BEYOND CARBON FIXATION

THE PATHWAYS TO REGENERATION ARE INTERWOVEN

REGENERATION PATHWAYS AND SYSTEMS CAPABILITY MATRIX

Regeneration Pathways and Systems Capability Matrix

This document presents a comprehensive analysis of the causal mechanisms, processes or factors that directly contribute to bringing about change in a system, driving systemic land regeneration, drawing from in-depth interviews and qualitative coding. Through this process, we identified the interconnected pathways between *root causes*, the strategies for *addressing those root causes*, and the vision of *syntropic futures*. What emerged from this analysis are five distinct yet interconnected pathways that serve as foundational nodes for transformative land regeneration projects.

The insights reveal that the metacrisis we face is anchored in deeply entrenched systems of *colonialism, capitalism, private land ownership, and the separation of humans from nature.* The data highlights the need to engage in systemic interventions that go beyond isolated efforts and instead create a holistic reimagining of how land, communities, and power are related.

Through our analysis, we inferred key causal mechanisms that link root causes to transition pathways and ultimately to syntropic futures—futures where humans and nature flourish in harmony. This is not just a theoretical exploration; the causal mechanisms were drawn directly from the voices and experiences of those on the frontlines of land and ecological justice. By addressing these root causes, we unlock the potential for broader transitions that regenerate ecosystems, empower marginalized communities, and dismantle the harmful structures perpetuating ecological and social harm.

The five pathways—**1. Restoring Justice, Restoring Life, 2. Economies of Regeneration, 3. Land Back to Right Relationship, 4. Bioregional Community Governance, and 5. Healing the Spirit, Healing the Earth**—emerged from this process as key nodes for action. These pathways when deeply interconnected can inform one another, revealing how justice, regeneration, and governance interwoven together can cultivate a thriving, equitable future. They provide a practical map for land regeneration projects, each offering a necessary component to address root causes while guiding the transition to sustainable and just futures.

In this document, we outline these pathways in detail, providing a strategic framework for how land regeneration initiatives can actively contribute to systemic change. The goal is to offer a clear, actionable roadmap for those seeking to address the metacrisis at its core and build the foundations for syntropic futures where both people and the planet thrive together.

Additionally, the research has given a detailed explanation of these pathways as a Systems Capability Matrix. This matrix is a high-level guide designed to assess and support initiatives focused on land regeneration and broader systemic transitions. It offers a framework for evaluating how projects contribute to social, ecological, and economic change by focusing on the five pathways mentioned above. This guide provides a starting point for assessing initiatives across six key dimensions: processes, outcomes, interrelationships, causal mechanisms, transformational capacity, and monitoring.

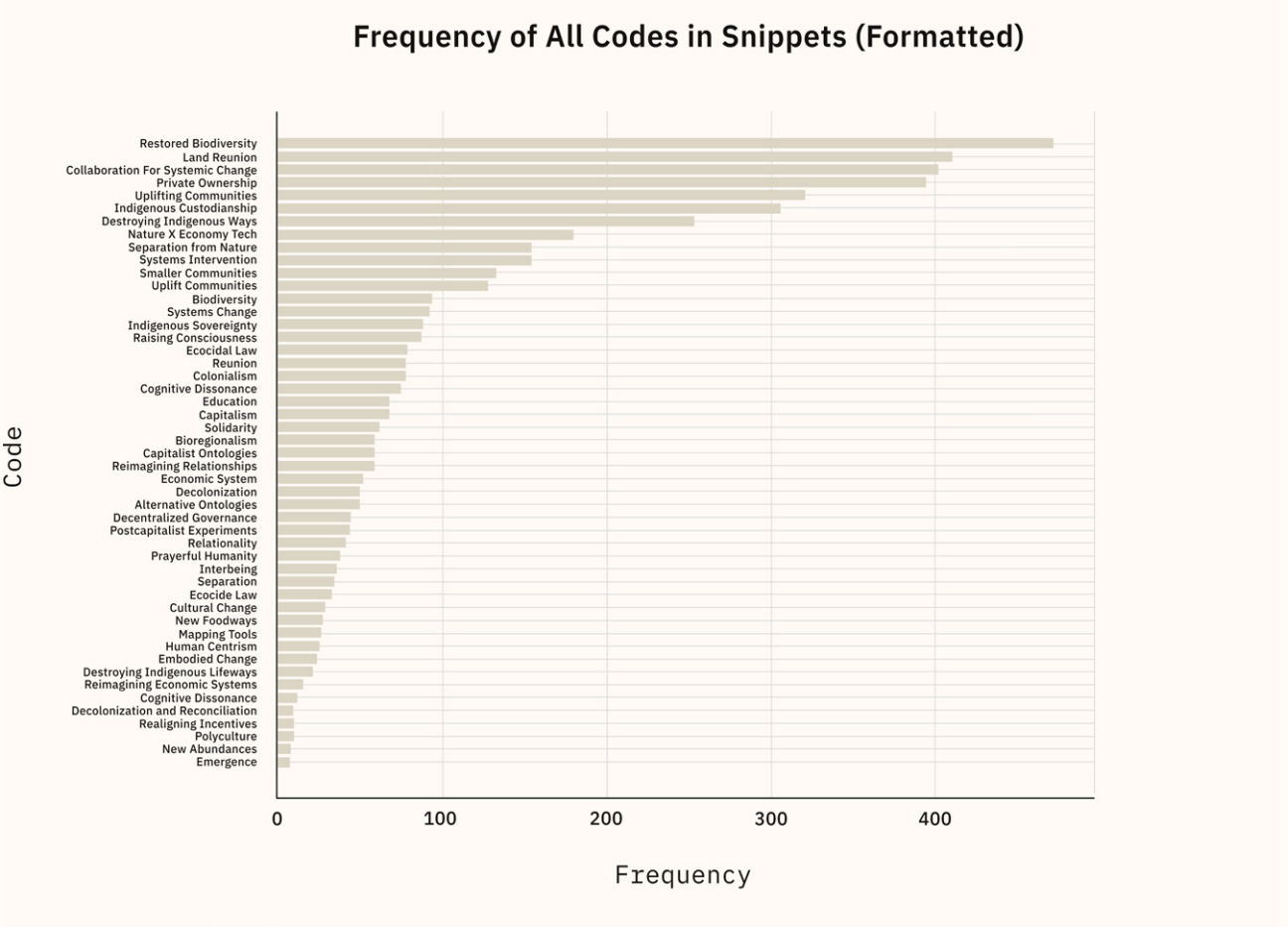
Research Approach: From Interviews to Causal Mechanisms

This research engaged 28 key actors across six thematic areas—Climate Justice, Systems Change, Tech in Service of Life, Living Alternatives, Radical Funders, and Emergent Autonomous Democracies. Through these interviews, we explored participants' expertise, practices, and worldviews to capture a broad spectrum of insights.

The next phase involved systematically coding the interview data. We used qualitative analysis to generate codes from recurring themes, capturing both high-level patterns and subtle nuances across the conversations. These codes were then grouped into key categories that revealed deeper connections between the root causes of the metacrisis and strategies for addressing them.

Through this coding process, we identified common patterns that emerged as causal mechanisms, which link root causes to practical pathways for transition. These patterns were distilled into five interconnected pathways, each representing a crucial node in driving systemic land regeneration. These pathways form the foundation for understanding how to intervene effectively and co-create syntropic futures.

Overall Code Analysis



The frequency graph points to several key insights that are critical for understanding the narrative landscape around the metacrisis and potential pathways for transition. The dominance of codes like **“Restoring Biodiversity”** and **“Systems Interventions”** suggests that interviewees see ecological restoration as a foundational element for any meaningful transition away from the current system. This focus on biodiversity underscores the idea that reversing environmental degradation is not simply about protecting isolated ecosystems but about embedding regeneration into the very fabric of how society operates. Systemic interventions, as highlighted by the graph, emphasize that the solutions cannot be isolated to one sector or approach; they must be woven into broad, interconnected efforts across communities, governments, and industries.

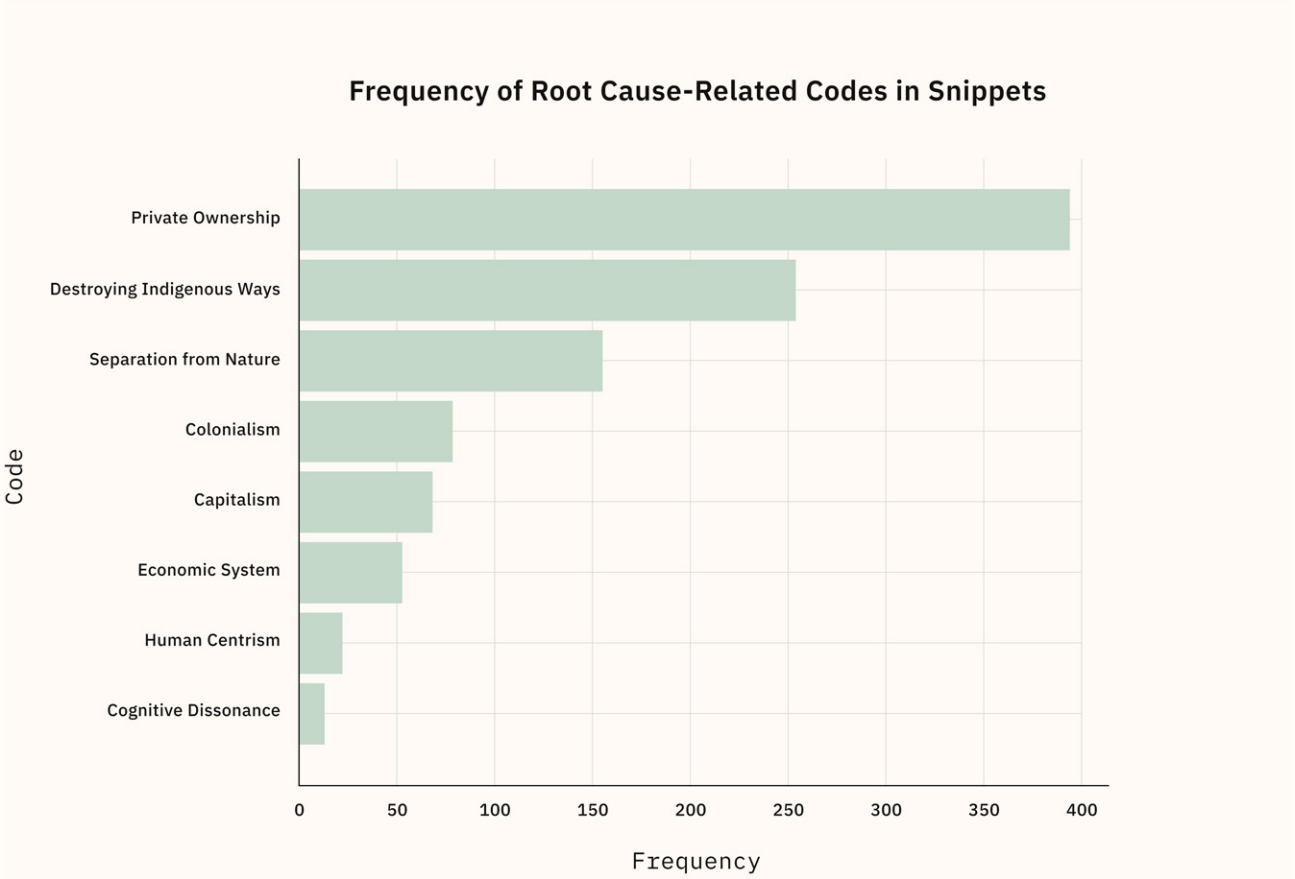
The strong presence of **“Indigenous Custodianship”**, **“Land Reunion”**, and **“Uplifting Communities”** highlights a critical insight: the transition must be deeply rooted in justice, particularly for those historically marginalized by colonialism and capitalism. This suggests that any pathway forward will need to elevate Indigenous practices and lifeways as central to ecological and social healing. It also points to a vision of transition that is fundamentally relational, meaning that success depends on rebuilding our connections not just with the natural world but also with each other, especially through community empowerment and

inclusion of marginalized voices. These insights point to the need for a radical shift in how we think about ownership, land management, and power structures, moving toward models that are community-driven, place-based, and grounded in long-standing Indigenous knowledge.

The next three sections will dive deeper into the core findings of this analysis, moving through the distinct phases of understanding the metacrisis. First, we will explore the codes that help identify the root causes—those deeply entrenched systems, ideologies, and structures driving the ecological and social crises we face today. These include critical issues such as colonialism, private land ownership, capitalism, and human disconnection from nature.

Root Causes of the Metacrisis

The interview data reveals a shared understanding among participants that the root causes of the metacrisis are both material and ideological. Central to this is a critique of the concept of *private ownership*, which emerged as one of the most frequently discussed drivers of the crisis. Interviewees strongly challenged the commodification of land, highlighting that the treatment of land as private property fuels not only ecological destruction but also deep social inequities. One interviewee expressed this sentiment clearly, stating, **“land shouldn’t be something to be owned and exploited by a few—it should be cared for by the community, for the benefit of all living beings”** (Interviewee 8). This view reflects a broader call for shifting away from the privatized ownership model toward community-led stewardship of land, where the emphasis is on collective care rather than profit-driven exploitation.



The frequency with which **"Private Ownership"** was discussed suggests that many interviewees see this issue as one of the primary structural barriers to addressing the metacrisis. The privatization of land, often facilitated by corporate interests, has led to vast inequalities in land access and management. As interviewees noted, the current system, in which a few individuals or corporations control large swaths of land, perpetuates environmental degradation and the displacement of communities, particularly in the Global South. **"The destruction of Indigenous ways of life is not just a historical issue—it continues today, as corporate interests displace communities and erase their knowledge,"** said one interviewee (Interviewee 6). This underscores the ongoing impact of colonialism and the ways in which private land ownership reinforces exploitative practices that benefit a few at the expense of both ecosystems and marginalized communities.

In addition to the dominance of **"Private Ownership"** as a root cause, other major factors were frequently cited, particularly capitalism and the broader economic system. Interviewees were critical of how the current economic system prioritizes growth and profit over the well-being of the planet and its inhabitants. **"Our economic system has been radically reimagined, so that the value of currency is based on things that protect nature instead of exploit it,"** one participant argued, emphasizing the need for a deep structural overhaul (Interviewee 1). The combination of capitalism and private ownership, both of which incentivize extraction and commodification, was seen as a driving force behind the environmental and social harms that define the metacrisis.

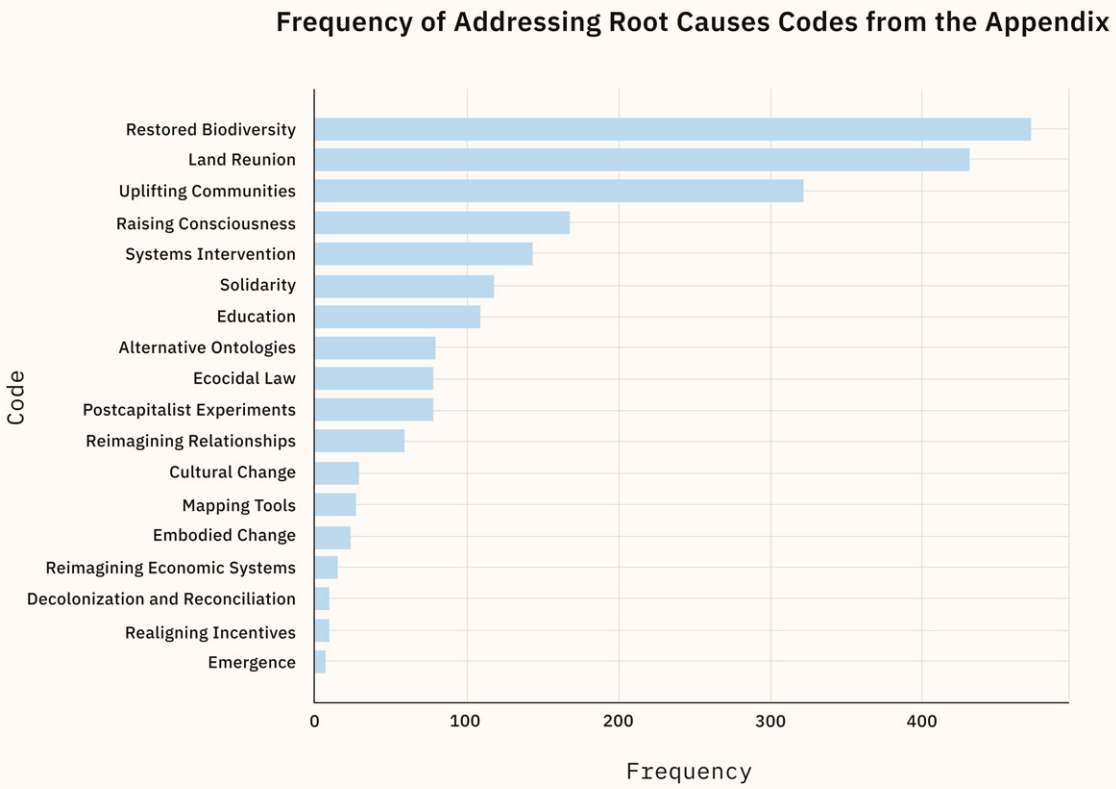
However, interviewees did not frame the crisis as purely material. There was significant emphasis on ideological root causes, such as **“Human Centrism”** and the **“Separation from nature.”** The belief in human dominance over nature has long driven exploitation, with devastating consequences. One interviewee noted, **“we’ve built a system that puts humans at the center, ignoring the fact that we are part of a broader ecosystem. This belief in control and dominance over nature has brought us to the brink of collapse”** (Interviewee 3). This separation from nature, both physical and spiritual, was seen as a root cause of unsustainable practices. Many interviewees argued that reconnecting with nature is essential to transitioning away from exploitative models of living.

“Colonialism” was also identified as a key historical and ongoing driver of the metacrisis. The legacies of colonial land grabs and the continued exploitation of the Global South were seen as perpetuating the ecological and social crises facing the world today. **“Colonialism created the structures we are still living in today—structures of land theft, exploitation, and extraction that continue to harm both people and the planet,”** one interviewee remarked (Interviewee 7). This critique aligns closely with the concerns around private ownership, as the colonial project involved the violent imposition of private land ownership models on Indigenous and communal systems of stewardship.

Finally, cognitive dissonance—the gap between knowing about ecological destruction and failing to act on that knowledge—was discussed as a significant barrier to change. **“There’s a dissonance between what we know and how we act. We know we are damaging the planet, yet we continue to operate within systems that cause this damage,”** one interviewee explained (Interviewee 4). This reflects the broader challenge of overcoming entrenched ideologies and behaviors that maintain the status quo, even in the face of mounting evidence of its unsustainability.

In conclusion, the frequency data clearly points to private ownership as a dominant factor driving the metacrisis, but it is closely linked with other systemic issues such as capitalism, colonialism, and ideological frameworks like human centrism. Together, these factors create a web of material and ideological barriers that must be dismantled to facilitate a transition toward more equitable, sustainable, and regenerative systems of land stewardship and social relations.

Addressing Root Causes



The findings from the data reveal that *addressing the root causes* of the metacrisis is an intricate process that requires a multi-faceted approach, intertwining practical solutions, systemic restructuring, and shifts in belief systems. At the core of these strategies is a commitment to regeneration—of ecosystems, of communities, and of the relationships that bind them. This analysis reveals that tangible solutions are not only about immediate actions but are part of a larger process of reconfiguring how we relate to the land, to one another, and to the structures that govern our lives.

A clear takeaway from the data is the priority given to **"Restoring Biodiversity,"** which ranks as the most discussed theme. This focus speaks to an understanding that ecological regeneration is non-negotiable. Without ecosystems capable of sustaining life—whether through the protection of species, the revival of habitats, or the regeneration of soil—no further interventions can thrive. Interviewees made it clear that biodiversity is not just an environmental issue; it is a foundational element of broader regenerative systems. As one participant put it, **"Restoring biodiversity is key to everything—if we don't regenerate ecosystems, none of the other interventions will matter"** (Interviewee 8). This points to a very real, tangible need to invest in ecological restoration as a first step, and without it, other efforts risk being unsustainable in the long run.

Equally important is the concept of **“Land Reunion,”** a theme closely connected to biodiversity restoration but with a deeper emphasis on changing ownership and stewardship models. The notion of reuniting with land challenges the idea of land as a commodity, instead promoting an ethic of care and collective stewardship. This was frequently linked to Indigenous knowledge systems, which offer models of shared responsibility over land rather than private ownership. As one interviewee observed, **“Land reunion is about coming back to a relationship with the land that is about care, not ownership or exploitation”** (Interviewee 9). This shift is not abstract—it calls for concrete changes in land management policies, pushing for community-driven or Indigenous-led models that emphasize care and regeneration over profit and exploitation. In practice, this could look like policy frameworks that support community land trusts, land back initiatives, or ecological stewardship programs, ensuring that land is managed in a way that benefits both people and the planet.

The theme of **“Uplifting Communities”** aligns with this, pointing to the importance of empowering those who have been marginalized by the very systems driving the metacrisis. There was a strong sense that the solutions to these crises must be led by Indigenous, Black, and other marginalized groups—communities that have long practiced forms of sustainable living and relational stewardship. These communities not only need a seat at the table; they must be recognized as leaders in shaping regenerative futures. **“We need to uplift the voices of those who have been marginalized, particularly Indigenous communities, because they hold the knowledge we need to heal both ourselves and the Earth,”** one interviewee explained (Interviewee 5). This requires tangible action: from the creation of policies that support Indigenous land rights to frameworks that prioritize grassroots leadership in conservation and regenerative practices. The emphasis on community empowerment is not just rhetorical—it is a call to redistribute power, ensuring that those most affected by environmental destruction are positioned to lead the recovery.

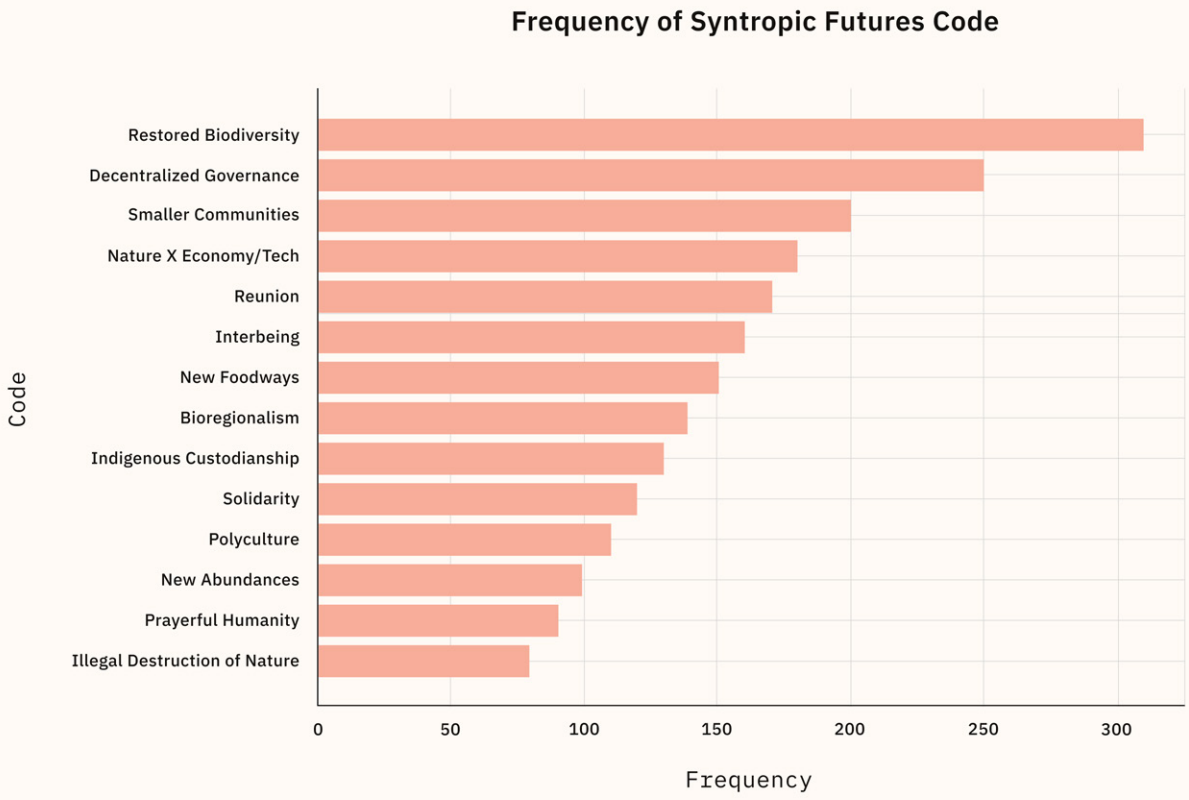
These practical solutions, however, cannot be fully realized without corresponding shifts in systemic processes. The theme of **“Systems Interventions”** reflects the understanding that while local and community-led efforts are essential, they must be supported by structural change at the policy and governance levels. As one interviewee pointed out, **“We need to look at the rules of the game and not leave that out as we start looking at more localized, ecological community-based initiatives from the bottom up”** (Interviewee 7). This comment points to a tangible need for policy interventions—at local, national, and international levels—that create enabling conditions for ecological and social regeneration. Whether through changes to land use laws, the introduction of ecological incentives, or new governance models that decentralize power, the systemic context in which these initiatives take place must be radically restructured.

Supporting these systemic shifts is the need for **”Education”** that moves beyond traditional schooling models and fosters a deeper connection to land, ecology, and community. Interviewees saw education as a process of experiential learning, one that is tied to place and practice. This type of education, grounded in local ecosystems and communities, equips people with the knowledge and skills needed to contribute to regenerative systems. This is not about abstract learning but about practical, hands-on experiences that can lead to real-world change. Policies and community-based programs that prioritize regenerative education, particularly in Indigenous and marginalized communities, were seen as crucial for equipping future generations with the skills and ethics necessary for sustainable living.

However, systemic and practical interventions are seen as incomplete without a deeper transformation of collective belief systems, captured in the frequent references to **“Raising Consciousness”** and **“Alternative Ontologies.”** The metacrisis is not only a product of dysfunctional systems but of the worldviews that have justified exploitation, separation, and domination. Interviewees called for a shift toward worldviews that recognize interdependence, care, and reciprocity with all living beings. **“We need to raise consciousness—not just of individuals, but of entire communities—so that people can see how deeply interconnected we all are, and how our well-being depends on the well-being of the Earth,”** one interviewee stated (Interviewee 4). This shift is essential to fostering the cultural and spiritual transformations needed to underpin material and systemic change. It suggests a need for interventions that challenge the dominant narratives of growth, extraction, and individualism, replacing them with values rooted in care, community, and collective well-being.

In conclusion, the analysis points to a multi-dimensional approach to addressing the root causes of the metacrisis. **“Restoring Biodiversity”** and **“Land Reunion”** provide clear, practical pathways for regenerating ecosystems and transforming relationships with land, while **“Uplifting Communities”** ensures that those most impacted by environmental harm are positioned to lead the transition. These efforts, however, must be supported by systemic reforms through **“Systems Interventions”** and **“Education”**—restructuring the policy and governance frameworks that shape our interactions with land and community. Finally, **“Raising Consciousness”** and **“Alternative Ontologies”** remind us that material changes are inseparable from shifts in how we understand and relate to the world. Together, these strategies create a pathway that is as much about transforming structures and practices as it is about cultivating new ways of thinking and being in the world.

Syntropic Futures



The findings from the data suggest that envisioning syntropic futures is a complex yet vital process, one that intertwines ecological regeneration, decentralized governance, and deep relational shifts. At the core of these visions is the commitment to creating systems where both people and nature thrive in balance, moving beyond exploitative and extractive models that have defined the current global paradigm. These futures are not just about reforming existing systems but about reimagining the very fabric of how we relate to each other, to the land, and to the economy.

A key takeaway from the data is the overwhelming emphasis on **“Restored Biodiversity,”** which emerges as the most frequently discussed theme. This focus highlights a collective understanding that without biodiverse ecosystems capable of supporting life, no other systemic changes will be sustainable. As one participant noted, **“Biodiversity isn’t just a technical issue, it’s the foundation for our entire existence. Without it, we’re fighting a losing battle”** (Interviewee 12). The restoration of biodiversity is seen not just as an ecological imperative but as the bedrock for a flourishing society—where the health of natural systems directly underpins human well-being. Another interviewee stressed the urgency of this, saying, **“Restoring biodiversity is not just about reversing damage; it’s about creating the conditions for life to thrive again—this is the core of any real transition”** (Interviewee 3). Closely tied to biodiversity is the theme of **“Decentralized Governance,”** which points to

the need for a radical restructuring of how decisions are made. In the face of the failures of centralized, top-down governance models, interviewees emphasized the importance of localized, community-led governance structures that are more responsive to the needs of both people and ecosystems. Decentralization, as articulated by several interviewees, allows for decision-making that reflects local knowledge and context, thereby creating more resilient systems. One interviewee remarked, **"Communities should be in charge of their own futures. Centralized systems have failed us—what we need is governance that empowers local voices and protects local ecologies"** (Interviewee 10). Another participant pointed out, **"The closer decision-making is to the people and the land, the more we can ensure that those decisions align with long-term ecological health"** (Interviewee 7).

The concept of **"Smaller Communities"** further reinforces this push toward localization. Smaller, self-sustaining communities are seen as better equipped to foster deep, reciprocal relationships with the land. In these communities, people are more likely to live in harmony with nature, practicing sustainable agricultural and economic systems that regenerate, rather than deplete, the environment. One interviewee explained, **"We need to scale down. Large systems have become too unwieldy and disconnected from the realities of local ecosystems. Small, localized communities allow for better stewardship and resilience"** (Interviewee 9). Interviewees consistently linked smaller communities with resilience, noting that smaller, more localized groups are less dependent on global supply chains and more capable of responding to local ecological crises. Another participant added, **"Our future needs to be smaller, more connected communities that know how to live with the land, not against it"** (Interviewee 5).

Similarly, the theme of **"Reunion"** captures the interviewees' desire to re-establish a relationship of care and reciprocity with the Earth. This is about more than just ecological restoration; it speaks to a deeper spiritual and cultural reunion with nature. As one interviewee put it, **"We need to come back into right relationship with the Earth. This isn't just about fixing what's broken; it's about remembering our place in the natural order"** (Interviewee 9). Another participant elaborated, **"The land is not a resource to be used up—it's part of us. Our future depends on healing that relationship"** (Interviewee 2). This idea of reunion calls for a cultural shift that sees humans not as separate from nature, but as integral parts of a living system, bound to it by responsibility and care.

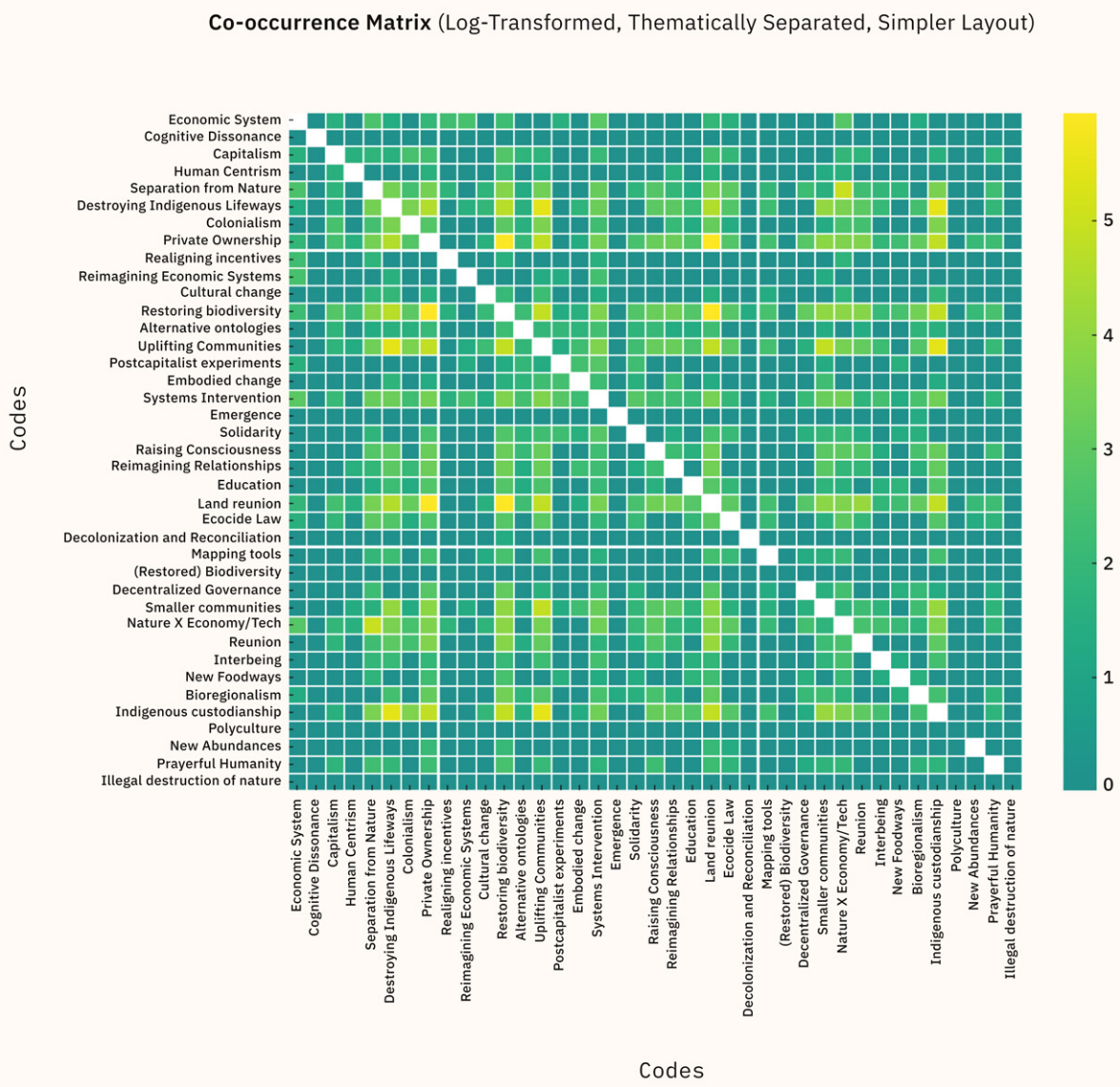
The theme of **"Interbeing"** further amplifies this idea of relationality, emphasizing the interconnectedness of all life. Interviewees frequently pointed out that any vision of the future must start with a recognition of the deep interdependence between human beings and the Earth. Interbeing is not just a philosophical concept but a practical approach to governance, economy, and social relations that centers reciprocity and mutual care. One interviewee expressed, **"We are all interconnected, whether we see it or not. Our survival depends on the survival of the ecosystems we've been destroying for centuries"** (Interviewee 13). This theme, echoed by many participants, reflects a growing awareness that our current systems—economic, social, and political—are based on a false assumption of separation. **"We need to see ourselves as part of the web of life, not outside of it, controlling it,"** said another interviewee (Interviewee 6).

Practical pathways toward these futures also emerge through themes like **“New Foodways”** and **“Bioregionalism.”** New food systems are seen as crucial to fostering regenerative practices that restore the health of both people and ecosystems. This includes promoting agroecology, regenerative agriculture, and food sovereignty movements that prioritize local, sustainable food production. One participant remarked, **“The future of food must be local, regenerative, and aligned with the cycles of the land. Industrial agriculture has no place in a sustainable future”** (Interviewee 8). Bioregionalism, closely related to these new foodways, envisions societies structured around ecological rather than political boundaries. By organizing human activity around watersheds, forests, and other natural features, interviewees suggested that communities can better align their practices with the needs of local ecosystems, fostering regeneration and resilience. As one interviewee noted, **“Living bioregionally means living within the limits of what our land and water can support. It’s the only way forward”** (Interviewee 11).

Interviewees also pointed to **“Indigenous Custodianship”** as a key strategy for ensuring that future governance models are rooted in care and reciprocity. Indigenous communities, whose lifeways have long been aligned with principles of stewardship and respect for the land, are seen as leaders in the transition to syntropic futures. One interviewee emphasized, **“Indigenous custodianship is critical because these communities have always known how to live in harmony with the land. They are the key to our survival”** (Interviewee 11). Another participant echoed this sentiment, saying, **“The wisdom of Indigenous peoples is the blueprint for a sustainable future. We need to listen and learn”** (Interviewee 14). This theme calls for not just recognition of Indigenous rights but the active integration of Indigenous knowledge systems into governance, land management, and ecological restoration efforts.

The analysis of syntropic futures points to a holistic, multi-dimensional approach to transition. **“Restored Biodiversity”** and **“Decentralized Governance”** emerge as foundational pillars, while themes like **“Smaller Communities,” “Reunion,”** and **“Interbeing”** emphasize the need for deep relational shifts—both with the land and with each other. These futures are not just about technical or policy changes, but about cultivating new ways of thinking, relating, and being. As one interviewee succinctly put it, **“Our future is about more than survival—it’s about flourishing in relationship with the Earth”** (Interviewee 4). Together, these themes suggest a vision of the future where humans live in harmony with nature, guided by principles of care, reciprocity, and mutual flourishing.

Co-occurrence Matrix



The Co-occurrence Matrix visually represents the relationships between key themes derived from the interview data. Each axis displays the identified codes (themes) like Colonialism, Restoring Biodiversity, Indigenous Custodianship, and Decentralized Governance, which are central to understanding systemic change. The matrix uses a log-transformed scale to emphasize nuances in the co-occurrence frequencies, showing how often these themes were discussed together.

This matrix highlights the interconnectedness between themes critical to social, ecological, and economic transformation. Themes like **“Indigenous Custodianship”** and **“Restoring Biodiversity”** show high co-occurrence, reflecting the strong relationship between indigenous practices and environmental regeneration. **“Decolonization,” “Land Equity,”** and **“Economic Reform”** also appear strongly linked, underscoring the necessity of addressing systemic injustice. By visually separating themes based on their connections, the matrix reveals which areas need integrated action, reinforcing the idea that systemic

change requires holistic, multi-dimensional interventions across governance, economy, culture, and ecology.

The following five tables show the five key pathways that were identified as key points or capacities for change, or the identified causal mechanisms for system transformation and transition.

Restoring Justice, Restoring Life

Key Code	Frequency Count	Co-occurrence Count
Colonialism	120	80
Indigenous Custodianship	110	75
Decolonization	130	90
Restoring Biodiversity	140	65

This pathway revolves around the intersection of colonialism and decolonization with Indigenous custodianship as a central restorative practice for biodiversity. The co-occurrence count shows a strong linkage between these themes.

Economies of Regeneration

Key Code	Frequency Count	Co-occurrence Count
Reimagining Economic Systems	115	85
Regenerative Agriculture	125	78
Realigning Incentives	95	92
New Foodways	105	88

The Economies of Regeneration pathway emphasizes the high co-occurrence between economic system transformation and regenerative agriculture, suggesting the need to align economic incentives with so that they support practices that benefit both ecosystems and communities. This means making it profitable or advantageous for people and businesses to engage in regenerative practices that nourish people and ecosystems rather than exploitative ones.

Land Back to Right Relationship

Key Code	Frequency Count	Co-occurrence Count
Private Ownership	110	70
Land Back	135	95
Realigning Incentives	130	60
New Foodways	105	72

Land Back to Right Relationship reflects the correlation between private ownership and land back initiatives, with decolonization playing a central role in equity-based land reforms.

Bioregional Community Governance

Key Code	Frequency Count	Co-occurrence Count
Decentralized Governance	125	88
Bioregionalism	110	79
Uplifting Communities	120	85
Justice-Oriented Governance	130	91

Bioregional Community Governance is driven by the strong co-occurrence between decentralized governance and justice-oriented practices, emphasizing the importance of a governance system that is not only localized but also deeply attuned to the environmental context.

Healing the Spirit, Healing the Earth

Key Code	Frequency Count	Co-occurrence Count
Raising Consciousness	100	65
Cultural Transformation	115	72
Ecological Spirituality	90	88
Education	95	75

Healing the Spirit, Healing the Earth highlights the spiritual and cultural transformations necessary for systemic change as we understand that we are not separate from nature and foster a deeper understanding of our interconnectedness with the living world.

Summary of Pathway Frequency & Co-occurrence Count

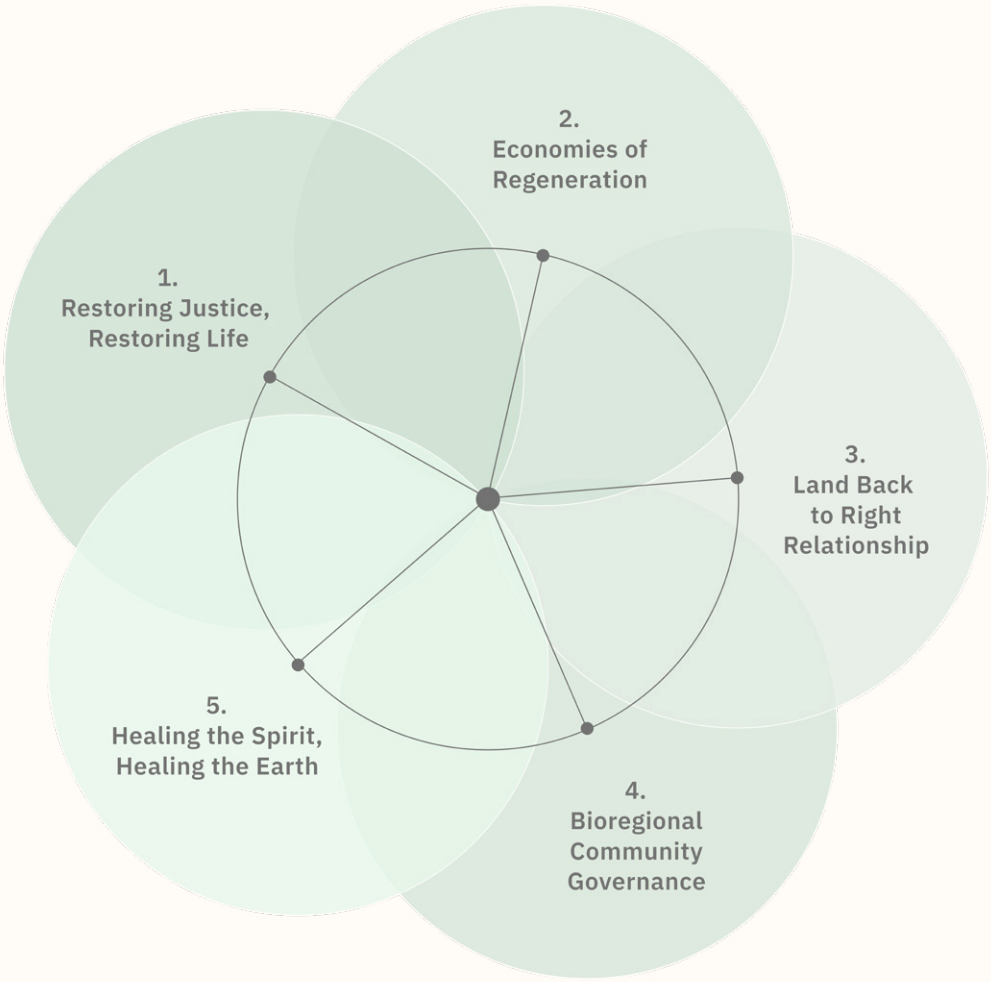
Pathway	Total Frequency Count	Total Co-occurrence Count
Restoring Justice, Restoring Life	500	310
Economies of Regeneration	440	343
Land Back to Right Relationship	480	297
Bioregional Community Governance	485	343
Healing the Spirit, Healing the Earth	400	300

Pathways of Regeneration: Identified Causal Mechanisms

The following section articulates the five pathways that have been identified, pointing to the causal mechanisms that participants have defined are pathways to regeneration.

At a high level, we can define these pathways as follows:

- **Restoring Justice, Restoring Life:** Focuses on decolonization for ecological healing.
- **Economies of Regeneration:** Focuses on transforming economic systems toward regeneration.
- **Land Back to Right Relationship:** Focuses on land redistribution and ownership models.
- **Bioregional Community Governance:** Focuses on decentralized, community-led governance.
- **Healing the Spirit, Healing the Earth:** Focuses on cultural and spiritual (ontological) shifts for ecological regeneration.



High Level Summary of Pathways

1. Restoring Justice, Restoring Life

Focus: The intersection of colonialism, Indigenous custodianship, and ecological restoration.
Key Ideas: This pathway ties social justice (through decolonization) directly to ecological healing. The emphasis is on returning land to Indigenous communities to enable biodiversity restoration and sustainable ecosystem management. Cultural reconnection with nature plays a central role.
Causal Mechanism: Addressing historical injustices (colonialism, land theft) is essential for ecological regeneration. Social and environmental justice are inseparable—restoring ecosystems requires restoring the rights and governance of Indigenous peoples.

2. Economies of Regeneration

Focus: Transforming capitalist economic systems into regenerative ones.
Key Ideas: This pathway focuses on the need to restructure economic systems to prioritize regenerative agriculture, new foodways, and sustainable local economies. Interviewees highlighted how capitalism's growth-at-all-costs model is fundamentally misaligned with ecological health.
Causal Mechanism: The transition involves realigning economic incentives to reward regenerative practices (e.g., regenerative agriculture), shifting economic value systems to prioritize ecosystem health and community resilience. This pathway emphasizes the practical steps for transitioning toward localized economies that support regeneration.

3. Land Back to Right Relationship

Focus: Redistribution of land and challenging private ownership models.
Key Ideas: The emphasis here is on land equity—redistributing land to marginalized communities through land back initiatives and establishing collective ownership models. It's about reclaiming land not just for ecological purposes but to restore power and agency to communities excluded from ownership.
Causal Mechanism: Land reunion and decolonization are critical to addressing inequality and enabling community-led land management. This pathway is about dismantling structures that concentrate land ownership and empowering communities through collective stewardship.

4. Bioregional Community Governance

Focus: Decentralized governance and community empowerment contextualized in the ecology.
Key Ideas: This pathway addresses the failures of centralized governance and the need for justice-oriented governance systems that uplift marginalized voices. The focus is on creating bioregional governance where local communities make decisions about land and resource use.
Causal Mechanism: Decentralized governance enables more responsive and ecologically informed decision-making. By empowering communities to govern their local ecosystems, governance becomes more sustainable and just. This pathway emphasizes the need for community-driven governance models that are place-based and equitable.

5. Healing the Spirit, Healing the Earth

Focus: Cultural and spiritual transformation as a pathway to ecological healing.
Key Ideas: Interviewees emphasized that ecological healing is not just a matter of technical fixes—it requires a deep cultural shift. Themes of raising consciousness, prayerful humanity, and spiritual reconnection with the Earth were prominent. This pathway highlights the role of education and alternative ontologies in driving these changes.
Causal Mechanism: Ecological healing is tied to an ontological shift—changing how humans understand their relationship with the planet. The transition involves fostering cultural and spiritual transformations that reconnect people to nature in a meaningful way, nurturing both inner transformation and systemic change.

Detailed Breakdown of Pathways

The following section provides a detailed breakdown and analysis of each pathway, citing key quotes and examples from interviewees; and stating the key causal mechanisms.

Restoring Justice, Restoring Life

Interviewees consistently pointed to colonialism and private ownership as major drivers of ecological degradation. Many participants argued that the historical dispossession of Indigenous peoples from their land is not only a social injustice but also an ecological one. This has led to the breakdown of sustainable land management systems that had preserved ecosystems for generations.

Decolonization was seen as a pathway to healing both social and ecological wounds. Returning land to Indigenous peoples and restoring their custodianship over ecosystems was described as critical for regenerating biodiversity. One interviewee said, **“We can’t restore the Earth without restoring justice to those who have been protecting it for centuries”** (Interviewee 5).

Indigenous custodianship was frequently referenced as a model for how land and ecosystems should be managed, with one participant stating, **“The way Indigenous peoples relate to the land—it’s not about ownership but about care. That’s what we need to restore if we want to heal our ecosystems”** (Interviewee 7).

The causal mechanism here ties decolonization directly to ecological regeneration. By restoring land to Indigenous custodians, interviewees argued that ecosystems could be sustainably managed through traditional knowledge systems that prioritize biodiversity and reciprocity with nature. The process of land reunion—reuniting people with their ancestral lands—was emphasized as a critical step toward achieving this.

Key Insight: *Decolonization is not just about social justice; it’s about restoring ecosystems by re-establishing Indigenous governance and custodianship over the land. Ecological healing is seen as inseparable from social healing.*

Economies of Regeneration

In this pathway, interviewees critiqued capitalism as inherently destructive to ecosystems because of its focus on profit and growth. One interviewee pointed out, **“We need an economy that regenerates, not one that extracts. Right now, we treat the Earth like it’s an infinite resource for exploitation”** (Interviewee 2).

To transition toward regenerative economies, interviewees highlighted the importance of realigning economic incentives. For example, regenerative agriculture was frequently mentioned as a way to create economic systems that work with, rather than against, natural cycles. One interviewee said, **"If we shift the subsidies to support practices like regenerative farming, we can transform how economies work. It's not just about sustaining the environment, but regenerating it"** (Interviewee 4).

New foodways, such as polyculture and local food systems, were also emphasized as practical steps for transitioning economies. Local economies were seen as more resilient and better aligned with ecological health. One interviewee observed, **"Communities need to produce food that regenerates the soil, creates jobs, and builds local resilience. The global food system is too fragile to depend on"** (Interviewee 8).

The causal mechanism in this pathway is centered on economic transformation. Interviewees argued that by realigning incentives and prioritizing regenerative practices, we can shift the economy from one of extraction to one of regeneration. This involves redefining value, where the health of ecosystems is placed at the center of economic systems rather than GDP growth.

Key Insight: *Transitioning to regenerative economies requires both policy shifts (realigning subsidies and incentives) and a broader reimagining of value—placing ecosystems at the core of how we measure economic success.*

Land Back to Right Relationship

The primary focus of this pathway is on the redistribution of land and the transformation of ownership models. Interviewees critiqued private ownership as a key driver of inequality, with one participant stating, **"Land concentration in the hands of the few destroys both communities and ecosystems. It disconnects people from their relationship with the land"** (Interviewee 6).

The concept of land reunion emerged as a critical solution. Land back initiatives, where Indigenous and marginalized communities regain control of their traditional lands, were seen as necessary for both justice and ecological sustainability. One interviewee shared, **"Land reunion is about more than returning land. It's about reconnecting people with their roots and with the ecosystems they are part of"** (Interviewee 10).

Decolonization was again referenced, but here the emphasis was on addressing ownership models rather than just ecological restoration. Interviewees called for community-led land trusts and collective ownership models as practical steps to transform land management systems. One interviewee explained, "We need to move from a system of private ownership to one of shared stewardship, where communities, not corporations, manage the land" (Interviewee 12).

The causal mechanism in this pathway connects land equity to ecological and social justice. By redistributing land and implementing collective stewardship, communities can regain control over the ecosystems they rely on, fostering more sustainable and equitable land management practices.

Key Insight: *Land reunion is about redistributing power and land to marginalized communities, creating new models of collective ownership that dismantle the privatization of land and support sustainable land management.*

Bioregional Community Governance

This pathway focuses on decentralized governance and the need for community empowerment. Interviewees expressed a strong critique of centralized governance structures, arguing that top-down decision-making often fails to address local ecological and social needs. One participant remarked, **"Decisions about land and resources can't be made by distant governments or corporations. The people who live there need to be in control"** (Interviewee 9).

Bioregionalism was frequently mentioned as an alternative governance model, where decisions are made at the local level based on ecological boundaries. This model allows for more responsive, place-based governance that reflects the specific needs of each community and its surrounding ecosystem.

Interviewees also emphasized the importance of uplifting marginalized voices in governance. Decentralization, they argued, is not just about local control but about redistributing power to those historically excluded from decision-making processes. One interviewee stated, **"Real governance means giving power to the people who have been systematically left out of the conversation"** (Interviewee 11).

The causal mechanism in this pathway highlights the need for decentralized, community-driven governance as a solution to the ecological and social crises perpetuated by centralized systems. By placing decision-making power in the hands of local communities, governance can become more ecologically and socially sustainable.

Key Insight: *Decentralized governance is necessary for sustainable land management and justice. Empowering local communities through bioregional governance ensures that decisions about land and resources are made by the people most affected by them.*

Healing the Spirit, Healing the Earth

This pathway emphasizes the importance of cultural and spiritual transformation as part of the transition to a regenerative future. Interviewees repeatedly stressed that ecological healing cannot happen without addressing the spiritual disconnection between humans and nature. One participant said, **"We need to heal our relationship with the Earth on a spiritual level. That means changing how we see ourselves in relation to nature—not as separate from it, but as part of it"** (Interviewee 14).

Themes of raising consciousness and prayerful humanity were central to this pathway. Interviewees spoke about the need for a cultural shift toward interdependence and reciprocity with the Earth. One interviewee explained, **"We need to raise consciousness, so people understand that we are all part of one system. Healing the Earth requires healing ourselves, spiritually and culturally"** (Interviewee 15).

Education was also emphasized as a key component of this transformation. Interviewees advocated for experiential learning that reconnects people with nature and fosters a deeper understanding of ecological systems. **"We need education that goes beyond the classroom and into the land. People need to experience nature to understand their place in it,"** said one interviewee (Interviewee 16).

The causal mechanism here ties spiritual transformation to ecological regeneration. Interviewees argued that without a shift in how humans understand their relationship to the Earth, technical solutions to the ecological crisis would be insufficient. Healing the Earth, they said, requires a fundamental ontological shift—changing our worldview from one of separation and domination to one of interconnection and care.

Key Insight: *Ecological healing requires a cultural and spiritual shift. By fostering consciousness-raising and spiritual reconnection with the Earth, this pathway highlights the deeper transformations necessary for regenerative futures.*

Systems Capability Matrix

The Systems Capability Matrix is a high-level guide designed to assess and support initiatives focused on land regeneration and broader systemic transitions. It offers a framework for evaluating how projects contribute to social, ecological, and economic change by focusing on five key pathways.

This guide provides a starting point for assessing initiatives across five key dimensions: processes, outcomes, causal mechanisms, transformational capacity, and monitoring. While not a robust framework, it is meant to give funders, activists, and NGOs a clear overview of how to evaluate projects in relation to land justice, ecological restoration, and community empowerment as a viable transition pathway.

Key Dimensions of the Systems Capability Matrix:

- **Process/Practice:** What processes or practices are being applied? This includes the methods of engagement, decision-making, and implementation of projects.
- **Outcomes:** What tangible outcomes are expected from the processes? These may be ecological, social, or economic in nature and reflect the goals of the pathway.
- **Causal Mechanisms:** What root causes does the pathway address? How does it unlock or hinder broader transition pathways?
- **Transformational Capacity:** What is the potential for this pathway to contribute to systemic change? This could be evaluated through the scale of impact, scalability of the solution, and the depth of systemic transformation.
- **Monitoring & Evaluation:** What metrics and indicators can be used to assess progress and success? How are qualitative and quantitative measures integrated?

Systems Capability Matrix

Pathway	Process/Practice	Outcomes	Causal Mechanisms	Transformational Capacity	Monitoring & Evaluation
1. Restoring Justice, Restoring Life	Returning land to Indigenous communities; restorative land management; policy advocacy for nature rights and sovereignty.	Regenerative ecosystems; improved biodiversity; empowerment of marginalized communities.	Addresses colonial land theft; links justice to ecological restoration by reinforcing Indigenous custodianship.	Potential to transform land-use models and reintroduce regenerative practices.	Indicators of land returned; ecological health metrics; degree of community-led decision-making.
2. Economies of Regeneration	Developing local, regenerative agricultural systems; promoting circular economies; shifting economic incentives.	Local economies rooted in sustainability; improved resilience; creation of alternative economic systems.	Targets extractive capitalism by promoting regenerative alternatives; relocalization of economies.	Transforms economic systems through local action, scalable regenerative practices.	Growth in regenerative economic initiatives; local economic stability and resilience.
3. Land Back to Right Relationship	Land redistribution efforts; establishment of collective ownership models; advocacy for land justice.	Increased access to land for marginalized groups; creation of sustainable land management practices; social equity improvements.	Tackles privatization of land; redistributes power through collective ownership models.	Supports long-term shifts in land management and ownership models.	Success of land redistribution; social and economic empowerment; sustainability of land management.

Pathway	Process/Practice	Outcomes	Causal Mechanisms	Transformational Capacity	Monitoring & Evaluation
4. Bioregional Community Governance	Implementation of bioregional governance models; supporting local democratic decision-making; decentralizing power.	Community stewardship over land and resources; strengthened local resilience and self-determination.	Decentralization of power addresses imbalances in governance systems; enables localized solutions.	Creating transformation through local empowerment and bioregional alignment.	Community participation in governance; alignment with ecological goals.
5. Healing the Spirit, Healing the Earth	Cultural and spiritual practices to reconnect people to nature; educational initiatives promoting ecological consciousness.	Shifts in cultural attitudes towards nature/other; broader adoption of ecological values; strengthened community resilience.	Challenges anthropocentric worldviews; fosters interdependence between human and ecological health.	High – creates cultural shifts needed for systemic ecological and social change.	Shifts in cultural narratives around nature; integration of spiritual practices in environmental initiatives.

Breakdown of Pathways by Principles, Activities & Examples

Pathway	Principle	Activities	Examples
1. Restoring Justice, Restoring Life	Addressing historical injustices (colonialism, land theft) is essential for ecological regeneration. Social and environmental justice are inseparable—restoring ecosystems requires restoring the rights and governance of Indigenous peoples.	**Indigenous-Led Biodiversity Restoration:** Returning land to indigenous communities and restoration of ecosystems using traditional ecological knowledge and reforestation efforts. **Rights of Nature:** Legal frameworks that grant ecosystems legal rights and protection often linked with Indigenous governance, as seen in some Latin American countries like Ecuador.	• **Stop Ecocide International** • **Earth Law Center** • **NDN Collective** • **Global Alliance for Rights of Nature** • **IndigenousLed** • **Amazon Sacred Headwaters**
2. Economies of Regeneration	The transition involves realigning economic incentives to reward sustainable practices (e.g., regenerative agriculture), shifting economic value systems to prioritize ecosystem health and community resilience. This pathway emphasizes the practical steps for transitioning toward localized economies that support regeneration.	**Regenerative Agriculture Projects:** Transitioning farms to regenerative practices, such as using permaculture principles or soil restoration techniques. **New Foodways:** Encouraging local food systems that prioritize sustainability and reduce reliance on global food supply chains. This might include urban farming initiatives or local seed banks. **Economic Incentive Realignment:** Implementing policies that incentivize organizations and farmers to adopt regenerative practices.	• **Grain** • **OASA** • **Solidaire Network** • **Planting Justice** • **Local Futures** • **Navdanya International** • **Tapestry of Alternatives** • **Silvi** • **Ma Earth**
3. Land Back to Right Relationship	Land reunion and decolonization are critical to addressing inequality and enabling community-led land management. This pathway is about dismantling structures that concentrate land ownership and empowering communities through collective stewardship.	**Land Back Initiatives:** Returning land to marginalized and Indigenous communities. **Community Land Trusts:** Models where communities collectively own and manage land, fostering equitable access and sustainable land use. **Challenging Private Ownership:** Initiatives that redistribute land ownership, for example, transitioning large estates into cooperatively managed farms or shared commons	• **Soul Fire Farm** • **Bomazeen Land Trust** • **Sogorea Te' Land Trust** • **Land Trust Alliance** • **Great Plains Action Society** • **Center for Ethical Land Transition** • **Land Justice Futures** • **Agrarian Trust** • **Shelterwood Collective**

Pathway	Principle	Activities	Examples
4. Bioregional Community Governance	Decentralized governance enables more responsive and ecologically informed decision-making. By empowering communities to govern their local ecosystems, governance becomes more sustainable and just. This pathway emphasizes the need for community-driven governance models that are place-based and equitable.	**Decentralized, Bioregional Governance:** Developing governance systems based on natural ecological boundaries (e.g., watersheds), where local communities have decision-making power over land use. **Community Assemblies and Participatory Governance:** Local councils where community members actively participate in decision-making, seen in examples like the Zapatista communities in Chiapas, Mexico. **Cooperative Management of Resources:** Shared governance structures for managing common resources (e.g., forests, rivers), especially at the local or bioregional level.	• **Bioregional Learning Center (UK)** • **BioFi Project** • **Design School for Regenerating the Earth** • **Institute for Global Peacework** • **Cascadia**
5. Healing the Spirit, Healing the Earth	Ecological healing is tied to an ontological shift—changing how humans understand their relationship with the planet. The transition involves fostering cultural and spiritual transformations that reconnect people to nature in a meaningful way, nurturing both inner transformation and systemic change.	**Raising Ecological Consciousness:** Educational programs that teach ecological awareness and spiritual reconnection with the Earth, often through practices like nature-based learning or environmental storytelling. **Spiritual Practices for Ecological Healing:** Practices that focus on prayerful or mindful interaction with nature, like those seen in some Indigenous and spiritual movements emphasizing Earth as a living entity.	• **Papawhakaritorito Trust** • **The University of the Forest** • **Work that Reconnects Network**

The Pathways to Regeneration are Interwoven

The five pathways are interconnected, forming a web of relationality essential for true land restoration. Each pathway relies on the development of the others to fully realize sustainable, just, and regenerative change.

Restoring Justice, Restoring Life: Ecological restoration can't happen without addressing historical injustices like colonialism. Returning land to Indigenous and local communities (Land Back to Right Relationship) is crucial for fostering biodiversity restoration through traditional ecological knowledge. This custodianship is more effective when supported by decentralized governance (Bioregional Community Governance), allowing communities to manage ecosystems according to local realities and must be moored to a deep cultural/ontological shift (Healing the Spirit, Healing the Earth).

Economies of Regeneration: Economic systems must shift away from extraction to support sustainable land use. Regenerative agriculture depends on the economic incentives that prioritize local food systems and ecosystem health. These economies, in turn, thrive when communities have equitable access to land (Land Back to Right Relationship) and are empowered through local governance models that reflect ecological needs (Bioregional Community Governance).

Land Back to Right Relationship: True land restoration requires redistributing land to communities that have historically been excluded. This not only ensures equity but also enables these communities to lead sustainable land management. However, land redistribution is only impactful when paired with economic systems that prevent re-exploitation of land (Economies of Regeneration) and governance structures that support collective land management (Bioregional Community Governance).

Bioregional Community Governance: Local, bioregional governance ensures that land and resources are managed by those who depend on them. Without land equity (Land Back to Right Relationship), governance remains disconnected from community needs. Additionally, decentralized governance must be aligned with regenerative economic models to sustain local ecosystems and support sustainable livelihoods (Economies of Regeneration).

Healing the Spirit, Healing the Earth: Cultural and spiritual shifts are the foundation for long-term ecological care. Land restoration is more than a technical fix; it requires a shift in worldview—a return to reciprocity and respect for the Earth. This cultural transformation supports decolonization efforts (Restoring Justice, Restoring Life), fosters community-led governance (Bioregional Community Governance), and reshapes how economies (Economies of Regeneration) value land and nature.

Conclusion

True land restoration transcends conventional carbon-focused approaches, which often reduce land to a mere tool for carbon capture. Instead, it recognizes that social, economic, and cultural dimensions are inseparable from ecological health. This view acknowledges that Indigenous and local custodianship thrives when there is land equity and decentralized governance. In alignment with this, equitable land access and community-led governance are vital for sustaining regenerative economies, which rely on local, place-based solutions to reinforce the health and resilience of ecosystems. Moreover, at the foundation of these efforts lies a cultural shift towards ecological consciousness, which ensures that efforts are rooted in reciprocity and care.

An essential underlying theme in this transition is the ongoing ontological shift from an anthropocentric to an ecological consciousness. This shift to an ecological or earth-centered consciousness[1] moves us from viewing the earth and its resources as commodities for human use to recognizing the interdependence of all living systems. By embracing an earth-centered consciousness, we begin to see that human well-being is deeply connected to the health of ecosystems, non-human life, and natural processes. This emerging worldview, which values interconnectedness and mutual respect, strengthens every dimension of the transition.

These interconnected efforts form a mutually reinforcing system. Catalysts in one area—whether through land back initiatives, economic reforms, or governance changes—generate momentum across the others. For instance, restoring land rights to Indigenous communities not only supports biodiversity but also empowers local governance and strengthens cultural ties. Similarly, regenerative economic models can thrive only when communities have access to land and the autonomy to govern it. This interdependence makes it evident that true restoration requires an integral approach, one that weaves together justice, economic transformation, governance reform, and cultural healing/transformation.

The five pathways identified—Restoring Justice, Restoring Life; Economies of Regeneration; Land Back to Right Relationship; Bioregional Community Governance; and Healing the Spirit, Healing the Earth—serve as essential pillars for this approach. Each pathway addresses a specific aspect of systemic change while remaining interconnected. Together, these pathways highlight that holistic/integral land restoration is as much about transforming systems of power and culture as it is about ecological resilience.

In sum, addressing the metacrisis requires more than isolated reforms; it demands a radical reimagining of relationships between land, communities, and systems of governance. By engaging with these pathways as a unified framework, we can cultivate a future where justice, ecology, and culture are integrated into every dimension of regeneration.

1 *Naia Trust, Earth-Centered Consciousness Research Overview, Earth-Centered Consciousness within the Context of the Metacrisis*

APPENDIX

APPENDIX 1. *Research Addendum (Interview guide)*
APPENDIX 2. *Definitions of common categories of responses to interview questions.*
APPENDIX 3. *Full linguistic Analysis*

APPENDIX 4: Overview of Systems Capacities

1. Restoring Justice, Restoring Life

•Colonialism → Land Dispossession → Ecosystem Degradation
•Decolonization → Return of Land → Indigenous Custodianship Restored
•Indigenous Custodianship → Regenerative Practices → Biodiversity Restored
•Cultural Reconnection → Sustainable Ecosystem Management

Key Mechanism: Addressing colonialism through decolonization restores Indigenous land stewardship, regenerating ecosystems and biodiversity.

2. Economies of Regeneration

•Capitalism → Resource Depletion → Ecological Harm
•Realigning Incentives → Support for Regenerative Practices
•Regenerative Agriculture → Soil & Ecosystem Health → Sustainable Economies
•Localizing Food Systems → Community-Based Food Security & Resilience

Key Mechanism: Transforming economic incentives supports regenerative agriculture and localized economies, fostering ecological and economic resilience.

3. Land Back to Right Relationship

•Private Ownership → Land Concentration → Exclusion & Inequality
•Land Reunion → Land Back Initiatives → Restored Rights
•Collective Ownership → Equitable & Sustainable Land Management
•Decolonization → Policy Changes for Land Trusts

Key Mechanism: Redistributing land through collective ownership models restores marginalized communities' rights, promoting equity and sustainability.

4. Bioregional Community Governance

- Centralized Governance → Disconnect from Local Needs
- Decentralized Governance → Bioregional Decision-Making → Community Control
- Community Empowerment → Equitable Governance
- Bioregionalism → Sustainable Resource Management

Key Mechanism: Decentralized, bioregional governance empowers communities to manage land and resources sustainably and equitably.

5. Healing the Spirit, Healing the Earth

- Human-Centrism → Disconnection from Nature → Exploitation
- Raising Consciousness → Spiritual Reconnection to Nature
- Alternative Ontologies → New Human-Nature Relations → Cultural Healing
- Cultural Healing → Ecological Wisdom → Sustainable Practices

Key Mechanism: A cultural and spiritual shift toward interdependence with nature drives systemic change in governance and practices.

Each pathway follows a progression from root causes (colonialism, capitalism, private ownership, centralized governance, human-centrism) to actions (decolonization, realigning incentives, land reunion, decentralized governance, raising consciousness) to outcomes (restored ecosystems, regenerative economies, equitable land management, community empowerment, and cultural healing).

Together, they point toward a future where social justice, ecological health, and cultural transformation are deeply interconnected.

APPENDIX 5: Causal Loop Modeling: Integrated Causal Flow for Transition Pathways

1. Restoring Justice, Restoring Life

•Colonialism (+) → Land Dispossession (+) → Disrupted Indigenous Custodianship (+) → Ecosystem Degradation
Colonialism drives land dispossession, which weakens Indigenous custodianship and leads to ecosystem degradation.

•Decolonization (–) → Land Dispossession (–) → Restoration of Indigenous Custodianship (+) → Regenerative Land Practices
Decolonization reverses land dispossession, restoring Indigenous custodianship and regenerative land practices.

Speed up: Policy reforms accelerating land return and decolonization, support for land back initiatives.
Slow down: Legal or political barriers to decolonization.

•Regenerative Land Practices (+) → Biodiversity Restoration (+) → Sustainable Ecosystem Management
Indigenous regenerative practices restore biodiversity, leading to sustainable management.

Speed up: Cultural reconnection initiatives and awareness-building around Indigenous knowledge and sovereignty.
Slow down: Cultural resistance to Indigenous custodianship and sovereignty practices.

2. Economies of Regeneration

•Capitalism (+) → Resource Depletion (+) → Ecological Harm
Capitalism drives resource extraction and ecological degradation.

•Realigning Economic Incentives (–) → Support for Regenerative Agriculture (+) → Soil Health & Ecosystem Resilience
Realigning economic incentives supports regenerative agriculture, improving soil health and resilience.

Speed up: Reforming subsidies to prioritize regenerative practices and local food systems.
Slow down: Market forces resisting change and maintaining unsustainable practices.

•Regenerative Agriculture (+) → Local Food Systems (+) → Economic Resilience
Regenerative agriculture and local food systems build economic resilience and sustainability.

Speed up: Investment in local supply chains and infrastructure.
Slow down: Dependence on global supply chains slowing the adoption of local food systems.

3. Land Back to Right Relationship

•Private Ownership (+) → Land Concentration (+) → Exclusion of Marginalized Communities (+) → Inequality
Private ownership centralizes land and excludes marginalized communities, increasing inequality.

•Land Reunion (–) → Land Back Initiatives (+) → Restored Indigenous & Community Land Rights
Land reunion through land back initiatives restores community land rights, enabling stewardship.

Speed up: Government support for land back movements, simplifying land transfer processes.
Slow down: Corporate lobbying and property law complexities.

•Collective Ownership (+) → Sustainable Land Management (+) → Equity & Regeneration
Collective ownership enables sustainable land management, promoting equity and ecological regeneration.

Speed up: Legal reforms supporting community land trusts and collective stewardship.
Slow down: Cultural resistance to collective ownership models, legal challenges to land redistribution.

4. Bioregional Community Governance

•Centralized Governance (+) → Top-Down Decision-Making (–) → Disconnection from Local Needs (+) → Resource Mismanagement
Centralized governance disconnects decision-making from local needs, leading to mismanagement of resources.

•Decentralized Governance (–) → Bioregional Decision-Making (+) → Community Control Over Land Use (+) → Sustainable Resource Management
Decentralized, bioregional governance fosters community control and sustainable resource management.

Speed up: Empowering local communities and bioregional governance councils.
Slow down: Political resistance to decentralization or interference from centralized authorities.

•Community Empowerment (+) → Equitable Governance (+) → Improved Land Stewardship
Empowered communities create equitable governance structures, improving land and resource stewardship.

Speed up: Grassroots movements promoting community governance, funding for capacity-building
Slow down: Lack of resources or external political interference reducing community empowerment.

5. Healing the Spirit, Healing the Earth

•Human-Centrism (+) → Disconnection from Nature (+) → Ecological Exploitation
Human-centrism increases disconnection from ecosystems, driving exploitation and environmental harm.

•Raising Consciousness (–) → Spiritual Reconnection to Nature (+) → Ecological Care & Reciprocity
Raising consciousness fosters a spiritual reconnection to nature, promoting ecological care and reciprocity.

Speed up: Cultural initiatives and education promoting ecological interdependence and Indigenous worldviews.
Slow down: Cultural resistance to ontological shifts that support a plurality of worldviews
.
•Cultural Healing (+) → Systemic Changes Based on Ecological Wisdom (+) → Adoption of Sustainable Practices
Cultural healing drives systemic changes rooted in ecological wisdom, leading to widespread adoption of sustainable practices.

Speed up: Public and cultural initiatives that promote Indigenous wisdom and ecological principles.
Slow down: Entrenched materialistic or extractive worldviews resisting cultural shifts.

Summary of Integrated Causal Flow:

Across the five pathways, the key leverage points (like policy reform, economic incentives, decentralized governance, and raising consciousness) can either accelerate the transition to more sustainable and just systems, or create resistance (through legal barriers, political interference, or cultural resistance). By strategically addressing these leverage points, we can reinforce positive feedback loops and mitigate balancing loops that slow down progress.

APPENDIX 6: Methods

The co-occurrence matrix was generated using the following steps:

- Data Extraction: The codes from each text snippet were extracted from the ‘All Codes’ column. These codes were stored as lists for each snippet..Unique Codes: A list of all unique codes across all snippets was created to form the rows and columns of the co-occurrence matrix.
- Matrix Creation: An empty matrix was set up with the unique codes along both the rows and columns.
- Counting Co-occurrences: For each text snippet, the co-occurrence of codes was calculated by checking which pairs of codes appeared together in the same snippet. If two different codes appeared in the same snippet, their corresponding cell in the matrix was incremented.
- Symmetry: The matrix is symmetric because the relationship “code A co-occurs with code B” is the same as “code B co-occurs with code A.”