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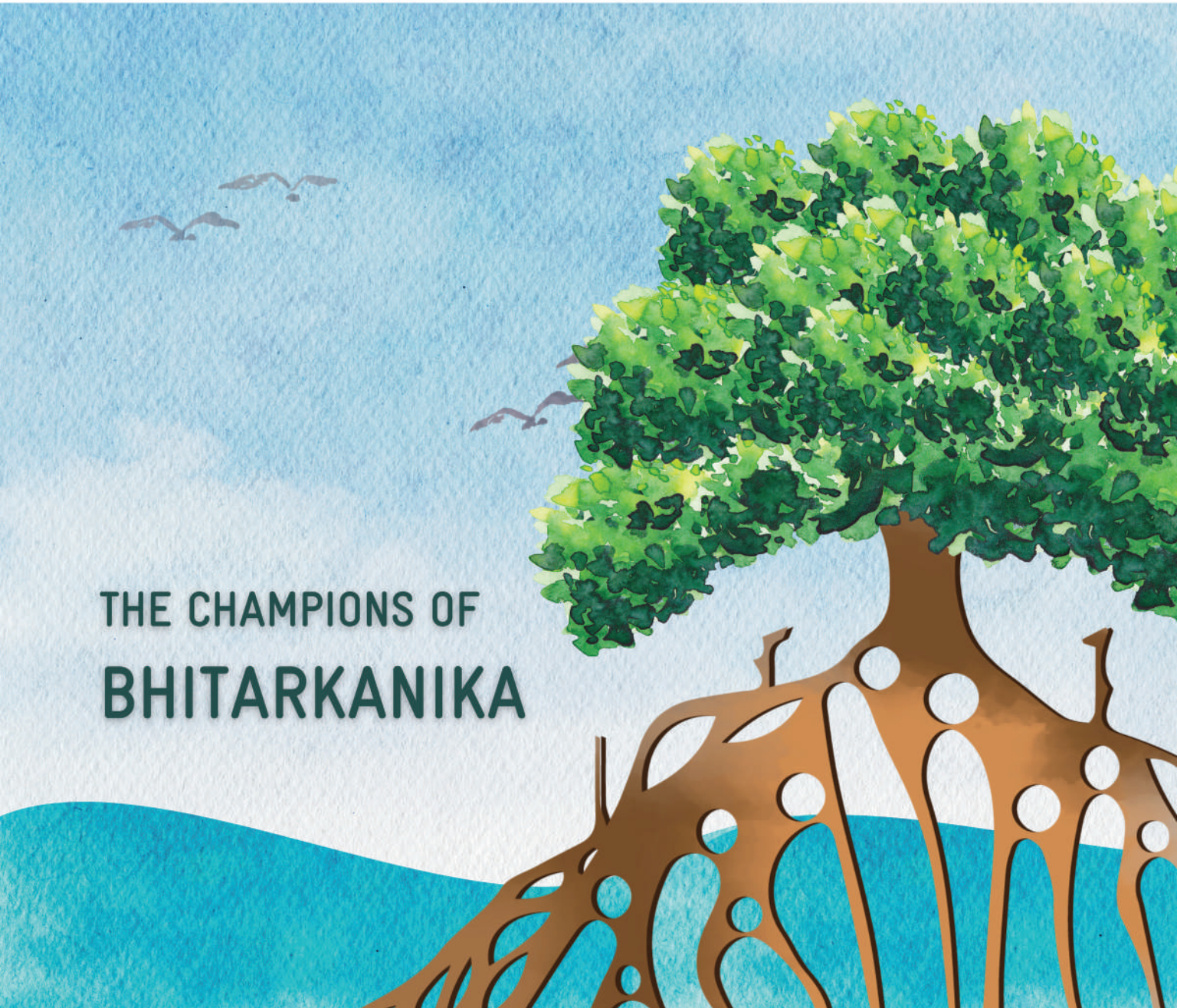

THE CHAMPIONS OF BHITARKANIKA

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New Delhi, 2025

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APOWA

MANGROVE FOREST DIVISION
RAJNAGAR • ODISHA

List of abbreviations

APOWA	Action for Protection of Wild Animals
BMUV	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IKI	International Climate Initiative
MoEFCC	Ministry of Environment, Forest and Climate Change

Contents

The Bounty of Bhitarkanika

Situated in Kendrapara district on the eastern coast of the country, Bhitarkanika Mangroves of Odisha act as the sentinels of the coast, protecting the region from frequent cyclones. It is a mosaic of tidal rivers, creeks, riverine islands, coastal wetlands and inter-tidal zones. Located at the delta of the Brahmani and Baitarani rivers, and inundated by Dhamra and Pathsala rivers, Bhitarkanika was designated as a Ramsar Site, a Wetland of International Importance, in 2002. A large area of the mangroves is protected as Bhitarkanika National Park, surrounded by the Bhitarkanika Wildlife sanctuary. The Gahirmatha Marine Sanctuary separates the mangroves from the Bay of Bengal.

Map Disclaimer: The geographical map used is for informational purposes only and does not constitute recognition of international boundaries or regions; GIZ makes no claims concerning the validity, accuracy or completeness of the maps nor assumes any liability resulting from the use of the information there.

The people living near and around Bhitarkanika depend on it for water, food, and livelihoods – fishing, crab collection, cultivating shrimps and fish in the backyard ponds sustained by Bhitarkanika's water

Bhitarkanika

is home to a rich biodiversity, including the highest density of Saltwater Crocodiles in India. It hosts one of the largest heronries in Asia and one of the largest Olive Ridley turtle mass nesting beaches in the world. It is home to the elusive Mangrove Pitta and at least six of the eight kingfisher species found in India. In fact, the number of mangrove (plant) species in Bhitarkanika is reportedly more than Sundarbans.

But Bhitarkanika's bounty goes beyond its amazing flora and fauna. The interconnectedness of its biodiversity to the people who inhabit the region is marvelous. The people living near and around Bhitarkanika depend on it for water, food, and livelihoods – fishing, crab collection, cultivating shrimps and fish in the backyard ponds sustained by Bhitarkanika's water, harvesting Nalia grass along the upper stretches of the river, and recently, tourism. The '*loona jungle*' (saltwater jungle) and its crocodiles are weaved into the socio-cultural fabric of the people. With growing pressures of populations, rapid urbanisation and chemical-intensive farming and fishing and ever increasing tourist influx, the people of Bhitarkanika are tasked with an important job of transitioning (or shifting back) to sustainable practices and conservation stewardship.

Wetlands Management of Biodiversity and Climate Protection project with MoEF&CC implemented by GIZ on behalf of German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and International Climate Initative(IKI) has been working in the region for the last few years with the support of various partners, including, but not limited to Mangrove Forest Division (Odisha Forest Department), Action for Protection of Wild Animals (APOWA), Naturalist School, Drishti Media. We bring to you the stories of some of the many, many people of Kendrapara district, doing their bit to maintain Bhitarkanika's bounty.

Weaving a better future

Malati Jena, an artisan from the coastal village of Rabaneswar village, uses Nalia grass to create a range of handcrafted products, weaving resilience and tradition into every piece she makes—against the backdrop of a changing world and Bhitarkanika's timelessness.

Sitting cross-legged on a wooden cot with her back resting on the bare plastered wall, Malati Jena skillfully weaves the long strands of dried grass in and out, twisting them into tight, sturdy baskets.

"This is nalia grass," she explains. "It grows in the mangrove creeks, along the rivers, wetlands, and forests of the nearby Bhitarkanika. For decades, I have managed to sustain my family using this saltmarsh grass. My husband collects it, which I then use to make baskets, cups, and wall hangings.

Malati is a craftswoman from Rabaneswar village in Odisha. Now in her sixties, she has been practicing the craft since she was a young girl, with the knowledge passed down through generations in her family. These skills are frequently handed down from parents to children, serving to provide for the family, meet domestic utility, and, in some cases, to preserve cultural traditions. Malati's three sons, however, are all daily wage workers and have long left the village in search of work.

"Craftwork has become increasingly challenging in the present times due to several reasons," she explains, skillfully continuing to weave the basket in her hands. "Our children look for other opportunities as they have seen us struggle to survive on what we make through our craft."

She then goes on to list some of the challenges, saying, "Nalia grass grows seasonally, making it difficult to sustainably source it throughout the year. Moreover, natural calamities, such as cyclones and floods, which are common in this region, can often destroy the grass. And this is not all! There is a constant fear of crocodile attacks–hidden beneath the grass cover, they can attack when the grass is being harvested.

On top of the challenges of obtaining raw materials, there is also huge competition from handicraft items made from other materials, which dominate the market. "Despite having the craftsmanship and nearly lifelong experience of crafting, I often struggled to access market opportunities," she explains. "Craftspeople like me often also have low financial literacy, which limits our ability to explore new opportunities."

During the COVID-19 pandemic, these challenges snowballed further, making them much more overwhelming. With the markets closed and movement restricted, Malati lost her income. "We could not collect the grass during the lockdown. Simultaneously, two of my sons lost their jobs and came back home. I felt helpless as we were barely coping," she recalls. Even after the lockdown was lifted, her struggles continued. "I had no choice but to sell my products at low prices to be able to afford groceries for my family," she adds.

Soon after, it so happened that Malati was selected for a training program as part of the Green Recovery Project

designed for community members, focusing on alternative sustainable livelihoods, including handicrafts. She, along with 77 other participants, was trained in design principles, new weaving techniques, and quality control measures. She was introduced to modern design principles, how to use colors and patterns effectively, how to enhance the aesthetic appeal of her products, and most importantly, how to meet market demands.

"I realised that small changes in color and design could make a huge difference," says Malati. "Using the learnings from the training, I diversified my product range from just baskets and storage containers to hats, vases, fruit baskets, trays, wall hangings, table mats, jewelry boxes, and pen stands," she adds.

The training also provided basic financial literacy and market linkages by connecting artisans with the Handicrafts Department and Odisha Livelihood Mission. "Previously, we would often exchange our produce for items like rice, black gram, and green gram, but now we sell it for money," she reveals. "The exposure to Shilpi Gram, organised by Krishi Vigyan Kendra, was invaluable for women artisans like me." Through the support of the Handicraft Department, Malati is now registered as an authorised artisan.

"Our products are now sold in nearby markets, at various exhibitions and melas, and we also receive orders from local customers," she adds proudly. "My income has increased by almost 25% as my products are more aesthetic and fit the contemporary demand better."

Though Malati is satisfied with her success in recent years, she recognises that some challenges remain. "We still struggle with collecting nalia grass, especially for bulk production," she says. "And marketing of our products needs a further push." She feels the need for setting up a collective enterprise for nalia grass artisans–something that would help artisans like her organise bulk production and manage larger orders. "A group enterprise would help us be more competitive," she explains.

She plans to sell her products directly to visitors and tourists by opening a kiosk near Bhitarkanika National Park's entrance. In the long run, she wishes to pass on the knowledge of the craft to more women and girls and network with various agencies to learn new designs and skills.

Malati's story shows how traditional craft can evolve and adapt when given appropriate opportunities. Design training and innovations, hand in hand with the artisans, can help overcome the challenges in sustaining traditional crafts, where the essence of artistry can converge with modernity. Such collaborations can not only hone their artistic abilities but also sharpen their commercial intuition.

"Using the learnings from the training, I diversified my product range from just baskets and storage containers to hats, vases, fruit baskets, trays, wall hangings, table mats, jewelry boxes, pen stands, among other items."

Building the roots of resilience

Kalakanhu Swain, a 33-year-old daily wage laborer from Jagannathpur, finds hope and purpose in a new role as mangrove plantation caretaker—changing his family's future and protecting Bhitarkanika's ecosystem.

"Fishbone channels are designed to help water flow evenly across the plantation," explains Kalakanhu as he kneels in the soft, damp earth, carefully digging intricate fishbone channels into the mud to guide the flow of water through the mangrove plantation.

Kalakanhu Swain, who is in his early thirties, works as a caretaker of a 12-hectare mangrove forest near his village of Jagannathpur, close to Bhitarkanika National Park. Here, he manages the plantation site, digs fishbone channels, prepares the nursery, fills polythene pots, collects seeds, nurtures seedlings, and plants them.

"I was not always involved in mangrove plantation," he explains. "Before the COVID-19 pandemic, I worked for several years as a daily-wage plumber on construction sites in Bengaluru."

Like several other men from his village, Kalakanhu had migrated out of Odisha in search of employment opportunities. "I would make around 400 rupees every day, which I would send back home as I am the only one earning in a household of five," he adds.

However, during the COVID-19 pandemic, all construction projects and factories were shut down in Bengaluru and hence, there was no demand for plumbing services. "I had no job or source of income. The lockdown restrictions, combined with the threat of COVID-19 infection, made it nearly impossible to find alternate employment," he recalls. The impact was not just financial for migrant laborers like him; he faced social, psychological, and emotional distress, being isolated several thousand kilometers away from his family.

With the lingering uncertainty, he had no other option but to return to Odisha. He was one of the thousands of labourers, the most vulnerable among the working class to come under this economic fallout, who moved back to their villages during the pandemic. They wanted to move back not just due to the lack of jobs, but also to be around the family in the face of mounting panic.

"The journey back home, however, was not easy," he notes. "Long distance, transportation bans, and travel restrictions made it really challenging."

But once back home, Kalakanhu's relief was short-lived, and he soon became increasingly frustrated and anxious about his future. "Jobs were scarce, and people were constantly stressed," he remembers.

However, determined to regain control of his finances, he established a modest vegetable garden in his backyard. "My wife and I grew some crops and sold them in the local market," he says. "With these limited resources, we were able to survive for a few months."

Soon thereafter, he learnt about the opportunities provided by the Green Recovery Project to work on a mangrove plantation near his village. "I decided to approach the project team to find out more about this opportunity," he explains.

Kalakanhu was one of the thirty people selected as caretakers for managing the mangrove plantation. They received in-depth instructions on plantation requirements and nursery procedures. Although mangroves were familiar to him, having grown up next to them, it was during the training that he learnt about the different mangrove species, their ecological significance, and the specific challenges in their plantation and management.

"Every day, I woke up early, headed to the plantation site, and spent hours monitoring the saplings and inspecting for any issues," he says. This new opportunity helped him stabilise his finances. "This job ensured that we received our monthly wages, even in the situation where no other work was available in the village," he recalls.

"The mangrove plantation has not only provided me with a steady income but also expanded mangrove areas near my village," says Kalakanhu. "This 12-hectare forest will protect us from cyclones and soil erosion, while also benefiting agriculture, increasing biodiversity, and supporting local farmers, artisans, and wildlife."

Over the years, the plantation has been beneficial for the local people as farmers collect grass for their animals and artisans harvest nalia grass for their handcrafted products. "The area has seen an increase in fish, crabs and overall biodiversity; more birds, butterflies, snakes and crocodiles are thriving in the plantation," says Kalankahu.

He now plans to use the skills he has learned from his training to boost his career. "I plan to focus on mangrove plantation and management projects," he says. "For now, I will continue to manage mangrove nurseries and produce quality saplings for planting and restoration activities."

For Kalakanhu, this opportunity has not only brought financial stability but given him greater control over his life, eliminating the need of migrating thousands of miles away just to survive. His success corroborates that cultivating sustainable livelihoods and environmental resiliency are not mutually exclusive and can often be a shared goal.

"The mangrove plantation has not only provided me with a steady income but also expanded mangrove areas near my village. This 12-hectare forest will protect us from cyclones and soil erosion, while also benefiting agriculture, increasing biodiversity, and supporting local farmers, artisans, and wildlife."

Rethinking women's agency in rural Odisha

Malati Maity, a farmer from Suniti, uses her newly acquired knowledge of sustainable farming techniques to improve crop yield and increase her income despite limited resources and the COVID-19 lockdown.

The connection of people and natural resources—both private and shared—often plays out in gender-specific ways. This difference in relationships is rooted in the material realities of the genders who interact with their environments in different ways. This is most evident in the agrarian and wetland-dependent rural communities, like those in Kendrapara district of Odisha.

Frequent cyclones, rising salinity, and limited job opportunities have forced men in the region to migrate out of the state and in some cases, even out of the country to look for seasonal work. This results in women assuming added responsibilities at home. Besides managing household duties, they also frequently work on farms, care for livestock, or even oversee pond management. These added tasks have further cemented their role as the primary caregivers of land, water, and livestock in rural communities, all while already providing sustenance for themselves and their families.

The situation was no different for 35-year-old Malati Maity, who lives in Suniti village with her husband, son, and daughter. Her husband is a migrant worker who periodically takes on work in other states, during which she takes on the added dual responsibilities of taking care of the farm and family.

As was the case with most women in rural regions, she found herself in despair when the nationwide lockdown was put in place during COVID-19 pandemic in 2020. As gatherings in the village were prohibited, there were no weekly haats—local open-air markets where farmers, artisans, and traders from nearby villages buy and sell their produce and goods. "Not only was I unable to sell any produce, but I could also not even buy agricultural inputs such as fertilisers and seeds," she recalls.

"I was struggling to make do with the limited resources available to me. All of this made it an extremely distressing period for me," she adds. "Moreover, with the lockdown in place, many people were forced to return home, including my husband. But there was no work in the village. Money from daily wages suddenly stopped and our earnings plummeted to almost zero." To add to this, the informal social support networks in the villages were suddenly disrupted, pushing her into further isolation and alienation.

Her situation, unfortunately, was not uncommon. The COVID-19 crisis aggravated the vulnerability of women farmers, particularly those without direct access to resources or support systems. "I was also extremely anxious as three people in the village had succumbed after getting infected by the virus. It was horrifying to see neighbours and relatives struggle with the infection," Malati adds.

"During the lockdown, I heard about the Green Recovery Project being introduced in our village to train farmers

on sustainable farming practices. I was interested in the project and applied for it," Malati adds. She was selected as a beneficiary of the project and got trained in organic farming, composting, and integrated pest management. As part of the project, Malati also learned how to manage her water resources including setting up a small pond for irrigation.

"After the training, my husband and I worked to expand our old kitchen garden and planted more vegetables. We now grow eggplants, cauliflower, okra, pumpkins, and more on our one-acre plot," Malati shares. "Without learning the right techniques, it would have been difficult for us to scale up our production."

The backyard kitchen garden has become a source of additional income, earning her an additional Rs 60,000 per season. Malati believes that the garden not only helps her with income but provides her with nutritious food for her family. "During the training, I also found out how crucial a balanced diet and good nutrition are. These days, I make sure my kids get enough protein, which has helped me improve our family's health," she says.

She also advises her husband against moving to distant cities, for she believes that with the right skills and support, they can thrive in their village rather than migrating for work. For women farmers like Malati, such training exercises can be crucial as it empowers them to become key contributors to their families' livelihoods, while also giving them the agency to voice their thoughts.

"During the training, I also found out how crucial a balanced diet and good nutrition are. These days, I make sure my kids get enough protein, which has helped me improve our family's health."

Crafting sustainable tourism opportunities

Satyajit Jena, a youth from Rajakanika, rekindles his hopes through eco-guide training and uses his new skills to support eco-tourism in Bhitarkanika, becoming a champion for wildlife conservation and sustainable tourism.

Satyjit Jena, fondly called "Bapi", is a young eco-guide in his mid-twenties from Baghabuda, a small village in Rajkanika, not far from Bhitarkanika National Park. Satyajit, along with his sister, was raised in a small farming household. Like many others in the village, his family would often also engage in wage labor to supplement the meagre family income. But what he lacked in resources and facilities, he made up in his ambitions. Determined to provide for his family, he temporarily worked in the Mangrove Forest Division in a neighbouring village after his graduation but eventually wished to pursue higher studies and secure a stable job.

His plans, however, were put on hold when the COVID-19 lockdown was enforced in the country. With the rural economy struggling to stay afloat, Satyajit's family found it hard to make ends meet. Amidst this economic uncertainty, the already scarce job opportunities in his village declined even further. This drastically affected his morale, and he battled with increased stress levels.

"I found myself up against a wall," he recalls, sighing. "Loss of income meant that we could not even put food on the table and struggled with basic living needs. Social isolation only added to our woes." With odds stacked against him, he turned to nature to find some comfort. "I would often walk and spend hours in the mangrove forests around my village which came to my rescue and helped me cope with everything," he says.

His anxieties only eased when the lockdown was lifted after several months and he secured some short-term work in Bhitarkanika, taking on tasks like plantation work and assisting with boats. What gave him a reason for measured hope, however, was participating in an eco-guide training program.

"The sessions were incredibly informative, and we learned so much about Bhitarkanika, of its lush mangroves and rich biodiversity", Satyajit says of the training. "We learned about wildlife identification, birdwatching techniques, mangrove ecology, and interpretation skills. I also found mentors and fellow participants who guided and encouraged me." Satyajit's brief work assignments and love of nature, in general, were good preparation for his new job as an eco-guide.

The training not only helped him move closer to financial security but also lifted his confidence as it gave him an opportunity to practice his communication and interpersonal skills by interacting with many tourists. "I have guided several dignitaries including district magistrates, secretaries of various government departments, researchers and foreign delegates", he says proudly. "Many of them gave me positive feedback, recommended me to others, and I even started maintaining a feedback register to improve my skills."

This new opportunity has lifted his spirits, but he is grounded with practicality and carefully considers the challenges that can affect the long-term prospects of the job. "Even though Bhitarkanika is well-known for its mangroves and salt-water crocodiles, it is still not very popular among tourists," he shares. "Lack of infrastructure, such as roads and transportation network, hinders the development of ecotourism initiatives in this area. To attract more tourists, the government and supporting agencies must take initiatives to develop Bhitarkanika National Park as an eco-tourism site in the region."

On his end, he is determined to get certified as an eco-guide and continuously upskill himself by attending more training programs and refresher courses. "I am planning to set up a homestay for tourists in my village," he says with a big smile. "I am also thinking about creating a YouTube channel to share my experiences and educate people about Bhitarkanika."

Satyajit's hope and determination, along with the right opportunities, have helped him take better control of his life. Looking ahead he is hopeful but realistic, he knows the road ahead will need persistence and patience. "I know it is not easy" he says, "but every step forward is important". With his passion and contagious energy, Satyajit is not just building a future for himself but also inspiring others in his community.

"We learned about wildlife identification, birdwatching techniques, mangrove ecology, and interpretation skills. I also found mentors and fellow participants who guided and encouraged me."

Inspiring students to promote coexistence

Apurba Milan Roul, a school teacher, is working to promote peaceful coexistence of humans and crocodiles by educating his students about the biodiversity of Bhitarkanika and the importance of its conservation.

Meet Mr. Apurba Milan Roul, a 41-year-old teacher from Jaduchandrapur village close to the Bhitarkanika National Park, who lives with his family of four. Having lived all his life near Bhitarkanika, he feels a sense of belongingness to the place, which reflects in his response, beliefs, and attitudes towards nature in general. Yet, this sense of shared destiny is often overshadowed by the fear of crocodile attacks, which are not unheard of in and around his village. As Apurba reflects, "The presence of crocodiles in the region is a constant reminder of why we should be cautious when in nature."

Patasala River, which flows through the heart of Bhitarkanika, is just 400 meters from Apurba's school. In the last two years alone, the community has witnessed five crocodile attacks on villagers and livestock. Although rare, the attacks were severe enough to create fear and trepidation. "We have seen our cattle being taken by crocodiles and people being injured. This fear has restricted the daily activities of people in the village" Apurba says. What was once a peaceful coexistence between humans and crocodiles in this coastal region appears to have long vanished.

Apurba's journey to find a solution to this problem started when he attended a teacher training workshop on wetland conservation and conflict resolution. Apurba, like many others in his community, saw crocodiles as a threat but the workshop and the ensuing field visit to Bhitarkanika's mangroves made him reconsider his position. Apurba was amaised to see the intricate network of mangroves and realised how interconnected the ecosystem truly was. "It was a revelation to see crocodiles in their natural habitat and to learn more about them as a species–their habits,

behaviour, and habitat. I now understand how important they are for the balance of life here," he says.

Back in his village with this new knowledge, Apurba prioritised educating his students and the community about crocodiles. "In times of conflict, knowledge has the potential to bring a difference," he says. "If we understand these creatures better, we can coexist with them". He started conducting awareness sessions in his school and in the village explaining the role of crocodiles in the ecosystem and how to stay safe around them. "We need to learn to live with them and respect their space," he says. For him, it is not just about safety, it is about changing the way people perceive the presence of crocodiles around them.

Apurba included discussions on Bhitarkanika's biodiversity in his curriculum and made it a part of his environmental science lessons. His students were excited to learn, asking questions about the crocodiles and the mangroves. "Seeing the students getting curious was fulfilling," Apurba says

with a smile. He also conducted community meetings where he spoke about the importance of preserving the wetland and how to avoid crocodile attacks. "Living with these animals doesn't mean we are at risk all the time. We just need to change our behavior," he explained.

Apurba's students are now involved in hands-on environmental activities in the village. They participated in local clean up drives, art competitions on conservation themes, and even suggested improvements to the park infrastructure to prevent human-wildlife conflict.

"Fear and misconceptions cannot be vanquished overnight," says Apurba. "We need continuous education and community engagement". To further his mission, he started writing poetry on the beauty and importance of Bhitarkanika's biodiversity and posting it on social media to reach beyond the local community. "Poetry is a powerful way to connect people with nature," he says.

Looking back, Apurba sees that the fear that once defined the student's relationship with crocodiles has the potential for change. But Apurba knows this journey is far from over. "There's still a lot of work to be done," he says. "We need to educate the next generation and involve everyone in the conservation mission".

Apurba's journey is a story of change, growth, and hope. Through education and conversations, he is trying to mend the community's relationship with Bhitarkanika's iconic wildlife, and in doing so has become a true steward of the environment.

"Fear and misconceptions cannot be vanquished overnight," says Apurba. "We need continuous education and community engagement".

Switching to organic farming practices

Subash Mandal, a 65-year-old farmer from Jamboo, increased his income and improved his family's health by switching to bio-fertilisers and establishing vermicomposting units in his backyard.

In April 2019, Cyclone Fani, one of the strongest tropical cyclones to hit the Indian subcontinent in almost two decades, made landfall in Odisha, causing widespread damage in its wake. Strong winds and torrential rains also wreaked havoc across Bhitarkanika and the surrounding villages. For 65-year-old Subash Mandal, a farmer in the coastal village of Jamboo, this meant complete destruction of his harvest. "As an aftermath of the cyclone, our farmlands were waterlogged and inundated with saltwater," he says.

Cyclones are a common occurrence in this region. The regular occurrence of cyclones results in excessive waterlogging of farms, which has degraded the soil quality. "It is challenging to grow crops with high nutrient demands, such as paddy or vegetables, due to nutrient leaching and soil erosion," says Subash.

Ten months after cyclone Fani, the world was struck by the unprecedented COVID-19 pandemic. The pandemic had created a major crisis for farmers like Subash. Travel restrictions and the inability to access seeds, fertilisers, or even markets for their produce made it difficult to sustain a living. "The lockdown hit us hard. My crops withered away, and my income declined. It was a very stressful time for all of us," he recalls. In less than a year, the world as Subash knew was flipped on its head.

Subash was selected as a trainee for the Green Recovery Project which focused on nature-based solutions and offered an alternative to chemical fertilisers and pesticides. "I had been using chemical fertilisers for years without considering their long-term impact on the soil. After the project's training, I realised that there was a better, more sustainable way to farm—one that could help my land recover." After learning how to prepare bio-fertilisers

during the training, Subash successfully grew more than 15 different types of vegetables in his field.

"The project did not just help with farming practices; they also gave financial support at a critical time. That allowed me to buy materials like compost and seeds and continue farming without worrying about immediate expenses," he said.

The demand for organic produce eventually increased in the market, and his vegetables started selling at slightly better prices. "People are more health conscious these days, especially after the pandemic. They are looking for chemical-free food, and I can provide that to them as I use bio-fertilisers on my farm now," Subash said. "Consequently, my vegetables are selling at higher than the market rates, giving me extra money."

Subash was later also selected as a beneficiary to set up a vermicomposting unit in his backyard. "The project team, along with agriculture experts, visited my field regularly and trained us about earthworm management and other

processes," he says. "I harvested a total of 500 kg of vermicompost, of which I used 200 kg on my farm and sold the rest to other farmers. I earned an additional Rs 3000 rupees from the compost alone."

Subash noticed favourable changes in his and his family's health too. His family was eating healthier, and he was able to provide for them in a way he never could before. "My family is eating the vegetables I grow, and no one has gone to the doctor in the last three years. I can say that switching to organic farming has made a big difference in our health."

When asked how the impact of the project can be increased, he says, "It is essential to actively engage small farmers. This can be done through participatory decision-making processes, joint meetings, and awareness campaigns. By involving more farmers, the programme can ensure that the benefits derived from the project are increased.

"We have made progress, but some challenges require more effort, especially those related to waterlogging and soil salinity. We need more support to overcome these," Subash says. For now, he plans to continue his journey of adopting organic farming techniques and engaging with other farmers and experts.

"I harvested a total of 500 kg of vermicompost, of which I used 200 kg on my farm and sold the rest to other farmers. I earned an additional Rs 3000 rupees from the compost alone."

Exploring sustainable horticultural practices

Kanchan Dhaudia adopted sustainable horticultural practices to overcome the challenges faced by the COVID-19 lockdown; she established a nursery, improved her income, and developed skills.

Kanchan Dhaudia is a 35-year-old paddy farmer from Junusnagar, a quiet village situated outside the southern edge of Bhitarkanika National Park. As opportunities of income generation are limited in the village, it is common for men in Junusnagar's households to move out of the state to look for work. Kanchan's husband, the main breadwinner of the family, also migrated to Chennai—nearly 1400 km away—where he works as a daily wage laborer in a plyboard factory. Meanwhile, Kanchan manages their small farm and raises their two children at their home in Junusnagar.

In 2020, the COVID-19 pandemic hit her family hard and left everyone in the family feeling mounting anxiousness. The factories in Chennai shut down, and like millions of migrant workers across India, her husband lost his job. Unable to support his family, he returned to Junusnagar, and the family's already fragile financial situation grew even more difficult. She, like several other farmers, was subject to chronic stress during the lockdown.

"We experienced increased stress levels, anxiety, depression... it was a horrible situation," she recalls. "The isolation and the uncertainty about our future took a heavy emotional toll on all of us." Many families shared her frustration. Like Kanchan's family, they too depended on daily wages, seasonal farming, and small businesses to survive.

"The lockdown meant that markets were closed, travel was restricted, and basic supplies became scarce." Kanchan says.

Kanchan learned about the Green Recovery Project, which aims to empower women farmers in the villages around Bhitarkanika. The project was looking to provide alternative livelihoods that were eco-friendly and sustainable. It was

offering training in horticulture and sustainable farming practices, targeting families like hers who were worst affected by the pandemic.

Under this project, Kanchan received essential training in organic farming, composting, and bio-fertiliser use. She started implementing these techniques in her own backyard. "I learned how to take care of plants using organic methods; for example, we used Sanjivani for the soil and Handikhata to protect the plants," she says proudly.

One of the first things Kanchan did after joining the project was to start a small nursery in her backyard. The project team provided resources, technical guidance, and even labor support to help her set up the nursery. Soon after, she started cultivating fruit saplings and learned how to care for them using organic fertilisers and pesticides. "Before, I used chemical fertilisers, but the project introduced me to bio-fertilisers and taught me how to use compost. I could notice the difference after using the bio-fertilisers almost immediately," she explains.

"See these trees?" Kanchan asks, pointing to the rows of guava, papaya, and banana trees behind her. "Before the pandemic this land was empty. I never thought we could grow so many trees here but now I feel proud every time I look at them," she says as she goes to the guava tree closest to her, carefully selecting and picking ripe fruits before letting them fall into colander.

Despite these initial successes, challenges remain. Kanchan's husband went back to Chennai for work soon after the lockdown was lifted, as the income from horticulture is not enough to sustain the family alone. But the financial burden is much less intense than before. "We need more training, more support. Many families here, like mine, are still struggling and government schemes can only do so much," says Kanchan. She believes with community involvement and education the impact of these projects can be multiplied. "We need more awareness, more campaigns to teach more people about sustainable practices. Then our children will have a better future," she adds.

"Before, I used chemical fertilisers, but the project introduced me to bio-fertilisers and taught me how to use compost. I could notice the difference after using the bio-fertilisers almost immediately."

Building leadership to drive local change

After receiving training on organic farming and vermicomposting, Debajani Sahoo not only improved her crop yield and increased her family's income but also became a community resource person, inspiring others in her village to adopt sustainable practices.

Debajani Sahoo, in her mid-thirties, is a resident of Suniti, a small village in Odisha's Kendrapada district. She and her husband support their family of six, including their two sons and her husband's elderly parents, through farming and fishing. While her husband, Sadanand, goes fishing, she manages the farm and cares for their livestock. However, much like other farmers in the coastal district, Debajani finds herself in difficult predicaments.

"Living near the coasts, we get affected by cyclones time and again, which destroys our crops," she explains. "The frequent cyclones also increase the salinity of our lands, making it difficult for us to grow rice and vegetables. And on top of that the weather pattern in and around our area has been erratic for the past few decades. So, ensuring good yield has become a constant struggle for us."

In 2020 and 2021, lockdowns due to COVID-19 made their already precarious situation more difficult. "Our village went into lockdown right when harvest was about to begin. We couldn't hire laborers, nor could we go to the market. Most of the crops got damaged as we could not harvest them on time," Debajani remembers. "The price of food went up during the same time, and we couldn't even meet the basic needs of our family. It was very stressful, especially for the children. I was worried about the impact this may have on their emotional wellbeing and academic performance."

Debajani does not want to just focus on the immediate challenges; she looks at them in a broader context. "While there is no doubt that the lockdowns during COVID-19 affected us a lot, the challenges we face go beyond the pandemic," she explains. "Cost of agricultural inputs like fertilisers and pesticides are high and labour shortage is common. These cost burdens affect our revenue and profit. In addition, women farmers like me often face social barriers, which also hinder our growth."

During the lockdown, she was selected as a project trainee for the Green Recovery Project, and soon after, she was trained on various sustainable farming techniques, including vermicomposting. She learnt everything she needed to start adopting such practices—setting up a vermicompost pit, using earthworms to create nutrient-rich compost, and learning the many benefits of organic farming.

"I enjoyed learning how to set up a vermicomposting pit, which has made me less dependent on chemical fertilisers," she says. "Organic transition reduced my expenses, and I feel the quality of produce also improved." Over time she was able to grow vegetables and fruits that were healthier, more durable, and provided better profit margins in the local markets. "We consume some of the produce and sell the surplus in the local market, making around 20,000 rupees every season. This added income has helped us save some money and manage our expenses better."

When asked why such programs are important, she says, "One of the main reasons why women farmers struggle is lack of access to training programs and skill development initiatives. And lack of recognition undermines our capacity to acquire knowledge and skills. So, such training programs help us to be more confident in our skills."

Debajani is now a Community Resource Person (CRP) and has become an advocate for sustainable farming in her community. As a CRP she shares her newfound knowledge with other farmers. Her role has also earned her social respect not only within her family but in the whole community. "I want to share what I have learned with others in my community to help them understand the value of organic farming and its impact on the environment," she says.

She plans to continue learning more about sustainable agriculture and attend regular training and refresher programs organised by the government and other agencies. She also supports addressing gender bias, promoting equality and ensuring women's participation in decision making. "Government, NGOs and private sectors should collaborate to support women farmers" she adds.

Debajani encourages other women in rural areas to "step out of the four walls." "We must first recognise our own potential," she says. "Women have unique skills and perspectives that can make a real difference especially in environmental conservation and livelihood improvement." She believes by taking the lead women can "bridge the gap" and ensure their voices are not just heard but represented in community decisions.

"Not only did the organic transition reduce my expenses but I feel the quality of produce also improved."

Promoting conservation through student stewardship

Kasturi Swain, a young science student from Odisha, participated in a training on crocodile conservation, which motivated her to create a project on coexistence that won her awards at the district and state levels.

Fifteen-year-old Kasturi Swain had never witnessed a crocodile attack, but she had heard stories and read news. Everyone around her seems to have heard these stories too—of how large saltwater crocodiles, known to them as Baula Kumbhira or Kuji Khumbhiora, lurk near the edges of rivers, creeks, and backwaters and attack those who get too close to the waters.

Incidents of crocodile attacks are not unfamiliar in the Kendrapara district of Odisha, where Kasturi resides with her parents, siblings, and grandfather. The Bhitarkanika mangrove ecosystem and its adjacent waterways are a suitable habitat for saltwater crocodiles, the largest and most powerful reptile species living today.

Though not all crocodile attacks are fatal, and some victims are able to escape, the experience often leaves a lasting impression on the people. The terror of the unexpected attack stays with them, reshaping the way people view the species and dousing their relationship with fear and conflict.

Like her fellow students at Matiapara Nodal High School, Kasturi's knowledge of crocodiles was also limited to human-crocodile conflict in the region, and most of them did not recognise the broader significance of crocodile conservation. "We live close to Bhitarkanika National Park, and out here, crocodiles are not just something we see on TV, but something we have frequently heard and been warned about during conversations at home," says Kasturi. "But we did not really know much about crocodiles as a species, their habitat, behaviour, and ecology," she adds, shaking her head.

She did not take an interest in the species until she attended a workshop at her school on the Student

Stewardship Program. The theme of the workshop was wetland management and crocodile conservation. "This was an interesting opportunity. It wasn't someone just talking to us—we watched these amazing wildlife films and did roleplays where we had to think like conservationists," says Kasturi. "And the experts who came to the workshop… they didn't just talk to us; they shared real stories from the field and showed us actual photos of their work."

"We also visited the mangroves at Bhitarkanika as a part of the workshop. I never saw crocodiles and mangroves the same way after the field visit," she adds. When asked about what she learned from the workshop, Kasturi quickly rattles off the lessons. "When faced with a crocodile attack, the first thing we were taught was to stay calm and alert," she says, her eyes serious. "Panicking only makes things worse. If you see a crocodile, don't make any sudden movements. Keep your distance and try to stay as still as possible."

She nodded as she remembered more practical advice. "We also learned about the warning signs in the area—those boards with crocodile symbols. They're not just for show. If

you see one, turn back. Crocodiles are known to be in those areas, and you don't want to take that risk.

Kasturi's voice softened as she talked about the crocodiles' habitat. "Crocodiles love the edges of rivers and lakes. They stay close to the water because that's where they hunt. We were told to avoid these areas, especially in the mornings or evenings when crocodiles are most active. That's when they're out hunting for food."

She smiled as she summed it up. "It's all about giving space to these animals. Understanding their behavior and knowing when to step back is key to our safety and their conservation."

Soon after the training, Kasturi participated in the Children Science Congress, an annual event held by the Government of India's Department of Science and Technology. Motivated by the workshop, she developed a project on human-crocodile conflict in the region. "It was a proud moment when I won first place at the district level," Kasturi shares. "Though I did make it to the national level, the recognition gave me a sense of purpose."

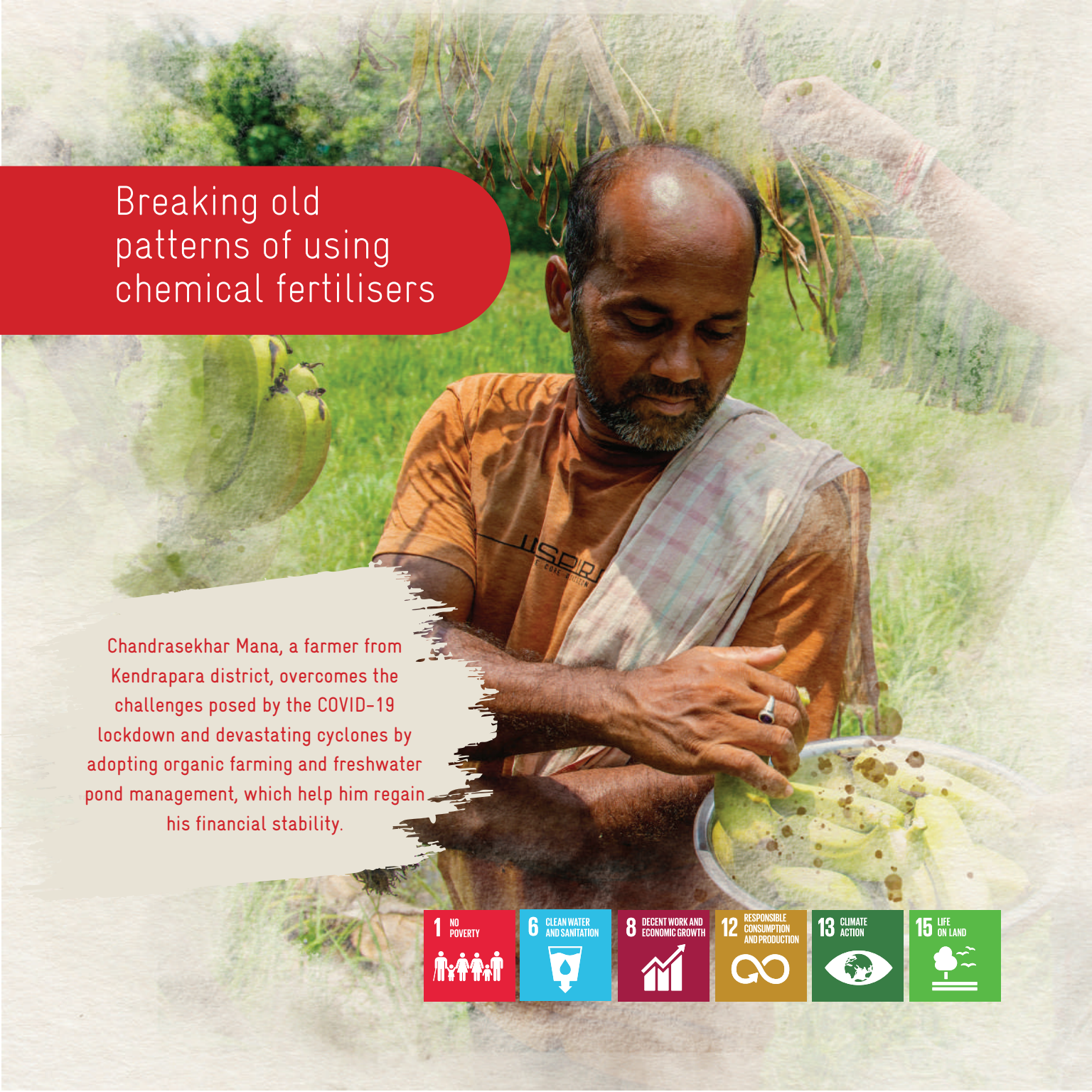
As a science student, Kasturi now plans to research these issues in detail, gather data and insights to identify the conflict hotspots, and identify possible solutions. She plans to raise awareness, educate local communities about the importance of conservation and advocate for sustainable

practices. She also intends to work with authorities and conservation groups to propose solutions to human-crocodile conflict and preserve the region's biodiversity for future.

Her journey from a curious student to a steward of conservation is a reminder that even the smallest conversations – when initiated with passion – can ignite curiosity in young minds, bringing about the warranted change!

"We also visited the mangroves at Bhitarkanika as a part of the workshop. I never saw crocodiles and mangroves the same way after the field visit."

Breaking old patterns of using chemical fertilisers



Chandrasekhar Mana, a farmer from Kendrapara district, overcomes the challenges posed by the COVID-19 lockdown and devastating cyclones by adopting organic farming and freshwater pond management, which help him regain his financial stability.

We met Chandrashekhar, a 43-year-old farmer from Junusnagar, Odisha, on a warm summer afternoon in 2024. We were there to take a tour of his farm and hear firsthand how he had adapted his agricultural practices in the last few years, especially in the face of the many vagaries of life from the COVID-19 pandemic to devastating cyclones.

He welcomed us outside the farm with a warm smile. "Let me show you around as we chat," he said. With a quick step, he scurried off on a well-beaten trail. As we followed him, we walked through several rows of nets with vines climbing up their frames. The nets were supported by wooden logs and were arranged in straight lines in such a way that they formed almost parallel walls. Narrow paths ran down the middle, allowing us to walk between the rows. "I grow eggplant, okra, cucumbers, and other vegetables on the farm," he said, pointing to a cucumber vine.

"Before the COVID-19 pandemic, there were fields ready to harvest, livestock to tend, and markets to sell the harvest in," he said. "But when the lockdown was announced in March 2020, things changed dramatically."

With no market and no way to transport the produce, everything withered on the vine. "My debts grew, my family's daily needs were unmet, and the fear of losing everything weighed heavy over me," he said as we moved from the vine-covered area to a small clearing where his livestock were tethered. He solemnly added, 'It was not just financial trouble. We could not even access veterinary care for our livestock. We ended up losing one of our cows during that time."

"Things started looking up a little in early 2021 when I was selected for the Green Recovery project," he says. "Initially, I didn't think the organic methods would work for me. I

thought chemical fertilisers were the only way to improve crop yields, but I gave it a try."

As we walked through the fields, he shared what he learned from the project. "During the training, I learned about composting, biopesticides, and soil health management. We were also given seeds and equipment for our ponds, including fingerlings, ducks, fish and duck feed, probiotics, and testing kits," he explained, pointing toward the freshwater pond nearby.

But things turned south just days into the program. The region took a hit from Cyclone Yaas–a very severe cyclonic storm–in May 2021. "The storm tore into the land and destroyed everything in its path, which only added more hardship to an already tough year for us," he recalled. "The recently transplanted seedlings in my farm took a beating from the fierce winds along with rain that followed."

The plan to keep growing vegetables in the wake of the unpredictable weather seemed pointless to

Chandrashekhar. "Why bother?" he remembered telling his wife, Sandhyarani. "The money is already gone."

But Sandhyarani suggested that they put some of the learning from their training into use. "Why not try using organic fertilisers on the seedlings? It would not cost us more money, and we can use what we already have on our farms," she had suggested. Even though he was skeptical, his wife convinced him to prepare organic fertilisers and natural pesticides using resources available on their farm.

Chandrashekar then led us to a large, sturdy earthen pot near the freshwater pond, whose rim had traces of spilled contents of a thick paste. Pointing to it, he said, "This is handikhatta, one of the organic bio-inputs that we applied to our seedlings after the cyclone."

In just seven days, the seedlings had started showing improvement. "When I noticed these changes, I thought this might work," he explained. He then began to try different bio-inputs like Agneyastra, NPK consortium, Trichoderma viride, and neem leaf extract. The outcomes looked favourable. "While I still saw some benefits in chemical fertilisers, switching to Sanjeevani for kharif crops helped cut my use of chemicals by 60%," he stated.

Over the next few months, Chandrasekhar's earnings grew, and soon after that, the horticulture department recognised him as a progressive farmer. "My crops also became popular at the local market, where buyers now preferred fresh, chemical-free vegetables," he added.

We had now come to an open patch at the end of Chandrashekhar's farm, where knee-high okra plants stood proudly, their bright yellow flowers in full bloom, and the okra still growing. In the middle of the patch, a sign read 'Front Line Demonstration,' indicating that this part of the farm was used to showcase the potential of new farming practices to farmers.

As we finished our tour, Chandrasekhar walked us back to the edge of the farm. "To be honest," he says, "I doubted the feasibility of the plan in the beginning. But sometimes, it is about being willing to adapt and try new things."

With the right support and a willingness to make some changes, things are looking better for Chandrashekhar and Sandhyarani. They now plan to expand the agricultural activities, form a producer's group to promote organic practices, and collaborate with agencies to further support sustainable farming initiatives.

"My crops also became popular at the local market, where buyers now preferred fresh, chemical-free vegetables."

These stories from Bhitarkanika are testament that the people living in the vicinity of the wetlands are not only dependent on them but also play a major role in their upkeep and safeguarding.

In the surroundings of Bhitarkanika mangroves, agriculture is the mainstay, with nearly 80% population of Kendrapara district dependent on it (District Environmental Plan, Kendrapara Collectorate, 2022). But, the impact of shifting agriculture practices and increasing use of chemical inputs in agriculture, fisheries, horticulture and backyards ponds can lead to major issues for the mangroves where the catchment drains into. Thus the role of the farmers is paramount in protecting the wetland.

During the uncertain pandemic related lockdown, Subhash Mandal and Chandrashekhar Manna adopted sustainable agriculture practices, enhancing their yield and income. Malati Maity, Kanchan Dhaudia and Debajani Sahoo showcased agency as women changemakers of their families and villages. These cultivators didn't let go of their traditional practices but rather integrated them with their newly gained knowledge. And even years after the 'interventions' they continue to do so, while also working as resource persons to others in their communities.

With growing demand on the wetland resources, there is also a need to diversify into newer, alternate and innovate livelihoods that keep Bhitarkanika's conversation into forefront. Satyajit Jena is working to enhance his role as a nature guide. With growing tourist influx, Bhitarkanika needs more such pioneers from the informal hospitality sector.

Malati Jena has taken her traditional weaving skills and transitioned them to suit to a more modern consumer base, showcasing brilliantly that innovation can be led at all ages. Kalakanhu Swain is one of the people who has supported the mangrove restoration efforts in their storm-ravaged state. And finally, Apurba Milan Roul, a teacher and Kasturi Swain, a student, are representing hundreds of schools of Kendrapara that are today working on mitigating humn-crocodile conflict and inspiring young residents of Kendrapara to become the stewards of Bhitarkanika.

Our champions of Bhitarkanika represent the essence of whole-of society approach and the core themes India's Mission LiFE's - water conservation, climate resilience, and biodiversity protection through individual commitment to eco-friendly ways of living. There are many such stories that can inspire and mobilise conservation efforts. India's wetlands, including mangroves, are the lifeline for the country and their wise use is possible only with the determination and support of such champions all over the country.

Wetlands Management for Biodiversity and Climate Protection, a technical cooperation project, is implemented in close cooperation with the Ministry of Environment, Forest and Climate Change (MoEFCC) by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and is supported under International Climate Initiative (IKI).

In Odisha, the project worked with the site managers and State Wetland Authority to prioritise wise use concepts in management planning. The project also implemented Green Recovery Measures aimed at building capacities for the beneficiaries in sustainable alternate livelihoods while safeguarding wetland values. These included mangrove restoration, vegetable gardening, sustainable fisheries, local grass crafts and eco-guide training. In response to increasing human-crocodile conflict in upstream stretches of the rivers, the project has also worked with teachers and students to enhance awareness in the region the conflict disproportionately impacts younger children.

These interventions have been implemented with several partners, including, Green Recovery Measures and CEPA for Conservation Stewardship with APOWA, Eco-Gide Training with The Naturalist School, Participatory Video Skilling with Drishti Media. The Mangrove Forest Division, Department of Forest and Environment, Government of Odisha and Bhitarkanika Ecotourism Eco-Development Society (BEES) have played a major role in all these activities.

Several other stories and resources on Bhitarkanika from the project, including 'Mysterious Mangroves of Bhitarkanika' (a children book about the wetland) and 'Voices from Wetlands' (a collection of short films created by Participatory Video Trainees) can be accessed on our website: https://indo-germanbiodiversity.com/