



Regenerative Transitions in the Tropical Andes

Támesis, Southwestern Antioquia, Colombia

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Finca viva Biosuroeste
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Regenerative Transitions in the Tropical Andes. Támesis, Southwestern Antioquia, Colombia

Transiciones Regenerativas – Támesis, Suroeste Antioqueño

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Abstract

Pointed to as South America's largest water source and a priority region for conservation planning and research, the tropical Andes of today face compounding socio-ecological challenges linked to land use practices. Agriculture and mining interests have resulted in significant replacement of tropical forests, water contamination, soil erosion, and social conflict. Simultaneously, erratic changes in weather patterns are rapidly altering conditions for life on the mountains.

Within this landscape, the Colombian municipality of Támesis, Southwestern Antioquia, emerges as a node sheltering agroecological lighthouses; socio-ecological civic movements; and public-private hybrid organisations working to facilitate transformations intersecting agriculture with ecosystem restoration at the bioregional scale.

This study investigates agricultural transitions to soil health-enhancing practices within the municipality of Támesis. Intersecting complexity thinking with inquiry into the lived experience of transitioning farmers, this study employs qualitative methodologies in crafting a metaphorical map of the strategic landscape for transitions towards agroecological and regenerative practices. Among the findings are six possibilities and six barriers.

External input removal is, among local farming communities, perceived as placing farmers at socioeconomic risk given an overall low financial resilience and lack of governance support for farming families. The attractors of short-term yield stability offered by agrochemicals may surpass even prominent regenerative attractors such as health awareness. Such structural mechanisms are reinforced at phenomenological levels of mindsets and culture, with educational inheritances tied to chemical farming. Lack of financial and social sustainability in conventional farming are further causing growing disengagement of youth and farmers from agriculture.

Yet, there is a strong agricultural and nature-anchored identity in the studied territory. Pressing conventional disruptors such as rising prices for agrochemicals – and increasing awareness of adverse health effects from their usage – are generating increased opportunities for new attractors to form alternative, regenerative paradigms.

While a variety of factors presently make up attractors to initiate transitions journeys towards regenerative and agroecological practices in the territory, a main mechanism reinforcing the new practices was found to be a direct experience of the ecosystem responding to care – of ecological reciprocity. Hence, the strongest stabilising attractor was found to be eco-relational in nature, as well as to arise *from*, rather than consistently *before* the practices.

The study concludes with four strategic nudges, actionable for local organisations and farmers engaged in expanding regenerative transitions in the territory: Equipping early adopters to increase visibility of successful alternatives and stimulate incentivising markets; strategic design focusing on gradual transitions and what is most adjacent for local farmers to apply; empirical remembrance for soil awareness; and framing regeneration in language close to farmers' own worlds.

Keywords: regeneration, soil health, agroecological transitions, phenomenology, complexity thinking, tropical Andes

To my parents. Thank you for bringing me to the forest.

Foreword

Västmanland, Sweden, May 2026

As a child, we would spend all summers in the forest. This was normative – Sweden is a rural society in its ancestry, and most families would have an inherited old *torp* – country or archipelago cottage – reflecting their heritage.

My grandmother has told stories of how they lived here in the 60s. The children would run through the pastures outside the door, hiding behind grazing dairy cows to avoid getting called to bed. How they would spray pyrethrin – insectile nerve toxin – to kill off the massive number of flies attracted by the grazing animals, in the bedroom before going to sleep.

Now there is no problem with flies. In fact, out of the 20 or so pastoral husbandries that existed in the village, only one remains.

Lot by lot, the landscape has changed massively during my lifetime. The old forests that used to envelop the cottage are now shrubs and pioneer species, cut through by sunken, waterlogged scars where massive machinery dragged out the old pines.

I do not know if anyone ever called it development. Perhaps that was the label under which the models that made it close to impossible to remain a small-scale dairy farmer emerged. Perhaps it was the label with which clearcutting was introduced to forestry farmers.

“We cannot fight development. Growth and development are central characteristics of life” – the director of Biosuroeste told me in a lecture he gave to our Agroecology MSc program at SLU, quoting Fritjof Capra. “The question we are asking here is, what *kind* of development do we want for our territory?”. With those words, I was introduced to Támesis.

From the moment I arrived, it welcomed me with open arms. It is in the very culture of rural Antioquia – embodied in a simple “*tranquila, no te preocupes, lo que necesitas*” (All good, don’t worry, whatever you need). Here I saw a lively rural population. Here I was introduced to a movement working towards a vision to keep rural areas advancing – working *with* the undeniable and regenerative forces of the ecosystem.

I, undeniably, wanted to gift something back to the territory. Lugging around my questionnaires, interview guides, theoretical frameworks and broken Spanish, I have instead repeatedly had to admit to being the unilateral recipient of a

humorous and graceful generosity seeping through the inhabitants of these enchanting Andean mountains.

“We share these stories for you to bring them back to your country” – several interviewees told me. Bearing the inevitable question, where will their teachings go?

Returning jetlagged and open-hearted to the old Swedish *torp*, surrounded by what-used-to-be a forest, I ponder this again. The dandelions in the compacted fields show the soils desire to reconfigure itself – what I view as nothing less than an ecological protest on poor soil management. The pioneer species crouching over our old foraging paths declare the undying fierceness of ecological succession. In what I mourn, there remains endless potential for a new growth and development. With our conscious interaction, it can be one which is moving *with* the regenerative forces of this patient, devoted land.

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1. Introduction

The need for fundamental changes in food and agricultural systems has resulted in a blossoming of thought and action under different labels such as regeneration, regenerative agriculture and agroecology. While these terms are continuously being pondered, underlying coherency appears to centre around practices sustaining and enhancing soil health; increasing agrobiodiversity; significantly reducing reliance on external inputs such as agrochemicals; as well as cultural transformations which work more in alignment with, rather than against, natural rhythms and ecological processes (Schreefel et al. 2020; Vandermeer 2020; Soini Coe & Coe 2023). Practices which, considering dominant agricultural paradigms, must be seen as fundamentally processes of systems transformation (Côte et al. 2022).

Agricultural systems are complex. Their processes unfold as people sense cues from their environment, make sense of them, then respond – in turn triggering a response from the ecosystem. Their holistic nature makes them defiant to reductionist study, generating a need for integrating complexity thinking in inquiry into agricultural transitions (Bawden 1991; Vandermeer 2020; Luke et al. 2026). Responding to this call, this study intersects the concepts of attractors, adjacent possibles and nudges with qualitative interpretative inquiry in crafting a map of possibilities and barriers for transitions towards soil health-enhancing practices in an emerging node for agroecology and regeneration in the Colombian tropical Andes.

Making up less than 1% of the planet's surface, the tropical Andes has been estimated to shelter the richest biodiversity of flora and fauna on earth (Myers et al. 2000). Pointed to as South America's largest water source and a priority region for conservation planning and research, the ecosystems of the tropical Andes have hosted an array of cultures throughout the millenniums in what is today called a "global epicentre of biodiversity" (Myers et al. 2000; Yáñez-Muñoz et al. 2024).

Yet, the tropical Andes of today face compounding socio-ecological challenges linked to land use practices. Agriculture and mining interests have resulted in significant replacement of tropical forests, water contamination, soil erosion, social conflict and territorial dispossession of indigenous and campesino populations (Alcala-Orozco et al. 2021; Alvarez-Pugliese et al. 2021; González-González et al. 2021; Rodríguez Castro 2022). Within this landscape, the municipality of Támesis, Southwestern Antioquia, Colombia, emerges as a node sheltering agroecological lighthouses; socio-ecological civic movements; and

public-private organisations working to intersect agriculture with ecosystem restoration at the bioregional scale (Lagerman 2025; Ortiz et al. 2024).

Among engaged local populations, soil regeneration and agroecological practices are viewed as a response to socio-ecological challenges facing the tropical Andes: A dynamic, unfolding strategy to transform bioregional development.

Despite broad acknowledgement of the significance of inquiring into underlying perceptions, framings and motivations shaping agricultural practices, agroecological transitions research remains extensively focused on *doings* – implementation of certain practices – of transitions. This study represents a unique endeavour in intersecting phenomenological¹ inquiry with complexity thinking to understand – and help shape – transitions towards soil health-enhancing practices in the heart of the tropical Andes.

1.1 Research objectives

This thesis investigates agricultural transitions unfolding in the bioregion of southwestern Antioquia, Colombia. Through qualitatively mapping tendencies in transition journeys within the municipality of Támesis – home to several organisations driving regenerative and agroecological transformations at the bioregional scale – this study aims to identify strategic pathways for expanding soil health-enhancing practices across the territory.

The analysis is enriched by inquiry into the lived experience of local populations as it relates to regeneration and farming soils, as well as how these internal orientations shape behavioural tendencies in agricultural practices. The research objectives are three-fold:

Objective 1: To map the strategic landscape² for transitions to soil health-enhancing practices in the studied zone, identifying key possibilities and barriers.

Objective 2: To tend to narratives of direct experience – drawing on phenomenology and farmers' knowledge – to ground the analysis in the lived reality of local populations.

¹ Phenomenology is an approach to qualitative research which focuses on studying human lived experience – elements such as meaning making, perception and internal orientations which influence behaviour (Delmas & Giles 2023).

² Landscape metaphors suit how humans evolved to see patterns (Kurtz & Snowden 2003; LEGISLEAD n.d.). The *strategic landscape* herein signifies a metaphorical map of key patterns (possibilities and barriers), currently at play within the studied system, influencing agricultural transitions.

Objective 3: To identify where energy can be directed in ways that are actionable for the local organisations and individual farmers engaged in expanding regenerative and agroecological transitions.

1.2 Roadmap

The thesis opens with a background chapter introducing the study context of Támesis and southwestern Antioquia. A literature review proceeds to position the study within existing research on agroecological transitions. This is followed by outlining core terminology as well as the complexity-inspired conceptual framework guiding analysis in the study. The methodology chapter discusses choices for research design, data collection and analysis. The results chapter interweaves empirical findings with analysis, mapping the strategic landscape of regenerative transitions in the studied zone, concluding with four strategic nudges for their expansion. The discussion embeds these findings within the broader field and reflects on limitations of the data, before the study concludes in response to the research objectives.

2. Background

The following chapter provides contextual background on the studied zone of Támesis, southwestern Antioquia – including land use; geography; presence of organisations working to facilitate regenerative transitions at the bioregional scale; as well as prevalent social conflicts and environmental pressures.

2.1 The bioregion³

The town and municipality of Támesis resides in the Colombian department of Antioquia, as part of the Cartama province in the region of Southwestern Antioquia. The province is named after the river that shapes the landscape, nested within the western mountain chain of the northern Tropical Andes. The bioregion has long been inhabited – rich archaeological findings include inscriptions in rock (petroglyphs), ceremonial caves and pre-Colombian trail infrastructure. The bioregion is recognised as a major biodiversity hotspot, ranging from dry, to humid tropical forests and páramos (Gori et al. 2022). The tropical climate provides rich amounts of sun and rainfall, complemented by a diverse topography hosting a variety of thermal floors – enabling a vast potential for highly diversified farming systems.

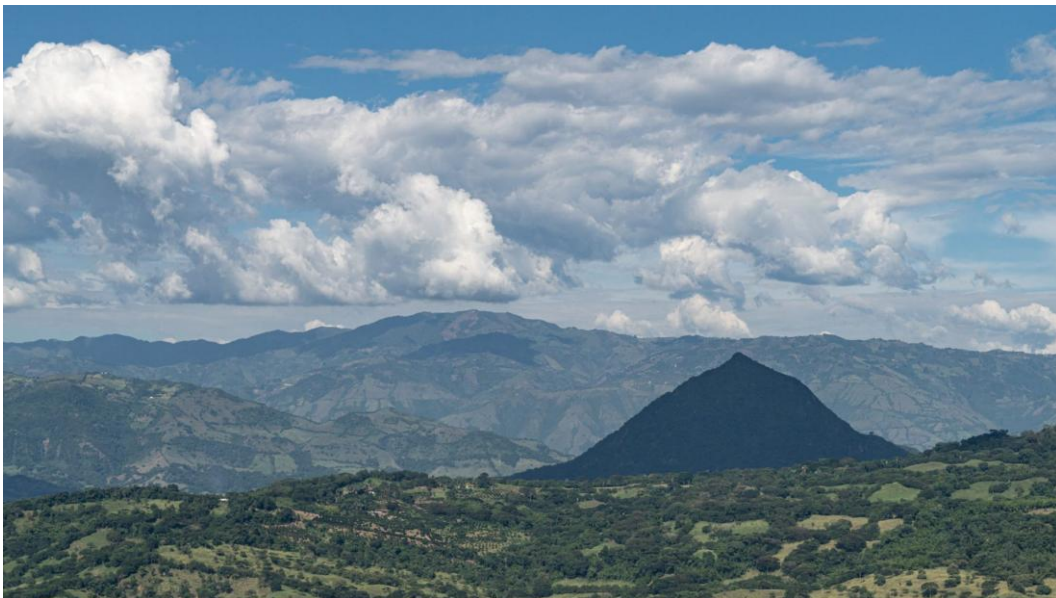


Figure 1. Landscape view from Támesis, Southwestern Antioquia

³ A bioregion is defined as a geographical area defined by biological and ecological characteristics, including human land-use practices, rather than administrative boundaries (McGinnis 2005). Herein, the term references the broad landscape enveloping the studied zone.

Agricultural land-use within the bioregion largely consists of livestock farming and fruit-tree cultivation – predominantly citrus, hass-avocado, plantain, coffee and cacao (FOLU Antioquia 2021; DNP 2024). Livestock typically operate under extensive permanent grazing or semi-extensive grazing, often on slopes greater than 25%, prone to erosion, on monocultures of pasture (Toro et al. 2020). The dominating conventional fruit-tree cultivation in the territory entails mono- or semi-monocultural cultivations on variable – often steep – topographies, largely sustained by extensive use of chemical fertilizers and pesticides (FOLU Antioquia 2021). While data on the studied territory is scarce, over half of all pesticides sold in Colombia in 2016 classified as highly hazardous to human health or the environment (Valbuena et al. 2021) and a systematic review of Colombian studies from 2022 documents widespread contamination of soils, water and human health (Cabrera 2022).

2.2 Land use in Támesis

The municipality of Támesis consists of three thermal floors – climate zones defined by altitude, locally referred to as cold, temperate or warm. It is not uncommon for a single farm to span two zones or contain several microclimates derived from the curvature of the mountain. For purposes of this study, data on local land use and tenure has been obtained through conversations with local agronomists and agricultural project managers.

At lower altitudes (warm zone), land use is dominated by larger farms (from >20 ha, up to several hundreds) focused on livestock and citrus cultivation. Labour is typically informal, and workers generally do not own the land they work – a tenure pattern with implications for adoption of agricultural practices. The town itself, Támesis, resides within the temperate zone (around 1700 m), a zone largely



Figure 2. Támesis town, temperate zone.

consisting of smaller farms of 1-15 ha more frequently owned by the farming families themselves, predominantly producing coffee and small-scale livestock. At higher altitudes (2000 m and above), the pattern shifts again towards larger-scale operation worked through a labour model with monocultures of pine, eucalyptus and hass avocado alongside livestock (N. Ramírez, personal communication, March 2026).

Within the municipality of Támesis, local agronomists and farmers report issues with compacted as well as polluted soils, erosion threats, loss of agricultural biodiversity, extensive use of agrochemicals (with lacking protective implementations and equipment for land workers), and cropping systems which have developed a severe agrochemical dependency (J. Perez, personal communication, March 2026).

2.3 Local organisations for regeneration

Alongside the agricultural environmental pressures spanning Támesis as well as the bioregion, local socioecological movements are working to declare Southwestern Antioquia as Colombias first “Agroecological district” (Ortiz et al., 2024). There is a living history of diversified farming systems sustaining the region prior to the arrival of monocultural cultivations in the 1960-1980s, a natural flourishing of biodiversity from the climatic conditions, and a presence of so-called *lighthouse*⁴ agroecological farms spanning the southwest.

Támesis carries a distinct agricultural identity and is home to several organisations and enterprises working to facilitate regenerative transitions at the bioregional scale, making it a node for the emerging regenerative and agroecological network within the region. The mentioned organisations include Biosuroeste, Musa del Trópico and Visión Suroeste.

Biosuroeste is a public-private hybrid corporation stewarding 600 ha of land in between the municipalities of Támesis and Valparaíso. Through working with emerging sectors, high-value markets, regional lighthouses, universities and local communities, the living park⁵ has developed two productive systems reflecting the cultural history of the territory redirected at its potential as a regenerative beacon. They include an agroforestry system centred on cacao and vegetable production, as well as a livestock system sustained by rotational grazing and incorporation of

⁴ An agroecological lighthouse farm is an individual farm that acts as a centre of learning and influence, demonstrating agroecological principles and practices in order to catalyse their implementations and expansion among farmers in surrounding territories (Nicholls, Clara & Altieri 2018).

⁵ A living park (Finca Viva) is a farm which operates as part of nature’s rhythms rather than against them, where people and the wider web of ecology are recognised and approached as one interconnected community (F. Botero, CEO of Biosuroeste, Personal communication, April 2026)

a diversity of native trees with relevance for a bioeconomy market (Lagerman 2025). The park hosts training programs, regional events and fosters communities of practice informed by principles of integrated systems health (OneHealth), agroecological- and regenerative practices.

Musa del Trópico is a sociology- and environmental enterprise working to design technical solutions for regenerative food production – including agroforestry systems and kitchen gardens – as well as implement educational models for ecological thinking. Their clients and partners range from private enterprises to public institutions, including the municipal government of Medellín and Biosuroeste. Like Biosuroeste, Musa del Trópico works directly with rural farmers and communities to shift practices away from agrochemical-dependent production toward organic, soil-health-enhancing alternatives.

Visión Suroeste is an NGO and citizen movement working to cultivate regenerative cultures across the Southwest Antioquian bioregion (Visión Suroeste 2023). The NGO was founded in response to territorial mining threats and has since 2019 engaged local actors, indigenous communities, smallholder farmers, women's collectives and youth to articulate a vision for the future of the territory based on regenerative rather than extractivist cultural and financial models (Visión Suroeste 2023). Through the project *Red de Regeneradores* (Network of Regenerators), forty-six initiatives across the southwestern region – including agroecological lighthouse farms, organic coffee producers and nature tourism enterprises – have connected to each other with the aim to build cohesion and visibility of regenerative alternatives.

2.4 Mining pressures and conflict

Around 2001, a South African transnational mining company – AngloGold Ashanti – entered the municipalities of Támesis and neighbouring Jérico to conduct geological surveys. According to an interview with a representative from Visión Suroeste, the company initially presented the surveys as agricultural soil studies. Later, the company declared that they had instead conducted surveys for mineral identification of copper and gold, having already acquired mining titles (Representative of Visión Suroeste, personal communication, March 2026).

In Colombia, mining titles are granted on a first-come, first-served basis and can be acquired by national or foreign entities through a centralised process in Bogotá; community consultations are not required prior to acquisition, and after only where communities are formally registered – which is not consistently the case. Furthermore, geological exploration and extraction design typically precedes any environmental impact assessment or licencing (Wachenfeld 2016; Pardo & Lugo 2019; Hougaard 2022).

AngloGold Ashanti – later followed by additional mining companies such as Aris Mining – identified five mineral deposits in the area, with priority targets formally located in the municipality of Jérico – which is positioned on the other side of the mountain enveloping Támesis, with water streams flowing into the latter. The company's long-term plans have been described as developing the territory into a mining district (Representative of Visión Suroeste, personal communication, March 2026).

Large-scale mining is a documented driver of deforestation in Antioquia, generating loss of ecosystem connectivity, water acidification, sedimentation, slope instability and soil pollution (González-González et al. 2021). Studies in the neighbouring Cauca department similarly document significant pressure on local water resources from mercury and cyanide contamination associated with gold extraction (Alvarez-Pugliese et al. 2021). The humid tropical forests of Antioquia – considered a global biodiversity hotspot – are deemed particularly vulnerable to biodiversity loss connected to large-scale mining (Alcala-Orozco et al. 2021).

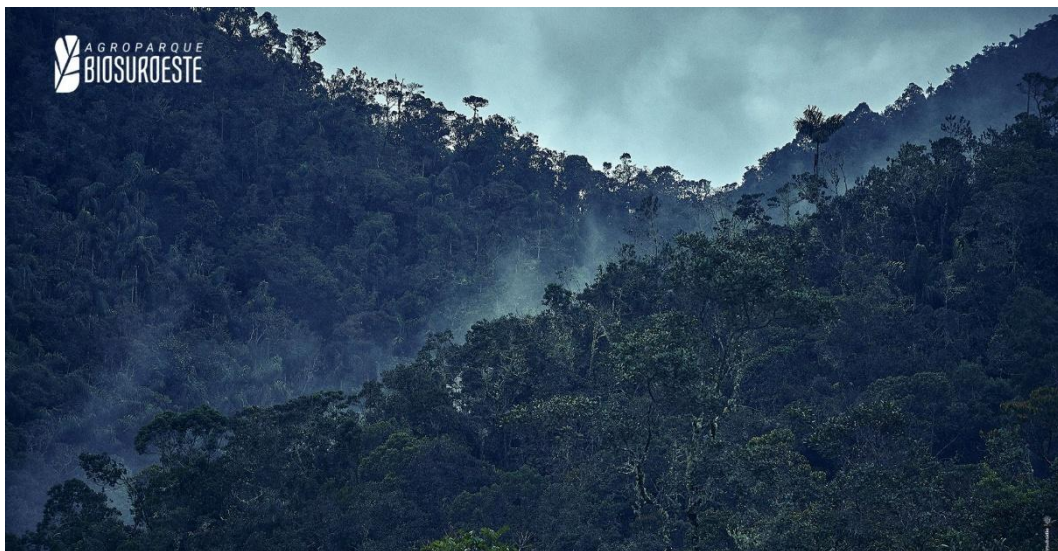


Figure 3. Tropical Andean forest capturing rising humidity. Photo: Mauricio Granados. Fotógrafo de Naturaleza

The forests of the mountains in which Támesis reside play a central role in regional water generation, through an ecologically delicate process in which lichen, in symbiosis with trees, absorbs rising condensation formed in the larger waterbodies of the wider valley rivers. The prevalence of water- and nature-related civic action in the territory reflects a shared understanding of the interdependence between forest connectivity, water access and the agricultural systems that sustain local livelihoods. This is illustrated by the history of the indigenous Marcelino Tascón *resguardo* in the neighbouring municipality of Valparaíso – a territory with fewer water sources than Támesis, facing future

threats of surface water scarcity. In an interview conducted for this study with a representative of the *resguardo*, the following account was given – demonstrating both the importance of the forest ecosystems in water generation as well as the diverse voices making up the water- and forest defence in the bioregion:

When people arrived up above [in the early 2000s] — on that ridge you cannot quite see from here — it was almost entirely coffee plantations. About 90% was coffee. The elders said: ‘Where are we going to get water from if all we have is pasture and coffee?’ And the elders declared: ‘No — this area up above, we will not work it. We will not touch it.’ So they began to set it aside as a reserve. And people from the town started to say: ‘Look at these lazy Indians, not working the land.’ But our vision was much further ahead. Our wealth was the water we would drink, the water future generations would live on. The legacy we would leave for the children of our children. And today, almost 50% of our territory [Marcelino Tascón *resguardo*] is in natural reserve. About 30 years of letting it grow and recover. We only enter to clean the aqueduct or the water springs — to clean them and plant more trees that will bring us more water. Otherwise, we do not enter.

And now — because of the thinking of our elders — we have about 25 water springs. Of those 25 springs, one supplies the entire municipality. Our elders were not only thinking of our own well-being — they were also thinking of the well-being of the town. And look at the saying that was proved true — we were thinking further ahead, while people were criticizing us for being lazy. That is why you cannot judge a person without understanding what vision they are working toward.

That is the history of our *resguardo*. And right now, what the elder was mentioning — we have a conflict with an entity that wants to come and take the water. We are not against providing water — it is a vital resource for humanity. But they want to come and destroy everything, and we do not want that. We want them to work in a much more thoughtful way — because there, in that area, we have our sacred sites that no one can touch, because touching them also affects us spiritually. If they want to work in a different way — ecologically — the community is always willing. But not by destroying the trees, the plants. There must be a much more respectful way to work. That is our lived experience — we have endured much suffering to have the beautiful things we have today. (Marcelino Tascón rep.)

In Jérico and Támesis, civic action coordinated by Visión Suroeste and allied communities contributed to the formal archiving of the environmental license for a priority mining site in Jérico in 2021 – from which water streams flow towards Támesis (Visión Suroeste 2023). Mining titles in the territory remain active, however, and the territory is described as vulnerable to political shifts. In 2026, during the writing of this report, the influential economist Juan Carlos Echeverry – whose consultancy firm produced a commissioned study on the Jérico sites project financial impacts – argued in a *Portafolio* interview that not pursuing the project would be an “economic crime” given Colombia’s poverty and lack of formal employments (Silva & Cigüenza 2026).

Echeverry further argues for a “viritous coexistence” between agriculture and industrial mining – particularly mentioning avocado, citrus and tomato cultivations in the territory (Silva & Cigüenza 2026): presently monoculturally dominant and environmentally problematic production systems in the territory. Proceeding to name the positions opposing modern industrial mining as “infantile” (Silva & Cigüenza 2026), Echeverry’s account may be seen as a strategic pivot re-framing the mining project to adhere to industrial agricultural actors. While politically impactful, this pivot nevertheless represents the strength of the agricultural identity of the territory.

For the local civic movement, expanding regenerative agriculture is a form of territorial defence. Maintaining a social and economic relevance of agriculture and nature restoration among local populations and turning the narrative of capital to reflect the wealth of healthy ecosystems is a strategy intended to keep the territory inhabitable with its cultural history and ecological resources intact. This study represents an inquiry into what challenges and motivations; possibilities and barriers are encountered in such transformational processes.

3. Literature review

The following chapter consist of a purposive literature review, embedding the study and the chosen approach for fulfilment of the research objectives within the academic field. In the literature review, research from the field of agroecology is dominant. As will be covered in 4.1 *Terminology*, the term agroecology – while it is a principal term within academia – is not commonly evoked in this report, as it is not the dominant term used by the interviewed farmers and local stakeholders to describe the studied processes. Rather, local stakeholders – as observed for purposes of this report – tend to a greater extend towards identification with the term regeneration. Nevertheless, agroecology, regenerative agriculture and regeneration carry underlying coherency centred around practices sustaining and enhancing soil health; significantly reducing reliance on external inputs such as agrochemicals; and cultural transformations which generate human-nature relationships that are more aligned with natural rhythms and ecological processes (Schreefel et al. 2020; Soini Coe & Coe 2023).

3.1 Agroecology and phenomenology

Agroecology has been described as fundamentally a process of *transition*: a context-driven and diversified *systems transformation* (Côte et al. 2022). This notion makes agroecological transitions distinct from any classical notions of “scaling up” through deployment of standardised, one-size-fits-all solutions (Côte et al. 2022). Transformation processes, rather, require complexity-thinking, dynamic adaptations, and transdisciplinary inquiry (Côte et al. 2022; Letmathe et al. 2024; Omonte-Ferrufino et al. 2026).

Many scholars and analysts have considered processes of agroecological transformations and how they take place (Soini Coe & Coe 2023). In a foundational article for agroecology, Francis et al. (2003) emphasise that agroecosystems are based on human action – including desires, values and vision – and that inquiry into human motivation and behaviour must therefore be integrated within the study of agroecological transformations. Still, this area of research remains to a large extent focused on what people are *doing* – behavioural practices, mobilisation, knowledge sharing etc. – while inquiry into underlying motivations, worldviews and perceptions which enable such action are increasingly called for to deepen the discourse and acknowledge its complexity (Gosnell et al. 2019; Soini Coe & Coe 2023). Furthermore, a systematic review of 347 agroecological case studies uncovered that only a small fraction employed participatory or action-oriented methods – a gap prevalent despite a broad

acknowledgement that transition research requires research design oriented towards the lived reality of communities (Sachet et al. 2021).

Such elements of transition are well captured by the field of phenomenology – in qualitative research applied to study how reality is experienced and perceived by study participants (Delmas & Giles 2023). Soini Coe and Coe (2023) comment that agricultural transitions always rest within a field of beliefs, values and worldviews, shaping the systems and structures which influence behaviour and technical responses on the field. Drawing on environmental psychology, their commentary states that a felt experience of connectedness with the wider web of ecology tends to evoke consistent attitudes and behavioural tendencies related to the concepts of empathy, compassion and love (Soini Coe & Coe 2023; Zylstra et al. 2014). Such patterns of behaviour are described as particularity self-reinforcing, due to their spillover effect into spheres of pride, meaning making and relationship to place. Within this study, a purposeful weaving of phenomenological accounts as well as participatory elements aims to complement and deepen the body of literature around regenerative transitions, as well as demonstrate what attributes of empirical data such an approach might surface – and how it contrasts to more quantitative methods.

3.2 Transitions in the tropical Andes

Within the tropical Andes, agroecological transition literature has recently seen a small but significant upsurge in studies utilising TAPE (Tool for Agroecology Performance Evaluation) to study transitions (see Barrios Latorre et al. 2023; Suarez Cordoba et al. 2025). These papers have identified patterns of barriers and possibilities to agroecological transitions on structural levels. Barriers include structurally embedded agrochemical dependency in agricultural systems, lack of governance support, and low financial resilience among farmer populations. Possibilities include a particular momentum apparent in agroecological farms, with synergistic effects emerging between agricultural diversity, household empowerment, production autonomy and soil health (Barrios Latorre et al. 2023; Suarez Cordoba et al. 2025). These findings suggest self-reinforcing mechanisms in agroecological practices which support transitions.

Still, while TAPE captures structural and to some extent behavioural aspects of transition journeys, phenomenological elements – how transitions are lived and experienced – are difficult to capture without purposeful narrative analysis. A pattern identified in the literature review by Sachet et al. (2021) states that studies on agroecological transitions primarily look to agroecology as a set of practices – what farmers are *doing* – while elements of meaning making, perception and personal experience in transition journeys remain largely unexplored. While

literature on regenerative transitions in the tropical Andes overall is scarce, such specific literature is even scarcer – possibly due to the overall perceived lacking generalisability of narrative or thematic analysis. Nevertheless, transferability – the extent to which findings from one context might be recognised as applicable to other situations or contexts (Lincoln & Guba 1985) – is an element to qualitative inquiry which researchers can draw upon to compare findings.

One study from a Bolivian smallholder context – in an inter-Andean valley landscape, a significantly dryer climate than the tropical altitudes of southwestern Antioquia – utilised thematic analysis over a span of four years to construct farmer typologies (categories of character traits) and identity factors influencing perceptual and behavioural transformations towards agroecological practices (see Omonte-Ferrufino et al. 2026). Results from the study show that risk aversion made up a dominant trait reinforcing agrochemical dependency in the studied context. Making up a stronger determining factor than awareness of agroecological practices – or even of the risks associated with the use of agrochemicals for human- and soil health – risk aversion was shown to gear agricultural behaviour among this typology of farmers towards extensive use of agrochemicals as a strategy to stabilise yields (Omonte-Ferrufino et al. 2026).

The qualitative approach utilised by Omonte-Ferrufino et al. (2026) could uncover that educational endeavours aiming at bridging the gap of technical knowledge around agroecological practices would have been lost on risk-adverse population groups if no strategies to mitigate risks associated with production drop were implemented prior. Rather, main factors associated with adoption of agroecological practices were inherited family- and cultural traditions that favoured such practices (Omonte-Ferrufino et al. 2026). Hence, endeavours aiming at reinforcing such a collective cultural inheritance, combined with risk-mitigating strategies, would be more appropriately applied by stakeholders looking to support regenerative transitions in this context.

3.3 Complexity thinking in transition research

In this manner, complexity thinking urges researchers and stakeholders to observe and engage with emergent patterns in any given system, rather than assuming any cause-effect linearity (e.g. “standardised solution from context A should generate the same results in context B”) (Kurtz & Snowden 2003; Luke et al. 2026). The above study shows that a classical notion of “scaling up” agroecological practices through sole focus on educational initiatives aiming at building technical awareness would not have been an efficient strategy in the studied context. Likewise, a complexity approach to studying transformation processes surfaces emergent patterns that are already active within the system — patterns that

strategies can draw on to craft more contextually grounded and effective responses.

Complexity thinking is being called for to support understanding of the dynamic interconnectivity of elements in agroecosystems (Vandermeer 2020; Miller & Baumber 2025; Luke et al. 2026). The field of agroecology has long encouraged students and researchers alike to “embrace the wholeness and connectivity of systems [...] stimulate a focus on uniqueness of each place, and solutions appropriate to its resources and constraints” (Francis et al. 2003, pg. 101). In his 1991 paper on systems thinking in agriculture, Bawden concludes that “we must learn how to come to terms with complexity [...] to develop learning strategies that enable us to help others to deal with such dimensions. [...] we must be prepared to let go the old and embrace the new science and praxis of complexity.” (Bawden 1991, pg. 2371).

Foundational agroecological researchers have since spawned a tradition of systems thinking in agroecology, encouraging students and researchers to apply ecological thinking to the study of agriculture and food systems. In this tradition, food systems are described as holistic; made up of many interconnected elements; and displaying emergent properties arising from interactions taking place between those elements, as well as with their environment (Francis et al. 2003; Gliessman 2014). Tittone (2019) further emphasises that agroecological transformation processes are inherently non-linear.

Similarly, complex systems – as described by complexity theorist Cilliers (1998) – entail manifold elements interacting; all in relationships to one another and their environment; in non-linear, unpredictable manners; but with observable patterns described as feedback loops. The distinctness of complex systems from hard systems has sincere implications. Complexity thinking firmly states that complex systems are unpredictable, with cause-and-effect relationships only observable in retrospect (Kurtz & Snowden 2003). This matters – and is distinct from hard systems thinking – when it comes to engaging with a system. Hard system strategizing tends to define objectives of a system and put in strategies to close the gap to reach those objectives (Bawden 1991; Snowden 2017). This is a fine strategy if the system has clear cause-and-effect relationships (Kurtz & Snowden 2003). But, if cause-and-effect relationships are not predictable, such strategies are plain guesswork.

In the field of management science, this distinction has led researchers to ponder on strategies for impacting and steering complex systems. Kurtz and Snowden (2003) emphasise that complex systems should be engaged with through pattern management, rather than goal setting or scenario planning. This entails actions

which encourage and stabilise emergent patterns that are found to be desirable, or action which destabilises patterns that are perceived as undesirable.

Gradually, this way of approaching complex systems in order to influence their direction has moved into spheres of policy making and cultural transformation (Kurtz & Snowden 2003; van der Merwe et al. 2019). This study represents a novel venture in integrating such a complexity approach – as inspired by its development by Snowden and others in management science – into agroecological transformational research. Through this lens, the study seeks to understand and support transition processes unfolding in a regenerative node of southwestern Antioquia, Colombia.

4. Theoretical and Conceptual Framework

The following chapter situates and defines core terminology at use throughout the study – regeneration, agroecology and soil health – before outlining concepts at use as an analytical framework. This study integrates multiple concepts, generating a framework adapted for integrating complexity thinking with transformative research. The framework has been developed abductively throughout the study, through an interplay between emerging data and relevant academic concepts (See 5.5 *Data analysis*).

4.1 Terminology

Soil health has been defined as “the vitality of a soil in sustaining the socio-ecological functions of its enfolding land” (Janzen et al. 2021, pg 2). The term captures biophysical components, while also carrying poetic capacities that help evoke emotive connections through conjuring the imagery of health (Janzen et al. 2021). Health indicates functionality, vitality, resilience and the sustaining of these aspects over time: aspects which are, in their nature, relational, dynamic and relative to the socioecological system they are part of. Observation of soil health, therefor, has been stated to call for “a deliberate, adventurous transdisciplinary approach” (Janzen et al. 2021, pg. 3). This study evokes narrative methodologies, collecting stories from farmers and other persons engaged with expanding soil- and ecosystem health, in a contribution to such an academic adventure. Soil health – its promotion and sustaining – is generally recognised as foundational aspect of agroecological and regenerative practices (Schreefel et al. 2020; Soini Coe & Coe 2023).

Regeneration is a broad term within research, typically indicating support of self-renewal capacities of natural systems which have been over-exploited by human activity (Morseletto 2020). Yet, as anyone who has taken the term on as part of an allusive yet guiding sense of purpose in their life and work would testify, the term carries multiple dimensions that are not easily captured by mere biophysical processes. Dimensions of cultural, emotive, structural and spiritual transformations are embedded in day-to-day usage of the term, referencing something more like “changing the idea of our separateness” (Wahl 2016, pg. 33) as humans from the wider encapsulating ecosystem. In its early formation within the Rodale institute, the term regeneration signified increasing the soil’s biological production base over time – while also placing an emphasis on personal social resilience. Rodale articulated a vision of community and personal regeneration, running in parallel to that of the soil (Rodale, 1983).

Agroecology links together science, practice and social movements in the transformation of food systems (Gliessman 2016). Early on, agroecology emphasised the interdependence between human and ecological factors – as well as the open nature of agricultural systems – and agroecology is today widely seen as an inherently holistic endeavour (Jordan et al. 2005). In more recent times, agroecology has been concretised in sets of *principles* (for instance, the HLPE 13 principles of agroecology; or the FAO 10 elements of agroecology) which are translated at the local level to context-embedded *practices* with the purpose of ensuring food sovereignty as well as ecological regeneration (Nyéléni 2015; HLPE 2019). Among agroecological social movements, cultural transformations towards recognising “our connection with our lands and with the web of life” (Nyéléni, 2015, pg. 3) are central aspects of agroecological transformations.

Throughout the interviews for this study, it was noted that the term regeneration was the principal term used to describe the cultural transformations which agricultural transitions away from agrochemical-dependent farming towards farming sustained primarily by soil health-enhancing practices entail. When asked, participants stated that agroecology was generally understood as a set of practices – while the unifying vision for wider cultural transformation, among engaged stakeholders in Támesis, tended to be captured by the term regeneration. This reflects the pattern identified in the literature review, that academic studies tend to focus on agroecology as a set of practices while elements of cultural transformation remain underrepresented. This contrasts the use of the term by social movements, such as La Vía Campesina, which run deeply political and transformational in their use of the term agroecology (see, for instance, Nyéléni 2015). Nevertheless, this study mirrors the usage of its interviewed participants in its choice of terminology. The term agroecology is largely used for the literature review and subsequent discussion chapters to situate the study within the academic field. The term regeneration, throughout the report, is used to indicate both biophysical processes of self-renewal; as well as the cultural transformations which transitions to agricultural practices that ensure such processes entail.

Yet, the term regeneration is, understandably, contested. Firstly, by persons aligned with the concept but uphauled by appropriation of the term by corporate entities associated with green-washing (Mambo & Lhermie 2024). Secondly, by groups of farmers themselves – detecting an old habit of academic- and institutional promotion of practices detached from the lived reality of persons working the land.

Soil health, by contrast, is so far mainly contested within academia. It therefore functions rather usefully as a term providing common ground across political positions and helps narrow the scope of investigation for this study.

Within the interviews for this study, soil health-enhancing practices have been described by a set of principles (see 5.4.1 *Semi-structured interviews*, in *Methods* chapter) to generate a mutual understanding for dialogue on barriers and possibilities towards implementing these. This delimitation supported discussions focused on on-farm implementation of soil health-enhancing practices and direct experience connected to such endeavours. While this concretised discussions, it arguably excluded some agroecological dimensions that broader inquiry might have surfaced. For instance, discussions of seed sovereignty or gender relations might have arose from agroecological inquiry at a broader scale than a restricted focus soil health.

While a chosen emphasis was placed on soil health-enhancing practices, “facing complexity means befriending uncertainty and ambiguity” (Wahl 2016, pg. 39). Therefore, the terms *regeneration* and *regenerative transitions* are at times used interchangeably with *expansion of soil health-enhancing practices* in the report. This is to capture the many layers of cultural, behavioural as well as biophysical transformation that implementation of the practices often entail – as well as to avoid linguistic repetition.

4.2 Framework

Complexity is a foundational concept for this study. Complexity theory holds that complex systems are without any central “controller” steering their direction – instead, they are *emergent*: composed of many entangled elements all in relationship with one another (Kurtz & Snowden 2003). Rather than displaying clear cause-and-effect relationships, complex systems are *dispositional*: they have inclinations, tendencies, and *patterns* (Kurtz & Snowden 2003). Understanding these tendencies and patterns can reveal where a system is currently inclined to move – insight which can be leveraged to support transformation processes (van der Merwe et al. 2019).

In mapping the strategic landscape for regenerative transitions in the studied zone, this study identifies emergent patterns categorised as *possibilities*, *barriers* or *dual-elements* for expanding soil health-enhancing practices. *Possibilities* entail patterns which can be leveraged for regenerative transitions. *Barriers* entail patterns which hinder or obstruct such transition. *Dual-elements* entail patterns which are relevant to transition that function as both possibilities and barriers. To further understand and leverage the identified patterns, this study utilises three concepts from complexity theory: those of *attractors*, *adjacent possibles* and *nudges*.

Attractors are a concept within complexity science to describe stable and self-reinforcing patterns within a system (Snowden & Boone 2007). In complexity science, it is primarily used to describe a cluster of energy or behaviours within a system – but, interestingly, the term does not differentiate the pattern itself from the motivational forces pulling entities towards this pattern, as these are two sides of the same phenomenon (Snowden & Boone 2007; Ray 2011). Within this study, the concept is used in its second form: motivational forces pulling entities within a system, keeping certain patterns self-reinforcing and stable.

Nudges are tactical interventions by stakeholders within a system designed to allow desired patterns of behaviours to emerge organically (van der Merwe et al. 2019). The tactic of nudges differs greatly from that of goal setting in that it moves from the present disposition of a system – looking at already occurring patterns which can be leveraged or discouraged – rather than operating from a future theoretical ideal. Nudges seek to encourage a system towards an adjacent possible which it is already inclined towards – simply put, pushing the system while it is already moving, rather than pushing it uphill.

The adjacent possible is a concept which was popularised by Steven Johnson (2010: in the popular-science book *Where good ideas come from*). The term originates from Stewart Kauffman (1993) in his work on evolutionary biology and complexity research. It can be defined as the set of possibilities immediately accessible from the current position of an entity within a system (Kauffman 1993). What makes something an adjacent possible is as much a matter of material conditions as it is a matter of perception and social cognition – being able to perceive that an alternative to the current position is possible, as well as finding that alternative attractive and appropriate to move towards. In integrating complexity thinking with action research, it is highlighted that “Nudging a system [...] to an adjacent possible is easier than bringing about large shifts” (van der Merwe et al. 2019, pg. 12).

Transition energy is a term abductively synthesised for purposes of this study. It refers to the resources – including internal resources such as motivation – which enable a regenerative transition and provide material or psychological support throughout the process. Herin, the term is used to capture both material, symbolic and psychological dimensions, which would otherwise need to be integrated by a combination of terms (e.g., Bourdieu’s *social capital*, Snowden’s *energy cost*, or Douglas’s *schemas* [Douglas 2011; Bourdieu 2021; Snowden, D. 2025]).

5. Methodology

The methodology chapter accounts for methodological choices in detail, starting with broader research design, chosen delimitations as well as a discussion on researcher positionality. The chapter proceeds to describe and reflect on data collection, including methodological limitations and ethical considerations for conducting semi-structured interviews. Following this is a description on the applied approach for data analysis, as well as a description on use of AI and other software tools applied in this study.

5.1 Research design

The study is a qualitative case study, combining transformative and transformational research orientations. Transformation research is defined as research which seeks to understand societal transformation processes (Letmathe et al. 2024) – something the first and second research objective attends to. Simultaneously, transformational research is defined as research seeking to help shape and impact such transformative processes (Letmathe et al. 2024). The third research objective endeavours this through identifying actionable pathways and engaging local stakeholders in participatory dialogue. Both forms of research fall under the broader tradition of action research: an orientation to research which links action to scientific inquiry, often in collaboration with studied communities (Reason & Bradbury 2001).

Abductive reasoning was applied throughout the study, moving between emerging empirical patterns and theoretical concepts – something that has been called “the logic of hunches” (Snowden 2022). Such reasoning suits inquiry into systems which are complex: dispositional rather than linear, characterised by emergent patterns which can be analysed and responded to, but that are difficult to predict deductively (Kurtz & Snowden 2003).

5.2 Delimitations

This study is delimited to the municipality of Támesis, with a sample primarily representing the temperate zone: a farming context mainly made up of small- to medium sized holdings. The sample includes local persons and organisations engaged in regenerative transitions (see 5.5.1 *Semi-structured interviews*). The studied system of Támesis is nested the broader agricultural context of its bioregion – in turn shaped by market structures, governance and social dynamics that impact across geographical boundaries.

Systems can be defined as sets of factors that someone chooses to view as coordinated for one purpose or another (Jordan et al. 2005). Cilliers (1998) points out that since complex systems are open – that is, interchanging energy, matter and information with the environment they are part of – any boundary drawn around such as system is a production of the observer. While being conceptual and to some extent artificial, boundaries still generate useful units of study when observing systems (Vandermeer 2020). In this study, the studied system can therefore be seen as *agriculture within the territory of Támesis*; more specifically *regenerative transitions within this system*; influenced by the *broader context of agriculture, history and geopolitical influences* impacting the territory.

The drawn boundary of Támesis agriculture, and the delimitation to regenerative transitioners within this system, emerged through participatory engagement in the municipality. Through previous collaboration with local organisations working to facilitate regeneration in the bioregion, the researcher had access to farmers who had initiated and proceeded with regenerative transition journeys – early transitioners who work to expand regeneration in the territory. As will be argued in sub-chapter 6.5.1 *NI: Equip “Early adopters”*, this group is of relevance for the diffusion of regenerative innovations to spread into wider majority groups. It is therefore a useful unit of study to adhere to the research objectives pursued in this study. Readers are encouraged to read the results as a temporal snapshot of the strategic landscape as it is perceived and experienced from *within* a transition journey. Should the sample instead have centred on conventional farmers, or landless labouring farming populations, the strategic landscape presented in this study would likely differ considerably. Barriers related to land tenure patterns and governance support would might surface at higher frequency, and attractors such as income stability or risk aversion might play a more dominant role.

5.3 Researcher positionality

Within qualitative research, the researcher positionality carries particular significance (Holmes 2025). As the main instrument for data collection and analysis, positionality entails both ontological and epistemological assumptions that the researcher carries into the study (Holmes 2025). Positionality inevitably affects the output of a qualitative study, impacting whether a similarly designed study would generate equivalent results (Bryman 2016). Reflexivity – recognition of one’s own perspectives and position as a researcher – may be seen as a main tool to navigate researcher positionality in qualitative inquiry and increase utility of results for possible transferability to other contexts (Lincoln & Guba 1985; Braun & Clarke 2023). Interpretative reflexivity is further discussed in 5.5 *Data analysis*.

As an outsider arriving to the territory, the social dynamic between interviewer and interviewee plays out differently than in daily peer-to-peer conversations. There is continuous potential for social desirability bias: a tendency for respondents to gear towards answering what they perceive as socially acceptable or desirable to the researcher, rather than reflecting reality as directly as the prompts and questions intend (Bergen & Labonté 2020). Within the study, certain measures sought to mitigate social desirability bias and support researcher reflexivity. Several months of engagement in the local context – building relationships with interviewees throughout data collection, improving in the local language and living within the territory – developed a contextual familiarity and sharpened relational intuition. A local interpreter was utilised for some interviews, as well as for subsequent reflection on the dialogues, contributing with cultural literacy.

At the same time, the positionality of an outsider carries perks. As a traveller, prior knowledge and worldviews become more naturally suspended, replaced with a spontaneous openness to the new culture and context. This can shift or resolve assumptive positionality that occurs when a researcher shares the same social background or identities as those they study (Berger 2015). As a returning visitor to the territory, the writer of this study also had access to a network of contacts particularly interested in collaborating with foreign researchers. Such collaboration, to many, represents a development in the region which involves external institutional attention – recognised as a resource which can help protect the territory.

5.4 Data collection

Data for this study has primarily been obtained through semi-structured interviews, complemented or combined with field visits, researcher observations and conversations with local populations. Fourteen interviews were carried out – primarily with farmers undergoing regenerative transitions, complemented with contextual or contrasting perspectives from other respondents (see 5.4.1 *Semi-structured interviews* below).

Interview-based methods are commonly applied when exploring how reality is perceived and acted upon by studied populations (Bryman 2016), and when meaning-making is sought to emerge from the data (Creswell 2003). This is suitable for the study of transformation processes, which are not understood in their full complexity yet are evidently, in large part, social phenomena (Letmathe et al. 2024). Transformation processes reside as patterns observable through stories, relationships, orientations and perceptions that shape behaviour (Kurtz & Snowden 2003).

Data was gathered within participants' own environments – adhering to common practice for ecological validity, the degree to which findings might reflect real-life behaviours and orientations (Lincoln & Guba 1985). The in-person data collection also engages the researcher in the studied environment, which impacts interpretative quality. Through a participatory orientation, data was returned to relevant local stakeholders in a workshop setting. The phenomenological orientation, adhering to the second research objective, further sought to centre narratives of lived experience and embodied knowledge of local population as primary data, revealing where motivations, experiences and perceptions that shape agricultural behaviour reside.

Transformational research call for impact-oriented interdisciplinary approaches which produce a systemic understanding in order to support transformation processes (Letmathe et al. 2024). An evident limitation of the qualitative, interview-based methodology is that it reflects the reality of a limited sample and typically lacks the generalisability that a larger sample would imply. In-depth interviews can also blur boundaries between views and voices of research participants as well as the researcher (van der Merwe et al. 2019). However, the qualitative approach of this study allows for a systemic mapping which reflects the reality of persons who have undergone regenerative transitions – who have faced the challenges and complexity inherent to such processes. Results are not intended to be viewed as objective conclusions, but as a living systemic map – dynamically evolving and gratefully complemented with other, future research methods.

The purposive sample does, on the other hand, provide a richness which enables readers to make an informed judgement on the transferability of results – the extent to which findings from one context might be recognised as applicable to other situations or contexts (Lincoln & Guba 1985). It allows for claims about the present attractors as they are experienced from before and within a transition: what pulls people towards regenerative practices, what sustains them to continue the journey, and how the practices are sensed and experienced. Claims about barriers are nuanced through narratives of participants' intentional, deliberate work to overcome them. Momentum is understood through how transition journeys are described to alter the lived reality of the participants.

5.4.1 Semi-structured interviews

The interviews were carried out between February to April 2026, primarily in the municipality of Támesis, southwestern Antioquia. Participants were reached mainly through purposive snowball sampling, utilising an established network accessible to the researcher through a prior research project in the territory (see Lagerman 2025). Initial contact was made via WhatsApp, informing participants

of the study and arranging a meeting – either at their farm or local cafés or educative centres, based on the participants preference. The purposive criterion included: persons who had initiated transition journeys towards soil health-enhancing practices; informants working to facilitate regeneration within the territory in different ways, not necessarily through farming; and additional persons who could provide contrasting or enriching perspectives (for instance, one CEO of a large-scale avocado company, and one indigenous community representative from the neighbouring municipality of Valparaíso).

Two modes of interviews were utilised. Farmer interviews followed a semi-structured interview guide developed in Spanish prior to the field work. Non-farmer informant-interviews were mainly unstructured, conducted as conversations focusing on the specific knowledge and experience the informant held in their role to provide contextual insight of value to the research objectives. The list of interviewees can be seen in table 1. In table 1, small scale farms reference farming systems <15 ha. Medium scale up to 20 ha, and large scale from 20 ha up to several hundred (see 2.2 *Land use in Támesis*).

Table 1. Sample: Overview of interviewees.

Pseudonym	Interview format	Gender	Role / farming approach	Scale	Translator	Notes
<i>Farmers</i>						
Vereda Matilde	Farm tour + group interview	Women (9)	Gardening, CSA	Small	Yes	Women's collective, trained by Musa del Trópico
Farmer 1	Interview	Woman	Diversified production, agroecology	Small	Yes	—
Farmer 2	Interview	Man	Specialty coffee, soil health	Small–medium	No	—
Farmer 3	Interview	Man	Specialty coffee, agrotourism, agroforestry	Small–medium	Yes	Based in Jérico
Farmer 4	Interview	Man	Specialty coffee, soil health	Small	No	—
Farmer 5	Farm tour	Man	Specialty coffee, livestock, regeneration	Medium	No	—

Farmer 6	Interview	Man	Specialty coffee, livestock, regeneration	Medium	No	—
Farmer 7	Farm tour + interview	Man	Specialty coffee, forest restoration	Medium	In English	American and European descent
<i>Informants</i>						
Informant 1	Interview	Woman	Visión Suroeste representative	—	No	Primarily contextual
Informant 2	Interview	Woman	Visión Suroeste representative	—	No	Primarily contextual
Informant 3	Interview	Man	Ecotourism, self-sustaining farming, forest conservation	Large	No	—
Local agronomist	Interview	Man	Agronomist and regenerative systems designer	—	No	Young, of local campesino decent
Avocado producer	Interview	Man	CEO, large-scale avocado company, IPM	Large	No	—
Marcelino Tascón representative	Interview	Man	Indigenous <i>resguardo</i> representative	—	Yes	Primarily contextual

All interviews except one were conducted in Spanish. The researcher was at an intermediate level of the language, allowing for conversational engagement while relying on the interview guide and recorder to capture narratives for subsequent analysis. For four of the interviews, a translator joined the researcher – one student from EAFIT University in Medellín, and one local English teacher for one and three interviews respectively. Translators enabled follow-up questions outside of the interview guide – providing more expansive data – as well as contributing with a contextual sensitivity and reflective dialogue with the researcher.

The interview guide for the farmer-interviews was structured in thematic sections, specifically inquiring into accessibility of soil health enhancing-practices; motivations to initiate a transition journey; challenges encountered during the transition journey; internal and external resources which helped sustain and

continue the journey; and visibility of regenerative alternatives within the territory. Farmers were encouraged to answer the questions speaking both from their own experience of the journey, as well as assess how each section would be encountered and perceived for the general farmer in the territory. This allowed for both personal accounts rooted in direct experience, as well as subjective insight into the territory rooted in the interviewees' embeddedness in the local context.

Each farmer was presented with three categories of soil health-enhancing practices to initiate the interview. This was intended to create a mutual understanding and anchor of what types of transformation of practices the interviews were looking to explore, without need for philosophical conversations on regeneration or agroecology (see 2.1 *Terminology*). The three categories were presented as follows:

Utilization of amendments: *E.g. addition of organic matter to the soil (compost, manure), cultivation and addition microorganisms (e.g. bokashi), Utilizing mulching/green manure*

Utilization of low perturbation: *E.g. maintaining living roots in soil year-round, Minimizing/no tillage, minimizing/no slash and burn, minimizing/no use of agrochemicals, rotational grazing (if livestock)*

Utilization of diversity: *E.g. Intercropping, cover cropping, utilisation of crop rotation*

All interviews initiated with restating the purpose of the study – simply phrased as understanding the motivations and challenges for farmers transitioning to soil health-enhancing practices within the territory. Participants were encouraged to speak freely based on the prompts and questions; asked whether they consented to the recording of the interview for subsequent use in a publicly available master's thesis; whether they explicitly desired anonymity; and informed of their right to discontinue their participation at any point. All names have been suspended from the report – the question on explicit anonymity was intended to capture if the participant wanted no information which could be traced back to them to be included. No participant asked for anonymity.

5.4.2 Participatory workshop

A participatory workshop was carried out on 16th April 2026, in the local educative centre of Támesis. Thirteen persons attended, including representatives from Biosuroeste, Musa del Trópico, Visión Suroeste as well as local farmers from Támesis, Valparaíso and Jérico municipalities. The workshop initiated with

a presentation of initial research findings – six possibilities and six barriers presented in the results chapter – followed by group discussions.

It has been noted that if key stakeholders are involved in action-oriented research, there is increased opportunity for transformational change (Luke et al. 2026). In the workshop, participants were presented with principles of complexity thinking for cultural transformations – looking to emergent patterns within a system to understand where nudges can be placed to move the system in a desired direction. The participants were asked to choose a challenge they were encountering in their work for regeneration – either one of the presented barriers, or a specific challenge in their individual projects. They were then asked to look to the strategic map of possibilities and barriers, to identify which possibilities can be leveraged to meet that challenge. One participant described experiencing the task as playing a video game: placing the patterns next to each other, understanding their relationships, and navigating which challenge will be faced after meeting the prior.

The participatory workshop functioned as a means of bringing results back to stakeholders in the territory, while the group discussions provided insight which helped inform the nudges presented in the results chapter – adhering to research objective 3.

5.5 Data analysis

The following sub-chapter accounts for data processing and analysis in the study. It also describes usage of AI tools and other software applied to structure files.

Audio from the interviews was transcribed word-for-word using NotebookLM⁶. The Spanish transcripts were subsequently anonymised and translated into English using two complementary tools. Claude.ai was prompted to identify speakers and clean transcriptions of filler words, while remaining as true to original wording as possible. Google Translate was used to cross-check translations, to mitigate the risk of AI hallucination. Each transcript was then placed into its own Microsoft Word document and manually coded through a framework-guided thematic analysis.

Coding is an inherently interpretative practice – as meaning emerges in an interplay between researcher and the data (Braun & Clarke 2023). The emerging patterns cannot be viewed as fixed or fully independent of the researchers own

⁶ Both NotebookLM (Google) and Claude (Anthropic) stated prior to the writing of this study that data is not shared for model training or human review unless agreed to in user settings, or when leaving feedback; sharing for these purposes has been disabled in the user settings of both platforms.

subjectivity, which might be viewed as tension between complexity research – seeking to identify emerging patterns in a system – and interpretative methodologies. Still, narrative and thematic analysis were chosen methodologies to uncover patterns of meaning-making, and reflexivity as a pathway to integrate the tension.

Being reflexive in thematic analysis entails embracing researcher subjectivity as a resource (Braun & Clarke 2023). Within this study, the researcher approached coding and writing as a somatic experience: where there was a sense of vividness, or “a story to be told” – a somatic state most writers would acknowledge – this was viewed as an indication of a meeting between an element of particular relevance and the researcher as a conduit for storytelling. Accounts with phenomenological richness tended to produce this quality, weaving together elements which appeared seemingly unrelated, whereas other themes leaned closer to what Braun and Clarke (2023) call “topic summary” – more superficial accounts of occurring phenomenon.

Annotations from the conceptual framework were added to the codes, identifying which patterns indicated attractors, adjacent possibilities or potential nudges. This pattern-seeking lens may be viewed as a cognitive tool brought into interpretative dialogue with the data. The broader categories of possibilities, barriers and dual-elements – while constituting a deductive imposition on the empirical material – were kept and annotated to codes as they proved useful for the kind of landscape mapping that the research objectives require.

The phenomenological thread was woven throughout the initial thematic analysis, as annotations to codes for passages which held experiential or meaning making accounts. Annotated codes of such passages typically simply read as “phenomenology” or “perception/mindset”. This study maintains a light phenomenological orientation – the phenomenological lens was applied to enrich pattern understanding and surface patterns which would be overlooked in a purely structural or behavioural analysis, rather than conducting a full phenomenological study.

Researcher codes were kept separate from the participants speech through the coding process using the comment function in Microsoft Word. To form the thematic clusters, emerging interpretative patterns were written out in a one-person workshop setting in March 2026. Patterns of codes were physically placed out and thematically sorted into groups, as a means for supporting sensory integration of the data for the researcher.



Figure 4. One-person workshop in forming thematic clusters.

Following the one-person workshop, the researcher's coded and anonymised transcripts were converted into markdown (md.) format and placed along with the emerging thematic clusters into a folder in Claude code. A cross-interview synthesis then identified coding frequencies for each thematic cluster (among 718 codes). Claude code could then be used as a corpus search tool, prompted to extract codes and annotated passages from all transcripts simultaneously.

As norms around AI use continue to form, transparency has been identified as a key anchor for academic integrity (Cook et al. 2025; Naeem et al. 2025). The use of Claude code in this study resembles that of software like NVivo. Working directly with transcript files, codes could be extracted from all transcripts simultaneously, with a typical prompt reading: "find all passages with codes that read health, food, taste" or "find all codes that read attractor". This usage was complemented with re-reading transcripts, wherever there was a "hunch" that a particular conversation held depth which had not yet surfaced.

6. Results

The following chapter presents a temporal snapshot of the strategic landscape for regenerative transitions in the studied territory. The map consists of six possibilities, six barriers and one dual-element – key patterns identified in narratives from persons engaged in regenerative transitions within the studied territory of Támesis, Southwestern Antioquia.

The chapter opens with the emergent patterns, followed by a synthesis of the map. The chapter then proceeds to develop four strategic nudges informed by the findings, looking to emerging adjacent possibles.

The concepts of attractors and transition energy are used to describe and explore the self-reinforcing mechanisms at play within the patterns. The possibilities and barriers have been structured by how frequently they surfaced in the interviews, rather than by any assumed hierarchy of significance.

Analysis is woven throughout the chapter, keeping with the abductive and interpretative approach of the study. Field notes from the researcher are placed at the entrance to some of the possibilities and barriers, as a way of rooting the reader in the lived context – and as a reminder of the researcher’s interpretative role in the uncovering of the patterns, as well as the positionality as visitor to the territory.

6.1 Possibilities

Possibilities represent identified patterns within the studied system which can be leveraged to support regenerative transitions toward soil health-enhancing practices in the studied territory. The following table provides a summary overview of six main possibilities identified in this study.

Table 2. Summary of possibilities for expanding soil health-enhancing practices in Támesis.

Code	Name	Brief description
P1	Health and ecological reciprocity	Felt experiences of improved personal and environmental health function as strong attractors initiating and sustaining transitions toward soil health-enhancing practices.

Code	Name	Brief description
P2	Biophysical abundance and 'nature identity' of Támesis	Tropical climate, steep terrain favouring manual labour, abundant organic matter, and a strong local identity tied to natural abundance make soil health-practices biologically and culturally adjacent.
P3	Conventional disruptors	Increasing environmental pressures, rising agrochemical costs, and health concerns are weakening the pull of conventional attractors, creating openings for transition.
P4	Community, organisations and visible alternatives	Vereda-level collaboration networks, regional organisations (Biosuroeste, Visión Suroeste, Musa del Trópico) and emerging lighthouse farms provide transition energy, knowledge transfer and peer-to-peer visibility.
P5	Ancestral campesino knowledge and youth engagement	Land-anchored ancestral knowledge and embodied practice among older farmers, combined with growing youth activation, represent latent transition energy within the territory.
P6	Emerging markets	Glimmers of specialty and conscious-consumer markets for sustainably produced goods (e.g. specialty coffee, collective market models, tourism) offer economic incentives for soil health-enhancing practices.

Code	Name	Brief description
		Can be accessed through collective organisation.

6.1.1 P1: Health and ecological reciprocity

Field notes from the researcher: *Today I woke up to a large, blue-headed, parrot-looking bird plotted on the stub of a platano tree outside my window. Orange eyes observed me carefully. I stayed still. Never had I seen this bird here. I remembered the words of the landowner, a coffee farmer: "When I started regenerating this plot, there were no bird sounds to be heard. Now listen. Listen." I twitched. The bird flew off.*

If there were any coupling of elements which, abductively “through the logic of hunches”, as Snowden (2022) puts it, shines through the material most strongly – through the faces of people when they speak; the richness of phenomenological descriptors; the frequency of appearance in conversations – it is those of health and ecological reciprocity.

While semantically dual, the elements are closely related in their phenomenological nature. They weave into each other in a dominating pattern discernible throughout the interviews – acting as attractors to initiate a transition journey and providing motivational energy and other internal resources throughout the process.

Participants consistently describe either turning to soil-health enhancing practices for their personal health:

“Generally, what most helps a conventional campesino make the transition is an illness in the family.” (Farmer 1)

Or experiencing increased health from a change of practices as a key driver for proceeding with the process:

"We have understood that everything starts from the microorganisms in the soil. If I have good pastures, my sheep, rabbits, chickens, and cows will be healthy, and if I have healthy soils, the crops will be healthy for us." (Informant 3)

Nine women interviewed as a group for this study – rural mothers and grandmothers living in a geographically isolated mountain Vereda – came together as part of a local initiative for rural empowerment and organic production

driven by Musa del Trópico. The women provide rich descriptors of this element within their transition journey:

“With Musa, approximately two years ago, they accompanied us to cultivate in a healthy way. [...] [Before] we didn’t know [specific soil health-practices]. We didn’t know. We always just used poison. [...] [Now,] these we care for with organic matter, with compost. Not with things that poison us. So, you eat it very calmly, knowing it's going to nourish you, that you won't get sick, that you're preventing many diseases. And it tastes different too.” (Woman of Vereda Matilde)

When asked about what sustains and motivates them to continue the practices they have learnt for building soils, the women go on to talk about the benefits they experience for their health. Potentially, this shift in experience – described in the quote as both an attractor and an element providing transition energy – can be attributed to a shift in perception around pesticides driven by the training from Musa. Across several interviews, however, informants testify to a general understanding, or rather sense, within the territory that the use of agrochemicals appear to cause serious diseases (see P3 – *Conventional disruptors*). While several barriers in place – paradoxically including lacking awareness – still maintain an overall high frequency of their usage.

The statements of “eating calmly” and experiencing richer taste in the produce, points to a shift in the lived reality of the transitioning farmer which is highlighted across several interviews. One farmer, when asked about her perception of the general motivations for those in the territory undergoing regenerative transitions, states:

“Well, I think we all reached a point of realizing that there were certain products we were putting on the soil, and those products, in one way or another, were harming our bodies. I think most of us came from that. Of course, now, there are also many people who have learned the art of tasting food. And it’s very different. Foods grown in fertile soil, organically grown soil, are very different from those treated with chemicals. Even coffee is very different. [...] And savouring food more is also better for your health. [...] Before, we just filled up, right? Now, we taste. Mmm... [mimics tasting]. We give space to the taste bud: the sweet ones, the sour ones, the spicy ones. [...] [Then] the body metabolizes it better. And the spirit too. Yes, that too. It’s a pleasure to taste like that.” (Farmer 1)

The narratives around the element of health appears to follow a trajectory where conceivable health benefits of soil health-enhancing practices act as an attractor – pulling farmers towards the practices. The attractor then stabilizes the new behavioural practices as it integrates into the lived experience of the body, including the joy of tasting food. The experiences provide transition energy – motivating the farmers to proceed the process – and generates shifts in the lived experience of the farmer towards perceiving their health as interconnected with

the health of the wider ecosystem. This, in turn, appears to stimulate and interplay with a personal inclination towards a joyful experience of witnessing the landscape beginning to respond to care, an element herein called ecological reciprocity. Ecological reciprocity further interweaves with the experience of health, as it is described as providing both quality of life and a sense of purpose.

"On my father's farm, the return of so many birds after planting more trees, and how we started to care for a spring that was there and the water increased. Those small joys motivate you daily to keep doing this." (Farmer 2)

Among the sample of farmers undergoing transition, some were initially motivated to start their regenerative process by what can be described as a sense of ecological debt – leaving a functional ecosystem for future generations. Others were motivated by factors such as reaching novel markets or health attractors. However, all respondents independently describe witnessing vitality return to their ecosystems through their change of practices as something which sustains them throughout the process.

"For me, what makes me keep going is observing the evolution of the soil. When you see it improving, and more and more things growing and emerging — it's a kind of hope that you can reach full equilibrium." (Farmer 6)

As will be covered in the *Barriers* chapter (6.2), transitioning farmers encounter substantial challenges in the process. Within several interviews, the element of ecological reciprocity – particularly the dimension of it characterised as a sense of ecological debt – emerges as the singlehandedly strongest stabiliser of the new practices considering the challenges. When asked what sustains them in their transition towards soil health-enhancing practices, two participants independently answer the following:

"I believe it's about contributing a small grain of sand — to see if we are capable of reversing so much damage we've done to the soil, and in turn being able to feed ourselves in a better way. I think that's it, because you have to change from here, from the heart, for this to work. Otherwise it is very difficult — it truly is not easy. It's difficult, but the motivation comes from within." (Farmer 2)

"I think it's respect, awareness, and a sense of duty. In our case, it's like trying to compensate for a debt made by our previous generations. [...] It's like a task I must carry out as the fourth generation. [...] We are motivated by the desire to be aware that the earth is alive. The earth is not a machine; it is a living being that shelters millions of organisms. With those millions of organisms, if we activate them and act accordingly, we can have healthy food, healthy fruits, healthy soil, happy microorganisms, and very good fruits — all thriving without needing to accelerate the processes." (Farmer 3)

Looking to the concept of attractors as it is utilised in this study – as forces pulling entities towards a particular pattern, keeping that pattern self-reinforcing,

stable and observable – the elements of health and ecological reciprocity appear to interplay in a particularly robust manner. Health acts as broad attractor to soil-health practices, whereas ecological debt initially motivates a few conscious actors. Ecological reciprocity in the broader sense – the experience of the ecosystem responding to care – emerges across the body of data, seemingly as a result of the process.

This temporal claim is supported in the trajectory of the transition journey described by the study participants. Among the eight farmer interviews, only two describe a sense of ecological responsibility as the primary motivation for starting a transition journey. Yet, all interviewees describe ecological reciprocity as a primary force sustaining the practices and motivating them to continue. It appears as if somatic and emotional experience of health and ecological reciprocity gradually become embedded into the lived experience of the transitioning farmer. This characteristic of the pattern is particularly difficult for other attractors to mimic: ideological commitments may alter under social pressure, but embedded somatic experience of benevolent reciprocity appears more stable.

6.1.2 P2: Abundant biophysical Resources and “Nature Identity”

Field notes from the researcher: *Participating in a farmer’s meeting in Támesis. 75 local farmers with diverse backgrounds of cultivations and techniques. The room is chatting and the volume has gotten loud – it is challenging for the woman about to take the floor to make her voice heard among the sounds. She looks to a young man for support. He stands on a chair, claps his hands and yells “TIERRA!” [EARTH]. The room goes silent. Looks to him, and answers in one voice: “AGUA!” [WATER]. The woman takes the floor.*

The second coupling of elements carry both symbolic and material dimensions. They are closely intertwined through ways in which biophysical reality shapes culture, perception and lived reality of a location’s inhabitants, and are also coupled as a possibility through mutual leveraging points, which will be described in this section.

Támesis is across interviews described as an area with particularly abundant natural resources – as well as a territorial identity centred around this abundance. The archaeological richness of Támesis relative to its neighbouring locations is acknowledged as a historical expression of its biophysical wealth. Several rivers run through Támesis, and different climatic zones determined by altitude enable a vast biodiversity- and agricultural potential.

"I feel part of that wave starting in this region to think about the territory and envision our future. Having had the possibility to go out and see what is happening in other regions where they finished off natural resources is almost terrifying for us, especially being in a territory of abundance [...] Archaeology shows the thinking capacity of a territory. When a community is in a territory of abundance, it solves basic needs quickly and can spend time thinking, dreaming, and understanding the environment. Támesis has soil, water, climate, and landscape conditions that have always generated abundance, and today what is at risk is what generated that abundance." (Informant 3)

With "what is at risk" the interviewee is referencing the equilibrium of the mountain ecosystem and its water-generating forests, threatened by mining interests (see 2.4 *Mining pressures and conflict*). In an interview with a representative from the local NGO Visión Suroeste, the following is stated in relation to the biophysical richness of the territory as it relates to its cultural identity:

"I also feel there are geographical differences, even though Jericó and Támesis are very close. Támesis is very rich in water, very rich in mountains, and has more campesino culture. I think that also allows us to love this place deeply. [...] We planted ourselves in the position that in this territory our wealth is not what's underground – our wealth is the soil, is food, is coffee farming. Even with all its problems... it's still agriculture. But from mining – never. [...] That I can say: I can be in Támesis, I can work here, I can offer the community an alternative to extractivism. And that people know – that when the mine tells us, 'You're poor, you don't have enough' – we can say: no, we're rich because we have the river, because we have the mountain, because we can walk, because we have time." (Informant 1)

In an interview with a specialty coffee farmer of European and American origin – who travelled the southwestern region for many years before settling in Támesis – the following is stated about the theme of nature as a medium for a strong territorial identity:

"Támesis in particular, I think, has a profound love of nature – more so than other places. Even compared to Jericó, which I love and spent a lot of time in. Jericó has a love of culture and artistic and mystical identity. The identity of Temeles is nature. [...] You can have that identity and not know what it means – like being a fish in water. Or you could think protecting nature means monoculture coffee, because at least it's green. But here there's an increasing awareness of what it means to protect nature, so there's a whole line of nature defenders whose identity is catching up with practice." (Farmer 7)

As the interviewee points out, the underlying cultural identity of Támesis as a place to preserve and protect acts as a dormant leveraging point, which may redirect agriculture towards sustainable practices if coupled with growing awareness. While soils in the territory face threats from erosion (mainly attributed to monocultural cultivation of fruit trees or pasture), compaction (mainly attributed to livestock/permanent grazing) and depletion of microorganisms

(mainly attributed to extensive use of agrochemicals), soils are still described as overall fertile:

“The soils of this western mountain range are still very good. That is an advantage and a point of accessibility – we can make different composts or bokashi with the materials that are at hand.” (Farmer 3)

Organic matter is described as abundant, while cultural and habitual lock-ins (see B1 & B2) act as a main barrier for utilizing the available resources:

“This area is extraordinarily fertile. [...] Things grow so aggressively here. There is so much water.” (Farmer 7)

“In terms of organic matter, it's all there. From what I've seen here on farms, nature already provides the balance. But people don't use it.” (Farmer 6)

The logistical and economic accessibility of organic matter is however contested in the data, with two farmers (including the conventional avocado producer) stating that solid organic matter requires large volumes per tree, and correspondingly high labour and transport cost – making it inaccessible for small- to medium scale producers in relation to the simplicity of adding chemical fertilizers. Another interviewee, however, separately reports having halved his fertilizer-costs in replacing chemical fertilizers with liquid biopreparations produced on-farm or through collective biofabrics — a model currently being scaled by a regional coffee organisation in the southwestern municipality of Fedonia and taught through Biosuroeste. Through this narrative, liquid biopreparations appear to carry a particular potency which can elevate parts of the economic issues stated by the former interviewees.

These biophysical conditions of the territory indicate that several soil health-practices make up adjacent possibilities for regenerative transitions. Diversification of agroecosystems is aided by rapid growth in the tropical climate. Manual labour over mechanised agriculture, due to the steep terrains, means that the territory does not face the technical lock-in of highly mechanised agricultural regions. The rapid growth of biomass entails that addition organic matter is – if properly integrated into overall agroecosystem design – accessible. Leveraging the territorial identity of Támesis – as one of appreciating the natural abundance – may be done in combination with increasing awareness around soil health-practices and utilised as a strategy for meeting main barriers to the possibilities offered by P2. Furthermore, there is already existing momentum and social network- infrastructure generated by the local movement mobilising the territory around a vision of protecting and preserving nature (see P4 – Community, organisations and visible alternatives). The findings indicate that soil health-enhancing practices potentially carry a high degree of cultural embeddedness and

appropriateness – if the narrative around them is also presented in a culturally embedded manner (see B6 – Low visibility and ‘ideological’ framings of regeneration).

6.1.3 P3: Conventional disruptors

Researcher field notes: *We woke up many times in the night from the storm shaking the cabin close to the summit of the mountain. Rain pounding on the tin roof – even entering horizontally through the cracks of the walls. Lightning flashing, rapidly and repeatedly, illuminating the landscape for split-seconds. The next day, the road was flooded. Many trees had fallen. Landslides. No possibility to go down with the car. The only path was to walk – and not any walk. The ancient, pre-colombian trading route – consisting of long-sense smoothed rocks and intricate diagonal water-channels – carried us down a steep landscape which, I thought to myself, would have seen much soil runoff in the night on mountain cultivations wherever strong networks of roots were not binding the soil. “The rains are hitting much harder this year”, many locals had told me. “The seasons are not what they used to be.”*

The social, financial and environmental landscape in which Támesis resides is throughout interviews described as experiencing compounding pressures which are weakening the pull of conventional attractors. These perturbations are described as visible to all farmers – those inclined towards regenerative practices, as well as those not. Main perturbations to the conventional paradigm consist of increasing environmental pressures, rising costs of agrochemicals and increasing concerns with their health-effects. The potential of regenerative practices to generate stability and resilience on farm systems in light of these pressures is by several interviewees highlighted as an imminent gateway to waves of regenerative transitions.

“The climate has lost its chronological order — there are now excesses of rain, excesses of heat. That is quite a large challenge for crops because that equilibrium has been thrown off. But in becoming a challenge, it also becomes an opportunity for change.”
(Farmer 3)

“More than anything, [...] people are realizing that conventional agriculture requires a lot of input and yields very little profitability over the long term. [...] they're not transitioning because they want to — they're transitioning because they have to. [...] Climate change is forcing it. There have been droughts where plants die, houses run out of water, and when rain comes the crops rot. Plants get sick, there are landslides. So yes, more campesinos want to make this transition, but not out of desire — out of necessity.”
(Farmer 6)

Since participants of this study are persons who, for several years, have been promoting regenerative practices, their perspectives are likely geared towards seeing regeneration as an imminent adjacent possibility considering the experienced pressures. The compounding image the interviews provide is, however, that there are prevalent gaps between the experienced pressure and actual movement towards a change of practices (see 6.2 *Barriers* chapter, particularly B1 – Conventional paradigm 1 and B4 – Knowledge gaps).

"I think we are seeing the effects of climate change, but people still haven't developed enough awareness to change their practices or bring those practices into their crops or into their daily lives — and I believe it's due to the lack of knowledge. Knowledge is the primary gap." (Farmer 2)

"In Colombia, the 'Green Revolution' introduced large quantities of agrochemicals, and the previous generation didn't concern itself with the environment or soil health — they just applied inputs and the trees responded. Over time, we've depleted organic layers and soil microorganisms, and now crops don't perform the same way. That's making the need clear, but it requires a shift in mindset." (Avocado producer)

As the interviewed large-scale producer testifies in the final quote, the conventional paradigm has functioned through a coupling of stable attractors for many decades: promising financial returns, productive plots, and subsequent integration into the lifeworld of rural populations through educational initiatives. These attractors have been compelling – but as costs are rising and productivity is dropping, the attractors upholding this landscape are destabilising.

"The cost of chemical fertilizers has increased dramatically, and this increase has created a shock within the agricultural sector." (Farmer 4)

The women at La Matilde describe their experienced financial benefits of organic gardening – through cutting agrochemicals, increasing production to sell, and increasing self-sufficiency – as a main driver to continue the project:

"It's cheaper. And we also don't have to buy things anymore because we have them at home. [...] economics motivates [me] a lot — covering needs, not just selling, but reducing spending." (Woman of la Matilde)

The potential of soil health-practices and on-farm circularity to replace the pull of previous financial attractors of conventional agriculture emerges in the data as a clear opening, if coupled with visibility of alternative practices and increased knowledge of carrying out the practices. There are descriptors of an increased sense of independence and production autonomy stemming from the soil health-enhancing practices.

"When your crops are dying and your neighbours aren't, you ask why." (Farmer 6)

“You do notice some people who are more conscious — because of everything we've been discussing: climate, and costs, because producing with an agrochemical system is very expensive. So, people start saying, ‘No, this isn't profitable.’ Especially here in coffee production, there are already some trends — people and organizations beginning to make the transition, but it is very new. This requires a great deal of consciousness and pertinent education to make a change.” (Farmer 3)

As will be seen in B6 (Low visibility and ‘ideological’ framings of regeneration) and DE (Empirical culture), visibility of alternatives arises as a main challenge and pathway to leverage the possibility of conventional disruptors.

The third dimension of this possibility is that of health concerns connected to use of agrochemicals. Across three interviews, participants answer confidently when asked about their observations of the general experience of health pressures derived from agrochemicals in the territory:

Question: “Do farmers here know and are concerned about negative health effects of pesticides?”

Answer: “Yes, of course. [...] Even if you wear a suit, whatever. These chemicals enter your body, and if they don't enter your body, they're in the crops and you eat them. [...] there's been a great deal of awareness about this because many people have died from the accelerated incidence of cancer.” (Farmer 4)

Still, several other interviewees point to an urgent lack of awareness of the toxicity of many used pesticides, and the compounding image around overall awareness in the territory is divided in the data. When asking a local confidant about this phenomenon, she responds the following, supporting the statements of lacking awareness about negative health effects of pesticides:

“If you go out in the countryside here – next time you go, just look – the containers that Glyphosate come in. They're white with a blue lid. People clean them, and then *they put their soups in them.*” (Comment by local; original emphasis)

While data investigating how a shift of awareness around health effects of pesticides occur is limited in this study, narratives from the women at la Matilde testify to a rapid integration and shift in perception following their training time with Musa del Trópico:

"One reason [for organic gardening] is that we're going to eat healthier food, right? Because we always used things to counter pests, and they [Musa del Trópico] have taught us there are other ways to treat pests without poisoning the plants. I think that's very good because it's for our health. [...] When you go to town and buy a little something, it costs a lot. And you know it's pure poison. You know you're buying poison — and that money could go to something else. And it tastes like poison." (Women of la Matilde)

This narrative, while limited in its generalisability, still indicates a particular pull of awareness-raising narratives pertaining to health – once again indicating the significance of P1 (Health and ecological reciprocity) as a particularly robust attractor to couple with the possibilities emerging from the conventional disruptors present in the landscape.

While the conventional disruptors appear to generate some urgency within the landscape, this urgency is not equal to direction. Demonstration of alternatives – increasing their adjacency – is needed to properly leverage the opening. The following quote from a participant provides a particularly strong view of the current state of the landscape, and will summarise P3:

“I believe that every chaos, every storm, generates change — and afterward generates peace. Right now, we are in a moment of storm and chaos. Price volatility, sick plots and crops, sick soils, contaminated water, erratic climate. But humans have the capacity to evolve — humans adapt, though I think it happens through necessity. When you are comfortable, nothing changes. But when chaos arrives, there is a need to think and to change. We are in that transition. It is an inflection point. Either we make decisions and go through the transition, or things are going to go very badly.” (Farmer 3)

6.1.4 P4: Community, organisations and visible alternatives

The social fabric of Támesis include a culture of Vereda-level collaboration and word-of-mouth sharing of ideas; several organisations working to facilitate regeneration at the bioregional scale such as Biosuroeste, Visión Suroeste and Musa del Tropica; farmers-organisations such as La OMCE; and emerging farms engaging in soil health-enhancing practices and regenerative transitions. This network provides an emergent coordination-infrastructure which can be leveraged for knowledge transfer, transition energy and increasing visibility of regenerative attractors.

Across nearly all interviews, community is named as a critical source of transition energy and practical support – through its lack is also highlighted (see B6 – Low visibility and ‘ideological’ framings of regeneration).

"Community is very important. Because when more people from the community start joining, it creates momentum. Alone, your impact is very limited. But as you start connecting with more and more people, you become a force — a muscle, a network." (Farmer 6)

It is pertinent that the Vereda-unit (neighbourhoods, often isolated in the mountainous terrain) is a level at which farmers communicate, interact and observe potential innovations.

"Little projects like this start to be visible. They may not even be doing much or being successful, but they're trying something different and the word gets out. There's also a total openness of sharing – genuine interest in what your neighbour is up to. A lot of word of mouth." (Farmer 7)

The women at la Matilde testify to the importance of the Vereda-unit for building community and sharing seeds and ideas:

"Let me tell you – here we are very united. For example, that neighbour brings me plantain. I say, 'Come, I have yuca'. At Doña Nancy's place – I have a little cilantro, and she comes back with something in return. Very sharing, very united – that's how we've been in this Vereda" (Woman of la Matilde)

The story of the women of Vereda Matilde represents an example of the potential effect of the organisations present within the territory to leverage Vereda-level community to expand regeneration.

"We understood each other very well with them [Musa del Trópico and trainers from Biosuroeste]. [...] because they're also very kind [...] you felt that — they're not outsiders (forasteros), they're family. [...] it built more community. [...] We got to know each other's gardens and planted in all of them until we'd gone through every single one — and then Musa released us. We were ready on our own. [...] They taught us to walk. They taught us to fly." (Women of la Matilde)

The descriptors of “flying” and “walking” display an experience of significantly increased mobility through the training and connections offered by the local organisations. The importance of the integration of the organisations into the social fabric is also pertinent in the narrative. This presents a stark contrast to narratives around extension services visiting from outside the local territory, with little social integration (see B6 – Low visibility and ‘ideological’ framings of regeneration).

The organisations working to facilitate regeneration within the territory are described as bridges and knowledge transferers, providing both visibility of and connections among regenerative practitioners, as well as institutional connections.

"Biosuroeste acts as a kind of bridge, with alliances to Agrosavia and Grupo Argos. So Biosuroeste is the key connector." (Farmer 1)

"Definitively our greatest mobilization is the network of regenerators [spanning all of southwestern Antioquia], which we call the heart of Visión Suroeste – because it's our weaving. We can't do it alone. They are our little candles – and we ourselves are one little candle too." (Informant 1)

The strength of partnerships and farmers-network, such as emerging independent coffee-organisations, is also highlighted as a medium for increasing inspiration around alternative practices and reducing costs through collective models:

"Partnerships help lower the individual costs of investments like biopreparations. By having so many partners, everything is cheaper — we get larger quantities and it costs them half of what it would otherwise." (Farmer 4)

The visibility of emerging regenerative farms is generally described as low (see B6 – Low visibility and ‘ideological’ framings of regeneration), but impactful where it is present and, importantly, where it is leveraged with cultural embeddedness and peer-to-peer communication.

“There was this young woman who came from the CES – her father was a businessman with large farms near Cañas Gordas. [...] The father came along, and at first, he had his guard up – imagining he'd find a bunch of hippies doing strange things. When he arrived and met us, he saw us as fellow farmers and started talking with us on those terms. We started speaking the farmer's language. At first, he was making jokes – ‘I like birds too, but grilled with fried plantain.’ But by the end, he had genuinely liked many things. We also learned a lot from them. [...] And the father left with a real desire to start making changes.” (Farmer 5)

There is a possible contingency from the visibility of successful regenerative stories. One farmer is said to have hindered potential city-migration for several local youth, who thought his project inspiring and choose to engage with territorial regeneration. The women of la Matilde also speak to the contingency of their story:

“It spreads like a wave. For example, San Pablo – they're going to do something communal there too, and one of the leaders said, 'We've been told so much about you – how did you do it, tell us how you managed to do this and that. I feel so alone.’” (Woman of la Matilde)

In summary, community around soil health-practices appears to work both as an attractor pulling farmers towards regenerative practice, and a source of transition energy sustaining them throughout the adoption process. The organisations operating in the territory generate an infrastructure of knowledge transfer and visibility of regenerative alternatives, as well as connecting isolated actors into a network with potential collective momentum. The Vereda-level appears as a crucial unit for building community and peer-to-peer transmission of adopted practices, which may be prioritised over more diffuse regional outreach in strategies aiming at expanding soil health-enhancing practices within the region.

6.1.5 P5: Ancestral, campesino knowledge and youth engagement

Field notes from researcher: *I was recently asked, “What is one of the main insights you take from this region back to your home?” I thought for a moment. “Well, where I come from, we have to envision regeneration in agriculture from a place of having no idea what that would look like in a*

climate like ours, on a scale that we are wanting to envision it. No one alive today has truly seen it – industrialised agriculture came so long ago. Here, several of you alive, you know it. You can look just two generations back – your grandmothers and grandfathers were providing for you through cultivating food forests. It was not perfect – but it was food production and regeneration at a larger scale than I have ever seen it in my lifetime.”

The campesino culture present in the territory (as visible in P2 – Biophysical abundance and ‘nature identity’ of Támesis) points to a heritage of land-anchored knowledge, as well as ancestral memory of food production more aligned with ecological processes. Drawing on this knowledge and memory, rather than replacing it with external models, is throughout the interviews identified as key to a culturally embedded and appropriate expansion of soil health-enhancing practices.

"That conversation about caring for life – I think it was born here, or has always been here, with our grandparents, our grandmothers, our aunts and uncles, with people who have had their hands in the soil their whole lives and who have a special connection to it. Who have walked the rivers all their lives and know the territory simply through living it." (Informant 1)

The ancestral knowledge and memories of lived experience of regenerative food production represents a form of hidden transition energy – a motivational force that is present within the landscape.

“Deep down they know. In a conversation with my father [a conventional producer], he told me: ‘Of course, my grandfather had a plot where we never had to fumigate. It was a forest, the grains were beautiful, the production was beautiful, and it was a forest.’ He knows it.” (Farmer 3)

The land-anchored knowledge of campesinos within the territory is highlighted as a main leveraging point for making regenerative transitions – if attractors are strong enough to generate a direction towards the alternative practices.

"He [a neighbouring farmer] knows this land well... He started the specialty coffee, they're doing well, and now he's learning what we'd call regeneration practices and implementing them. He's got bees, flowers, all of it. Because somebody said, 'Your coffee can be better if you have bees and flowers.' For me it would take a year to implement that. He's got it right away because he knows what to do and knows the land." (Farmer 7)

In the story above, the attractor of entering a specialty coffee market (see P6 – Emerging markets) coupled with the land-anchored campesino knowledge

generated a regeneration process at a speed unreplacable by a person arriving from outside.

Apart from the campesino knowledge of the older generations, there is also an activation among youth in the territory. Young people are identified as primary drivers of regenerative transitions across several interviews.

“I think it's a force that youth bring. And it is the youth — not the older ones. It's the youth. [...] Young people care a great deal. [...] And those of us who are older have to latch on — those of us who have been in this for a long time are already there. We were called strange, bad, crazy, romantic — all of that. But the new ones, the conventional ones, the ones who never got into it, are now joining, because it [the youth-energy] pulls them in. That example is contagious.” (Farmer 1)

One farmer tells the story of strategically pivoting the outreach of their lighthouse farm towards youth:

“I explained all that and told him: ‘Let's do this differently. Instead of bringing the landowners, bring their children — the children of the people who own those farms. That's how we change mindsets.’ And it's worked. Young people come from elite universities, and their fathers are typically landowners with farms. They get interested and think, ‘How can I do something like this?’ And I tell them: ‘Go to your grandfather or your father — no one will say no — and ask for a small piece of land to do an experiment.’ The father won't refuse — the child wants to work on the farm. And as soon as you start showing results, they start watching and thinking, ‘Hey, this could work.’ That's how things can change. Those are the hummingbirds — the small ones who spread the pollen, so to speak. You have to be strategic.” (Farmer 5)

Coupling the transformative qualities of youth with the land-anchored knowledge and ancestral memory of farmers emerges as a possibility for the implementation and expansion of soil health-enhancing practices within the territory. The attention and focus of youth on land-use practices functions as a type of attractor, whereas the existing land knowledge provides transition energy. Memories among the elder population, of the *abuelos*’ food forest, functions as a type of latent transition energy — entailing potential regenerative transitions as an act of remembrance.

6.1.6 P6: Emerging markets

The market landscape for incentivising soil health-enhancing practices is overall described as severely lacking in southwestern Antioquia and Támesis (See B3 — Lack of incentivising markets). There are, however, glimmers of possibilities that have enabled the interviewed farmers to proceed with their transitions.

European and American specialty coffee markets emerge as a main pathway for coffee farmers accessing a premium for soil health-enhancing practices, as well as a catalyst for initiating interest in transitioning among local farmers.

Question: "Are there markets here for these kinds of practices?"

Answer: "Let's say, not in Colombia, [...] most of the relationships one has regarding coffee are in Europe. [It's about] marketing. But when that client sees what you're doing, some say, 'Come on, [...] I'll give you a premium because I like what you're doing. And if you can demonstrate it and put a QR code on the packaging so people can see what you're doing, that's wonderful. Many people are already implementing that.'" (Farmer 4)

"Specialty coffee becomes a kind of colonization pathway... they [neighbouring farms] started with specialty coffee first, and now they're moving toward better practices." (Farmer 7)

Specialty coffee markets are visible attractors in the landscape, already directing parts of the system towards soil health-enhancing practices. Another glimmer of possibility regarding incentivising markets for regenerative produce emerges as that of tourism.

"The specialty coffee market in Colombia really only exists because of tourism. Fifteen or twenty years ago, you couldn't find good coffee in this country. Then tourism started to grow – about ten years ago it really boomed, after violence declined – and suddenly there was pressure to offer something. Colombia is famous for coffee, so the whole industry came around that. Now even small towns have specialty coffee shops. That's opened a local market for Colombians and tourists alike, and it's created a trickle effect toward better processing, biodiversity, organics." (Farmer 7)

Specialty coffee is emerging on a local market directed towards local populations as well as tourists. Figure 5 shows a photograph from Frutos del Suroeste – a store operating in Támesis – providing a picture of the emerging diversity of artisanal coffee within the territory, as well as the relatively low threshold to market the product locally.



Figure 5. Local specialty coffee brands in Frutos del Suroeste

Frutos del Suroeste operates under a framework of the Asociación Multisectoral de Campesinos – la OMCE – having adopted a legal framework supported by the Fundación Aurelio Llano. The philanthropic foundation has accompanied them and placed in significant capital to make the process happen. It is said in an interview with an informant from Visión Suroeste that local farmers would not have had that capital – highlighting the importance of institutional involvement in creating markets which may incentivise soil health-enhancing practices. Another initiative led by the University of Antioquia and the Government of Antioquia – currently in pilot-phase in the southwestern Antioquian municipalities of Támesis and Jérico – is called Agro100. Agro100 seeks to provide technical support for farmers, with a particular focus on agroecology, while also connecting local produce to local service sectors (hotels, restaurants and cafés). While this project is in an initial inventory phase, it indicates an emerging institutional interest for the creation of local markets – another glimmer of possibility for markets incentivising soil health-enhancing practices.

"What I love about Colombia, compared to Europe or the US, is that formalities are deconstructed here. There are fewer gatekeepers. In Támesis specifically, there's a store called Frutos del Suroeste where anyone can sell products – no certification, no label standards, nothing. [...] There are markets in the town square. So, the local channels are visible and accessible to average producers." (Farmer 7)

Direct-to-conscious-consumer markets are rare, but nevertheless an enabler for two of the interviewed farms to have transitioned towards regenerative practices:

"Now through social media there are markets for food from these types of practices. But those markets are limited, and the few that exist want to take all the profit for themselves. The intermediaries don't really value the process [...] That's why we don't sell to intermediaries. We sell directly. [...] The margin that a store would take, stays with us." (Farmer 6)

Part of the project of la Matilde involved creating a CSA (community supported agriculture) through which the women could sell their excess produce. They share the story of this shift, moving from the local market towards a direct-to-consumer process:

"We [previously] took the products to the market for people to buy, and it was like - 'Ah, no, I already have some' or 'I don't need it' or whatever – or the price they offered us was tiny. It didn't matter that it was organic – so no one was very motivated, for that reason. Then when the idea was born to join together and commercialise it directly to families – that's when we got excited. Because in fact, most of us – honestly, I think all of us – had no income apart from the household. You were simply at home, that's it. Whereas this way we receive a little money each month." (Woman of la Matilde)

In summary, direct-to-consumer markets entail another glimmer of possibility, however data on their prevalence is scarce in this study and mostly indicates that they are extremely rare. Accessing speciality coffee emerges as a visible attractor in the territory with already existing momentum, and tourism further reinforces this momentum. There is emerging institutional interest in generating incentivising markets directed at agroecology (diversifying produce, increasing territorial resilience and expanding soil health-enhancing practices) – but this process appears as currently not adjacent to the wider majority of farmers within the territory.

6.2 Barriers

Barriers represent patterns which hinder or obstruct the transition toward soil health-enhancing practices within the studied territory. The following table provides a summary overview of the six main barriers identified in this study.

Table 3. Summary of barriers to expanding soil health-enhancing practices in Támesis.

Code	Name	Brief description
B1	Conventional paradigm 1 – Mindsets and loss of attraction for agriculture	Deep-rooted conventional mindsets, social inheritance tied to chemical farming, and a cultural disengagement from agricultural work create resistance to regenerative transitions.

Code	Name	Brief description
B2	Conventional paradigm 2 – Chemical lock-in	Prolonged agrochemical use has created soil and crop dependencies, meaning removal of inputs risks production drops and economic loss, reinforcing the conventional paradigm through economic pressure.
B3	Lack of incentivising markets	Dominant wholesale market infrastructure offers no price premium for soil health-enhancing practices; Fedecafé purchase guarantees reinforce conventional production, and access to niche markets requires entrepreneurial capacity unavailable to most farmers.
B4	Low capacity to absorb shock, land tenure, and lack of governance support	Low financial resilience, absence of financial governance support for regenerative transitions, and land tenure dynamics (many campesinos work land they do not own) constrain the ability to take on transition risks.
B5	Knowledge gap	Low awareness of soil health as a concept, limited technical knowledge of soil health-practices, and lack of diverse cooking knowledge relevant to agroecosystem diversification form a three-dimensional knowledge gap within the territory.
B6	Low visibility and 'ideological' framings of regeneration	Regenerative approaches have been communicated in alienating, ideological terms by

Code	Name	Brief description
		external actors with no land experience, generating 'antibodies' to the concept; simultaneously, successful regenerative alternatives remain of low visibility within the everyday lifeworld of conventional farmers.

6.2.1 B1: Conventional paradigm 1 – Mindsets and loss of attraction for agriculture

Field notes from researcher: *On my walk to the closest river there are walls of greenery climbing the sides of the road. A sprouting diversity of flowers and vines climbing self-dispersed Platano trees. I always see an array of butterflies there. As I was walking today, the greenery had been cut to the ground. Only the skinny platano trees remained, with a modest bunch of fruits coming forth. It reminded me of the clearcut forests of Sweden – ecological wealth erased for the sake of a model which ultimately does not seem to be very profitable for the whole.*

The first two barriers carry several interrelated elements which might go under the voluminous and slightly ambiguous header “Conventional paradigm”. For ease of flow and chapter structure, the elements are herein divided under the rubrics “Conventional paradigm 1 – mindsets and loss of attraction for agriculture” – carrying cultural dimensions – and “Conventional paradigm 2 – Chemical lock-in” – carrying biophysical dimensions.

Within the cultural aspects of the conventional paradigm, inherited mindsets attributed to historical, Green Revolution-education within the conventional paradigm, and an overall disengagement from agriculture are described as constraints to successful expansion of soil health-enhancing practices within the territory. While the latter points to destabilisations occurring in the prior, it paradoxically risks increasing a chasm between a conventional paradigm – currently undergoing a loss of pull to its attractors (see P3 – Conventional disruptors) – and potential, emerging regenerative alternatives.

Across all interviews, deeply inherited cultural mindsets – attributed to the Green Revolution emerging in Colombia during the 1960s-80s – is testified to as a main barrier for the expansion of soil health-enhancing practices.

"By far, the major challenge has been the culturally established practices, the education that has worked against these things." (Farmer 7)

The education referenced entails national institutions and federations – such as Fedecafé, Fedecacao, and agricultural extension services – encouraging monocultural cultivations sustained by agrochemicals. Drastically increasing production in the shorter term while also entailing severe consequences for farmers – such as an epidemic of coffee rust spanning across Támesis in the 1970s. One of the inherited conventional mindsets most often referred to in the interviews is that of “cleaning”. A “clean” farm, in this inheritance, entails one symmetrically planted with rows of monoculture crops and no visible weeds. This mindset is described as having been further reinforced during the narco-era sweeping Colombia in the 1990s – farms with many shrubs and visible weeds were associated with coca cultivation for illicit cocaine production, further driving a cultural inclination towards “clean” conventional aesthetics. The women of la Matilde testify to embeddedness of the cultural custom in their own experience, as it relates to soil health:

“Completely new [the knowledge of soil health-practices]. What happened was that mentally, we had the idea that the soil had to be clean. It has to be clean, right? ‘It has too many weeds, we have to clean it.’ We would simply clear it out and throw the weeds away. That’s why it [the soil] was always left exposed to the sun, and we were throwing away the nutrients that were in the weeds — we’d obviously throw them out but never use them again.” (Woman of La Matilde)

Mindsets function as unconscious attractors – often shaping the strategic landscape more profoundly than many material or biophysical aspects. Phenomenologically speaking, mindsets make up a substantial part of the pre-reflective backdrop through which all new experiences are perceived. They are durable dispositions that generate behaviours, orientations and in turn practices. From a complexity perspective, understanding inclinations as derived from mindsets is a pre-requisite for interacting with a system in any manner pertaining to nudges.

Through including this perspective, a substantial part the gap between biophysical possibilities for expanding soil health-practices within the territory, and the reality of low implementation, may be found in the lived experience of the populations concerned. The willingness to revise cultural mindsets considering preeminent challenges (see P3 – Conventional disruptors) is throughout the interviews described as a pre-requisite for expanding soil health-enhancing practices.

“The three categories [of soil health-practices] are practically focused on what is available. The challenge is finding who is willing to change — and how — because [...] not everyone is conscious [...]. People are not willing, or the system has taught them that everything should be faster. So, to get rid of a few weeds, it's easier to spray herbicide than to plant something else or do something to maintain the organic layer there. It's a question of culture, conscience, and time.” (Farmer 3)

Several interviewees point to shifts already emerging in this cultural inheritance:

"Before, the image of pride was the perfectly planted, clearcut monoculture. I've had so many people walk this property and look across at the clearcut monocrop over there and say, 'Wow, that's incredible. What a great job he's doing.' That guy is genuinely proud of it, because that's been the societal value for fifty years. And now it's shifting toward biodiversity — having birds on the land and clean water." (Farmer 7)

Yet, the second element of this barrier — bluntly labelled as ‘unattractiveness’ of agriculture, indicate a chasm which risk a severe fall-out of campesinos as culture changes — if the sense pride and identity which has upheld the current paradigm are not carefully stewarded throughout the process.

"This is actually what saddens me most. The great majority of people who have the mindset and desire to change [agriculture] are from outside.” (Farmer 6)

The participants describe an overall disengagement from agriculture present in the culture, attributed to the way practices are currently being taught within the conventional paradigm:

“Almost nobody wants to work on farms — but that’s because of the current model. At least I was raised on this farm, and I even migrated to the city, bored of it — bored because it was only work and I saw no purpose, no life in it.” (Farmer 3)

The interviewees also testify to parents discouraging children from remaining in agriculture:

“Children were always punished with something farm-related. And we don’t paint any other picture: ‘Son, study — A pencil weighs less than a machete.’” (Farmer 1)

And a current crisis-of-identity among local farmers:

“Here, unfortunately, if people see you a certain way — if you don't have money, you're nobody. You have to look well-organized, well-established, to be respected. Even wearing rubber boots is seen as demeaning. ‘You're nothing.’ So many campesinos move to the city and sell their land.” (Farmer 6)

The cultural elements of conventional ‘mindsets’ and ‘unattractiveness of agriculture’ are coupled within this barrier, because they demonstrate an interplay of elements which risk deepening a chasm between a potential regenerative paradigm and the current destabilising conventional one. If the lived experience of

a conventional farmer is not understood, respected and communicated to in a way which stewards the values and experiences that have uphold current practices – for instance, the risk of simply being told that ‘cleaning’ is wrong – there is a risk of campesino and campesino-youth fall-out – a loss of knowledge and relationship to land which appears crucial to successful regenerative transitions within the territory (see P5 – Ancestral, campesino knowledge and youth engagement).

6.2.2 B2: Conventional paradigm 2 – Chemical lock-in

A reinforcing pattern acting as a barrier of a more biochemical nature is in two interviews independently pointed to through a “soil-as-addict” metaphor. Soils that have been treated with agrochemicals are described as having developed a dependency on their accustomed treatments. While the particularly descriptive metaphor is used in two interviews, the theme is present in close to all interviews – and strongly tied to the economic aspect of changing practices (see B4 – Low capacity to absorb shock). A chemical dependency developed in crops entails a potential production drop once these are removed. One participant shares his personal perspective on the reinforcing loop, in a particularly close-to-heart section of the interview:

“Everything is a business — you produce coffee because there's an organization that buys it and because we need money to live. That business was monopolized. I'm talking about coffee specifically. It was monopolized by one organization [Fedécafé] because there was no technology and the markets were not open, and back then we didn't even know about roasted coffee — only raw material. The world knew coffee, but from outside. So, what happened? They cut down the native species; they cut down the forests. This is very personal to my thinking. They knew that by cutting the forest and changing the species there would be a massive production boom, because the soils were all healthy and fertile. It was a frenzy, they saw the money, and the entire population became indoctrinated to the organization. Then what happened? With monoculture and no forests, the soils began to degrade and pests and diseases arrived. And when diseases arrived, it became a chemical and agrochemical business. That is the reinforcing loop they have us in. [...] There is already erosion; the microorganisms have to be reactivated; and we have to return to processes where production will not be as high, but we have to move toward quality. It is an enormous shift in thinking [...], leaving behind that ambition and that foolishness they put in our heads that everything has to be fast, and we have to produce a lot.” (Farmer 3)

Other perspectives highlight the lived reality of the production drop in making a drastic transition away from agrochemicals:

"Personally, I lived through an attempt at going fully organic when I was young — the whole operation went organic — and I remember it clearly because it nearly bankrupted us. We stopped being productive." (Avocado producer)

The perceived production drop is described as causing transition-curious farmers to return to agrochemicals when results are not visible within a close timeframe:

"The organic system doesn't produce the same as a conventional system in the first years. And everyone in the countryside wants things to happen right away. This system is a little slower. So, when they see their productivity drop, they say, 'No, this doesn't work.'" (Farmer 2)

That the described barrier is biochemical in nature does not mean it is separate from phenomenology – on the contrary, the lived experience of the farmer applying chemicals is described as a main driver of this barrier, through a phenomenon in one interview referred to as “false health”:

"If you apply a chemical, in 15 days the plant looks healthy. But it's a false health. You're killing the soil. Each time you degrade the soil more, and you need more and more chemicals." (Farmer 6)

Witnessing a crop respond within two weeks treatment is understandably phenomenologically compelling. The “false health” operates as a visual attractor which is simply not replicable within the same timeframe by regenerative alternatives. Any nudges aiming at surpassing this barrier must therefore consider which alternative attractors lay most adjacent, as well as encourage strategic transitions – including financial and practical strategies – which see to a potential production drop (See 6.4 *Nudges*).

Another structural aspect relevant to this barrier is that of the labour-structure around coffee-picking. The price-rate model – entailing workers get paid a fixed rate, in the case of Támesis coffee, per kilo, regardless of the time taken to perform the task – entail a that the chemical lock-in also resides in the labour structure of the Támesis landscape:

“There's an irony: even the labour that picks coffee has an interest in it being monoculture. Tightly planted, flat, chemically fertilized for maximum beans per tree – that's what makes sense for the piece-rate model. Plant trees two and a half meters apart, on contour, mixed with other species, in a shaded system – it's harder to pick, fewer beans per pass. Offering an hourly rate doesn't really work in this cultural context. [...] For a lot of people, it's not worth it.” (Farmer 7)

The economic part of transitioning is recurrently pointed to as a make-or-break aspect in regenerative transition stories. The chemical-lock in herein described functions as a paradigm stabiliser because of its interplay with the economic barriers, which will be covered in subsequent parts.

6.2.3 B3: Lack of incentivising markets

While some glimmers of possibilities for incentivising markets emerge in the data (see P6 – Emerging markets), across nearly all interviews, the lack of incentivising markets for soil health-enhancing practices is highlighted as a main barrier for transitioning from the conventional paradigm.

"There are no markets – at least here there is not yet a specific market that says, 'Because you are doing these different practices, we are going to value your product differently.' When you bring it to market, it is at the normal price that everyone else is selling at. So, we lack a lot of culture – both from those who produce and from those who consume – because if the consumer does not value the effort you are making on the farm, it will be hard to have it compensated with a better price. It is still a cultural issue that in this region we lack, and we lack it greatly." (Farmer 2)

The interviewee describes a lacking consumer culture which could incentivise sustainable practices. The bulk of the data, however, points to even more robust barriers residing within the overall market infrastructure of southwestern Antioquia.

The local market infrastructure dominantly consists of wholesale companies from the city of Medellín purchasing from Támesis farmers. Produce is transported to the city, where it is repackaged and distributed nationally. In return, large quantities of produce from major wholesalers is imported to Támesis to be sold in local shops – at a price which is described as one that local farmers simply cannot compete with. Given the effort to transport their own produce into town, the wholesaler trucks arriving at the farm may offer a low price, but a stability which render selling directly to local markets as neither practical nor attractive. This market dynamic, along with the low financial returns, is pointed to as discouraging many producers from continuing their production at all.

Within coffee production, the national coffee Federation (Fedecafé) offers a purchase guarantee on beans, sold at bulk without processing or added value:

"The reason the conventional system has such a hold is because it guarantees purchase. You take out a kilo of coffee, 2 kilos, and they pay you – but you are at the mercy of a chemical production system and whatever they dictate. And that is why it has credibility – because they guarantee that purchase." (Farmer 3)

The purchase guarantee offered by Fedecafé, and the accessibility of wholesaler trucks, make up conventional attractors which are upheld by a market infrastructure developed over decades. While prices are described as seriously low (see P3 – Conventional disruptors), an overall low financial resilience and capacity to absorb shock (see B4 – Low capacity to absorb shock) generates a dependence on the current market infrastructure which reinforces the robustness of this barrier.

Accessing markets which offer a premium for sustainable practices is described as challenging, and largely limited to specialty produce:

"Those of us making the transition believe that it is now possible to reach specific niche markets, but I know that because I have been battling for 14 years. A conventional farmer is not going to take on that fight. It is very hard, very hard. It is not easy.

However, there is an opportunity through organizations like associations – but it is an access to very niche markets, and that is where the value is." (Farmer 3)

Furthermore, people who manage to access specialty- or export markets are described as “politically savvy” – persons who can navigate export licences, form producer groups or travel abroad to connect to international markets:

"Export is a whole other game. That requires licenses, contacts, organization. [You would need to focus on] on getting international contacts and forming producer groups to create consistent, exportable product. But for an individual producer, getting from farm to packaged exported product is an enormous feat." (Farmer 7)

The women of la Matilde succeeded in collectivising to generate a reliable stream of production towards a small conscious consumer-market, but the process was accompanied by Musa del Trópico – entailing technical- and knowledge support which may not be adjacent to most farmers (See B4 – Low capacity to absorb chock).

The pattern discernible through the interviews is that accessing the glimmers of possibilities described in P6 (Emerging markets) requires individual entrepreneurial qualities, or considerable external accompaniment. For a general farmer in the territory, becoming a marketer or entrepreneur is neither an adjacent possible nor necessarily at all an attractor. This causes something of an entrepreneurial bottleneck: access to markets which incentivise soil health-practices stagnates at the level of personal qualities, or with access to organisational networks. For the diffusion of regenerative practices to cross from persons driven by internal motivations to a greater majority, it appears evident that the market structure of the landscape needs to be leveraged or changed in novel ways.

6.2.4 B4: Low capacity to absorb chock (economic resilience), land tenure and lack of governance support

The capacity to absorb chock – resilience needed for motivation and/or capacity to make changes in light of potential production drop – is a theme which in the data for this study carries two dominant elements apart from the low financial returns of conventional farming covered in previous sections: lack of governance support, as well as land-tenure dynamics.

Speaking to a lack of financial- and governance support in Colombia, one farmer states the following:

"I think it's a debt that is owed to the campesino, a debt owed to humanity itself, because those supports should exist. You have a big corn crop, a windstorm comes, all the corn

goes flat. Collect what you can from the ground. It's lost — and the campesino loses. And his family. And those failures are always paid for with the land itself." (Farmer 1)

As previously described, there is a division in the data around the financial benefits of initiating a transition to soil health-enhancing practices. One farmer, belonging to the group experiencing transitions as significantly costly, describes the following situation and perceived need for governance support:

"The economic part is the biggest challenge. Those supports — tax breaks, incentives — none of that happens here. Nothing. The countryside has been very neglected. The great majority of people in rural areas don't have the economic conditions to start adopting these other practices, because they are not easy — because they become more costly, because today labour is very scarce." (Farmer 2)

Land tenure data is underrepresented in this study – where the sample is largely from the temperate zone of Tamesis, with smallholder farmers who typically own the land that they cultivate (see 2.2.2 *Land use in Tamesis*). Nevertheless, the following quote from a participant point to a crucial element for future investigations to consider:

"It's very sad the situation in Tamesis, because the great majority of campesinos live in a house but work someone else's land. They [landowners] are people who have a lot of money and a lot of land, and they pay others to work it. So, if those landowners say to apply chemicals, the campesino has to go do it because they're being paid. And it's not that anyone took the land from them – the campesinos themselves sold their land and ended up continuing to work it for a salary. It's very sad. You keep working your own former land for wages, but you don't keep what the land produces." (Farmer 6)

What is described, in essence, is that land tenure dynamics hinders transition from being an adjacent possible for most people actually working the land. This barrier entails that the ones who may experience health chocks – previously described as a main pathway to turn to the potential attractors offered by soil health-enhancing practices (see P1 – Health and ecological reciprocity) – are not the ones with autonomy to choose the direction of practices on the farm that they work.

Taken together, the elements composing B4 undermine key attractors to transition from fully chemical-dependent agriculture towards soil health-enhancing practices. This indicates the cruciality of leveraging strengths within the system (such as availability of organic matter, community support and peer-to-peer learning) to enable strategic potential transitions for the greater majority of farmers.

6.2.5 B5: Knowledge gap

The remaining two barriers cover elements pertaining to gaps within the system of knowledge relevant to soil health, as well as gaps in visibility of regenerative

alternatives. Visibility and knowledge of alternatives may be seen as the bridge between experienced pressure under the conventional paradigm, and a potential direction towards soil health-enhancing practices. The elements are necessary for perceiving potential alternative attractors, which in turn is necessary to considering undertaking a transition journey, or simply even experimenting.

The knowledge gap is within the study found to carry three dimensions: missing awareness of soil health as a concept, low technical knowledge of soil health-practices, and lack of diversified cooking-knowledge relevant to diversifying agroecosystems. One participant describes the situation as following:

"The truth is that technology, science, and knowledge in agriculture is very, very low in our territory – [...] almost no technology, almost no understanding of what soil health is. The great majority of people don't even know the terms." (Farmer 2)

"...the truth is that soil health has not been thought about. That is a real weakness." (Farmer 3)

Whereas the first participant points to a gap in technical knowledge, the second participant points to the knowledge gap in a different light – the considering of soils. Rather than technical knowledge, the quote points to the relational awareness of soils as a lacking component within the system. A further aspect in the knowledge gap is that of diversifying diets to suit diversified production systems.

"The change also needs to happen on the plate." (Comment by Local café owner)

Diversifying agroecosystems – a core practice for soil health – often entails output of diversified produce. Interest in cooking such produce is a key incentive to implement diversification practices and make use of the output from the diversified cropping system. Conversations with locals on this topic point to a prevalent knowledge- as well as interest gap pertaining to diversified cooking techniques.

"Traditionally we've eaten beans, pork rind, sancocho, rice — and it's delicious, it's our culture and tradition. But this global interconnection has allowed us to start discovering other ways of eating. [...] But what I see with traditional farmers and producers is that they don't like the taste of vegetables, they don't like fresh greens — because there's no culture around it. And also, what we have in our other stomachs — the microorganisms there — they like what they're used to." (Local agronomist)

As P1 (Health and ecological reciprocity) points to, there appears to be a certain momentum adjacent to acquiring lived experience of diversified agroecosystems, and taste of food grown in these. The women of la Matilde speak to this as it relates to expanding cooking knowledge:

"And we had eggplants – 'How do we eat this? How does it work? How do we eat eggplant?' Exactly. The first ones I gave away, because we didn't know. And then we learned to consume the things we have." (Woman of la Matilde)

In summary, the knowledge gaps discerned through the data are both technical and experiential in nature and necessary to bridge to leverage current perturbations to the conventional paradigm.

6.2.6 B6: Low visibility and 'ideological' framings of regeneration

In some of the interviews, a pattern is described where advocates for regenerative agriculture have arrived in the territory and communicated about practices in ways that hinder, or even damage, adaptation. It is described how farmers in the territory, to some extent, are developing "antibodies" to the term itself – having heard it connected to ideological framings that alienate persons of practical orientation. One farmer summarises the phenomenon:

"The thing is, there are many people who want to follow these models. The problem is how these models are communicated. Many people arrive radicalized, with a bias, saying 'You have to eliminate all chemicals at once.' These people already practicing conventional farming switch to full organic overnight and the crop crashes immediately. Then they say 'I'm going to starve,' and 'this doesn't work.' And that's why this model hasn't been more successful here. It's not communicated correctly. No one tells the farmer: 'Yes, you can become regenerative and profitable, but you have to transition gradually. Nature itself moves gradually – nature doesn't make one big leap.' That's the problem that has been introduced to farmers. [...] These trainers come, earn a salary, live off a salary – they don't live from the land. They deliver the information to campesinos, the campesinos try it, it fails, and they go back to chemicals with even more intensity, and now they'll never enter the regenerative world because they believe it's bad. Why? Because the trainers were university-educated professionals who had never picked up a machete, never gotten their hands in the soil. [...] There are people who want to do it – but the message needs to change." (Farmer 6)

The farmer points to the importance of the way the message is being delivered, but also by whom. What organisations and farms seeking to expand regeneration within the territory seemingly have done successfully within the territory (see P4 – Community, organisations and visible alternatives) through cultural embeddedness, other initiatives, or possibly the same initiatives in a less mature state, appear to have countered.

The second component of this barrier is that of overall low or skewed visibility of regenerative alternatives implementing soil health-enhancing practices. When asked about his perception of visibility of initiatives working with agroecology and regeneration, one participant answers the following:

"Yes, we are visible – but people think we are crazy." (Farmer 3)

The farmer statement points to a chasm of ideologies. Three farmers point how the word “regeneration” is a current fad, visible throughout Colombia, but indicate there is a detachment of this movement from the lived reality of most conventional farmers – a chasm deepened by the perceived overall low visibility of successful regenerative alternatives, adjacent to the lived reality of most conventional farmers.

"There are very few of us. We haven't made ourselves visible. In the Vereda where I have my crops, there's only me." (Farmer 2)

"The visibility given to all the people who work this way is quite limited. The impact is much less than it should be. [...] Social media gives a little visibility, but only a little." (Farmer 6)

In summary, low visibility of successful alternatives and ideological framings of regeneration, non-resonant to many farmers, appear to have generated a chasm which actors looking to expand soil health-enhancing practices must navigate for successful transmission of potential regenerative attractors. Paradoxically, this could include excluding the very word “regeneration” from the narrative of soil health-enhancing practices.

6.3 Dual element

Dual element signifies findings that are of analytical importance but does not integrate into the Possibilities and Barriers division as their function within the system is highly dependent on what the conditions are. There are several factors which could be included that are currently outside of the scope of this paper to analyse – such as anticipated increase in tourism, potentially generating market incentives for regenerative produce while also potentially increasing uneven distribution of resources among the local population: or anticipated gentrification, harbouring a similar effect. Here, one major element emerging through the data is covered.

Table 4. Dual element of relevance to the expansion of soil health-enhancing practices in Támesis.

Code	Name	Brief description
DE	Empirical culture	Farming knowledge is predominantly obtained through direct observation, demonstration and experience. As a possibility, this makes visible regenerative alternatives highly leverageable. As a

Code	Name	Brief description
		barrier, it can delay adoption where alternatives are not yet demonstrably successful, or disproportionately enhance negative transition stories.

6.3.1 DE: Empirical culture

Farming knowledge within the territory is, throughout the interviews, described as largely obtained through direct observation, demonstration and experience over theoretical transmission of ideas.

“Here in Colombia there's a saying: seeing is believing. They have to see it done. That has even been my challenge in this project — nobody believed in me since I started, and things have been unfolding gradually, and they are slowly starting to believe. That makes it even more interesting. [...] I've had contact with four or five coffee farmers who have told me that if they see good results they would be inspired — but as I say, they are not going to do it from the outset out of conviction or belief alone. First they have to see the mistake, or see that it actually works, before they believe and get involved. But that is also our challenge, and it's what makes it interesting. You have to see it to believe it.” (Farmer 3)

As a possibility, empirical understanding is highly leverageable – if regenerative alternatives are visible and showcasing directly beneficial alternatives.

"When they see that you are profitable – producing coffee, plantain, cassava, just through pruning and incorporating microbial broths and energy, all of it from within the same farm, not buying anything, not spending money, and still generating income – they say 'that is possible.' Once they see it actually generates results, that's when they transition." (Farmer 6)

As a barrier, the same cultural trait may hinder adaptation of practices to move into a greater majority, if this majority remains waiting for conditions to change. It may also render stories of failed transitions towards soil health-practices as extra damaging. Furthermore, as shown in B1 and B2 (Conventional paradigm 1 and 2), there is an interplay with the conventional paradigm promising fast visible results through the phenomenon of “false health” – empirically compelling on the shorter-term in relation to the crop while damaging for long-term resilience of the overall agroecosystem.

The dual element of Empirical culture demonstrates the significance of visibility of successful regenerative alternatives, transparency in evident challenges and

mistakes throughout transitions, and direct experience of potential benefits of soil health-enhancing practices.

6.4 Analysis of the Strategic Landscape

Complexity theory asserts that complex systems are dispositional – with underlying tendencies and inclinations which can be sensed and responded to with action. The results chapter has so far presented key possibilities and barriers for expansion of soil health-enhancing practices in the territory of Támesis. This section offers a synthesis of key findings from the possibilities, barriers and dual-element sections – pondering on the disposition of the studied system – before the chapter proceeds to develop four strategic nudges informed by the emerging patterns.

Firstly, it is important to state that presenting six possibilities and six barriers may indicate a symmetry between conventional and regenerative alternatives within the system which is simply not there. The reinforcing mechanisms of the conventional paradigm are firmly established, structurally embedded and actively shaping the lived experience of what it means to be a farmer for most people working the land in the studied zone. Regenerative transitioners make up a very small minority, almost entirely sustained by internal motivation with little external incentives.

Taken together, barriers 1 through 4 form a cluster of reinforcing attractors – not because they offer a particularly promising future for farming families, but because they are thoroughly embedded both structurally and culturally within the system. Conventional market infrastructure offers attractors of short-term stability difficult to surpass without alternative markets incentivising soil health-enhancing practices – markets currently lacking or not adjacent to most farmers within the system. Prolonged agrochemical use has created soil- and crop dependencies, and removal of inputs risks placing farmers at crisis given an overall low financial resilience and lack of governance support for farming families. The attractors offered by agrochemicals may surpass even prominent regenerative attractors such as health awareness considering this perceived potential crisis. These structural mechanisms are further reinforced at phenomenological levels of culture and mindsets, with a social inheritance tied to chemical farming – coupled with a growing active disengagement of youth and farmers from agriculture, making the land vulnerable to external financial interests.

Barriers 5 and 6 form a different cluster, describing gaps between existing pressure on conventional attractors and regenerative alternatives. Prevalent knowledge gaps and low visibility of regenerative alternatives directly impact

whether transitioning is an adjacent possible at all, from where most farmers within the system stand.

That is the rather obstructive image the data provides from the barriers side. Meanwhile, a compelling find from the patterns of possibilities within the map is that they are largely latent. There is an array of adjacent possibles to regenerative transitions largely underused within the system, such as access to organic matter. A territorial identity of nature appreciation and stewardship is also alive but not yet reflected in practice. Ancestral knowledge of diversified, low external-input farming exists, but lays dormant. Combined with the findings of how the conventional paradigm is destabilising, there appears to be a strong potential for high effectiveness of strategically placed nudges to expand soil health-enhancing practices within the territory. These findings are particularly temporal – during the writing of this study, coffee farmers within the temperate zone of Tâmesis were experiencing significant pressures from high rainfall and low amounts of sun amid a summer season which never fully arrived, sparking discussions among neighbours about the future of their livelihoods.

A pattern of particular interest is that of the attractors of health and ecological reciprocity. The interviews point to changes in farmer worldviews stemming from adopting regenerative practices, with ecological reciprocity overtaking initial attractors as a main motivator to proceed with soil health-enhancing practices. This suggests that ecological awareness was strengthened by or arose from the practices, rather than consistently preceding them. Such a temporal find indicates that transition journeys do not need to rest on eco-centric orientations – but that these likely emerge from the practices themselves.

There also appears to be a particular robustness of the attractor of ecological reciprocity as it intersects with farmers' experience of their personal health. A direct experience of the inseparability of oneself from the wider ecosystem increases the stakes and benefits of sustaining the ecosystem in a regenerative state.

An alarming find is that the persons currently undergoing regenerative transitions appear to be sustained largely by internal resources, with very little external incentives. Increased financial independence, health attractors, experience of ecological reciprocity and to a limited extent a regenerative community of practice provide transition energy for the interviewed farmers. Largely, however, testimonies of feeling alone and isolated in the transition journey, facing uphill battles with locating markets, and judgements from surrounding neighbours are common among the interviewees.

Taken together, the results show that the system of agriculture within the territory of Tâmesis – specifically, as it is *experienced* and *perceived* from within a transition journey – clusters around conventional attractors, with substantial mechanisms reinforcing the conventional paradigm. Yet, with remarkable possibilities for regenerative inclinations stemming from a territorial identity connected to nature; an increasing awareness and embodied sense of unsustainability of conventional practices; and increasing visibility of regenerative alternatives amplified through a network of organisations and farmers working to facilitate such transformations in the territory.

The possibilities and barriers presented – summarised in tables 2, 3 and 4 – represent the study’s response to its primary research objective. The second research objective – that of curating narratives of lived experience to enrich the analysis – is interwoven throughout the chapter. The chapter now proceeds to respond to the third research objective, through looking at potential actionable strategies for expanding soil health-enhancing practices in the studied territory.

6.5 Nudges

Nudges are small, tactical interventions designed to influence a complex systems disposition (Kurtz & Snowden 2003; van der Merwe et al. 2019). Nudges are distinct from long term goal setting: they work from present tendencies within the studied system to encourage desired patterns of behaviour to emerge, rather than moving from a future ideal. Looking to the data presented in the strategic landscape, certain points of significantly high leverage are clear, such as opening new, consumer-conscious markets to compensate for lack of governance support; strengthening communities around regenerative practices; or enhancing visibility of regenerative alternatives. Yet, these goals require a long timeframe as well as significant political influence or resources. Nudges, comparatively, can be seen as small, low-cost shifts in how energy is being directed within a system.

This sub-chapter presents four potential nudges which can be applied by stakeholders in the territory looking to facilitate regenerative transformations. They are not extensive in relation to the range of possibilities and can be replaced or complemented with other strategic interventions – for which the map of the strategic landscape may provide an entry point. The written nudges are also influenced by work already taking place among present organisations and individuals working to facilitate regenerative transformations in the studied territory – through conversations, as well as discussions from the participatory workshop conducted for this study.

6.5.1 N1: Equip “Early adopters”

While the complexity approach encourages abductively looking to emergent patterns rather than moving from theories which assume linearity in processes, Rodgers (2003) diffusion of innovations theory carries certain elements which the data in this study supports. Rodgers (2003) signifies that there is a critical threshold in the diffusion of any innovation when it crosses from *early adopters* (described as making up around 13% of a population) into the *early majority* (described as occupying around 33% of a given population). The critical threshold entails the moment when a new pattern of behaviour becomes self-reinforcing within a social system.

The tendencies for empirical learning, as well as peer-to-peer observation as a main medium for innovations to spread described in P4, suggests that most farmers within the territory adopt techniques primarily through observation and communication with peers. This is a character trait that Rodgers (2003) describes as typical to an early majority population group – persons who wait and see if an innovation works in their context before applying it.

Actionably, what the theory of innovations suggests is that any energy directed at converting majority groups within a population is largely wasted until earlier adopter groups are resourced, visible and well-connected within the social web that the majority groups belong to.

Early adopters are described as people who are well-embedded in the local social system, typically have access to information beyond their immediate surroundings, are comfortable with measured risk and willing to go through extra effort to implement an innovation or behaviour that they feel is important, or that aligns with their values (Rodgers, 2003). Emerging from the data, several possible early adaptors can be found within the landscape. Targeting, resourcing and connecting these offers potential nudges towards reaching a critical threshold for regenerative transitions within the territory. Early adopters can be found in farmers who repeatedly show up to trainings and local events without being pressured by extension services; farmers who have already created a specialty coffee segment of their produce, locatable through Frutos del Suroeste; or youth who display curiosity and engagement in regenerative agriculture. These characters are likely already within the adjacent sphere for local regenerative stakeholders, and prioritising resources towards this population group may generate spillover effects into the greater majority, of greater efficiency than more diffuse regional outreach.

The typology of farmers described as able to reach current conscious-consumer or premium markets – persons with “politically savvy” or entrepreneurial traits –

may demonstrate early adopters within Rodgers's terminology. While the need for these qualities to be able to access financial incentives for regenerative practices was found to indicate an entrepreneurial bottleneck within the system, such a character can also generate financial spillover effects into the wider majority. Opening new markets and expanding a regenerative enterprise may generate employments or farmers collectives to meet demands of the new markets. This is an economic premise which Biosuroeste operates from, providing training programs for farmers, ecotourism and other entrepreneurial activities as a means of catalysing regional development.

Targeting, resourcing and connecting early adopters may further enhance the visibility of regenerative alternatives. In the participatory workshop conducted for this study, the visibility of lighthouse farms was stated to be of crucial influence for expansion of regenerative practices within the bioregion.

"I feel that's very powerful — the demonstrative effect of a lighthouse farm, a point where things actually work — because none of us want to be left behind. There's a fear of missing out. When we see another farm advancing, we also want to integrate what's working for them in order to advance. [...] And there are very big barriers [...] I think the lighthouse farms and the seeds are very important — to show that it can be done, to show that big 'yes.' Opening the door." (Workshop participant)

6.5.2 N2: Strategic and gradual design of transitions

An adjacent possible, in Kauffman's (1993) sense, is what is reachable from the current position of an entity within system without requiring conditions that do not yet exist. Increasing government support for farmers might be of high leverage, but not necessarily adjacent for stakeholders in the studied territory. Equally, fostering premium markets – while more adjacent through leveraging existing partnerships and institutional relationships – still sits of low adjacency to individual farmers. Such strategies require conditions to shift before transitioning can become actionable for any farmer.

Hence, strategic design of transitions to avoid production drop (B2 – Chemical lock-in) may be seen as necessary for the alternative to be actionable. Coupled with visibility of regenerative attractors – such as health or increased financial independence – strategic designs can be promoted in training programs and peer-to-peer communication, focusing on adding to the soil what it has been missing before taking substances away from it.

Consider a body of low health, having developed a sugar dependency: fast carbs generate a sense of saturation, not reflected in actual uptake of essential nutrients in the body. Drastically erasing sugars from the diet, without having built up a deposit of micro- and macronutrients, is likely to cause hunger sensations and

cravings which undermine the effort. Firstly adding to a body the nutrients that are missing, through diversifying diet – eating more – might generate a more stable diet transition. Similarly, organic amendments build up a deposit of nutrients in soils may be more actionable than removing chemical fertilizers in one go. This nudge explores adjacent possibles in terms of strategic design of transitions towards soil health-enhancing practices, to avoid production drop and awaken interest in regenerative practices.

One participant describes his take on appropriate strategic transitions away from agrochemicals – an account which is not to be received as a standardised recommendation, but as one pathway among others embedded in the local context:

“You have to be very strategic. If you have 5 hectares, you cannot regenerate all 5 at once. You close off one hectare and start regenerating that one. Those other 4 hectares stay in conventional production. When that one hectare starts sustaining itself, then you close two more. Why? Because in that first hectare you're going to make mistakes and face problems. Those problems teach you what not to do with the next two hectares. [...] You have to make a gradual transition: start planting pioneer plants, the musáceas [banana and plantain family], the tutor plants – start creating a kind of forest. First build the forest while continuing to feed it with chemicals. Once you have a moderately established forest and those plants start generating nutrition for your crops, then you can begin cutting back gradually. For example, if you fertilize with chemical fertilizer four times a year, you start doing it three times instead, and that fourth application you replace with organic – prunings, and fertilizer that you produce on the farm itself. Then once the crop keeps responding well, you drop to two chemical applications, then one, adding more and more organic each time, until eventually the crop sustains itself on its own. Because if you cut the chemicals abruptly, the production crashes. You risk killing the crop.” (Farmer 6)

Focusing on the adjacent possible in terms of soil health-enhancing practices in outreach and knowledge transfer is another possible pathway within this nudge. The local agronomist and regenerative systems-designer interviewed for this study states the following, from his observations in counselling local farmers:

Question: “What do you perceive as the most accessible soil health-enhancing practice for a farmer in this territory?”

Answer: "First, organic matter. They can see that with organic matter their plants grow bigger and produce more [...] within five months. That's where it starts. Many people have the capacity to make compost and don't do it. So the first step: 'Look — you're throwing out your coffee pulp. If you start accumulating it and turning it, it gives you compost for your garden, for your soil.' That's the first and most important practice. [...] When they see results [...] that's one of the first things that shifts. [...] Diversification is second." (Local agronomist)

Diversifying crops to increase food resilience in the personal household and decrease the need for market purchases was shown by the women of Vereda Matilde to offer another strategic design for increasing financial resilience to enable transitions away from agrochemicals.

Each context is unique, and outreach as well as training promoting soil health-enhancing practices need to dynamically adapt to what strategic and gradual design might mean in each context. This nudge, at its core, encourages outreach and training to focus on what is most adjacent to farmers to implement, before introducing practices that require commitment to new technical knowledge, not yet sustained by genuine interest.

6.5.3 N3: Empirical remembrance for knowledge activation

While conceptual or terminological knowledge around soil health is described as low within the territory, P5 (Ancestral, campesino knowledge and youth engagement) displays that embodied land knowledge is a clear strength and resource within the system. Coupling embodied knowledge with soil health-knowledge comes forth as an adjacent leveraging point, as visible through the example below:

“Our friend said something I love. He comes from campesino roots, and he was talking to the guys – older guys, already in their 50s and 60s. He asked, ‘What did your grandparents do? Did they have chemicals?’ ‘No. They just chopped and dropped around the coffee; they cleaned around it and let it sit there.’ He said, ‘What were they clearing?’ ‘Oh, like carbonero or something’ – a nitrogen producer. ‘That’s the fertilizer.’ I thought it was a really beautiful way of drawing from empirical experience to get to a different practice. And then he said, ‘What’s your job here? How exhausting is it to go and spray all these chemicals, cut everything down? What if we had a system where you don’t need to be cleaning so much because you have better species around it? [...] Wasn’t that how things were when you were little kids? Didn’t your parents do it like that?’ And they said yeah. It was lovely – calling on an ancestral memory. Because ultimately, the harmful system hasn’t been in place that long, especially in areas like this.” (Farmer 7)

Rather than offering technical knowledge, the agronomist is retrieving knowledge that already exists within the system. Secondly, he is drawing on envisioning to make the re-implementation of the memory into practice an adjacent possibility. Phenomenologically speaking, this way of teaching appears well-integrated into the living reality of the impacted persons.

In the workshop conducted for this study, this was confirmed in a group discussion on knowledge transfer:

“Something we’ve also noticed is that as you start implementing, the knowledge that’s already there wakes up. Like: ‘Oh, we’ve been doing it such-and-such a way for many

years, but I remember it was like this, I've seen — ah, the coffee grows better under the guamo tree' — little things like that that slowly awaken, and that opens up other knowledge, other practices. And neighbours start to copy, they talk, and it's a small seed of change there. [...] We also talked about how that small seed that can work well for us is this intergenerational exchange of knowledge — but doing it in reverse. Because when someone arrives and, say, hires people, those people come with ancestral knowledge, and they're often older people. But making that intergenerational exchange in reverse — also starting to acquire new knowledge — not sure if from young people, but there's the possibility of youth as a source of knowledge. There are new knowledges today that lead us toward regeneration, toward healing. So we talked about how it should start to be implemented more: those talks, those exchanges of knowledge across diverse generations.” (Workshop participant)

As the statement above emphasises, the transformational impact of retrieving ancestral agricultural knowledge is likely to occur in the meet between new and older knowledges. Retrieval of ancestral knowledge should not be practiced without discernment, much like modern practices should not be implemented drastically at scale without sincere contextual awareness. Older agricultural practices are not automatically sustainable – something visible in the tropical Andes by the use of slash-and-burn in what today are densely populated areas, not allowing for adequate fallow periods. Ancestral knowledge is, within this nudge, a source of adjacent possibles – historically embedded practices which can be tested for present-day appropriateness.

Such testing may be done theoretically as well as experimentally. Strategic transitions discussed in Nudge 2 offers one framework for experimenting with retrieved practices hectare-by-hectare. Weighing practices against agroecological principles, such as the HLPE 13 principles of agroecology (HLPE 2019), offers a holistic framework which also accounts for social factors in the retrieval of older practices, such as labour conditions.

Apart from the activation of latent agricultural knowledge, there is also an element of experienced relationship towards the soil within this nudge – soil awareness. Participants of this study, who have undertaken a transition journey, describe the momentum of acquiring soil awareness and building a relationship to the soil as a main element providing transition energy throughout the process. Soil health, itself, is a metaphor. It offers an emotional connection through calling on the imagery of human health. Health is dynamic in its essence, and relational – it unfolds in an interplay with surrounding ecosystem components. While the ambiguity, or un-quantifiability, of this is something soil scientists can be uncomfortable with, it is a phenomenological strength when it comes to knowledge transfer within an empirical culture. Calling on *awareness* of soils and their processes – through influencing perceptions of soils as living systems rather than purely as technical components – leverages relationship to place and a nature

appreciating territorial identity, as well as the attractor of health and ecological reciprocity.

Practically speaking, this could include interweaving metaphors in knowledge transfer – such as soils as networks of living actors, similar to a Vereda, exchanging resources and information. It also includes curating somatic experiences of being in biodiverse agroecosystems – witnessing birds, tasting produce – something which Biosuroeste offers through their demonstrative productive systems in the public park.

6.5.4 N4: Reframe regeneration

As is visible from the data, there is a high degree of compatibility of regenerative practices with the nature-based identity of Támesis. Yet there are, within the territory, prevalent aversions to the term itself, and there is a longstanding cultural heritage of the “clean” farm which must be honoured in communication around soil health-enhancing practices (see B1).

A re-framing of outreach, training, peer-to-peer discussions and farm-visit language mainly directed at health and productivity – rather than the terms regeneration or agroecology – may enable a wider reach which is not limited by ideological resonance, while also leveraging main attractors for regenerative practices. This nudge is linguistic and intended to make the practices more adjacent to a farmer’s world. In a conversation with a representative from Biosuroeste, its importance was acknowledged and described as learned over time in continuous response to working with local farmers. This learning, curiously, is a core reason for their agroecological production plots being called *Sistemas productivos*, “productive systems”.

Leveraging the nature identity of Támesis could entail redirecting the narrative away from adopting new techniques, towards a narrative of stewarding what is already important to farmers. Practically, it might look like connecting soil health to water defence – an already live political identity in the territory, a strategy utilised in the work of Visión Suroeste. As the soils of the mountain are a crucial component in generating the water for the territory, making this link explicit connects the practice to a movement which already carries social momentum.

Curating the heritage of the “clean” farm, while promoting transitions towards ground cover, diversification and other soil health-enhancing practices, is a challenge which requires shifts in norms occurring over time. One farmer (see B1) indicates that some shifts in this norm are visible, with the trending emergence of birdwatcher communities and increasing integration of flowers for pollinators in coffee farming. Leveraging the attractors of having birds on the land and clean

water – for instance through social media presence emphasising these factors – may be the closest adjacent possible in curating this shift. Another farmer describes how he communicates to visiting farmers about the abundant life visible in his soil as his *capital*, his profitability – shifting the object of attention from a “clean” surface to financial value under the surface. Reframing “messier” practices as signs of economic resilience and skill, alongside care, is another strategy within this linguistic nudge.

6.5.5 Beyond Nudges

In addition to the four nudges herein presented, the following piece provides some reflections on what stakeholders might avoid when working to expand soil health-enhancing practices in the studied zone.

As previously stated, the complexity approach, as applied in certain management science, emphasises that complex systems should be engaged with through pattern management, rather than goal setting or scenario planning (Kurtz and Snowden 2003). Applying hard systems evaluation logic – for instance, fixed targets evaluated with standardised questionnaires – risks blinding evaluators to the creativity emerging in the system. It also risks playing into the pattern described in B6, of outside actors arriving with imposing models – generating resistance towards the shared practices in farming populations. Rather, informal dialogue in farming communities and within the network of regenerators – or other narrative methodologies – may be a more appropriate strategy to both build relationships and observe changes within the system. Furthermore, the usage of social media in this regard is a possibility not explored in this study.

Nudge 1 places significant emphasis on the group herein described as early adopters. Early adopters are, as described through the diffusion of innovation language, typically relatively well-resourced and able to absorb risk – something which B4 shows is not the case for large parts of the farming population in Tamesis, including landless labour populations. If strategies built around visible lighthouse farms and early adopters do not generate deliberate spillover towards this group – in terms of access to emerging markets and organisations, increased empowerment or financial independence – there is a risk that regeneration remains legible to a small minority perceived as outsiders. Since this study is delimited to a sample of primarily land-owning farmers, exploring the experiences of landless labouring groups remains crucial for the development of context-embedded regenerative farming, and labour or land-distribution models which supports such development.

Finally, a complexity approach grounded in nudging should not be used to disregard long-term vision. While hard systems engineering aimed at set goals

might be seen as poor practical tools in complex systems, envisioning and “dreaming” remain central to human motivation and drive. Holding long-term vision – such as increased political influence for farming populations or transformed market structures – can sustain personal and collective motivation towards substantial transformation. Well-placed nudges may generate self-organising capacities within a system, capable of altering structural barriers which today seem rigid.

7. Discussion

This study has provided a map of the strategic landscape towards soil health-enhancing practices in the territory of Tâmesis, curating narratives of direct experience in identifying patterns of possibilities and barriers for regenerative transitions within the territory. The patterns have been further analysed using concepts from complexity theory to uncover self-reinforcing mechanisms (attractors) which keep them stable. The thesis has further discussed where energy can be directed in ways that are actionable for local stakeholders in expanding regenerative transformation, through small, tactical interventions (nudges) which help shape transformation processes in a direction it already is inclined to move towards (adjacent possibles). The following chapter moves on to bring the findings into dialogue with existing research covered in the literature review. The chapter also examines some prevalent limitations of the data and discusses implications of the findings.

One of the most voluminous emerging patterns in the data for this study – that of health and ecological reciprocity (P1) – closely intersects with writings by Soini Coe and Coe (2023) and Zylstra et al. (2014) describing that a felt experience of connectedness with the wider web of ecology tends to evoke consistent attitudes and behavioural tendencies oriented towards ecosystem care. This study adds a temporal nuance to this finding, by suggesting that *performing* the regenerative practices itself *generated* such a felt experience of connectedness. Witnessing the ecosystem starting to respond to care was continuously described as generating an experience of joy and satisfaction for the transitioning farmer – representing self-reinforcing mechanisms (attractors) taking place between farmers and the land. These mechanisms were found to stabilise the new behaviours and practices, at times framed as the only factor providing transition energy during periods of scarce external incentives. This finding indicates that entry points to regeneration do not necessarily need to rely on already held eco-centric orientations, but that the practice itself is likely to generate these in the process.

To fully establish such a claim, studies portraying to understand farmer worldviews prior to the adoption of regenerative practices are required. Participants of this study may be particularly prone towards eco-centric orientations, and the narrative is retrospective. Still, the impact of ecological reciprocity should not be understated: looking to the field of environmental psychology, Soini Coe and Coe (2023) and Zylstra et al (2014) highlight the self-reinforcing nature of such patterns, due to their spillover effects into spheres of pride and meaning making.

A second voluminous theme – that of territorial identity (P2) – was not encountered in the transition literature reviewed for this study. Omonte-Ferrufino et al. (2026) observed an influential role of cultural and family inheritance at the household level in their studied Bolivian context. This study encountered a leveraging point in the collective identity at the scale of the territory. The territorial-identity dimension carries potential transferability to bioregional contexts where there is a present, nature-appreciating distinctness to the local culture. It is also a finding not likely to be surfaced through approaches which do not centre lived experience and meaning making of local populations. Both P1 and P2 emerged through phenomenological inquiry and are illustrative of what such an approach might surface that structural or quantitative methods often miss. Agroecological transition research may benefit from such inquiry, if seeking to understand context-specific cultural phenomenon which influence transitions.

The structural findings of this study echo those identified in recent work using TAPE in the Tropical Andes (Barrios Latorre et al. 2023; Suarez Cordoba et al. 2025). Structurally embedded agrochemical dependency (B2) lack of governance support, and low financial resilience among farmer populations (B4) all corresponded. Parts of these structural findings were further expanded upon in this study by exploring cultural and phenomenological dimensions which reinforce them (B1). Culture and mindsets influenced by education stemming from the green revolution centred around the “clean” farm, reinforced by a reluctance to be associated with coca-growing plantations of the *narco* era, were found as reinforcing mechanisms to the agrochemical lock-in (B1, B2).

The momentum indicated by TAPE studies – emphasising synergistic effects between agricultural diversity, household empowerment, production autonomy and soil health (Barrios Latorre et al. 2023; Suarez Cordoba et al. 2025) – was further found in this study to be supported by an interplay of attractors such as health and ecological reciprocity (P1), a growing sense of independence from conventional entrenchment (P3), and access to emerging markets (P6).

Lack of incentivising markets (B3) has repeatedly been found to hinder agroecological transitions, especially in light of lacking institutional and policy support (Zhao et al. 2018; Borja et al. 2023; Omonte-Ferrufino et al. 2026). Nudge 2 – that of promoting strategic transitions – herein emerges through context-specific stories from farmers who have successfully transitioned to soil health-enhancing practices despite such barriers. This finding mirrors writings by van der Ploeg (2009) – stating that agroecological practices are commonly integrated in parallel to other profitable activities, or even conventional farming, to mitigate financial risks of transition – and is encouraged to be considered for transferability to multiple contexts which suffer agrochemical lock-ins.

The Bolivian smallholder study by Omonte-Ferrufino et al. (2026) found risk aversion to be a dominant trait reinforcing agrochemical dependency, something recognisable in findings for this study for B1 and B4. There is an evident limitation of the present study in exploring the reality of these persons, given that the interviewed sample did not include any typology of non-transitioned farmers. Omonte-Ferrufino et al. (2026) explicitly states that the perceived stability of agrochemicals in combination with the typology of risk aversion made up a stronger attractor than awareness of health- and environmental risks of agrochemicals, something of great relevance if attempting to leverage P1 in a similar context.

Using diffusion of innovations language, the typology of risk adverse farmers found in the Bolivian smallholder context (Omonte-Ferrufino et al. 2026), and the farmer groups with low financial resilience coupled with inherited mindsets of the conventional paradigm identified in this study (B1, B4), might be classified as majority groups within the studied system: mainly willing to transition when results are visible and risks are demonstrably managed. Both findings indicate potential increased efficiency in directing energy towards early adopters (Nudge 1) who have both the inclination, resources and the autonomy to absorb potential risk of early transitions.

Furthermore, the finding around ancestral and campesino knowledge (P5) as a latent transition energy resource resembles Omonte-Ferrufino et al's (2026) observation that a primary factor associated with agroecological adoption in their studied context was not technical training, but inherited traditions. This has strategic implications for efficient knowledge co-production which emphasise approaches that retrieve knowledge which is already existing within the system (Nudge 3) to bridge prevalent knowledge gaps (B5). Simultaneously, this knowledge retrieval should be integrated in a fashion which aligns with modern agroecological principles for soil health-enhancing practices.

The need to strategically reframe regeneration (Nudge 4) to manage barriers of ideological framings of the concept, non-resonant to many farmers (B6), represents a finding of this study which adheres to comments by Soini Coe and Coe (2023). Agricultural practices rest within a field of beliefs, values and worldviews, and these are dimensions of existence which are often reflected in language. Linguistic nudges may be seen to require a phenomenological understanding of the studied context, something which the systematic review by Sachet et al. (2021) points to as missing in much research on agroecological transitions – largely focused on practices and *doings* of transitions.

The integration of phenomenological inquiry with complexity thinking work in complementary ways within the study, to uncover attractors as well as their underlying mechanisms. Still, there is a tension present in the utilisation of narrative and thematic analysis for these purposes: endeavouring to uncover patterns from narratives of lived experience carries certain positivist qualities – looking for an “objective truth” beyond interpretation – which the tradition of reflexive thematic analysis opposes. Braun and Clarke (2023) emphasise that a researcher utilising thematic analysis is never a “neutral conduit”, simply accessing and conveying a direct truth.

In this study, the researcher can be seen as an integrated part of the data. The interviews took place in relationship between interviewer and interviewee. It can be noted once more that the possibilities and barriers presented here are not hierarchical in a sense of objective significance: rather, they are structured by volume of appearance in the transcripts – a volume which has, in turn, been influenced by chosen methodology as well as positionality. For instance, phenomenological inquiry steered the interviews towards more emotive recollections from participants; and the researchers’ internal values on ecological awareness (notable in the foreword) increases the abductive resonance for identifying and discussing patterns such as P1. An interview guide centred on open questions, aiming at unprompted results (I.e. “what motivates you to continue this work?” rather than “do you do this work for a love of the land?”) was one strategy utilised to soften this effect.

The strengths of the interpretative method should also be emphasised: the data appearing is a unique product of the interaction between the researcher and the place of study.

It should once more be noted that land tenure dynamics are underrepresented in the study, as the sample mainly includes small- to medium holders from the temperate zones of Támesis, who experience higher production autonomy in their own farms. Exploring the experiences and autonomy of labour population groups – landless as well as tenant – would generate results of deep value to understand possibilities and barriers for regenerative transitions within the studied context, as well as the tropical Andes overall. Likewise, the experiences of non-transitioned, land-owning farmers would provide an alternative snapshot of the strategic landscape to regenerative transitions. Together, these population groups may provide insights into the reality of majority groups within the studied system.

This study represents a temporal snapshot of the strategic landscape as it is perceived and experienced from within a transition journey – conveyed through researcher analysis in the interpretative tradition. While limited in its scope, the

delimitative choice to focus on what may be classified as early adopters carries distinct benefits in adherence to the research objectives. This population group could be essential for the diffusion of soil health-enhancing practices to continue in wider population groups in the studied territory. Understanding their experiences better enables uncovering true adjacent possibles towards regenerative transformations.

8. Conclusions

Engaged organisations, farmers, civic movements and other local persons are providing unique responses to modern challenges facing life in the western *cordillera* of the tropical Andes. Támesis contains fascinating conditions for regenerative transitions – biophysical richness, community infrastructure, agriculture largely based in manual labour, and a territorial identity anchored in the wealth of ecosystems. Yet, prevalent barriers sustain a conventional paradigm centred around extensive use of agrochemicals and monocultural cultivations, harmful to soil, aquatic and terrestrial life of the mountain. This is an expression of forces upholding conventional practices globally – but as the need for fundamental changes in food production systems become increasingly obvious and pressing, there are increasing opportunities for new attractors to form alternative paradigms. The case of Támesis provides insightful imagery of what such attractors could consist of. This chapter will conclude the study, summarise key findings and reflect on pathways for future research.

Responding to research objective 1, the system of agriculture in Támesis can be seen to cluster around conventional attractors, with substantial structural and cultural mechanisms reinforcing the conventional paradigm – categorised as barriers (see table 3). Regenerative transitioners make up a small minority, testifying to little external incentives. Even more so, prevalent knowledge gaps and low visibility of regenerative alternatives directly impact whether transitioning is adjacent at all, from where most farmers within the territory stand. Yet, conventional disruptors – rising prices for agrochemicals, adverse health effects from their usage, and changing climatic patterns placing single-crop cultivations in a very vulnerable state – are generating possibilities for regenerative transitions (see table 2).

One of the more remarkable findings of this study, responding to research objective 2, was that while a variety of factors served as attractors to initiate transitions journeys for the respondents, the main mechanism reinforcing the new practices was an experience of the ecosystem responding to care – of ecological reciprocity. That the strongest stabilising attractor was found to be eco-relational in nature – as well as seeming to arise *from*, rather than *before* the practices – has sincere implications for understanding agroecological transitions. Framings of regeneration which focus on environmental ideals are not necessary if attractors such as health and productivity can lead, and eco-centric alterations in lived realities follow.

Herein, complexity thinking has supported understanding of the strategic landscape. Firstly, it helps explain stability. The self-reinforcing nature of attractors helps explain why the system resists change even under pressure. Phenomenology works complementary in this regard, through uncovering experiences and meaning making-mechanisms which generate attractors.

Second, phenomenological inquiry combined with the complexity lens helps to understand why some seemingly obvious interventions might not work. Technical knowledge transfer towards a crowd of farmers with low financial mobility within a cultural landscape rooted in empirical learning is likely to be a less-than-successful implementation – whereas focusing on the adjacent possible invites the observer to visualise the locality of an actor within a system, where certain movements are more available than others.

The strategy of nudges takes this mobility into account. Small tactical interventions moving from the present disposition of the system can be seen as better adapted to the unpredictable, non-linear development which complex systems display.

Nudges also acknowledge the impermanent nature of attractors. Conventional attractors can be overrun by regenerative ones, if these are adjacent enough. Opposition by itself does not give direction to the system, unless anchored in alive attractors which influence behavioural tendencies. This is acknowledged in approaches already applied by organisations in the territory – Biosuroeste extensively focuses on the attractor of productivity in their research output and training programs, and in showcasing their agroecological productive systems.

Responding to research objective 3, the nudges proposed in this thesis are intended to work from within the attractor and adjacency landscape: increase attractor visibility through equipping early adopters, focusing on adjacency in designing strategic transitions, retrieving knowledge from within the system to stimulate embodied interest, and reframing language around regenerative transitions to adhere to attractors within the system rather than repellents.

The latter speaks to an unresolved issue in the study of agricultural transitions overall – that of terminology. This study is embedded in agroecological transitions research, while using the term of regeneration – as the term appeared more resonant to local stakeholders. Yet, regeneration, in turn, was found to be non-resonant to parts of the local farmer population, and within academia critiqued for ambiguity. Simultaneously, agroecological transitions research remains largely focused on agroecology as a set of practices, whereas elements of cultural transformation are less incorporated in the academic use of the term.

Terminology itself posing a barrier to agricultural transitions deserves attention, integrative solutions, and transparency in future inquiry.

Future research may also apply alternative methodologies for mapping the dispositional state of agricultural transitions. The sense-maker methodology – developed by The Cynefin Co (van der Merwe et al. 2019; The Cynefin Co n.d.) – utilises questionnaires with micro-narratives and self-interpretation across a minimum of 200 participants to understand the dispositional states of complex systems. Such a methodology would be fascinatingly applied to understand inclinations towards or away from regenerative practices within the studied system. Furthermore, future research which dives into the lived experience of non-transitioned farmers is needed to complement the strategic landscape presented in this study.

This study has contributed to perspectives on regenerative transitions in Támesis, nested in the heart of the tropical Andes. It represents a novel endeavour in applying a complexity approach – as developed by Snowden and others in the field of management science for *engaging* with and *influencing* complex systems – into agroecological transformational research. Phenomenological inquiry has further deepened insight into the lived realities of the studied farming population, hence complementing existing agroecological transition research with narratives of underlying motivations which enable transitions. The study may be utilised by local actors in the studied territory to: increase institutional attention to the territory; share information to external stakeholders about the territory; leverage the strategic landscape in novel ways – not necessarily suggested within this report; reflect on applications of complexity thinking in hands-on work for regenerative transitions; as well as to be mirrored in challenges and opportunities of every-day life working in the studied territory.

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References

- Alcala-Orozco, M., Palomares-Bolaños, J., Alvarez-Ortega, N., Olivero-Verbel, J. & Caballero-Gallardo, K. (2021). Socio-Economic and Environmental Implications of Gold Mining in Afro-Descendant Communities from Colombia. I: Merlin Yonk, R. (red.) *Improving Quality of Life - Exploring Standard of Living, Wellbeing, and Community Development*. IntechOpen. <https://doi.org/10.5772/intechopen.96407>
- Alvarez-Pugliese, C.E., Machuca-Martínez, F. & Pérez-Rincón, M. (2021). Water footprint in gold extraction: A case-study in Suárez, Cauca, Colombia. *Heliyon*, 7 (9), e07949. <https://doi.org/10.1016/j.heliyon.2021.e07949>
- Barrios Latorre, S., Sadovska, V. & Chongtham, I. (2023). Perspectives on agroecological transition: the case of Guachetá municipality, Colombia. *Agroecology and Sustainable Food Systems*, 47, 1–31. <https://doi.org/10.1080/21683565.2022.2163449>
- Bawden, R.J. (1991). Systems Thinking and Practice in Agriculture. *Journal of Dairy Science*, 74 (7), 2362–2373. [https://doi.org/10.3168/jds.S0022-0302\(91\)78410-5](https://doi.org/10.3168/jds.S0022-0302(91)78410-5)
- Bergen, N. & Labonté, R. (2020). “Everything Is Perfect, and We Have No Problems”: Detecting and Limiting Social Desirability Bias in Qualitative Research. *Qualitative Health Research*, 30 (5), 783–792. <https://doi.org/10.1177/1049732319889354>
- Berger, R. (2015). Now I see it, now I don’t: researcher’s position and reflexivity in qualitative research. *Qualitative Research*, 15 (2), 219–234. <https://doi.org/10.1177/1468794112468475>
- Borja, R., Blare, T., Reimao, M., Padilla, G. & Oyarzun, P. (2023). *Women’s Associations in Cotopaxi, Ecuador from Rights to Agroecological Markets*. Agricultural and Applied Economics Association (AAEA). <https://doi.org/10.22004/ag.econ.339076>
- Bourdieu, P. (2021). *Forms of Capital*. Polity Press.
- Braun, V. & Clarke, V. (2023). Toward good practice in thematic analysis: Avoiding common problems and be(com)ing a knowing researcher. *International Journal of Transgender Health*, 24 (1), 1–6. <https://doi.org/10.1080/26895269.2022.2129597>
- Bryman, A. (2016). *Social Research Methods*. Oxford University Press.
- Cabrera, L.M.M. (2022). Consumo e impactos de los agrotóxicos en Colombia: comunidades envenenadas. *Saúde em Debate*, 46, 75–88. <https://doi.org/https://doi.org/10.1590/0103-11042022E205>
- Cilliers, P. (1998). *Complexity and Postmodernism: Understanding Complex Systems*. Routledge. <https://doi.org/10.4324/9780203012253>
- Cook, D.A., Ginsburg, S., Sawatsky, A.P., Kuper, A. & D’Angelo, J.D. (2025). Artificial Intelligence to Support Qualitative Data Analysis: Promises, Approaches, Pitfalls. *Academic Medicine*, 100 (10), 1134–1149. <https://doi.org/10.1097/ACM.0000000000006134>

- Creswell, J.W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications.
- Côte, F.X., Rapidel, B., Sourisseau, J.M., Affholder, F., Andrieu, N., Bessou, C., Caron, P., Deguine, J.-P., Faure, G., Hainzelin, E., Malezieux, E., Poirier-Magona, E., Roudier, P., Scopel, E., Tixier, P., Toillier, A. & Perret, S. (2022). Levers for the agroecological transition of tropical agriculture. *Agronomy for Sustainable Development*, 42 (4), 67. <https://doi.org/10.1007/s13593-022-00799-z>
- Delmas, P.M. & Giles, R.L. (2023). Qualitative research approaches and their application in education. I: *International Encyclopedia of Education (Fourth Edition)*. 4. uppl. Elsevier. 24–32. <https://doi.org/10.1016/B978-0-12-818630-5.11003-6>
- DNP (2024). *Támesis, Antioquia. Terridata*. Departamento Nacional de Planeación. https://terridata.blob.core.windows.net/fichas/Ficha_05789.pdf [2026-04-22]
- Douglas, M. (2011). *How Institutions Think*. Routledge.
- FOLU Antioquia (2021). *Hoja de Ruta para la Nueva Economía de la Alimentación y Uso del Suelo de Antioquia*. FOLU Antioquia.
- Francis, C., Lieblein, G., Gliessman, S., Breland, T., Creamer, N., Harwood, R., Salomonsson, L., Helenius, J., Rickerl, D., Salvador, R., Wiedenhoeft, M., Simmons, S., Allen, P., Altieri, M., Flora, C. & Poincelot, R. (2003). Agroecology: The Ecology of Food Systems. *Journal of Sustainable Agriculture*, 22, 99–118. https://doi.org/10.1300/J064v22n03_10
- Gliessman, S. (2016). Transforming food systems with agroecology. *Agroecology and Sustainable Food Systems*, 40 (3), 187–189. <https://doi.org/10.1080/21683565.2015.1130765>
- Gliessman, S.R. (2014). *Agroecology: The Ecology of Sustainable Food Systems, Third Edition*. CRC Press.
- González-González, A., Clerici, N. & Quesada, B. (2021). Growing mining contribution to Colombian deforestation. *Environmental Research Letters*, 16 (6), 064046. <https://doi.org/10.1088/1748-9326/abfcf8>
- Gori, B., Ulian, T., Bernal, H.Y. & Diazgranados, M. (2022). Understanding the diversity and biogeography of Colombian edible plants. *Scientific Reports*, 12, 7835. <https://doi.org/10.1038/s41598-022-11600-2>
- Gosnell, H., Gill, N. & Voyer, M. (2019). Transformational adaptation on the farm: Processes of change and persistence in transitions to ‘climate-smart’ regenerative agriculture. *Global Environmental Change*, 59, 101965. <https://doi.org/10.1016/j.gloenvcha.2019.101965>
- HLPE (2019). *Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*. (14)
- Holmes, D.A.G.D. (2025). Researcher Positionality -A Consideration of Its Influence and Place in Qualitative Research -A New Researcher Guide. <https://doi.org/10.34293/EDUCATION.V8I4.3232>

- Hougaard, I.-M. (2022). Unsettled Rights: Afro-descendant recognition and ex-situ titling in Colombia. *Political Geography*, 96, 102606.
<https://doi.org/10.1016/j.polgeo.2022.102606>
- Janzen, H.H., Janzen, D.W. & Gregorich, E.G. (2021). The ‘soil health’ metaphor: Illuminating or illusory? *Soil Biology and Biochemistry*, 159, 108167.
<https://doi.org/10.1016/j.soilbio.2021.108167>
- Johnson, S. (2010). *Where Good Ideas Come From*. Penguin.
- Jordan, N.R., Andow, D.A. & Mercer, K.L. (2005). New Concepts in Agroecology: A Service-Learning Course. *Journal of Natural Resources and Life Sciences Education*, 34 (1), 83–89. <https://doi.org/10.2134/jnrlse.2005.0083>
- Kauffman, S.A. (1993). *The Origins of Order: Self-organization and Selection in Evolution*. Oxford University Press.
- Kurtz, C.F. & Snowden, D.J. (2003). The new dynamics of strategy: Sense-making in a complex and complicated world. *IBM Systems Journal*, 42 (3), 462–483.
<https://doi.org/10.1147/sj.423.0462>
- Lagerman, W. (2025). *Testing TAPE: Assessing Agroecological Performance of Biosuroeste and Exploring Applicability for Multi-Stakeholder Agricultural Systems*. <https://res.slu.se/id/publ/143330> [2026-04-21]
- LEGISLEAD (u.å.). *2-Beyond Mental Models: David Snowden on Human Decision-Making in Complexity - YouTube*. <https://www.youtube.com/watch?v=e3-8-8IyrfI&list=TLGG33II7jxrAVUwMzAzMjAyNg> [2026-03-03]
- Letmathe, P., Paegert, M., Roll, C., Balleer, A., Bösch, S., Breuer, W., Förster, A., Gramelsberger, G., Greiff, K., Häußling, R., Lemme, M., Leuchner, M., Piller, F., Seefried, E. & Wahlbrink, T. (2024). Societal Transformation: Transformation Research, Transformational Research, Research Transformation: A Novel Framework from RWTH Aachen University. I: Letmathe, P., Roll, C., Balleer, A., Bösch, S., Breuer, W., Förster, A., Gramelsberger, G., Greiff, K., Häußling, R., Lemme, M., Leuchner, M., Paegert, M., Piller, F.T., Seefried, E., & Wahlbrink, T. (red.) *Transformation Towards Sustainability: A Novel Interdisciplinary Framework from RWTH Aachen University*. Springer International Publishing. 3–38. https://doi.org/10.1007/978-3-031-54700-3_1
- Lincoln, Y.S. & Guba, E.G. (1985). *Naturalistic Inquiry*. SAGE.
- Luke, H., Allan, C., Cooke, P., Kilham, S., Ollerenshaw, A., Craig, N., Scholz, N., Fear, D., Kruger, S., Telfer, J., Alexanderson, M., Davenport, D., Haigh, Y., Brown, S. & Angel, K. (2026). Deliberative project design for understanding and working within complexity in agricultural systems. *Frontiers in Complex Systems*, 4.
<https://doi.org/10.3389/fcpxs.2026.1749741>
- Mambo, T. & Lhermie, G. (2024). The futures for regenerative agriculture: insights from the organic movement and the tussle with industrial agriculture. *Frontiers in Sustainable Food Systems*, 8. <https://doi.org/10.3389/fsufs.2024.1455024>
- McGinnis, M.V. (red.) (2005). *Bioregionalism*. Routledge.
<https://doi.org/10.4324/9780203984765>

- van der Merwe, L., Biggs, R., Preiser, R., Cunningham, C., Snowden, D., O'Brien, K., Jenal, M., Vosloo, M., Blignaut, S. & Goh, Z. (2019). Making Sense of Complexity: Using SenseMaker as a Research Tool. *Systems*, 7, 25.
<https://doi.org/10.3390/systems7020025>
- Miller, M. & Baumber, A. (2025). Futures in Transition Multi-Scale Theory of Change in Transition Design: A Case Study in Regenerative Agriculture (Special Issue: Futures in Transition). *World Futures Review*, 1–17.
<https://doi.org/10.1177/19467567251330208>
- Morseletto, P. (2020). Restorative and regenerative: Exploring the concepts in the circular economy. *Journal of Industrial Ecology*, 24 (4), 763–773.
<https://doi.org/10.1111/jiec.12987>
- Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B. & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, 403 (6772), 853–858.
<https://doi.org/10.1038/35002501>
- Naeem, M, Smith, T & Thomas, L. (2025). Thematic Analysis and Artificial Intelligence: A Step-by-Step Process for Using ChatGPT in Thematic Analysis. *International Journal of Qualitative Methods*, 24 (7), 1–18.
<https://doi.org/10.1177/16094069251333886>
- Nicholls, Clara & Altieri, M. (2018). Pathways for the amplification of agroecology. *Agroecology and Sustainable Food Systems*, 42, 1–24.
<https://doi.org/10.1080/21683565.2018.1499578>
- Nyéleni (2015). Declaration of the International Forum for Agroecology, Nyéleni, Mali: 27 February 2015. <https://doi.org/10.1057/s41301-016-0014-4>
- Omote-Ferrufino, M.C. 1, De Angelis, R. 2, Navarrete, I. 3, Alem-Zabalaga, M. 1 & Barahona-Zamora, C. 2 1 1 F.A.A. (2026). Navigating agroecological transitions: key factors for Bolivian small producers. 1655378.
<https://doi.org/10.3389/fagro.2026.1655378>
- Pardo, K.L.-E. & Lugo, J.V.Z. (2019). *Spotlight: the legal framework and licensing regime for mining in Colombia*. Lexology.
<https://www.lexology.com/library/detail.aspx?g=4c8ff8c0-8317-4e63-8665-c4e12be598be> [2026-04-30]
- van der Ploeg, J.D. van der (2009). *The New Peasantries: Struggles for Autonomy and Sustainability in an Era of Empire and Globalization*. Routledge.
- Ray, K. (2011). Attractors of Leadership. *The Cynefin Co*.
<https://thecynefin.co/attractors-of-leadership/> [2026-04-11]
- Reason, P. & Bradbury, H. (2001). *Handbook of Action Research: Participative Inquiry and Practice*. SAGE Publications.
- Rodríguez Castro, L. (2022). Extractivismo y despojo territorial en el campo colombiano: un compromiso decolonial con las políticas de lugar de las mujeres campesinas. *Tabula Rasa*, (42), 313–337.
<https://doi.org/https://doi.org/10.25058/20112742.n42.13>

- Sachet, E., Mertz, O., Le Coq, J.-F., Cruz-Garcia, G.S., Francesconi, W., Bonin, M. & Quintero, M. (2021). Agroecological Transitions: A Systematic Review of Research Approaches and Prospects for Participatory Action Methods. *Frontiers in Sustainable Food Systems*, 5. <https://doi.org/10.3389/fsufs.2021.709401>
- Schreefel, L., Schulte, R.P.O., de Boer, I.J.M., Schrijver, A.P. & van Zanten, H.H.E. (2020). Regenerative agriculture – the soil is the base. *Global Food Security*, 26, 100404. <https://doi.org/10.1016/j.gfs.2020.100404>
- Silva, B. & Cigüenza, N. (2026). "Dejar de hacer este proyecto es un crimen económico": Juan Carlos Echeverry sobre la mina de cobre en Jericó. *Portafolio.co*. <https://www.portafolio.co/energia/dejar-de-hacer-este-proyecto-es-un-crimen-economico-juan-carlos-echeverry-sobre-la-mina-de-cobre-en-jerico-492210> [2026-04-24]
- Snowden, D. (2017). Systems thinking & complexity. *The Cynefin Co*. <https://thecynefin.co/systems-thinking-complexity/> [2026-08-02]
- Snowden, D. (2022). Abduction through entanglement. *The Cynefin Co*. <https://thecynefin.co/abduction-through-entanglement/> [2026-04-21]
- Snowden, D. (2025). Cynefin Framework and Estuarine Mapping: Strategic Frameworks for an Era of Competition. *The Cynefin Co*. <https://thecynefin.co/strategic-frameworks-for-an-era-of-competition/> [2026-04-28]
- Snowden, D.J. & Boone, M.E. (2007). A Leader's Framework for Decision Making. *Harvard Business Review*, (85), 68–149
- Soini Coe, E. & Coe, R. (2023). Agroecological transitions in the mind. *Elementa: Science of the Anthropocene*, 11 (1), 00026. <https://doi.org/10.1525/elementa.2022.00026>
- Suarez Cordoba, Y., Barrera-García, J., Sterling, A., Rodríguez, C. & Tiftonell, P. (2025). Evidence of Agroecological Performance in Production Systems Integrating Agroecology and Bioeconomy Actions Using TAPE in the Colombian Andean–Amazon Transition Zone. *Sustainability*, 17, 9024. <https://doi.org/10.3390/su17209024>
- The Cynefin Co (u.å.). SenseMaker®. *The Cynefin Co*. <https://thecynefin.co/sensemaker/> [2026-05-22]
- Tiftonell, P. (2019). Las transiciones agroecológicas: múltiples escalas, niveles y desafíos. *Revista de la Facultad de Ciencias Agrarias*, 51 (1). <https://revistas.uncu.edu.ar/ojs/index.php/RFCA/article/view/2448> [2026-05-01]
- Valbuena, D., Cely-Santos, M. & Obregón, D. (2021). Agrochemical pesticide production, trade, and hazard: Narrowing the information gap in Colombia. *Journal of Environmental Management*, 286, 112141. <https://doi.org/10.1016/j.jenvman.2021.112141>
- Vandermeer, J. (2020). Confronting Complexity in Agroecology: Simple Models From Turing to Simon. *Frontiers in Sustainable Food Systems*, 4. <https://doi.org/10.3389/fsufs.2020.00095>

- Visión Suroeste (2023). *Quiénes Somos – Visión Suroeste*. <https://visionsuroeste.com/wp-content/uploads/2023/11/Quienes-Somos-Vision-Suroeste.pdf> [2026-04-22]
- Wachenfeld, M. (2016). Mining Unseen: Sector Wide Human Rights Impact Assessment of the Mining Sector in Colombia. *CREER - Centro Regional de Empresas y Empredimientos Responsables*.
https://www.academia.edu/41450856/Mining_Unseen_Sector_Wide_Human_Rights_Impact_Assessment_of_the_Mining_Sector_in_Colombia [2026-04-23]
- Wahl, D. (2016). *Designing Regenerative Cultures*. Triarchy Press.
- Yáñez-Muñoz, M.H., Jarrín-V., P., Brito M., J., Román-RR, R., Astorquiza, J.M., Baca, A.E., Baker, P.A., Bejarano-Muñoz, P., Cuesta R., E.Y., Freire, E., Garzón, C., Gómez-Paredes, J., Klinger, W., Lagos, L.E., Medina, W., Mena-Valenzuela, P., Mosquera R., L.J., Mosquera M., R.S., Murillo, Y., Murillo A., Y.D., Nagle R., E., Narváez, G., Pimm, S., Proaño, C., Prieto A., F.J., Quezada, Z., Ramírez, G., Rengifo I., R., Rentería M., L.E., Urgilés-Merchán, M.A., Vargas, Lady, Valdospinos, C., Valolyes, Z. & Inclán, D.J. (2024). The Tropical Andes Biodiversity Hotspot: A Comprehensive Dataset for the Mira-Mataje Binational Basins. *Scientific Data*, 11 (1), 782. <https://doi.org/10.1038/s41597-024-03463-1>
- Zhao, L., Wang, C., Gu, H. & Yue, C. (2018). Market incentive, government regulation and the behavior of pesticide application of vegetable farmers in China. *Food Control*, 85, 308–317. <https://doi.org/10.1016/j.foodcont.2017.09.016>
- Zylstra, M.J., Knight, A.T., Esler, K.J. & Le Grange, L.L.L. (2014). Connectedness as a Core Conservation Concern: An Interdisciplinary Review of Theory and a Call for Practice. *Springer Science Reviews*, 2 (1), 119–143.
<https://doi.org/10.1007/s40362-014-0021-3>

Popular science summary

Home to the richest biodiversity of flora and fauna on earth, the tropical Andes have hosted an array of cultures throughout the millennium. Today, large-scale mining interests and agriculture based on extensive use of agrochemicals and single-crop cultivations are driving deforestation – impacting soil, aquatic and terrestrial life on these breath-taking mountains.

The forests here play a central role in water generation, through an ecologically delicate process in which lichen, in symbiosis with trees, absorbs rising condensation formed in the larger waterbodies of the wider valley rivers – gifting it back to the river streams through soil filtration. Here, there is a sensitive and rigorous interdependence between forest connectivity, water access and the agricultural systems that sustain local livelihoods.



*Image: River condensation intermingling with humid tropical forests on Andean hillsides.
Photo: Mauricio Granados. Fotógrafo de Naturaleza*

In the municipality of Támesis, Colombia, engaged organisations, farmers, civic movements and other locals are providing unique responses to modern challenges facing life in the western *cordillera* of the tropical Andes. For local movements, expanding regenerative agriculture is both a means of consciously steering the development of their home – as well as a form of territorial defence. Maintaining a social and economic relevance of agriculture combined with nature restoration and turning the narrative of capital to reflect the wealth of healthy ecosystems, is a strategy to keep the territory inhabitable with its cultural history and ecological resources intact.

In agricultural practice, the base of regeneration is soil health. Soil health-enhancing practices include covering soils to protect them from hard sun and heavy rain; growing with biodiversity to increase the ecosystems' resilience; and minimising disturbance to soils – eliminating agrochemical use to grow a community of microorganisms which mobilise and distribute the nutrients already available below the surface. That might sound straightforward to implement. But the truth is that agricultural transitions are very complex phenomenon. With structural and cultural lock-ins that favour monocultural and agrochemical farming, regenerative transitions face a lot of barriers – while also showing remarkable possibilities.

Within Támesis, interviews with transitioning farmers, local organisations, citizen movements, women's collectives and indigenous representatives from neighbouring communities provide contextual background and empirical data for studying these possibilities and barriers. This data shows that Támesis contains fascinating conditions for regenerative transitions – biophysical richness, community infrastructure around regenerative networks, and a territorial identity anchored in the wealth of ecosystems. Yet, the reinforcing mechanisms of the conventional paradigm are firmly established, structurally embedded and actively shaping the lived experience of what it means to be a farmer for most people working the land. Regenerative transitioners make up a small minority, to a great extent sustained by internal motivation, testifying to little external incentives. Even more so, prevalent knowledge gaps and low visibility of regenerative alternatives directly impact whether transitioning is adjacent at all, from where most farmers within the territory stand.

This is an expression of forces upholding conventional practices globally. Yet, as the need for fundamental changes in food production systems become increasingly obvious and pressing – with rising prices for agrochemicals, adverse health effects from their usage, and changing climatic patterns placing single-crop cultivations in a very vulnerable state – there are increasing opportunities for new attractors to form alternative paradigms.

“When they see that you are profitable – producing coffee, plantain, cassava, just through pruning and incorporating microbial broths and energy, all of it from within the same farm, not buying anything, not spending money, and still generating income – they say 'that is possible.' Once they see it actually generates results, that's when they transition.” (Transitioning coffee- and livestock farmer, Támesis)

In Támesis, some farmers are choosing to transition to regenerative practices to achieve greater independence in their production and income; others are choosing to transition for the health of themselves, their families and future generations. Yet, a remarkable finding from this territory is that while a variety of attractors

served to initiate transition journeys, the main mechanism reinforcing the new practices was an experience of the ecosystem responding to care – of ecological reciprocity.

"On my father's farm, the return of so many birds after planting more trees, and how we started to care for a spring that was there and the water increased. Those small joys motivate you daily to keep doing this." (Transitioning coffee farmer, Támesis)

To work within the strategic landscape of agricultural transitions in Támesis, different nudges can help steer the direction and development of the territory towards regeneration. Empowering the farmers who are early to adopt soil health-enhancing practices could increase visibility of regenerative alternatives and open new incentivising markets for the territory. Focusing on what practices are most available to which farmer, and designing gradual, context-adapted transitions can help farmers to avoid drastic and disheartening production drops. Retrieving knowledge – the memories of the *abuelos*' food forest before the introduction of single-crop cultivations in the 1960s – is another creative pathway to stir embodied interest, for remembrance of cultivating food in alignment with nature's rhythms, rather than against them.

In Támesis, civic action coordinated by local movements contributed to a formal archiving of the environmental license for a priority mining site in 2021. Yet, the mining titles – heavily critiqued for their territorially socially and environmentally detached acquisition process – are still active. The territory – like many others in the tropical Andean *cordillera* – is vulnerable to political shifts. Regeneration offers an alternative path of development – one characterised by soil health and human-nature relationships that are more aligned with ecological processes.

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