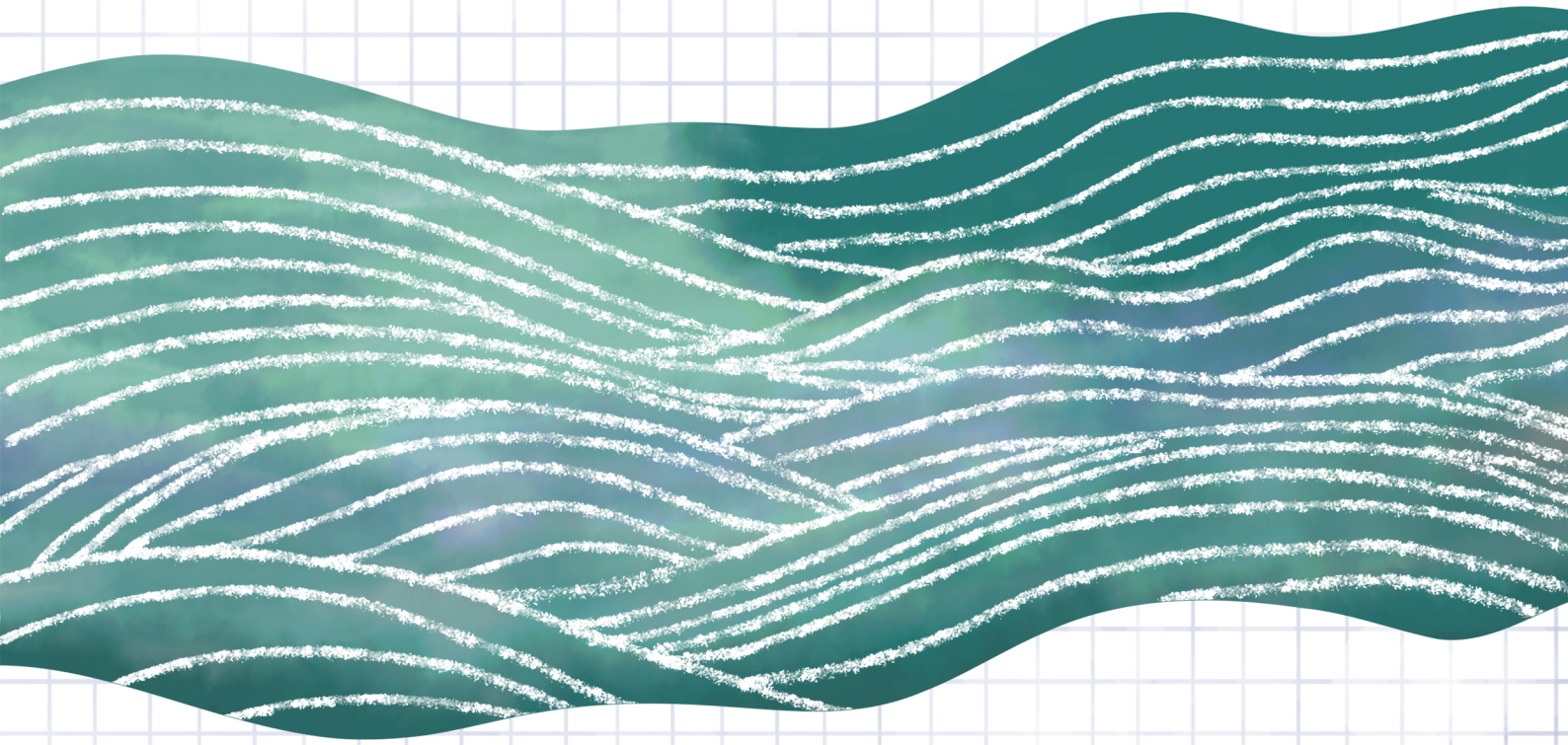
Consortium for Agroecological Transformations

CARING FOR THOSE WHO FEED THE NATION
CSA
SINCE 2004

Landscape-Based Investment Plans for Mainstreaming Agroecology



Summary Note

SEPTEMBER 2025

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Consortium for Agroecological Transformations

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Prepared by **The Consortium for Agroecological Transformations**
hosted at **The Centre for Sustainable Agriculture.**

September 2025

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Acknowledgements

Note: These acknowledgements have been organised in alphabetical order, except sections where two or more names of individuals belonging to the same organisation occur together.

The Consortium for Agroecological Transformations (CAT) would like to acknowledge several organisations and individuals, without whose involvement and support, this enormous and systematic undertaking would not have reached this critical juncture in our larger concerted effort to scale agroecology.

CAT is grateful to many individuals whose insights, reflections, ideation, and vision have shaped the consortium's thinking, for these have been foundational in its approach throughout its existence.

CAT's journey began with the formation of its Working Group (WG), which has played a crucial role in guiding and framing the underlying process and all the stipulations that have come to constitute CAT's landscape-based approach. To that end, CAT is incredibly grateful to the following WG members, who have been instrumental in soliciting input, providing feedback, analysing & rethinking the direction of CAT's initiatives, and assessing methods and priorities:

Dr. G. V. Ramanjaneyulu of the Centre for Sustainable Agriculture, whose intellectual dexterity, scholarly & judicious expertise, formidable domain knowledge and profound tutelage have brought considerable value to this entire process.

Ms. Mridula Pandey of the Children's Investment Fund Foundation, whose exceptional ability to navigate the labyrinthine ecosystem of funding, influence, and social and ecological action has ensured a firm footing for CAT in the entire ecosystem.

Shri P. V. Suryakumar, the Former Managing Director of the National Bank for Agriculture and Rural Development (NABARD), whose tenacity, tact, and authenticity, coupled with decades of experience in anchoring large-scale projects, have served as a reminder that the landscape process design must be approached with rhythm and pragmatism.

Mr. Ramanshu Ganguly, Shakti Sustainable Energy Foundation, for his unwavering participation, enthusiasm, and trust in CAT's organisational mission and vision, with a resolute interest in collaborations.

Ms. Ajita Padhi, Ms. Rishika Das Roy and Ms. Priya Agrawal of the India Climate Collaborative, for their steadfast presence, unerring attendance, and initiatives beyond the routine mechanics of meetings, and for ensuring that CAT's central locus, however small, served as a compass to guide its future trajectories. Furthermore, to **Ms. Edel Monteiro** of ICC, for the visionary alignment, and of key advocates for coordinating continued engagements between the two parties, who demonstrated exemplary commitment to CAT's efforts in coalition building and ecosystemic-systems thinking.

Ms. Sara Farley and Mr. Saahil Parekh of the Rockefeller Foundation, whose enthusiastic participation and stewardship in the sphere

of agroecology have enabled CAT to navigate corridors of influence with strategic poise and a dedicated purpose.

Mr. Rajeev Ahal of BMZ-GIZ, India, for his vision and initiative in conceptualising the consortium in its early stages. Furthermore, to **Mr. Navin Horo, Ms. Liesa Nieskens** of BMZ-GIZ, as well as **Ms. Ute Rieckmann and Ms. Parul Lakshmi Thapa** of BMZ-GIZ, SuATI initiative, for their persuasive articulation, diplomatic tenacity, strategic thinking, diligent efforts, and continuous participation have been paramount in the mobilisation of resources in the early days of CAT's formation, which helped find much-needed clarity in an otherwise obscure strategic landscape. Their proactive role in helping build new associations has strategically embedded CAT in a new constellation of partnerships.

Ms. Gayatri Lobo, Ms. Amrtha Kasturi Rangan, and Ms. Kanika Thanawala of A.T.E. Chandra Foundation for their persistent engagement, seamless sharing of data and resources, and for creating the cornerstone of this collective endeavour, thereby creating several possibilities for CAT's growth and visibility.

Mr. Nico Janssen, Ms. Annelies Withofs, Mr. Shivi Sheoran, and Mr. Biswarup Banerjee, of the IKEA Foundation, for their resolute belief in CAT's vision and mission, which have not only elevated CAT's sphere of influence but also lent it the aura of credibility that is difficult to replicate.

Mr. Sameer Shishodia and Mr. Vikas Hosoor of the Rainmatter Foundation, for their steadfast participation, incisive reflections, and principled provocations, which ensured that no facile assumption went unchallenged and no conceptual blind spot remained unaddressed.

Ms Tanya Kak of Rohini Nilekani Foundation for envisioning the role of agroecology in combating climate change and ecosystem restoration.

Mr. Nityananda Dhal of PRADAN, for his profound knowledge and continuous engagement, which contributed to shaping the larger objectives and goals of CAT's landscape thinking and design.

Mr. Ravindra Adusumilli of the Watershed Support Services and Activities Network (WASSAN), for his exceptional cognitive dexterity, strong domain knowledge and continued engagement.

Mr. Anshuman Das and Mr. Philippe Dresruesse of WelthHungerHilfe (WHH), for their scholarly rigour, evident through decades-long grassroots engagement, principled provocation, guidance, and enthusiasm in this entire process.

Mr Pramel Gupta and the team at the National Coalition for Natural Farming (NCNF) for ideating and envisioning the role and involvement of civil society organisations in this entire undertaking.

Mr. Minhaj Ameen of Agroecology Fund (AEF) for anchoring this entire endeavour, and for his vision, leadership, and collaborative spirit in conceptualising the consortium.

Ms. Sayali Dongare of Bharat Agroecology Fund for providing continuous strategic support throughout this endeavour.

CAT is genuinely grateful to the Bharat Agroecology Fund (BAF) for providing considerable support in the early stages of this development.

A very special thank you to **Mr. Daniel Moss**, Co-Director of the Agroecology Fund (AEF), for playing a key role in enabling the creation of CAT.

Additionally, CAT also expresses its gratitude to the following members of the **Bharat Agroecology Fund Advisory Board.**

Mr. Ishteyaque Ahmad (Campaigner, Sustainable Agriculture); **Mr. Kapil Shah** (Director, Jatan

Trust); **Ms. Manjushree Tadvalkar** (INORA); **Mr. Nachiket Udupa**, (Independent Consultant); **Prof. Shambu Prasad** (Professor, Institute of Rural Management, Anand); **Mr. Shirish Joshi** (Independent Consultant, Farmers Producer Organisations – FPOs and Markets); **Ms. Sreedevi Lakshmikutty** (Co-Founder, Bio Basics)**; Ms. Tamara Law** (Environmentalist, North East Network); and **Ms. Ushakumari S** (Save Our Rice Campaign, Thanal Trust).

CAT is deeply appreciative of RAFT's collaborative spirit, support, and understanding of the impending socio-economic and ecological quagmires at the nexus of the climate-agriculture-food systems crisis. Furthermore, RAFT exemplifies the art of institutional ambassadorship within the landscape thinking and design framework, as well as capital mobilisation in the space. In this regard, CAT conveys its sincerest gratitude to **Ms. Amanda Jekums, Ms. Lauren Baker, and Ms. Rohini Chaturvedi** for their engagements that exemplified partnership paradigms rooted in mutual respect, a shared vision, and a transparent exchange of ideas.

Furthermore, special thanks are due to **Ms. Soojin Kim, Ms. Kanchi Gupta, and Ms. Patty Fong** of Climate Works for their generous support, which enabled the landscape studies.

After numerous deliberations and subsequently, key decisions made by the WG, CAT initiated the process of promoting, building, and socialising the concept of landscapes by organising six regional convenings. These were conceptualised and organised to invite dialogue, collaboration, and critique from various stakeholders. CAT acknowledges the contributions of the following organisations that participated in these six regional convenings:

Central regional convening: **NCNF (National Coalition of Natural Farming)**

Southern regional convening: **Socratus Collective Wisdom Corporation, Catalyst Management Services**

Western regional convening: **Centre for Grower-centric Eco-value Mechanisms (C-GEM), Aga Khan Rural Support Programme (India) (AKRSPI), Vaagdhara, Watershed Organisation Trust (WOTR), Sahjeevan, Foundation for Ecological Security (FES), Self-Employed Women's Association (SEWA) Cooperative Federation, DSC India**

Eastern regional convening: **PRADAN, WASSAN, Welthungerhilfe (WHH), Centre for Youth and Social Development (CYSD), SwitchON Foundation**

Northeast regional convening: **North East Slow Food & Agrobiodiversity Society (NESFAS), Farm2Food, North East Network, Better Life Foundation, Seven Sisters Development Assistance (SeSTA)**

Northern convening: **Dr YS Parmar University of Horticulture & Forestry, Nauni, Solan, Kheti Virasat Mission, HimRRA**

Subsequently, the learnings from the regional convenings were channelised and organised, with the help of a small group over a two-day workshop at Krishna Sudha Academy, Vijayawada, in August 2024. CAT would like to acknowledge the following individuals for their participation in this workshop:

Mr. Akash Badave (NIRMAAN Organisation), Mr. Ashish Ambasta (SRIJAN), Ms. Divya Velguri (DDS), Mr. Durgesh Gupta (PRADAN), Ms. Gijivisha Khattry (WASSAN). Mr. Krushna Sahu (AKRSPI), Mr. Pankaj Patil (Urban FarmsCo), Dr. G V Ramanjaneyulu (CSA), Mr. Rishabh Verma (Sylva), Mr. Satyasovan Das (FES), Mr. Shirish Joshi (Independent Consultant) and Mr. Sridhar Radhakrishnan (Independent Consultant).

A key outcome from the discussions and deliberations held by the WG was the formation of a **Landscape Design Committee.** This committee was formed to ideate, define, guide and design all the interventions and stipulations for CAT's landscape approach. CAT extends its deepest gratitude to the members of this Committee, whose perspicacious insights and hard work have been instrumental in refining the Landscape Thinking Framework. Their key contributions — the formulation of a robust Terms of Reference, process management and documentation, and the construction of a nuanced narrative have been exemplary:

Mr. Anshuman Das of WHH, for his critical reflections and deeply grounded wisdom on participatory approaches, as well as guidance on key thematic domains of the report and the planning process.

Ms. Archana Chatterjee of the International Union for Conservation of Nature (IUCN), whose expertise, knowledge, and groundedness in ecology added value to the evolving design framework.

Mr. Minhaj Ameen of AEF, for his salient contributions towards stakeholder engagement and landscape design, particularly in articulating this visionary impulse at the inception of the journey, which is foundational to the integrity of the initiative.

Mr. Navin Horo of BMZ GIZ who played a vital role in bringing a cohort of experts through the GIZ network, which has been critical in helping these reports come to fruition.

Mr. Nikhil Goveas and Ms. Priya Agarwal of India Climate Collaborative have shaped the agenda for how agroecological transformations intersect with climate change, and for bringing in fresh, critical perspectives on how climate response can be integrated into the approach.

Mr. Shirish Joshi, an independent consultant par excellence, for his counsel and panoramic perspective, which offers the team a sense of direction for decision-making and process management.

Mr. Sridhar Radhakrishnan, a relentless advocate of agroecology in India, has foregrounded the core principles of agroecology within the framework of this effort, situating the social, economic, and ecological lenses as key, non-negotiable tenets within the sustainability discourse and within the landscape-based approach.

Mr. Vineet Kumar, for diligently playing his role as the member secretary of the committee in the initial phase.

CAT extends its heartfelt gratitude to all the consultants and anchor organisations who, as catalytic agents, meticulously harmonised community knowledge and data-driven insights with a highly granular and intimate understanding of the selected geographies, weaving together potential interventions, possibilities and challenges while capturing the on-ground lived realities of the local communities, and translating these into coherent insights for their respective reports. Their unwavering commitment and relentlessness are the fulcrum upon which this report has been crafted.

For the first phase, following discussions and decisions made within the LDeC committee, three pilot landscapes from across the country were selected, with the assistance of the following anchor organisations and consultants, who collaborated to compile the three landscape reports.

CAT expresses its sincere gratitude to the following individuals in each of these landscapes and congratulates them on their significant contributions to this milestone.

For Ahwa, Gujarat:

Mr. Harpalsinh Chudasama (AKRSPI), Mr. Piyush Chaturvedi (AKRSPI), Mr. Subankar Chatterjee (Civil Society Academy South Asia Pvt Ltd), and Mr. Naveen Patidar (AKRSPI).

For Dantewada, Chhattisgarh:

Mr. Akash Badave (NIRMAAN Organisation), Mr. Ashwini Chandak (Ecociate), Ms. Chandrakala. P (Centre for Sustainable Agriculture), Dr. Payal Dewangan (Ecociate), Mr. Shashank Guwalani (NIRMAAN Organisation), Mr. Santosh Gupta (Ecociate), Mr. Kirti Mishra (Ecociate), Mr. Suresh Kumar Nag (NIRMAAN Organisation), Mr. Jaswinder Singh (NIRMAAN Organisation), Mr. Midivelli Venugopal (Ecociate)

For Malkangiri, Odisha:

Mr. Dinesh Balam (WASSAN), Mr. M Kiran Kumar (Green Foundation), Mr. Sambit Nanda Kumar (Catalyst Management Services), Mr. Sandip Pattanayak (Green Foundation), and Mr. Soumya Ranjan (WASSAN).

During this process, a large number of experts and consultants were engaged to ideate, critique & modify the work-in-progress drafts for each landscape report, as well as to provide insights on intervention designs & unit costs. To the experts who lent not only their time but also their wisdom, built over decades and incorporated into the draft versions of the report, CAT extends its sincerest gratitude. Each discussion, question, and answer session served as a crucial reference point that guided the collective thinking of all involved parties for the landscape design, development and planning. This helped strengthen how partner organisations were able to envision specific interventions on the ground. To his end, a special thanks to the following people-

Dr. Anitha Varghese (Non Timber Forest Products vertical, Keystone Foundation), **Mr. Anshuman Das** (Gram Panchayat Development Plan, WelthHungerHilfe), **Ms. Ashwini Kulkarni** (MGNREGA Convergance, Pragathi Abhiyan), **Mr. Aviram Rozin** (Food Forests, Sadhana Forests), **Mr. Ayan Deb** (Renewable Energy, Sustain Plus), **Dr. Chanda Nimbkar** (Goat Breed Improvement, Nimbkar Agricultural Research Institute), **Mr. Devraj Patil** (Biogas, Yuva Rural Association), **Dr. Dhirendra Kumar** (The Bihar Experience, AKRSPI), **Dr. Eshwer Kale and Dr. Madhav Gholkar** (Water Management: Demand and Supply, WOTR), **Dr. G.V Ramanjaneyulu** (Strategy for Agroecological Transformations, Centre for Sustainable Agriculture), **Prof. Gurmeet Singh** (Nutrition, Transdisciplinary University), **Mr.Ishteyaque Ahmad** (Campaigner, Sustainable Agriculture – Organic Production Systems), **Mr.Jayakumar C** (Rice and FPOs,Thanal Trust), **Mr. Krishna Prasad** ('Native seed man' of Karnataka, Sahaja Samrudha), **Mr. Manish Rajankar** (Biodiversity and Fisheries, Foundation for Economic and Ecological Development), **Dr. Manjushree Tadvalkar** (Soil and BRCs, INORA, Know How Foundation), **Mr. Murugesan Kandasamy** (Marketing, Centre for Sustainable Agriculture), **Mr. Peter Bakos** (Processing plants and infrastructure, Independent Consultant), **Mr. Puneet Bansal** (Pollination and apiculture income supplementation for farmers, GIZ), M**r. Ranjit Mohanty** (Commons, Foundation for Ecological Security), **Dr. Sabyasachi Das** (Livestock, WASSAN), **Mr. Sandip Pattanyak** (Income modelling, Green Foundation), **Prof. Shambu Prasad** (Entrepreneurship, Institute of Rural Management, Anand {IRMA}), **Ms. Shilpa Vasavada** (Gender in Agriculture, Independent Consultant,), **Mr. Shirish Joshi** (FPOs, Independent Consultant), **Mr. Soumik Banerjee** (Forestry, Independent Consultant), **Mr. Srajesh Gupta** (Payment for Ecosystem Services, Centre for Grower-centric Eco-value Mechanisms {C-GEM}), **Ms. Sreedevi Lakshmi Kutty** (Bio Basics, Indigenous Seed Systems), and **Ms. Ushakumari S** (Save our Rice Campaign, Thanal –

Indigenous Seed Systems).

A special note of gratitude to **Ms. Divya Velguri and Mr. Anshuman Das**, whose discerning intellect and contextual sensitivity breathed life into the integration of the TAPE Tool for the Landscape Investment plans, as well as for their detailed contributions to helping design the methodology.

A special note of appreciation is due to **Ms. Divya Velguri, Ms Shirisha Junuthula, and Ms. Adrija Chaudhuri** of the Centre for Sustainable Agriculture, for generously allocating time despite their busy schedules to engage and train members of the anchor organisations for field-level roll-outs, effective ground-level optimisation by using the DQQ survey questionnaire and tools/software used for data collection, as well as for putting together the final report.

Prof Aaditeshwar Seth of IIT Delhi and his team at Core Stack, for envisioning the digital infrastructure needed for the transformation

Ms. Preeta Raghunathan for her expertise in blended finance and for serving as the expert author for the corresponding chapters in each report, which are dedicated to finance options in relation to the investment plans for all landscapes.

Mr. Venkatesh Tagat for his detailed review and insightful comments on this chapter, which helped strengthen the narrative on finance and helped situate the options for finance in the larger discourse.

CAT would like to take this opportunity to express its sincere appreciation to the WASSAN team consisting of **Dr. M.L. Sanyasi Rao, Ms Gijivisha Khattry, Mr. Jaya Prakash and Mr. Malyaj Shrivastava** for convening the community workshops across the different landscapes, thus ensuring that moving forward, the voices from the local community are meaningfully and in good measure, integrated into the reports.

Furthermore, special thanks are due to **Mr. Ranjit Mohanty, Ms. Mohita Bhatt, Mr. Chiranjit Guha, Mr. Subrata Singh, and Mr. Anand Biswas** for developing acute GIS layered maps for each geographical landscape with technical proficiency and speed. These tasks were arduous and undertaken with unwavering dedication, based on the principle that landscape efforts yield results, and with a genuinely collaborative spirit.

CAT would like to thank the **FES team**, whose willingness to contribute data and information underpinned a deep alignment with values and the true essence of shared knowledge and tools in the development ecosystem.

In addition to the three reports, a document titled "Mainstreaming Agroecology: The Landscape Approach" was prepared to serve as a concept note. It succinctly details various aspects of CAT's approach and theory of change. CAT acknowledges the contributions of the following individuals in this effort.

Mr. Sridhar Radhakrishnan took the lead in compiling this document by editing and consolidating its content. The section-specific content was provided by **Mr. Minhaj Ameen, Shirish Joshi, Dr. GV Ramanjaneyulu and Ms. Preeta Raghunathan,** and the CAT Secretariat carried out a final round of editing.

Several individuals have volunteered to assist with the activities outlined in these efforts. CAT sincerely thanks the following individuals for their contributions in this regard.

Ms. Nivedita Arumugasamy (ATREE), Ms. Manisha Sinha (CAT), Ms. Priya Agarwal (India Climate Collaborative), Mr. Rishabh Verma (Sylva), Ms. Sayali Dongare (Bharat Agroecology Fund), Mr. Srajesh Gupta (C-GEM), Ms. Nivedita

Ravindranath (CAT), Mr. Harpalsinh Chudasama (AKRSPI) and Ms. Adrija Chaudhuri (CSA).

An enabling policy document was compiled by **Mr. Nachiket Udupa** (Independent Consultant). CAT is grateful to the following individuals, who have helped review and contribute to this policy compendium report, A Compendium of Enabling Policies for Mainstreaming Agroecology.

Mr. A. Ravindra (Executive Secretary and Director, Watershed Support Services and Activities Network – WASSAN) Mr. Anshuman Das (Lead Expert - Agroecology and Food Systems, Welthungerhilfe India); Ms. Ashlesha Khadse (Regional Director - Asia and the Pacific, Thousand Currents); Ms. Ekta Jaju (Executive Director, SwitchON Foundation,); Ms. Kavitha Kuruganti (Convenor, Alliance for Sustainable & Holistic Agriculture – ASHA, Kisan Swaraj network; National Facilitation Team member, Mahila Kisan Adhikar Manch – MAKAAM); Dr. Manjushree Tadvalkar (CEO, INORA Know How Foundation; Advisory Board member, Bharat Agroecology Fund); Mr. Nemani Chandrashekhar (Senior Program Officer, Watershed Support Services and Activities Network – WASSAN); Mr. Prashant Mehra (CEO and Co-founder, Platform Commons); Mr. Rohit Parakh (Government Engagement Lead, National Coalition for Natural Farming); Shri. S. M. Vijayanand (IAS – Retd., Former Chief Secretary to the Government of Kerala); Ms. Seema Kulkarni (Senior Fellow and founding member, SOPPECOM; National Facilitation Team member, Mahila Kisan Adhikar Manch – MAKAAM); and Mr. Shirish Joshi (Consultant and Facilitator in Organisation Design and Strategic HR; Advisory Board member, Bharat Agroecology Fund).

CAT is sincerely grateful to the Centre for Sustainable Agriculture, CAT's host organisation. A special acknowledgement note to **Mr. Dullabh Pattnaik,** CFO of CSA, and his team, who played a key role in providing backend administrative support.

Finally, this entire endeavour has been orchestrated and supported by the CAT Secretariat, comprising **Vibhusha Gupta, Richa Desai, Nivedita Ravindranath, Vineet Kumar, Satya Sainath, Sandeep Nayak and Anhad Imaan**. The secretariat was guided throughout by **Mr. Shirish Joshi and Mr. Minhaj Ameen**. The Secretariat's role has been pivotal in organisational strategy and planning, with a focus on various agendas for 2025 for CAT. Their deft handling of the reporting architecture, meticulous documentation, insights and narrative shaping has ensured that collective thinking has crystallised. Without the anchoring of this labyrinthine initiative by the collective will of the Secretariat members, this report would have been hard to materialise.

I. Introduction

The Consortium for Agroecological Transformations (CAT) is developing landscape-level investment plans to accelerate agroecological transformation in India across ten landscapes. In CAT's approach, a landscape is defined as the minimum viable unit for planning and convergence across agriculture, natural resources, livelihoods, and governance systems. Our current plans are outlined for the administrative unit of a 'block' as a landscape (approximately 50-100 Gram Panchayats). Still, this approach is expected to be more fluid as more models are developed for additional landscapes - essentially allowing the context to drive the landscape boundaries.

The transformation effort is guided by six overarching goals: improving the quality of natural resources, enhancing farmer income, conserving biodiversity, strengthening food and nutrition security, advancing social inclusion, and building resilience to climate change.

This present summary covers **three initial landscapes: Ahwa (Dang district, Gujarat), Chitrakonda (Malkangiri district, Odisha), and Dantewada (Dantewada district, Chhattisgarh).** While all three are predominantly tribal and forest-rich, they also reflect diverse agroclimatic conditions, ecological zones, and farming systems. This diversity is intentional and integral to CAT's landscape approach, which aims to develop context-specific yet scalable models for agroecological transformation. Each of these geographies has a historical and cultural foundation in agroecological practices, with a 10 to 15-year history shaped by varying pathways, including community tradition, state-led programmes, and civil society mobilisation. Agroecological activity in these blocks is not a new phenomenon. Instead, what is now emerging is a compelling opportunity to consolidate dispersed efforts into cohesive, landscape-level strategies that advance sustainability, resilience, and social inclusion.

This summary is based on detailed assessments conducted across the three landscapes to establish a foundational understanding of existing conditions. These assessments served as the

basis for designing multi-domain interventions and investment plans, which have also been presented. The intervention plans are designed for phased implementation over ten years, enabling steady and inclusive change that is anchored in local systems and capacities.

Fig. 1 - CAT Phase 1 Landscapes (for the purpose of illustration only)

II. Ahwa, Gujarat

Agroecological Resilience in a Fragile Highland Ecosystem

Ahwa is located in the Dang district of Gujarat, one of the country's least populous and most forest-rich regions. The block spans approximately 560 square kilometres, comprising 122 villages and a population of around 123,000, with over 94% of the population being tribal. The terrain is mainly hilly and forested, with limited flat land suitable for agriculture.

The landscape is defined by hilly terrain, dense forests, and a predominance of smallholder, rainfed agriculture - conditions that have fostered a deep-rooted relationship between communities and their natural environment. Despite high annual rainfall (over 2,300 mm), much of the precipitation runs off quickly due to steep slopes and poor soil structure, resulting in significant seasonal water stress.

In Ahwa, households derive their income from a blend of rainfed agriculture, livestock rearing, NTFP collection, and wage labour. Key crops include paddy, millets, pulses, and various vegetables, with traditional cropping systems still widely practised. While incomes are largely seasonal and modest, local farming systems are highly self-reliant, rooted

in low-external-input traditions.

The dietary quality assessment for Ahwa, based on the Global Diet Quality Questionnaire (GDQQ), revealed moderate diet diversity in the landscape. Millets and pulses are commonly consumed through their own production, reflecting strong links with indigenous food cultures. However, a low intake of nuts, seeds, dairy products, and vitamin A-rich fruits and vegetables indicates areas of micronutrient inadequacy.

Over the past decade and a half, Ahwa has seen a steady emergence of agroecological practices, supported by civil society efforts and state-led programmes. There is strong community awareness around seed diversity, low-input farming, and the value of indigenous food systems. Local institutional capacity is also robust, with an active network of SHGs, producer collectives, community resource persons, and women-led knowledge-sharing platforms.

Community aspirations centre around improved irrigation, revival of indigenous seeds, and expansion of markets for organic and agroecological produce. Women and youth, in particular, have shown a strong interest in entrepreneurial and technical roles within the agroecological ecosystem.

III. Chitrakonda, Odisha

Traditions of Diversity and Opportunity in a Remote Agroecological Landscape

Chitrakonda is located in southern Odisha's Malkangiri district, spanning an area of 570 square kilometres across 287 villages and a population of approximately 62,000, predominantly comprising tribal communities. Part of the Eastern Ghats, the block receives ample rainfall, averaging around 1,600 mm annually over 60–67 days, making it well-suited for rainfed agriculture and allied livelihoods.

Forests cover nearly 47% of the area, while net cultivated land accounts for just 19%, indicating a delicate balance between habitation, farming, and ecology. The region's ecological wealth, including rich forest cover and indigenous biodiversity, supports a multi-sectoral rural economy anchored in agriculture, livestock rearing, and forest-based activities. Traditional farming knowledge, particularly in relation to millets, pulses, and agroforestry, continues to inform local practices, providing a robust foundation for scaling agroecological approaches.

Small and marginal farmers comprise 87% of the cultivators in Chitrakonda. They sustain themselves with subsistence crops, while their livelihoods are dependent on the sale

of surplus produce, supplemented further by the collection of 'Non-Timber Forest Products' (NTFP) and wage labour. Millets, pulses, oilseeds, and vegetables are widely grown using traditional practices.

Chitrakonda also demonstrates significant institutional potential. The presence of community structures such as SHGs, FPOs, and forest governance bodies provides an enabling framework for participatory implementation. The block has already seen multiple agroecology-oriented efforts, including the promotion of System of Millet Intensification (SMI), intercropping, and soil and water conservation through integrated watershed management.

The dietary quality assessment for Ahwa, based on the Global Diet Quality Questionnaire (GDQQ), revealed an encouraging picture of diet diversity and diet quality among households in a tribal region. A majority of households both consumed and produced their own cereals, pulses, millets, and green leafy vegetables. The landscape exhibits early signs of a nutrition transition, characterised by a rise in the consumption of sweets and sugary beverages.

Community aspirations include reducing migration, strengthening food self-sufficiency, and increasing incomes via climate-resilient farming. Aspirations are also emerging around improved storage, increased access to water, and expanded nutritional security.

The landscape shows institutional readiness and openness to change, with a strong foundation for scaling decentralised, participatory, and nutrition-sensitive interventions.

IV. Dantewada

A Structured and Organic Agroecological Ecosystem

Located in southern Chhattisgarh, the Dantewada block spans 584 square kilometres, comprising 64 villages and a population of approximately 94,000, with over 60% of the population composed of tribal communities. The landscape features upland, midland, and lowland gradients that influence cropping patterns and water flow. The region has been a frontrunner in organic transition, with efforts since 2013 led by Bhoomgaadi Organic Farmer Producer Company and supported by state programmes and civil society. This has enabled the systemic adoption of organic inputs, composting, and integrated farming practices. The district administration's ban on chemical fertiliser sales is a noteworthy policy shift that has supported grassroots transition toward low-input, bio-input-based farming. Communities have a long tradition of multi-sectoral livelihoods that encompass agriculture, livestock, non-timber forest products (NTFP), and agroforestry. These activities are embedded within household spaces, community commons, and forest ecosystems - demonstrating a highly adaptive and diversified local economy. Agriculture is diversified, with millets, pulses, vegetables, and paddy grown across land types.

The diet quality observed in Dantewada reflects a food system dominated by grains and pulses, with commendably low reliance on ultra-processed foods. However, diversity across nutrient-dense food groups, particularly dairy, eggs, nuts, seeds, and vitamin A-rich fruits and vegetables, remains limited. Persistently low fruit intake and minimal consumption of animal-source foods highlight the risk of ongoing micronutrient deficiencies.

Women also play leading roles in forest governance institutions, such as Village Forest Committees and Eco-Development Committees. Local cadres such as Jaivik Karyakartas, Krishi Sakhis, and Pashu Sakhis serve as last-mile service providers, embodying the lived connection between agroecology, gender equity, and rural agency.

Community aspirations include deepening the organic movement, expanding market access, and increasing returns from processing and value addition. Agroecological sensibilities are already present in the district's move towards organic certification and bio-input production, supported by administrative initiatives and local knowledge systems. Dantewada provides a strong institutional and ecological foundation for an agroecological economy.

V. Shared Conditions & Rationale for Intervention Planning

These landscapes, though distinct in history and ecology, reveal standard features relevant to intervention planning:

- Rainfed agriculture is widespread, supported by traditional knowledge and practices. While technological inputs remain low, communities are ready to adopt improved irrigation systems, organic input systems, and climate-resilient cropping practices.

- Forests and commons form a vital part of rural economies across all three landscapes, providing food, fuel, fodder, and income through NTFPs. Sustainable forest governance, resource regeneration, and legal rights (e.g., CFR, IFR) are crucial for effective agroecological planning and promoting equity.

- Livelihood diversification is a norm—combining crops, livestock, forest-based activities, and wage labour. This mix provides a solid foundation for agroecological strategies that reduce risk and enhance resilience.

- Women and youth are already central to farming, forest work, and community leadership. There is strong readiness for their deeper involvement in technical roles, entrepreneurship, and governance.

Across Ahwa, Chitrakonda, and Dantewada, the design of interventions builds upon the agency, ecological wisdom, and lived practices of communities who have long sustained diverse, rainfed, and forest-linked landscapes. Using emerging contemporary agroecological approaches, the interventions aim to strengthen and scale the systems of traditional knowledge, resilience, and sustainability that are already shaping from within.

While each location has distinct characteristics, a shared rationale underpins the proposed landscape-level approach: to build climate resilience, enable diversified and dignified livelihoods, promote ecological integrity, and strengthen institutions in ways that are rooted in local realities and traditions.

The interventions are conceived as integrated systems that work across sectors, including agriculture, livestock, forestry, water, soils, nutrition, and markets, rather than isolated activities. They emphasise low-input, biodiversity-enhancing, and community-validated models that reinforce the overall agroecological system towards social, economic, and ecological gains. An emphasis on extension service systems forms the backbone of implementing interventions outlined in these models.

A strong focus is placed on inclusion, particularly of landless households, women, youth, and vulnerable groups, through

roles in service delivery, enterprise, and governance. The strategy leverages local institutions and existing government frameworks while filling key gaps in capacity, infrastructure, and ecosystem restoration. Across all three landscapes, the goal is to:

- Establish self-sustaining, community-owned models that can evolve with time.
- Promote integration of agroecological principles.
- Expand opportunities for realising climate-related outcomes of mitigation, adaptation, and resilience, and
- Build upon avenues for strengthening income, food security, and social equity.

VI. Intervention Planning for Agroecological Transformation

To translate the landscape diagnostics and community priorities into actionable steps, intervention plans have been developed for each of the three landscapes. These interventions are designed to be implemented in a phased manner over ten years, responding to each landscape's specific socio-ecological context and readiness. The design strikes a balance between early-stage institution building and medium to long-term ecological and livelihood outcomes.

The total estimated implementation cost across the three landscapes is approximately USD 84.9 million, with significant public finance convergence and community contributions already anticipated. A breakdown of financial planning for each landscape is provided below:

Landscape	Total Implementation Cost (INR Crore)	Public Convergence Funds (INR Crore)	Community Contribution (INR Crore)	Net Investment Required (INR Crore)
Ahwa	374.6	192.3	39.4	142.9
Chitrakonda	113	25.3	23.1	64.6
Dantewada	202.9	39.4	10.8	152.8

Table 1 - Total implementation cost with sources of finance

Substantial portions of the programme can be financed through public scheme convergence and community-led mechanisms, leaving a focused, catalytic investment gap for donor and blended capital.

Key Insights from Intervention Plans

The following sections provide key insights into the findings of the three reports, including the cost distribution across sources for each landscape, the implementation cost distribution by domain for each landscape, the types of investments required for each domain, and the

investments needed per person per unit area for each landscape. The following quantitative information is but a glimpse into the context and scope of investments in the three landscapes, and is primarily derived as subsets of larger quantitative data sets, that indicate investments required by each domain and corresponding interventions, thematic area, people and land and other funding sources, granularly put together for the developing plans that are all-inclusive and comprehensive.

Intervention Planning Across Domains

This diagram is a radial cluster map that categorizes various interventions under different thematic domains including: Agroforestry, Forestry, and NTFP (blue), Crops (light blue)

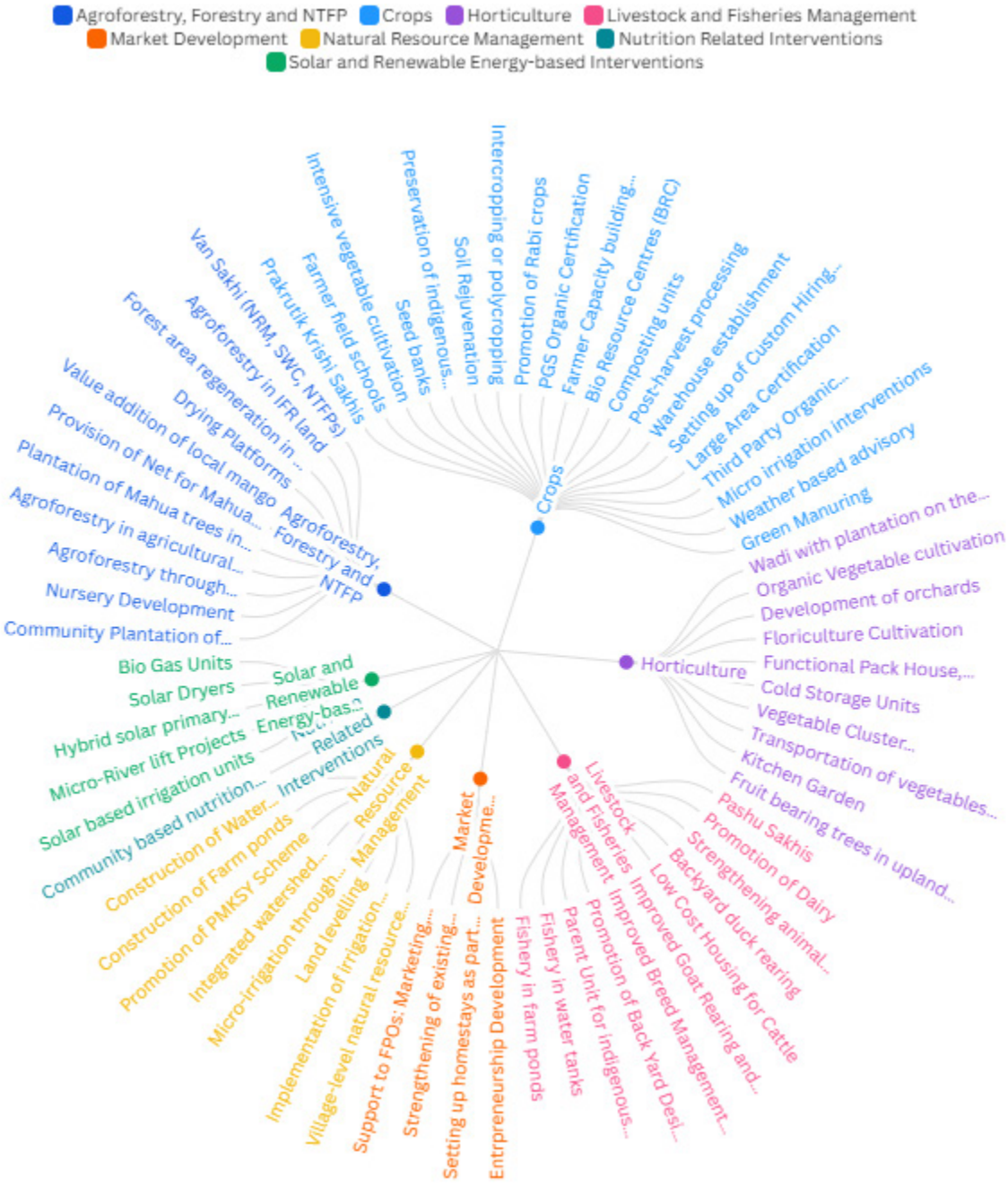

Fig 1 - Intervention Planning Across Domains

Horticulture (purple), Livestock and Fisheries Management (pink), Market Development (orange), Natural Resource Management (yellow), Nutrition Related Interventions (teal) and Solar and Renewable Energy-based Interventions (green).

The important thing to note with respect to this map can be described as follows:

- Each domain branches out into multiple specific interventions.For example, Crops include activities like soil fertility management, seed banks, organic certification, weather advisory, etc.
- It also highlights that livelihood and agricultural transformation, as interlinked realities, require multi-dimensional interventions -from crop management to market linkages and renewable energy.
- The map indicates that the interventions are deeply embedded in sustainability, through renewable energy, agroforestry, natural resource management
- Furthermore, it suggests that the interventions also prioritise value addition and market linkages, showing intent to move beyond production towards economic resilience.
- Nutrition-sensitive interventions are included, ensuring that food systems also address dietary diversity and health.

The map reaffirms a holistic systems approach, and stresses the need for looking at these interventions in relation to one another.

Implementation Cost Distribution Over Primary Sources of Finance

The following charts illustrate the relative distribution of costs through primary sources of funding for each of the landscapes. This essentially denotes finance procured through the integration of government schemes and community contributions. Subsequently, the proportionate gap in investments needed is showcased in purple.

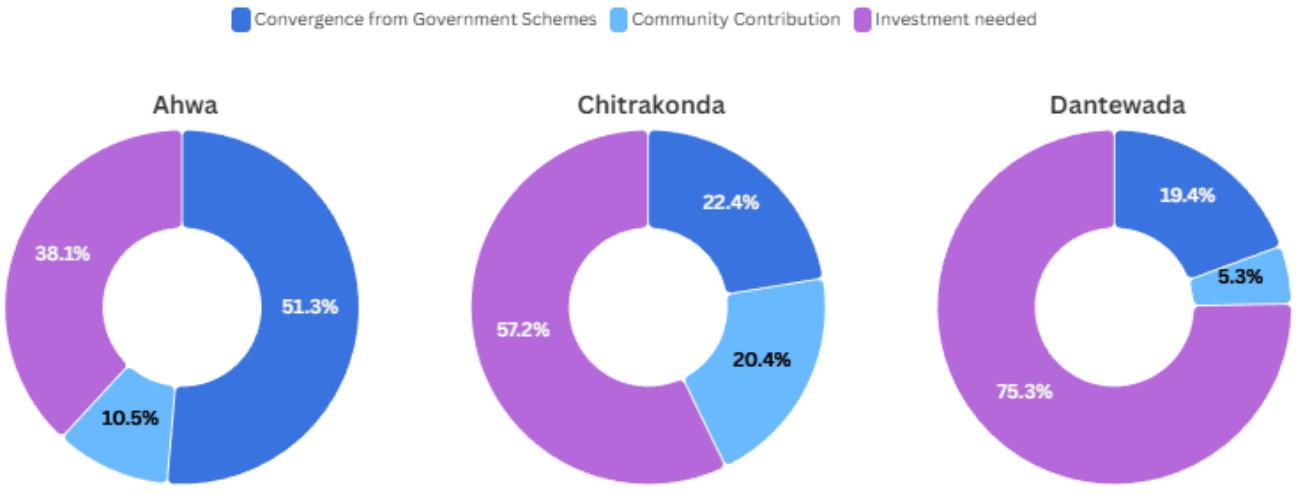

Fig 3 - Implementation Cost Distribution Over Primary Financing Sources

As evident from these illustrations, government support is strongest in Ahwa, making it the least dependent on additional investments relative to its primary funding source. Community participation is most significant in Chitrakonda, suggesting stronger local engagement. Dantewada has the most significant investment gap, underscoring a substantial need for external funding and capacity-building efforts.

Implementation cost distribution by domain for each landscape

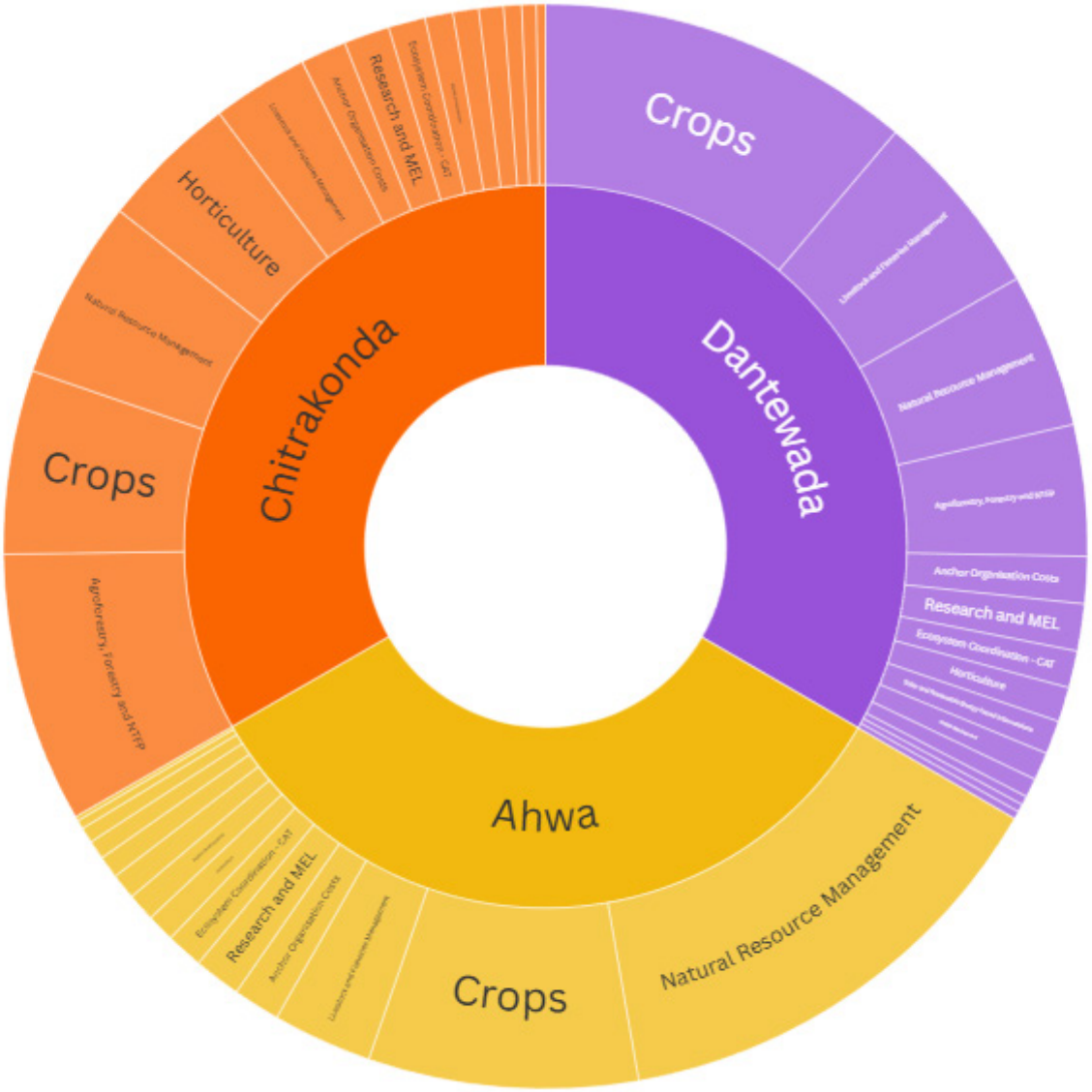

Fig 4 - Implementation Cost Distribution By Domain

The chart above showcases the implementation cost distribution by domain, for each landscape. Key things to note from this chart are as follows

- Crops hold a dominant share of total costs, ranging between 35–45%, while other priorities differ for each of the landscapes.
- For Chitrakonda, Agroforestry, Natural Resource Management and Horticulture constitute a dominant chunk.
- For Dantewada, Livestock and Fisheries Management, and Natural Resource Management have a larger share of implementation cost allocated.
- Ahwa: Allocations for Natural Resource Management dominate, followed by crops.

This indicates a context-specific strategy, where local ecology and livelihood needs shape funding allocation.

Investment required by domain for each landscape

Fig 4 - Investment required by domain for each landscape

This sunburst chart showcases investments required by domain, in each of the landscapes. A few key things to note for this chart are provided below:

- Investments required for crops dominant in Ahwa and Dantewada - reaffirming the dominance of agriculture in the region.
- Both Ahwa's and Dantewada's investments warrant a strong focus on livestock management.
- Chitrakonda's required investments are lower than Ahwa and dantewada and warrant strong need for investment across Agroforestry, Crops and Livestock Management.
- Dantewada and Chitrakonda both highlight the need for crops and forest-based livelihoods (NRM, NTFPs).

Investment required per person and per hectare for all three landscapes

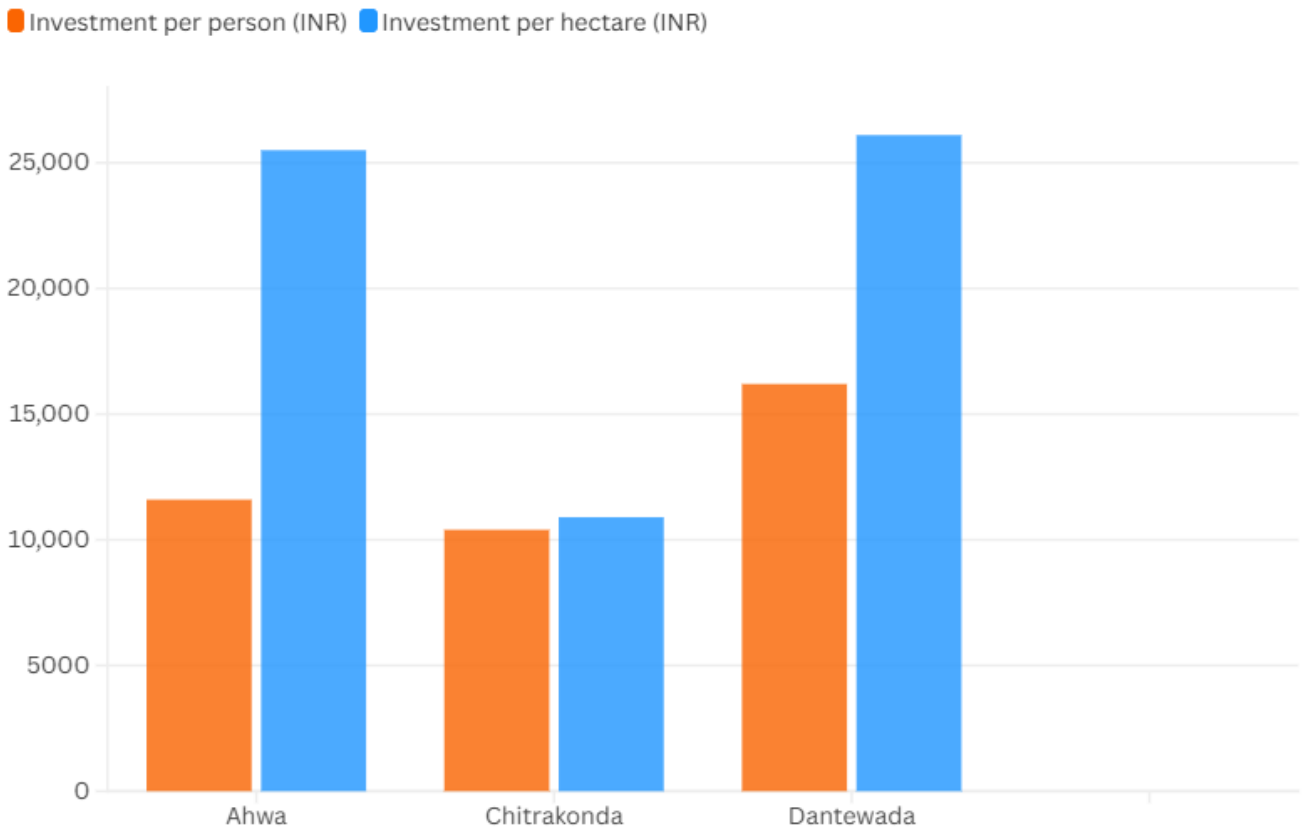

Fig 4 - Investment required per person and per hectare across the three landscapes

- Ahwa and Dantewada prioritize land-based investments, while Chitrakonda shows a more equitable investment pattern.
- Dantewada stands out as the highest investment region with respect to both costs, reiterating that the region warrants larger investments for both categories, compared to Ahwa and Chitrakonda.

VII. From the Landscapes to Benefits

How these interventions relate to SDGs, 13 Agroecology Principles and CAT's core objectives

This section provides an overview of the ground interventions within these landscapes and how they intersect with the 13 agroecological principles. Furthermore, it sheds light on how these actions directly contribute to the United Nations' Sustainable Development Goals (SDGs) and, in doing so, systematically achieve the six core objectives of the Consortium for Agroecological Transformations (CAT). Most importantly, it provides an overarching view of how these interventions simultaneously benefit people, plants and land in the three distinct regions.

1. Ahwa, Gujarat, India

The interventions in the densely forested Ahwa region align with CAT's six core objectives. They are linked to the SDGs and 13 agroecology principles, specifically enhancing livelihood opportunities through agriculture, promoting the local production of biofertilizers to reduce carbon emissions, and implementing robust recycling practices on farmlands.

1. Improving the Quality of Natural Resources

The restoration of the landscape's natural capital and resources is addressed through the application of principles such as **Recycling (AE1), Input Reduction (AE2), Soil Health (AE3), Synergy (AE6)**, and strengthening **Land and Natural Resource Governance (AE12)**.

- The Recycling principle is being put into practice through the involvement of Prakritik Krishi Sakhis (Agriculture trainers) and Pashu Sakhis (Animal husbandry trainers), who are community cadres that train farmers to adopt on-farm recycling practices, such as composting crop residues, preparing biofertilizers and botanical pesticides, and utilising animal dung. The establishment of Bio-Resource Centres (BRCs) is further facilitating the production of compost, Jeevamrit, and Beejamrit using local biomass. Meanwhile, dairy-linked biogas units convert animal waste into energy and organic slurry, thereby closing nutrient loops.
- Input Reduction is being achieved through localised production and promotion of biofertilisers and biopesticides at the BRCs, coupled with

training in natural farming methods such as Jeevamrit and Neemastra, thereby reducing reliance on external chemical inputs.

- Soil Health is being actively promoted through the active use of mulching, compost application, cover cropping, and soil moisture conservation practices. Integrated Natural Resource Management (INRM) efforts, such as contour bunding, trenching, and vegetative barriers, prevent erosion and improve groundwater recharge.

- Synergy between farm elements is being constantly fostered by integrating water conservation strategies, ensuring the presence of water harvesting structures, while prioritising micro-irrigation systems at the community level.

- Land and Natural Resource Governance is being strengthened through the preparation of integrated plans under the Gram Panchayat Development Planning (GPDP), ensuring convergence with schemes such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), and through the utilisation of GIS-based planning tools for participatory land and water management.

Through this integrated approach, direct contributions are being made to **SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 15 (Life on Land)**, thereby fulfilling CAT's objective of improving natural resources.

2. Increasing Income to Make Agriculture an Attractive Livelihood

This objective is pursued through a strategy built on the principles of **Economic Diversification (AE7), Fairness (AE10), and Connectivity (AE11)**.

- Economic Diversification is advancing through the development of dairy, goat-rearing, and backyard poultry enterprises, particularly for women's SHGs. Additionally, processing and value addition for forest products and agroforestry produce are being supported through cluster-level facilities, creating multiple income streams.

- Fairness is being addressed by strengthening Farmer-Producer Organisations (FPOs) to aggregate and market a diverse range of products, reducing income risks from mono-cropping and enhancing farmers' bargaining power for better price realisation. The intervention also promotes youth engagement through dignified, income-generating opportunities.

- Connectivity between producers and consumers is reinforced by fostering a circular and solidarity-based local economy. Cluster-based FPOs, supported by local outlets, ensure that processed agricultural produce is primarily marketed and sold within the local region, minimising transportation costs and retaining value within the local community.

These interventions contribute to and correlate with **SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth), while also advancing SDG 12 (Responsible Consumption and Production)** by building more efficient, localised value chains, thus fulfilling the CAT objective of making agriculture an attractive livelihood.

3. Preserving and Enhancing Biodiversity

The stewardship of the landscape's rich biodiversity is pursued with focus on the principles of **Biodiversity (AE5) and Synergy (AE6)**.

- Steps to enhance Biodiversity include cultivating more than three major crops of indigenous varieties (millet, pulses, rice, maize, and vegetables) selected for local adaptability and resilience. This diversification is supported through enhanced agroecological extension

services and an increased availability of bio-inputs.

- Additionally, the landscape will help more than three animal species through structured interventions in poultry, dairy, and goat rearing. Agroforestry and the promotion of multipurpose forest species contribute to increased perennial plant diversity.

- Synergy is being fostered through an Integrated Farming Systems (IFS) approach, facilitated by PKSs and PSs, ensuring strong crop-livestock integration where livestock are fed with on-farm resources, and animal manure is recycled as a key organic fertiliser. This has led to positive ecological interactions and has enhanced nutrient cycling. Regular crop rotation, intercropping, and rotational grazing have also contributed to the overall health of agroecosystems.

These interventions are fundamental to achieving **SDG 2 (Zero Hunger)** by building resilient and diverse food systems, and **SDG 15 (Life on Land)** by maintaining and enhancing species, functional, and genetic diversity across all scales, thereby meeting the CAT objective of preserving and enhancing biodiversity.

4. Ensuring the Well-being of Smallholder Farmers, Women, and Landless Labourers

Strengthening the social fabric of the region is being addressed through principles of **Animal Health (AE4), Co-creation of Knowledge (AE8), Social Values and Diets (AE9), Fairness (AE10), Participation (AE13), and securing Land and Natural Resource Governance (AE12)**.

- Animal Health, which is crucial for farmer well-being and diversified livelihoods, is being directly supported through the deployment of trained Pashu Sakhis who deliver first-line ethno-veterinary care, routine vaccinations, and deworming. Improved infrastructure for livestock housing and feeding, combined with regular animal health camps, ensures disease control and improved productivity.

- Co-creation of Knowledge and Participation are being fostered through at least two dedicated platforms for PKSs and PSs, enabling continuous peer learning, experience sharing, and collective problem-solving. This is integrated with FPOs, SHGs, Gram Sabha-led GPDP planning, and Farmer Field Schools.

- The principle of Fairness has been embodied by actively strengthening women's leadership across multiple community institutions, ensuring women are empowered in decision-making and have equitable access to resources. The programme also promotes family farming systems where both men and women share responsibilities.

- Social Values and Diets are integrated by promoting local food systems and cultural food traditions, with women-led SHGs playing a central role in improving household nutrition and cultural food practices.

- Land and Natural Resource Governance is central to securing well-being. Shifting to a participatory, landscape-based planning approach, led by Gram Sabhas and community-level institutions, ensures that women's priorities are integrated into NRM.

Through this focus on knowledge, equity, and rights, contributions are made to **SDG 1 (No Poverty), SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), SDG 5 (Gender Equality), SDG 8 (Decent Work and Economic Growth), and SDG 16 (Peace, Justice & Strong Institutions)**, ensuring the CAT objective for the well-being of all community members is achieved.

5. Enhancing Food and Nutrition Security

This objective is directly advanced through

the principles of **Social Values and Diets (AE9), Input Reduction (AE2), and Biodiversity (AE5).**

- Social Values and Diets are being upheld and enhanced by promoting local food systems and preserving cultural food traditions through the advisory roles of PKSs and PSs. They advocate for integrated farming systems to encourage the production and consumption of a diverse range of locally available, nutrition-rich foods, thereby ensuring food sufficiency and dietary diversity. Training in nutrition education for PKSs and PSs enhances awareness of balanced diets and the importance of traditional food practices, with a special focus on reviving traditional recipes.

- Input Reduction is fostering a system of food security by making local bio-inputs readily available, reducing reliance on external markets and ensuring sustainable production of food in the region.

- The Biodiversity principle is being realised through the promotion of diverse indigenous crop varieties and animal species, which directly increases the variety and resilience of food sources available to households.

These interventions directly address **SDG 2 (Zero Hunger)** by ensuring access to safe, nutritious, and sufficient food, and **SDG 3 (Good Health and Well-being)** through improved dietary diversity and a reduction in malnutrition.

6. Addressing the Climate Crisis

The strategy for addressing the climate crisis is woven throughout the landscape's design, employing a comprehensive approach of mitigation, adaptation, and systemic resilience. This multi-faceted effort is guided by a range of interconnected agroecological principles, including **Recycling (AE1), Input Reduction (AE2), Soil Health (AE3), Biodiversity (AE5), Synergy (AE6), and Land and Natural Resource Governance (AE12).**

- Mitigation interventions are focused on actively reducing greenhouse gas emissions and sequestering atmospheric carbon. In Ahwa, achieving a smaller carbon footprint is being accomplished through the principle of Input Reduction (AE2), where, as previously discussed, localised production and promotion of biofertilisers and biopesticides at BRCs are helping reduce the use of energy-intensive synthetic inputs. The principle of Recycling (AE1) is embodied by the installation of Bio-Gas Units, which capture methane from animal manure and convert it into clean energy.

- Activities such as mulching, compost application, cover cropping, and promoting agroforestry and multipurpose forest species are systematically drawing down atmospheric carbon, storing it securely in the soil organic matter and biomass.

- Adaptation measures equip the farming community to adequately manage the immediate impacts of a changing climate, such as erratic rainfall and the stress of extreme temperatures. The primary outcome is reduced vulnerability to climate shocks. This is achieved by improving Synergy (AE6) between farm elements through Integrated Farming Systems (IFS) and through water conservation interventions and micro-irrigation systems, which enhance water security. Land and Natural Resource Governance (AE12) has played a key role in participatory planning under the GPDP, adopting a ridge-to-valley model for effective soil and water conservation, thereby increasing the landscape's adaptive capacity.

- Finally, the Biodiversity (AE5) principle is central to adaptation; conserving and promoting indigenous crop varieties ensures that the community retains access to genetic material that has been naturally selected for resilience to local climate stresses.

- Eventually, these mitigation and adaptation strategies converge to build long-term systemic resilience. By applying these diverse agroecological principles—from improving Soil Health (AE3) and closing nutrient loops through Recycling (AE1) to diversifying the landscape with high Biodiversity (AE5) and reducing dependencies via Input Reduction (AE2)—the entire agricultural system becomes more stable, productive, and self-sufficient in the face of climate uncertainty.

This integrated strategy makes a direct and tangible contribution to SDG 13 (Climate Action) by addressing both its causes and effects. The promotion of clean energy through biogas also supports SDG 7 (Affordable and Clean Energy), thereby fulfilling the CAT objective of addressing the climate crisis.

2. Chitrakonda, Odisha

In Chitrakonda, strong institutional support and community initiatives ensure that the interventions in the region align closely with several of the 13 agroeocological principles and the SDGs. Amongst other aspects, they are helping bolster improved soil health, biodiversity preservation & enhancement, nutritional security, and economic empowerment. Here is how these interventions fall under the six objectives and intersect with the SDGs and the 13 principles.

1. Improving the Quality of Natural Resources

The enhancement of the landscape's natural capital is being addressed through the application of principles such as **Recycling (AE1), Soil Health (AE3), and Land and Natural Resource Governance (AE12).**

- The establishment of a Bio-Manure Centre advances the Recycling principle, introduces a multi-layer integrated farming system, and promotes backyard duck rearing, all of which are designed to close nutrient loops.

- These same interventions are securing Soil Health, in addition to Integrated Watershed Development, the promotion of agroforestry, and the promotion of Green Gram and Bengal Gram in rice fallow areas, which prevent erosion, build organic matter, and naturally enrich the soil.

- Land Governance is strengthened through interventions such as community-based irrigation and watershed development, which require the collective management of shared resources.

Through these integrated actions, direct contributions are made to **SDG 6 (Clean Water and Sanitation), SDG 15 (Life on Land), and SDG 13 (Climate Action)**, thereby fulfilling the CAT objective of improving natural resources.

2. Increasing Income to Make Agriculture an Attractive Livelihood

This objective is addressed through principles of **Economic Diversification (AE7), Fairness (AE10), and Connectivity (AE11)**.

- Economic Diversification is being driven by the development of horticulture (cashew, mango, floriculture, vegetables), the promotion of animal husbandry, the establishment of primary processing infrastructure, entrepreneurship development, and the strengthening of a collective marketing framework through FPOs.

- Fairness is fostered by empowering

farmers through the provision of a revolving fund to FPOs for collective marketing, by enabling access to premium markets via Organic Certification (PGS), and by developing Pack House and Cold Storage Units as a measure to give farmers power to avoid distress sales.

- Connectivity to markets has improved through the development of the proper infrastructure for value addition, such as functional packhouses, and supporting branding and marketing activities.

These interventions consistently and directly contribute to achieving **SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth)**, thereby fulfilling the CAT objective of making agriculture an attractive livelihood.

3. Preserving and Enhancing Biodiversity

The preservation of the landscape's biodiversity is being pursued by focusing on the principles of **Biodiversity (AE5) and Synergy (AE6)**.

- The enhancement of biodiversity is being achieved through the promotion of intercropping and polycropping approaches, the development of diverse horticulture, and, crucially, the promotion of breeder models for the conservation of indigenous landraces.

- Synergy between farm elements is being created through the establishment of multi-layer integrated farming systems, the promotion of agroforestry, and the adoption of intercropping or polycropping approaches, as well as backyard duck rearing and the construction of farm ponds, where beneficial interactions are explicitly designed.

These interventions are fundamental to achieving **SDG 15 (Life on Land)** and contribute to the resilience of the food system as outlined in **SDG 2 (Zero Hunger)**, thereby meeting the CAT objective of preserving biodiversity.

4. Ensuring the Well-being of Smallholder Farmers, Women, and Landless Labourers

A focus on human and social capital is realised through principles addressing **Animal Health (AE4), Co-creation of Knowledge (AE8), Social Values (AE9), and Participation (AE13).**

- Animal Health is directly improved by strengthening vaccination services, constructing low-cost goat shelters, and enhancing fodder availability.

- Co-creation of Knowledge and Participation are being fostered through the operation of Farmer Field Schools, extensive capacity-building programmes, the development of a cadre of local Resource and Master Farmers, the establishment of demonstration units, exposure visits for farmers, and the farmer-led Participatory Guarantee System (PGS) for organic certification.

- Social Values are being addressed by reducing the drudgery of female farmers through the research and development of small-scale farm machinery. Participation is being further fostered through the Farmer Field Schools. This is explicitly strengthened by the formation of a unified Women's Collective, a key initiative designed to empower women to drive local initiatives and ensure community upliftment.

Through this focus on health, knowledge, and equity, contributions are made to **SDG 3 (Good Health and Well-being), SDG 4 (Quality Education), and SDG 5 (Gender Equality)**, ensuring the CAT objective for the well-being of all community members is achieved.

5. Enhancing Food and Nutrition Security

The enhancement of food security is being directly addressed through the principle of

Social Values and Diets (AE9).

- Direct action has been taken to ensure a stable and nutritious food supply. The cultivation of diverse crops has been prioritised to make a variety of food groups available, which has been achieved through interventions such as promoting organic vegetable cultivation, developing fruit orchards, and establishing integrated farming systems that produce eggs, meat, and pulses.

According to the mapping, **SDG 2 (Zero Hunger)** is directly addressed by these interventions. As **SDG 3 (Good Health and Well-being)** is also consistently impacted through improved nutrition, the CAT objective for food and nutrition security is fulfilled.

6. Addressing the Climate Crisis

Climate resilience is woven into the programme's design by applying the principle of **Input Reduction (AE2)**, which builds self-sufficiency. This is being achieved through the establishment of a Bio-Manure Centre to replace chemical inputs, promoting breeder models for local seed security, and promoting solar-powered irrigation, which reduces dependency on external energy and erratic rainfall.

These actions contribute to **SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action)**. A significant contribution to climate change mitigation has been achieved. While not a standalone intervention, carbon sequestration is an explicit outcome of the key activities in the region. The promotion of agroforestry and practices that enhance Soil Health systematically removes carbon from the atmosphere and stores it in soil and biomass, making a direct and tangible contribution to the goals of **SDG 13 (Climate Action)** and fulfilling the CAT objective of addressing the climate crisis.

3. Dantewada, Chhattisgarh, India

The interventions in Dantewada are systematically advancing the six core objectives of the Consortium for Agroecological Transformations (CAT). By aligning with key agroecological principles, these targeted actions are helping create a formidable, virtuous cycle of ecological restoration, economic empowerment, and social well-being. Here is how these alignments have unfolded.

1. Improving the Quality of Natural Resources

The restoration of the landscape's natural capital is addressed through the application of principles such as **Recycling (AE1), Soil Health (AE3), Synergy (AE6) and strengthening Land and Natural Resource Governance (AE12)**.

- The Recycling principle has been put into practice through Bio-Resource Centres, NADEP composting units, and Bio-Gas units, all designed to close nutrient loops.
- Soil Health is actively built through these measures, alongside green manuring, Soil and Water Conservation (SWC), and agroforestry initiatives.
- Synergy between farm elements is being fostered by promoting multicropping cycles and through SWC and micro-irrigation interventions that improve the relationship between soil and water management across the landscape.
- Land and Natural Resource Governance is being strengthened by integrating agroecological interventions into local government plans (GPDP) and promoting sustainable community-led management

through forest area regeneration and Good Collection Practices (GCP) for NTFPs.

Through this integrated approach, direct contributions are being made to **SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production), SDG 15 (Life on Land), and SDG 13 (Climate Action)**, thereby fulfilling the CAT objective of improving natural resources.

2. Increasing Income to Make Agriculture an Attractive Livelihood

This objective is being pursued through a strategy built on the principles of **Economic Diversification (AE7), Fairness (AE10), and Connectivity (AE11)**.

- Economic Diversification is being bolstered through post-harvest processing, the development of vegetable clusters, promotion of animal husbandry, and the fostering of local enterprises to create multiple income streams.
- Fairness is being addressed through organic certification (which enables premium pricing) and by strengthening Farmer-Producer Organisations (FPOs) to increase their collective bargaining power.
- Connectivity between producers and consumers is being reinforced by strengthening local haat bazaars and developing market linkages for primary agricultural produce and high-value NTFPs.

These interventions contribute to **SDG 1 (No Poverty) and SDG 8 (Decent Work and Economic Growth)**, while also advancing **SDG 12 (Responsible Consumption and Production)** by building more efficient, localised value chains that aim to minimise food losses, thus fulfilling the CAT objective to make agriculture an attractive livelihood.

3. Preserving and Enhancing Biodiversity

The stewardship of the landscape's rich biodiversity is being pursued by focusing on the principles of **Biodiversity (AE5) and Synergy (AE6)**.

- Steps to enhance Biodiversity include creating Crop Diversity Blocks for in situ conservation of traditional seeds, developing biodiversity registers to document local genetic resources, and promoting indigenous poultry and goat breeds.
- Synergy is being fostered through the expansion of agroforestry interventions, which integrate trees, crops, and livestock, as well as through the development of fisheries in shared water bodies, thereby creating positive ecological interactions.

These interventions are fundamental to achieving **SDG 15 (Life on Land) and SDG 14 (Life Under Water)**, and contribute to the resilience of the food system as outlined in **SDG 2 (Zero Hunger)**, thereby meeting the CAT objective of preserving biodiversity.

4. Ensuring the Well-being of Smallholder Farmers, Women, and Landless Labourers

Strengthening the social fabric is addressed via the principles of **Animal Health (AE 8), Co-creation of Knowledge (AE8), Participation (AE13), Fairness (AE 10) and securing Land and Natural Resource Governance (AE12)**.

- Animal Health, crucial for farmer well-being, is directly supported through the construction of improved cattle shelters and the adoption of better management practices for goat and poultry rearing.
- Co-creation of Knowledge and participation is being fostered through the induction and capacity building of community cadres (such as Jaivik Karyakartas), extensive capacity-building programmes for farmer households, and the integration of agroecological interventions into local governance plans (GPDP).

- Building platforms addresses fairness in access to government entitlements and, through institutional strengthening, gives smallholders, particularly women, a greater voice and more secure standing within the community.

- Land and Natural Resource Governance is central to securing well-being. This is being achieved through the creation of institutional platforms meant to improve access to entitlements and by formally recognising and supporting farmers as sustainable managers of natural and genetic resources through organic certification and capacity building.

Through this focus on knowledge, equity, and rights, contributions are made to **SDG 1 (No Poverty), SDG 4 (Quality Education), SDG 5 (Gender Equality), and SDG 16 (Peace, Justice & Strong Institutions)**, ensuring the CAT objective for the well-being of all community members is achieved.

5. Enhancing Food and Nutrition Security

This objective is directly advanced through the principles of **Social Values and Diets (AE9) and Input Reduction (AE2)**.

- Social Values and Diets are upheld and enhanced by specific nutrition-related interventions, including the promotion of kitchen gardens and vegetable clusters to increase access to diverse foods, as well as support for culturally significant practices such as backyard poultry and fisheries.

- Input Reduction contributes to food security by strengthening farmer self-sufficiency through seed-related interventions focused on traditional varieties and the establishment of Bio-Resource Centres, which reduce dependence on external markets for critical farm inputs.

These interventions directly address **SDG 2 (Zero Hunger) and SDG 3 (Good Health and Well-being)**, which are also consistently impacted through improved nutrition.

6. Addressing the Climate Crisis

The strategy for addressing the climate crisis is woven throughout the landscape's design, employing a comprehensive approach of mitigation, adaptation, and systemic resilience. This multi-faceted effort is guided by a range of interconnected agroecological principles, including **Input Reduction (AE2), Recycling (AE1), Soil Health (AE3), Biodiversity (AE5), and Synergy (AE6).**

- Mitigation interventions are focused on actively reducing greenhouse gas emissions and sequestering atmospheric carbon.

- The outcome of a smaller carbon footprint is achieved through the principle of Input Reduction (AE2), where the establishment of Bio-Resource Centres (BRCs) and the promotion of organic certification are replacing the use of energy-intensive synthetic fertilisers, avoiding their associated nitrous oxide emissions. The principle of Recycling (AE1) is embodied by the installation of Bio-Gas Units, which capture methane—a potent greenhouse gas—from animal manure and convert it to clean energy. Carbon sequestration is a direct outcome of enhancing Soil Health (AE3) and Biodiversity (AE5). Activities such as green manuring, expanding agroforestry, and regenerating forest areas systematically draw down atmospheric carbon, storing it securely in soil organic matter and biomass.

- Adaptation measures equip the farming community to manage better the immediate impacts of a changing climate, such as erratic rainfall and temperature stress. The primary outcome is reduced vulnerability to climate shocks. This is achieved by improving Synergy (AE6) between farm elements through Soil and Water Conservation (SWC) interventions and micro-irrigation systems, which enhance water security. At the crop

level, popularising climate-smart paddy cultivation methods like SRI and Line Transplanting enables farmers to produce more with less water. Finally, the Biodiversity (AE5) principle is central to adaptation; conserving traditional seeds in biodiversity blocks ensures that the community retains access to genetic material that has been naturally selected for resilience to local climate stresses.

- Ultimately, these mitigation and adaptation strategies converge to build long-term systemic resilience. A resilient agroecosystem is not just one that endures a shock, but one that can recover, reorganise, and adapt.

- By applying these diverse agroecological principles—from improving Soil Health (AE3) and closing nutrient loops through Recycling (AE1) to diversifying the landscape with high Biodiversity (AE5) and reducing dependencies via Input Reduction (AE2)—the entire agricultural system becomes more stable, productive, and self-sufficient in the face of climate uncertainty.

This integrated strategy makes a direct and tangible contribution to **SDG 13 (Climate Action)** by addressing both its causes and effects. The promotion of clean energy through biogas also supports **SDG 7 (Affordable and Clean Energy)**, thereby fulfilling the CAT objective of addressing the climate crisis.