Training Report on Climate Change: Science, Impacts, and Solutions

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We acknowledge the invaluable support offered by Dr Arabinda Kumar Padhee, Principal Secretary; Shri Shubham Saxena, Director of Agriculture and Food Production, Government of Odisha (GoO); and Shri Nikhil Pavan Kalyan, Director of Horticulture, Soil Conservation and Watershed Development, Department of Agriculture & Farmers' Empowerment (DA&FE), GoO. Their strategic direction and commitment were pivotal in the effective planning and execution of this project.

We extend our gratitude to Shri Subhranshu Mishra, Additional Secretary, DA&FE, GoO, for his valuable presence at the inaugural and valedictory events. His comments motivated participants to engage actively during sessions and to use the knowledge gained in the training programme in frameworks to be applied in the field.

We thank Dr Sangram Keshari Pattanaik, Joint Director of Agriculture, DA&FE, GoO, and Shri Nagendra Kumar Malik, Assistant Director of Agriculture, DA&FE, GoO, for their continuous support, guidance, and collaboration in organising this programme. Their active involvement was crucial in fostering engagement with a diverse range of directorates across the state. We also thank Shri Malik for delivering an insightful session on Climate-Resilient Agriculture and Departmental Initiatives.

We are grateful to the authorities at the State Institute for Training & Extension (SITE), especially Shri Purna Chandra Shaw (Principal, SITE), for providing the essential infrastructure and logistical support that enabled the smooth execution of the training sessions.

We appreciate the efforts of the officers of the three directorates from the state and district levels for their enthusiastic participation in the training. Their active engagement, sharing of valuable field experiences, and commitment to applying climate knowledge at the grassroots level greatly contributed to the programme's success.

We also appreciate Thejas Shawn for effectively managing media coverage during the training.

This workshop is a clear demonstration of our joint commitment to climate-resilient development and knowledge sharing. Together, we are making progress in preparing Odisha's farming communities for a sustainable future.

Executive Summary

The report summarises the outcomes of a training programme held from 7 to 12 April 2025 at the State Institute of Training and Extension (SITE) in Bhubaneswar. The training aimed to build a foundational understanding among stakeholders regarding the science of climate change, its current and projected impacts, and potential adaptation and mitigation strategies.

The programme presented diverse topics, such as the greenhouse effect at global, national, and local levels; regional climate projections; climate hazards; and vulnerability and its impacts on various areas, including ecosystem and biodiversity, human health, infrastructure, vulnerable communities, water resources, and agriculture and allied sectors. The training stressed on evidence-based, climate-smart solutions. To connect the science with policy action, interactive discussions were held and case studies with real-world examples were presented.

The programme had a diverse group of participants from various directorates, divided into 3 batches, each comprising 33 participants. Participants expressed strong appreciation for the training's content, quality of facilitation, and relevance. The key areas of interest that they highlighted are climate risk assessment, sectoral impacts, sustainable land and water management practices, adaptation and mitigation strategies, and integration of climate resilience into locally led adaptation planning in agriculture and allied activities.

This training represented a vital step towards fostering a more climate-aware and responsive stakeholder ecosystem. Furthermore, the programme highlighted the need for continuous capacity building, inter-institutional collaboration, and grassroots engagement to promote scalable and sustainable climate action. The knowledge and insights gained from such initiatives can enable integrating climate change considerations into planning and implementation, particularly in vulnerable regions such as Odisha.

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Abbreviations

Abbreviation	Definition
CRA	Climate-resilient agriculture
CRC	Climate Resilience Cell
CSA	Climate-smart agriculture
DA&FE	Department of Agriculture & Farmers' Empowerment

1. Introduction

Climate change poses a significant and growing challenge to agriculture and allied sectors, particularly in vulnerable regions such as Odisha. These sectors are increasingly impacted by extreme weather events, such as heatwaves, droughts, floods, and cyclones, which adversely affect crop productivity, water availability, soil health, and rural livelihoods. Climate change challenges are compounded by the gaps in knowledge, limited access to adaptive technologies, and constrained local decision-making capacity of state- and district-level officials. To help address this gap, the Center for Study of Science, Technology and Policy (CSTEP) in collaboration with the Department of Agriculture & Farmers' Empowerment (DA&FE), Government of Odisha, is supporting the state's transition to climate-smart agriculture (CSA). This partnership aims to enhance institutional capacity, improve climate literacy, inform policy, and promote sustainable practices in agriculture and allied sectors.

As part of this effort, CSTEP and DA&FE have launched a series of capacity-building workshops, beginning with the session titled 'Climate Change: Science, Impacts, and Solutions'. The concept note and agenda are included as Appendix A and Appendix B, respectively.

1.1. Objectives

This workshop addressed critical knowledge gaps by focusing on the following objectives:

- **Enhance understanding of the science of climate change:** Facilitating the development of a clear and practical understanding of climate change—its science, causes, and implications across various sectors, including agriculture and allied sectors
- **Promote understanding of sectoral climate-risk assessment methods and potential solutions:** Equipping participants with the knowledge and tools necessary to identify and analyse the vulnerabilities and risks posed by climate change to agriculture, horticulture, soil, and water systems and introduce potential adaptation and mitigation strategies to reduce the impacts of extreme climate events
- **Strengthen decision-making:** Building the capacity of state- and district-level officials to develop and effectively implement climate-informed plans and interventions
- **Align with policy frameworks:** Improving participants' understanding of national and international climate commitments and frameworks, including India's Nationally Determined Contributions, Odisha's State Action Plan on Climate Change, and schemes such as the National Adaptation Fund for Climate Change and how these can be leveraged for district-level actions.

2. Participant Overview

The training programme was conducted across three batches, including participants from all 30 districts across Odisha as well as state-level officers. Each batch comprised mixed groups of participants from three directorates, Agriculture and Food Production, Horticulture, and Soil Conservation and Watershed Development, to foster cross-sectoral learning. The district representatives were organised into three regional clusters based on shared climatic and geographic characteristics.

The training was conducted in batches aligned with the regional groupings. The batch-wise schedule and participant details are provided in Table 1. The list of participants is provided in Appendix C.

Table 1: Batch-wise schedule and participant details

Batches	Dates	Total number of participants	Number of district-level officers	Number of state-level officers
Batch 1	7–8 April 2025	36	33	3
Batch 2	9–10 April 2025	34	31	3
Batch 3	11–12 April 2025	30	27	3
Total		100	91	9

2.1. Participants' pre-training knowledge and expectations

A survey was conducted before the training for all three batches to evaluate their baseline knowledge on themes pertaining to climate change, including impact, mitigation, adaptation, vulnerability, and policy frameworks. The aim was to identify knowledge gaps and tailor training contents accordingly to ensure better learning outcomes. The following are the survey's major findings:

- Most of the participants in all three batches possessed basic knowledge of climate change science and its impacts on the agriculture sector and considered climate as being very or extremely relevant to their daily activities (Figure 1).
- On average, the participation of officers with climate-related work experience was well balanced, with 45% having more than 5 years of experience in climate-related work, 27% having 1–5 years of experience, and 28% being relatively new to the field, with less than 1 year of experience (Figure 2). However, the results varied across batches.
- Participants had moderate to limited understanding of mitigation and adaptation strategies, suggesting the need for focused capacity building in these areas. Concepts such as climate vulnerability and global climate policies required deeper explanation and contextualisation.

To address these gaps, the training programme focused on the following:

- Practical examples of adaptation and mitigation relevant to agriculture and allied sectors
- Simplified frameworks for assessing impacts, vulnerability, and climate risks at the district level in agriculture and allied sectors.

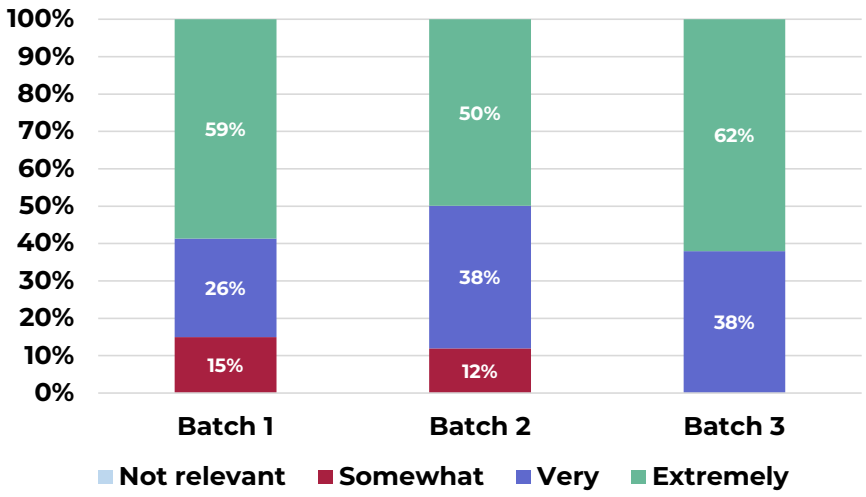

Figure 1: Participants' responses to climate change in day-to-day work

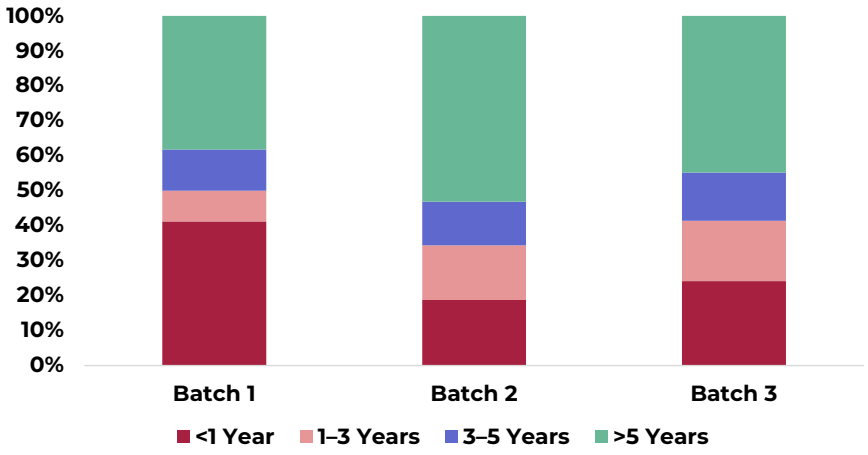

Figure 2: Participants' experience in climate-related work

3. Training Content and Delivery Methods

The training programme was inaugurated with a traditional plant watering activity, symbolising our commitment to sustainability. The event was graced by Shri Shubhranshu Mishra, Additional Secretary, DA&FE, GoO, who delivered the welcome address, emphasising the importance of climate-focused capacity building. This was followed by a round of participants' introductions, during which attendees shared their names, the directorate to which they were affiliated, and specific interest areas pertaining to climate change. The exercise encouraged participation and established a collaborative tone for the sessions. Next, the team from CSTEP was introduced and an overview of their expertise (Appendix D) provided.

Shri Nagendra Kumar Malik presented a brief overview of the structure and objective of the two-day training programme.

Dr Tushar Ranjan Mohanty, Professor, Agrometeorologist (OUAT), urged district- and state-level officials to act decisively in the light of shifting climate patterns affecting all 314 blocks of Odisha. He emphasised that overall rainfall has not declined significantly, but there has been a reduction in the number of rainy days, especially in June, a crucial sowing month, posing serious challenges for rainfed agriculture. Additionally, he highlighted that rising day and night temperatures, particularly in the summer months, are increasing climate stress on farming systems. However, he pointed out that these changes also present opportunities, particularly in northern Odisha, where warmer rabi seasons may support the cultivation of pulses such as green gram and black gram. Dr Mohanty called for increased investments in irrigation, drainage, and soil moisture conservation, alongside promoting adaptive strategies such as low-water-requiring crops and revised sowing calendars to build long-term resilience in agriculture.

3.1. Training delivery methods

The training programme adopted a participatory methodology designed to actively engage participants throughout the sessions. The methods used to deliver the sessions are given in Figure 3.

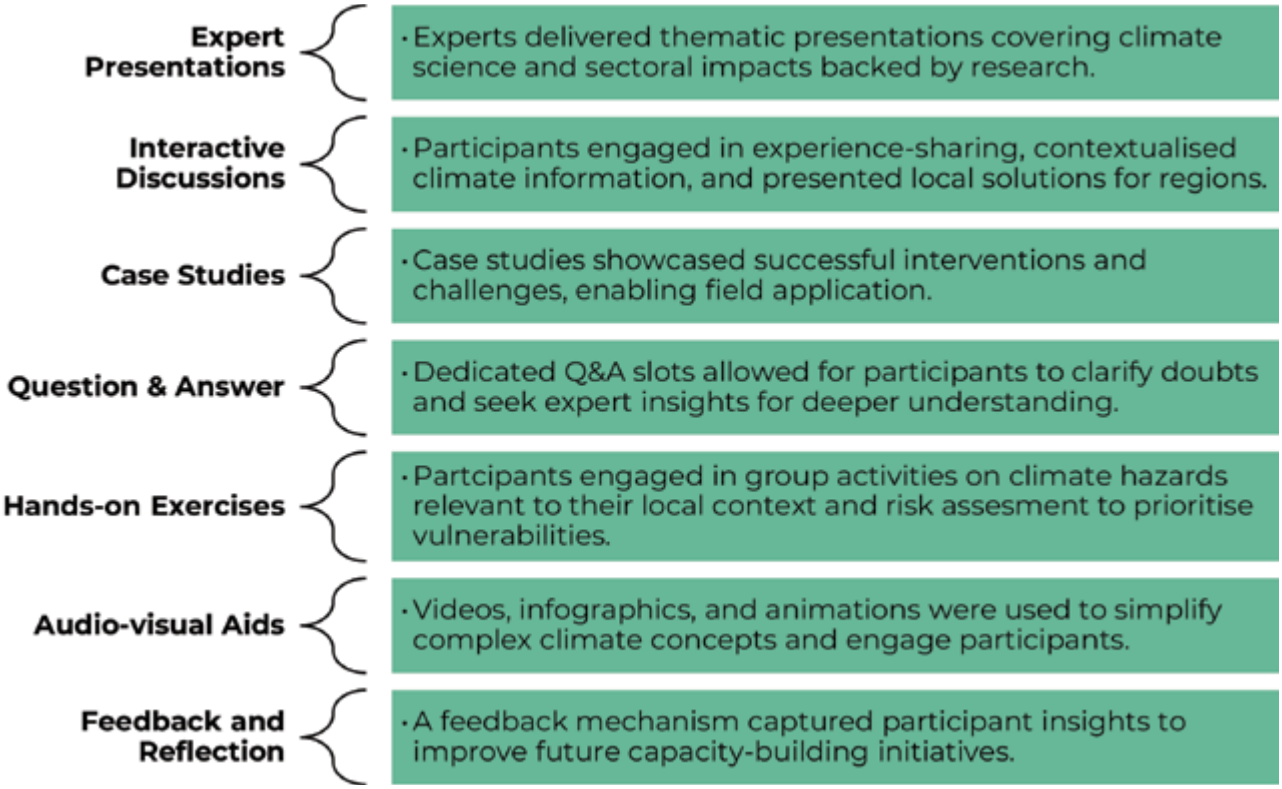

Figure 3: Overview of training methodologies

3.2. Session-wise descriptions

Session 1: Introduction to Climate Change and Impacts at Different Scales—The Basics —Dr Indu K Murthy	
Methodology	Presentation, audio-visual aids, and interactive discussion
Topics Discussed	Participants were introduced to fundamental concepts of climate change through scientific explanations about the greenhouse gas effect, global warming, and long-term trends in surface temperature rise. The session covered natural and anthropogenic drivers, including fossil fuel combustion, deforestation, and unsustainable agriculture. Using global and India-specific data, the presenter highlighted observable indicators of climate change such as extreme weather events, glacial melt, rising sea levels, and declining biodiversity. The socio-political dimensions of climate change, including climate justice, equity in global negotiations, and the role of developed vs developing nations, were also explored.

Key Learning Outcomes	• Developed a foundational understanding of the science behind climate change and its global and regional manifestations • Recognised key drivers and indicators of climate change and how they differ across geographic scales • Gained an understanding of the implications of climate change for agriculture, health, water, and biodiversity, particularly in the Indian context • Became aware of climate justice issues and the role of policy and international negotiations in shaping climate action
Session 2: Sectoral Impacts of Climate Change —Srilakshmi Menon	
Methodology	Presentation, interactive discussion, and group activity
Topics Discussed	This session explored the multi-dimensional impacts of climate change across key sectors, including agriculture, water, biodiversity, livestock, fisheries, infrastructure, and human health. Using visual and data-driven methods, the session highlighted how climate hazards such as cyclones, floods, heatwaves, and droughts influence livelihoods, ecosystems, and economic stability. The session particularly focused on Odisha's climate vulnerabilities, illustrating how different districts face varying risks, from coastal erosion and salinisation to water stress and yield reduction. Participants examined case studies to understand sector-specific disruptions and the interconnectedness of impacts.
Key Learning Outcomes	• Enhanced understanding of how climate change affects multiple sectors • Identified sector-specific consequences, such as yield losses, soil degradation, pest outbreaks, and infrastructure damage • Practised systems thinking to trace interlinkages between sectoral impacts • Recognised the importance of aligning local assessments with state and national climate action plans to ensure coordinated resilience building.

3.2.1. Group activity on climate hazards and its impacts

A group activity was conducted to promote experiential learning for the participants. It was aimed at exploring the direct and indirect impacts of climate hazards on agricultural and allied sectors. Participants in each batch were divided into four groups and assigned a specific climate hazard (Table 2). The hands-on exercise reflected the value of activity-based learning approaches, as highlighted in post-training reflections (Menon, L., & Cheranda, T.M., 2025a).

Each group identified a minimum of 5–8 direct and indirect impacts of the assigned hazard; these included soil erosion, pest and disease outbreaks, declined yields, damage to standing crops, market disruption, and migration of farm labour. These observations were noted in the reflections on local climate risks and district-specific challenges (Menon, L., & Cheranda, T.M., 2025b). A representative from each group presented the outcome of this group discussion and demonstrated critical thinking by mentioning short-term losses and long-term risks, such as food insecurity, economic instability, and reduced adaptive capacity.

Table 2: Group allocation and topics

Group	Climate hazard
Group 1	Cyclone with storm surge
Group 2	Heatwave plus prolonged drought
Group 3	Erratic rainfall
Group 4	Inland flooding

The group activity primarily enhanced awareness of the multi-dimensional nature of climate risks and improved participants' ability to distinguish between immediate and systemic impacts. It highlighted the importance of coordinated planning and early warning systems. The group exercise also fostered a new learning approach of collaborative problem solving, laying the foundation for localised climate adaptation planning.

Session 3: Addressing Climate Change: Mitigation and Adaptation —Dr Indu K Murthy	
Methodology	Presentation, interactive discussion, and audio-visual aids
Topics Discussed	This session focused on equipping participants with a clear understanding of the concepts of climate change mitigation and adaptation. Participants learned that mitigation involves reducing greenhouse gas emissions and enhancing carbon sinks, while adaptation refers to building resilience and coping mechanisms to manage climate-related impacts. India's commitments under the Paris Agreement were discussed, along with the country's achievements in emissions reduction and renewable energy expansion. Interventions specific to Odisha, such as precision irrigation, agroforestry, solar-powered systems, conservation tillage, and crop diversification, were presented as examples of climate-smart agricultural practices. The session also highlighted national schemes and initiatives supporting climate action and improved early warning systems.
Key Learning Outcomes	• Developed a strong conceptual understanding of the differences and interlinkages between mitigation and adaptation • Gained insights into India's climate policy framework and Odisha's contributions to national climate goals • Identified locally relevant CSA practices that contribute to emissions reduction, an increase in productivity, and adaptive capacity • Enhanced the ability to integrate mitigation and adaptation into district-level planning for sustainable agricultural development
Session 4: Climate Vulnerability and Risk Assessments —Tashina Madappa Cheranda	
Methodology	Presentation, interactive discussion, polls, quiz, and group activity
Topics Discussed	The session introduced participants to the frameworks and principles behind climate risk and vulnerability assessments, focusing on how they can be applied at the district level to guide informed planning. Climate risk was presented as the interaction between hazard, exposure, and vulnerability, with an example for the agriculture sector. Participants were guided through an indicator-based approach, learning how to select, normalise, and weigh indicators relevant to hazards. Participants were asked to distinguish between sensitivity and adaptive capacity indicators through an interactive poll. They also participated in a quiz based on the risk assessment concepts explained during the session.

Key Learning Outcomes	• Gained understanding of the conceptual basis of climate vulnerability and risk and the need for anticipatory planning • Gained familiarity with key components of risk assessments—hazard, exposure, and vulnerability indicators • Learned to apply indicator-based frameworks and mapping tools for assessing sectoral and regional risks • Strengthened capacity to design locally relevant risk profiles for prioritising climate-resilient interventions • Recognised the importance of aligning vulnerability and climate risk assessments with district and state-level climate action planning

3.2.2. Group activity on climate risk assessment

The prime objective of the group activity was to get participants to learn and apply the various steps for undertaking a climate risk assessment. Participants were divided into three groups based on their directorates. They were asked to complete the following steps:

- Step 1: Define the scope of a risk assessment.
- Step 2: Select the type of risk assessment—biophysical, socioeconomic, or integrated.
- Step 3: Select the tier they would employ. Mention the spatial and temporal scale of assessment.
- Step 4: Identify indicators—one for climate hazard, two for exposure, two for sensitivity, and three for adaptive capacity.

All groups were highly engaged in this activity and presented the details of the steps of climate risk assessment. They were able to identify the following relevant hazard and exposure indicators, as well as indicators of vulnerability:

- Hazards identified: Drought; flood; variability in temperature, rainfall, and cyclone
- Vulnerability indicators identified: Landholding size, crop diversity, irrigation coverage, soil fertility, access to services, literacy rates, and insurance coverage.
- The hands-on exercise helped in honing the participants' critical thinking skills and enhanced their understanding of the Intergovernmental Panel on Climate Change climate risk framework.

Session 5: Climate-Resilient Agriculture (CRA) and Departmental Initiatives —Nagendra Kumar Malik	
Methodology	Presentation, interactive discussion
Topics Discussed	The session outlined Odisha's strategic approach to addressing climate change impacts by discussing climate-resilient agriculture (CRA), the state's vulnerability status, natural disasters, adaptation and mitigation strategies, CRA-diversified cropping pattern, improved irrigation, digital extension services, and the state's Climate Resilience Cell
Key Learning Outcomes	• Transforming CRA into policy through the State Action Plan on Climate Change; adoption of resilient practices • Leveraging technology for farmer empowerment by aligning with the United Nations' Sustainable Development Goals • Odisha is making field interventions through policy innovations and global collaborations.
Session 6: Climate-Resilient Agricultural Practices—Case Studies —Sachin Venkatrao P	
Methodology	Presentation, interactive discussion
Topics Discussed	Mechanised direct-seeded rice (DSR) and customised leaf colour chart (CLCC)
Key Learning Outcomes	• Mechanised DSR is used as a seed-cum-fertilizer drill to reduce seed input and labour, as well as cultivation cost by 4500/ha; yields are higher than in conventional methods. • CLCC improves nitrogen efficiency by 22%–24% and reduces nitrogen input by 20%. The yield increases by 10%–25%, and overall gains increase up to ₹14,544/ha.

The training programme concluded with a valedictory session that brought together key dignitaries and participants for a reflective and forward-looking discussion.

The key participating officials included Shri Shubharanshu Mishra, Additional Secretary, DA&FE, GoO; Shri Nagendra Kumar Malik, Assistant Director, DA&FE, GoO; and Dr Indu K Murthy, Sector Head, Climate, Environment, and Sustainability, CSTEP. Participants received certificates from dignitaries on completion of the training. The dignitaries appreciated the participants for their active involvement in the training programme. The key takeaways from their speeches are summarised below.

The Additional Secretary emphasised the critical role of district-level officials in mainstreaming CSA over conventional practices and bridging the gap between science and field-level implementation. He acknowledged the challenges posed by erratic weather and land degradation and highlighted the need to scale up training and awareness at the field level for farmers. He also emphasised the department's commitment to providing technical support and strengthening climate resilience in agricultural practices.

The Assistant Director stressed the significance of capacity building for frontline officers, stating that such training programmes are essential to enhance understanding of emerging climate challenges and local adaptation solutions. He also highlighted the importance of data-driven decision-making and climate-informed planning. Furthermore, he appreciated the format of the training that fostered mutual learning through peer discussion and knowledge sharing.

Officials from the DA&FE announced that a group of selected participants will be invited to join upcoming capacity-building workshops as part of the ongoing training series. The next line-up will be focused on HRVA and Climate modeling, for Risk-Informed Prioritisation of adaptation strategies in which the Participants will learn how to use HRVA and climate modelling tools to identify climate risks, vulnerabilities, and exposure in agricultural systems. They will also gain skills to prioritise adaptation strategies based on risk-informed, data-driven decision-making. this will followed by trainings on Climate-Smart Agriculture: Principles, Practices, and Agroecological Relevance, Planning CSA Adoption Based on Climate Risks, Cropping Systems, and Feasibility, Farming in a Changing Climate – What Every Farmer Should Know, Adopting Climate-Resilient Practices – How to Protect Yield and Income, Evaluating CSA: CBA and LCA perspectives and Understanding Policies and Schemes through a Climate Lens.

4. Key Outcomes and Learnings

After the training, participants were requested to share feedback on the technical sessions, logistics, and expected impact of training on their professional roles. The key findings from their responses are summarised below.

4.1. Training content and delivery

The training led to significant improvement in participants' understanding of climate change and the additional topics covered. As reflected in the pre- and post-training feedback, 43% of participants rated their understanding as moderate before the training. However, post training, the percentage increased to 90% (Figure 4).

Additionally, 90% of the participants rated the overall content delivery and training sessions as good or excellent, indicating the relevance of the topics and clarity of delivery (Figure 5).

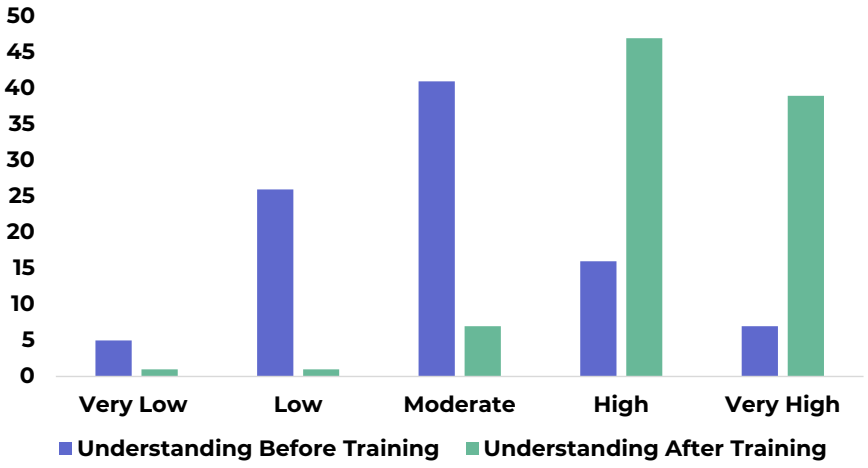

Figure 4: Understanding of topics related to climate change before and after training

Figure 5: Satisfaction with training content and quality

4.2. Confidence in applying the knowledge gained

Most of the participants (64%) felt confident in applying the knowledge gained from the training, indicating that the training's core objective of building practical understanding was fulfilled; however, 25% of participants expressed moderate confidence in applying the knowledge and 11% felt slightly confident in applying the concepts. This feedback suggests a need to further simplify complex topics and incorporate more real-world examples in future sessions to enhance clarity and application (Figure 6).

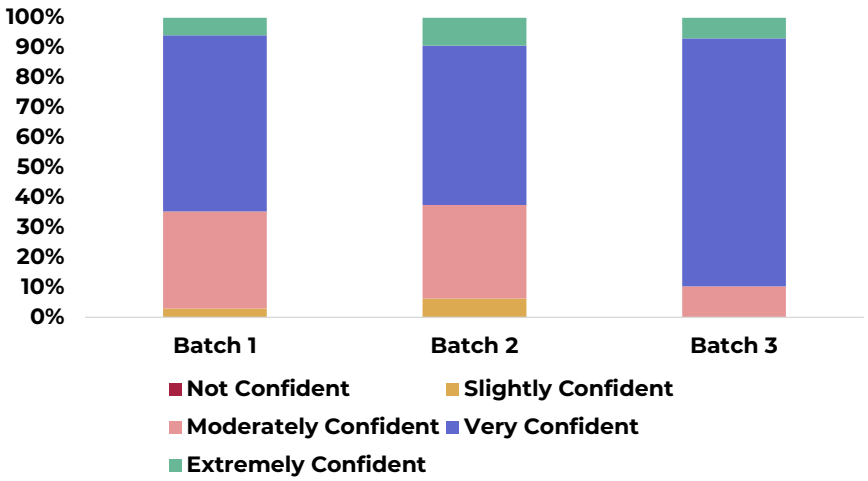

Figure 6: Applicability of knowledge gained to participants' work

4.3. Logistics and overall experience

The logistical arrangements for the training were appreciated, with 80% of participants rating them as good or excellent, reflecting smooth coordination and effective delivery (Figure 7). Overall, participant satisfaction with capacity building was notably high—60% reported being satisfied while the remaining 40% expressed that they were very satisfied (Figure 8). These responses indicate that both the content and the organisation of the training met participant expectations.

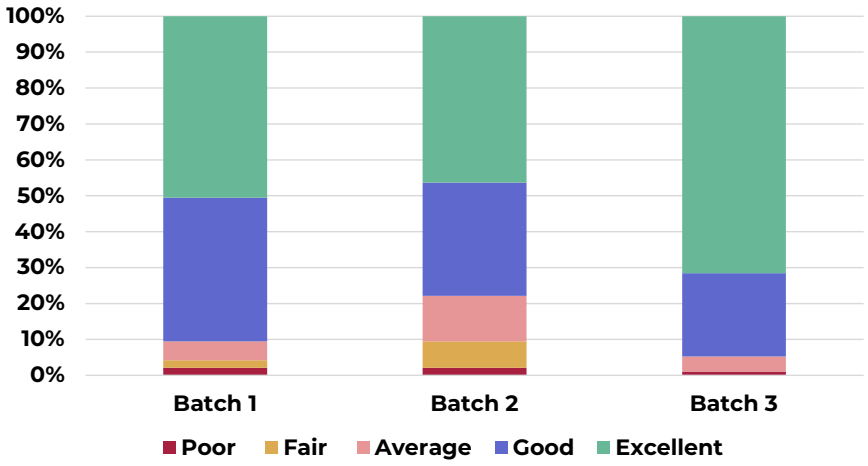

Figure 7: Logistics

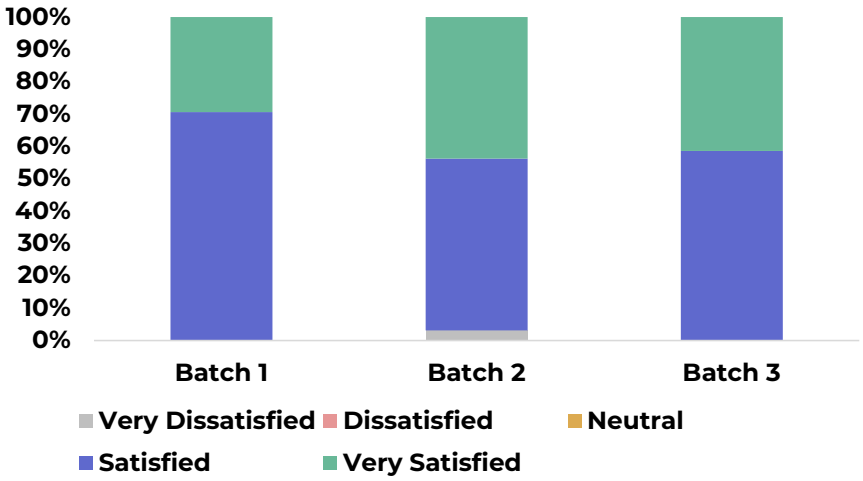

Figure 8: Overall experience

4.4. Recommending the training programme to others

Most of the participants (>75%) responded that they would recommend the training to others, reflecting a strong endorsement of its relevance and quality. Additionally, they expressed satisfaction with the programme and perceived it as being valuable for enhancing their knowledge and skills (Figure 9).

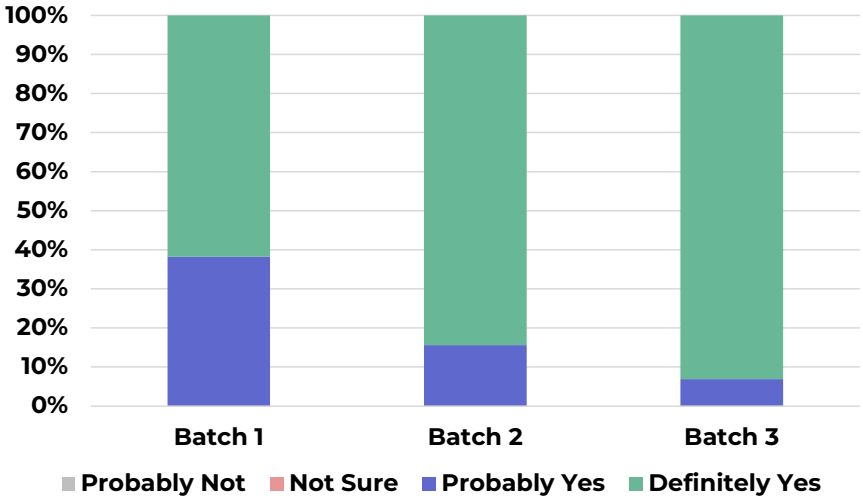

Figure 9: Recommending the training programme to others

5. Key Takeaways and the Way Forward

The training programme provided essential insights that will guide participants to transform climate resilience efforts in the agriculture and allied sectors. The feedback from participants shows that the training was valuable, equipping them with essential knowledge, practical skills, and the confidence necessary to integrate climate considerations into their professional roles.

The feedback provided by participants will contribute to improving future training programmes. A majority recommended extending the training duration to 4–7 days, allowing for deeper engagement with the content. They also suggested incorporating field visits to model farms or climate-resilient villages to gain practical insights. Additionally, many participants expressed interest in future sessions focused on sector-specific adaptation measures, highlighting the need for targeted and applied learning to better address the challenges of climate change in their respective contexts.

6. References

Menon, L., & Cheranda, T.M. (2025a). Reflections from a climate training workshop: Activity-based learning.https://www.linkedin.com/pulse/reflections-from-climate-training-workshop-activity-based-learning-ujncc

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7. Appendices

Appendix A: Concept note for 'Climate Change: Science, Impacts, and Solutions'

The Center for Study of Science, Technology and Policy (CSTEP), in collaboration with the Department of Agriculture & Farmers' Empowerment (DA&FE), Government of Odisha, is working towards building climate resilience in the state's agriculture and allied sector. As part of these efforts, we propose a series of capacity-building training programs on key climate-related themes, including climate change science, adaptation, mitigation, climate modelling, climate-smart agriculture, greenhouse gas (GHG) emissions profiling, life cycle assessment, climate finance, and carbon markets.

This concept note outlines the first training programme in the series, titled 'Climate Change: Science, Impacts, and Solutions'. Designed as a one-and-a-half-day, state-level event, this programme aims to enhance the awareness and technical capacity of district-level government functionaries working on climate change in Odisha. By providing a comprehensive understanding of climate change science, the implications of climate change and the urgency for action, the programme will equip participants with the knowledge and tools needed to drive climate action within their respective domains.

This training programme will be conducted for district-level functionaries from 30 districts across Odisha and 3 state-level agriculture officers. The programme will have 99 participants, with representatives from the Directorates of Agriculture and Food Production, Horticulture, and Soil Conservation and Watershed Development. To ensure effective engagement and learning, participants will be divided into 3 batches of 33 participants each, with each batch attending a separate one-and-a-half-day session. To foster cross-sectoral learning and collaboration, each batch will consist of a mixed group of participants, 10 each from the 3 directorates and 3 state-level officers, allowing for cross-cutting discussions and interaction between departments that are interdependent and interconnected.

The training programme will span six days. CSTEP seeks support from DA&FE for logistics, including the venue and finalisation of participants for the three training batches.

The next capacity-building workshop will focus on GHG emissions profiling. This workshop is targeted towards district and state-level officials from the Directorates of Agriculture and Food Production, Horticulture, and Soil Conservation and Watershed Development. Individuals familiar with MS Excel-based data analysis are eligible to participate in this workshop. Attendees of the first workshop will be briefed on the upcoming workshop to gauge interest and suitability.

Appendix B: Agenda

Training Programme on Climate Change: Science, Impacts, and Solutions
Date: April 7–12 (Batch 1: April 7–8, Batch 2: April 9–10, and Batch 3: April 11–12)
Venue: State Institute of Training and Extension (SITE), Bhubaneswar, Odisha

Time	Activity	Resource
Day 1		
9:00 a.m.–9.30 a.m.	**Registration**	**CSTEP**
9:30 a.m.–11.00 a.m.	**Welcome Note**	Shri Shubhranshu Mishra (Additional Secretary, DA&FE)
	Address	Shri Shubham Saxena, Director, Directorate of Agriculture and Food Production, DA&FE Shri Nikhil Pavan Kalyan, Director, Horticulture, Soil Conservation and Watershed Development Shri Purna Chandra Shaw, Principal, SITE, Bhubaneswar Members, CRC
	Keynote Address	Dr Arabinda Kumar Padhee (IAS, Principal Secretary, DA&FE)
	Icebreaker: Brief introductions and sharing of expectations	
11:00 a.m.–11:15 a.m.	**Tea/Coffee Break**	
11:15 a.m.–1:00 p.m.	**Session 1. Introduction to Climate Change and Impacts at Different Scales—The Basics** *Interactive session delivered in the form of a short presentation followed by discussion*	Dr Indu K Murthy, CSTEP
1:00 p.m.–2:00 p.m.	**Lunch Break**	

2:00 p.m.–3:30 p.m.	**Session 2. Sectoral Impacts of Climate Change** **Presentation:** How climate change affects key sectors: Agriculture and other inter-related sectors Interactive session on perspectives from the field. Participants worked in groups to identify and map the climate impacts they perceived.	Srilakshmi Menon, CSTEP
3:30 p.m.–4:00 p.m.	**Tea/Coffee Break**	
4:00 p.m.–5:00 p.m.	**Session 3. Addressing Climate Change: Mitigation and Adaptation** **Presentation:** Overcoming or reducing the harmful effects of climate change and approaches to be adopted	Dr Indu K Murthy, CSTEP
5:00 p.m.	**Wrap Up**	
Day 2		
10:00 a.m.–10:30 a.m.	Recap of Day 1	Tashina Madappa, CSTEP
10:30 a.m.–11:30 a.m.	**Session 4. Climate Vulnerability and Risk Assessments** **Presentation:** Introduction to assessment of risks of climate change using a scientific framework considering climate hazards, exposure, and vulnerability	
11:30 a.m.–12:00 p.m.	**Tea/Coffee Break**	
12:00 p.m.–12:45 p.m.	**Group Discussion**: Possible indicators to be selected for undertaking vulnerability assessment	Moderated by CSTEP Team
12:45 p.m.–1:30 p.m.	• Workshop Closure • Closing remarks by the facilitator • Participant feedback and reflections on the workshop • Certificate distribution	
1:30 p.m.	**Lunch and Dispersal**	

Appendix C: List of participants

Sl. No.	Name	Directorate	Designation	District
Batch 1 (7–8 April 2025)				
1	Amit Kumar Behera	Soil Conservation and Watershed Development	ADSC	Angul
2	Kishore Chandra Behera	Soil Conservation and Watershed Development	ASCO	Bolangir
3	Soubhagini Behera	Soil Conservation and Watershed Development	ADSC	Bargarh
4	Bijayalaxmi Naik	Soil Conservation and Watershed Development	AAE	Deogarh
5	Anuradha Behera	Soil Conservation and Watershed Development	ADSC	Dhenkanal
6	Suprava Matha	Soil Conservation and Watershed Development	AAE	Jharsuguda
7	Pradeep Kumar Rout	Soil Conservation and Watershed Development	ADSC	Kendujhar
8	Rosy Sahoo	Soil Conservation and Watershed Development	ADSC	Sambalpur
9	Sambhuraj Bhoi	Soil Conservation and Watershed Development	AAE	Sonepur
10	Siba Prasad Nayak	Soil Conservation and Watershed Development	ADSC	Bhubaneswar
11	Chinmayee Roy	Agriculture and Food Production	AAO	Angul
12	Abhisek Agrawal	Agriculture and Food Production	AAO, Sohela	Bargarh
13	Nehalin Bhuyan	Agriculture and Food Production	AAO	Bolangir
14	Satyaprakash Das	Agriculture and Food Production	BAO	Deogarh
15	Markanda Pradhan	Agriculture and Food Production	ADA, Soil Chemist	Dhenkanal
16	Sasmita Patel	Agriculture and Food Production	AAO	Iharsuguda

17	Subrata Kumar Malik	Agriculture and Food Production	AAO	Kendujhar
18	Soumya Bhoi	Agriculture and Food Production	AAO	Sambalpur
19	Pranatirani Pradhan	Agriculture and Food Production	BAO	Subarnapur
20	Soumya Subham Guru	Agriculture and Food Production	AAO, Gurundia	Sundargarh
21	Chandra Prava Parida	Agriculture and Food Production	ADA	DA&FP, Odisha
22	Nabin Chandra Sahu	Agriculture and Food Production	AAO	Sundargarh
23	Narayan Chandra Sahu	Agriculture and Food Production	BAO	Angul
24	Bidyut Kumar Sahoo	Agriculture and Food Production	AAO	Mayurbhanj
25	Priyanka Priyadarsini	Horticulture	AHO	Angul
26	Sriya Saswati	Horticulture	ADH	Bolangir
27	Nirakar Meher	Horticulture	AHO	Bargarh
28	Soubhagya Kumar Sahu	Horticulture	AHO	Deogarh
29	Asutosha Behera	Horticulture	AAE	Dhenkanal
30	Nutanshree Patel	Horticulture	AHO	Jharsuguda
31	Archana Behera	Horticulture	AHO	Keonjhar
32	Mousumi Sarpatia Didi	Horticulture	AHO	Sambalpur
33	Lucy Priyadarshini Pujahari	Horticulture	AHO	Subarnapur
34	Barun Kumar Meher	Horticulture	AEE	Khordha
35	Madhumita Minz	Horticulture	AHO	Sundargarh
36	Pramod Kumar Mahara	Soil Conservation and Watershed Development	AAE	Sundargarh

Batch 2 (9–10 April 2025)				
37	Adyasha Mallick	Soil Conservation and Watershed Development	AAE	Boudh
38	Rashmi Rekha Nayak	Soil Conservation and Watershed Development	ADSC	Gajapati
39	Suman Saurav Samantaray	Soil Conservation and Watershed Development	AAE	Ganjam
40	Puspalata Hembram	Soil Conservation and Watershed Development	ADSC	Kalahandi
41	Rajesh Kumar Behera	Soil Conservation and Watershed Development	ADSC	Kandhamal
42	Narasingh Nayak	Soil Conservation and Watershed Development	ADSC	Koraput
43	Sameer Kumar Sabar	Soil Conservation and Watershed Development	ADSC	Malkangiri
44	Santosh Kumar Biswal	Soil Conservation and Watershed Development	ADSC	Nabarangpur
45	Swayam Prava Singh	Soil Conservation and Watershed Development	ADSC	Nuapada
46	Sampad Swarup Samal	Soil Conservation and Watershed Development	ADSC	Rayagada
47	Sushree Sonakshi Biswal	Soil Conservation and Watershed Development	ADSC	DSC&WD, Odisha
48	Subhashree Jena	Agriculture and Food Production	BAO	Ganjam
49	Devi Prasad Prusty	Agriculture and Food Production	BAO	Kalahandi
50	Ashutosh Sahoo	Agriculture and Food Production	AAO	Kandhamal
51	Sangeeta Behera	Agriculture and Food Production	AAO	Koraput
52	Firoj Kumar Bidika	Agriculture and Food Production	AAO	Malkangiri
53	Prasanta Kumar Bag	Agriculture and Food Production	AAO	Nabarangpur

54	Ashish Kumar Meher	Agriculture and Food Production	AAO	Nuapada
55	Diptirani Patnaik	Agriculture and Food Production	AAO	Rayagada
56	Priyanka Priyadarshini	Agriculture and Food Production	ADA	Khorda
57	Sisir Kumar Bishoyi	Agriculture and Food Production	BAO	Gajapati
58	Swagatika Mishra	Agriculture and Food Production	BAO	Jajpur
59	Pooja Barik	Horticulture	AHO	Boudh
60	Archana Nahak	Horticulture	AHO	Gajapati
61	Aiswariya Panda	Horticulture	AHO	Ganjam
62	Sri Sourav Panigrahi	Horticulture	AHO	Kalahandi
63	Lipsa Rani Dalabehera	Horticulture	AHO	Kandhamal
64	Sanjib Mohanta	Horticulture	ADH	Koraput
65	Miss Namita Madhi	Horticulture	AHO	Malkangiri
66	Miss Tejaswini Nayak	Horticulture	AHO	Nabarangpur
67	Rabindra Nag	Horticulture	AHO	Nuapada
68	Tanmay Chhualsingh	Horticulture	AHO	Rayagada
69	Debashis Martha	Horticulture	AHO	Khorda
70	Madhu Sudan Patra	Agriculture and Food Production	AAO	Boudh

Batch 3 (11–12 April 2025)				
71	Subhasis Das	Soil Conservation and Watershed Development	AAE	Balasore
72	Satyabrata Das	Soil Conservation and Watershed Development	AAE	Bhadrak
73	Manisha Rout	Soil Conservation and Watershed Development	ADSC	Cuttack
74	Sarfraz Mohammad	Soil Conservation and Watershed Development	AAE	Jajpur
75	Niharika Sahoo	Soil Conservation and Watershed Development	AAE	Kendrapara
76	Arati Sethi	Soil Conservation and Watershed Development	ASCO	Mayurbhanj
77	Madhusmita Behera	Soil Conservation and Watershed Development	ASCO	Nayagarh
78	Swayamprava Das	Soil Conservation and Watershed Development	ADSC	Puri
79	Ankita Mishra	Soil Conservation and Watershed Development	ADSC	DSC&WD
80	B P Rosalin	Agriculture and Food Production	Block Agriculture Officer, Simulia	Baleshwar
81	Jaffna Ray	Agriculture and Food Production	BAO, Cuttack Sadar	Cuttack
82	Annapurna Behera	Agriculture and Food Production	ADO, Jagatsinghpur	Jagatsinghapur
83	Debabrata Sethi	Agriculture and Food zProduction	BAO, Rajnagar; ADO, Kendrapara	Kendrapara
84	Rohan Kumar Panda	Agriculture and Food Production	BAO, Balipatna; ADO, Bhubaneswar	Khordha

85	Arpita Sahoo	Agriculture and Food Production	ADO Nayagarh	Nayagarh
86	Soumyaranjan Patra	Agriculture and Food Production	AOO, Puri	Puri
87	Abhipsha Priyadarsini	Agriculture and Food Production	AAO	Bhubaneshwar
88	Subhashree Mohanty	Agriculture and Food Production	BAO	Cuttack
89	Surya Prakash Mishra	Horticulture	AHO	Balasore
90	Subhadarsini Rath	Horticulture	AHO	Bhadrak
91	Devi Prasad Rout	Horticulture	AHO	Cuttack
92	Swetapadma Bhoi	Horticulture	AHO	Jagatsinghpur
93	Subhashree Subhadarshinee	Horticulture	AHO	Jajpur
94	Sourav Mohpatra	Horticulture	AHO	Kendrapara
95	Sushri Bijayini Mansingh	Horticulture	AAE	Khordha
96	Sujan Kumar Narendra	Horticulture	AHO	Mayurbhanj
97	Anurag Dasmohapatra	Horticulture	AHO	Nayagarh
98	Tribhuban Badjena	Horticulture	AHO	Puri
99	Laxmipriya Dehury	Horticulture	ADH	Bhubaneshwar
100	Tilottama Mahakud	Agriculture and Food Production	ADA, Soil chemist, Bhadrak	Bhadrak

Appendix D: Profiles of trainers

1) Dr Indu K Murthy

Dr Indu K Murthy is Principal Research Scientist and Sector Head, Climate, Environment, and Sustainability, CSTEP. She was a Consultant Scientist at Indian Institute of Science, Bangalore, for over two decades. Her major areas of research and policy advocacy include various dimensions of climate change, including greenhouse gas inventory for the land-use sector; land-based mitigation; and climate change risk, resilience, and adaptation.

She is an expert for the United Nations Framework Convention on Climate Change, a member of the Commission on Ecosystem Management of the International Union for Conservation of Nature and a member of the International Platform on Adaptation Metrics. She is a contributing author for the reports of the Intergovernmental Panel on Climate Change. Further, she is a Coordinating Lead Author and Lead Author, respectively, for the sixth and seventh Global Environment Outlook reports for the Asia Pacific region. She is an Associate Editor on the International Journal of Climate Change Strategies and Management and the Frontiers in Forests and Global Change and an Academic Editor on the PLOS Climate Editorial Board. She has been published widely in journals, leading national newspapers, and other news media.

2) Tashina Madappa C

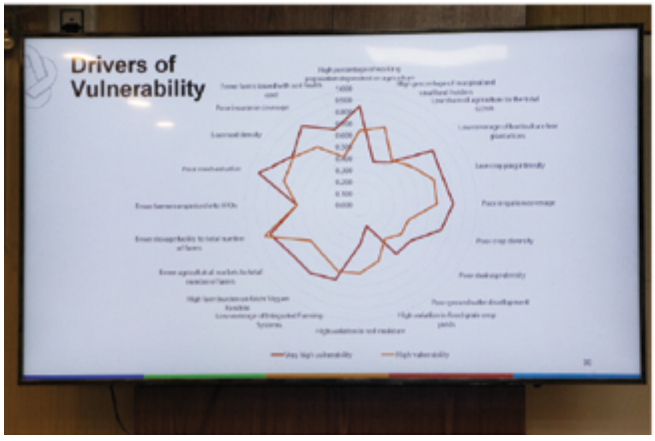
Tashina Madappa Cheranda holds a BSc in Biotechnology from St Joseph's University, Bengaluru; an MSc in Climate Science and Policy from TERI School of Advanced Studies, New Delhi; and an LLM in Climate Change Law and Policy from the University of Strathclyde, Glasgow. With over 14 years of professional experience, she has worked extensively across India on climate resilience, natural resource management, and sustainable agriculture in roles at institutions such as Indian Institute of Science, Environmental Defence Fund, Indian Institute of Technology, Mandi, the World Bank, and International Institute of Environment and Development. She is presently a Senior Associate in the Adaptation and Risk Analysis team at CSTEP. Her work is focused on CSA, low-carbon farming, and enhancing the resilience of agricultural systems. She has led and facilitated numerous capacity-building workshops and training programs for state climate change cells, civil society organizations, and local government agencies to mainstream climate adaptation and risk-informed planning into policy and practice.

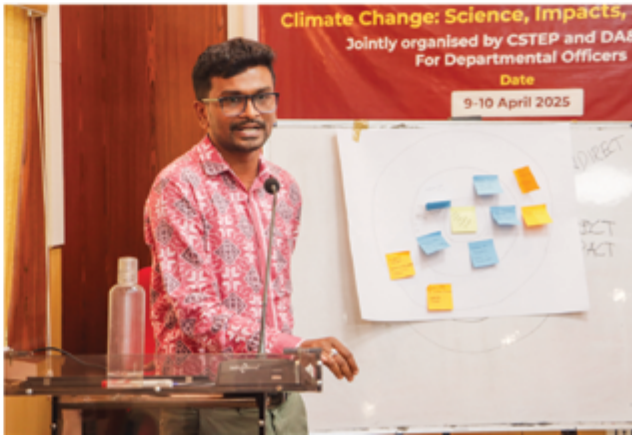
3) Srilakshmi Menon

Srilakshmi Menon holds a MSc in Integrated Sustainable Design from the National University of Singapore (NUS) and a BArch from the National Institute of Technology, Trichy. A licensed architect by training, she has led and contributed to architectural projects across South India. She worked as a Research Associate at the Sustainability Services Division at NUS and as a Climate and Urban Environment Intern with the United Nations Human Settlements Programme (UN-Habitat), with both roles focusing on sustainable urban development and policy. Over the past year, she has contributed to CSA initiatives in Odisha, drawing on her experience in urban agriculture and systems thinking. She has facilitated capacity building programmes for over five years, spanning themes of urban systems, sustainability, and climate change.

Appendix E: Glimpses from the training programme


Training on
Climate Change: Science, Impacts,
Jointly organised by CSTEP and DA&
2025
and Extension
Odisha
and Solutions
&FE, GoO
on (SITE)
TEP


Drivers of
Vulnerability


Climate Change: Science, Impacts,
Jointly organised by CSTEP and DA
For Departmental Officers
Date
9-10 April 2025


Training on
Climate Change: Science, Impacts, and Solutions
Jointly organised by CSTEP and DA&FE, GoO
For Departmental Officers
Date
7-8 April 2025
Scan the QR code for details
State Institute of Training and Extension (SITE)
Bhubaneswar, Odisha
CSTEP

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Center for Study of Science, Technology & Policy

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