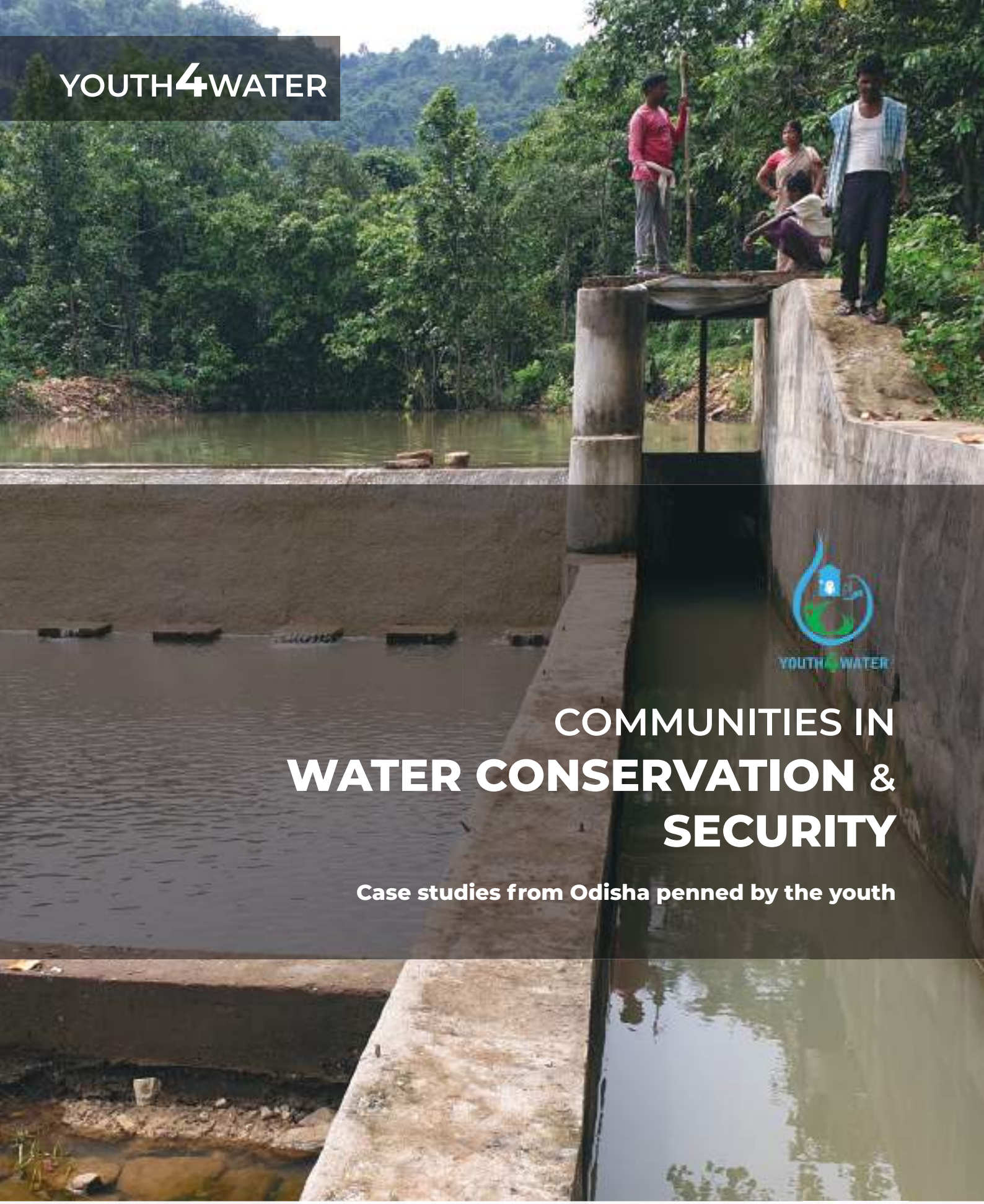
YOUTH4WATER



# COMMUNITIES IN **WATER CONSERVATION & SECURITY**

**Case studies from Odisha penned by the youth**

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WATER INITIATIVES

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# COMMUNITIES IN **WATER CONSERVATION & SECURITY**

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# FOREWORD

**Smt. Anu Garg, IAS,**
Principal Secretary,
Deptt of Water Resources

At a time when the entire world is facing severe challenges due to water crisis that is growing by the year, all sections of the society need to be part of initiatives aimed at containing the crisis.

Water is a key driver of our socio-economic development as well as maintaining good health, sanitation and hygiene. Water also has a basic function in maintaining the integrity of the natural environment.

Water is an essential point of our adaptation action in the face of climate challenges that are exerting a lot of pressure on the people, economies and ecosystems.

The state government has been promoting rainwater harvesting and taking several other measures for water conservation. These efforts are meant to augment the water retention capacity of soil in different parts of this state.

I am very glad to learn that youth have come forward to take actions to contain the crisis together in a campaign mode.

I encourage more and more such initiatives to be taken up by the youth for judicious use of water and its conservation.

It is a much needed campaign which is being led by the youth and supported by renowned experts and leaders in the field of water conservation.

I wish the campaign all the success and good luck. Let the campaign set an example for others to make conscious efforts to save our water resources.

# PREFACE

**Monika O. NIELSEN,**
Chief of Field Office - Odisha,
UNICEF India

I am so happy that since 2019 youth of Odisha have joined their hands in the Youth4Water campaign to secure their own water future. I am very delighted to observe that they have visited several communities across the state, who have taken initiatives for conservation of water to make their villages water secured.

Youth4Water was conceptualised to harness the power of youth to raise awareness and initiate action on water conservation and related fields such as sanitation and hygiene. It is heartening to know that the campaign has been able to mobilise thousands of youth across the state in just one year.

The youth got a firsthand opportunity to understand community conservation efforts in different parts of the state. Interactions with the communities have enlightened them on how united and persistent efforts can bring in solutions to some of the serious challenges that we face. While we are already facing water crisis, climate change further worsens the crisis. Our rivers are drying up and drought periods are extending their grip.

This book is a product of one of the many important activities that the campaign took up. The examples captured in this booklet tell us how community initiatives in harvesting rainwater and conserving forests can help us building resilience to impacts of climate change.

I am sure more and more youth will join this campaign and be part of ideas and actions that bring solutions to water crisis and related challenges.

UNICEF is proud to support the next generation of #ClimateWarriors in India.

# INTRODUCTION

Water crisis is increasing by the day. At a time, when climate change is impacting the water resources in devastating ways, the intensity of the crisis will keep growing impacting the human civilizations as well as other species. We are facing challenges both in terms of quantity and quality of water owing to such crises.

This is the right time to think about how to secure our water resources for ensuring not only health, hygiene, livelihood and other securities to the current population but also for the future generations.

In this context, it is heartening to know we have many local examples in a country like India of communities putting in effort to conserve and secure their local water resources. Many of these are supported by the government, non-governmental and local community organisations themselves. The members of the Youth for Water campaign have decided to explore further on the community conservation efforts in five specific villages in the state of Odisha.

This book is a labour of love of students and youth volunteers of Youth for Water campaign who visited villages that have been successful in harvesting, securing and managing their water resources through revival and strengthening of their traditional water harvesting structures through protection of forest and through efforts to check salinity ingress to their water bodies and drinking water sources.

However, before talking about their case studies, it will be good to look at the status of the burgeoning water crisis and the ongoing activities to mitigate its effects and reach.

India's aquifers are under stress as our water requirements have increased considerably over the years. We extract around 250 cubic km of groundwater annually, which is the highest in the world. Groundwater contribution is nearly 62 percent in irrigation, 85 percent in rural water supply and 45 percent in urban water supply[1].

In 2017, the Central Ground Water Board published a groundwater assessment report of 6,881 units like blocks, tehsils and watershed areas across the country. It was found that 17 per cent of such areas were over-exploited while 5 per cent on the verge of over-exploitation. Another 14 per cent areas were found to be vulnerable. What is alarming is that while the groundwater levels are decreasing, groundwater salinity is on the rise.

The same year, the central government formed the Ministry of Jal Shakti by integrating different ministries and departments dealing with water with a view to tackling India's alarming water crisis and supplying piped water to all households by 2024. The ministry took up a huge task of devising and implementing measures to recharge aquifers and traditional water conservation structures in 1,592 water-stressed blocks of 256 districts in the country.

Besides, taking up works through Jal Shakti Mission, the central and state governments have also been taking up a lot of efforts through schemes such as the Mahatma Gandhi National Rural Employment Generation Scheme (MGNREGS).

Water harvesting techniques are nothing new to India. Such techniques have developed across different parts of the country over centuries. We receive about 400

[1]National Compilation on Dynamic Ground Water Resources of India, 2017. Central Ground Water Board.

million hectare metres of rain over 329 million hectares of land mass annually. As the distribution of rainfall differs from area to area, different water harvesting techniques have evolved in different places.

So in a place like Thar desert in Rajasthan, where there is scanty rainfall, communities have developed excellent rainwater harvesting structures like kunds and tankas (i.e. underground storage tanks). In Meghalaya, which is known for abundant rainfall, the communities have created bamboo drip irrigation to divert water from the streams in the hills to the plains. In the central highlands, there are talaabs (big reservoirs).

In Odisha, we have success stories in so far as community conservation in both forest and water resources are concerned. The communities in the western and hilly parts of the state have a long tradition of conserving water resources to combat drought and ensure water security. They have shown a lot of experience in creating structures like bandh, katas, mudas, chahalas (rain water harvesting structures named according to their shapes and sizes).

In coastal Odisha, which is devastated by cyclones frequently, there are hundreds of villages where people protect forests and hence conserve the local water resources. There are some villages where people have protected mangrove, casuarinas and other forests to ensure that sea ingress is stopped and saline water does not invade into their drinking and other water sources.

So when we started the Youth for Water campaign in 2019, it was decided that the current generation youth should actually get an exposure to such community efforts so that they not only understood the importance of water in the lives of local communities and ecology but also learnt from the community on how they were actually managing these resources to secure their water future.

For this booklet of success stories, the students visited five villages in an equal number of districts – Bargarh, Mayurbhanj, Nuapada, Puri and Sambalpur districts. They observed and learned everything from how the tribal group of Munda founded the Rantal village in the deep forests of Sambalpur district and then became expert rainwater harvesters to how the villagers of Bijepur in Bargarh and of Khariar in Nuapada built excellent water harvesting structures that ensured water security as well as irrigation to hundreds of acres of cropland.

The students also got first-hand knowledge about how forests regenerated by communities in hilly Mayurbhanj revived streams. They witnessed the power of women in Gandabla village in Puri who conserved the coastal mangrove and casuarinas forests to ensure protection to soil and drinking water sources.

As of 2019, researchers point out, 17 countries in the world are facing “extremely high” water stress . These 17 nsations are home to nearly one-quarter of the world’s population – around 1.7 billion people – with India having the lion’s share of approximately 1.37 billion. The crisis is growing by the day.

In the last six to seven decades, we have already utilised about 70 to 80 per cent of the usable water meant for ourselves as well as for our future generations . By 2030, the beginning of the next decade, we would have just a half of the water we would need.

At this critical juncture, as our water present and future look gloomy, these villages in Odisha and many such villages in the country offer hope. They have not only protected their water resources but also done that through community action and collaboration with government, civil society and other organisations. Such small yet effective solutions need to be promoted.

Most importantly, youths of the day need to learn about these efforts so that they can integrate the practice and culture of conservation in their daily lives and work towards conservation of water and other natural resource to secure their water future.

[2]http://bloom.bg/3ruvShL

[3]http://bit.ly/3caWIFk

*For most of the students who participated in these exposure visits, it was a first of its kind experience. They got a firsthand exposure to community-led and governed conservation efforts. They are now highly motivated to take the message forward and take initiatives at their individual, community and society levels .*

# Water Harvesting Structure Brings Life to Community

## Bijepur, Bargarh District

*Way back in 1800s, the initiatives of the village landlord (zamindar) Damodar Gadtia, resulted in creation of this huge traditional water harvesting structure named Damodar Kata that flourished with community efforts. The 250-acre kata named after the zamindar put an end to the water woes of the villagers and their lives and livelihood revolved around it. However, around 3 decades ago, this structure started degrading as the community ownership was pulled out. In 2009, its revival process began with the community claiming its responsibility, women being the first to raise their voice. Government chipped in with its support and now the Kata thrives again providing many benefits to the communities.*

Bijepur, a block headquarters as well as notified area council (NAC) in Odisha's Bargarh district, is about a 200-year-old civilisation that came up with the creation of a water harvesting structure, which was almost destroyed completely before the community was able to save it recently.

Chandrakanti Pujhari, who according to her family members is 104-year-old, narrates an interesting story that she had heard from her father-in-law about the creation of a 'kata' and subsequent settlement of people in the surrounding areas. Kata is usually a massive water harvesting structure that is built by erecting an embankment on one side of a flow of water to divert into it water passing by during monsoon from other sides, known as the catchment.

In the early 1800s, she says, there used to be a remote village called Jaring near the same place. As the area was going through acute water shortage, the local landlord, or zamindar, Damodar Gadtia, took up a mammoth exercise of creating the 250-acre kata that would put an end to the water woes of the villagers.

**Fun Fact!**

*104-year- old Chandrakanti Pujhari says that in early 1800s, there used to be a remote village called Jaring near the same place. As the area was going through acute water shortage, the local landlord, or zamindar, Damodar Gadtia, took up a mammoth exercise of creating the 250-acre kata to end water woes. The entire village was then relocated near the kata.*

There were only five families who were living in the area where the water tank was to be dug up. "The zamindar motivated them to shift so that the work for the tank could be started," recalls Chandrakanti, who still has a sharp memory despite old age.

The villagers helped in the construction of the kata. The zamindar also called expert pond diggers from outside for the job.

### The ABCs of Kata Construction

The water structure was created centuries ago by erecting an embankment over a stream that was flowing through the pond of another village Baunsapal. The embankment made of stones put together with clay not only helped to hold water for the kata but also functioned as ghats for bathing purposes for the people.

No one knows how long it took to create the water harvesting structure. However, following its completion, people started settling around it by clearing the forest on one side of the structure. The area came to be known as Bijepur. Damodar allowed the villagers to practise farming with water from the kata.

The structure was named Damodar Kata in his memory. His family members are highly respected in Bijepur for the great gift of water reservoir. Villagers say that the kata has accorded them a unique identity.

As the water got stored, people started creating crop fields at the downstream of the kata. Hundreds acres of land were irrigated with its water through canals that were built on two sides of it.

Over the years, the system was developed further; the embankment was strengthened, and its height was raised. As people's lives started to revolve around the huge water structure, temples and ashrams came along its banks.

### An Increased Sense of Security

As time went on, the kata provided assured irrigation during monsoon. Even long after the rainfall receded, enough water remained in the kata to meet irrigation demands. People cultivated a variety of crops including paddy, wheat, sugarcane, green gram, black gram and vegetables and Bijepur came to be known as an agriculturally prosperous village in the region. "In addition, the tank was used for fishery and at least one hundred families belonging to Keut, Sahara and Binjhal castes and tribes benefited from it," says Janardan Panigrahi, a village leader.

According to the villagers, the kata supported about 150 acres of farming during Rabi and somewhere between 500 acres and 1,000 acres during Kharif by ensuring water supply through two canals. About five nearby villages depend on Damodar Kata for bathing and other purposes.

Besides, Bijepur nullah, which starts from the forests on the side of the kata and runs about 20 km to the Raanjh river, benefited villages like Budapali, Bairagpali and Bhalubahal along the way. The villagers built at least 25 small check dams on the nullah to ensure assured irrigation to around 1,000 acres of land.

*At a time when climate change is inducing more and more water scarcity in the region, restoring and conserving the traditional water harvesting structures such as Damodar kata of Bijepur is of utmost importance.*

"Damodar Kata never dries up. In fact during the rainy season, the water level touches the steps at the top of the bathing ghats," says 77-year-old Anadi Samara.

Villagers say that even after the administration connected Bijepur with alternative water supply sources, most people depended on the kata for all their water needs. Basanti Meher, an old woman, says that most people preferred the water from the kata for drinking purpose because its quality was better than water from other sources like bore well.

Chandrakanti says people loved the taste of the water and the food boiled in it. "When I was young, the water of the kata was so clear that a coin dropped to its bottom could be visible from the bank," she says.

*The water structure was created centuries ago by erecting an embankment over a stream that was flowing through the pond of another village Baunsapal. The embankment made of stones put together with clay not only helped to hold water for the kata but also functioned as ghats for bathing purposes for the people.*

### Decay Due to Neglect

However, things started to deteriorate about 25 years back. The government, which took control of the kata, did not encourage people's participation in its maintenance. People, who used to take care of the kata earlier, distanced themselves from it as its wellbeing was perceived to be the government officials' responsibility.

And the administrative neglect had its adverse effect on the kata. The water got contaminated and hyacinths grew all over. People stopped drinking its water. Waste was dumped in the kata. Villagers say that a time came when the water turned red and became unsafe even for bathing.

Moreover, some unscrupulous people encroached on it, as a result of which, the water harvesting structure started shrinking. Villagers say that the total area has now reduced to around 156 acres.

In 2009, the women were the first to raise their voice against the pollution and encroachment of the kata. They organised a demonstration to wake up the villagers. Gradually, people of Bijepur organised themselves. In the next seven years, they sent petitions to the government and took to the streets holding protest marches and demonstrations. Their sustained campaigns bore fruit as the Chief Minister of Odisha, Naveen Patnaik, sanctioned a special grant of around Rs. 3 crore for the revival of the structure.

### Revival Efforts

The revival work started in 2016/2017, as the farmers recall. The embankment was heightened and strengthened, and the tank water was cleaned. Janardan says that as Bijepur has been declared as an NAC recently, hopefully more development works are on the cards.

Thousands of people are back to the bath ghats of Damodar Kata and irrigation has been restored. But there is still a lot that needs to be done, according to Janardan. One of the two ponds downstream the tank's embankment, he says, has completely been destroyed.

Then, two other ponds have also been rendered useless as the water is contaminated. The forest in the catchment area is severely degraded.

Villagers say that they had about a hundred acres of sal forests on one side of the tank and there was a time when they saw several wild animals coming to drink water from the kata. However, the forest is denuded now and the wild animals are gone.

What the government now needs to do, according to them, is to revive the water harvesting structure as well as the overall ecosystem, including the ponds and the forests in the catchment with the participation of the local public. There would be many benefits of the revival. "Water in the Bijepur Kata keeps our area cool," says Kishor Meher, a farmer in his mid-70s.

Kishor adds that large scale fishery, which has stopped after the kata got polluted, can be resumed with the revival of the kata and ponds, and regeneration of the forests. Basanti says the survival of the bore wells depends on the water in the kata.

At a time when climate change is inducing more and more water scarcity in the region, restoring and conserving the traditional water harvesting structures such as Damodar kata of Bijepur is of utmost importance.

### Students' takeaways -

***Learnings from traditions:*** Such traditional water harvesting systems have a big solution to offer for the modern day water crisis.

***Community efforts:*** When the communities get together on a goal to bring prosperity to their village, they achieve the target with success.

***Women care about natural resources:*** Women's voice is to be respected in safeguarding our degrading water resources. They are the primary users and they care for the resources as well as people.

# Khariar has a rich history of water harvesting and management

## Khariar, Nuapada District

*Khariar town in Nuapada district, in the western part of the state, is dotted with a number of traditional water bodies (TWBs) – some surviving since the 12th century and others dug between 1820 and 1900 AD. These TWBs had been meeting all the water requirements –from drinking to bathing and from irrigation to all other livelihood supports – of people till extraction of groundwater started by the government in 1990s to provide piped water supply. These TWBs, locally known as Bandh, Muda, Sagar and Kata used to feed the soil with moisture and thus save the crop from erratic monsoon. These community structures, unfortunately, started degrading post-independence.*

Khariar town of Nuapada District has several traditional water bodies (TWBs) known as Bandh, Muda, Sagar and Kata. From archaeological records it is found that two of the Bandhas (Tira Bandh and Bisi Bandh) in this town have been surviving since the 12th century. The rest of the structures (seven in numbers) have been dug between 1820 and 1900 AD after the capital of Khariar estate was shifted from Komnagarh to Khariar in 1820. The palace was built adjacent to a stream and later on; a tank was made in an area of about 7 acres by constructing embankments across the stream that was named as Nilji Bandha. The stream flow was allowed to run on one side of the tank. One inlet was there to feed water to the tank at the time of need.

These two Bandhas altogether provide irrigation to above 100 acres of Kharif crops. "There is no need to worry if there is a deficient rain, my land is in the downstream of the tanks, crop sustains even if there is a dry spell of 18 to 20 days," says Harish Bagartti, a farmer of Khariar, whose land is located about half km away from the tanks in the downstream. A vast patch (about 70 acres) of low land located in the downstream of Nilji Bandha and Hira Munda, known as Mangala Khari (Khari means 'most fertile') is one of the most fertile patches inside Khariar town. The paddy yield rate, at about 30 quintal per hectare, in such category of land is the highest in the locality. Such categories of lands don't need much external inputs such as fertilizers.

**Fun Fact!**

*Maharani Hiradei, wife of Maharaja Ratan Singh Deo of Khariar estate, got a tank dug adjacent to the palace in between 1820 to 1830, which was named after her as Hira Munda.*

The people of Lalsaheb pada and Gandhinagar pada, which are located near these tanks, say that Hira Munda acted as the main source of drinking water for the people of Ward No. 06, 07, 08 and 13 till 1990. The dependence reduced after the pipe water supply system was installed in Khariar town. "Borewells were dug and groundwater was drawn for supplying water through pipe in the early nineties.

It is not safe because it has high level of fluoride content," say the inhabitants of Ward No-07. "We were safe by drinking the water of Hira Munda, but the water is now polluted due to lack of maintenance of the tanks," they add.

The inhabitants of Ward No-08 reveal that the water of the Nilji Bandha became polluted when polluted drainage water of the town entered into the tank in late 1980s. "There was no drain in the town till 1980. Water entered into the tank only in rainy season. Drains were constructed in due course of time and the sewage water started flowing though all the natural waterways that entered in to the tanks. We have never seen any maintenance work in this tank in our life,"inform the elderly persons of the ward no – 07. Most people in the town still use the water of these tanks for bathing. Both the tanks are also now used for fishery purpose.

Mukta Sagar located on the outskirt of Khariar town was excavated by King Brajraj Singh Deo in memory of his late wife Muktakumari. It spreads over 15 acres of land. The inhabitants of Muktapur locality depend on this tank for bathing and various purposes. Water of this tank is no more used for drinking purpose after a bore-well was dug by the NAC to supply drinking water through pipes. Mukta Sagar has also an ayacut area of about 100 acres. It provides lifesaving irrigation to paddy crop during Kharif season. The tank has been now connected to the left canal of Lower Indra Irrigation Project. However, no renovation work has yet been taken. All these TWBs, although in a depleted state, are still useful for different purposes for local people and for geo-environmental reasons.

*Mukta Sagar located on the outskirts of Khariar town was excavated by King Brajraj Singh Deo in memory of his late wife Muktakumari. It spreads over 15 acres of land. The inhabitants of Muktapur locality depend on this tank for bathing and various purposes.*

### Excavated along the drainage flow:

An observation of the present location of the tanks in Khariar town reveals that the tanks have been constructed mostly by plugging the natural drainage lines. There might be at least three drainage lines which drained rain water from north to south of Khariar. The water flow from Mukta Sagar drains into Hira Munda covering a distance of about 3 kms and in between covers several tanks like Dhara Munda, several small pisciculture tanks (24 in numbers spread over an area of 25 acres) of fishery department. The other drainage line inside the town starts from Kangal Munda and covers Kamla Sagar, Bisi Bandh, Mara Bandh, Gudel Bandh before entering in to the Tira Bandh. The third drainage line covers Nua Bandh and Nilji Bandh and after joining with the drainage of Hira Munda releases water to the Tira Bandh.

The district gazetteer of Kalahandi mentions about existence of several such TWBs. The average size of these structures ranged from less than an acre to 40 hectares in area. The structures which were small in size had less water retention capacity, water dried up before summer, but provided irrigation to crops in critical periods of dry spells in rainy season. The use of these structures depended upon the popular needs of the locality.

It is reported in the gazetteer that the construction, maintenance and renovation remained the responsibility of the village community as a whole. However after they were vested with different government agencies after the abolition of zamindari system, the renovation aspects took a back seat.

**Renovation is Needed:** Agriculture remains the main source of sustenance and livelihood for about 80% of the people of Nuapada district, however; about 25% is irrigated. Rainfall analysis of last 50 years reveals that variability in rainfall causes havoc for the rain fed farmers. Date of onset of monsoon, duration, critical period of dry spell and date of withdrawal are important factors, that decide the state of agriculture. The usual monsoon period is from 13 June to 19 September, which incorporates two to three intervening dry spells. If the onset is delayed or the intervening dry spell is lingered, the situation becomes uncertain. TWBs like Muktasagar and Hiramunda play important roles during such uncertain periods.

It was learnt from the people of Ward No – 07 and 08 that the Minor Irrigation division of Khariar had submitted a DPR to Water Resources department about four years ago for repair, renovation & restoration (under RRR scheme) of some of the traditional water bodies inside the Khariar NAC. But the proposal got stuck and no fund was allotted. Khariar NAC, subsequently in 2018 October submitted DPR for renovation of four of the old structures with an estimated cost of Rs. 713.66 lakh to the Housing and Urban Development Department, Government of Odisha. The DPRs got approved under Odisha Urban Infrastructure Development Project (OUIDP) with a condition that the NAC would contribute 10% of the project cost, which amounted to approximately Rs.80 lakh in total for four projects. As the NAC was not in a condition to spend the contribution amount, the work could not be initiated.

*The water flow from Mukta Sagar drains into Hira Munda covering a distance of about 3 kms and in between covers several tanks like Dhara Munda and several small pisciculture tanks (24 in numbers spread over an area of 25 acres) of fishery department.*

## Students' takeaways -

***Solution in tradition:*** Traditional water harvesting structures (like Bandh, Muda, Sagar and Kata in western part of the state) not only conserve water, but also contribute to a healthy ecology and secured livelihood,by maintaining soil moisture.

***Community ownership:*** While sustenance of these structures is of utmost importance, community ownership is vital to keep these intact.

***Tackling groundwater contamination:*** As groundwater of this region is said to have high fluoride content, system should be developed to renovate these TWBs so that drinking water can be supplied from these.

# Rainwater harvesters of Rantal

## Rantal, Sambalpur District

*It is the journey of some Jharkhand-based tribal families, who had settled inside a forest of Sambalpur district in the 1980s, from water-scarcity to water sufficiency courtesy community efforts and traditional knowledge. The community members, who had to walk miles to fetch water in the alien land, dug up a well in course of time to meet their water needs on the advice of the elders. The organised community efforts that also pulled support from the government and non-government agencies, further resulted in construction of a number of ponds and a huge water harvesting structure on 10-acre land at the bottom of a hill. The village is now agriculturally prosperous and people also practice pisciculture that strengthens their livelihood further.*

In the early 1980s, around 360 families belonging to Munda tribe migrated from Jharkhand to the forested block of Jujomura in Sambalpur district of Odisha.

They set up a village at a place in the block by clearing patches of tree cover where they built their huts and carved out crop fields.

In its effort to evict them, the administration arrested the tribals for the encroachment of forest and other lands. Most fled the area as they could not afford the legal battle but 33 families stayed back and challenged their eviction by filing cases.

The number of families has now increased to 42 with a population of about 250.

In the beginning, the village did not have a name as the people were perceived as illegal settlers. After cholera broke out in 1985 claiming the lives of many men, it was referred to by others as 'Randtal', meaning habitation of widows. Due to intervention of some social workers, later the name was changed to Rantal. However, the name itself speaks a lot about acute water scarcity and related problems the villagers faced earlier.

The forests provided the villagers with fruits, green leaves and other non-timber forest produces (NTFPs), which they not only consumed but also sold in local markets to eke out a living. However, that was not sufficient to survive. They had to grow crops in the farmland they had carved out but there was no water for irrigation.

### Crisis triggering action

Besides farming, the villagers also needed water to meet their other daily requirements. "We walked down to Baijharan (a local stream) about 2.5 km away to fetch water," says Suani Soren, an elderly woman. "But it would dry up some years. The next water source was another stream, Badmal Nala, more than 3 km away from Rantal."

It was tough walking all the way to fetch water. Moreover, people of neighbouring Badmal village often objected to their going to the stream because they perceived the tribals as illegal settlers. Sometimes it led to conflicts.

Most of the villagers of Rantal worked as labourers at others' farms or road works carried out by the government. Sugad Kandulana, now 35, recollects those days when he was a young boy.

His parents would wake up at 4 am in the morning, go to far-off streams to fetch water, then come back and prepare food, and go out to other villages to work as agricultural labourers. "They would drop me at school while going to work and then bring me back while coming back," he says.

At the same time, the villagers were busy preparing the land in the village to make it suitable for farming. All villagers would devote a few days every week to level the land by forming 'pancha party', meaning contributing free labour in rotation.

When the farm fields were ready, they decided to store rainwater. "The elderly people organised a meeting in the village and talked about the importance of storing water so that the crops they grow won't fail," recalls Sugad.

Making drinking water available in the village was a priority too.

### It all started with a well

At a time when the villagers were struggling with their eviction cases and not sure of their permanent residency, they thought it would be wise to dig a small well first to get drinking water.

*Sanikia uses the well to water his 6 acre crop field to grow paddy, onion, tomato and other vegetables. At least six other families too depended on the well to water their crops.*

"The well had water at a level of a few feet but collapsed after some years as we could not afford to layer it with proper guard walls," says Ajay Dang, former ward member of the village and a farmer.

A local missionary charity however came to their aid in 1989 and offered Rs.35,000 to dig a pond. The villagers decided to convert the collapsed well into a pond as village elders pointed out that the area had better groundwater level as well as rain water holding capacity.

"In fact, our elders had demarcated a few places in the village where we would get water. They understood the topography very well with their traditional knowledge," says Sugad.

The water of the pond was used for drinking purpose, domestic use and the livestock. However, it was not sufficient for farming.

A few years later, a farmer, Sanikia Bage, decided to dig up a well in his farm field. As he started and found water at just a few feet beneath the ground, other villagers too contributed their labour and the well was ready within a month.

Sanikia uses the well to water his six acre crop field to grow paddy, onion, and tomato and other vegetables. At least six other families too depended on the well to water their crops. Besides, many villagers depended on it for drinking water. Sanikia's success prompted another farmer to dig up a well. "My well is a saviour. It has never dried up. It is 15 feet deep and has seven feet of water at the moment. It never gets below five feet," says 45-year-old Sanikia who supports a family of 11.

The village now has three bore-wells provided by the

government, which meet their drinking water needs.

### More ponds, more water, less drought

The elders had an important role to play when the villagers settled in Rantal. They had advised the youngsters to earmark few places in the village for water bodies and strictly prohibited them from encroaching upon them for farming and other purposes. “Our parents and other elders in the village were very wise. They had realised well that after settling down here we would need to harvest rainwater and save our crops from drought,” says Ajay.

**Fun Fact!**

*The elders had an important role to play when the villagers settled in Rantal in the early 1980s. They had advised the youngsters to earmark few places in the village for water bodies and strictly prohibited them from encroaching upon them for farming and other purposes.*

The village suffered drought continuously from 2008 to 2012.

As drought was taking a heavy toll on the villagers, they approached the local government officials for assistance in building water structures. In 2011, they got a sanction of Rs.200,000 under the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) for renovating the first pond.

The pond was deepened and bonds were strengthened. Community members worked as labourers in the work. The water from the pond was used to irrigate some of the crop fields in time of need. The villagers collectively practised pisciculture in the pond, which was also used bathing purposes.

The elders had earmarked a 10-acre land at the bottom of a hill as they understood it was the right place for constructing a kata – a large water harvesting structure open from three sides to collect rainwater from the catchment. They demanded job under MGNREGS and got a sanction of Rs.5,00,000 to dig up the kata.

Though construction had to be stopped half way as the forest department claimed that part of it was inside the boundaries of the reserved forest, the kata could still hold enough water to save crops of about 60 acres of the crop land around it. The village has around 175 acres of agricultural land.

The kata holds water till December. The villagers are planning to deepen it up further with a stronger bund on one side to ensure that more crop areas are covered by its irrigation.

In the meantime, the village women got organised under self-help groups and dug up another pond measuring 50x70 feet at a lower level of the village topography at a cost of Rs.250,000 under the state government’s Ama Gaon Ama Vikash scheme. They also put in some of the

*The village elders had demarcated a few places in the village where they would get water. They understood the topography very well with their traditional knowledge.*

“We were having difficulties to get our sons married earlier as people hesitated to send their daughters as brides to a village without water. However, things have completely changed and we are happy now,” says Manani Sarang, an old woman.

The villagers have now got their land rights settled under the Forest Rights Act (FRA) in 2016 and established themselves as successful rainwater harvesters. In fact, they also protect 79 hectare of local forests by forming a Vana Surakshya Samiti (VSS). Local voluntary organisation PATANG has been helping them in all these.

They need more support to drought proof their village completely.

### Students’ takeaways -

***Perseverance and community efforts:*** Around 360 families migrated to this place, but only 33 families stayed back and continued their struggle for a settled life notwithstanding many threats and difficulties. Their efforts not only resulted in their prosperity, but enriched the ecology too.

***Traditional knowledge of the elders:*** The villagers cashed in on the traditional knowledge of the elderly people to sort out water scarcity. The village elders earmarked some patches to create water bodies. They had strictly prohibited others from encroaching upon these patches for any other purpose.

***Women power:*** The women took initiatives to dig up a pond by availing funds from the government through their self-help group and thus added to the community effort.

# Bhagirathas recharge springs, streams by reviving forests

## Bhagirathipur, Mayurbhanj District

*Bhagirathipur is a small village in the periphery of Similipal biosphere region and used to be surrounded by dense forests and dotted with perennial streams five decades ago. The livelihood of the people was forest based. The deforestation process began in the 1970s due to rampant timber smuggling and the situation got such worse by 1990s that villagers did not even get firewood for use. The villagers joined hands in 2000 and took upon themselves the responsibility of protecting the forests and the youth then took the lead. After 15 years of conservation initiatives, the wild streams reappeared with the regeneration of forests. Currently, the villagers are self-sufficient so far as the need of water for irrigation is concerned and their livelihood restored.*

Bhagirathipur, a revenue village under Bangiriposi block in Mayurbhanj district, is said to have a history of two centuries.

According to the villagers, the village derives its name from Bhago Purty, who settled first at the place along with his wife in the periphery of the Similipal biosphere with the Budhabalanga river flowing on its eastern side. Surrounded by forests of Rairangpur forest division, the village is 10 km away from Baringiposi block headquarters.

Bhagirathipur is a completely Adivasi village having 53 households of Santhal, Kolha and Bindhani tribes. The total population is 235.

The village has 29.22 acres of lowland, 38.43 acres of plain and 26.62 acres of highland. As many as 43 families are small and marginal farmers. Six families are comparatively bigger farmers and four landless.

The lives, culture, customs and traditions of the people of Bhagirathipur are intricately linked to the forests. For their livelihood, they are mostly dependent on forests.

The villagers collect various forest produce – firewood, fruits, flowers, leaves and medicinal plants. After meeting their requirement, they sell the remaining amount to earn money. They use the forest sustainably and protect it.

Originally, they were not cultivators. Gradually, they started cultivation on small patches of land and it turned into their major occupation. They also started keeping poultry and livestock as their other means of sustenance.

**Fun Fact!**

*According to the villagers, the village derives its name from Bhago Purty, who settled first at the place along with his wife in the periphery of the Similipal biosphere with the Budhabalanga river flowing on its eastern side.*

## Deforestation blues

Five decades ago, when the village was surrounded by dense forests, there was enough water in the village. The streams were perennial and they used to feed the Budhabalanga river throughout the year. The villagers would create small puddles along the stream bed and use the water for irrigation and other purposes.

As deforestation process began in late 1970s, the streams started drying up by December-January every year. The perennial streams dried up after the rainy season, ground water level depleted considerably and rainfall become scanty.

The village faced drought-like situation every alternate year and the condition turned grim by the end of the 1990s. “We even failed to get sufficient firewood to cook food and repair houses,” says Balia Singh, a village elderly.

The reason, villagers said, was rampant tree felling by Similipal Forest Development Corporation (SFDC), timber smugglers and people of neighbouring villages. As the harvest of forest produce came down drastically, it adversely affected the villagers’ livelihood.

Their agriculture suffered as the water table of the wells went down. Many villagers were reduced to daily wagers while many migrated to other cities in search of works.

*Students of Baripada College learning from the villagers about a cross dam that retains water throughout the year and provides irrigation facility to around 50 acres of land surrounding it.*

## Regenerating the forests

The negative changes due to loss of forest affecting their livelihood were enough to alarm the villagers who sat down for discussion to find a way out. They resolved to regenerate their forests at any cost. “As a child I heard about the elders discussing about how they had to protect and regenerate the forests to recharge the streams and get back all the forest produce,” says 27-year-old Sania Singh.

In 2000, the villagers formed a forest protection committee called Daulaguru Jungle Suraksha O Parichalana Samiti with representation from every household. The committee started protecting the forests by keeping the intruders at bay despite facing lots of problems including conflicts with outsiders who wanted to cut the trees. Some problems also occurred within the committee due to disharmony among the villagers. In such situation, the village youth took the lead and sorted out most of the problems.

The forest protection drive got streamlined in 2010 with the intervention of Gram Swaraj, a grassroots organisation that prioritises conservation, says Shankar Murmu, 60.

The efforts of the villagers soon started showing results. The green cover started returning gradually and so also the water level in the village. The springs, which used to get dry after the rainy season due to loss of forest cover, became perennial again after revival of forest.

Small springs originating from the forests flow into two bigger streams – Dhanakacha and Kareighati Nala. Three small springs Sandia, Rabandahi and Gadia flow

into Dhanakacha whereas two other springs Kareighati and Matikambeda flow into Kareighati Nala. While Dhanakacha and Kareighati Nala are in the left and right of Bhagirathipur, another stream Jumubuditapa flows in the middle of it. Both Dhanakacha and Kareighati Nala then merge with Budhabalanga river that originates from the core area of Similipal Tiger Reserve.

*Women attending the village meeting to strengthen their forest protection measures.*

### Revival of streams

After 15 years of conservation initiatives, the villagers noticed improvement in the flowing pattern of the streams. The change was significant and visible by 2017.

According to Balia, with each passing year, as the forest cover became denser, the water level of the village increased. The small springs reappeared and fed Dhanakacha and Kareighati Nala. "We resumed agriculture and the harvest was good," he says.

As Dhanakacha started flowing, a small dam was built on the stream with the initiative of the forest committee to conserve water for use in dry days. It resulted in bumper harvest of paddy, vegetables, pulses and other crops. There is no more shortage of water, which remains in this dam from June till February. Around first week of March, as summer approaches, water from the upper catchment area settles down in the lower part ensuring availability of water throughout the year.

Balia further adds that the villagers have given a proposal to the concerned government authorities to construct a small dam to preserve water of Kareighati Nala. In Kareighati, water remains longer and when it becomes dry in the advent of summer, it also reappears in its lower catchment area, where it is pooled in two small ponds. Villagers use it for cultivation throughout summer. The villagers are now planning to construct a dam on Jumubuditapa to retain water and prevent soil erosion during rainy season when the flow is faster.

The return of green cover and recharged streams have contributed in a big way to replenishing other water sources in the village like small ponds, wells and hand pumps, which also used to get dry with the advent of summer. Farmers get good harvests every year as the water bodies are recharged and there is no more uncertainty over Kharif crops.

### Enhanced forest-based livelihood

The villagers' forest protection initiatives have paid off as they have got rights to protect, manage and regenerate 555 hectares forests surrounding their village. They use the forest produce for livelihood under the Forest Rights Act.

They get a variety of non-timber forest produce (NTFP) including mahua flowers, fish from streams, kendu and sal leaves and seeds, chironjee seeds, mushrooms, a number of leafy vegetables, tamarind, mangoes, jamun, edible roots and different types herbs. After meeting their requirements, they have been selling these in the market.

There is no migration from the village anymore. A number of villagers, who had migrated outside for work, have returned as they are assured of their sustenance from forest produce and agriculture.

The villagers have set an example in forest protection and regeneration. Their initiatives have not only increased the global carbon sink, but also recharged the water bodies and ensured steady forest-based livelihood options for the inhabitants.

Bhagirathipur is now considered as a referral village in the field of forest protection and community based management. The village has won several awards including the Prakriti Mitra Samman given by the Odisha forest and environment department in 2019, Prakriti Surakshak Samman given by the Baripada wildlife division in 2018 and Certification of Protection from Forest Fire given by the state forest department in 2014.

The villagers of Bhagirathipur are like the mythical Bhagiratha, who brought the Ganga river down to earth from heaven.

### Students' takeaways -

***Youth leadership:*** When the leadership stays in the hands of youth and backed solidly by the practical knowledge and experience of elderly people, the plan becomes a success.

***Forest-water nexus:*** Forest and water are interlinked. As the forests came back, streams got rejuvenated.

***Communities rights in commons:*** The ownership of a common resource should be in the hands of the dependent community as they can only use and manage it sustainably. The ownership should never be given to any outside agency/agencies.

# Reviving ecology and ensuring water security with Women power

## Gundalba, Puri District

*Village Gundalba that is just 500 metres away from the Bay of Bengal and 8 metres high from the sea level is prone to saline ingress. The residents faced a major catastrophe when the 1999 Super Cyconle hit Odisha coast. It washed away their sole means of livelihood – agriculture and pisciculture – by submerging the agricultural land and transforming their ponds into saltwater pools. However, the village was saved due to the existence of casuarina forest. The villagers joined hands to revive the forest as they realised that nothing but a forest cover can protect their village from the sea. Their efforts paid off with revival of their ecology and livelihood and earned them the prestigious UNDP India Biodiversity Award (Community Stewardship category) in 2012.*

Gundalba is a coastal village under Astaranga block in Odisha's Puri district having a population of around 450 belonging to 75 families.

It is located 59 km towards the east from the Puri district headquarters and 69 km from Bhubaneswar. Close to the Devi river mouth, the village is just 500 metres away from the Bay of Bengal and only eight metres high from the sea level.

The people are mostly farmers. They grow paddy, pulses and vegetables on their farmland and practise pisciculture in their individual ponds.

Most of them used to depend on marine fishing earlier. But after 1999 Super Cyclone, which destroyed their fishing boats and instruments, they are no more marine fishers. Due to its proximity to the sea, the village is vulnerable to sea-rise and cyclones, with salt water intrusion taking a toll on their livelihood. Besides, salinity of drinking water sources and other water bodies are among the several problems faced by the villagers.

The forest protection and regeneration initiatives taken up by the villagers led by women addressed most of these problems.

### Setback and resilience lessons

According to Charulata Biswal, president of the village's women forest committee, Pir Jahania Mahila Vana Suraksha Samiti, the 1999 Super Cyclone had completely destroyed the village. Recalling the fateful day, Charulata says that they have never seen such furious image of the sea. "It crossed its shoreline and entered half a kilometre inside the village. We survived clinging to the roofs and poles of our houses."

Almost all the clay and thatched houses of the village were completely destroyed in the cyclone. Not only houses, the cyclone also washed away their crop fields. The major loss, however, was the destruction of the forest full of casuarina trees that acted like a barrier between the shore and the village. "About 70 percent of the tree cover was lost in the Super Cyclone. Around 30,000 casuarina trees were uprooted and mangroves were inundated, said Sovakar Behera, honorary wildlife warden of Puri, who has been assisting the group in its biodiversity management initiatives.

*Small ponds created by villagers act as rainwater harvesting structures and support the villagers' fight against the increasing salinity.*

Chaanda Mallick, a member of the forest protection committee, says that though the casuarina trees faced the fury of the cyclone, they saved the lives of the people. Had there been no forest, she said, Gundalba would have vanished from the map completely.

However, the villagers lost their livelihood. After the destruction of the forest in the aftermath of Super Cyclone, the salty moisture carried by the wind from sea turned the land and water bodies in the village saline. Saline water from the sea submerged the crop fields and several ponds of the village. The crops got destroyed and fishes of the ponds died.

"Our crops did not grow for at least 3/4 years. We also did not get any yield of coconut. The small fruits would get dry and fell down as they came in constant contact with salt-laden wind," said Sovakar.

Most of the men of the village migrated to other places in search of work.

What affected the villagers most was the increasing salinity of their water bodies. Fish was their main source of nutrition and income. As the salinity increased, the fish production from their ponds became zero. The villagers also faced a lot of health problems – their blood pressure shot up due to constant consumption of saline water. Itching of skin and rashes occurred due to constant exposure to saline water while bathing and doing other household chores.

Amidst the destruction and despair, however, the women saw a ray of hope as they compared the devastation in their village with those lacking forest cover. They discovered that the damage was worse in villages having no forest. In case of Gundalba, forest cover acted as a shield against the cyclone.

**Fun Fact!**

*Chaanda Mallick, a member of the forest protection committee, says that though the casuarina trees faced the fury of the super cyclone 1999, they saved the lives of the people. Had there been no forest, she said, Gundalba would have vanished from the map completely.*

### Rebuilding village by regenerating forests

A few months after the Super Cyclone, in 2000, the women convened a meeting. "We passed a resolution to rebuild our village," says Charulata.

The women chalked out strategies to protect and manage forests on 75 hectares surrounding their village. They started their protection initiatives immediately.

In 2001, they formed the Pir Jahania Mahila Vana Suraksha Samiti comprising of 75 women with representation from each household. "As we realised that nothing but forests

[4] https://bit.ly/38jG6tW

can only save our village, we intensified our guard. Every day, a group of 10 lathi-wielding women would venture into the forest and ensure that no damage is done to the trees by any intruder. We patrolled the forest on a rotation basis and named it 'thengapali' (thenga means lathi – wooden stick - and pali means turn)," says Charulata.

According to Rahima Biwi, a member of the women forest protection committee, the initiative was basically started by women though the men had a supporting role. Gradually, the committee started including male members, she says.

The committee not only took care of the forests in the village but also spearheaded regeneration of mangroves and other species in nearby areas. Taking a cue from the good work done by Gundalba women, eight other villages started protecting forests around them.

### Rejuvenation of forests and water bodies

Due to their regular protection, the women could keep the timber mafia at bay and prevent people of the neighbouring villages from damaging the forest. It was no cakewalk as sometimes skirmishes occurred between the protectors and intruders. They were threatened with dire consequences if they continued to prevent the intruders from taking away the timber. "But due to our united efforts we managed to save our forest," says Chaanda.

Earlier, if they saw any intruder inside their forests, one of them would rush to the village and alert others for support. Nowadays, however, mobile phones have come in handy for the purpose.

Gradually the forests came back to life and they could see the environment of the area changed for the better. Now the forest boasts of several species of birds and animals. The most visible animal is the deer. To their surprise, the water bodies too revived spontaneously. Sometimes the villagers suffer loss as the deer enter their fields and eat the standing crops. However, the villagers do not bother about it as they cannot think of harming the animals.

The villagers' efforts paid off when Gundalba received the UNDP India Biodiversity Award (Community Stewardship category) in 2012. As per the award citation, the forest cover went up by 63 percent from 2.58 sq km in 1985 to 4.21 sq km in 2004 while fish catch increased from 1 kg per family to 5 kg .

### Revival of village eco-system

**Salinity of water bodies reduced:** After the regeneration of forests, casuarina trees and other species prevented the salt-bearing wind from entering the village and damaging ponds and wells. Gradually, these freshwater bodies got recharged with rainwater and salinity reduced to a large extent. The roots of the trees prevented soil erosion, maintained surface water level and kept salinity in check. The overall ecosystem and biodiversity was preserved, according to Sovakar.

**The portions close to the forest have fresh water:** The portions of the village that is close to the forest have freshwater. This is because the trees prevent intrusion of saltwater, says Soubhagya Ranjan Biswal, a resident of Gundalba. There are around 70 individual tube-wells in the village and 50 percent of them, which are close to forest, have fresh water.

**Pisciculture resumed:** Villagers resumed their fish farming again and get a good harvest. By 2012, the fish catch has increased from 1 kg per family to 5 kg. Currently, there are around 25 individual ponds in the village and four community ponds and, the fish catch has gone up even more. These ponds not only act as freshwater harvesting systems, but also assist the villagers in their livelihood.

**It reduced women's walk for water:** According to Mazmin Nisha, a village woman, when forests were not revived, women had to walk kilometres to fetch fresh water, because most of the dug-wells, which existed at that time, used to draw saline water. After the revival of forests, all the dug-wells are drawing fresh water, though few of them contain excess iron.

**Good harvest of crops:** According to Kokila Sahu, their crops are now safe from the influence of storm surges and salt-laden winds, thanks to the regeneration of forests. They are now harvesting good crops.

*Students learning how small puddles created by villagers inside the casuarinas forest provide drinking water to wild animals, maintain soil moisture and balance salinity.*

### Students' takeaways -

***Combating climate change impacts:*** An awakened community can best protect its ecology and livelihood and devise mechanism to combat the impacts of climate change.

***Women power in conservation:*** Women stewardship should be encouraged and nurtured for prosperity of a village.

***Ecosystem conservation:*** Existence of forest prevents soil erosion, maintains surface water level and keeps salinity in check and thus preserves the overall ecosystem of a given region.

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