division, asserting that academics, especially those in privileged positions, carry a unique responsibility in bending the arc of moral justice. He emphasises the need to push back against structures that perpetuate division, asserting that academics, especially those in privileged positions, carry a unique responsibility in bending the arc of moral justice. One way to do this is through “Resistance”.
To any aspiring ecological economist, Deepak’s advice is, “If possible, do not grow out of your idealism. The fate of our planet hinges on the idealism of young people.”

MANISH RAJANKAR & SHALU KOLHE (REPRESENTING THE DHIVAR FISHING COMMUNITY)

T N Khoshoo Memorial Award to the Dhivar community for their efforts to restore the lakes in Vidarbha

2024

Birds got Manish Rajankar curious about the ‘water tanks’ of the eastern Vidarbha region in Maharashtra. Soon, he was on a mission to revive these tanks, leaning on modern science and, in greater measure, community knowledge. That meant earning the trust of all stakeholders and realising ecological restoration was not possible unless it ensured the empowerment of the people dependent on these ecosystems for their livelihood. Today, as a director of the Foundation of Economic and Ecological Development (FEED), Manish has ‘much many things’ to share about his journey. And valuable lessons for any such restoration efforts.

SEEKING ANSWERS IN HISTORY

His journey began around 1993–94, when, as a member of the Bhandara Nature Club, he engaged in birdwatching and collecting data for the International Waterbody Census. The large number of water tanks in the region attracting rich and varied bird life made him want to know more about these tanks. ‘I started by documenting information on traditional tanks and tank building. The Gazetteer of the Bhandara region led me to their history. The Gond kings, during the sixteenth century, brought people from the Kohli community from Benaras to build these traditional tanks for irrigation purposes,’ says Manish. In order to learn more about the history of these tanks, Manish set out on a tour across the villages for 2–3 months, sometimes staying overnight in the local Kolhi homes and collecting traditional information about the tanks.

Every revival project witnesses several discussions with the villagers, whose traditional and lived experiences are then assimilated into the action plan

By then, the Vidarbha region had already boasted of its own Pakshimitra Sammelan. In the 1998 Sammelan, Manish met Ajay Dolke, who was then working on a fellowship with Anubhav Shiksha Kendra. ‘Ajay Dolke also happens to be one of the founders of Maharashtra Pakshimitra Sammelan. He told me there was something called the voluntary sector, where I could pursue my interest in water tanks, but it has to benefit the human population,’ says Manish.

A three-year fellowship from Econet in Pune to study the water-harvesting systems funded his pursuit. He learnt from the records that the British maintained an annual census of these water bodies, which were about 12000. After Independence and the subsequent enactment of the Proprietary Rights Abolition Act in 1951, the government took over the ownership of the tanks and their management and responsibility was split between various departments, like Revenue and Minor Irrigation. When the government started levying tax on the tank beneficiaries, people went to court, and the case dragged up to the Supreme Court. The court invoked the Nistar Rights (community rights on natural resources for livelihood purposes) to say the government could not levy tax during the kharif season.

Manish Rajankar (extreme right) engaging with villagers to revive the traditional water tanks

When the government took charge of the tanks, it alienated the local communities from these tanks. Until then, people managed desiltation, catchment clearing and other such activities. 'But now, the management of the tanks rested with different departments. They underwent many changes too – the sluice gates were altered to increase irrigation capacity, fishes were introduced, and the use of pesticides grew in proportion. Eventually, tanks started deteriorating and dwindled from 12000 to 2700,' elaborates Manish.

THE TURNING POINT

Manish has reels and reels of information to share. But he stops. 'When I documented all this information, one of my mentors, Datta Sawle, asked me, "Aapki jo aadarsh talobo ki vyavasta hai, is samaj ka aakri insaan tak kaise pachunti hogi?" (Your model water tank system, how does it reach the very last individual in the society?) That single question shook me and turned my whole pursuit upside down. I revisited my notes through this perspective and realised the system is also very exploitative. Until then, I looked at the tanks as decentralised water management systems. But they had never been accessible to all the people in similar ways. Apart from protective irrigation,

Manish Rajankar (fifth from left) brainstorming with the villagers before a tank revival project

the two other rights listed in the Nistar Patra were water for washing clothes and for cattle. It was then that I realised I must observe and record all the unlisted uses, and I arrived at 26 uses.'

LESSONS FROM THE MARGINS

He revisited the villages with this changed perspective and came in close contact with the Dhivar community, the fisherfolks, who were also the lowest in the social order. It was then that Manish met Patiram Tumsare. 'A seventh-class pass, he is an expert in botany, zoology, ornithology and several other subjects. Patiram Bhau (brother) taught me to look at a waterbody holistically through all the interlinkages. If a type of fish is found in a waterbody, what does it mean? It indicates the waterbody has specific types of aquatic plants and water quality for the fish to exist,' says Manish.
After Independence, the Dhivar community obtained fishing rights in these tanks through the fishing cooperative societies established by the government. Soon, the farmers and fisherfolk were at loggerheads. The farmers argued their ancestors built these tanks for protective farming and not fishing. 'I observed the fisherfolk, had a very close bond with the waterbodies. They knew what ails them and what solutions would work.

Children from local schools watching and recording birds as part of the tank revival exercise

But, being the lowest in the social order, they were nowhere in the system. Though it was about 30–40 years since they had fishing rights, they were extremely poor, with low literacy rates and high liquor consumption. But I also realised when you are marginalised, whatever knowledge you may possess, it also gets marginalised,' Manish explains.

TWO-FOLD MISSION

This awareness directed Manish's activities in two ways: ecological restoration of waterbodies and empowerment of the Dhivar community. With Patiram Bhau's assistance, he started his restoration activities at a small seasonal tank called Naav Talav in Jambhali, the former's village, with three objectives:

1. Increase fish production: After the state of Maharashtra was established, the fisheries department introduced Indian Major Carps or 'sarkari machhi', as the locals call them. They were touted as high-yielding fish that could grow 2–3 kgs in one year as opposed to the local or indigenous fish or 'mulki machhi' that took 2–3 years to grow that size. The fisherfolks were asked to eradicate the mulki machhi since they were shikari (predator) machhi that consumed the eggs of the sarkari machhi. The yield in the initial years was indeed high, and people were sold over to the sarkari machhi.

   Aquatic plants became the next impediment. While each mulki machhi was caught using different methods like line and hook and bamboo trap, sarkari machhi prompted the use of large-sized dragnets that also dragged in the plants. So these plants were blanketed as weeds, and besides manually uprooting them, Grass Carps were introduced to scavenge on them.

   These changes affected the tank biodiversity, and the robust food chain that once thrived was soon disturbed. After over 30 years, people realised fishes that grew 2–3 kgs were reduced to 200 gms annually.

Manish Rajankar and Shalu Kolhe in an awareness campaign involving schoolchildren and villagers

2. Ecological restoration: People wanted jeevanta (alive) talav. Reviving them was the only way out. The deterioration affected not only the fish but also the bird species and population. Everything interconnected with the ecosystem suffered. The activity also included rooting out Ipomea and some local invasive plant species and reinstating some of the lost aquatic plants, as per the soil type.

3. Restoring indigenous fishes: After years of sarkari machhi, the profits had dwindled. The few indigenous fish that remained fetched far more profits. People did not have to be convinced about restoring the tanks.

The project received small grants from the UNDP through the Ministry of Environment, Forests and Climate Change and the Centre for Environment Education.

RESTORING NAAV TALAV

The restoration of Naav Talav began in 2007 by documenting the tank biodiversity, including what vanished over the years and the reasons for the same. To identify the aquatic plants, birds and fishes, they sought the help of the local college professors. But the experts could not guide Manish and his team on how to go about the restoration. Patiram Bhau came to their aid. After documenting the soil types and the aquatic plants they would support, the team sourced the required plants from Navegaon tank, one of the biggest and biodiversity-rich waterbodies adjacent to Jambhali village. For plantation activity, they sought inspiration from the irrigation system, where they prepared a nursery bed in summer and after rainwater collected at 2–3 feet, they planted the saplings.

Villagers carry out plantation activities at the Naav Talav

After three years of restoring activity, the results were there for everyone to see: mulki machhi increased from 8 to 28 species and waterbirds increased from 3 to 12 species. Fish production increased from 40 kg per hectare to 400 kg. Since they maintained the data not only for sarkari machhi (a government requirement) but also for mulki machhi, they were able to see the latter was mainly responsible for the increase in production.

REACHING OUT

Inspired by the success, Manish and Patiram Bhau went from village to village on their motorcycle, covering about 70 fishing cooperatives in Bhandara and Gondia districts. Of them, 12 cooperatives signed up to restore their village tanks.

When Manish and his team went through their detailed documentation of plants, they realised that 70% of the diversity was on the periphery. Only plants in the shallow waters were not enough to sustain the diversity. That was when they came up with the idea of a seed bank. They collected nine types of seeds: four grasses, three shrubs and two floating species. The seed bank is located in Jambhali village, and it supplies to all the other villages. Through all this progress, a thought occurred to Manish – what if the profits from all the restoration work ended up in liquor shops? He had observed that though the Dhivar women were far more vocal than the men, they were hardly visible in any of the restoration activities. He came up with a proposition for the 12 cooperatives: he would assist in restoring the tanks only if women attended the meetings in future. The cooperatives assented.

ENTER SHALU KOLHE

When he started talking to the Dhivar women, he realised, unlike the men, their concern was not so much fish production but employment opportunities. In one such meeting in 2013, he noticed a woman speaking very animatedly. That was Shalu Kolhe. He assisted Shalu and another youngster, Sangeeta, to join a fellowship programme in community leadership at CORO India, an organisation in Mumbai with which he was associated.

For Shalu Kolhe, who had come into Nimgaon as a bride, the journey to being a leader was anything but easy. ‘Confined to home, I helplessly watched my husband and father-in-law work hard in the tanks with little profits. But attending the meeting called by Manish Bhai changed everything for me,’ says Shalu. She was a fast learner. She realised that unless she changed herself, she could do little for her family or her Dhivar people. Her in-laws were apprehensive about Shalu moving out into the society where she would have to interact with other men. They were worried about the gossip that would follow. But her husband’s conviction in her and timely support suppressed all other apprehensions and gave Shalu the much-needed fillip.

EMPOWERMENT BEGINS WITH FIGHTING FOR RIGHTS

When she attended the gram sabha to talk about employment issues, she was asked to go back and take care of her home. They told her father-in-law that his daughter-in-law was now teaching them the rules and the law. It had led to a massive fight at home. She was asked to end all her activities and sit at home, but once again, it was her husband who spoke up for her. Shalu was firm that she would continue as she was not only learning new things but also earning money. ‘Since then, I have never sat quietly at home,’ laughs Shalu. The gossip continued behind her back, spinning tales of how she remained out of the house all day, neglected her children and home and so on.

Shalu was instrumental in starting self-help groups (SHGs) for women of her community, who, until then, were absent from the SHGs of Nimgaon. The sole mission was to organise the Dhivar women and train leaders among them. SHGs paved the way, but again, it was not a smooth affair. Shalu, however, remained optimistic that after repeated convincing, the women would see they had more to gain with each other’s support. Five women joined her, and the next time, Shalu went with them to the gram sabha. All the management activities, including tank repair and maintenance, rested with the gram panchayat. Different committees managed these activities, and it was time the women

Shalu Kolhe seen with members from a self-help group in Nimgaon

The self-help groups Shalu Kolhe initiated in Nimgaon provide a much-needed fillip to the women of the Dhivar community

of her community made inroads into these committees. After the 73rd amendment, the government passed the resolution to hold separate mahila gram sabhas. But as far as she knew, none had been held in her village, and Shalu wanted to know why. More than anything, Shalu's determination to be part of the gram panchayat was to seek and gain equal respect for herself and others in the community. Today, it is an achievement she proudly talks about.

Garnering employment for her community people and stopping their migration from the village was as important, and Manish and his team provided her assistance and inspiration. She went from village to village, convincing people to unionise and fight for their right to work opportunities. One of her fights included resisting the JCB. 'The gram panchayat deployed the JCB for most activities, including tank maintenance. When I resisted it, saying people should instead be recruited for the work, I was told that JCB also saved time. But I persisted. Once, when I was away in Nagpur for a training programme, I heard the JCB being used yet again. They must have thought that I was away to resist. But I left my training mid-way and rushed back to Nimgaon, not even going home first but to where the JCB was and stood in front of it, alone. Since that day, the machine has never been in use in my village,' Shalu says proudly.

One of Shalu's strong points has been the way she has groomed women not only in her village but also in other villages to take on responsibilities and leadership and fight for their rights wherever required. 'That's how we now have Sarita, Kavitha and more Shalus,' beams Manish. Be it the tehsil office or collectorate or any other local administrative office, Shalu, Sarita and Kavitha are recognised as the changemakers. 'Nobody recognises me,' he laughs heartily. On a serious note, he concludes, 'When you promote leadership at the grassroots, you have to be sensitive and sensible. You should know where to let go of your leadership and when to pass it on in the hands of the community.'

Villagers preparing the tank bed just before the onset of rains

Illustration by Debangshu Moulik for Mongabay.

THE RESTORATION PROCESS, STEP-BY-STEP

1. We prepare an estimate for the selected waterbody with the major stakeholders, mostly the fisherfolk.
2. We document the different soil types in the waterbody and the percentage covered by each type. We also make a note of what is lost and what remains. Our focus is on re-establishing 9-10 lost species.
3. We then prepare the wetland bed when it is dry: ploughing, eradicating invasive species and so on.
4. When water is 2–3 feet after rainfall, we do the actual plantation.
5. The fishing cooperative of the village submits a formal application to the Biodiversity Management Committee of that village and procures the required saplings.
6. We then throw the seeds of the aquatic plants. We have laid down rules and regulations – which seeds should be thrown at which part of the wetland and how the periphery seeds should not be in the deep water. We transport the seeds from their source and do the plantation activities.
7. Youngsters from different villages are trained to identify grasses, birds, etc. and collect data.
8. For the survey of plants undertaken four times a year, we follow the quadrat method, using GPS. For observing and recording bird data, we work with the local government villages and include children to undertake birdwatching.
9. We collect the water quality data every month.
10. For fishing data, we seek the help of the fishing cooperatives.
11. We organise pre- and post-restoration data. All the 12 cooperatives that have signed up for our programme have reserved one tank in their villages for biodiversity conservation. They will not release any exotic fish in these tanks. After plantation activity, for one month, we guard the tank against cattle movement. We maintain fishing data for sarkari and mulki machhi – the date and the number of people who went fishing, the quantity of production, the size of the catch, the selling rate and so on.
12. Fishing is meticulously banned during the fish migration season.

Ashoka Trust for Research in Ecology and the Environment (ATREE) is a non-profit organisation which generates interdisciplinary knowledge to inform policy and practice towards conservation and sustainability.

For over two decades, ATREE has worked on social-environmental issues at local policy levels. ATREE envisions a society committed to environmental conservation and sustainable and socially just development.

ATREE's mission is to generate rigorous interdisciplinary knowledge for achieving environmental conservation and sustainable development in a socially just manner, to enable the use of this knowledge by policy makers and society, and to train the next generation of scholars and leaders.

www.atree.org