

Bridging the Gap: Participatory Action Research and Higher Education for Climate Change Adaptation in Rural India

Devisha Sasidevan¹, Sunil D. Santha, Tristan McCowan and Sowmya Balasubramaniam

Published in the *International Journal of Sustainability in Higher Education* (2025)
<https://doi.org/10.1108/IJSHE-10-2024-0710>

Abstract

This article explores a community-based initiative developed in Tamil Nadu, India that promotes climate resilience using heirloom seeds. Developed collaboratively through a University-Social Enterprise-Community partnership, the initiative employed participatory action research (PAR) to understand how universities can engage in practice-based research and strengthen actor networks in promoting climate action. The article emphasises on cross-border learning experiences across universities, social enterprises, and local farming communities to drive social and ecological transformation. Our fieldwork was shaped by pluralist methodologies that emphasised on strengthening relationalities such as participatory mapping, home visits, photovoice, movie screening, and seed fairs. Main findings indicate that such methodologies are crucial for the co-designing of pedagogy and practice, and co-creating alternative worldviews. More importantly, this paper showcases the need for climate action programmes and multi-stakeholder partnerships to be grounded in the lived experiences and wisdom of local communities. The study contributes to a more inclusive and equitable approach to knowledge production and climate action by highlighting the vulnerability of marginalised groups and promoting climate justice and sustainability debates in higher education.

Keywords: Climate Change Adaptation, Adaptive Innovation, Participatory Action Research, Theory-Practice Assemblages, Posthumanism

Introduction

In an increasingly complex, polarised and warming world, there is a need for co-creating reflective, systemic and innovative solutions. This is especially crucial when addressing climate change, a significant threat to vulnerable communities that increases food insecurity and requires immediate adaptation strategies. Recognising the limitations of external interventions that lack genuine engagement with local actors, cultures and settings, a growing consensus points towards universities' pivotal role in fostering climate action. Universities are crucial in building capacity among diverse stakeholders, enabling them to co-design and implement equitable climate action programmes. This necessitates a shift towards

¹ Corresponding Author: Assistant Professor, School of Social Work, Tata Institute of Social Sciences, Mumbai (ORCID: 0000-0001-5200-2815). Email: devisha.sasidevan@gmail.com

decentralised and participatory knowledge production structures and processes that acknowledge and amplify the agency and voices of all stakeholders. Nevertheless, there is an imminent challenge in our efforts to understand complex social-ecological contexts and adapt suitably to them. This also hints at our limitations in bridging the theory-practice disconnect. Such circumstances demand that we consider theorising as an embodied material practice where we do not leave the material world behind and enter the domain of pure ideas (Barad 2007, 55). Often, the dilemmas of these situations are felt in university-community partnerships and allied social innovation projects.

Action researchers engaging with environmental and livelihood issues are uniquely positioned to drive meaningful adaptation to complex social and ecological uncertainties. They possess a nuanced understanding of diverse engagement contexts, enabling them to effectively foster social change and cultivate shared responsibility. By bridging the divide between conceptualisation and practice, action researchers play a vital role in co-designing pedagogy and practice, providing a pathway for translating knowledge into action. They contribute significantly to co-creating alternative worldviews, developing new theories, refining professional intervention skills, and ultimately providing innovative solutions to address complex global challenges. Action researchers, like pracademics, navigate across two different spaces of practice and academia (Bouckaert et al., 2023; Mynott and Zimmatore, 2022; Wilson, 2015). They are uniquely placed to recognise the diverse engagement contexts, fostering social change, and nurturing shared responsibilities (Volpe and Chandler 2001; Kolber and Heggart 2022). They have a significant role in bridging the gap between conceptualisation and practice and co-designing pedagogy and practice (Bouckaert et al., 2023; Volpe and Chandler, 2001; Hollweck et al., 2022).

To further illustrate the entanglements of theory and practice, we have reflected upon our involvement in a participatory action research (PAR) project on climate adaptation at Kanjikoil in Erode district of Tamil Nadu, India (Fig 1). Geographically, Tamil Nadu is in southern India which is highly prone to extreme weather events such as heavy rains, flooding, coastal erosion, drought and severe water scarcity. The state is characterised by its rich cultural legacy and a strong agricultural economy. Agriculture is fundamental to the state's economy, considerably impacting both livelihoods and food security. Agriculture and allied activities serve as the primary source of livelihood for around 60 percent of the state's workforce and plays as a significant contributor to food security (Government of Tamil Nadu, n.d.).

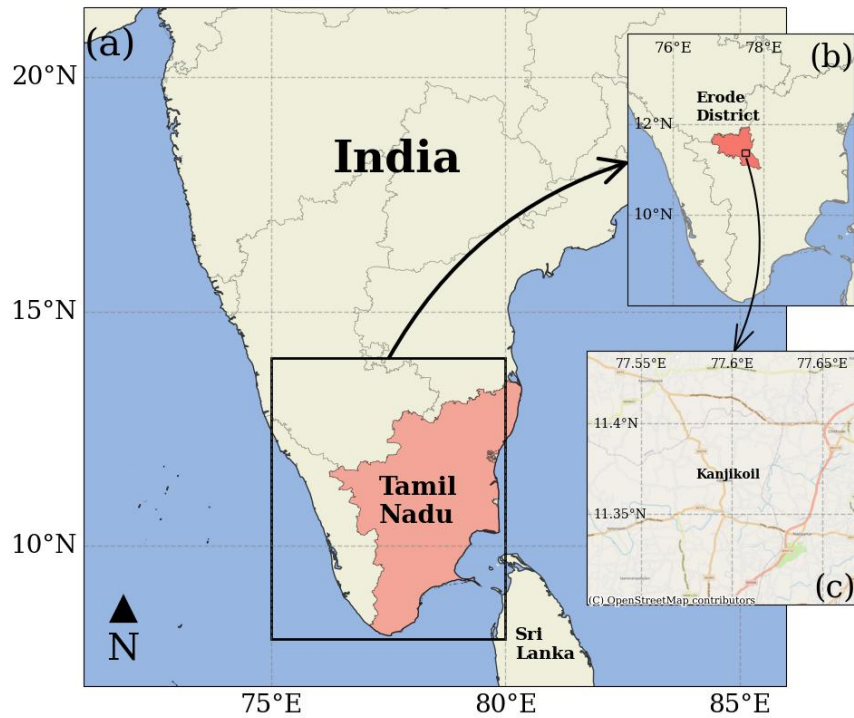


Figure 1: Map of Kanjikoll, Erode District in Tamil Nadu.

The effects of climate change in Tamil Nadu are seen to impact the daily lives of its people, including marginalised groups, daily wage labourers, and small-scale farmers (Sasidevan and Santha 2023). It has significant issues stemming from climate change, such as erratic rainfall, increasing temperatures, and altered crop viability. The effects of this change in weather patterns are diverse. Some areas within the district now experience extreme water scarcity, whereas others have experienced prolonged periods of heavy rain. In some places, the water has become too saline for cultivation. These factors have combined to negatively affect the crop growing season. There has also been an increase in crop diseases and pests (ibid).

The PAR was a collaboration between the Centre for Livelihoods and Social Innovation (CLSI), Tata Institute of Social Sciences (TISS), Hooga Seed Keepers' Collective (HSKC), and the Climate-U network. Climate-U² (Transforming Universities for a Changing Climate) is an international network fostering knowledge exchange on the experience of PAR for climate action between universities in diverse contexts (currently 10 countries spread across Latin America, Africa, Europe, Asia and the Pacific). Drawing on principles of climate justice and epistemic pluralism, it aims for a fundamental shift in university practice, away from extractive and exploitative relationships with human and non-human actors, and towards transformative action for sustainable futures (McCowan 2020; Climate-U 2021).

Located in an agrarian village in Erode district of Tamil Nadu, India, the PAR was facilitated through the dynamic partnership between faculty and postgraduate social work students from TISS, HSKC, and grassroots-level community actors, namely small farmers and seed keepers. The PAR highlighted the intricacies of working with theory-practice assemblages, emphasising the importance of

² <https://www.climate-uni.com/>

integrating theoretical frameworks with practical, on-the-ground applications. At the heart of this exploration lies the HSKC, a community-based initiative in Tamil Nadu, India. This initiative champions using heritage seeds over industrially produced hybrid varieties to enhance climate resilience and improve food security within the community. The HSKC employs a multifaceted approach to address context-specific needs, leading to impactful two-way intergenerational learning processes. By leveraging the principles and methods of adaptive innovation at Tamil Nadu, the project challenges established power dynamics between universities and communities, repositioning community members as active researchers and agents of change. This approach tackles critical local issues, including gender and caste disparities, while addressing the tension between immediate survival needs and long-term social and environmental consequences.

The article unfolds how universities can engage in practice-based research by fostering robust researcher-community interactions within international networks. This collaborative approach aims to enhance awareness of the potential and limitations of PAR, contributing to a more inclusive and equitable approach to knowledge production and climate action. Following this, the article presents the experiences and insights gained through collaborative fieldwork with social enterprise, Hooga Seed Keepers, and the community partners in Tamil Nadu. It explores various engagement methods, including following seeds from a post-human perspective, photovoice with children and school students, the development of seasonal calendars and movie screenings for community dialogue. The analysis then delves into bridging the theory-practice divide and stresses the significance of cross-border learning experiences across universities and communities, within community power and privilege structures, and across generations. While demanding, these interactions are instrumental in reclaiming lost knowledge, fostering social and environmental regeneration, and driving collective transformation - all essential for effective climate change solutions. Ultimately, the paper aims to contribute to a deeper understanding of grassroots climate action by highlighting the theoretical basis in participatory action research, the adaptive innovation framework, and post-humanist perspectives through university-community partnership in knowledge co-creation.

Shaping University Capacities

The larger environmental education in modern India has been primarily shaped by colonial thinking, replicating an education system that undermines situated, relational decision-making and creative response. Constrained by dualisms such as nature/culture, modernist ideas and anthropocentrism still resonate as their organising principles (Bell 2021; Bozalek and Pease 2021). Boetto (2017, 15) points out that the significant paradox of social work is its modernist dualist foundation, which is hierarchical and legitimises all forms of oppression and human mastery of nature. When we all began our careers in social work, we were also trained and conditioned to think of ourselves as a disinterested self, working towards the betterment of a distant natural world.

Entanglements reveal an alternative worldview on matter and aliveness (Barad 2007). Being entangled is not simply being intertwined with another, as in joining separate entities, but lacking an independent, self-contained existence (Barad 2007). Existence, therefore, is not an individual affair (ibid). Such a

posthuman ontology is an integral element in the resilience-building practices of indigenous communities, protecting their sacred ecologies, local knowledge, and livelihoods. Such a worldview does not fit well into the realms of Western science and resource management practices that are constrained by dualisms of human/nonhuman, nature/culture, theory/practice, and body/mind (Barad 2007; Datta 2016). Instead, indigenous knowledge systems are more embedded in the relationality of entangled beings, humans and nonhumans, rather than the thing or identity usually dominant in Cartesian knowledge frames (Bellingham 2022). Meaning making embedded in indigenous worldviews emerges in a relational context, where land, water, and other entities have stories to tell, exercising agency via situated knowledge (ibid). Conventional social work education seldom recognises such nature-culture entanglements (Bell, 2021).

Through this article we contend that fostering theory-practice connections through PAR could enable varied actors to innovate and revitalise community practice and climate action with marginalised communities. The fundamental concept is that local participation should serve as the foundation for progressive social policy and social change, while climate justice outcomes should guide our mission and practice evaluation.

To address some of the issues raised above, the Centre for Livelihoods and Social Innovation, School of Social Work at the Tata Institute of Social Sciences in Mumbai, established the M.A. Social Work in Livelihoods and Social Entrepreneurship in 2012. Our vision was for our students to pursue innovative ideas, institutional designs, and processes that would challenge and transform the contexts of vulnerability and uncertainty in individual households, vulnerable groups, and marginalised communities, while also increasing their asset base and affirming their rights to live with dignity and freedom. In this regard, our curriculum-specific and community-specific objectives also enabled us to carry out the Climate-U PAR.

Our curriculum provides many possibilities for social work students to understand that the day-to-day affairs of marginalised communities are regulated by a pluralist economic base rather than the functions of a market society. These pluralist forms of economy allow communities to maintain their harmonious relationship with nature, live a socially linked lifestyle, and establish solidarity-based human networks for social value production (Laville, 2010; Caille, 2010). Such a curricular viewpoint also shows students how the intricacies of poverty, marginalisation, and development are providing new issues for resource-deprived and disadvantaged groups.

Yet another strength of our curriculum is that it allows for adaptable social innovation as a practice. The curriculum framework, as well as its flexibility for diffraction through transdisciplinary and diversified methodological innovation, serves as a driving force. The Rural Practicum - Livelihood Innovation Lab - Block Fieldwork concept allows students to watch, experience, discuss, reflect, and participate in climate action. The rural practicum - livelihood innovation lab - block fieldwork strategy allows us to promote creativity, create new routes, and improve other entrepreneurial skills among social work students while identifying long-term and equitable solutions to recognised problems. Students and teachers are also urged to investigate the use of new media and other novel forms of social organising to promote livelihoods and improve the assets of marginalised communities. Such an engagement-focused curriculum enables students to use their creativity and

participate in experiential learning to improve the livelihoods of underprivileged communities. The goal is to foster university-community partnerships that highlight each partner's shared synergies and strengths. Such a method creates space for addressing complicated social issues and challenges while also benefiting all parties (Martin et al., 2005). This also allows for participation in local revitalisation initiatives, the formation of 'community scholars', and cohesive meshes of learning, research, and service collaborations (ibid). In such a setting, all learning stakeholders, including social work students, social work educators, and varied community organisations, are expected to emerge as 'co-creators', 'co-producers', and 'co-owners' of knowledge. The following section narrates the experiences of the authors in facilitating an Adaptive Innovation Model that recognised the significance of nature-culture entanglements in adapting to climate change.

The Adaptive Innovation Process

The Adaptive Innovation Model (Figure 2) has facilitated this PAR project. It has its roots in action research and reflective practice. The concerns of action researchers are located mainly on resolving an active problem that could fulfil the needs of those in need. We find it appropriate to start with 'problems' in the field, work collaboratively with diverse actors to generate people-centred 'solutions', and build theories reflexively. Nurturing action research partnerships also enables students to engage in field-based learning with their class works, thus deepening and broadening their professional capabilities (Susskind 2013). In a discipline like environmental social work, we consider such a way of life part of our everyday practice. Much of our practice situation requires informal, voluntary, and mutually accepted ways of engagement that could nurture and foster collaborative problem-solving. Often, we engage beyond the regular classroom encounters with hands-on instructions to deal with problems in the field and find ways to address the needs of the impacted actors.

This article asserts that as educators and learners in a more-than-human world, we must recognise that epistemology (ways of knowing) cannot be separated from ontology (being and becoming) and ethics (Barad 2007; Bozalek and Pease 2021). Relationalities are more critical in action research. Entanglements reveal an alternative worldview on matter and aliveness (Barad 2007). Being entangled is not simply being intertwined with another, as in joining separate entities, but lacking an independent, self-contained existence (Barad 2007). Existence, therefore, is not an individual affair (ibid). Such a posthuman ontology is an integral element in the resilience-building practices of indigenous communities, protecting their sacred ecologies, local knowledge, and livelihoods. Such a worldview does not fit well into the realms of Western science and resource management practices that are constrained by dualisms of human/nonhuman, nature/culture, theory/practice, and body/mind (Barad 2007; Datta 2016). Instead, indigenous knowledge systems are more embedded in the relationality of entangled beings, humans and nonhumans, rather than the thing or identity usually dominant in Cartesian knowledge frames (Bellingham 2022). Meaning making embedded in indigenous worldviews emerges in a relational context, where land, water, and other entities have stories to tell, exercising agency via situated knowledge (ibid).

Adaptive Innovation is a posthumanist practice model which offers a new ethics of engagement with a profound ecological consciousness and multispecies

thinking, eliminating rigid boundaries between humans and nonhumans. It is envisaged that such a model could disrupt the conventional ways of doing environmental social work, wherein knowing, doing, and becoming are all mutually entangled. It enables us to explore symbiosis, identity and collective agency through the complex web of interaction between humans and nonhumans.

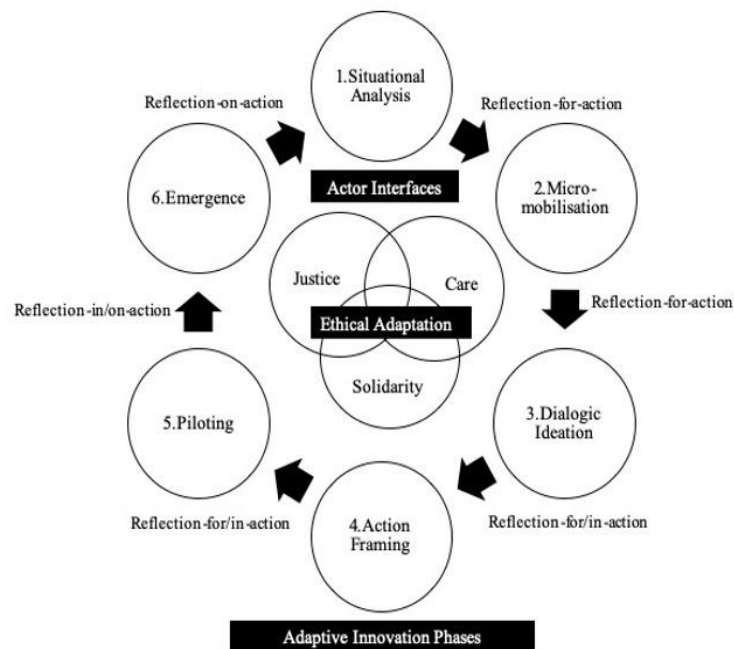
According to Bennett (2010, 6), these practices are about “the curious ability of inanimate things to animate, to act, to produce effects dramatic and subtle.” Bennett (2010, xiii) advocates pursuing material entanglements by following “the scent of a nonhuman, thingly power, the material agency of natural bodies and technological artefacts.” We began by “following seeds.” Citing Derrida, Bennett explains that to follow means “always to be in response to a call from something, however nonhuman it may be” (ibid). We explored seeds’ profound entanglements and relationalities with humans and other nonhumans. Further, we delved into how diverse commodity frontiers constrained the cultivation of heirloom crop varieties, often leading to their dispossession or displacement. Furthermore, as our journey unfolded, we encountered the complexities associated with ethical adaptation, primarily driven by the intersectional structural contexts influencing the agency of humans and seeds in a more-than-human world.

Guided by posthumanist perspectives of justice, ethics of care, and solidarity, Adaptive Innovation refers to:

“People-centred innovation processes by which local community actors collectively analyse their situations in the context of social and ecological transitions; forge a constructive partnership with other relevant actors to dialogue, ideate and develop working models; and implement and critically observe, reflect, and validate their adaptive strategies to the emergent contexts. These processes are situated, reflective, context-specific, developmental, and committed to the values of care, justice, and solidarity.” (Santha 2020)³.

³ The Adaptive Innovation Model and its different components are elaborated in Santha (2020). To discuss those features here maybe outside the scope of this paper.

Figure 2. The Adaptive Innovation Model



Source: (Santha 2020, 30)

We began the adaptive innovation process by familiarising ourselves with posthumanist perspectives on climate change, environmental uncertainties, and the livelihood practices of vulnerable groups. Our first five weeks of engagement between faculty and students involved reviewing the works of Donna Haraway (1988), Anna Tsing (2015), Val Plumwood (2009), van Dooren (2016), and Santha (2023). Through storytelling and reflective conversations, we shared these reviews on nature-culture entanglements and the Self. This was supplemented by watching movies like *Kadaisi Vivasai* (The Last Farmer) and daily debriefing. Reviewing news articles and case studies of the Green Revolution and their impacts on people also provided a preliminary sensitisation for the students to engage with the field realities. Following this orientation and sensitisation phase, we visited the village for two consecutive weeks, which also marked the commencement of our situational analysis phase where we began exploring the close entanglements between seeds and humans from a post-human perspective. The overarching approach of the project aimed to promote awareness and develop capacities for climate action initiatives at the grassroots level. This adaptive innovation model guided the action research process, emphasising people-centred innovation through analysis, partnership, dialogue, ideation, implementation, reflection, and validation. The process is ongoing, and we are still at the action framing phase (Table 1).

Table 1. Timeline of key processes involved

Timeline	Key processes
19/3/2022	Initial introduction of the action research project with faculty and students.
2/4/2022	Planning for Action Research with faculty and social entrepreneurs, reflecting upon the context and need for action research with respect to the ongoing work of field partners.

16/4/2022	Planning for Situational Analysis with faculty and social entrepreneurs, reflecting upon the context and need for situational analysis.
8/5/2022	Listening and Sharing Stories of Care, Justice & Solidarity with faculty and students, including theoretical reflections and introduction to discourses.
11/5/2022	Movie watching (Tamil Movie, 'Kadaisi Vivasayi') with students.
13/5/2022	Goal Setting with faculty and social entrepreneurs, developing learning and actionable goals for Rural Practicum.
15/5/2022	Reflection on Movie and Goal Setting with faculty and students.
21/5/2022:	Reflection on Goals with faculty and social entrepreneurs, reflecting on goals based on Field Realities.
23/5/2022	Collective Goal Setting with faculty, students, and social entrepreneurs, developing collective goals and action plans for Rural Practicum.
29/5/2022 - 14/6/2022	Rural Practicum - Students, social entrepreneurs, and the community engaged in Situational Analysis, including knowing the field, theoretical reflections, CASIO Framework, storytelling, group discussions, weekly reflective meetings, and daily debriefing. This period likely involved initial household visits and conversations to build rapport.
15/6/2022 - 11/7/2022	Continued Situational Analysis with social entrepreneurs and the community, involving conversational interviews, oral histories, key informant interviews, and transect walks.
15/7/2022 - 15/8/2022	Reframing goals and micro-mobilisation with social entrepreneurs and the community based on the situational analysis, including household visits, transect walks, and key informant interviews. This phase likely involved initial discussions around heirloom seeds with some community members.
16/8/2022	Reframing Goals with faculty and students after the Rural Practicum.
26/9/22 - 21/10/22	Block Field Work with students, social entrepreneurs, the community, and faculty, involving Micro-mobilisation, Dialogic Ideation, Action Framing, household visits, seed festivals/ fairs, group discussions, games, movie screening, and photovoice etc..
4/10/2022 - 7/10/2022	Specific dates mentioned for Photovoice sessions with children in the community near Hooga Farms.
14/10/2022	Discussion on developing a seasonal calendar with community members. Photovoice activities were also conducted at the Government school Kanjikovil. Initial movie screenings of 'Kadaisi Vivasayi' likely took place, leading to community discussions
21/03/2023	Dissemination of Action Research to Policymakers involving faculty and presentations and storytelling.

Pluralist and Situated Methodologies

Each phase of our fieldwork was shaped by diverse pluralist and situated methodologies. We visited different farming households and attempted to engage in shared conversations. Simultaneously, we immersed ourselves in human-nonhuman relationalities. For instance, when students engaged in the meticulous process of de-seeding the Trèfle du Togo Tomato, it became a journey of storytelling and shared conversations that aimed to unravel the unique history and intrinsic agency of this heirloom variety originating from Africa. Questions emerged:

“What gives it its striking red hue? Why does its shape deviate from conventional tomatoes? Why is it considered an heirloom variety? How does it adapt to water scarcity? And what insights can other seed keepers offer about this species?”

These ongoing inquiries and explorations showcased our constant pursuit of understanding the intricate and multifaceted epistemologies characterising the more-than-human world. Students also recognised entangled ethics of care when directly involved in packaging, transporting and couriering seeds. These activities are typically perceived as linear functions within the supply chain. Yet, our posthuman practice defies such conventional notions. Instead, we began to treat seeds as living entities. While holding this belief, we engaged with seeds on a sensory level - touching, feeling, selecting, and counting each seed with meticulous care. We placed them into biodegradable and non-toxic materials, ensuring they are safeguarded throughout their journey as we package them into covers and boxes. Finally, we sent them on their way, knowing that our actions reflect our commitment to the well-being of these seeds throughout their intricate journey.

In caregiving and care-receiving, these everyday practices are deeply woven into the fabric of our interconnected world, which extends beyond humanity's boundaries. The following methods helped us to nurture a sense of empathy, understanding and interconnectedness between the students and the more-than-human world.

Seasonal Calendar

Recognising the significance of traditional knowledge in adapting to climate change, we utilised seasonal calendars to explore cropping patterns and livelihood diversity, revealing the crops cultivated each season and the associated livelihood practices. A seasonal calendar guided by traditional knowledge systems including oral histories can clearly state ecological indicators, seasonal variations and associated activities (Yang et al 2019). Through participatory workshops and interviews with farmers, the team created visual representations of seasonal variations, highlighting the vulnerability of specific crops to changing weather patterns. This process enabled the (a) Documentation of traditional knowledge, where farmers shared their insights on optimal sowing and harvesting of crops, traditional pest control methods, and the historical impact of weather variations on crop yields; (b) Identification of climate risks such as the increase in frequency of extreme events like droughts and floods, emphasising their detrimental effects on agricultural productivity and local livelihoods; and (c) Opportunities to co-design community-based adaptation such as diversifying crop varieties and adopting water-saving techniques.

We explored cropping patterns and livelihood diversity through seasonal calendars, revealing the crops cultivated each season or the type of livelihood practices that local people adhered to. For example, farmers in Erode discussed their approaches, offering light on crop seasonality and production variances. This calendar documented livelihood and crop diversification methods, allowing for a better knowledge of traditional farming routines (Table 2). We determined that most of the vegetable cultivation occurred during Vaikashi (14 May-14 June), Āni (15 June-15 July), and Ādi (16 July-16 August). This seasonal calendar exercise revealed an interesting fact: certain crops, such as groundnut, brinjal, tomato, tapioca, chilli, coconut and okra, grow all year. However, their production varied greatly according to the months or seasons in which they were grown. For example, groundnut produced the most from March to May, with approximately four times the output of other months. Using the seasonal calendar, we looked at the various extreme weather occurrences that affected local communities each year.

Table 2. Seasonal Calendar & Cropping Pattern

Tamil Month	English Month	Crops Cultivated
Chithirai	Mid-April to mid-May	Groundnut, brinjal, tomato, tapioca, chilli, coconut, okra
Vaikashi	Mid-May to mid-June	Sugarcane, Groundnut, Raggi, onion, chilli
Ani	Mid-June to mid-July	Groundnut
Aadi	Mid-July to mid-August	Yam, groundnut, chili, avara, banana.
Avani	Mid-August to mid-September	Paddy and Groundnut
Poratassi	Mid-September to mid-October	Sugarcane, banana, groundnut, onion
Aipassi	Mid-October to mid-November	Groundnut and onion
Karthigai	Mid-November to mid-December	Groundnut and sugarcane
Margazhi	Mid-December to mid-January	Groundnut, sugarcane, chilli
Thai	Mid-January to mid-February	Sugarcane, banana, groundnut, chilly, avari
Massi	Mid-February to mid-March	Groundnut, tomato
Painkuni	Mid-March to Mid-April	Yam, groundnut

What added an intriguing dimension to our PAR was the application of a posthuman lens to the seasonal calendar. Rather than solely focusing on the question, “*What crops do farmers grow each month?*” we ventured into a deeper inquiry: “*How do specific crops influence and shape farmers’ livelihood practices?*” This shift in perspective enabled us to explore the agency of plants/crops and the interconnected roles played by humans and nonhuman elements in this agrarian village, thereby challenging the conventional linear methodologies employed in Participatory Rural Appraisal (PRA).

Photovoice

Photovoice emerged as a method that allowed us to gain profound insights into the contextual intricacies and practice landscapes and forged intricate entanglements between different actors, notably children and the broader natural environment, with the tools employed – namely, the camera and resultant photographs. Within this multifaceted interplay, each actor wielded distinct agencies pivotal in co-creating meaning and shaping the distinctive characteristics of their eco-social domains. The photovoice also unearthed the agency of the camera and the photograph as apparatuses entangled in our posthuman intra-actions. As Barad (2007, 145) states, “What is needed is a posthumanist understanding of the role of the apparatus and of the human and the relationship between them.” The camera’s nonhuman eye (Ivinson and Renold 2016) intra-acted with the children’s decision to intra-act with nature. As we read diffractively, all the prominent photographs capture children in the context of climate change and extreme weather events as the objects to be gazed at. In contrast, in our case, the gaze was not on children, but children were exploring the outside world and thinking/knowing/re-telling about it. For these children, who are otherwise instructed/controlled by the adults (teachers/parents) to learn by rote what is in the books and imitate the images printed in them or the blackboard or PowerPoint slides, children themselves had a learning opportunity to rewrite the research and learning process. They maintained control over the whole narrative. The process of photovoice, in particular, had led to children’s collaboration and the formation of a school seed club. Our postgraduate students who facilitated this process shared during the debriefing about the critical role of children in climate action:

“We were working on their future, and they indirectly expressed that they had a more significant stake in participating towards sustainable futures.”

Other Participatory Processes

During our fieldwork, we collaborated with seed keepers from a marginalised, oppressed Dalit community located remotely from the village. Initially, due to historical distrust stemming from caste hierarchies and conflicts, our engagement faced scepticism. Gradually, as we spent more time empathetically with the community, they reciprocated warmly. The transect walk revealed the community’s challenges: inadequate infrastructure, limited land holdings, and reliance on daily labour in the farms of upper-caste farmers. To foster community involvement, we screened the Tamil movie “*Kadai Vivasayi*” (The Last Farmer),

which mirrored their lives. Despite weather-related interruptions, the community displayed immense interest in the movie. Post-screening discussions unveiled their struggles and experiences, aligning with the film's themes. They emphasised the importance of water in farming, organic practices, and the preservation of native seeds. They identified with the movie's characters and shared their reflections on how some humans and some seeds are continually being displaced and dispossessed. They also collected native seeds for their kitchen gardens, signalling their commitment to seed conservation. This experience highlighted the significance of working collectively with the community. It instilled a sense of ethical responsibility to support this marginalised community's efforts in preserving heirloom seeds and sustainable agriculture.

We organised seed festivals and fairs, where farmers and seed keepers shared concerns about seed and crop commodification. These events also served as spaces for storytelling and sharing memories of cultural practices. During these gatherings, stories and histories related to seeds, seasons, soil, pests, and cuisines were shared, preserving human and more-than-human knowledge forms. Farmers expressed concerns about the dominance of hybrid seeds, driven by market forces and corporations. Despite being aware of the limitations of hybrid varieties, farmers felt compelled to use them, often leading to crop failures and financial losses. One of the farmers noted,

"The commodification of seeds has impacted our social harmony and traditional practices like Mulaipari offerings at Pongal festival, which encouraged collective seed sharing."

The commodification of agriculture dispossessed farmers of their agency and seed/crop sovereignty, making them dependent on external entities. It also devalued their efforts, as crops were sold for meagre prices. To counteract this trend, we initiated a model where seed keepers provided heirloom seeds to interested farmers for trial cultivation, aiming to encourage the adoption of native seeds. Seed festivals and fairs facilitated seed sharing and exchange among seed savers, creating pathways for vibrant seed commons.

Bridging the Theory-Practice Divide

(a) Theorising Practice at the Local Level

Our efforts to theorise practice resulted in unearthing an assemblage of theory and practice. Theory-practice assemblage denotes that both theory/practices are constituted through intra-action and do not exist without the other (Barad 2007). Within these entanglements, we could locate the agency of both theory and practice, where one is not above the other but both affecting and constituting one another. These entanglements denote the mutuality and relationalities of knowing, doing and being in our everyday life (de la Bellacasa 2012). Such an approach based on relationality recognises the complexity of networks of human and nonhuman actors and their agency in nourishing, affirmative and creative learning rather than human intentionality (Bozalek 2018; Richards et al. 2024). Employing an analysis of assemblage, Mulcahy et al. (2024) showcase how such a conceptualisation can

disclose the agencies, subjectivities, affects, capacities and power dynamics within the theory-practice / human-nonhuman entanglements.

Cutting across oppositional binaries and non-linear entanglements, an assemblage of theory and practice would enable us to diffract (rather than reflect) theory through practice and vice versa (Haraway and Goodeve 2000). The emphasis is further on the intra-actions and situated relationships between theory and practice, where both are entangled and shifting in a dynamic field of possibilities and impossibilities (Zarabadi and Morales 2024). In such an assemblage, people, objects, and spaces are intra-actively entangled, and all involved actors (human and nonhuman) and their narratives/stories/memories/silences/discourses are ontologically inseparable and part of it (Barad 2007; Buchanan 2021; Caetano-Silva et al. 2024)).

For example, the PAR enabled us to engage with a basket of theoretical perspectives: posthumanism, commodity frontiers, intersectionality and everyday justice, all intertwined with our practice. Our engagement in the field enabled us to understand that intersectional binaries shape farming impacted by climate change and other rural contexts of livelihood practices regarding gender, caste, age and ability to work or produce knowledge. We became self-aware of how nature/culture dualisms were embedded in our everyday practice, which also has implications for climate adaptation. The students shared their reflections during their fieldwork presentation as follows:

“During the seed-sowing festival, we observed that some people from a marginalised caste group played the drums while sowing the seeds. Playing drums is an age-old art form associated with their caste-based identity. However, caste-based social exclusion still prevails in the region, and these communities still bear the brunt. Following a double tumbler system, whereby tea or water is served in stainless steel tumblers for privileged caste groups, while the marginalised caste groups are served in paper cups, is one among the many prominent forms of caste discrimination in the region...There is a prevalence of high sexual division of labour as well, where women are paid much less than men. Like the caste binaries, gender binaries were also very much internalised in this society. Further, such binaries were, in a sense, barriers to our action research and climate action, which gives us a glimpse of how these intersectionalities could constrain adaptation strategies at a larger scale.”

The sites of practice turned out to be a complex and nuanced habitus in which we could sense diverse forms of binaries and, more typically, the complex entanglements of society/nature binaries with the intersectionalities of gender and caste. Students shared during their fieldwork presentation,

“We are also alarmed by the various binaries and intersectionalities entangled with the emerging complexities of climate change. Perhaps the marginalised and oppressed caste groups, women, and landless labourers were affected the most. They have to work in the fields of others and are vulnerable to extreme weather events such as heat stroke. Moreover, those who own some land cannot cultivate anything due to the lack of water. While the privileged caste groups and wealthy men can dig the bore well and use it, they are also appropriating the water the poor farmers deserve.”

Further, the commodification of agriculture has led to the alienation of farmers from native/heirloom varieties of crops, indigenous knowledge systems, and natural farming practices (Santha et al. 2024). However, such theory-practice assemblages require further understanding and critical exploration. More importantly, adopting such an ontological posthuman turn in our everyday practice would require a critical inquiry of those practices (Gilbert and Sklair 2018; Bessire and Bond 2014).

(b) University-Community Partnerships in Knowledge Co-creation:

Our efforts through PAR were able to capture the politics and potentials of university-community partnerships in knowledge co-creation. This was possible because of the collaborative action research partnerships between the Centre for Livelihoods and Social Innovation at TISS and the Hooga Seed Keepers' Collective. This effort, a fundamental component of the Climate-U network, seeks to reposition the people in the community as active researchers and participating in the generation and restoration of local ecological knowledge instead of remaining as passive subjects of research (Climate-U 2021).

The experience with our students who actively engaged in PAR helped us to build the connection between theoretical discourses on climate change and the perceptions and experiences of communities. It gave the students hands-on experience in fieldwork and at the same time reflected on the field realities from diverse theoretical perspectives. This engagement of faculty and our students with the local community signifies the evolving role of universities in fostering capacity-building among diverse stakeholders. By collaborating directly with community members and integrating them into the research and fieldwork process, we can highlight how decentralising knowledge production is needed and is possible. The PAR approach helped us to co-create and implement climate action programmes that are not only informed by academic research but also grounded in the lived experiences and expertise of local communities.

Theorising practice is a relational process where knowing is inseparable from the practices of being (Higgins 2016). Both are entangled with each other in everyday worldmaking. Such a state of becoming brings us to the liveliness of beings' experiences as subjects rather than objects (Tsing 2015). Our experiences in facilitating a posthumanist action research approach have made us aware of our entanglements with ecologies of "knowing-in-being" and "repair". The ecologies of knowing-in-being evolve through "seeking, making, sharing, and celebrating" (Cajete 2000, 178). At the same time, the ecologies of repair guide us to the situated understanding of nature-culture entanglements, their relationalities, and the multiplicities of human-nonhuman associations in capitalist ruins (Blanco-wells 2021; Tsing 2015). The posthumanist action researchers' hope for a better future lies in the agency of all beings, humans and nonhumans, in rebuilding damaged ecosystems and weakened social ties.

(c) Learning across boundaries

Some hold out faith that technological innovations such as geo-engineering will allow humanity to solve climate change and go back to business as usual. While

technology can certainly be part of the solution, this kind of approach is deeply flawed, assuming as it does that climate crisis is a linear problem that can have a single point of intervention. The problem in fact is a 'wicked' one (Head & Alford 2015) and rooted in human societies, their economic, political and cultural structures, and indeed in their epistemologies and ontologies. As such, the real solution can only be sought in a transformation of those societies and communities, and with a deep shift in human beings, their understandings and relationships. Education, therefore, is vital to humanity's response.

The experience of climate change education, however, over recent years is that knowledge about climate and understanding of the science is a necessary but not a sufficient condition of action (Monroe et al, 2019; Rousell & Cutter-Mackenzie-Knowles 2020; Stevenson et al. 2017). Transmissive approaches fall far short of what is needed to transform individuals, and educational processes must engage also with the emotions, values, imagination and creativity. In response, a range of innovative responses have developed, drawing in arts, storytelling, immersion in natural environments and engagement with diverse media and social media (Ojala 2016; Bryan 2020; Lehtonen et al. 2019). Connection with action is particularly important, in developing a positive spiral of learning between theory and practice, reflection and action (Freire 1970).

The experience of the Hooga Seed Keepers' Collective illustrates these points well, presenting as it does a series of boundary crossings that challenge and recreate conventional ideas of learning. First, there is the boundary between formal and non-formal education. Schooling in the contemporary age instils the idea that valuable learning occurs within the walls of the academy and consequently delegitimises learning in other spaces (Illich 1971; McCowan 2022). With a challenge as complex as that of climate, we need to move outside the confines of the categories that caused the problem in the first place, including academic disciplines and institutions. In this initiative, the learning of the TISS students and community members takes place in non-formal settings, in spontaneous interactions unmediated by curricula and assessment. It is the immersive experience of students in the distinctive cultural and geographical setting of Tamil Nadu that enables their learning and development (Climate-U 2023). This case also illustrates the limitations of the teacher-student relationship. The learning was not passed from a repository of knowledge and wisdom to those without but was mobilised and shared between all involved: both community members and university students work simultaneously as teachers and learners in a constant dance.

Furthermore, there are significant implications here for the institution of university. Historically, if the university has paid any attention to society outside, it has done so to graciously share its pearls of wisdom with less fortunate others. This condescending attitude is not only normatively misplaced, but it has ceased to reflect the reality of an epistemic challenge like climate that requires an ecology of knowledges (Santos 2015) and collaboration between diverse stakeholders. Through the PAR, the community benefits from the knowledge systematised in the university, but the university also benefits from knowledge emanating from the community. In fact, we could go so far as to say that the university can only achieve the transformation it requires if it opens itself to this new form of learning and engagement from communities, and the indigenous, local and counter-hegemonic knowledge that they embody and mobilise (McCowan 2024, in press).

Conclusion

Our experiences with PAR shows that an important shift toward more inclusive and participatory frameworks in academic research can help us co-create knowledge and local specific meaningful interventions which are sustainable. It demonstrates how universities may help to co-design climate change activities, ensuring that they are equitable, relevant, and responsive to the requirements of both academic and community partners. It explicitly showed us the relevance of intersectional spheres of everyday life interfacing with social and environmental issues, highlighting the vulnerability of marginalised groups, such as women and landless labourers, to the impacts of climate change.

The university's role in fostering climate justice and sustainability debates in higher education through its presence in the PAR was most evident. Specific aspects of the curriculum structure helped us with the PAR, such as the Rural Practicum, Livelihood Innovation Lab, and Block Field Work, providing students with practical experience and helped them in developing their skills in participatory action research. The curriculum and the pedagogy promote critical thinking about the social and ethical dimensions of climate change and encourages students to develop innovative solutions for marginalised communities. For example, the PAR facilitated interactions between postgraduate students and experienced farmers and seed keepers, enabling the exchange of knowledge and perspectives across generations. During seed festivals and fairs, farmers and seed keepers shared their concerns and stories, preserving traditional knowledge forms across generations. This intergenerational dialogue highlights the value of traditional ecological knowledge in adapting to climate change and emphasises the importance of preserving and transmitting this knowledge to future generations.

As discussed in the preceding analysis, the case presents a range of innovative characteristics - boundary crossings of various types, between generations, disciplines, spaces and social groups - that are highly conducive to effective climate learning and the profound social transformation needed to address the polycrisis. While having unique characteristics of culture and geography, the Hooga Seed Keepers' Collective experience can serve as a generative case for learning in other contexts - as per the aims of the Climate-U network - in providing insights into the ways of managing practical obstacles to transformation, imagining different ways of being and organising and inspiration for the feasibility of alternatives. These forms of learning can travel across boundaries of language, system and nation-state, and will be crucial if we are to forge the kind of horizontal, pluralistic and collaborative global space that is needed to address the planetary crisis.

Acknowledgements

We are grateful to the farmers, seed-keepers, Afla C.P, Dhanya Kolathur, Anna Steffy KJ, Khadeeja Ali, Ghurshida Jabeen, Soofiya Yoosuf, for their posthumanist engagements with the PAR. We are also thankful to the crucial support of our funder, Climate-U and the UK Economic and Social Research Council as part of the Global Challenges Research Fund.

We would like to acknowledge OpenStreetMap for providing the map data for our study area, which is copyrighted by OpenStreetMap contributors and available at <https://www.openstreetmap.org>. Additionally, map data for land, ocean, and coastlines were sourced from Natural Earth public domain datasets, available at <https://naturalearthdata.com>, and map data for Indian state and district boundaries were provided by the DataMeet India community (CC BY 4.0) at <https://github.com/datameet/maps>.

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