

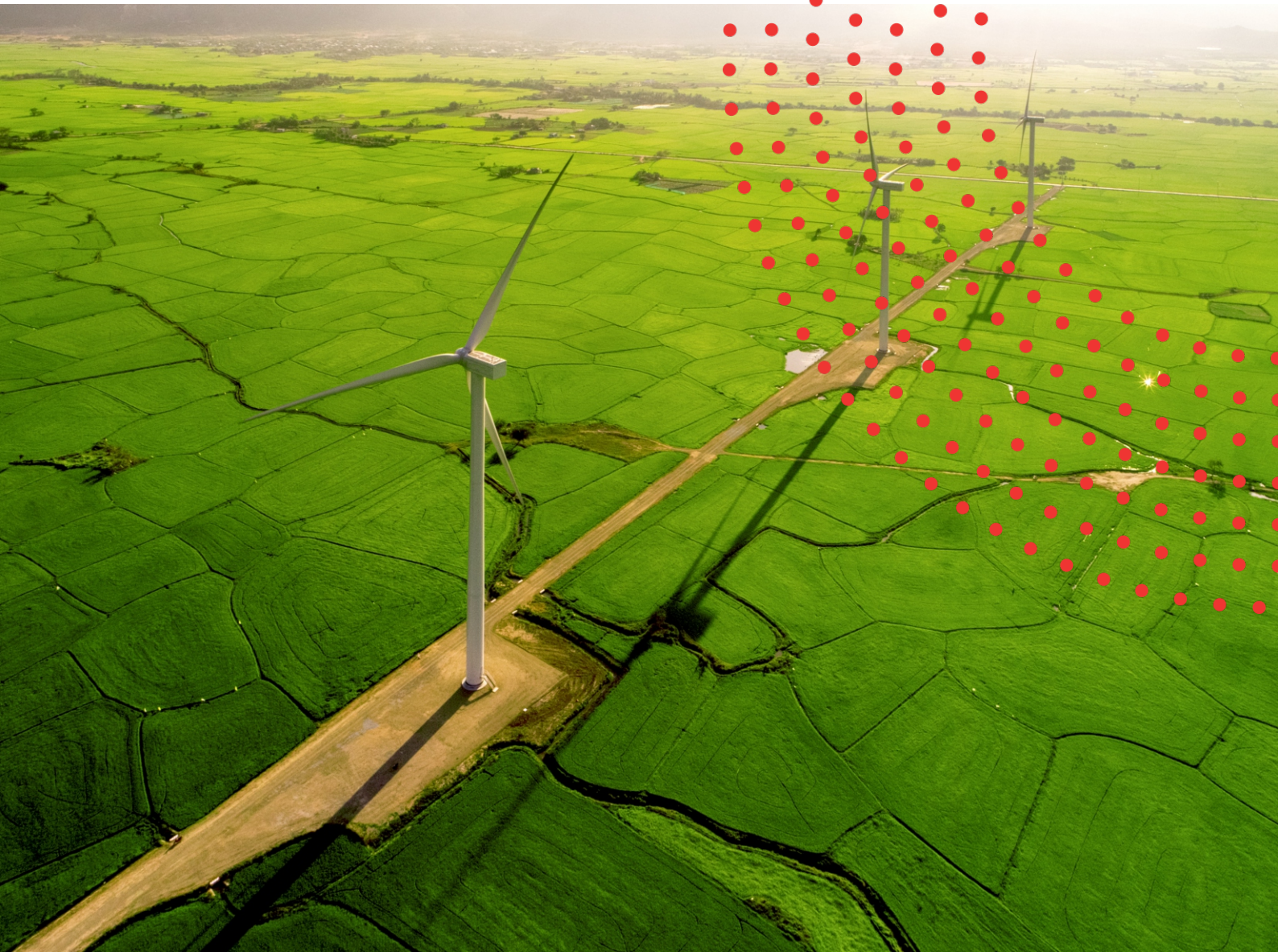


Secretariat

**CLIMATE GROUP**

# Compendium of **Best Practices** on Climate Action from Indian States

July 2022



## **Acknowledgements**


We thank the Indian state governments of Assam, Bihar, Gujarat, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Nagaland, Odisha and Tripura who engaged with us during our programmatic efforts.

We thank John D. and Catherine T. MacArthur Foundation for the support they provided through the India States Climate Leadership project.

### **Team**

Divya Sharma, Rana Pujari, Saurav Chowdhury, Zainab Agha, Disha Arora and Disha Ramanan

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## Foreword: climate action at all tiers of governance

The past decade has been disastrous when the world witnessed soaring temperatures, glacier and cloud bursts, flash floods, ravaging cyclones and deadly droughts. This has left us with several questions unanswered and the puzzle unsolved. I often like to ask: Are we adequately prepared to tackle the wrath of climate change at the pace we need to? Have we set the right ambition and goals? Do we have the right tools, technology, support and capacity to achieve what we have set out to for? These questions are ever pertinent for a country like India which has always been vulnerable to the impacts of climate change. India's vulnerability to sea-level rise and coastal hazards is comparable to that of the small island developing states (SIDS).

**The year 2022 was a momentous year for global climate discourse when India amplified its climate ambition vis a vis its Nationally Determined Contributions which include a net zero by 2070 goal.** India had already embarked upon this journey years ago rolling out several pathbreaking initiatives and policies to support the clean energy transition and strengthen community resilience. This included a very important cog in the wheel which is the acknowledgement of the fact that climate action requires a multi-faceted approach at different tiers of governance. This led to the initiation of the process of developing state-level climate action plans following the National Action Plan on Climate Change in 2008.

**For India to achieve its climate ambitions, it's imperative to undertake climate action at all the tiers of governance in an equitable manner.** As an innovative and leading organisation in this space, Climate Group's efforts at the subnational level are commendable. It is the future trajectory of

growth in large economies with higher aspirations that will determine whether we'll be able to keep the temperature rise below 2 degree. Therefore, the Under2 Coalition, with Climate Group as its secretariat, is the response we need in India. Actions undertaken by one state can inspire several other states through knowledge exchange and peer-to-peer learning. Climate Group has been successfully doing this along with profiling the achievements of Indian states in terms of climate action, further underpinning the need to strengthen alignment between national, subnational and local levels of governance.


This **Compendium of Best Practices on Climate Action from Indian States** sets an excellent example of subnational climate leadership recognition. India is undertaking successful climate actions around both mitigation and adaptation and this important document addresses multiple challenges faced due to climate change in India and how Indian states are designing tailored solutions to counter them.

As a supporter and advisor to Climate Group's work for years, I congratulate Climate Group for launching this very important knowledge product which I believe will not only inspire Indian states but our global counterparts as well. I welcome states, civil society, businesses and philanthropic organisations to support of such initiatives in future and work in collaboration as we all are striving to solve the same challenge at hand.

**Suresh Prabhu**  
Hon'ble Member of Parliament,  
Rajya Sabha, Government of India



## India Executive Director's message: shining a light on the climate leadership of Indian States



At Climate Group our mission is to drive climate action, fast. We are doing this by working with the most important stakeholders - businesses and governments. We are working towards a world of net zero carbon emissions by 2050, with greater prosperity for all.

In India, Climate Group's work at the subnational level has helped us make states surefooted and resolute in their climate action plans. Our mandate is to continue to strategically engage with subnational governments to accelerate their efforts and simultaneously support national government's climate ambitions.

We have been able to do it through the Under2 Coalition which is a group of ambitious state and regional governments committed to keeping global temperature rise to well below 2°C. **The Coalition is made up of 260 governments which represent over 1.75 billion people and 50% of the global economy.**

The Under2 Coalition has been active in India since 2016, with five members in India across geographies comprising - Chhattisgarh, Jammu and Kashmir, Maharashtra, Telangana and West Bengal. Our work in India focuses on supporting and strengthening subnational climate leadership. We are committed to working in line with the Indian government's climate policies, and our efforts complement the initiatives and climate ambition of national and subnational governments.

**Support from MacArthur Foundation through the India States Climate Leadership project has been instrumental in expanding our support to states above and beyond Under2 Coalition in the last four years.** As part of our continuous efforts, the **Compendium of Best Practices on Climate Action from Indian States** will serve as a recognition of the critical role Indian states are playing in the national climate discourse. With success stories and best practices from across geographies, I hope this Compendium goes on to inspire states and key stakeholders across continents.

We will continue to shine a light on the climate leadership of Indian States, connect decision-makers to essential information and resources and forge stronger collaboration across multiple partners to strengthen the momentum towards India's net zero goal.

I thank MacArthur Foundation for their faith and continuous support for Climate Group's work in India.

**Divya Sharma**  
India Executive Director,  
Climate Group


Climate Group is the Secretariat of the Under2 Coalition.



**This is an important decade for Indian states and regions to come forward and drive climate ambition.**



## Donor's message: states and regions can unlock an accelerated energy transition



The link between the rise in greenhouse gas emissions and more frequent and intense climatic events (such as droughts, cyclones, heat waves etc.) across the globe, needs no further debate. Countries in the Global South like India are even more vulnerable to these shocks due to a lack of adequate resources, as well as the wherewithal to fight the changing climate at the desired pace. This underpins the need to strengthen the capacities of key stakeholders at the forefront of climate action in this region, especially the subnational players like states, regions and cities.

Today, each Indian state has its own State Action Plan on Climate Change (SAPCC) which highlights the state's climate ambition and sectoral implementation plans over a period. With India's recent announcement of enhanced national climate ambition at CoP26, to achieve net zero by 2070, the role of states will now be even greater when it comes to realising these goals.

MacArthur Foundation's grantmaking objectives are well-aligned with India's Nationally Determined Contribution (NDC) targets. Since 2016, the Foundation's key focus in India has been to support mitigation interventions that seek sustainable solutions to challenges India faces from climate change. The Foundation has been working with its partners to strengthen support to state governments in India with capacity building, knowledge exchange and climate leadership profiling at its core. The Foundation firmly believes that **states and**

**regions have the power and ambition to unlock an accelerated energy transition, demonstrate tangible solutions and complement the national government's efforts towards net zero.** To this end, it is crucial to shine a light on and bring out best practices from Indian states on a global platform to foster greater knowledge exchange and cooperation.

**Climate Group's work has been instrumental to ensure that Indian states feel supported and connected as they navigate through this epoch of change and at the same time feel empowered to share their learnings with their global peers.**

This Compendium of Best Practices on Climate Action from Indian States is a collation of success stories across the length and breadth of India. It recognises and celebrates climate leadership at the subnational level. I envision these case studies to inspire other states across the globe and forge stronger partnerships across regions through knowledge exchange.

On behalf of the Foundation, I congratulate Climate Group and all the states who were involved in creating this vital repository of knowledge. I humbly request other states to engage with them and join a global movement towards our shared green future.

**Jarnail Singh,**  
Interim Country Director (India), John D. and  
Catherine T. MacArthur Foundation



# India States Climate Leadership Project

Following the successful first phase of the India States Climate Leadership Project in 2018-19, the Climate Group launched the second phase of the project in 2020.

The first phase engaged 10 Indian state governments in advancing climate ambition and stepping up their leadership role through peer-learning and strengthening the alignment between the city, state and national policymakers. Deepening support for Indian states Phase 2 of the India States Climate Leadership project has aimed to deepen engagement with subnational governments to catalyse climate action to achieve both, state-level and national goals.

## Outcomes

Our work enhanced peer learning and experience exchange between Indian states and with the wider Under2 Coalition. We achieved this through the development and **launch of our online knowledge-sharing platform (Knowledge Hub)** for supporting subnational governments to determine their progress and visualise how this supports the national government to meet its nationally determined contributions (NDCs). We also conducted sector-specific webinars on electric vehicles, renewable energy, climate finance and monitoring, reporting and verification (MRV) mechanisms.

We worked to strengthen alignment between the city, state and national policymakers through vertically integrated policy dialogues.

We expanded the domestic and international leadership profile of

Indian subnational climate action as we worked on building opportunities for Indian states to profile themselves at events, including Climate Week NYC and COP26, to talk about their climate action and ambition. We enabled knowledge exchange of best practices and interventions which states have developed in the form of case studies.

We organised international secondments for Indian states to learn from the policy actions being implemented around the world. The project enabled active engagement with more than fifteen Indian states and offered support through one or more outcomes listed above.



The webinars organised by Climate Group are always enriching and useful. The series of workshops on Zero Emission Vehicles, exposure to Hydrogen based technologies, online secondment with Baden-Württemberg, Germany – all these actions are enabling the states for on-ground implementation. Information gained through these webinars work as useful guiding tools to 'act locally' with input from case studies shared by global peers.

**Dipanjana Maulik,**  
Senior Environmental Engineer,  
Department of Environment,  
Government of West Bengal



## State Climate Action Series

To shine a light on the best practices and success stories from Indian states, we launched the State Climate Action Series. As part of this, we have published case studies across thematic areas and geographies in India. **This compendium** is a collation of the best practices which showcased the state climate action leadership and promoted knowledge exchange, peer learning and global profiling.



Climate Group is one of the key non-state actors working at the subnational level. The efforts of Climate Group have helped many state governments to articulate and spearhead climate action at the regional level. The peer learning and collaborative efforts facilitated through knowledge dissemination have been instrumental in supporting many new policies like use of solar energy and electric vehicle policy.

**Shwetal Shah,**  
Technical Advisor, Climate Change Department,  
Government of Gujarat



Peer learning and knowledge exchange, in my opinion, are extremely significant for climate action, especially to cope with a crisis like the ongoing extreme weather events that Assam is witnessing. For example, a city sharing its best practices for adaptation with another city, can be extremely helpful once it is contextualised and adapted to the particular geographic, socio-economic and political circumstances. It is essential for us to come together as a community of practice to share lessons learned and also build on each other's work to have any hope of responding and transforming quickly enough to cope with the crisis.

**Rizwan Zaman,**  
Technical Consultant, Assam Climate Change  
Management Society, Department of  
Environment and Forest, Government of Assam



### Andhra Pradesh

- Participation in policy dialogue

### Assam

- Case study showcase
- Climate action support - Climate fellows

### Bihar

- Participation in leadership forum
- Case study showcase
- Climate action support - Climate fellows

### Chhattisgarh

- Participation in leadership forum
- Climate action support - Climate fellows
- Technical support

### Delhi (NCT)

- Case study showcase
- Participation in leadership forum
- Disclosure 2021

### Gujarat

- Participation in leadership forum
- Knowledge exchange
- Case study showcase
- Disclosure

### Jammu and Kashmir

- Technical support
- Virtual secondment
- Participation in leadership forum

### Jharkhand

- Case study showcase

### Karnataka

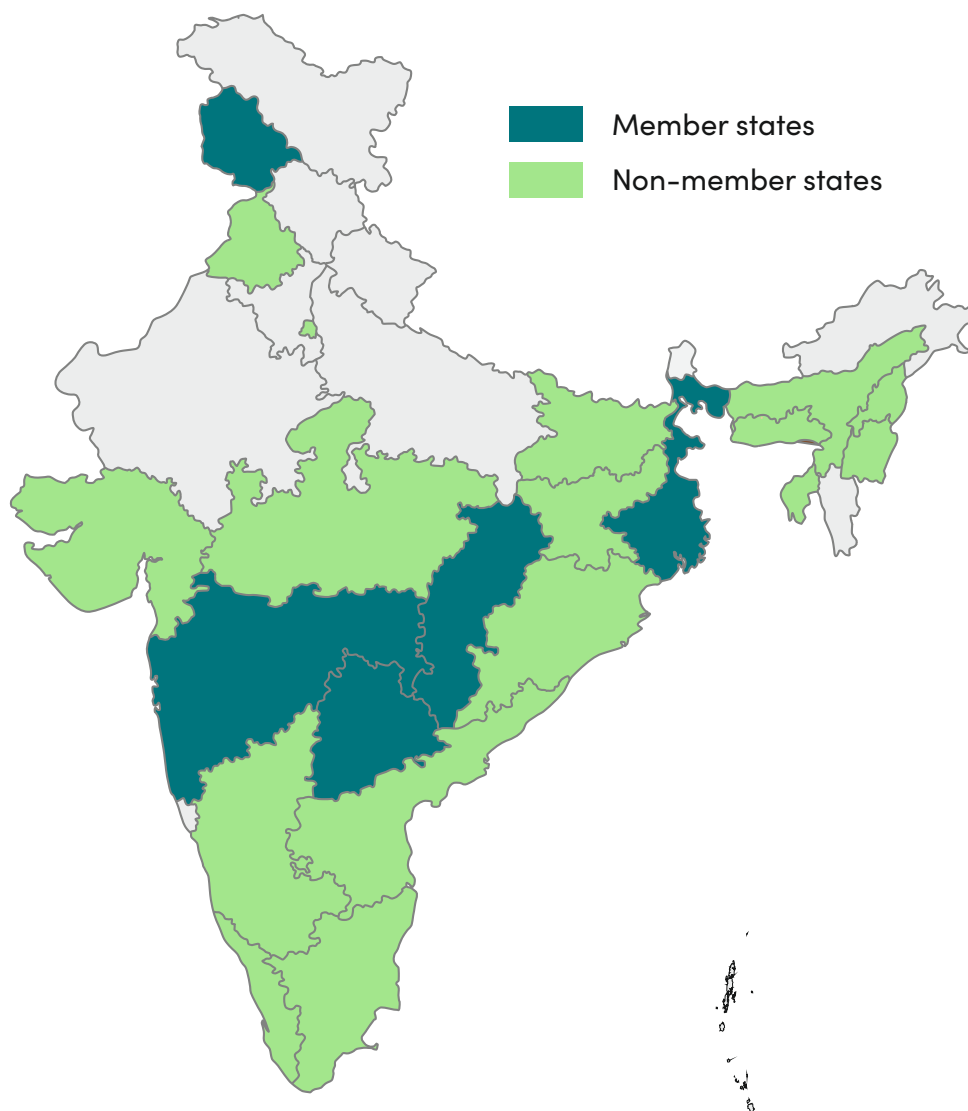
- Participation in leadership forum
- Participation in policy dialogue

### Kerala

- Case study showcase
- Participation in leadership forum
- Knowledge exchange

### Madhya Pradesh

- Participation in leadership forum
- Case study showcase
- Climate action support - Climate fellows



### Maharashtra

- Case study showcase
- Participation in leadership forum
- Video documentary

### Manipur

- Participation in leadership forum

### Meghalaya

- Participation in leadership forum
- Knowledge exchange

### Nagaland

- Case study showcase

### Odisha

- Participation in leadership forum
- Knowledge exchange

### Punjab

- Participation in leadership forum
- Knowledge exchange

### Tamil Nadu

- Participation in leadership forum
- Knowledge exchange

### Telangana

- Participation in leadership forum

### Tripura

- Participation in leadership forum
- Climate action support - Climate fellows
- Case study showcase

### West Bengal

- Participation in leadership forum
- Technical support
- Project support through Future Fund

**With climate change posing alarming threats to communities across India, state-level climate leadership is essential to meet climate and development targets. Many Indian states are spearheading key initiatives to elevate India's climate ambition to the next level, acting as frontiers for climate action.**

**The ten case studies in this Compendium were developed as part of Climate Group's India States Climate Leadership Project.**

**Through the Compendium, we aim to showcase these states and their rightful role as leaders in unlocking barriers to climate solutions.**

# Assam promotes participatory eco-learning through Nature Conservation Clubs



Themes: Environment and Forest Conservation  
Published in March 2022

## Summary

Assam, the most populous north-eastern state of India, is situated in the foothills of the eastern Himalayas. The state's unique topography, coupled with an average annual rainfall of 1807.1 mm or more via the southwest monsoon, creates a conducive environment to support its rich biodiversity. The state's developmental journey is being challenged by the changing climate, as its large population depends on agriculture and forests for livelihood.

The Nature Learning Centre (NLC), Assam, was implemented during the period 2018–2021 with the purpose of building the capacity of various stakeholders on nature conservation. This involved a holistic and coordinated effort to create an enabling environment for nature-based learning,

as well as sustainable developmental action to mitigate the impacts of climate change in the region.

**The NLC, through its exclusive school-level initiative, Nature Conservation Club (NCC) carried out several interactive learning programmes, practical activity-based learning and exposure visits to reserved forests. The centre also produced audio-visual training material and reading materials for different stakeholders.**

Most of the activities targeted students and communities living in and around the fringes of the protected forests.

## Background

Assam is blessed with unique biodiversity and rich forest areas that cover more than one-third of the state's total geographical area. Traditionally, a large population of Assam lives near the forest, dependent on its resources. Variability in climate can potentially impact the forests of Assam and subsequently detriment the livelihoods of these communities. To reduce vulnerability to climate change and improve the resilience of these communities, conservation of the forests is vital as a mitigation measure.

Assam State Biodiversity Board (ASBB) and the Department of Environment and Forests, Government of Assam implemented the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India funded project 'NMHS Him - Nature Learning Centre (NLC) - Assam,' during 2018–2021. The project aimed to

build the capacity of various stakeholders on nature conservation and create a dedicated group of conservationists. Through the unique approach of interactive learning programmes, nature-based learning, participatory conservation efforts and sustainable use of natural resources were promoted to minimise pressure on forest resources.

One of the interventions taken up under the project includes the formation of 103 Nature Conservation Clubs (NCCs) in remote forest fringe government schools in all the districts of Assam. **The NCCs prepared their climate action plans and promoted efficient energy use, ex-situ conservation and the 3R's principle (reduce, reuse and recycle) in the school and their respective localities.**



Photo by Inu Ete on Unsplash

To stimulate self-awareness and compassion among the students towards nature and conservation, 23 exposure visits to the protected areas and reserve forests were organised that provided nature-based learning to young students. Students also took part in awareness and sensitisation programmes on biodiversity conservation and

environmental issues. The community members, farmers, Self Help Groups (SHGs) of the forest-fringe areas have been trained on vermicomposting, beekeeping, nursery development and mushroom cultivation as a means of alternative livelihood options through 57 hands-on training programmes.

**12,560 people participated in different awareness, training and capacity building programmes**

### Objectives

- To develop and promote conservation awareness and sensitisation on biodiversity and resources
- To create a cadre of trainers among the various stakeholders who will lead conservation actions and capacity-building at multiple levels
- To promote participatory conservation action and management of wetland resources for livelihood generation
- To facilitate alternative livelihood generation capacities to reduce pressure on forest resources and promote efficient utilisation of natural resources

### Results

- 103 NCCs were formed for awareness generation, sensitisation and conservation.
- 57 training and capacity-building programmes on alternative livelihood were given to community members, farmers and SHGs to promote sustainable use of natural resources.
- Conservation and plantation of rare endemic plant species and medicinal plants were done at Assam state zoo and Nellie sub-centre.
- A nature learning sub-centre at Nellie and Kakoijana was developed.
- Participatory Rural Appraisal (PRA) exercise conducted at Upadbeel for wetland restoration.

### Next steps

- NCCs can provide a dedicated group of young conservationist cadres at district levels. The sustainability of these districts can be monitored under biodiversity management committees.
- The sustainability of ex-situ nature learning centre and sub-centres can generate revenue and promote conservation and nature-based learning facilities. The functionality of these centres can be monitored by the Assam State Biodiversity Board, Assam Climate Change Management Society and the Department of Environment and Forests, Government of Assam.

## Enabling conditions

The following conditions led to effective and successful programme implementation,

- Strong advocacy and support at the grassroots level by the Department of Environment and Forests, Government of Assam in biodiversity conservation and alternative livelihood options
- Technical support from Assam agriculture university, Krishi Vigyan Kendra, Khadi and village industries commission and collaboration with local NGOs, and
- Fruitful collaboration with biodiversity management committees, joint forest management committees and eco-development committees at the ground level.

## Key lessons learned

- Meaningful active participation of local communities in project activities is the key to successful conservation efforts and the sustenance of the initiatives.
- Formulating a climate action plan with inputs from grassroots stakeholders can enrich climate change mitigation at the regional and national levels.
- Ex-situ conservation sites and Nature Interpretation Centres at district levels can be important places of conversation and motivate locals to take conservation initiatives of their own.
- Collaboration with local government officials, civil society organisations and self-help groups aids in successfully implementing activities.



# Bihar strengthens its climate resilience using Systematic Catchment Area Treatment



Themes: Land use and forests  
Published in October 2020

## Summary

The Kaimur and Rohtas districts in Bihar are rich in biodiversity and wildlife. To address the rising water stress and changing climatic patterns in the region, the Durgawati Reservoir project was conceived. Under this project, a reservoir is built on the Durgawati river which forms the boundary of the Rohtas and Kaimur districts of Bihar. The reservoir and subsequent submergence zone became functional in 2014-15. The length of the dam is 1615.40 metres, and the height is 46.30 metres with the submergence zone spread over 1963.45 hectares. The core area of the Kaimur Wildlife Sanctuary forms the catchment of the Durgawati river leading up to the reservoir.

In order to check soil erosion and promote water conservation in the region, a Catchment Area Treatment plan was devised. **The catchment area is spread over 62,700 hectares and comprises 112 micro watersheds with an average size of 555 hectares. This plan aims to cover 51,657 hectares which are 97% of prime forest land, thereby benefiting both local villages and wildlife.**

## Objectives

- Check soil erosion and retrieve the precious and limited topsoil on the rocky plateau and reduce the silt load of the reservoir
- Reduce the run-off of excess rainwater and conserve as much water as possible on the Kaimur plateau to improve water availability in the region
- Enhance green cover by moisture retention and topsoil conservation
- Enrich the habitat of endangered fauna like the Indian pangolin, tiger, hyena and four-horned antelope by catalysing floral growth and ensuring consistent availability of water during the dry season

## Key activities

The detailed operational plan of the projects consists of systematically building individual micro watersheds for treatment and executing Soil Moisture Conservation (SMC). This plan operates in continuity over successive financial years.

The primary activities include,

- Mapping drainage channels on micro watersheds designated by the Central Water Commission
- Preparing a site-specific drainage line treatment chart, and
- Mechanical structures designed to intervene and capture the silt load of all first to third order streams falling in each micro watershed.<sup>1</sup>

1 - A stream of water is named based on its origin and when it joins the other streams as a tributary. A first order stream is the first or headwater channel with the lowest flow, which is joined by smaller tributaries as second, third and fourth order streams, and so on.



Photo by Shubham Kumar Jha on Unsplash

In the initial phase running from 2016-17 to 2018-19, adjacent micro watersheds consisting entirely of forest land were taken up for SMC work. Now, a detailed ground survey with socio-economic and other factors is being carried out in village areas located in the remaining micro watersheds. This is being done to prepare a prospective CAT plan, keeping in mind local needs. The Durgawati Catchment Treatment plan ultimately strives to treat all 112 micro watersheds falling within the river basin.

**62,700 hectare of catchment area to be treated**  
**112 micro watersheds will be developed**  
**51,657 hectare forest to be covered**

### Results

- More than 23,700 hectares of forest area has been treated to check erosion and conserve precious topsoil
- **Improved moisture regime** by recharging aquifers through retention of water in Silt Detention Structures (SDS) and check dams<sup>2</sup>
- Availability of water throughout the year in streams or nullahs and springs locally known as 'chuwan' which are benefitting around 4800 people in nine tribal villages as well as local wildlife

### Enabling conditions

- Long term planning under the Durgawati Catchment Area Treatment plan and committed financial support for the entire duration of the scheme through a dedicated fund
- Provision for technical guidance from an external consultant in designing technically sound and comprehensive CAT plans

### Challenges

- The region is fairly remote due to its mountainous terrain. There are safety concerns owing to the presence of extremist groups or Naxalites in the region.
- There has been a shortage of staff in the department. The project work was executed with a staff strength of only 20-30% of the actual requirement.

### Key lessons learnt

- An integrated CAT plan should be included in the project conceptualisation stage to visualise and plan the treatment operations for effective results in subsequent years.
- Local knowledge of hydrology such as water flow and moisture regime should be incorporated into the CAT plan for sound micro watershed planning for local villagers.

<sup>2</sup> - A check dam is a small dam constructed across a drainage ditch, swale, or channel to lower the velocity of flow.



# Climate change adaptation for natural resource-dependent communities in Kachchh, Gujarat



Theme: Resilience  
Published in June 2020

## Summary

The National Adaptation Fund for Climate Change (NAFCC) launched by the Government of India in August 2015 implements pilot-scale local climate change adaptation projects in the state and union territories of the country. The basic aim of these projects is to protect vulnerable communities from the adverse effects of climate change. The projects under NAFCC prioritise building climate resilience

in the areas identified under the State Action Plan on Climate Change (SAPCC) and the National Action Plan on Climate Change (NAPCC). The National Bank for Agriculture and Rural Development (NABARD) is the National Implementing Agency (NIE) of these projects across the country and, so far, 30 projects have been initiated across India.

## Background

In the Kachchh district of Gujarat, this project is being implemented by the Gujarat Ecological Education and Research (GEER) Foundation under the guidance of Gujarat's Climate Change Department.

Kachchh is one of the biggest districts of the country with diverse ecosystems and a range of local climatic variations. The objective of this project is to enhance the adaptive capacity of natural resource-dependent communities in agricultural, coastal fishing and pastoral sectors through Ecosystem-based Adaptation (EbA) and

Community-based Adaptation (CbA) interventions for water security, livelihood security and ecosystem restoration.

The project is funded by the Ministry of Environment, Forest and Climate Change, Government of India from 2017 to 2022.

The project is being implemented in three different ecological zones of the Kachchh District, which are in different geographical areas i.e., coastal areas of Abdasa, grassland area of Banni and agricultural areas of Khadir.

**A total of 2,170 direct beneficiaries including 1,230 households from agricultural, 700 households from coastal and 240 households from pastoral sectors are included, with women making up 35% of the total.**



Photo by Kiranlal Jadhav for Vision Unplished

## Results

- Interventions like restoration of mangroves in the coastal belt, restoration of Banni grassland and development of grassland as seedbank were implemented as part of the EbA.
- Following CbA interventions were implemented,
  - Construction of a new type of water harvesting structure (known as 'Holia') in agricultural villages
  - Creating micro-irrigation in Khadir region's agricultural area
  - Installation of solar-based water irrigation pumps
  - Distribution of fodder kits to pastoral communities
  - Restoration of the existing rainwater storage structures including farm ponds, surface ponds and percolation ponds
  - Installation of a bio-energy system and production of biochar from farm waste, and
  - Livelihood interventions and skill-building for small scale dairy and handicraft producers.
- Different interventions are completed at various stages of implementation; however, initial results show that scientific methods of addressing vulnerability will be very effective for natural resource-dependent communities.

## Enabling conditions

- There are several partner organisations and government departments working together on the Kachchh NAFCC project. These include Gujarat's state Climate Change Department, Forest Department, GEER Foundation, Gujarat Institute of Desert Ecology (GUIDE), Central Arid Zone Research Institute (CAZRI), Agriculture University, Women Self-help Groups such as Gurjari, state energy and department, agriculture and co-operation department. All these entities are contributing to the success of the project.
- The coordination of the project is taking place at both the district and state levels.

## Challenges

- Convergence of various government schemes is very tough; however, an effective mode of interdepartmental coordination could resolve this challenge in most cases.
- To work with communities and mobilise them for a new way of working is difficult but as the project goes on, they are becoming increasingly engaged.

## Key lessons learnt

- Alongside the implementation of hard-core interventions, the development of soft skills and capacity building are very important for communities.
- Mainstreaming climate action at every level is important. To reduce vulnerability and strengthen resilience capabilities, increased focus on scientific inputs on local climate change is required.
- The quality of rural livelihood is interlinked with the availability of natural resources. Therefore, it is important to promote sustainable use of resources and develop long-term strategies to conserve them through an ecosystem-based approach.

# Enabling a just transition through the 'Roadmap for Ecological and Sustainable Energy Transformation (RESET)' project in Jharkhand



Theme: Energy efficiency and Renewable energy  
Published in January 2022

## Summary

Jharkhand, a state situated in eastern India is endowed with natural and renewable resources like solar and biomass. The state is highly dependent on coal reserves for its economy and energy requirements. Despite this, Jharkhand has not been able to achieve universal energy access, impeding further developments especially in remote areas. To meet the energy demand of industrial and domestic consumers, the state requires a robust, well-defined energy pathway using its renewable energy sources. Decentralised renewable energy applications remain an alternative to conventional sources of energy, which will meet the needs of the population as well as ensure a cleaner ecosystem.

Jharkhand is also among the most vulnerable states of India in terms of the effects of climate change, where the prevalence of poverty accentuates the crisis. It is thus crucial to adapt to

the present as well as the future impacts of pollution, increased carbon emissions and climate change to build the resilience of vulnerable communities. Since August 2020, Swaniti Initiative<sup>1</sup> has been working in Jharkhand to address these challenges and fulfil the vision of a just transition. The Initiative works with government departments, both at the state and district administration levels, to facilitate an institutional shift towards a green economy. It is done by promoting renewable energy, sustainability in agriculture and a livelihood transition from the conventional mining sector. The team further adopted a decentralised approach by enabling and capacitating different stakeholders, community members and government officials toward a just transition. Until January 2022, the team had been able to mobilise INR 45 Crores (USD 60,40,755.00) to implement specific interventions linked to renewable energy and sustainability, across six districts of Jharkhand.

## Background and Results

Swaniti Initiative has a dedicated team meaningfully engaged with the district administrations of Bokaro, **Chatra**, **Dhanbad**, **Pakur**, **Palamu** and **West Singhbhum** districts. As a result, in the past year, the team has been able to strengthen governance by fast-tracking the implementation of the existing schemes and mobilising funds through various channels for the same.

- Notable interventions include rooftop solar installation on public assets which have been ongoing across two districts with a combined projected generation of more than **10 MWp**, especially across health centres.
- Two pieces of 100-acre land have been identified to set up a **20 MWp** solar farm in one of the districts.
- An initiative to install more than **1500 solar streetlights** under the RURBAN mission across two districts is underway.

1 - A nonpartisan social enterprise that provides development solutions to improve the delivery of public services



Photo by Moritz Kindler on Unsplash

- In Pakur district, the **Chas Haat project** has been launched for better market linkages and more than **7500 farmers** have been identified as beneficiaries
- Also, under the plastic waste management initiative, the development of an **eco-park** is ongoing in Pakur.
- In Ranchi district, Swaniti's team in coordination with the district agriculture office identified crop wastage as a major challenge in the agricultural domain. In order to increase crop shelf life, procurement of **two solar cold storages** and **100 solar dryers** from private manufacturers is ongoing.
- The distribution of solar water pumps under the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) was conducted. Swaniti Initiative facilitated the complete installation of the set target of **300 solar water pumps** along with the district agriculture office in Chatra. They are catalysing the process of implementation in the other districts. This initiative has enabled the beneficiaries to de-dieselise the agriculture sector and accept alternative and sustainable forms of agriculture.
- In the wake of the COVID pandemic, an effort to increase the coverage of child immunisation in the district was initiated by the Deputy Commissioner and the district administration of West Singhbhum. As a result, the provision of **342 e-scooters** to all the Auxiliary Nurse Midwives (ANMs) in the district is underway. The remaining ANMs are to be provided with e-scooters in a phase-wise manner. This initiative was aimed at enabling mobility of the ANMs in reaching remote villages. Swaniti's team facilitated this initiative by aligning with major industries and enterprises active in the district.

**2.5%** of the total power supply comprises renewable energy (as of March 2021)

**800+ kWp** Solar based installation generating more than 800 kWp has been completed in Chatra district

### Next steps

- **Promote an integrated model of Distributed Renewable Energy (DRE) applications:** Efforts to pilot and scale up existing interventions (across public and private infrastructure) with combined DRE applications will be initiated for optimal usage of renewable energy. Swaniti Initiative intends to leverage the learnings and best practices derived from the grassroots across other mining affected districts in Jharkhand.
- **Expand the current domains of intervention and introduce clean and green processes to ensure a just transition:** Efforts to catalyse inter-departmental scheme convergence for holistic sustainable development will be made. Swaniti's team intends to expand their domains of intervention across agriculture, small-scale industries and livelihood generation among others. Despite public provisions, gaps still exist in the implementation and subsequent monitoring. To address this, the convergence of different vectors for one-point implementation may ensure greater impact.

- **Explore various financial models:** The current interventions are promoted and financed using subsidies. It was noted that the subsidy model may not prove to be viable and sustainable in the long run. Subsistent efforts will be made to pave the way in creating different financial models including private and public funding channels and gradually tapping into the consumers' share. This is aimed with the intent of enhancing the sense of ownership amongst beneficiaries and lessening the government's reliance on subsidies.

## Enabling conditions

- **Support from the district administration and Jharkhand Renewable Energy Development Agency officials:** To promote distributed renewable energy applications, the district officials have helped Swaniti's team facilitate the implementation of existing schemes and curate innovative ideas by keeping sustainability at its core.
- **Fund mobilisation from various sources:** Swaniti's team has been successful in mobilising government and CSR funds towards ecological and environmental sustainability in the state of Jharkhand from various sources viz., the District Mineral Foundation Trust, Special Central Assistance to Aspirational Districts, funds issued by the Ministry of New and Renewable Energy, Government of India to the Jharkhand Renewable Energy Development Agency and funds available with the Department of Horticulture, Government of Jharkhand.

## Challenges and key lessons learned

- **Awareness:** It was learnt that training and capacitating the officials who could enable beneficiaries to adopt such sustainable interventions is vital. Additionally, capacity building of beneficiaries is necessary to empower them with the technical know-how so that they can make decisions that promote a just transition.
- **Approach:** Adopting a decentralised approach for a context like Jharkhand is vital to designing and promoting sustainable interventions involving renewable energy applications in the domain of agriculture, livelihood generation and small-scale industries. A shift from the previously followed top-down approach to a bottom-up approach enabled the team to widen their reach and implement pilot projects at the district level which fast-tracked the implementation process.
- **Geography:** To introduce new initiatives, it was learnt that an understanding of geography was imperative, to cater to the needs of the beneficiaries
- **Accessibility:** There was a lack of available data and prior documentation regarding surveys undertaken by the government departments. Further, for any intervention to be initiated, it was learnt that clarity is needed for associated stakeholders and departments. Swaniti, therefore, conducted stakeholder consultations and pre-assessments before designing decentralised interventions for the state and districts.
- **Adaptability:** In order to scale up the initiatives, beneficiaries as well as the district administration needed to accept the shift in their daily ongoing practices and adapt to green and clean initiatives, which included a shift in their behaviour and habits as well.

# Carbon Neutral Meenangadi in Kerala: A bottom-up model for integrating climate action into development planning



Theme: Resilience and Low carbon development  
Published in November 2020

## Summary

Low-emission development strategies are essential to tackle the severe threat of the climate crisis and move towards a sustainable, climate-resilient future. This project focuses on developing the Meenangadi Gram Panchayat of Wayanad district in the southern state of Kerala, India as the first 'Carbon Neutral Panchayat'. The project incorporates climate-resilient strategies in its development schemes across various sectors and integrating and reorienting development projects to achieve carbon neutrality.

The concept of carbon neutrality adopted here puts forth the notions of zero-carbon development as well as food and energy self-sufficiency at the

Local Self-Government (LSG) level while also creating a climate-resilient community. The strategies followed falls in line with the Sustainable Development Goals set by the United Nations.

Carbon Neutral Meenangadi is an attempt to achieve low emission development and climate resilience through decentralised actions. The mass participation of LSGs, community members and volunteers at the various stages of this project underscores the participatory nature of this endeavour. Most importantly, the project stands close to the progressive approaches to climate action that reaffirms the bottom-up approach at the local level.

## Background

The Kerala State Action Plan on Climate Change identifies the Wayanad district as one of the climate change hotspots in the state. Wayanad is nestled in the Western Ghats, an extension of the Deccan Plateau. It is home to crops that are thermo-sensitive and vulnerable to climate change such as coffee, paddy and pepper. It is also one of the eight hottest hotspots of biological diversity in the world, home to nearly 5000 species of flora and fauna.

The Wayanad district is primarily agrarian with 50% of its geographical area falling under plantation and other agricultural land use. 97% of the district's population is rural, therefore mostly directly dependent on agriculture for their livelihood. Due to this, the district was selected for a community-based climate change adaptation

and development initiative named "**Carbon Neutral Wayanad**".

As the district is highly vulnerable to the adverse effects of climate change, carbon-neutral development became essential for its people and the environment. Meenangadi Panchayat in Wayanad was selected as a model carbon-neutral panchayat for the district and the rest of the country to follow. The purpose of this project is to propose sector-wise adaptation and mitigation strategies in Meenangadi by estimating its Greenhouse Gas (GHG) emissions and carbon sequestration for the baseline year 2017 (based on 2006 IPCC Guidelines for National Greenhouse Gas Inventories). The analysis was carried out in the sectors of Transportation, Domestic Energy, Electricity, Waste and Agriculture, Forests and Other Land Use (AFOLU).



Photo by Faris Mohammed on Unsplash

## Results

- The project produced a detailed GHG inventory of the Meenangadi Panchayat for the year 2016-17.
- The estimate shows that there was a net GHG emission (the difference between total emissions and total sequestration) of 11,412.57 tonnes of CO<sub>2</sub> equivalent in 2016-17. Targets were set to reduce these emissions by adopting various projects in Meenangadi. The process is still ongoing, and several projects undertaken by the panchayat are currently in the implementation phase.
- During the period of 2017-19, Meenangadi Panchayat planted about 400,000 trees on private land to increase carbon sequestration and revive biodiversity.
- The tree-banking scheme introduced as part of low carbon development has become a source of income for farmers by providing incentives to those who plant and protect trees.
- Bamboo was promoted due to its high sequestration rates, especially on riverbanks, to conserve soil and water.
- Meenangadi started implementing energy-efficient measures such as energy auditing, promoting LED bulbs, waste management plants and vermicomposting.
- The project anticipated improving the livelihoods of people, adapting to climate change and emerging as a sustainable community.
- The methodology developed for Meenangadi Panchayat in Kerala can be adapted by any region or local self-government for planning a sustainable low-carbon economy. The project resulted in environmental, socio-economic benefits, both qualitative and quantitative, such as the number of training sessions provided, megawatt solar energy installed and acceptance of smart meters among residents.

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## Enabling conditions

- Meenangadi Panchayat is implementing the carbon-neutral project by including all sectors. With financial support from the state government of Kerala, the tree-banking scheme in Meenangadi is being implemented.
- Thanal, one of the oldest environmental organisations in Kerala, was entrusted by the Government of Kerala to provide technical assistance to this flagship project.
- Numerous other organisations, universities, educational institutions, government departments and authorities were also part of this project during various stages along with Thanal. Their participation played a huge role in the successful implementation of this project.

## Challenges

- **Methodology:** Due to the lack of examples of a GHG inventory at a subnational level, forming the methodology was quite difficult.

- **Data collection:** Primary data collection was a major challenge and various sampling strategies were used to get representative data of the panchayat. Most of the secondary data for the inventory was available only at the district level and hence extrapolation based on population and number of households was carried out.

### Key lessons learned

- Participation and support of community, authorities, organisations and people across all sectors are essential for the successful implementation of such cross-sectoral projects.
- Data collection is an arduous task when the project is done at a subnational level. Primary and secondary data collection are required, especially while doing a GHG inventory.

**Carbon Neutral Meenangadi project is proof of a successful bottom-up approach by carrying out low carbon development towards a climate-resilient future.**





# Restoration of traditional water supply sources in Indore, Madhya Pradesh



Theme: Resilience  
Published in July 2020

## Summary

A climate resilience strategy for the city of Indore in Madhya Pradesh has been developed as a part of the Asian Cities Climate Change Resilience Network (ACCCRN). The strategy hopes to bring back local/traditional water management techniques to restore water resources for the city, while complying with climate-friendly policies.

A pilot of the project is being implemented by the Department of Environment, Government of Madhya Pradesh (GoMP), through the State Knowledge Management Centre on Climate Change (SKMCCC) and Environmental Planning and Coordination Organisation (EPCO). These entities are working with the Indore City Municipal

Corporation to conserve the city's traditional water supply sources, thereby enhancing its adaptive capacity to address climate change.

The objective of this project is to conserve and rejuvenate 330 of Indore's traditional water supply sources with community participation. The project will directly benefit around 16,500 households and save revenue for Indore Municipal Corporation due to reduced water pumping costs. The project will also reduce greenhouse gas emissions as less energy is required for pumping water under the business-as-usual water supply system.

## Background

Madhya Pradesh, a land-locked state in central India, is highly vulnerable to the impacts of climate change due to its topography and social structure with around 70% of its population living in rural areas.

Changing climatic conditions, such as increasing average temperatures, changes in the spatial and temporal distribution of monsoons and increasing rainfall frequency, are severely impacting climate-sensitive sectors such as water, agriculture and forestry and threatening the livelihood security of most of the population.

**The Department of Environment has outlined key sector-specific strategies that are needed to adapt to and mitigate the impacts of climate change and build resilience in the most vulnerable communities in the State Action Plan on Climate Change (SAPCC).**

Indore, one of the cleanest cities in India, and the

most populous in the state of Madhya Pradesh, experiences rainfall of 700 to 800 millimetres (28 to 31 inches) during the southwest monsoon season (July to September).

Climate change poses unique threats to the Indore water supply system. Downscaled climate information suggests an increase in surface temperature of two to four degrees Celsius and a change in rainfall amounts in the range of -4% to +8% by 2046-2065. The current water demand is around 290 million litres per day and with rapid urbanisation and a projected increase in population to 3 million by 2021, the water demand is expected to rise to 421 million litres per day.

As the water footprint of the city keeps growing, Indore Municipal Corporation needs to pump water from the nearby Narmada River which is 70 km away. It costs INR 45 (USD 0.57) per cubic meter of water.



Photo by Sandeep Yadav on Unsplash

However, there is mounting stress on the water availability of the Narmada River due to erratic rainfall impacting the lifecycle of the river. In addition, traditional water

supply sources of the city have been neglected as piped water supply provides water at the doorstep level, leaving many traditional labourers out of work.

## Objectives

This project will address the twin challenges of rising water demand and the impact of climate change in the city of Indore by,

- Developing water resilience of Indore with respect to climate change
- Restoring traditional water sources and reducing the burden on the existing water distribution system

Started in March 2017, this project is funded by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India under the Climate Change Action Programme (CCAP).

**INR 51.6 million (USD 0.65 million)**  
expected savings per year for  
Indore Municipal Corporation

## Results

### Environmental

- Conserved water through traditional, low-carbon intensive techniques.

### Social

- Improved water availability and strengthened the capacity of women and marginalised groups to adapt to climate change and varying water availability. Water will now be readily available, primarily to the dependent marginalised communities and women who had to travel long distances to fetch water.
- Improved quality of water is contributing to better health.

### Economic

- Indore Municipal Corporation is saving approximately INR 51.6 million (USD 0.65 million) per year.
- The costs associated with the procurement of water have been reduced.
- Households have been able to increase their savings.

## Way forward

- Water Quality Assessment of all 330 water supply sources will determine suitability for drinking.
- The revived open wells and step wells will be dedicated back to the communities.
- Awareness campaigns on traditional water sources for communities will be run.

- Policy support to replicate such initiatives and integrate learnings will be garnered.
- A detailed hydro-geological assessment of traditional water supply sources will be done to assess their yield potential and response to recharge.
- An online dashboard for all the 629 identified locations in Indore will be developed.

### Enabling conditions

The project is being implemented by EPCO, the State Designated Agency on Climate Change in Madhya Pradesh. The leadership has been provided by the Executive Director, EPCO and Commissioner, Indore Municipal Corporation at all levels during the project. The progress has also been reviewed by Principal Secretary, GoMP, Environment Department.

### Challenges

- Resolution of community conflicts over Common Property Rights (CPR)<sup>1</sup>

### Key lessons learned

- Support and ownership of the local community are critical to the success of any project involved with natural and common resources.
- It is vital to have close coordination among various stakeholders, including communities, to successfully implement such a challenging project.

1 – Common Property Rights: Rights that individuals or communities have on the use and management of scarce resources, in this case, water. Rules or criteria may be established under law or regulation to govern the use of such scarce resources to resolve competition and conflict among individuals.



# Conservation of mangroves and marine biodiversity in Maharashtra



Theme: Resilience  
Published in August 2021

## Summary

The Western state of Maharashtra, with a coastline of 720 km, has 32,000 hectares of mangroves and a third of this is in the metropolitan city of Mumbai and its suburbs. In January 2012, the State Government of Maharashtra set up the Mangrove Cell to protect and conserve the mangrove ecosystem of the state. Despite initial problems like staff shortage and financial constraints, the Mangrove Cell successfully protected the state's mangrove forests, which led to an increase in the mangrove cover of the state (from 186 sq. km in 2013 to 320 sq. km in 2019). The Mangrove Cell also partnered with external agencies such as UNDP-GEF and GIZ to implement various mangrove and marine conservation activities in coastal Maharashtra (from 2012-13 to 2017-18).

To ensure the sustainability of its mangrove protection efforts and marine biodiversity conservation initiatives (started under the UNDP-GEF and GIZ projects), the Mangrove Cell created the Mangrove and Marine Biodiversity Conservation Foundation of Maharashtra (also known as Mangrove Foundation). The Mangrove Foundation was set up in 2015 with a corpus of around USD 15 million which was increased to USD 70 million in 2020-21. From the interest generated in its corpus, the Mangrove Foundation finances the conservation of the state's mangroves, two marine protected areas and a host of marine conservation programmes.

**320 sq. Km Mangrove Cover in the state of Maharashtra**  
**Sonneratia alba State Mangrove Tree -**  
**First coastal state in India to declare a state mangrove tree species to enhance conservation**

## Results

The Mangrove Cell and Foundation have implemented various mangrove and marine biodiversity conservation and protection initiatives such as the following,

- **Mangrove protection:** To check and prevent the destruction of mangroves, regular patrolling of mangrove areas is undertaken by the Mangrove Cell. This has led to the registration of numerous offences and seizure of vehicles. With almost a third of the mangrove forests in Maharashtra falling within one of the most populated metropolises of the world, Mumbai, a specialised unit called the Mumbai Mangrove Conservation Unit was established under the Mangrove Cell to check and prevent encroachment and mangrove destruction in and around Mumbai.



Photo by Joel Vodel on Unsplash

- Many illegal structures which had cropped up on mangrove lands in various areas of Mumbai, have been removed/demolished by the Mangrove Cell (more than 5000 structures). Also, the Mangrove Cell is in the process of constructing a compound wall (around 4.85 km in length) in some of the sensitive mangrove areas in the city which will help put an end to encroachment in these areas.
- **Mangrove afforestation:** Thousands of saplings have been raised in 12 mangrove nurseries for establishing mangrove plantations in different coastal districts of the state. From 2012-13 to 2020-21, a total area of about 1819 hectares, in over 120 locations across coastal Maharashtra, has been covered under the mangrove plantation programme and more than 8.3 million mangrove saplings have been planted.
- **Implementation of two externally funded conservation projects:** The Mangrove Cell, with the help of the Ministry of Environment, Forest and Climate Change (MOEFCC), implemented the United Nations Development Programme (UNDP)'s Global Environment Facility (GEF) project in the district of Sindhudurg from 2012-13 to 2017-18 and an Indo-German collaboration project, supported by GIZ and MOEFCC in Thane creek and parts of coastal Ratnagiri from April 2014 to April 2017. Through the UNDP-GEF Sindhudurg Project, the Mangrove Cell addressed a wide range of interconnected conservation issues, from the sustainability of coastal fisheries and conservation of endangered species to the development of sustainable livelihood initiatives. Under the GIZ project, the Mangrove Cell took up conservation issues, particularly in Thane creek (one of the biggest creeks in Asia) and in parts of coastal Ratnagiri. It developed a state-of-the-art coastal and marine biodiversity interpretation centre at Airoli (a suburb of Mumbai).
- **Work of the Mangrove Foundation:** The Mangrove Foundation, set up in 2015, functions under the aegis of the Mangrove Cell, Maharashtra Forest Department and provides financial support to most of the mangrove protection and conservation activities. The Mangrove Cell undertakes the implementation of various sustainable livelihood development programmes for local communities in the coastal districts of Maharashtra. Apart from this, the Mangrove Foundation also coordinates and finances the sea turtle and other marine protected animal conservation programmes in the State. It also commissions/conducts research activities, awareness programmes and capacity-building activities related to the conservation of mangroves and marine biodiversity of the state.
  - Since 2017, the Mangrove Foundation has been implementing a Government of Maharashtra scheme titled Mangrove Conservation and Livelihood Generation in the coastal districts of the state. Under this scheme, local communities have been supported with sustainable livelihood activities (mainly mangrove and estuarine conservation-related aquaculture activities such as mud crab and oyster farming, fish cage culture, ornamental fish culture and ecotourism initiatives). Presently the scheme is being implemented in about 120 coastal villages, with women being key drivers of these programmes. This scheme has been successful in garnering the support of the local coastal communities for mangrove and marine conservation issues, and since 2019 a revenue of more than INR 9.1 million (USD 115,222) has been generated by local communities through the livelihood activities mentioned above.
  - The Mangrove Foundation also carries out capacity building and training programmes, mainly for the village beneficiaries who are part of the various livelihood activities.

- The Foundation also conducts awareness and outreach programmes for sensitising different groups in the community regarding the conservation of coastal and marine biodiversity.
- The Mangrove Foundation has collaborated with various research organisations such as Bombay Natural History Society, Institute of Wood Science and Technology, Salim Ali Centre for Ornithology and Natural History, Wildlife Institute of India, Dakshin Foundation, Indian Institute of Space Science and Technology, ICAR-Central Marine Fisheries Research Institute and ICAR – Central Institute of Brackish water Aquaculture to carry out various research projects on different aspects of coastal and marine biodiversity.
- The Maharashtra Forest Department has been carrying out the Olive Ridley Sea Turtle Conservation Programme in coastal Maharashtra since 2002-2003, and from 2018 onwards, the Mangrove Foundation has lent technical and financial support to this programme. Also, the Mangrove Foundation has established a sea turtle transit and treatment centre at Airoli for treating stranded sea turtles along the coast of Mumbai. Similar centres are being developed in other parts of coastal Maharashtra by the Foundation.
- The Mangrove Foundation has also collaborated with the State Fisheries Department to run a compensation scheme wherein fisherfolk cut their fishing nets to release entangled protected marine species like sea turtles, dolphins, and whale sharks in lieu of receiving compensation from the Foundation for the damaged fishing nets. Until now, more than 200 fisherfolk have been compensated under this scheme and more than INR 3.3 million (USD 41,786) has been released as compensation, overall. 171 sea turtles, four dolphins and porpoises, 30 whale sharks and four guitarfishes have been safely returned to sea.

### Next steps

- The Mangrove Cell and Foundation will continue its mangrove protection and afforestation programme across Maharashtra, which will help secure the presently degraded mangrove areas in the state.
- The sustainable livelihood programme will be scaled up so that by the end of 2025, about 200 villages may become a part of this scheme.
- Development of sea turtle treatment and transit centres in coastal districts of Raigad, Ratnagiri and Sindhudurg will lead to better management of stranded sea turtles along the entire coast of Maharashtra (since Airoli in Mumbai and Dahanu in Palghar already have functional transit centres).



Mangroves, coastal and marine biodiversity conservation requires an integrated approach and substantial financing. The Mangrove Foundation, which complements the ongoing mangrove protection efforts, has enabled a broader approach that blends ecosystem conservation while supporting alternative livelihood programmes for hundreds of coastal communities along Maharashtra coast.

**Virendra Tiwari,**  
APCCF Mangrove Cell & Executive Director Mangrove Foundation

### Enabling conditions

- The State Government of Maharashtra, acting on the orders of the Bombay High Court, created a dedicated unit of the Forest Department - the Mangrove Cell - to protect and conserve the mangrove forests of the state.
- Along with the protection of mangrove forests, the Mangrove Cell also assumed the responsibility for the conservation of the coastal and marine ecosystems in Maharashtra.
- The Mangrove Cell was able to leverage networks within the government to enter into agreements with external agencies such as UNDP-GEF and GIZ, which allowed the Mangrove Cell to implement various innovative and landscape-level conservation initiatives for mangroves and marine biodiversity in the State.

- Partnerships with organisations and expert institutions developed under externally aided projects have helped in continuing conservation efforts taken up by the Mangrove Foundation.

### Key lessons learned

- In the past, conservation of mangroves and coastal and marine biodiversity was not one of the topics of focus in the conventional framework of managing forests in the country. Since the management of these ecosystems requires specialised knowledge and expertise, the formation of the Mangrove Cell has led to more effective management of mangroves and marine ecosystems in the state.
- In the Mangrove Foundation, dedicated teams have been created to carry out the tasks of research and capacity building, livelihood development initiatives and awareness and outreach programmes that support the overall goal of conservation of mangroves and coastal and marine biodiversity.



# Participatory springshed development in Nagaland

Theme: Resilience  
Published in September 2020



## Summary

Most of the villages in Nagaland, a state on the far eastern side of the Indian Himalayan Region, are perched on hilltops. Communities in these villages rely on natural springs for their domestic and agricultural activities. With an exponential increase in population since the 1980s and the corresponding increase in anthropogenic activities compounded by climate change, these mountain springs are drying up fast, leading to severe water shortages in many villages.

To tackle this, in 2016, the state's Department of Land Resources initiated a pilot project in 11

sensitive villages on community-led springshed development. The project aimed to rejuvenate drying and dying natural springs through recharge of the underground aquifers by employing appropriate engineering, vegetative and social measures. The efforts led to quantifiable increases in the discharge of springs in all the sites in subsequent years, benefitting the local population.

In partnership with various agencies, the state is applying the experiences and learnings obtained from the project in other villages with critical water issues.

This project was one of the recipients of **Earth Care Awards 2019**, a joint initiative of the JSW Group and the Times of India Group.

## Background

The mountainous topography and rapid changes in climatic zones over small distances makes Nagaland one of the most climate-sensitive regions in India. Recent indicators of climate change in the region include warmer summers, irregular but high intensity rainfall, unpredictable snowfall in some areas, increase in the number of pests like locusts in the fields and lesser number of migratory birds.

Most of the villages in Nagaland are located on hilltops and people are largely dependent on natural springs and ponds for their domestic and agricultural water requirements. But the impacts

of rainfall variability caused by climate change and diverse developmental activities have jeopardised the perennial flow of springs. Scarcity of water along with poverty and limited options for alternative livelihoods threaten to further reduce the resilience and increase the vulnerability of the people to cope with extreme climatic events.

**Participatory springshed development is one of the most effective strategies to address the growing demand of water and strengthen communities' resilience to the impact of climate change.**





Photo by Anindam Sahaen-Ungphasi

During 2016-17, the Land Resources Department (LRD) of Nagaland launched a pilot project on participatory springshed development in 11 villages that were experiencing critical water issues. These villages were selected from the ongoing watershed project of the Pradhan Mantri Krishi Sinchayee Yojana - Watershed Development Component (PMKSY-WDC), Government of India in technical collaboration with the People's Science Institute (PSI), Dehradun. The goal of this initiative is in line with Sustainable Development Goal (SDG) 6 - Ensuring availability and

sustainable management of water and sanitation for all.

Intervention included undertaking a detailed hydrogeological study of the watershed, identification and demarcation of the recharge zone/s and construction of a series of appropriate engineering structures along with vegetative measures in the recharge zone. Formation of strong Village Level Institutions (VLI), participation of communities (particularly, women) and communication strategies for knowledge dissemination have all played an instrumental role in the success of the project.

### Objectives

- To identify and revive drying springs through recharge of the underground aquifers by employing appropriate engineering or vegetative measures with involvement of the community.
- To increase the availability and improve the quality of water.
- To create awareness and build capacity among the stakeholders on conservation and management of natural springs to cope with the impacts of climate change.

### Results

- Rejuvenated springs in 11 villages, which resulted in increased spring discharge and increased availability of water during the lean season.
- Achieved reduction in incidence of waterborne diseases through constant monitoring of water quality to ensure sanitary protection of the springshed recharge area.
- Generated seasonal water quality data and hydro-geological data of the region which will be used in further research studies.
- Empowered local institutions towards governance of water resources in a sustainable and equitable manner.
- Established a robust community-based coping mechanism against climate change.
- Documented experiences and lessons learned which are being replicated in other villages.

### Way forward

Following the success of the project, the following initiatives were launched later,

- An Action Research project - Water Security through Community-based Springshed Development in the IHR, jointly with PSI Dehradun and WWF India under the National Mission on Himalayan Studies (2017-18)
- Springshed-based watershed development programme, funded by National Bank for Agriculture and Rural Development (NABARD) in nine watersheds in Nagaland (2018-19)

- Springshed Convergence Programme – Multi-stakeholder Initiative to Provide Drinking Water Security through Springshed Management in 100 villages in rural areas of Nagaland – a joint initiative of Land Resources Department, Rural Development Department, North East Initiative Development Agency (NEIDA), Tata Trusts, PSI Dehradun, ACWADAM Pune and Arghyam Bangalore (2018-19)

Out of around 71,000 natural springs in the state, communities are dependent on about 7,000 springs. An inventory of 2,394 springs covering both physical and water quality parameters (2017-18) was created.

### Enabling conditions

- Strong advocacy by the Government of India in water conservation and efficient utilisation has enabled PMKSY-WDC to fit in very well with the springshed development pilot project.
- Successful public-private partnership between Land Resources Department (LRD), representing the Government of Nagaland and PSI Dehradun has contributed towards technical collaboration.
- PSI Dehradun has provided capacity building and technical support to the field functionaries and village-level Institutions.
- LRD has a strong rapport with other stakeholders in the state.

### Challenges

- Springshed development involves significant vegetative measures including planting of trees and grasses. Erratic rainfall and animal/human factors have seriously impacted the expected biomass productivity and output. Partial reseeding and gap-fillings were done in the subsequent season.
- Some of the springshed sites were prone to landslides. Local knowledge and technical know-how of the partner organisations helped in the identification and avoidance of such hazards and minimised the risks.

### Key lessons learned

- Purposeful participation of local communities in projects is key to the sustenance of natural resources.
- Communities' contributions towards the project in the form of manual labour or locally available materials were crucial in building a sense of ownership.



# Odisha undertakes cross-sectoral analysis to formulate a climate budget, a first by an Indian state



Theme: Climate finance  
Published in March 2021

## Summary

Odisha, a coastal state in eastern India, is a disaster-prone region and witnesses climate change-induced events such as tropical cyclones, floods and water stresses almost every year. The state is also home to a population who are dependent on coastal livelihoods, thus making them more vulnerable to weather extremes. To address the issue of climate change, Odisha formulated its State Action Plan on Climate Change (SAPCC) in 2010, which was revised for the period of 2018-23 and is under implementation.

As desired by the Government of India, this report was again revised for 2021-30 as per the commitments made in the SDG-NDC Report submitted by the Government of India to UNFCCC

to achieve the 2030 targets. However, public expenditure has not received significant focus in the Indian context and budgetary allocation and spending on climate change issues remain a challenge. To overcome this, the state of Odisha undertook a rigorous cross-sectoral analysis to come up with a Climate Budget for the Fiscal Year (FY) 2020-21.

The aim of this is to keep track of the government expenditure made for climate change and to support mitigation and adaptation actions to address climate change. Odisha became the first state in India to make such a public disclosure and acknowledge the need for identifying sectoral scheme level/budgetary needs and mainstreaming climate change into the state's budget.

## Background and key activities

Climate budgeting was preceded by a comprehensive budget coding exercise across the 11 priority sectors identified under the SAPCC. Instead of the Industries and mines sector, the Panchayati raj and rural development sector is taken into consideration.

In step one, the climate relevance of public expenditure was analysed. While in step two, the vulnerability of public expenditure to future climate impacts was studied. It was observed that there are schemes in every sector which provide greater climate benefits relative to others while also being sensitive to climate impacts. Hence, relevant design considerations are required to ensure that the benefits are not at risk. Similarly,

schemes which are low in providing climate benefits might also be low in sensitivity, which could again call for design changes for accruing greater benefits at lower risk exposure. This could help states draw greater benefits out of schemes which are more tolerant of climate impacts. Dual analysis combined with facilitating effective design changes could also provide a holistic view of where the current climate preparedness stands vis-à-vis future requirements.

A Phased Climate Change Impact Appraisal (CCIA) study was conducted with technical support by the Climate Change Innovation Programme (CCIP). 11 stakeholder departments were taken into consideration.



Photo by P. K. Picture world on Unsplash

- **Phase 1 - Climate Change Relevance Share (CCRS):** This phase looked at the assessment of how benefits from development programmes contribute to improving climate change resilience. This helps the state government to identify priority schemes/programmes in each department to focus on climate-related planning. It also helps to identify the schemes most relevant to climate resilience planning.
- **Phase 2 - Climate Change Sensitivity Share (CCSS):** This phase focussed on understanding how programme benefits are likely to be impacted by climate change itself in the absence of climate change specific planning interventions. This helps in identifying the components of schemes/programmes which are more vulnerable and need additional support in terms of technical or financial intervention to further augment climatic relevance of the programme.

## Results

- The importance of undertaking an analysis of public expenditure in sectors critical for achieving Odisha's climate response agenda stems from the need to secure development benefits of large-scale funding programmes from potential future losses that climate change would exacerbate.
- The result of the phased CCIA analysis highlighted two major dimensions of programme-level linkages with climate change,
- How benefits from development programmes contribute to improving climate change resilience, and
- How programme benefits are likely to be impacted by climate change in the absence of climate change specific planning interventions.

A brief analysis of the top ten schemes (by budgetary allocation) has been presented in every sector on their relevance and sensitivity levels, indicating the scope for realignment over a significant portion of the department's expenditure. Additionally, all the schemes analysed have been ranked based on their CCRS for the purpose of prioritisation by policymakers at the time of budget allocations to ensure maximum climate as well as welfare benefits.

## Enabling conditions

- A paper presented by Odisha Climate Change cell on Odisha's Climate Finance Framework in 2019 was approved by the Joint Secretary, Climate Change Division of the Ministry of Environment, Forest and Climate Change (MoEF&CC), Government of India.
- Being a milestone event in the history of Odisha Climate Change cell, it aided in the incorporation of Odisha's climate budget as an individual chapter in the state budget for the first time in FY 2019. Subsequently, separate climate budget documents were prepared and published in FY 2020-21 and 2021-22.
- The Revised Budget for FY 2019-20, the expended budget for FY 2020-21 and the estimated budget for FY 2021-22 were taken into consideration while preparing the climate budget document for FY 2021-22.

## Challenges

- Coordinating data compilation with the help of all the stakeholders was initially a challenge for the state.
- It was difficult to identify and tag programmes and schemes to climate relevance and sensitivity. Several rounds of discussions followed by interactive workshops conducted by the Odisha Climate Change cell, Forest and Environment Department helped the budget coding exercise.

## Key lessons learned

- Using the phased CCIA approach, the CCRS and CCSS scores of the different schemes with different degrees of relevance and sensitivity to climate change can be compared within each sector.
- Integration of a simple yet relatively objective budget coding template with departmental budgets would be the way forward for the state if it were to measure the climate relevance and sensitivity of its expenditure.
- Internally, this would facilitate greater effectiveness of public expenditure not only in delivering welfare but also significant climate adaptation or mitigation benefits without much additional effort towards planning.



# Tripura Bio-villages: An intersection of sustainable development, climate change mitigation and climate adaptation



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## Summary

Tripura is one of the north-eastern states of India, part of the 'seven sister states'. It is geographically the third smallest state with around 75% of its population relying predominantly on agriculture and allied sectors.

With the intent to facilitate the sustainable development of agriculture and allied sectors in the state, the concept of 'Bio-Village' was first introduced by the Directorate of Biotechnology, Government of Tripura in 2018 with the primary objective of promoting organic farming. However, as the initiative evolved, components such as biogas, improved breed of livestock, solar-powered agricultural equipment and energy-saving electrical devices were included to broaden the scope of the project in order to make it climate-smart.

With the fundamental goal of providing sustainable livelihood and food security, the bio-village project largely aims to ensure holistic socio-economic development among the rural communities through the application of climate-friendly technologies focusing on both mitigation and adaptation. Project components like solar-powered agricultural equipment, energy-saving electrical devices, biogas and biofertilizers are supporting climate mitigation at the local level. Similarly, components like improved livestock breed and temperature tolerant mushroom cultivation are ensuring a better adaptation to the changing climate. The project also aims to demonstrate compatible sustainable technologies that can also be replicable in other villages within the state.

**500+ households have been benefitted**

## Objectives

- Promote green technologies like solar water pumps, biomass cookstoves and biogas plants for sustainable production of agricultural and allied sector-related products
- Enhance the socio-economic condition of small and marginal farmers with the application of simple biotechnological interventions like biofertilizers, biopesticides and mushroom spawn cultivation
- Enhance the livestock component by providing improved breeds of animal resources
- Build capacities of the local communities in the bio-villages through skill and knowledge development



The success of the project is based on four pillars - participation of the whole family in the project, skill development and building confidence, use of the right technology and regular monitoring and providing technical assistance.

**Anjan Sengupta,**  
Senior Scientific Officer, Directorate of Biotechnology, Tripura

### Background and key activities

The bio-village project comprises multiple components as indicated in the table below. These components are further categorised into two types - Common components and Additional components. The selection of these components for each village is primarily done in a collaborative consultative process with the panchayat. For each village, some of the below-mentioned components are clubbed together as common components, to be provided to each household, who are designated as beneficiaries. In the case of additional components, another bunch of components are selected from the remaining list, where each beneficiary is allowed to make their selection in accordance with their needs and availability of resources.

A financial limit of INR 33,000 (USD 418) per household has been fixed for the communities. They have to select their project components within this limit. Hence, in a nutshell, one of the key highlights of the project is the provision of project components selected by the communities as per their aspirations, rather than being directed by the government.

- Biotech Kit including sprayers, bio-fertilizers, bio-pesticides, bio-fungicides and yellow sticky trap
- Energy-saving electrical devices
- Animal resource component - improved breed of goats, pigs, ducks and chicks
- Mushroom cultivation unit
- Bee keeping unit
- Biogas unit
- Solar water pump
- Biomass cookstove
- Fish fingerlings and feed material
- Water purification system

The key stakeholders involved in this project are broadly the rural communities and government departments. The departments associated with this project are the Department of Agriculture, Animal Resource Development Department, Directorate of Horticulture, Fishery Department, Energy Efficiency Services Limited (EESL), Tripura Renewable Energy Development Agency (TREDA) and College of Fisheries, Tripura. During the implementation of the project, the rural communities obtain benefits in terms of technical resources, financial support and capacity building.

A few examples of technical support provided during the project are dish fingerlings and feed materials provided by the Fishery Department and solar-based equipment and biogas units provided by TREDA.

This emphasises an important aspect of their project where the government focuses on providing project support, while it is the communities that derive the direct benefits from their selection of components. This brings a wider citizen-focused approach to the initiative.

## Results

- A total of nine bio-villages have been planned, out of which five bio-villages have been completed and four are in the implementation stage. Besides this, two additional bio-villages are currently in the pipeline.
- The project has benefitted more than 500 households.
- The project has shown significant impact in terms of improvement of soil nutrient condition and pollination status. The project has also reduced the use of synthetic fertilizers, fossil fuels and firewood.
- The project has led to an approximate increase in the monthly income of the beneficiaries by INR 5500 (USD 70) per month per household.
- The local farmers have learned simpler new techniques like mushroom cultivation, installation and maintenance of biogas units and bio-composting. It also strengthened the decision-making, marketing and team-building skills of the beneficiaries.
- The adaptation aspect of the project will reduce the impact of climate change on vulnerable communities. While the mitigation aspect of this initiative would ensure carbon neutrality in the longer run.

**INR 5500 (USD 70) economic benefit per month per beneficiary household**

## Key lesson learned

One of the most important factors that lead to the success of an initiative like the bio-village is the wider acceptance and participation by the rural communities. After recognising the needs of the people, this project has provided innovative, climate-friendly solutions to address those needs, besides improving the quality of life for the rural community.





# Way forward

India's road to net zero has the potential to ensure climate emissions are curbed, without leaving anyone behind.

The tremendous leadership shown by Indian states over the years is a testament that collective collaboration is key to climate action. **The case studies showcased in this compendium, highlight the role of regional and tailored climate action initiatives and commitments in fortifying Government of India's national ambition.** Such efforts at subnational level will also be key in determining the trajectory and pace needed towards realising the country's net zero targets.

**The Under2 Coalition is the largest global network of state and regional governments committed to reducing emissions in line with the Paris Agreement.** With more than 260 subnational governments worldwide, the Coalition enables states to enhance their climate action ambition and showcase the leadership toward climate change mitigation and adaptation. With a focus on cross sectoral and multi-stakeholder collaboration, Climate

Group in India is bringing together governments, businesses, civil society, funders/ philanthropies, and sectoral experts to encourage leadership on climate change in the region.

Due to India's diverse geography the impacts of climate change are varied in different areas of the country. Through the Under2 Coalition's wide network of subnational governments and key organisations, we have been able to promote, global peer to peer learning, knowledge exchange and capacity building of Indian states. These are fundamental to our subnational strategy in the region working across the length and breadth of the country and support the country to achieve its Nationally Determined Contributions (NDCs). **A just and equitable transition is imminent for India to achieve its net zero target and subnational climate action is pertinent in fostering this transition.**



Opportunities are galore in India when it comes to leveraging the climate action momentum at the state level. Access to information on policy action across geographies, platforms for peer learning and showcasing leadership, strengthening capacities (technical and financial) are key levers in supporting long-term climate strategies of Indian states. Under2 Coalition is exactly doing that and is a global call to action for regions to up the ante and showcase bolder climate leadership.

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