Building Resilience

Top 15 Solutions for a Climate Resilient Kerala

SUS TERA

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EDITION 01
This is the inaugural edition of the 'Top Solutions Book,' which will continue to evolve in response to the ever-changing landscape of future uncertainties in the state of Kerala.

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Foreword

Climate change is **THE** biggest challenge of our time. Floods, cyclones, storm surges, droughts, heatwaves and wildfires are stripping off lives, livelihoods, and our delicate natural ecosystems at a rapid pace. While scientists like me call for urgent climate change mitigation by reducing carbon emissions and concurrent adaptation efforts, decades of negotiations show a world that has not acted in unison.

We find ourselves at a crossroads, where the luxury of time has evaporated. We can no longer afford to wait for the world to conclude its negotiations while our roofs are blown away by cyclones or our homes are submerged by rising seas and relentless rains. Where do we go from here? Are we doomed? Can individuals make a difference, and will their actions matter in the grand scheme of things? Can communities band together to effect change and mitigate the impacts of climate change? These questions weigh heavily on our **collective conscience**. It is with this profound sense of urgency and the desire to empower individuals, communities, and policymakers that this book, "Top 15 Solutions for Climate Resilient Kerala," comes to life.

This book serves as a **beacon of hope** and a **call to action**, and has the potential to save lives and livelihoods. It provides practical insights, actionable steps, and case studies that can guide individuals, communities, and policymakers in the battle against climate change. As a climate scientist, I am always in lookout for practical solutions to the myriad of climate change issues, and this book is a sure-shot reference for scientists like me, as much as it is for anyone else out there. It provides insights into what an individual can do to reduce carbon footprint, embrace local adaptation measures, and help build a climate-resilient future, involving the youth and local communities. In fact, the Intergovernmental Panel on Climate Change (IPCC) calls for **"collective climate action"** to adapt and mitigate the impacts of global warming.

DR. ROXY MATHEW KOLL
Climate Scientist,
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The top solutions laid out in this book are solutions that have already been worked out and have found merit in addressing the climate change issues that we are facing. We can tailor these solutions to suit our local environment and scale it up to address the complex and overwhelming nature of climate impacts. One aspect of this book that resonates deeply with me is its focus on an often-overlooked aspect—mental health. It highlights the need to address the psychological impacts of climate-related disasters and stresses the importance of building **mental resilience** among individuals and communities. Climate action is not just about physical changes; it's also about the emotional well-being of those affected.

With **15 practical solutions** laid out with case studies, examples and ways to engage, this book is actually empowering you and your local community to take action now. By doing that, **YOU** become the solution to address climate change impacts. Why not try some or all of them—and save lives and livelihoods around!

- Dr. Roxy Mathew Koll

Executive summary

This book highlights the critical importance of building resilience in the face of a changing climate and emphasizes the pivotal role of youth engagement in driving climate action. The solutions outlined in this guide are carefully selected based on their potential impact and relevance to Kerala's unique context. The compilation of these solutions is the result of a collaborative effort between participants of the Climate Leadership Program in Kerala and expert consultations with professionals from various fields across the state. This inclusive approach ensures that the solutions reflect local stakeholders' perspectives, experiences, and expertise, fostering a sense of ownership and relevance within the Kerala context.

Recognizing the need for early warning systems, this book advocates for installing more local-level weather stations to enhance the accuracy of forecasts and improve disaster preparedness. It explores the potential of utilizing the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) for ecosystem restoration projects, which address climate challenges and generate employment opportunities.

This book emphasizes the promotion of climate entrepreneurship, encouraging innovation and job creation while solving climate-related issues. It underscores the significance of prioritizing funding for climate adaptation and resilience projects, ensuring Kerala's sustainable and resilient future. The conservation of paddy wetlands is highlighted as a robust solution, preserving biodiversity, providing food security, and reducing vulnerability to climate impacts. Scaling up decentralized rooftop solarization is recommended to enhance renewable energy adoption, reduce carbon emissions, and improve energy access. The guide emphasizes the importance of strengthening climate governance at local government institutions, promoting effective decision-making and policy implementation.

Education plays a crucial role, and the inclusion of climate change and sustainability as core subjects in schools is proposed to empower the youth and foster a culture of sustainability. This book also emphasizes the need for sustainable transportation, last-mile connectivity, solid waste management, and climate-resilient and green infrastructure development.
Addressing the psychological well-being of climate refugees and displaced populations is essential to climate resilience. Furthermore, this book highlights the untapped potential of Kerala's youth in driving climate action, calling for their active engagement in implementing the proposed solutions.

This book provides practical insights, actionable steps, and case studies to guide individuals, communities, and policymakers in combatting climate change. By embracing resilience and engaging the youth, Kerala can pave the way for a sustainable and resilient future, setting an example for other regions facing similar challenges.

Introduction

In a world grappling with the challenges of climate change, it has become increasingly evident that addressing this global crisis requires collective action and collaboration. In this comprehensive guide, we will explore the unique aspects of Kerala and delve into the strategies and initiatives that can help the state build resilience, mitigate climate change impacts, and create a resilient future. Kerala, known as "God's Own Country," is blessed with rich natural capital and a diverse ecosystem that sustains a significant population. However, recent extreme weather events, such as heavy rainfall, floods, and landslides, have highlighted the urgent need for enhanced actions to holistically address climate change vulnerabilities and risks. Despite having an outstanding record in the Human Development Index (HDI) and Sustainable Development Goals (SDG), within India, Kerala remains highly vulnerable to multiple natural hazards.

One of the critical strengths of Kerala lies in its ability to engage and mobilize its youth. The document emphasizes the crucial role of youth in driving climate action and finding innovative solutions to combat climate change. Kerala can harness their energy and enthusiasm to create a sustainable and resilient future for the state by empowering the youth and providing them with the necessary tools and platforms. Furthermore, the document recognizes the importance of mental health in the face of climate change. It highlights the need to address the psychological impacts of climate-related disasters and stresses the importance of building mental resilience among individuals and communities.

Resilience and disaster preparedness are critical components of Kerala's State action plan on climate change. This document emphasizes the importance of investing in adaptation measures that enhance the state's ability to withstand and recover from climate-related events. By focusing on building resilience, Kerala can minimize the impacts of climate change on vulnerable communities and infrastructure. Eco-restoration is another robust solution highlighted in the document. Kerala can enhance its natural capital and promote biodiversity conservation by recognising the importance of preserving and restoring ecosystems. The state can contribute to global efforts in mitigating climate change through local innovation and the promotion of affordable clean energy technologies. By establishing linkages at national and international levels, Kerala's climate action can serve as a conduit for coordination between various stakeholders, fostering collaboration and knowledge exchange.

This document has been specifically created to guide Kerala's youth and ordinary people on 15 solutions for climate change. The solutions presented in this guide have been carefully ranked based on their importance and potential impact. The aim is to simplify the complex challenges of climate change and provide actionable steps individuals can take to implement these solutions daily. By strongly emphasising youth engagement, the document recognizes the transformative power of the younger generation in driving climate action. It empowers them with knowledge, tools, and practical strategies to actively contribute towards creating a sustainable and resilient future for Kerala. Through the collective efforts of the youth and ordinary people, these solutions can be effectively implemented, making a significant impact in combating climate change and building a better tomorrow for generations to come.

Contents

01 LOCAL WEATHER STATIONS TO ENHANCE EARLY WARNING SYSTEMS

The urgent deployment of localized automatic weather stations across Kerala is more than a technical necessity; it can be a lifesaver. This will enable the much-needed hyperlocal weather forecasting and even nowcasting. With real-time, site-specific data, local governments and farmers can anticipate heavy rainfalls or natural calamities, shifting from mere reaction to proactive preparedness and building resilience.

WHY?

Since 2018, phrases like "red alert," "orange alert," and "yellow alert" have become part of the daily lives of Keralites. The Indian Meteorological Department and local disaster management agencies have been broadcasting these rain alerts, and most of us have been tuning in to stay updated.

Thanks to technological advancements, we can now access real-time weather forecasts at our fingertips.

But, have you ever wondered how these weather data and forecasts are obtained? The answer lies in the network of weather stations installed nationwide, although their placement is not evenly distributed. These weather stations are crucial in collecting the necessary data for accurate and reliable forecasts.

Weather patterns can vary significantly even within small geographical areas. More localized data enables meteorologists to make precise forecasts for individual communities, which can be highly beneficial in regions with diverse terrain and microclimates. Hence, the significance of having local weather stations become

evident in providing precise and more reliable weather forecast-related information.

For instance, if Kerala had more local weather stations installed across vulnerable regions, the people affected during the 2018 floods would have had a better early warning system, possibly resulting in lesser casualties and damages.

By enhancing prediction accuracy, facilitating timely response, and enabling local forecasting and decision-making, more local weather stations ultimately help build more resilient communities. They allow citizens and local governments to take proactive measures in the face of impending extreme weather events, minimizing damage and saving lives. Local weather data serves as a valuable resource for research and educational institutions. It enables scientific studies on climate change, meteorology, and environmental sciences, fostering a deeper understanding of local weather patterns and their implications.

IMPACT OF SOLUTION

Community engagement

Setting up and maintaining weather stations can foster community involvement and education, cultivating a community that is more knowledgeable about and engaged with local weather patterns and related issues.

Support to local economy and planning

Improved weather predictions can benefit various sectors of the local economy, such as agriculture, tourism and construction, which depend on weather conditions. Detailed weather data can inform infrastructure planning and design, leading to more resilient and sustainable local infrastructure.

Accurate forecast allows preparedness

It will allow residents to prepare better by taking the necessary steps. One example could be - prepare an emergency kit with essential supplies such as food, water, medications, flashlights, and batteries. It reduces risks, optimizes resource utilization, and enhances overall community resilience to climate-related hazards.

CO-BENEFITS

- Ensuring open access to this data democratizes information and helps academic explorations, fostering a generation of college students to delve into dissertations and research with real-world implications.

- Accurate data can educate students and young professionals about climate variability, early warning systems and the impact of climate change on our economic activities.

- Local farmers can utilize precise weather data to optimize irrigation, planting, and harvesting schedules, improving agricultural productivity and sustainability.

- Long-term data collection of weather variations and accurate data helps the government and climate experts to prepare for future climate challenges and disaster management plans.

1

COMPREHENSIVE REASSESSMENTS

Conducting a comprehensive reassessment/study by competent authorities and organizations to identify regions most vulnerable to extreme climate-related events, such as settlements near floodplains and landslide-prone areas. These assessments should be regularly updated to incorporate new findings and data.

2

INSTALLATION SUPPORT

Creating collaborative partnerships among stakeholders, including citizens, research institutions, local NGOs, and state and central governments, to identify suitable locations and accurately install automated local weather stations. This maximizes their efficiency in predicting weather forecasts correctly.

3

CROWD SOURCING AND CITIZEN SCIENCE

By adopting a participatory approach and empowering local governments through capacity and resilience building, we can promote the utilization of weather monitoring apps or platforms. These tools enable individuals to report and share weather data from their local areas.

4

COLLABORATION WITH EDUCATIONAL INSTITUTIONS

Supporting educational institutions to enhance weather-related information across the state can foster collaboration with existing weather networks or platforms to contribute to a broader data network, enabling better forecasting and overall improvement in weather-related services.

5

FUNDRAISING AND SPONSORSHIP

Initiate fundraising campaigns or seek sponsorship from local businesses, organizations, or government entities to secure funding to purchase and install weather monitoring equipment.

6

COMMUNITY WEATHER DATA

Local residents can be trained to track weather conditions, especially during critical weather events. This real-time, ground-level data can supplement official forecasts and alerts and provide valuable local context.

In conclusion,

Installing more local weather stations and engaging the local community in collecting weather data will significantly impact improving regional or local weather forecast-related information, aiding in disaster management and enhancing our understanding of the changing climate. These stations will help farmers, governments, and communities take immediate steps to minimise the damage from weather changes, and over time, researchers can use regional or local weather-related information to improve the accuracy of their forecasts and help make farming more resilient to the impacts of climate change.

💬 Painting the picture

Raghav, a young climatologist and data expert, teamed up with Nayana, a passionate farmer, and their local NGO to develop a community-based data analysis and weather monitoring system. Their innovative solution empowered farmers in their panchayat to predict unprecedented rains, enabling them to take proactive measures and minimize potential losses.

02 DRIVING ECOSYSTEM RESTORATION AND NATURE BASED SOLUTIONS 3

Rejuvenation of waterbody in Vannappuram panchayat by MGNREGA members l Photo by Agnus M

Ecosystem restoration plays a key role in mitigating the impact of natural disasters. Leveraging schemes such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) for restoration and natural resource management creates employment opportunities, enhances agricultural practices, and helps mitigate disaster impact.

WHY?

Ecosystem restoration is "a process of reversing the degradation of ecosystems to regain their ecological functionality." In other words, ecosystem restoration aims to help damaged, degraded, or destroyed ecosystems recover to the point where they can provide services that the ecosystem typically provides.

In the case of Kerala, wetlands, marine ecosystems, forest ecosystems and high mountain ecosystems play a significant role in making the state unique. E.g. mangroves, which are currently facing threats, play a crucial role in safeguarding coastal communities. It acts as a natural barrier by reducing the height and energy of wind and waves. It also serves as the breeding ground for fish, thus ensuring food security for coastal communities.

Mangrove ecosystems typically thrive in the protected coastlines of tropical or subtropical regions. However, the extent of these mangroves is rapidly shrinking in Kerala, which has a fragile ecosystem covering 12 out of 14 districts in the state.

Protecting eco-sensitive areas under threat of degradation is crucial due to various human interventions.

Thus, the need of the hour is to embark on ecosystem restoration, nature-based solutions, and conservation efforts with timely planning and the efficient use of the available resources to ensure that the lost ecosystems have ample time to recover.

MGNREGA Act was created as a social security measure, providing 100 days of employment in rural areas to build durable assets such as canals, roads, and ponds.

MGNREGA has been vital in managing and developing natural resources, including water conservation, plantation, watershed management, and ecosystem rejuvenation.

Kerala has been actively utilizing MGNREGA and has become the first state to implement significant ecosystem restoration projects. Ecosystem restoration projects.

Restoration approaches suited for Kerala include restoration of coastal biodiversity, marine ecosystems, forest and landscape restoration, agroforestry, wetlands and watersheds, and high mountain ecosystems.

Creation of job opportunities

Presents a unique opportunity for job creation, coupling economic growth with environmental stewardship. Implementing restoration projects requires a diverse workforce, including community members, scientists, technicians, and farmers, thus directly generating numerous jobs.

Enhancing food security

Healthy, thriving ecosystems are the bedrock of agricultural productivity. They provide fertile soils, pollinators for crops, natural pest control, and a stable climate. By restoring degraded ecosystems, we can improve the productivity and resilience of agricultural lands, ensuring a reliable food supply.

Natural Resource Management for Agriculture

Increasing natural resource management projects in the state can improve irrigation and prevent crop damage, thus boosting the agricultural economy and supporting farmers.

CO-BENEFITS

- The uptake in ecosystem restoration projects presents an opportunity for the government to address its priority of boosting employment in the state. By increasing the number of people employed through various employment schemes in rural and urban areas, the government can effectively tackle the dual challenges of ecological restoration and unemployment.

- It aids in preserving our natural heritage by reviving degraded habitats and fostering the recovery of indigenous flora and fauna. Thus ensuring the longevity of unique landscapes and ecosystems integral to our cultural identity and shared heritage.

- By revitalizing forests, grasslands, and wetlands, we stimulate the growth of plants that absorb carbon dioxide, an essential greenhouse gas, from the atmosphere and store it in their biomass and the soil.

1

PARTICIPATORY APPROACH

Adopt a citizen-centric approach and promote collaboration and participation in the conception and management of ecosystem restoration projects.

2

ECOTOURISM

Ecotourism can serve as a strategy to encourage ecosystem restoration work. Ecotourism draws visitors eager to experience natural beauty and biodiversity, thereby generating revenue that can be reinvested into further restoration efforts.

3

IDENTIFY RESTORATION SPOTS

Identification of ecologically sensitive areas that has been degraded or are at a risk of degradation is key for targeted conservation and restoration efforts.

4

PARTICIPATE IN CITIZEN SCIENCE

Engage in CS projects related to monitoring and collecting data on the environment, participate in biodiversity surveys, wildlife observations etc. which could provide researchers and conservationists with baseline datasets.

5

VOLUNTEER

Get involved in local restoration initiatives or join organizations working on environmental conservation. Participate in tree planting drives, wetland clean-ups, or other restoration activities and be a changemaker.

6

POLICY ADVOCACY

Advocate for stronger policies and regulations that support ecosystem restoration and conservation. Engage with local authorities, policymakers, and elected representatives to voice your concerns and promote sustainable practices.

In conclusion,

restoring ecosystems can play a crucial role in reducing greenhouse gases and mitigating the impact of natural disasters. Kerala's focus on ecosystem restoration through schemes like MGNREGA has set an example for other regions to follow. Ecosystemrest oration and conservation of natural assets are of utmost importance for our survival than ever. The IPCC's sixth assessment report (WG3) found that natural ecosystems are crucial for absorbing more carbon dioxide and reducing the effects of climate change. Ecosystem restoration is a resource-intensive strategy, but it can lead to high impact if done through incentivized systems in Kerala.

💬 Painting the picture

Realizing the importance of wetland restoration in reducing flood impacts in her village, Krithi, a 16-year-old, teamed up with local environmentalist Vinayak. With Vinayak's technical guidance and support, Krithi embarked on a fundraising campaign for mangrove restoration in her region. Their efforts were significantly boosted when Devika, the local ward member, mobilized MGNREGA workers to plant the mangroves. Over the years, the initiative gained momentum, with nearby colleges and corporate organizations from Kochi joining forces to scale up the restoration efforts.

03 BUILDING AN ECOSYSTEM FOR CLIMATE ENTREPRENEURS

Given India's demographic dividend, it is vital to offer resources and opportunities for today's youth to address climate change through innovation and entrepreneurship. Creating an ecosystem for climate and social enterprises can foster their contribution to finding solutions for climate change mitigation and adaptation while creating more green jobs.

WHY?

The youth population, considered a valuable asset, holds immense potential for entrepreneurship in addressing climate change. By providing the necessary support and opportunities, youth can become pioneers in climate enterprises, driving innovative solutions. For instance, in Kerala, a climate enterprise could focus on developing eco-friendly tourism initiatives that promote sustainable practices, raise awareness about conservation, and contribute to preserving the region's rich biodiversity and natural heritage.

In terms of adaptation, climate enterprises can provide products and services that help communities and businesses adapt to changing climatic conditions.

For instance, a company may specialize in designing and constructing flood-resistant infrastructure or developing climate-resilient crop varieties and agricultural practices. Finally, climate enterprises focused on resilience may offer climate risk assessment services, insurance products, or climate-smart technologies that enhance the ability of communities and businesses to withstand and recover from climate-related shocks and stresses.

Young people all around the globe have been at the forefront of the battle against climate change, since it is their future that is at stake.

Supporting climate enterprises fosters collaboration and partnerships among various stakeholders, including entrepreneurs, investors, research institutions, and government agencies. These collaborations create synergies, leverage expertise, and amplify the impact of climate initiatives.

Kerala Startup Mission is pivotal in supporting climate enterprises by providing incubation, mentorship, funding, and networking opportunities to aspiring entrepreneurs and fostering innovation and sustainable solutions for addressing climate change.

Green start-ups have the potential to drive economic growth that helps to reduce the educated unemployed in the state. It could also act as a catalyst for raising awareness and engaging communities in sustainable practices. By nurturing and empowering climate entrepreneurs, we can accelerate the transition towards a low-carbon and resilient future

IMPACT OF SOLUTION

Building resilience

Climate enterprises contribute to building resilience and enhancing adaptive capacity by developing solutions that help communities and ecosystems adapt to climate change impacts.

Livelihood

Green entrepreneurship can forge new paths, and enable the state to align its goals of ensuring livelihood opportunities for its growing workforce while providing meaningful solutions to pressing environmental challenges.

Partnerships

Promoting climate enterprises positions Kerala as a proactive and innovative player in addressing climate change. This can attract international organizations, investors, and development agencies interested in collaborating and partnering with Kerala-based enterprises to implement climate solutions.

CO-BENEFITS

- By becoming an innovation hub for climate solutions, the state can deploy and test various strategies, allowing it to serve as a proving ground for effective and timely solutions to tackle the pressing climate crisis.

- By fostering climate enterprises, Kerala can become a hub for knowledge sharing and learning in the field of climate change mitigation and adaptation. This can attract experts, researchers, and entrepreneurs from around the world who are keen to exchange ideas, experiences, and best practices.

- Promoting climate enterprises can contribute to Kerala's tourism sector by positioning the state as a sustainable and eco-friendly destination.

1

GREEN JOBS

Creating 'Green Jobs' through the employment guarantee schemes of the government can absorb a workforce trained in green technology. Kudumbasree can be leveraged to facilitate the transition to green jobs.

2

GREEN PROCUREMENT

A dedicated one-stop portal for purchase of green products and services can ensure market access for green businesses, facilitate networking and collaboration among buyers, sellers etc.

3

SOLUTION CERTIFICATION

Introducing government-led hallmarks, labelling, and certification for innovative green solutions can help build trust among consumers and maintain credibility.

4

ACCESS TO FUNDING

Establish dedicated funds or venture capital programs that specifically target climate entrepreneurship. Partnerships with financial institutions and impact investors, incentives such as tax breaks, subsidies can attract innovators with necessary funds.

5

MONITORING AND EVALUATION

Establish monitoring and evaluation mechanisms to track the progress, impact, and effectiveness of climate enterprises.

6

INCUBATION & ACCELARATION PROGRAMS

Enhance government-sponsored hackathons, challenges and training programs to invite innovative green solutions and promote sustainable entrepreneurship for climate and agriculture-related challenges faced by the state.

✔ In conclusion,

Promoting green entrepreneurship in Kerala can lead to the creation of new job opportunities that align with sustainability goals, address pressing climate change issues, and foster a balance between development and ecosystem conservation. The government can achieve this by creating green jobs, implementing green procurement practices, certifying innovative green solutions, incorporating sustainable infrastructure, providing incentives for environmentally-friendly practices, and fostering innovation through challenges, hackathons, and training initiatives.

💬 Painting the Picture

Haris, a 23-year-old engineering graduate, embarked on developing a hydrogen-based boat engine during his college project. With the support of the college's incubation centre, he received an initial seed funding of 10,000. As his idea gained traction, Haris connected with a development organization that provided him with 50,000 in the second stage. Further support came from the Kerala Startup Mission, which granted him 4 lakh. With the backing of an incubation organization, Haris successfully commercialized his boat engine, showcasing a robust ecosystem for climate entrepreneurs.

04 SHIFTING FOCUS: INVESTING IN CLIMATE RESILIENCE PROJECTS FOR A SUSTAINABLE FUTURE

Funding climate-resilient infrastructure and promoting climate-positive growth in Kerala is of utmost importance. It can not only bolster the state's ability to withstand the impacts of climate change but also foster economic growth and job creation.

WHY?

In light of the challenges posed by climate change, it is imperative to prioritize funding for climate adaptation and resilience projects over initiatives that may have adverse effects. The combination of unprecedented land-use changes and high population density exacerbates these challenges.

Funding climate adaptation and resilience projects involves providing financial support for initiatives aimed at helping communities adapt to the changing climate and mitigate its impacts. For instance, creating a 50-year master plan and investing in the construction of climate-resilient buildings, renewable energy systems, and green infrastructure enhances resilience, reducing the ecological footprint and ensuring long-term viability.

The constructed surfaces in urban areas are often non-porous, limiting rainwater to percolate down through them.

Similarly, an adaptation solution must be designed considering the local context to prevent maladaptation. For example, a tin house built for vulnerable communities to withstand floods may not help people cope with heat stress during the summertime.

The state government can allocate funds from its annual budget specifically dedicated to climate resilience projects. These funds can be directed towards infrastructure improvements, renewable energy initiatives, sustainable agriculture programs, and other climate-focused projects. To further encourage private entities, they can be incentivized to invest in climate-resilient infrastructure projects by offering improved revenue sharing or other attractive financial incentives. These measures not only attract greater private sector participation but also foster collaboration in initiatives that promote climate resilience and contribute to sustainable development.

e.g. Investing in green infrastructure, such as urban parks and green roofs, constructed wetlands can help mitigate the urban heat island effect. Developing climate-resilient water management systems can help address water scarcity and manage fluctuations in rainfall patterns.

Rampant exploitation of resources through mining and other activities which damages the environment should be curbed through an effective land use and environment policies and law.

IMPACT OF SOLUTION

Funding for Climate Adaptation

It will bolster the state's capacity to adapt and build resilience. This would enable vulnerable communities to cope with the impacts of climate change and avoid massive financial loss to communities.

Save costs in long term

Infrastructure is expensive to build and often incurs damage due to natural disasters and extreme events. Thus, increasing adaptation investment in making infrastructure climate resilient will significantly lower the cost of repairs and damages.

Adaptation for climate- sensitive livelihoods

Capacity building of those who are engaged in climate sensitive livelihoods to be resilient to climate shocks. Eg-Farmers having poultry or livestocks can earn a living even if the rains destroy their crops, or if provided with technologies (like post-harvest storage) they can prevent losses from unprecedented weather events.

Social and Financial Benefits

It can enhance the social-economic and environmental benefits and reduce the financial burden arising from the extreme events.

CO-BENEFITS

- Increasing investment in climate adaptation would directly translate to creation of green jobs across sectors.

- By implementing flood mitigation strategies, such as improved sanitation systems, water management, and disease surveillance, the risk of waterborne illnesses and other health hazards can be reduced, promoting better public health outcomes.

1

RENEWABLE ENERGY

Youth can advocate for and engage in renewable energy projects such as solar panels, wind turbines, and energy-efficient technologies to reduce greenhouse gas emissions and promote clean energy alternatives.

2

COASTAL PROTECTION:

Implementing measures such as sea walls, dune restoration, and beach nourishment to protect coastal areas from sea-level rise and storm surges.

3

WATER MANAGEMENT

Enhancing water storage and distribution systems, promoting rainwater harvesting, and implementing efficient irrigation techniques to ensure water availability and resilience in the face of changing precipitation patterns.

4

URBAN PLANNING AND DESIGN

Implementing climate-responsive urban planning strategies, including green spaces, permeable surfaces, and smart city infrastructure, to enhance climate resilience and improve the quality of urban life.

5

ECOSYSTEM RESTORATION

Restoring and conserving natural ecosystems, such as wetlands, mangroves, and forests, to enhance biodiversity, improve natural water retention, and provide natural buffers against climate impacts.

6

CLIMATE-RESILIENT AGRICULTURE

Promoting climate-smart agricultural practices, including precision farming, agroforestry, and crop diversification, to enhance food security, water efficiency, and the resilience of farming communities.

In conclusion,

Enhancing investments in climate adaptation and resilience projects is crucial to improve the extent of the adaptive capacity of vulnerable communities, expanding climate-resilient infrastructure, and adapting agricultural practices to climate variability. Such investments not only provide significant socio-economic and environmental benefits but also foster the development of new job opportunities across various sectors. Consequently, prioritizing climate resilience projects over high-impact development is imperative for ensuring a sustainable future.

💬 Case Study

Ini Njan Ozhukatte' is a community-driven initiative under Haritha Kerala Mission's water conservation mission. It aims to rejuvenate streams originating from the Western Ghats to preserve water quantity and quality. In the initial phase, over 1,60,805 volunteers revived 914 streams, covering 2034.60 kilometres in 820 local self-government.

05 PRESERVING VITAL WETLAND ECOSYSTEMS

Paddy wetlands in Kerala are crucial to maintaining the state's food security, mitigating floods, regulating temperature, preventing soil erosion, and much more. By acting as natural sponges, paddy wetlands help absorb excess rainfall, reducing the risk of flooding nearby.

WHY?

From the aromatic biryanis to the comforting kanji, rice is an inseparable part of our culinary culture. But did you know that the very source of our beloved rice, the paddy wetlands, hold a secret superpower? These wetlands provide us with the delicious grains we adore and play a vital role in water retention, flood prevention, and supporting diverse ecosystems.

The inherent resilience of paddy wetlands helps protect nearby communities, agricultural lands, and infrastructure from the adverse impacts of climate-related disasters, enhancing the overall climate resilience of the region.

In Kerala, paddy wetlands are extensively used for growing over 100 varieties of rice, thus, making rice an essential agricultural staple.

It is grown on vast paddy fields across the state, particularly in the **Kuttanad region, often referred to as the state's rice bowl.**

Additionally, paddy fields have air-cooling effects, retain nutrients, trap sediment, prevent soil erosion, regulate temperature, and produce oxygen. Although paddy wetlands emit methane, their positive impact surpasses the opposing side.

Paddy wetlands provide numerous benefits for the environment, community, and climate.

Paddy wetlands are crucial for flood mitigation and freshwater retention; however, they are being converted for development. Also, the state's rice production continues to dwindle.

High agricultural labour costs make rice production uncompetitive with other states, leading to more farmers selling their land for non-agricultural activities.

To combat the issue, **Kerala implemented the Kerala Conservation of Paddy Land and Wetland Act in 2008**, which regulates the development and conversion of paddy fields, protects wetland areas, and supports agricultural growth, food security, and ecological sustainability.

Additionally, the government offers Rs.2000 per hectare royalty to paddy wetland landowners. Despite these measures, conserving paddy wetlands from conversion remains challenging for the state.

Protecting paddy wetlands should be one of the top priorities for Kerala and its people!

IMPACT OF SOLUTION

Limit flooding in flood prone areas

The impact of climate change in Kerala is expected to cause more floods due to extreme rainfall. The presence of paddy wetlands in flood-prone areas can act as a natural sponge to mitigate flooding, thereby reducing socio-economic-ecological damage.

Water and weather improvement

Paddy wetlands also help in water purification and groundwater recharge, thus helping maintain the state's water security. Additionally, they significantly impact the local climate by regulating temperatures and acting as a source of oxygen.

Preservation of Cultural Heritage

By preserving paddy fields, we protect and promote the traditional seeds, farming practices, rituals, and festivals associated with rice cultivation, fostering a sense of identity and pride.

CO-BENEFITS

- If the government implements appropriate measures to prevent further conversion of paddy wetlands for non-agricultural purposes and support rice cultivation, it could create substantial employment opportunities in the agricultural sector.
- It fosters a sense of community cohesion as farmers and community members work together to maintain and sustain this important cultural and agricultural practice.

- Helps safeguard native plant species, provides habitat for wetland birds and aquatic organisms, and contributes to biodiversity conservation.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1

INNOVATIVE FINANCE MODEL

Addressing the issue of the high cost of cultivation and low returns is vital for the state to motivate farmers in the region.

2

ENCOURAGE VARIETY

Promoting rice varieties with high saline tolerance, such as Pokkali, must be encouraged. Conserve and promote the exchange of traditional rice seeds to maintain genetic diversity and preserve heritage varieties.

3

ECO-TOURISM

Diversifying paddy wetlands to incorporate eco-tourism is needed to conserve the remaining wetlands in the state.

4

AWARENESS

Conduct awareness campaigns and educational programs to highlight the importance of paddy wetlands. One solution to preserve paddy wetlands is for youth groups to adopt paddy lands in different areas.

5

COLLABORATION

To develop integrated wetland management plans, Foster collaboration between government agencies, local communities, research institutions, and non-governmental organizations.

6

INCENTIVES & RESEARCH

Introducing other incentives to aid farmers in rice cultivation and curb the conversion of paddy wetlands. Allocate resources for research and development to address challenges and identify innovative approaches for sustainable paddy cultivation.

✔ In conclusion,

the conservation of paddy wetlands in Kerala is crucial to maintaining the state's water security, mitigating the intensity and frequency of floods, regulating temperature, preventing soil erosion, and preserving the scenic beauty of the region. Although the state has taken steps to regulate the conversion of paddy fields, stringent action is needed to address the challenges paddy cultivators face. The state should also tackle the scarcity of agricultural labour and tap into the potential of eco-tourism. Regulating the conversion of paddy wetlands and promoting rice cultivation will substantially benefit the environment and creates decent-paying jobs in the agricultural sector.

💬 Painting the Picture

Aravindan, a farmer cultivating Pokkali, the highly saline-tolerant variety of rice in Kerala, faced the challenge of increased labor requirements for manual harvesting. Contemplating discontinuing the cultivation, he received valuable advice from Soumini, an environmental research student. Soumini highlighted the organic nature of Pokkali, emphasizing its higher market value and the importance of preserving paddy fields as flood absorbers. Together with a sustainable tourism company, Soumini facilitated tour programs where visitors volunteered for the harvest, and enabed Aravindan and others to sell the organic rice at four times the usual price.

06 SCALING ADOPTION OF DECENTRALISED ROOFTOP SOLARISATION

Decentralized rooftop solarization offers a promising solution to Kerala's challenges of escalating electricity costs and dependence on conventional, non-renewable energy sources. By embracing rooftop solar installations, the state can effectively reduce carbon emissions, improve energy accessibility, create green jobs, and make significant strides towards achieving carbon neutrality. Furthermore, this sustainable approach to energy generation has the potential to encourage migration towards cleaner and greener energy alternatives, supporting Kerala's commitment to a sustainable and resilient future.

WHY?

The state of Kerala heavily depends on purchasing electricity from other states, predominantly sourced from coal-fired thermal power plants. **These plants emit much more CO2, significantly contributing to climate change.**

In addition to the environmental implications, the state has a significant financial burden arising from the cost of the purchase of electricity. Electricity usage continues to rise in Kerala. As a result, its expenses are anticipated to rise, thereby adding more strain to the state's budget.

Scaling the deployment of decentralised rooftop solar panels is one of the prominent ways in which Kerala can reduce the rising electricity cost and contribute towards mitigation efforts.

Solar energy is one of the most promising renewable energy sources and has received positive and continuous support from the state and central governments. Similarly, Kerala is yet to tap the full potential of wind energy.

Expanding the share of solar energy is also beneficial for India to meet its renewable energy commitments made at COP26, Glasgow, as part of its Nationally Determined Contribution.

Kerala has made commendable progress in terms of innovation and widespread adoption of solar energy across the state. **In 2015, Cochin International Airport became the world's first airport to be fully powered by solar energy and has also motivated many other airports to shift towards solar energy.**

Decentralized solar energy can lead to cost savings for both consumers and the state. Solar power's declining costs and potential for energy self-sufficiency can reduce consumer electricity bills. Decentralised or off-grid solar power plants that are installed on rooftops or open terraces can provide electricity without being connected to the larger electricity grid.

These self-sustained systems will ensure sufficient availability of clean electricity for households and reduce the dependence on traditional energy sources that often contribute to pollution and environmental degradation.

IMPACT OF SOLUTION

Energy Resilience

By diversifying the energy mix and incorporating distributed solar systems, the state becomes less vulnerable to centralized power disruptions or grid failures.

Cost saving and self-sufficiency

As solar technology costs continue to decline, large-scale adoption can reduce electricity bills for households, businesses, and industries, improving energy affordability and reducing the energy burden on low-income communities.

Ensure reliable supply

Installing off-grid solar power plants in households can provide a reliable source of energy during summer when electricity demand is at its peak. The families then need to avoid additional shortages or load-sharing. It also reduces the dependency on hydropower stations.

Create green jobs

Adopting rooftop solar creates more green jobs by stimulating demand for solar installation, maintenance, and related services. This promotes sustainable energy and fosters economic growth and employment in the renewable energy sector.

CO-BENEFITS

- Decentralized solar systems located closer to the point of consumption reduce energy losses during transmission and distribution.

- Scaling up solar energy can reduce dependence on dams and ensure a smoother flow of our rivers, contributing to a more sustainable energy future.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1

ADDRESS CONCERNS

Address maintenance and servicing issues for rooftop solar power plants, including low power generation during the monsoon season in Kerala.

2

PROMOTION

Government has to promote RESCO (Renewable Energy Based Companies) model for installing decentralised solar rooftop systems, especially in low-income households.

3

PARTICIPATION

The government needs to involve stakeholders across all levels of governance, including LSGs (local self-governments) and panchayats to promote rooftop solarisation.

4

INNOVATION

Explore ideas for solar startups, social enterprises, or technology advancements that can contribute to scaling up solar energy deployment and address specific challenges in your community.

5

CREATE AWARENESS

Many people turn away from installing rooftop solar power plants due to concerns about efficiency and costs, making it essential to increase awareness of the benefits and ease of the installation process.

6

PREPARE FOR THE FUTURE

Incentivize private sector participation in promoting rooftop solar power plant adoption, and provide attractive remuneration for selling excess electricity to the grid. Government should try to increase competition to reduce the cost of installation, maintenance, and servicing.

In conclusion,

scaling the adoption of decentralized rooftop solar panels can help Kerala reduce its dependence on coal-powered thermal power plants, improve energy access, reduce electricity bills for households, create green jobs, and contribute to state action towards climate change. The government should focus on creating awareness, addressing maintenance and servicing issues, involving stakeholders, incentivizing private sector participation, and appreciating LSG initiatives to encourage rooftop solarization.

💬Case Study

During the devastating floods in Kerala, a house in Chengannur stood as a beacon of hope for the community. Equipped with a rooftop solar power plant, the house remained illuminated even when the electricity distribution was cut off due to the hazardous conditions. As a result, the house provided shelter to five families and served as a vital hub for communication. The solar power system allowed the refugees to charge their phones, send SOS messages, and stay connected to the outside world.

07 IMPROVING CLIMATE GOVERNANCE AT LOCAL GOVERNMENT INSTITUTIONS

Effective climate governance is essential for ensuring sustainable development and reducing the risks associated with climate change. By adopting a multilevel approach to climate governance involving inter-sectoral coordination, local government support, and dedicated funding mechanisms, Kerala can enhance its resilience to climate change while promoting low-carbon development pathways.

WHY?

Climate governance refers to the coordinated efforts, policies, and actions undertaken by these institutions to address the risks and impacts of climate change specific to the region. It entails adopting proactive measures, such as prevention, mitigation, and adaptation strategies, to tackle Kerala's climate-related challenges. Through effective climate governance, local government institutions in Kerala can play a vital role in safeguarding communities, enhancing resilience, and fostering sustainable development in the face of a changing climate.

Local government entities must have sufficient resources and training to effectively tackle the impacts of climate change in their respective regions.

Effective climate action requires efficient national, international and local governance. While national and international governance sets the tone for climate action, local governance is crucial in responding to climate-related disasters.

Improved climate governance in local self-government institutions is necessary because these institutions are the closest to the people and are responsible for delivering essential services such as water supply, waste management, and disaster response. By strengthening the capacity of local self-government institutions to address climate change, we can ensure that vulnerable communities have access to the resources and support they need to adapt to changing climatic conditions.

Additionally, it can help reduce GHG emissions by promoting sustainable land use practices, encouraging energy efficiency measures, and supporting the transition to renewable energy sources.

According to Kerala's 2014 climate action plan, the state currently lacks the institutional capacity to address climate change adequately. Well-regarded local self-government structures have not yet taken any significant action to address climate change. Furthermore, local institutions have limited knowledge about global climate negotiations and innovations and are struggling to keep up with rapidly changing trends related to climate change mitigation, adaptation, and disaster risk reduction.

IMPACT OF SOLUTION

Mitigation policies

Urban areas are significant sources of greenhouse gas emissions, so mitigation policies at the municipal level are critical in addressing this issue.

Empower local governance

Empowered local governance on climate change would enable local governance institutions to respond quickly to natural disasters and monitor climate-related activities in their respective regions.

Improve data for better prediction

Increased local-level data collection will allow models to improve weather events prediction and thus assist in the development of effective climate change mitigation, adaptation and disaster management policies.
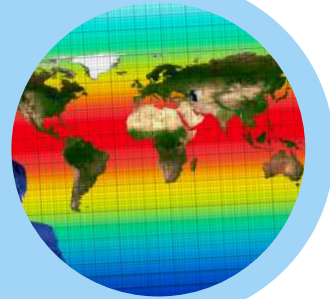
Economic benefit

Climate action at the local level can create new jobs in sectors such as renewable energy, green infrastructure development, and sustainable agriculture. It can also attract investment and enhance the resilience of local economies to climate-related shocks.

CO-BENEFITS

- It also enhances collaboration among various stakeholders, enabling a comprehensive, inclusive approach to addressing climate change.

- Conservation initiatives, afforestation programs, and sustainable land use practices safeguard biodiversity, promote ecosystem health, and preserve natural resources for future generations.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

Ways in which you can engage

1 LOCALIZED APPROACHES

Contribute to local climate initiatives and projects that promote renewable energy, waste management, tree planting, and sustainable agriculture—volunteer for community-led programs and initiatives that aim to address climate change at the grassroots level.

2 PROVIDE EXPERTISE

State-level Climate change information and expertise should be provided to local governments for adaptation planning and resilience building.

3 PARTICIPATION

Engage with local governance bodies, such as village councils or urban local bodies, to actively participate in decision-making processes related to climate change and sustainability.

4 EMPOWER GOVERNMENT

All levels of local self-governments, panchayats, blocks, and municipalities need to be empowered to chart respective strategies to tackle climate change and natural disasters.

5 CLIMATE NODAL AGENCIES

Appointment of nodal agencies at the local level focusing on climate change for every 4-5 panchayats for better monitoring of the situation on the ground. A climate expert per region should be appointed for better assessment of threats and opportunities.

6 REVISE ACTION PLAN

The state's climate action plan must be revised to involve all levels of local governments at all times to research and design locally suitable strategies and programme implementation.

SAPCC
PROPOSED GOVT INSTITUTION MECHANISM

INSTITUTIONAL MECHANISMS

Chief Minister's Governing Council on Climate Change

Advisory Committee

State Level Steering Committee (SLSC)

Working Group - Mitigation

State Climate Change Cell (SCCC)

Working Group - Research, Strategic Partnerships, Training & Extension

Working Group - Adaptation

Sectoral Climate Change Cell

District Climate Change Cell

LSG Working Group
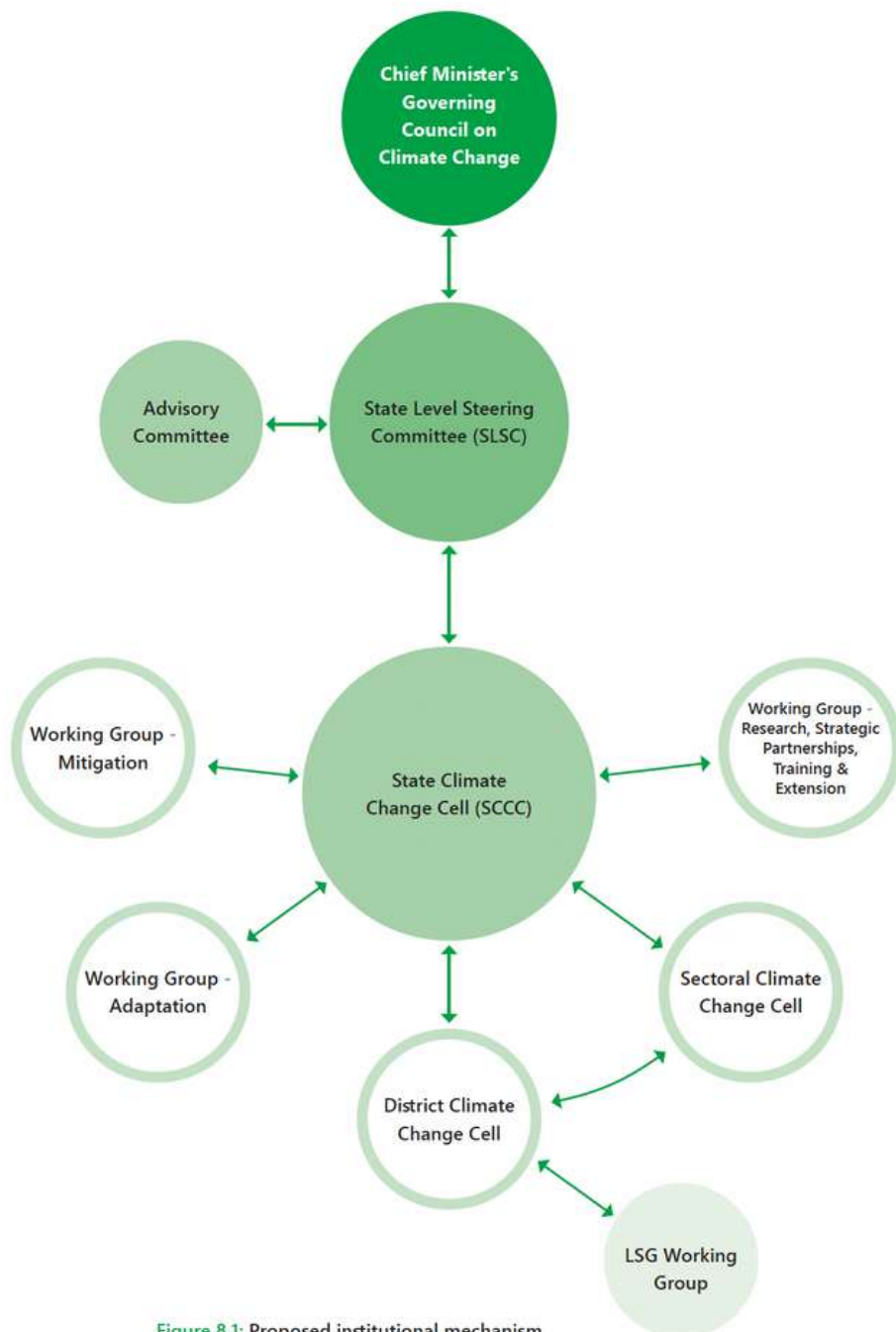
Figure 8.1: Proposed institutional mechanism

KERALA STATE ACTION PLAN ON CLIMATE CHANGE
2023 - 2030

Download SAPCC

In conclusion,

improving climate governance is an urgent imperative at all levels. This requires robust capacity-building efforts to enhance knowledge and skills, particularly within local government institutions. Adequate funding must be raised to support climate initiatives and ensure their effective implementation. Equally important is the collaboration and coordination among different government departments, fostering a holistic and integrated approach to addressing climate challenges. Furthermore, NGOs complement and support government efforts through their expertise, grassroots engagement, and advocacy.

💬 Painting the picture

In a panchayat in Kerala, a collaborative effort among multiple stakeholders transformed the water availability situation. The Panchayat faced acute water scarcity, leading to hardships for the local community. Recognizing the urgency, Ramesh, the Panchayat President, initiated a partnership with the local water authority, community members, and a nearby NGO. Together, they developed a comprehensive water management plan, which included rainwater harvesting structures, watershed restoration, and awareness campaigns on water conservation. The local community actively participated in implementing the plan, with youth groups and women's self-help organizations playing key roles. Water authority provided funding, while KILA gave the training and several other departments goined hands.

08 IMPLEMENT PLACE-BASED SOFT AND HARD SOLUTIONS IN COASTAL REGIONS

Coastal regions are at the forefront of the impacts of climate change, with sea-level rise posing a significant threat to communities' lives and livelihoods. Kerala's densely populated coastline is particularly vulnerable to natural disasters, requiring the implementation of place-based solutions.

WHY?

Coastal regions are experiencing some of the most devastating impacts of climate change, sea-level rise being the biggest challenge in the long term.

Communities living near the coast face numerous challenges, including frequent flooding, cyclones, high tides, catastrophic waves, and storm surges. These natural disasters are causing havoc on their lives and livelihoods, destroying houses, agricultural farms, and fishing zones.

Climate change has turned many coastal communities into climate refugees, leaving them with no other option but to leave everything behind. Kerala's coastline is approximately 600 km long and is densely populated. The geography of the state exacerbates the population's vulnerability to many natural calamities, with coastal communities being particularly at risk. Unscientific development in the region over the years has worsened the impacts of climate change.

Moving forward, it is imperative for the government to consider the vulnerabilities of the region and the communities residing within it. However, due to the diverse geographical conditions, communities, and livelihood practices present in each area, it is essential to **develop place-based soft and hard solutions to address the challenges the coastal region faces effectively.**

Hard solutions refer to infrastructure measures that require using materials like rock, steel, and concrete to build physical structures like sea walls, dykes, and other barriers that would absorb wave energy and prevent coastal erosion or flooding. **Soft solutions,** on the other hand, are natural approaches that can be integrated at different scales and use ecological ideas and practices, having less of an effect on the environment.

In contrast to long-term, sustainable soft solutions, which are designed to have a positive impact over time, short-term hard solutions are often implemented without considering their potential detrimental influence on the environment.

IMPACT OF SOLUTION

Location specific solutions

Coastal management has its own challenges, and thus targeting location-specific implementation of solutions will allow the government to provide tailor-made solutions to region-specific issues. Hard solutions reduce risk in the short term, while soft solutions provide long-term risk reduction.

Natural solutions

Soft solutions like coastal afforestation, dune restoration, and mangrove conservation help mitigate the impacts of sea-level rise, storm surges, and erosion. These natural buffers protect coastal communities, infrastructure, and ecosystems.

Improved Disaster Preparedness

Implementing place-based solutions enhances adaptive capacity and preparedness in coastal communities. By incorporating climate considerations into development plans, communities can better anticipate and respond to climate risks, reducing vulnerabilities and enhancing overall resilience.

CO-BENEFITS

- Coastal ecosystems have substantial carbon sequestration potential, particularly mangroves and seagrass beds.
- Coastal communities in Kerala rely heavily on fisheries and tourism for their livelihoods, with many people also depending on coastal activities for transportation, aquaculture, energy, minerals, metals and other resources.

- Protecting and rehabilitating these habitats can lead to the recovery and thriving of various marine species, including endangered and threatened ones.
- Implementing place-based solutions creates opportunities for sustainable livelihoods in coastal areas. Restoration projects like mangrove rehabilitation and coral reef conservation support fisheries, ecotourism, and other nature-based enterprises, providing economic benefits to local communities.
- It can help preserve and revive traditional practices, local knowledge, and cultural heritage associated with coastal ecosystems and livelihoods.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

Ways in which you can engage

1

COASTAL MAPPING

Develop a coastal erosion map and identify hotspots to assess the current state of erosion across the state. Engage local government and institutions to understand its socio-economic impact on communities.

2

MINING RESTRICTIONS

Restrict mining activities in high-risk coastal areas like Kollam, Alappuzha, and Ernakulam districts and monitor them closely to protect the coastal ecosystem.

3

COMMUNITY ENGAGEMENT

Encourage active community participation in coastal management to ensure sustainability and resilience. Providing necessary monetary and financial support for implementing peaceful solutions to the communities.

4

ECOSYSTEM RESTORATION

Introduce projects and policies that can facilitate the restoration of critical ecosystems such as mangroves, coastal wetlands and sandy beaches.

5

AWARENESS AND ADVOCACY

Raise awareness about the importance of coastal resilience and the need for place-based solutions. Engage in advocacy efforts to promote sustainable coastal practices, conservation, and community involvement.

6

POLICY AND DECISION-MAKING

Engage in policy discussions and decision-making processes related to coastal management and resilience. Advocate for youth representation and inclusion in decision-making bodies to ensure the integration of youth perspectives and ideas.

In conclusion,

Coastal regions are facing severe challenges due to climate change, and addressing the issues these vulnerable communities face is crucial. Implementing location-specific soft and hard solutions, such as natural solutions and participatory coastal management, can provide long-term risk reduction and co-benefits to both the ecosystem and the communities in the region. We can build resilience in coastal regions and ensure a sustainable future by taking action and implementing sustainable solutions.

💬 Painting the picture

In a coastal village, enthusiastic youth led an initiative to implement soft solutions for coastal resilience. Recognizing the vulnerability of their community to rising sea levels and erosive forces, they collaborated with local environmental organizations and government agencies to implement a tree-planting project. The youth leader Anagha mobilized her peers, including Aparna, Anoop, and Shalini, to plant resilient tree species along the coastal stretch. They selected native species, such as Casuarina and Rhizophora, known for their ability to withstand saltwater intrusion and stabilize the shoreline. The impact of their efforts was twofold. Firstly, the planted trees acted as a natural barrier, reducing the intensity of sea waves and protecting the coastal area from erosion. This contributed to the overall safety and well-being of the community. Secondly, the presence of the newly planted mangroves created an ideal habitat for marine life. The increased density of fish and other aquatic species in the nearby water bodies showcased the positive ecological impact of the project.

09 PROMOTION OF SUSTAINABLE AGRICULTURE AND FARMING PRACTICES

Sustainable agriculture and farming practices are essential for food security and environmental protection. Adopting sustainable practices can make farming more climate-resilient and economically beneficial for farmers in the long run and help build climate resilience.

WHY?

Agriculture and farming practices are familiar to many, but the inputs required to maximize productivity often negatively impact the environment.

Certain crops require a very high amount of water to produce them, and most farms use groundwater irrigation methods. Some current agricultural practices do not yield much, which is also an impact of climate change and land degradation. Hence to increase productivity, farmers often prioritize using chemicals and cultivating cash crops without considering long-term sustainability, which can lead to soil degradation. The unsustainable nature of most agricultural practices in India jeopardizes food security, land, soil and environmental health in the long term.

Sustainable agriculture methods involve farming practices without significantly damaging the soil and environment. By adopting sustainable and agro ecological farming practices, such as organic farming, agroforestry, and soil conservation techniques, Kerala can protect its fragile ecosystems, preserve its rich biodiversity, and ensure the sustainability of its agricultural productivity.

In **Kerala, as paddy cultivation is becoming non-profitable, many farmers have started converting their lands for other purposes and some shifted to other cash crops.** Nevertheless, agriculture is still practised across the state.
Encouraging local food systems and promoting food sovereignty empowers communities by ensuring access to nutritious, culturally appropriate food produced through sustainable practices. Hence, it is important to adopt sustainable agricultural practices that are specific to the location, which are resilient to climate change impacts in the long run, and rely on traditional practices and seeds. Sustainable farming also promotes monocultural farming or crop diversification, i.e., growing multiple varieties of crops.

For example, In the Vidarbha region, Maharashtra, farmers decided to grow sugarcane, which is a cash crop, despite the water scarcity.
Over time, this practice adversely affected the environment's health by causing a continuous decline in the groundwater table each year, further exacerbating water scarcity.

IMPACT OF SOLUTION

Ensuring Food Security with Sustainable Farming

Sustainable farming practices will help preserve food security without compromising soil health or the environment.

Reduce pollution of soil and water

By phasing out the use of synthetic fertilizers and pesticides, adopting organic farming methods, and promoting agroecological approaches, sustainable agriculture helps protect the environment by minimizing soil and water pollution, preserving biodiversity, and conserving natural resources.

Enhanced Food Security

Sustainable agriculture promotes diverse cropping systems, local seed varieties, and resilient farming practices. It can also improve the economic resilience of farmers by reducing input costs, increasing market opportunities for organic and sustainable products, and diversifying income sources through value-added activities.

CO-BENEFITS

- It can reduce farmers' vulnerability to price fluctuations and market uncertainties. Farmers can establish stable and direct relationships with consumers by focusing on niche and local markets, ensuring a more secure income source and reducing dependency on external markets.

- It helps communities to learn about the importance of sustainable food production, environmental stewardship, and the interconnectedness of agriculture and ecosystems.

- Sustainable farming practices can enhance climate resilience. Some traditional seeds or farming techniques enable the crops to withstand harsh climate conditions. For e.g., Pokkali rice grown in Kerala has proven to be flood resilient and can help rice farmers in flooding or extreme rainfall.

- Sustainable agriculture practices can enhance the provision of ecosystem services such as pollination, pest control, and soil fertility.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1

INCLUSION OF CARBON FINANCE

The resilience of farmers can be enhanced when hit by climate shocks and also becomes an aid to improve their income. This could be a way to encourage youth into the farming sector.

2

SUSTAINABLE FARMING R&D

Invest in research and development(R&D) of sustainable farming techniques to make them more affordable and accessible.

3

SUPPORT AND AWARENESS

Local governments and panchayats should be empowered and supported to encourage sustainable farming practices in their area. Conduct awareness campaigns to explain the benefits of these practices to farmers.

4

DEMONSTRATION FARMS AND LEARNING CENTERS:

Demonstration farms and learning centres can serve as platforms for showcasing best practices, conducting research, providing hands-on training, and disseminating knowledge to youth and the wider community.

5

GOVERNMENT POLICY

Youth should participate in policy discussions, provide feedback on existing agricultural policies, and propose new policies that promote sustainable agriculture practices and youth involvement in the sector.

6

CROP DIVERSIFICATION

Region-specific cash incentives, guaranteed price mechanisms like the Minimum Support Price (MSP) and effective insurance mechanisms should be provided to farmers to promote crop diversification, as well as protect them from climate related disasters.
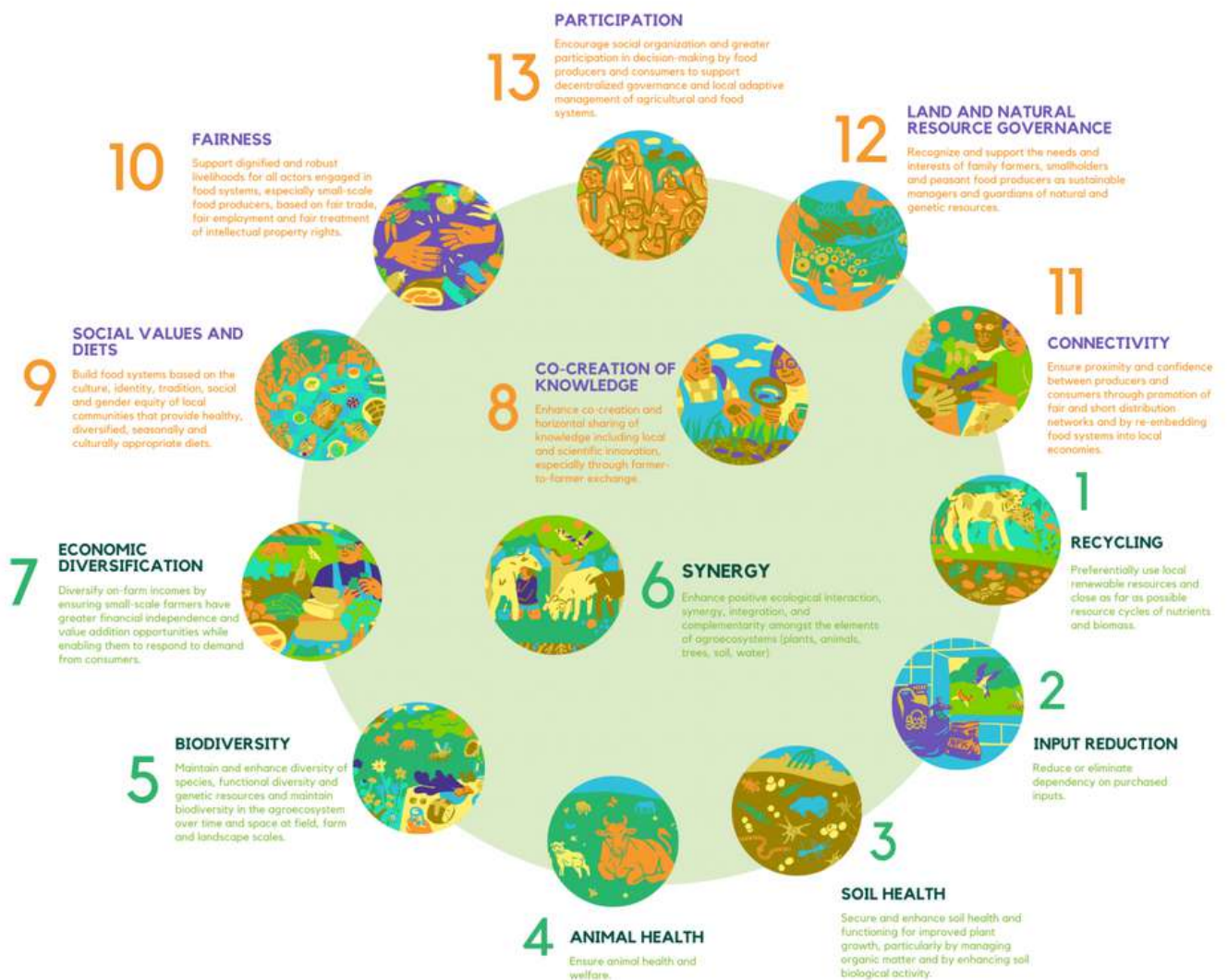
INTERACTION OF THE 10 ELEMENTS OF AGROECOLOGY

The five levels of transition towards sustainable food systems and the related 13 principles of agroecology.

FOOD SYSTEM

AGROECOSYSTEM

13 PARTICIPATION
Encourage social organization and greater participation in decision-making by food producers and consumers to support decentralized governance and local adaptive management of agricultural and food systems.

12 LAND AND NATURAL RESOURCE GOVERNANCE
Recognize and support the needs and interests of family farmers, smallholders and peasant food producers as sustainable managers and guardians of natural and genetic resources.

11 CONNECTIVITY
Ensure proximity and confidence between producers and consumers through promotion of fair and short distribution networks and by re-embedding food systems into local economies.

10 FAIRNESS
Support dignified and robust livelihoods for all actors engaged in food systems, especially small-scale food producers, based on fair trade, fair employment and fair treatment of intellectual property rights.

9 SOCIAL VALUES AND DIETS
Build food systems based on the culture, identity, tradition, social and gender equity of local communities that provide healthy, diversified, seasonally and culturally appropriate diets.

8 CO-CREATION OF KNOWLEDGE
Enhance co-creation and horizontal sharing of knowledge including local and scientific innovation, especially through farmer-to-farmer exchange.

7 ECONOMIC DIVERSIFICATION
Diversify on-farm incomes by ensuring small-scale farmers have greater financial independence and value addition opportunities while enabling them to respond to demand from consumers.

6 SYNERGY
Enhance positive ecological interaction, synergy, integration, and complementarity amongst the elements of agroecosystems (plants, animals, trees, soil, water)

5 BIODIVERSITY
Maintain and enhance diversity of species, functional diversity and genetic resources and maintain biodiversity in the agroecosystem over time and space at field, farm and landscape scales.

4 ANIMAL HEALTH
Ensure animal health and welfare.

3 SOIL HEALTH
Secure and enhance soil health and functioning for improved plant growth, particularly by managing organic matter and by enhancing soil biological activity.

2 INPUT REDUCTION
Reduce or eliminate dependency on purchased inputs.

1 RECYCLING
Preferentially use local renewable resources and close as far as possible resource cycles of nutrients and biomass.

ILLUSTRATIONS:DOROTTYA POÓR

In conclusion,

the promotion of sustainable agriculture and farming practices is critical. The negative impacts of current agricultural practices on soil health and water resources jeopardize the long-term viability of the farming sector. These benefit the environment, preserve ecosystems, and boost revenue through crop diversification. Incorporating these practices can make farming more climate-resilient and economically beneficial for farmers.
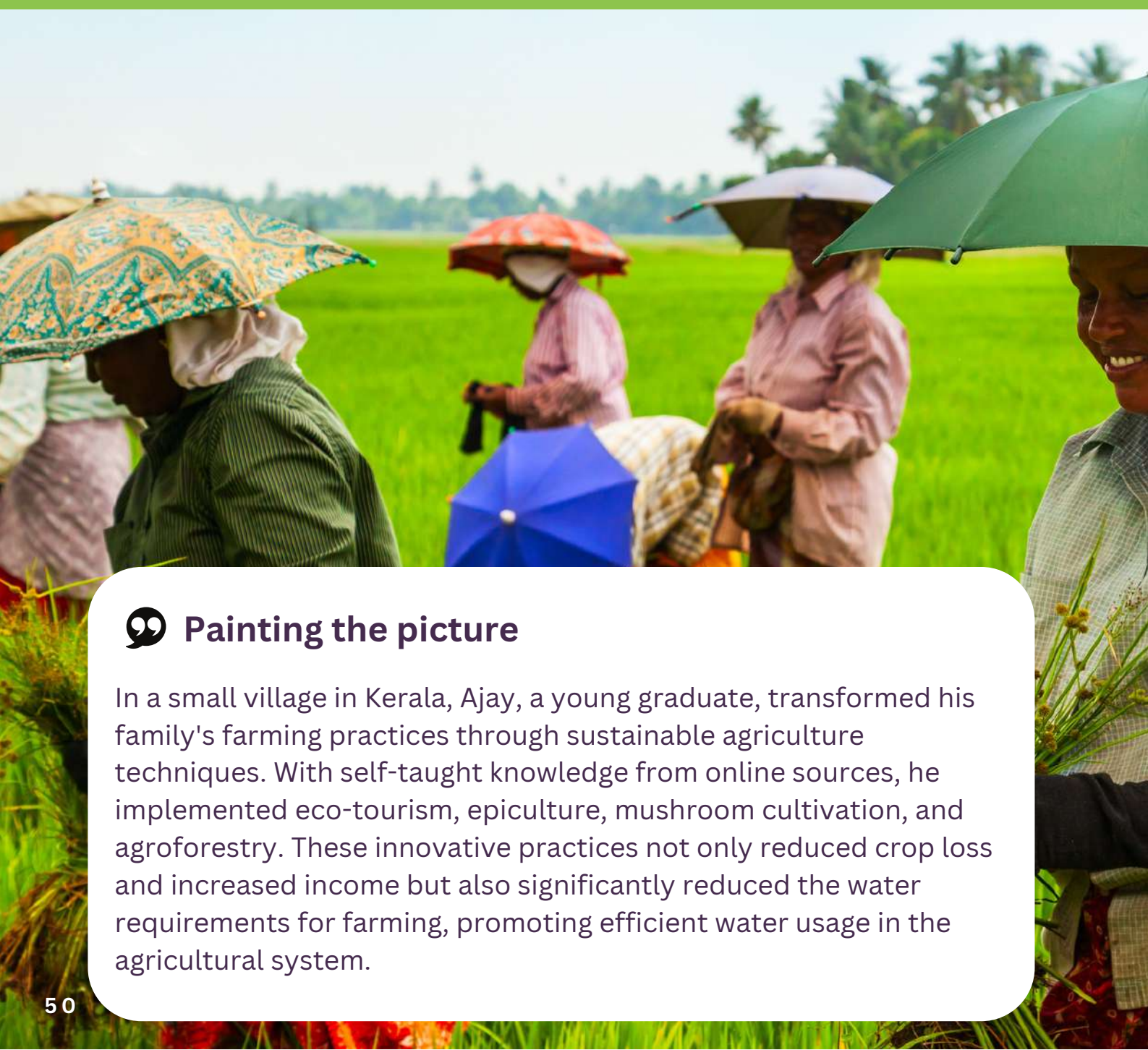
💬 Painting the picture

In a small village in Kerala, Ajay, a young graduate, transformed his family's farming practices through sustainable agriculture techniques. With self-taught knowledge from online sources, he implemented eco-tourism, epiculture, mushroom cultivation, and agroforestry. These innovative practices not only reduced crop loss and increased income but also significantly reduced the water requirements for farming, promoting efficient water usage in the agricultural system.

10

CLIMATE CHANGE AND SUSTAINABILITY AS CORE SUBJECTS IN SCHOOL AND COLLEGES

Education plays a critical role in shaping our understanding and beliefs about the world, and therefore, it is crucial to introduce climate change and sustainability as core subjects in schools. Teaching children early about the impact of climate change can bridge the gap and make them more aware of the threats it poses now and in the future.

WHY?

Our education and values learned in schools significantly influence our beliefs, ideology, and understanding of the world. Therefore, they are crucial in shaping what we care about as adults.

Although humans tend to react more quickly to immediate threats, such as those that can impact us in the near term, we tend to disregard long-term threats like climate change. For developing countries, there are pressing issues such as poverty, hunger, unemployment, and infant mortality that take priority over climate change.

However, educating children early about the impact of climate change can bridge the gap and make them more considerate and aware of the current and future threats. Introducing climate change and sustainability as core subjects in schools and colleges is an essential step towards equipping the younger generation with the knowledge, skills, and mindset needed to address the pressing environmental challenges of our time.

Climate change and sustainability should be taught in school as core subjects. By doing so, children will develop an early understanding of the effects of climate change on people's lives and livelihoods. This will encourage today's youth to grow into adults who recognize climate change as an existential issue and take decisive action, which the current generation considerably lacks.

Also, teaching basic concepts related to climate change and sustainability, such as sustainable living and the carbon cycle, can promote scientific curiosity among students.

It is critical that **children grow up with values that emphasize the risks of further exploiting the environment and do not contribute to climate change.** Rather, as a society, they should learn to address the issue appropriately. It can play a pivotal role in nurturing a generation of informed and environmentally conscious individuals who are equipped to drive positive change and contribute to a more sustainable future.

IMPACT OF SOLUTION

Early Climate Education

Climate education in schools can turn children into responsible members of society with the knowledge and values necessary to tackle climate change through development and innovation.

Student Influencers

Students can be strong influencers in their families and communities, teachers and educators, spreading a culture of respecting the environment through their education.

Mindset Shift

An interactive curriculum will help to influence the community around educational institutes. This can shift the mindset away from the belief that climate change is someone else's problem and increase appreciation for the importance of conserving our planet.

Awareness and Appreciation

Climate education can lead to a cultural shift in the perception of certain jobs, such as farming, which can significantly mitigate the climate crisis. It can also encourage young minds to brainstorm solutions for dealing with climate change.

CO-BENEFITS

- Education in climate change and sustainability opens up many career opportunities in the growing green economy.

- Climate change and sustainability cut across various disciplines, including science, social sciences, economics, and ethics. Integrating these subjects into the curriculum promotes interdisciplinary learning, helping students develop critical thinking, problem-solving, and systems thinking skills for addressing complex environmental challenges.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1 ASSESS KNOWLEDGE GAPS

Conduct a comprehensive analysis of the understanding and perception of climate change among students of all education levels in the state. Assess the needs of affected communities.

2 EVALUATING POLICIES

The state must evaluate policies and courses at each level to assess how much climate change and sustainability are taught across subjects.

3 MANDATE CLIMATE COURSE

Mandate climate related courses and integrate topics into existing subjects to promote them as subjects on par with others like physics, biology or math. The curriculum should include community interactions.

4 INNOVATION SUPPORT

Innovation and entrepreneurship support can spur the development of new technologies and solutions that contribute to climate change mitigation, adaptation, and resilience.

5 UPDATES AND EVALUATION

Youth can engage in policy discussions and provide inputs on educational reforms related to climate change and sustainability. They can collaborate with relevant government bodies, education boards, and decision-makers to ensure that the voices of young people are heard in shaping educational policies.

6 RESOURCE ALLOCATION

The government should allocate resources to support the development of age-appropriate teaching materials, textbooks, digital resources, and educational tools related to climate change and sustainability.

In conclusion,

Climate education in schools can turn children into responsible members of society with the knowledge and values necessary to tackle climate change through development and innovation. Mandating climate-related courses and integrating topics into existing subjects can promote them as subjects on par with others like physics, math, or biology. Developing an understanding of the impacts of climate change on lives and livelihoods will help today's youth grow into responsible adults and engrain compassion in them towards society and the most vulnerable people and communities.

💬 Painting the picture

In a small town in Kerala, Anu, a passionate teacher, noticed the lack of climate change education in schools. Determined to make a difference, she approached the Education Department and local NGO, with a proposal to introduce climate change as a core subject in the school curriculum. Impressed by Anu's initiative, the Education Department collaborated with Climate Warriors to develop age-appropriate and interactive learning materials on climate change. They conducted teacher training workshops to equip educators with the knowledge and skills to teach the subject effectively.Youth were inspired to take climate action, organizing awareness campaigns, tree-planting drives, and waste reduction initiatives in their communities.

11 SUSTAINABLE TRANSPORTATION AND IMPROVING LAST-MILE CONNECTIVITY

The transportation sector is a major contributor to climate change and air pollution, primarily through emissions from personal vehicles. Developing sustainable transportation alternatives, including improved public connectivity and last-mile solutions, is crucial for ensuring a resilient future for Kerala.

WHY?

The transportation sector significantly contributes to climate change through emissions from combustion engines running on petrol or diesel. Personal vehicles also contribute to several issues, including air pollution that affects people's lungs and traffic congestion that negatively impact the productivity of people. Every litre of petrol we burn emits around approx. 2.3 kg of CO_2 equivalent to the atmosphere, among other gases.

The overreliance on private vehicles has led to a disproportionate distribution of road space, where a vast amount of land is dedicated to parking lots and road infrastructure, limiting the availability of public spaces and green areas.

The public transport system is a clear solution; however, getting people to shift their commuting behaviour remains a challenge.

Firstly, the lack of comfort and cleanliness in buses and trains needs to be improved. These modes of transport often have poor ventilation and are not well-maintained, especially in rural areas.

Secondly, there is a need for more last-mile connectivity options to make it more convenient for people to take public transport. People find it easier to own a personal vehicle and commute at their convenience without worrying about last-mile connections if they are far from an accessible bus or train station.

In Kerala, the escalating number of vehicles on the roads exacerbates these challenges, posing threats to the environment, public health, and the overall quality of life. By addressing the pressing issues associated with the growing vehicular population, Kerala can pave the way for a greener, healthier, and more connected state.

By investing in sustainable transportation alternatives, Kerala can position itself as a leader in combating climate change, improving air quality, and promoting sustainable development. An enhanced public transport system enhances connectivity and accessibility, particularly for underserved communities and marginalized populations. It ensures people have affordable and convenient access to education, healthcare, employment opportunities, and other essential services.

IMPACT OF SOLUTION

Safe, Comfortable, and Inclusive Transportation

Improving safety and comfort, and ensuring cleanliness across all modes can encourage residents from all socio-economic backgrounds, including women, to utilize public transport, contributing to the growth of the state's economy.

Cost-Effective and Sustainable Commuting

If more people shift to commuting via public transport, it will reduce their expenses significantly and thus reduce our collective reliance on fossil fuels.

Reduce Fossil Fuel Dependence

The Indian government spends a large sum of their annual budget on importing fossil fuel products like diesel and petrol. Thus, shifting to electric vehicles (EVs) will help reduce the country's import bills that can be utilised for other social benefits of the people.

CO-BENEFITS

- Promoting public transit and sustainable transportation can improve city air quality by reducing vehicle emissions, resulting in cleaner air and healthier residents.
- A well-designed public transport system encourages walking and cycling as part of the commute, thus promoting physical activity.

- Public transportation can improve social interaction, cultural exchange, and a sense of community, enhancing social cohesion.
- Public transport systems reduce the overall number of vehicles on the roads, improving road safety for all road users.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1
INCENTIVIZING EVS & PUBLIC TRANSPORT

Government should introduce incentives to improve the uptake of electric vehicles in the state and public transportation, including subsidies and credit support for Electric Vehicles(EV) auto rickshaws.

2
EXPAND INFRASTRUCTURE

EV charging and public infrastructure in the state can be improved by expanding the availability of charging stations across the state. Similarly, improving the condition of public buses and trains.

3
UNDERSTAND COMMUTING

Mapping traffic to understand commuting patterns. Using existing data, strategically increase transport stations and improve the connectivity of key destinations.

4
LAST MILE CONNECTIVITY FOR DELIVERIES

Implementing effective last-mile connectivity solutions for deliveries is essential for optimizing supply chain efficiency, reducing emissions, creating job opportunities, and fostering economic growth.

5
OTHER TRANSPORT MODES

Building the necessary infrastructure, such as bike lanes and footpaths in cities, to promote other modes like bicycles or walking. In partnership with technology-driven start-ups like Yulu, Bolt Mobility provide pay-ride-drop services for short distances and improves last-mile connectivity.

6
SUPPORT CLEAN SOLUTIONS

Facilitate an ecosystem for entrepreneurs working on clean transport solutions by providing financial aid, subsidies, innovation support and space for manufacturing. Create diploma courses on subjects related to the production and repair of EV products, solar panel management, etc.

SAPCC mentions how Kerala has also taken initiatives to boost electric mobility. The State announced its Electric Vehicle (EV) Policy in 2019 and aimed to introduce one million EVs by 2022.

In conclusion,

Shifting to public transport can promote sustainable and cost-effective commuting, reducing our dependence on fossil fuels and promoting cleaner air and healthier residents. However, addressing concerns about public transport's quality, safety, and convenience is necessary to encourage more people to shift. Improving last-mile connectivity, expanding charging infrastructure, and incentivizing electric vehicles are among the key solutions that can be implemented to achieve a safe, comfortable, and inclusive public transportation system, as well as reducing traffic congestion, promoting sustainable transportation and improving air quality.

💬Painting the picture

In bustling Kochi, Priya's daily commute was a 15-kilometre journey to work in her car. However, with the arrival of the metro, she found a sustainable solution. Opting for a bike taxi service, Priya travelled just 1 kilometre to the nearest metro station. From there, she took the metro to Kakkanad, her workplace. This switch saved her 300 rupees daily and reduced her emissions by 3 kilograms. Priya's story highlights how sustainable mobility can combat climate change and reduce air pollution in Kerala.

12 WASTE MANAGEMENT

Efficient solid waste management is vital in addressing the state's escalating plastic menace and environmental challenges. Recent incidents, such as the devastating landfill fire in Brahmapuram, have underscored the urgent need to tackle this issue effectively. By empowering individuals and local self-government institutions (LSGIs), we can collectively address the challenges posed by solid waste and work towards a sustainable future.

WHY?

Effective solid waste management is paramount for Kerala as the state grapples with various environmental and health challenges. Landfills, methane emissions, legacy waste, biological waste, microplastic contamination, and the adverse health impacts of burning waste are critical issues that need urgent attention.

Landfills, often overwhelmed with mounting waste, pose significant environmental risks. Improperly managed landfill sites can lead to leachate contamination, soil and groundwater pollution, and the release of methane, a potent greenhouse gas contributing to climate change.

Kerala also faces the challenge of legacy waste, accumulated waste from past years that requires careful handling and disposal. The presence of unmanaged legacy waste not only presents a visual eyesore but also poses health and environmental hazards.

Another pressing concern is managing organic waste from households, markets, and biological waste from healthcare facilities. Proper segregation, composting, and recycling of biodegradable waste are essential to minimize landfill burden and promote circular economy practices.

Microplastic contamination, resulting from the improper disposal of plastic waste, is a growing concern in Kerala's water bodies, posing risks to aquatic life and potentially entering the food chain. Burning waste, a common practice in some areas, releases toxic fumes and pollutants, posing severe health risks to nearby communities.

To tackle these challenges, the active involvement of the Haritha Karma Sena members, who play a pivotal role in waste management at the local level, is crucial. These dedicated individuals are instrumental in waste collection, segregation, and awareness campaigns, contributing significantly to waste reduction and proper disposal practices.

Furthermore, the youth of Kerala have a significant role in driving innovation and promoting sustainable practices. Their fresh perspectives, technological expertise, and passion for environmental stewardship can lead to creative solutions for waste management challenges. It is also essential to address specific aspects of waste management, such as sustainable menstruation practices and diapering. In Kerala, commendable efforts have been made to address this particular issues by empowering women groups and asha workers.

IMPACT OF SOLUTION

Circular Economy

Implementing waste management strategies prioritising segregation, recycling, composting, and resource recovery supports the transition to a circular economy. It promotes the reuse and recycling of materials, reduces waste generation, and encourages the sustainable use of resources.

Economic Opportunities

It can create economic opportunities by generating employment in waste collection, sorting, recycling, and waste-to-energy sectors. It also fosters the growth of a green economy, stimulates local entrepreneurship, and supports sustainable businesses.

Climate change mitigation

Proper waste management helps reduce greenhouse gas emissions, mainly methane, which is a potent contributor to climate change. The Global Warming Potential of methane is generally estimated to be around 25-28 times higher than that of CO_2 over a 100-year period.

CO-BENEFITS

- Proper waste management reduces the need for raw material extraction and minimizes habitat destruction associated with resource extraction.

- Family savings can increase by transitioning to sustainable products.
- Clean and well-managed surroundings enhance the attractiveness of tourist destinations, promote eco-tourism, and encourage responsible visitor behaviour, thus supporting the growth of the tourism industry in Kerala.

- Promoting sustainable menstruation and diapering practices can help young entrepreneurs engage in the production or sale of such products in the state.
- Promoting these products with effective policies will also create job opportunities for women in the state.
- Proper waste management reduces the risk of accidental fires caused by the accumulation of combustible materials in landfills or uncontrolled waste disposal sites.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1

INFRASTRUCTURE

Invest in developing and improving waste management infrastructure, including waste collection systems, sorting facilities, recycling centers and composting facilities.

2

SEGREGATION AND COLLECTION

Segregation at source encourages individuals and households to separate their waste into different categories, such as organic, recyclable, and non-recyclable.

3

AWARENESS

Engage and educate communities about the importance of proper waste management through awareness campaigns, workshops, and training programs.

4

WASTE DISPOSAL

Improving local waste collection and supporting Haritha Karma Sena workers with capacity, innovation and mental support. HKS workers often face harassment from families due to monthly user fee collection.

5

EPR & PLASTIC CREDITS

Implementation of Extended Producer Responsibility (EPR) is crucial in our journey towards Zero Waste. By holding producers accountable for the entire lifecycle of their products, we can incentivize sustainable design, reduce materials use, and minimize discards, ultimately creating a circular economy where waste is minimized, and resources are maximized.

6

ENTREPRENERUSHIP

Offer specialized training programs and workshops to educate youth about the opportunities and challenges in solid waste management. Establish business incubation centres or programs dedicated to supporting youth-led waste management startups.

In conclusion,

the youth of Kerala have a crucial role to play in addressing the waste crisis in the state. While improving waste management practices remains a priority, focusing on waste reduction initiatives is equally important. Together, we can lead the way towards a circular economy where waste is minimized, resources are conserved, and environmental sustainability is prioritized. The urgency to scale up efforts in addressing the waste crisis is paramount, as we cannot afford to wait any longer to safeguard our environment and secure a sustainable future for generations to come.

💬 Case Study

In the Alappuzha, waste management was revolutionized through the dedicated decentralized waste management efforts of the Haritha Karma Sena members. These enthusiastic volunteers took charge of waste collection, segregation, and disposal in their local communities. Similarly several other panchayats and municipalities have been trying innovative models for proper waste management.

13 CLIMATE CHANGE CHAIR IN COLLEGES AND UNIVERSITIES

Introducing climate change chairs in educational institutions across Kerala can foster sustainability and resilience by integrating climate change across various disciplines. This initiative promotes the development of effective climate action plans, encourages research on climate-related topics, and cultivates a pool of skilled volunteers who can actively contribute to local sustainability projects, further strengthening the state's commitment towards a sustainable and resilient future.

WHY?

Colleges and universities are centres of knowledge, innovation, and activity, making them ideal places to address climate change. With the pressing challenges posed by climate change, it is crucial to empower the younger generation with the knowledge and skills necessary to tackle these issues effectively.

University students are already engaged in various projects and activities, including NGOs and clubs. This makes it easier to redirect their efforts toward sustainability and addressing climate change.

To facilitate this, a climate change chair should be established in every college and university, either through government or self-initiative.

Additionally, climate-related studies should not be limited to one subject, but instead, a multidisciplinary approach should be encouraged across all departments in research and educational institutions. This would encourage collaboration and creativity and could lead to the development of new technologies and solutions to address climate change.

Kerala can create a platform for fostering youth engagement, encouraging innovative thinking, and nurturing a generation of climate-conscious individuals. The establishment of a climate change chair and committee at the college or university level would facilitate this effort and enable them to engage in projects or activities at the local or state level to address climate change.

It could also attract funding and grants from organizations and institutions that support sustainability initiatives, providing additional resources for research and action. It enhances the institution's rating and reputation by showcasing its commitment to addressing pressing environmental challenges. Additionally, local self-government institutions in the vicinity can benefit from the human resources and technical support offered by these climate chairs.

The broader objective of the chair is to spark innovation and conversation around climate change and encourage college or university contributions towards the betterment of their region.

IMPACT OF SOLUTION

Engage in climate action plans

Climate change chairs and committees can engage in developing and implementing local climate action plans, and formulate strategies for climate mitigation, adaptation, resilience building strategies and capacity-building projects.

Assistance in student projects

Climate chairs can also propose research topics to students for their thesis, assignments, or project linking academic output to improve understanding of climate change and sustainability among students.

Integrating Sustainability in Education

Encouraging subject specific integration of climate change and sustainability with subjects like physics, chemistry, biology, social sciences and arts subjects would improve subjective understanding of climate change.

Benefit for institution

At the institutional level, climate change chairs enhance the institution's academic reputation and attract students who are passionate about sustainability. This integration strengthens the institution's commitment to environmental stewardship and contributes to its overall rating and recognition

CO-BENEFITS

- Climate chairs and committees established in colleges can provide skilled volunteers for local sustainability projects such as ecosystem restoration and waste management.
- It encourages cross-disciplinary collaboration among faculty members, researchers, and students from various fields of study.
- By providing a dedicated space for research, learning, and experiences, these chairs empower students to become changemakers and motivate them to pursue careers focused on sustainability & climate action.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1

ESTABLISH

Establish climate chairs and committees of professors and students at colleges and universities, either through government or self-serving initiatives.

2

ALLOCATE

Allocate special funds in college or university budgets for sustainability-related engagements and climate change.

3

ENGAGE

Engage climate chairs and local colleges throughout all stages of planning and executing local projects. Let them spearhead local action plan development to guide colleges' involvement in sustainability initiatives.

4

TRAIN

Provide appropriate training to climate chairs and committees on the latest local-level mitigation, adaptation, resilience building and disaster risk reduction trends.

5

ENCOURAGE PARTNERSHIP

Encourage partnerships between local NGOs and academic institutions. The climate chair can offer sustainability consultancy services to local NGOs, raising revenue for scaling internal activities.

6

SUPPORT AND EVALUATE

Establish incubation centres within educational institutions to support climate enterprises founded by students and staff. The chair must lead campus-wide water, energy, and biodiversity audits to evaluate the institution's impact and identify sustainable practices.

In conclusion,

Establishing a climate chair and committee at the college or university level can be crucial in promoting climate education, developing and implementing climate action plans, and providing skilled volunteers for local sustainability projects. This can be achieved by integrating climate change and sustainability across multiple disciplines, providing appropriate training to climate chairs and committees, and encouraging partnerships between NGOs and academic institutions. Allocating special funds for sustainability-related engagement and climate change can help scale internal activities and promote climate education at all levels of governance.

💬 Case study

In September 2022, Harvard University appointed Dr. James Stock, professor of Political Economy as the Vice Provost (Vice President) , Climate and Sustainability. The agenda is to focus on making real-world impacts on issues related to climate and the environment at Harvard and across the global community.

14 MENTAL HEALTH SUPPORT AND CLIMATE RESILIENCE

Climate change-related extreme weather events and long-term changes in the environment can have varied effects on the mental health of people. There is a need for comprehensive climate change adaptation strategies that address the mental health consequences of climate change.

WHY?

Extreme weather events caused by climate change, including floods, can devastate people's lives and livelihoods. The impacts can extend beyond physical destruction and affect people's mental health and wellbeing. The IPCC has identified that mental health issues can result from climate change, including anxiety, depression, grief, and suicidal thoughts.

Climate change affects mental health through both direct and indirect pathways. Direct impacts include the psychological trauma and distress caused by extreme weather events, such as hurricanes, floods, and droughts. Indirect effects stem from long-term environmental changes, including rising temperatures, loss of biodiversity, and disruptions to ecosystems, which can generate chronic stress and anxiety.

Coastal communities in Kerala are particularly vulnerable to climate change-related extreme events, and it can disproportionately severely impact the poorest.

The victims can suffer unimaginable psychological distress due to the uncertainty and loss of everything they have planned and built for years.

Climate change-related concerns and the awareness of ecological degradation can cause significant distress, leading to feelings of helplessness and hopelessness.

Losing everything, including significant documents and facing an uncertain future can lead to mental breakdowns. The traumatic experience and uncertainty about their future can have long-lasting psychological effects.

During the 2018 Kerala floods, NGOs and networks provided mental health assistance to displaced and rescued people at relief camps but did not continue beyond the rehabilitation period of the disaster. A framework and local support groups should be developed for climate refugees as part of displacement relief.

Similarly, climate anxiety among youth is increasingly becoming an alarming issue globally. Having a system to tackle this crisis is essential at this point. Efforts have been made to integrate mental health considerations into climate change adaptation and mitigation policies and plans in Kerala.

IMPACT OF SOLUTION

Develop mental health care

Developing a system for mental healthcare for climate refugees as part of displacement relief will ensure that they receive necessary psychological assistance during crises. t provides a space for them to express their concerns, process their experiences, and develop coping mechanisms to navigate their psychological challenges.

Resilience and Adaptation

Psychosocial support helps individuals build resilience and adaptability in the face of climate-related adversities. Addressing their emotional needs enhances their capacity to cope with stress, recover from trauma, and adapt to changing circumstances, enabling them to face future climate challenges better.

Community Engagement and Awareness

NGOs, community-based organizations, and government agencies in Kerala can organize awareness campaigns and community engagement activities to promote mental health resilience in the face of climate change.

CO-BENEFITS

- Mental health support at times of crisis can help in better disaster management. Chaos and panic are the two key challenges faced by disaster management professionals and the victims.
- By acknowledging and addressing the psychosocial impacts of climate change, the support system contributes to a positive cultural shift in how society perceives and responds to mental health challenges.

- It is vital to have a system that can offer psychological support to victims, even in remote areas, during a crisis. This is crucial in addressing the growing problem of climate refugees.
- It facilitates the exchange of experiences, coping strategies, and resilience-building techniques, allowing for mutual learning and the spread of innovative practices.
- It can influence family members, friends, and broader social networks, spreading awareness and understanding of climate-related mental health issues.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

1

COORDINATED EFFORTS

Develop a system for mental health support by coordinating with the Disaster Management and Health Department at the state and local levels.

2

EXPERT PANEL

Appoint an expert panel consisting of researchers, mental health experts, disaster management professionals, first responders, and bureaucrats to oversee the development of the mental health support system.

3

WORKFORCE AND HELPLINE

Employ and train sufficient workforce to provide psychological support during displacement relief and set up a toll-free mental health support helpline at local and state levels.

4

LIVELIHOOD ASSISTANCE

Provide short-term livelihood and skill development support by local government bodies for people impacted by climate disasters, including alternate livelihood methods.

5

CLIMATE ANXIETY

Offering mental health support services that address climate anxiety can provide young people a safe space to express their concerns and emotions. Also

6

INCLUSIVE SPACES

Examine how climate change affects the mental health of marginalized communities, such as the LGBTQ+ community, people with disabilities, people of short stature, and immigrant workers. Use collaborative, interdisciplinary research to gain a comprehensive understanding.

In conclusion,

addressing the mental health impacts of climate change is of utmost importance in Kerala. The challenges mentioned in this chapter highlight the urgent need for a comprehensive support system that focuses on the mental well-being of individuals and communities. It is crucial to recognize that climate change not only poses environmental and physical risks but also profoundly affects mental health and psychological well-being. Creating a robust support system involves developing strategies to mitigate the impacts of climate change on mental health, ensuring access to mental health services and resources, and promoting awareness and education about climate-related mental health challenges.Together, we can build a future where mental health support is integrated into climate resilience efforts, ensuring the well-being of individuals, communities, and the environment.

💬 Case Study

After losing his home to devastating floods, Rahul, a graduate student, found solace and support in Professor Priya, who specialized in post-disaster mental health. With her guidance, Rahul embarked on a journey of healing, learning coping mechanisms, and rebuilding his life. Recognizing the impact of the flood on Rahul's well-being, the local Panchayat stepped in to assist with document recovery and provided small grants for house reconstruction. The combined efforts of Professor Priya, Rahul's resilience, and community support enabled him to regain stability and mental well-being in the face of adversity.

15 CLIMATE RESILIENT AND GREEN INFRASTRUCTURE

The concept of green infrastructure is highly relevant to a landscape like Kerala, where natural disasters like floods and landslides are common occurrences. Building infrastructure that is both environmentally friendly and resilient to such disasters is crucial for the long-term sustainability of the state.

WHY?

The concept of green infrastructure involves high-quality infrastructure with low impact on the environment that includes natural or semi-natural areas with environmental benefits designed to provide ecosystem services while protecting biodiversity.

Infrastructure design should be resilient to climate change and withstand extreme weather. This ensures functionality and efficiency in the long term.

The growing population's demand for food, amenities, and infrastructure has led to rapid development in Kerala.

This includes infrastructure like roads, bridges, dams, and private houses. People aspire to build houses, considering them permanent assets that can be passed on to the next generation. Although this is seen as a sign of progress, it often harms the environment.

Green infrastructure protects and enhances the provision of ecosystem services, such as water purification, air quality improvement, and carbon sequestration.

In Kerala, a lot of the public infrastructure is built on paddy wetlands and sensitive zones that have been converted for infrastructure purposes.

As an eco-sensitive state, Kerala is vulnerable to natural disasters and extreme climate events, which can have devastating consequences.

Natural ecosystems such as mangroves and wetlands have historically protected against climate disasters but are now being cleared for infrastructure development.

To address this issue, Kerala must adopt eco-friendly and climate-resilient development practices. The state should implement stringent laws, provide incentives for green buildings and ensure that new infrastructure construction does not harm the environment.

To achieve this, government, stakeholders, and people must work together to create policies and laws that support a climate-resilient and green Kerala.

IMPACT OF SOLUTION

Promoting energy efficiency

Promoting green buildings can help residents save costs on amenities like electricity and heating, as insulation and ventilation can make appliances more efficient.

Ensuring infrastructure is climate resilient

Climate resilience of new and existing infrastructure will increase their longevity and protect them from extreme weather events that will become more frequent due to climate change.

Protection of Human Lives

Climate resilience infrastructure prioritizes the protection of human lives by reducing exposure to climate-related hazards. This includes measures such as building safe shelters, implementing evacuation plans, and strengthening emergency response systems, all of which contribute to saving lives during extreme weather events.

Safeguarded Economy

By minimizing damages to critical infrastructure, industries, and agricultural systems, states can protect livelihoods and ensure the continuity of economic activities even in the face of climate-related disruptions.

CO-BENEFITS

- By prioritizing vulnerable communities and areas disproportionately affected by climate change, these projects can help bridge the gap between marginalized populations and access to essential services, resources, and infrastructure.

- Green infrastructure policies can preserve ecosystems like wetlands and mangroves. Incorporating green and climate-resilient principles in public and private infrastructure can reduce maintenance and recovery burdens after natural disasters.

NEXT MILESTONE IN YOUR CLIMATE JOURNEY

Ways in which you can engage

1

YOUTH-LED ADVOCACY

Youth can advocate for prioritising climate resilience infrastructure within their communities, schools, and local governments.

2

ASSESS INFRASTRUCTURE

Assess the vulnerability of existing public infrastructure to climate change impact, and develop public and private infrastructure models that encourage household sustainability practices.

3

DEVELOP COMPLIANCE

Develop a compliance framework that mandates energy efficiency and insulation from heat for all public and private buildings, and introduce policies to ensure all infrastructure in the state is climate resilient.

4

R & D FUNDING

Provide funds for research and development at the local level to create action plans for making climate-resilient infrastructure. Conduct mapping of vulnerable regions in the state at risk due to natural disasters.

5

MONITORING AND EVALUATION:

Youth can play a crucial role in monitoring the effectiveness and impact of these projects, providing feedback, and advocating for continuous improvements.

6

PROMOTE GREEN BUILDING

Encourage the use of green buildings by offering incentives and financial support for residential buildings.

In **SAPCC**, some of the schemes mentioned include

By 2017, under Kerala Sustainable Urban Development Project (KSUDP), INR 142 Crore was spent on developing urban transport infrastructure.

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2015 supported several infrastructure development projects such as non-motorized transport, public transport, and parking facilities.

In conclusion,

To address the environmental challenges posed by rapid development, Kerala must adopt eco-friendly and climate-resilient practices in infrastructure design. This includes preserving natural ecosystems, incentivizing green buildings, and implementing stringent laws. Building climate-resilient and green infrastructure benefits the environment and also saves costs on amenities, and reduces maintenance burdens after natural disasters.

💬 Painting the Picture

Abdul, a building contractor, had an eye-opening conversation with his 18-year-old daughter, Aisha, who enlightened him about the environmental impact of unsustainable construction practices. Deeply moved by his daughter's concern, Abdul decided to make a change. He hired a team of architects and engineers dedicated to designing buildings with sustainable materials like mud, bamboo, and recycled materials, significantly reducing the carbon footprint of his projects. Furthermore, Abdul implemented energy-efficient technologies and practices to minimize energy consumption during construction and operation. To combat waste generation, he initiated a comprehensive waste management system, reusing and recycling construction materials whenever possible.

Concluding Remarks

The solutions for climate change highlighted in this book are among the most pivotal that demand both immediate attention and expansive implementation. While Kerala has witnessed a lot of commendable initiatives addressing this crisis, the sheer magnitude of potential climate impacts makes it imperative for all of us to unite in fortifying our resilience. Central to this endeavour is **climate literacy and effective climate communication**. Through this book, we aspire to enlighten the masses about these solutions and galvanize them into the movement.

At the forefront of many of these initiatives is SUSTERA. We are actively involved in testing and contributing to these solutions and are eager to amplify our efforts through collaborations with individuals and organizations alike. The success of these endeavors hinges on a shared awareness and collective knowledge. But our journey doesn't conclude with this publication. We are committed to not only implement these solutions but also to empower the youth of Kerala to take the lead. Furthermore, we pledge to produce similar publications for every state in India.

I extend my heartfelt gratitude to the dedicated team behind this endeavour. Despite constrained resources, we believe we have crafted a work that will leave an indelible mark on history and enlighten the youth of Kerala.

It is my hope that this book finds its place in libraries throughout the state and integrates into educational curricula. We remain receptive to collaboration, ever eager to join forces with those who share our passion for sculpting a climate-resilient Kerala.

Sanju Soman
CEO, Sustera Foundation
United Nations Youth Climate Leader

Glossary

Adaptation	Adapting to climate changes and challenges for a better future.
Agroforestry	Growing trees with crops to protect the environment and support farming.
AMRUT	Mission for improving cities and making them eco-friendly.
Biodiversity Preservation	Protecting diverse plants and animals to keep our world vibrant.
Carbon Finance	Money to help projects reduce climate-changing pollution.
Carbon Neutrality	Balancing out our pollution by being greener.
Casuarina	A special tree that helps protect coastlines from harm.
Circular Economy	Using things wisely to reduce waste and help the Earth.
Citizen Science	Regular people helping scientists to learn about nature.
Climate Action	Doing things to fight climate change and protect our planet.
Climate Anxiety	Feeling worried about climate change; it's okay to talk about it.
Climate Change Chairs	Smart people who study and help with climate problems.
Climate Entrepreneurship	Starting businesses that help the environment and make money.
Climate Governance	Rules and plans to manage climate issues properly.
Climate Leadership Program	Training young leaders to help the Earth.
Climate Refugees	People who move because of climate problems; they need help.
Climate-Smart Technologies	Innovative inventions to deal with climate challenges.
Conference of the Parties (COP)	A big meeting where countries talk about fixing climate problems.
Decentralized	Sharing power and decisions with local communities.
Early Warning Systems	Tools to warn us about bad weather and disasters.
Eco-restoration	Fixing damaged places to make them healthy for nature.
Environmental Stewardship	Taking care of our world for a brighter future.
Extended Producer Responsibility (EPR)	Companies responsible for their product's recycling.

Glossary

Extreme Weather Events Very unusual and dangerous weather, like big storms.

Flood-Resistant Infrastructure Strong buildings and roads that don't flood easily.

Floodplain Low areas that might flood during heavy rains.

Food Chain How animals and plants depend on each other for food.

Food Security Making sure everyone has enough good food to eat.

Funding For Climate Adaptation Money to help communities get ready for climate changes.

Green Entrepreneurship Starting businesses that are good for the Earth and for us.

Green House Gas Pollution that makes the Earth warmer.

Green Infrastructure Nature helping us in cities, like parks and trees.

Green Jobs Cool jobs that help the planet, like protecting nature.

Green Start-Ups New businesses with ideas to make the Earth better.

Haritha Karma Sena A community-based environmental workforce in Kerala

Hazard A big problem or danger, like pollution or floods.

Hyperlocal Focusing on what happens very close to where you live.

IPCC's Sixth Assessment Report A report telling us what's happening with our climate.

Kerala Start up Mission An organisation that is helping new businesses grow in Kerala.

KSUDP Making Kerala cities better and eco-friendly.

Last-mile Connectivity Ensuring accessible and convenient access to essential services or resources in the final stages of a journey or distribution network.

Leachate Dirty liquid from garbage that can hurt our world.

LGBTQ+ People of different genders and who they love, all respected.

Local Self Government Decisions made by people close to you, for your area.

Local-Level Weather Stations Local weather reports that help us prepare.

MGNREGS A government program in India that provides rural households with guaranteed employment and income opportunities to support rural development and reduce poverty.

Glossary

Maladaptation — Trying to help but making things worse by mistake.

Microclimate — Localized and unique atmospheric conditions within a small area, distinct from the surrounding climate, often influenced by factors like terrain, vegetation, and urban development.

Microplastic — Tiny bits of plastic harming our world.

Minimum Support Price — A fair price for farmers' hard work.

Nationally Determined Contribution — A country's self-defined plan and commitment to reduce GHG emissions and address climate change, as agreed under international agreements like the Paris Agreement.

Organic Farming — Farming without harmful chemicals, good for us and the Earth.

Paddy Wetlands Conservation — Protecting rice fields and the animals that live there.

Participatory Approach — Letting everyone help with decisions and plans.

Post-Harvest Storage — Keeping crops safe after they're picked.

Psychological Well-Being — Feeling good and safe about climate changes.

Real-time Weather Forecast — Knowing what the weather will be like right now.

Renewable Energy — Clean energy from wind, sun, and more.

Resilience — Bouncing back from problems and staying strong.

Rhizophora — Special trees that help coastal areas and animals.

Risk — How likely something bad might happen, like a storm.

Solid Waste Management — Cleaning up our trash and keeping it safe.

Sustainable Transportation — Getting around without hurting the Earth.

Trap Sediment — Keeping soil from washing away.

Urban Heat Island Effect — Cities getting hotter because of buildings.

Vulnerability — How easy it is for something to get hurt, like our planet.

Watershed — A geographic area where all the water drains into a common point, such as a river, lake, or ocean, influencing the local environment and water resources.

About SUSTERA

Sustera Foundation was established in 2017 with a vision premised on addressing the climate urgency in India. Sustera drives collective action through capacity-building training, campaigns, and policy dialogues to equip communities to adapt better to climate change and build resilience.

We collaborate with governments, civil society organizations, and the private sector to envision solutions for climate challenges that have the potential to be scaled up and replicated.

In the last seven eyears, we have worked extensively towards handholding stakeholders in co-creating Climate Resilient & Responsible Communities and scaling up climate solutions.

This is one of our first publications with the ambition of scaling future action research work.
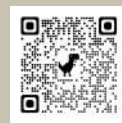
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QR	15 solutions for Climate Change in Kerala
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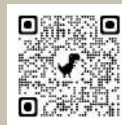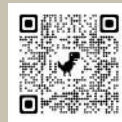
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