Forest-making in agrarian frontiers

Place-based transformative pathways toward sustainability in the Brazilian Amazon

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Gabriela Russo Lopes

FOREST-MAKING IN AGRARIAN FRONTIERS:

Place-based transformative pathways toward sustainability in the Brazilian Amazon

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To my father and my mother, Marcos e Fátima,
my greatest sources of love and support.
This thesis is a materialization of the faith you always had in me.

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Author's contributions

The author contributions described below follow the definitions of the Contributor Role Taxonomy (CRediT), developed by Harvard University with input from researchers and partners.[1]

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Castro, F., Russo Lopes, G., & Brondízio, E. (2020). The Brazilian Amazon in times of COVID-19: from crisis to transformation? *Ambiente & Sociedade*, 23, 1-11. https://doi.org/10.1590/1809-4422asoc20200123vu2020L3ID

Gabriela Russo Lopes performed the following CRediT roles in this publication: Investigation (Conducting a research and investigation process, specifically performing the fieldwork, or data/evidence collection); Resources (Provision of study materials, such as interviews, fieldwork observations, document analysis and quotations); Writing – Review & Editing (Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre-or post-publication stages). Gabriela participated in the writing and editing of all the sections in this article.

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[1] More details on the scientific definitions can be found at: Allen, L., O'Connell, A., & Kiermer, V. (2019). How can we ensure visibility and diversity in research contributions? How the Contributor Role Taxonomy (CRediT) is helping the shift from authorship to contributorship. *Learned Publishing*, 32(1), 71-74.

Londres, M., Salk, C., Andersson, K., Tengö, M., Brondízio, E., Russo Lopes, G., Siani, S., Molina-Garzón, A., Gonzales, T., Rázuri Montoya, D., Futemma, C., Castro, F., Tourne, D. (2023). Place-based solutions for global social-ecological dilemmas: an analysis of locally grounded, diversified, and cross-scalar initiatives in the Amazon. *Global Environmental Change*, 82, 102718. https://doi.org/10.1016/j.gloenvcha.2023.102718

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1. Introduction[*]

Rural areas in the Brazilian Amazon are a key stage where a double-edged dynamic plays out (see Hecht & Cockburn, 2010). On one hand, systemic arrangements usually favor increased deforestation and expansion of commodity production, often leading to rural violence and dispossession (Russo Lopes & Bastos Lima, 2022). On the other hand, local communities find creative forms of resistance at the fringes of and through the cracks in such dominant systems (Russo Lopes et al., 2021). In the words of Luiz Antonio Simas (2021, p.15), a Brazilian historian of marginalized populations and cultures: "it happens that at the same time, amongst all this [systemic violence], we find innovative ways to invent life are produced where usually only death is able to triumph. A Brazilian-ness [*brasilidade*] forged on the small everyday practices of local peoples (…) capable of transforming the whip of the oppressor (…), and continuously producing life even in the darkest hours".[2]

A particular form of resistance is the practice of *forest-making*. I propose this concept as an umbrella term for the multiple transformative pathways toward sustainability carved at the local level through the agency, mobilization and resistance of place-based initiatives of forest restoration, particularly in agrarian frontiers with high deforestation pressures. Agrarian frontiers are spaces of rural struggle, which can be dominated by large-scale deforestation-intensive agriculture (see Ioris et al., 2020), but can also be where local communities develop their forest-based livelihoods as a way to (re)claim such spaces (see Castro & Futemma, 2021). Forest-making, thus, is local communities' act of resisting and reclaiming agrarian frontiers by actively regrowing forests in intensely deforested areas.

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[*] Segments of this chapter are based on the previously published articles: Russo Lopes, G., & Bastos Lima, M.G. (2022). Understanding deforestation lock-in: Insights from Land Reform settlements in the Brazilian Amazon. *Frontiers in Forests and Global Change*, Section People and Forests, 5, 951290. https://doi.org/10.3389/ffgc.2022.951290; and Brondízio, E., Andersson, K., Castro, F., Futemma, C., Salk, C., Tengo, M., Londres, M., Tourne, D., González, T., Molina Garzon, A., Russo Lopes, G., & Siani, S. (2021). Making place-based sustainability initiatives visible in the Brazilian Amazon. *Current Opinion in Environmental Sustainability*, 49, 66-78. https://doi.org/10.1016/j.cosust.2021.03.007.

[2] Translated by me. The full original passage in Portuguese reads: "Acontece que no meio de tudo isso, e ao mesmo tempo, produzimos formas originais de inventar a vida onde amiúde só a morte poderia triunfar. Uma brasilidade forjada nas miudezas de nossa gente, alumbrada pela subversão dos couros percutidos, capaz de transformar a chibata do feitor em baqueta que faz o atabaque chamar o mundo; produtora incessante de vida no arrepiado das horas (...)".

Forest restoration initiatives, in this sense, oppose renewed forms of violence against forests and their peoples a (sometimes silent) part of everyday life. In the Amazon, this resistance is carried out by fostering human-nature connectedness (see Burgos-Ayala et al., 2020), place-based attachments to territories (see Brondízio et al., 2021), and collective bonds of solidarity (see Pérez-Ramírez et al., 2021), all of which allow for sociocultural reproduction of forest-based livelihoods that are alternative (and opposed) to large-scale commodity production.

Although crucial for promoting sustainable livelihoods and landscapes' transformations, place-based initiatives are seldom acknowledged as drivers of sustainability, economic growth or, in a broad sense, desirable futures (Muiderman et al., 2020; Brondízio et al., 2021). The sheer existence of such initiatives in agrarian frontiers dominated by commodity expansion is an expression of what Eliane Brum (2022, para. 30), a Brazilian socioenvironmental journalist, describes in her work as

> [To f]ight like a forest, by clinging to life's openings and turning them into a horizon, using joy as an instrument of resistance, and imagining the country in which we want to live. Occupying, as nature does, every empty space, finding the last breath of life on the dead earth and being reborn, sabotaging the agents of death day after day and choosing the affirmation of life (…). Fighting like a forest is just that: being radically involved in life.

In the so-called *arc of deforestation,*[3] the Amazon's most disputed agrarian frontier, place-based forest restoration initiatives symbolize the innovative ways found by local peoples to exist and resist. In doing so, they assert their agency and transform their surrounding landscapes, creating inclusive and grounded transformative pathways toward sustainability. To understand how this process happens in such challenging contexts, this thesis aims to answer the question of *how place-based forest restoration initiatives carve transformative pathways toward sustainability on agrarian frontiers of the Brazilian Amazon*. To do so, the thesis looks at two interrelated processes. First, it examines the political aspects of landscape transformations by analyzing the sub-question of *how state-level politics interplays with local-level place-based transformative pathways.* Second, it probes the dynamic and non-linear aspects of landscape transformations on the ground by analyzing the sub-question of *how place-based transformative pathways develop over time in agrarian frontiers.*

In the following sections of this chapter, I demonstrate the challenges that place-based initiatives face on agrarian frontiers due to the depth and tenacity of tropical deforestation patterns, particularly in the Global South. I then contextualize how the

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[3] For the purposes of this thesis, I use the terms *forest* and *deforestation* broadly, noting that in the Amazon they also refer to other types of native vegetation less common in the region like Cerrado (see Barbosa et al., 2007; Milliken et al., 2010).

Amazon has been reconfigured over the decades, followed by a characterization of forest restoration practices in the Brazilian Amazon's arc of deforestation. Finally, I introduce the two states and two place-based initiatives analyzed in this thesis to deepen the understanding of transformative pathways toward sustainability on the ground.

1.1. Enduring patterns of tropical deforestation

Tropical deforestation has been a major outcome of resource demands for industrial production (FAO, 2020). In particular, agricultural commodities – including livestock as well as crops – are a primary driver of tropical deforestation (see Curtis et al., 2018). Pendrill et al. (2022, p.3) estimate that the yearly deforestation driven by agriculture across the tropics ranges from 66,000 to 88,000 square kilometer (km^2), a number which "implies that most (~90 to 99%) tropical deforestation occurs in landscapes where agriculture is the dominant driver of forest loss." Such agricultural expansion and associated land clearing is not for local consumption, but rather aims to profit from the growing international demand for commodities. As summarized by Reis et al. (2021, p.1) "deforestation embedded in global supply chains is especially acute in the trade routes between commodity-producing countries in the Global South and commodity-importing countries in the Global North."

South America is a case in point, where export-oriented resource extraction has become an 'imperative' for regional development and economic growth across the political spectrum (see Arsel et al., 2016; Svampa, 2015). Resource extraction and commodity expansion takes different forms throughout the continent. Mineral extraction has caused deep socio-environmental conflicts in the Andean region (Bebbington et al., 2021), cattle-ranching is a major deforestation driver in the Amazon (Hecht, 2019), and expansion of cash crops (e.g., soy, maize, cotton) is associated with environmental degradation and land grabbing in the Brazilian Cerrado (Rausch et al., 2019; Russo Lopes et al., 2021) as well as in the Gran Chaco in Argentina, Bolivia and Paraguay (Hecht, 2005; le Polain de Waroux et al., 2018). Throughout the continent, as much as 2,68 million km^2 of natural ecosystems were cleared for cropland or pastures between 1985 and 2018 (Zalles et al., 2021). The Brazilian Amazon, in particular, saw approximately 450,000 km^2 of natural landscapes lost between 1985 and 2021 (Mapbiomas, 2021). Most of this land was converted to agriculture (440,000 km^2) with another 3,110 km^2 consumed by mining expansion (Mapbiomas, 2021).

These enormous landscape transformations happen in a context of globalized hyper-connectivity, where processes across scales and geographies play a major role (Lewis et al., 2011; Keys et al., 2019). Local land-clearing practices impact global

greenhouse-gas emissions (see Fearnside, 2019; Pendrill et al., 2019), while global demand for commodities has local impacts on land-use systems, through a process that has been labelled 'telecoupling' (see Friis et al., 2016; Kapsar et al., 2019). Local and global processes, in this sense, are increasingly interlinked. Oftentimes, they connect in skewed ways the large-scale actors that promote unsustainable practices and the local communities who bear their impacts (see Gupta & Lebel, 2010; Benevolenza & DeRigne, 2019).

The consequences of large-scale deforestation are multidimensional, leading to environmental disruptions (see FAO, 2020), such as climate change (IPCC, 2019) and biodiversity loss (IPBES, 2019), as well as social ones, such as heightened inequality, widespread land grabbing, forced displacements and dispossession of marginalized rural communities (see Brito et al., 2019; Bebbington et al., 2021). In many ways, these social impacts are further reinforced by environmental disruptions, generating a negative feedback cycle (see Brondízio et al., 2016). The industrial agribusiness model of commodity production affects ecosystem services that are *"vital to the livelihoods of forest-dependent and rural people"* (Pendrill et al., 2022, p.1). In this sense, commodity production has concrete impacts on the livelihoods of rural communities, often impairing access to clean water, disrupting traditional food systems, and contaminating air, land and water with agrochemicals and pesticides (see Borras et al., 2012; Brondízio & le Tourneau, 2016; Russo Lopes et al., 2021). As commodity production overruns local territories, it deepens socioenvironmental struggles and leads to 'maldevelopment', characterized by wealth concentration and social exclusion (Russo Lopes et al., 2021).

A new lexicon has been elaborated to capture the speed and magnitude of such human-induced transformations of natural ecosystems. The *Great Acceleration* refers to the growth in production and consumption patterns, particularly since the 1950s (see Steffen et al., 2015; Bradley et al., 2020), while the *Anthropocene* has been proposed as a new geological epoch dominated by anthropogenic environmental change (see Lewis & Maslin, 2015). Both concepts highlight the fast-changing relations between humans and nature, in which their mutual influence and co-dependence is increasingly evident (see Arts et al., 2012).

The notion that human societies are an inextricable part of nature is aligned with longstanding indigenous cosmologies. Ailton Krenak, a Brazilian indigenous thinker, highlights: "For a long time, we have been alienated from the organism to which we belong – the Earth. So much that we began to think of Earth and Humanity as two separate entities. I can't see anything on Earth that is not Earth. Everything I can think of is nature." (Krenak, 2019, p. 22). Within this context of changing relations between humans and nature, there is an ongoing social and political construction of images and narratives around the role of forests in society (see Arts & Buizer,

2009; Bidone, 2021). In the next section, I explore how these images and narratives are (re)created, (re)framed and (re)claimed in the Brazilian Amazon as a result of continuous and cross-scale negotiations between different interests and worldviews.

1.2. Reconfiguring Amazonian forests

In recent decades, large-scale resource extraction in the Brazilian Amazon has taken many forms. A key process enabling such waves of extraction is the social and political construction of images and narratives around the role of forests in society, often centered on the economic interests of rural elite groups (see Chernela & Pereira, 2018; Anderson & Rivera-Ferre, 2021; Bebbington et al., 2021;). These images and narratives are dynamic and result from interactions involving international agreements, national politics and non-state actors, such as civil society organizations, social movements and private companies (see Arts & Buizer, 2009). Mediated by the different sub-national states[4] of the Amazon region, these interactions are translated into land uses on the ground (see Bizzo & Michener, 2017; Stickler et al., 2018; Tovar et al., 2021). Such socio-cognitive practices have been reconfiguring the Amazon territory over time, leading to different patterns of large-scale deforestation (see Hecht, 2005). From government-based developmentalism to mobilizations of forest peoples or a green economy approach to sustainability, the Brazilian Amazon has undergone cycles of territorial governance that resignify the region around new discourses, actors, agendas and institutions at different scales (Brondízio et al., 2021; Bidone, 2021).

Between the 1960s and the 1980s, government-based development projects under Brazil's military regime promoted a series of top-down colonization programs that led to rapid deforestation, land ownership concentration, and increased social inequalities (Bunker, 1988; Toledo et al., 2017; Paula Pereira et al., 2022). Notions of national sovereignty and economic progress supported the construction of a developmentalist narrative (Hecht & Cockburn, 2010). The Amazon was framed as a 'demographic vacuum', an untamed 'green hell', and an untapped source of natural resources (see Meggers, 1971; Moran, 1993), while the multiple existing local communities – e.g., rubber tappers, indigenous peoples, afro-descendants *quilimbolas* – were ignored.

This rationale achieved its heyday in the 1980s, when public policies sought to integrate the region into the country's agricultural production network. This was done by investing in large-scale infrastructure, such as highways, railroads, and hydroelectric power plants (Moran, 2016), and also by relocating landless rural

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[4] The term *states* is used here to refer to a sub-national government administration level, between the federal and the municipal levels. This unit is analogue to departments or provinces elsewhere.

populations from southern Brazil through Land Reform programs, managed by the National Institute of Colonization and Agrarian Reform (INCRA; Alencar et al., 2016; Paula Pereira et al., 2022). The arrival of new actors to the region triggered new land-use practices, governance institutions, and social interactions, as forests were increasingly regarded as an obstacle to development (Russo Lopes & Bastos Lima, 2022). Larger landowners who migrated to the Amazon during this period repeatedly use the expression "*when I arrived here, everything was jungle*",[5] framing the replacement of native vegetation with other land uses as an improvement to the land (see Ofstehage, 2018). The imaginary of an agrarian frontier based on development through deforestation resulted in accentuated environmental degradation, socio-environmental conflicts and dispossession of local communities (see Schmink et al., 2014; Ioris et al., 2020).

In the 1990s, the recognition of the role of tropical forests in global climate governance changed this perspective. Following the United Nations' Earth Summit in Rio de Janeiro in 1992, an alliance between Amazonian forest peoples and international environmental advocacy groups gave rise to a new image of the Amazon as 'the lungs of the world'[6] (Bezerra, 2015). This image shift contrasts with the previous notion of the Amazon as an empty space, thereby making forest-dependent people more visible and valued. Moreover, it politically empowered them as 'forest guardians' who protect native vegetation through traditional ecological knowledge, low-impact livelihoods, and a strong connection to nature (Hecht & Cockburn, 2010; Reyes-García et al., 2019). These notions helped reframe the Amazon as source of nature-based solutions to global environmental change (see Lovejoy & Nobre, 2018).

This renewed narrative paved the way for the implementation of programs and policies to strengthen environmental conservation, forest restoration and territorial governance (see Keck & Sikkink; 1998; Castro, 2012). They have been largely fostered by public policies (e.g., PPG-7, Bolsa Floresta, Pro-Extrativismo), NGO projects (e.g., Sustainable Rural Settlements' Project), international financing mechanisms (e.g., REDD+ schemes) or private companies (e.g., voluntary commitments). These mechanisms focused on local solutions to global issues, seeking to halt deforestation and promote sustainable livelihoods. In this sense, adoption of forest-based

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[5] In Portuguese, "*Quando eu cheguei, era tudo mato*". Also translated to English as "*When we came, there was nothing*" (see Ofstehage, 2018).

[6] This expression remains widely used, even though the net oxygen production from forests is almost null. This means that the oxygen that the forest produces through photosynthesis, it also consumed through respiration. In the end, the surplus is close to zero. Even if the entire world were deforested, the decrease in atmospheric oxygen concentration would be negligible (see Malhi, 2021). A possibly better way to highlight the Amazon's environmental relevance would be to refer to the biome as the 'faucet of the world' since water cycling in fact depends heavily on tropical forests.

practices has been driven by national environmental legislation and international donors (e.g., protected areas, traditional territories, financial support) as well as by collective action and individual leadership within local communities (e.g., social movements, place-based initiatives).

Since the 2010s, the Amazon has seen the resurgence of green developmentalism which paints a narrative of the region as a frontier for 'green commodity' expansion. Changes in the national and international political economy continue to influence the notion of commodity expansion as major driver of national development (see Brondízio et al., 2021; Russo Lopes & Bastos Lima, 2022; Londres et al., 2023b). Drawing from the notions of green economy, this perspective is rooted in multiple alliances among multinational corporations, state and federal governments and neoliberal environmental NGOs (Azevedo et al., 2015; Lederer et al., 2018; Bastos Lima & Persson, 2020).

This ongoing period can be seen as a *greened* version of the 1980s developmentalist approach, with market-based mechanisms claiming to reconcile economic and environmental needs. These mechanisms include payments for ecosystem services, REDD+ schemes, carbon offsetting, certification programs, and multi-stakeholder roundtables (see den Besten et al., 2014; Castro & Futemma, 2015; Bastos Lima et al., 2017). In regard to commodity production, sustainability arrangements such as private-led zero-deforestation commitments have been particularly prolific. Their mechanisms include mandatory due diligence procedures, or voluntary commodity-trader sourcing policies (Zu Ermgassen et al., 2020; Schilling-Vacaflor & Lenschow, 2021) – of which the Soy Moratorium[7] is a key example (Gibbs et al., 2015; Heilmayr et al., 2020; Rausch & Gibbs, 2021).

Zero-deforestation commitments focus on promoting sustainability through the elimination of land clearing embedded in commodity supply chains; however, this focus fails to account for deeper issues of unsustainable development on the ground (Zu Ermgassen et al., 2020). The commitments leave unaddressed the complexities of commodity production, for instance, the widespread use of agrochemical inputs, water diverted for irrigation, or the social and cultural impacts of commodity expansion, which remain out of the scope of the above-mentioned voluntary commitments (see Russo Lopes et al., 2021; Zu Ermgassen et al., 2022). Moreover, they fall short from addressing broader socioeconomic inequalities and power imbalances (Gustafsson & Schilling-Vacaflor, 2022), such as imbalanced participation in decision-

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[7] The Soy Moratorium is a voluntary commitment adopted in 2006 by the main soy traders operating in Brazil, with the support of other actors, such as Brazil's Ministry of Environment and environmental NGOs like Greenpeace, WWF, TNC, IPAM and Imaflora. The commitment establishes that traders will not buy any soy produced in areas deforested after 2008 in the Brazilian Amazon (see Gibbs et al., 2015).

making processes, and exclusion from governance forums of local peoples and their worldviews and land-use systems, which often oppose commodity expansion (see Bastos Lima & Persson, 2020). Such commitments overlook the diverse (and more sustainable) livelihoods adopted by smallholders and traditional populations in rural areas of the Amazon. In doing so, they ignore the multiple transformative pathways toward sustainability implemented by place-based initiatives that rely on forest-based practices (see Brondízio et al., 2021). Therefore, the green commodities narrative tends to portray forests as a supporting element to 'sustainable' commodity expansion and (re)frames the Amazon as a natural resource basket. Ultimately, during this period, agribusiness elites have strengthened their social capital, political power and economic returns. This has made large-scale agricultural exports a dominant and expanding land-use system in the Amazon, while legitimizing socioenvironmental injustices in the region (see Sauer, 2018).

Growing global concerns about tropical forest loss have yet to translate into more thorough, comprehensive and integrated support for place-based transformative pathways to sustainability. The efforts to build a single generalizing image of the Amazon often disregard the diversity of forest societies and their attachments to the surrounding environment (Porto-Gonçalves, 2001; Adams et al., 2009). Acknowledging the multiple realities and subjectivities on the ground could enable more place-based approaches to transformations toward sustainability, bringing nuance to the national and international imaginary of the Amazon as a homogeneous region (Bezerra, 2015; Slater, 2015).

1.3. Forest restoration in the arc of deforestation

The recent decades' territorial reconfiguration of the Amazon faces ongoing contestations from local communities and reveals the region as a space of disputes over both the material and symbolic relevance of the forest. These struggles take different shapes on the ground according to the regional context. For one, deforestation is quite uneven across the Brazilian Amazon; it is especially intensive along the arc of deforestation (see Fearnside et al., 2009). Located on the southern margin of the biome, the arc of deforestation is an agrarian frontier where commodity production marches northward and pushing deforestation pressures into the heart of the Amazon (Domingues & Bermann, 2012; Figure 1). Dominated by agricultural production (e.g., cattle, soy, maize, cotton) largely oriented for export markets (see Ioris, 2017; Trase, 2021), the arc of deforestation has been called the 'epicenter of Amazon deforestation' (Costa & Pires, 2010, p. 1970). As such, this is a region of drastic landscape transformations, a dynamic and moving space of frontier making, shaped by

pervasive and large-scale deforestation practices[8] (see Schmink & Wood, 1992; Moore, 2000; Mapbiomas, 2021).

Figure 1. The Brazilian Amazon's arc of deforestation in 1985 and 2021
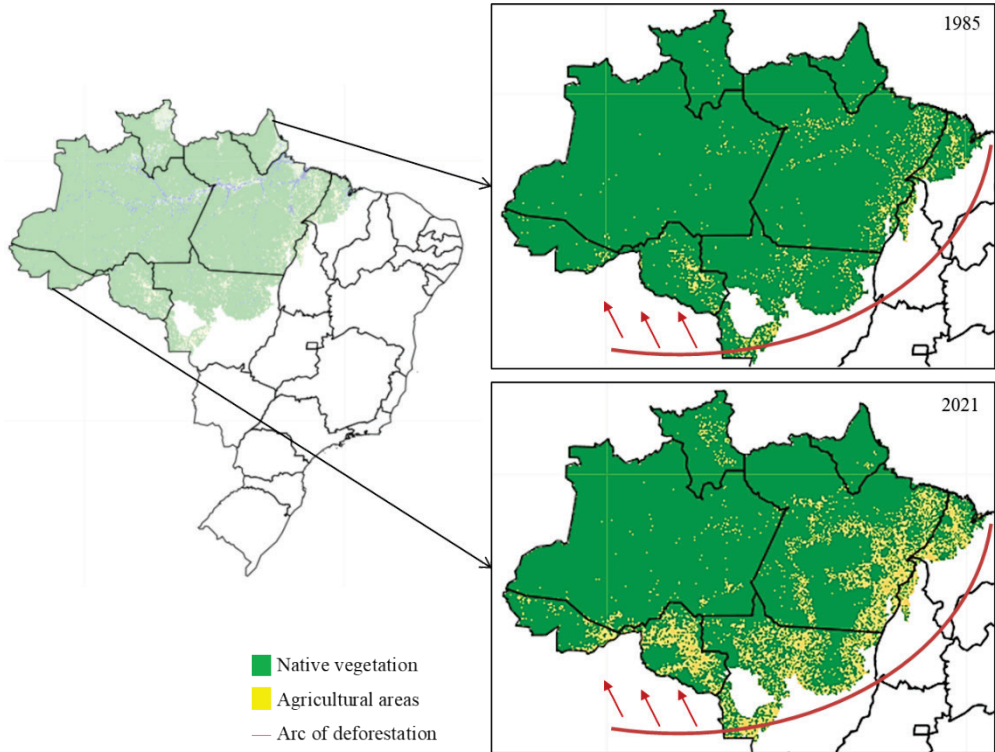
Source: Own elaboration based on Mapbiomas, 2021

While deforestation and commodity expansion remain an enduring pattern of resource extraction on this agrarian frontier, local actors develop and implement forest-based practices as a response to the ongoing socio-environmental degradation. Forest-based practices include the conservation of native vegetation against further land clearing (see Buchadas et al., 2022), as well as the recovery of natural ecosystems that were previously deforested (de Jong et al., 2021). This second type of practices has been gaining substantial political relevance within environmental governance circles worldwide (see Table 1). Since 2011, international forums have been establishing global goals for the recovery of degraded and deforested ecosystems, like the Bonn Challenge led by UNEP and the New York Declaration articulated by national governments. In the same vein, regional commitments have also been forged around

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[8] Small-scale farming also relies on some level of land clearing, but with significantly smaller impact (see Alencar et al., 2016; Paula Pereira et al., 2022).

the world, within Asia, Latin America, and Africa, to mitigate and adapt to global environmental change. Brazil, in particular, has made a pledge of recovering 120,000 km² of its native vegetation to the UNFCCC which later became a nationwide policy, the Planaveg. The numerous examples of multilateral, regional and national agreements on recovering forests show the increasing prominence of such agendas across scales, particularly since the 2010s.

Table 1. Commitments for recovering natural ecosystems at multiple levels

Initiatives	Year	Goals	Links	References
Global Commitments				
Bonn Challenge to Restore Our Future	2011	1,5 million km2 of the world's degraded and deforested lands by 2020 and 3,5 million km2 by 2030	https://www.bonn challenge.org/	Mansourian & Kleine 2013
New York Declaration on Forests	2014	Halt natural forest loss and restore 3,5 million km2 of degraded lands by 2030	https://forestdeclaration.org/about/new-york-declaration-on-forests/	Wolosin 2014
Half-Earth Project	2016	Protect and/or restore half of the world's natural ecosystems	https://www.half-earthproject.org/	Wilson, 2016
United Nations Decade on Ecosystem Restoration	2021 - 2030	Prevent, halt and reverse degradation of the world's natural ecosystems	https://www.decadeon restoration.org/	Aronson et al., 2020
Regional Commitments				
Asia–Pacific Economic Cooperation's Forest Cover Goals	2007	200,000 km2 of forests in Asia by 2020 (reportedly achieved)	https://www.apec.org/ publications/2021/10/ achieving-the-apec-2020-forest-cover-goal	Korhonen et al., 2021
20 × 20 Initiative in Latin-America	2014	3,5 million km2 of forests in Latin America and the Caribbean by 2030	https://initiative20x20. org/	Vergara et al., 2015
African Forest Landscape Restoration Initiative	2016	1 million km2 of forests in Africa by 2030	https://afr100.org/ content/home	de Jong et al., 2021

Initiatives	Year	Goals	Links	References
National Commitments				
National Plan for the Recovery of Native Vegetation	2017	120,000 km2 of native vegetation in Brazil by 2030	https://www.gov.br/mma/pt-br/assuntos/politica-nacional-de-recuperacao-da-vegetacao-nativa/planaveg.pdf	Planaveg, 2017
Nationally Determined Contribution to the Paris Agreement	2017	120,000 km2 of native vegetation in Brazil by 2030	https://documents1.worldbank.org/curated/en-PUBLIC-Brazils-INDC-Restoration-and-Reforestation-Target.pdf	World Bank, 2017

Multi-scale commitments have also been triggering actions by state-level governments. Amazonian states participate in such international negotiations and, to some extent, influence their goal-setting processes. In many ways, state-level politics shape how globally-agreed goals will be (re)interpreted by each state's narratives and policies, influencing how effectively multilateral commitments will land on the ground. As we shall see in Chapter 4, this narrative-policy nexus at the state level plays an important role in defining how the recovery of natural environments will be implemented over the landscape. Two extremes are a techno-managerial and top-down approach, focusing on ambitious quantitative targets, or a more inclusive and bottom-up approach, focusing on local agency, social mobilization, co-production and broad participation of rural communities.

The techno-managerial approach often relies on forest concessions and reforestation projects. Those are based on a binary (and often arbitrary) view on forest/non-forest cover. It mainly entails planting new trees and increasing tree coverage (see de Jong et al., 2021; AF, 2022). However, it lumps together native and exotic tree species, and homogeneous (e.g., monoculture of eucalyptus) and heterogeneous (e.g., multi-species of multiple ages) tree cultures (see Adams et al., 2021). In this sense, techno-managerial reforestation practices are concerned with expanding the coverage of tree canopies while leaving unaddressed other aspects of sustainable landscapes, such as ecological function, connectivity or social inclusion.

Forest restoration practices, in contrast, entail more integrative views of landscapes and more comprehensive views of sustainability. Forest restoration seeks to reestablish, as much as possible, the original functions of natural ecosystems (Adams et al., 2021). However, it goes beyond that: "Forest restoration is a mechanism to achieve multiple goals, including climate mitigation, biodiversity conservation,

socioeconomic benefits, food security, and ecosystem services" (Chazdon & Brancalion, 2019, p. 25). Some authors also speak of mental health ecosystem services connected to a healthy (restored) environment (Bratman et al., 2019; Subiza-Pérez et al., 2020). In that same vein, the latest framework of the Intergovernmental Science-Policy Panel on Biodiversity and Ecosystem Services (IPBES) on Nature's Contributions to People (NCPs) recognizes "psychological experiences" (NCP 15) as well as "learning and inspiration" (NCP 14) and to the "formation of social identities" (NCP 16) as key contributions from natural ecosystems to societies (IPBES, 2019; see also Bastos Lima & Palme, 2022). Forest restoration, thus, creates possibilities for reverting native vegetation loss, re-wilding, and re-building healthier livelihoods in rural areas through local agency and bottom-up mobilization (see Jepson & Blythe, 2020; Adams et al., 2021).

The top-down reforestation approach of many multilateral goals and public programs contrasts with the bottom-up restoration approach led by numerous place-based initiatives on the ground, as we shall see in Chapter 5. These initiatives practice forest-making to assert their livelihoods, identities, social dynamics and community building (see Hecht & Cockburn, 2010; Reyes-García et al., 2019). They do so through collective action, social innovation, grassroots mobilization and local agency (see Adams et al., 2021; Osborne et al., 2021). While large-scale reforestation projects entail a continuation of a business-as-usual and apolitical stands toward the recovery of natural ecosystems, place-based forest restoration initiatives have a more holistic and enabling approach that promote transformative pathways toward sustainability.

Place-based forest restoration initiatives in the Amazon are those carried out by (often marginalized) forest-dependent people. They are traditional peoples and local communities (e.g., indigenous peoples, rubber tappers, family farmers) who implement a myriad of forest-based practices, including agroforestry systems, native seed collection, artisanal latex production, Brazil-nut production, fruit-pulp production (sold frozen), native oil production (e.g., *copaíba*, *andiroba*), artisanal native products (e.g., jams, palm heart, natural fibers), community-based ecotourism projects, and organic fertilizer production (see Figure 2). These place-based initiatives are grounded in collective action from local communities whose livelihoods are directly dependent on a sound and conserved environment (see Brondízio et al., 2021). Those can be conceptualized as what Bennett et al. (2016) call "bright spots" or "seeds of the good Anthropocene," as they represent concrete transformation pathways toward sustainability on the ground (see also Bachi et al., 2023).

Figure 2. Examples of forest-based practices in the Amazon

Agroforestry systems

Native seed collection

Artisanal latex production

Brazil nut production

Fruit-pulp production (sold frozen)

Native oil production

Artisanal native products
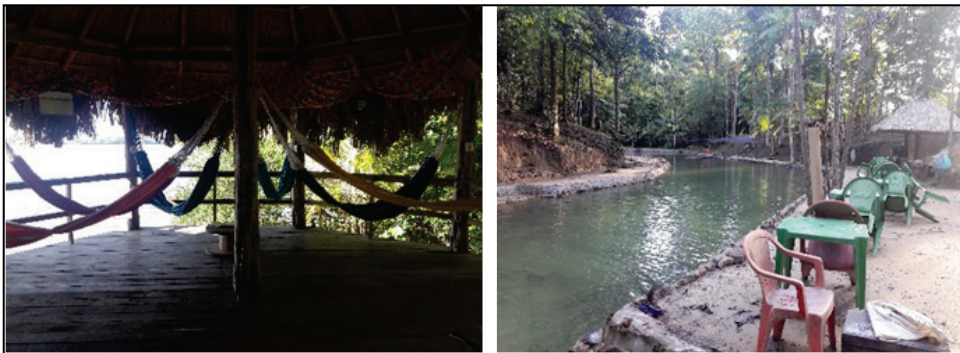
Community-based ecotourism projects

Organic fertilizers production

Source: Own fieldwork pictures

It is important to note that the increasing importance of forest restoration practices in regional, national, and international arenas brings even more complexity to agrarian frontiers. This is because forest restoration is the very opposite of commodity expansion: it represents the advance of natural ecosystems into areas of resource

extraction. Forest-making, therefore, strengthens the claim of forest-based activities in frontier regions and highlights the role of local communities as the primary drivers of forest restoration through their livelihoods and everyday practices. The encounter between such divergent land-use systems steers the making and unmaking of transformative pathways toward sustainability on this frontier.

The mechanisms that incentivize and support these two opposed land-use systems, however, are highly imbalanced. As shown in Section 1.2, alliances between external and local agricultural-interest groups have influenced government policies and enabled market forces to support the spread of logging, mining, land invasions and deforestation in the Amazon (Hochstetler, 2021; Milhorance, 2022). Such patterns of degradation are upheld by many processes, including weak (or biased) enforcement of environmental legislation, unfettered expansion of roads and other infrastructure, and a market lenience to consume deforestation-inducing commodities (Margulis, 2004; Moran, 2016; Fearnside, 2018; Coelho-Junior et al., 2022). The public and private support for commodity expansion form a rather coherent, solid and self-reinforcing network that steers unsustainable transformations throughout the Amazonian landscape (Russo Lopes & Bastos Lima, 2022) based on various lock-in mechanisms – politico-institutional, techno-economic, and socio-cognitive (Geels, 2019) – that challenge and hinder the emergence of alternative place-based pathways grounded in sustainable practices and livelihoods.

Place-based forest restoration initiatives have long existed in the region, but in a looser and less structured way. Only after the emergence of the global socio-environmental agenda in the 1990s have they received more visibility in national and international arenas addressing deforestation and social inequalities (Hecht & Cockburn, 2010). Environmental legislation and public policies have been implemented to create protected areas and traditional territories nationwide (Castro, 2012; Nolte et al., 2013; Ruiz-Mallén et al., 2015). These efforts proved effective to slow deforestation, improve environmental and land justice, and expand sustainable production grounded in cooperativism, value-aggregation, and social movements (Hochstetler & Keck, 2007; Brondízio & LeTourneau, 2016). In particular, command-and-control policies (e.g., monitoring mechanisms, environmental fines, sanctions, apprehensions) have been effective to hinder deforestation and (partly) halt unsustainable land-use practices (see Hayes & Rajao, 2011; Soares-Filho et al., 2014; Arima et al., 2014; Nolte et al., 2017).

Even though important achievements emerged from these interventions, they have fallen short in challenging the expanding commodity system in the region. The depoliticized and techno-managerial approach present in many national policies and international commitments failed to fully account for local needs of livelihoods, agency, and citizenship (Castro, 2012). The mechanisms supporting forest-based

practices also lack the scale, adequate infrastructure, continuity, political support and cultural valorization conceded to the deforestation system (Russo Lopes & Bastos Lima, 2022). During the past few decades, place-based initiatives have been repeatedly challenged by conflicting policies, land-tenure insecurity, and poor access to transportation, sanitation, education, healthcare, and rural credit (Alencar et al., 2016; Castro et al. 2020; Russo Lopes & Bastos Lima, 2020; 2022). Although place-based forest restoration initiatives are essential protagonists of local and regional transformative pathways towards sustainability, they remain largely marginalized and invisibilized.

The arc of deforestation, therefore, is an agrarian frontier of disputed landscape transformations. On one hand it is a system locked into commodity expansion that drives deforestation, on the other, a diffuse articulation of smaller place-based initiatives which resist such expansion through forest-making. In the current reconfiguration of the Amazon region, place-based initiatives are fundamental pockets of resistance. Such initiatives are a way for local peoples to exert their local agency and push landscape transformations in more sustainable directions. The fact that these initiatives exist throughout the arc of deforestation and still resist and flourish over time sheds light on the relevance of analyzing forest-based practices along these agrarian frontiers of disputed transformations.

1.4. The structure of this thesis

To understand the multiple pathways through which place-based initiatives promote transformations on the ground, this thesis focuses on two contrasting regions in the arc of deforestation. Mato Grosso is an old, consolidated agrarian frontier dominated by commodity production, and Acre is a recent, unfolding agrarian frontier with a forest-dominated economy. Mato Grosso, as Brazil's largest soy producer and exporter, represents a development model based on commodity expansion (Jepson, 2009; Richards et al., 2015; Ioris et al., 2020; Trase, 2021). Conversely, Acre is historically known as a 'forest state', whose development model has been grounded in forest valorization practices (Vadjunec et al., 2011; Schmink et al., 2014; Mapbiomas, 2021). These contrasting frontier regions represent two extremes of a continuum between commodity production and forest protection. An analysis of these states' land uses and histories as well as their narratives and policies allows for a deeper understanding of the different dimensions and patterns of landscape transformations in the Amazon region.

Within these two contexts, I analyze the development trajectory of two relevant place-based forest restoration initiatives. During the fieldwork in Acre, the case of the RECA Agroforestry Project (RECA) is highlighted as an example of landscape

transformation in the region.[9] The initiative has been implementing forest restoration through agroforestry for more than thirty-three years, and is now starting to witness its fourth generation of members in an area of fast-expanding cattle ranching. In Mato Grosso, the Xingu Seed Network (XSN) has been pointed out as the regional reference. Gathering indigenous peoples, family farmers and urban dwellers, the initiative collects native seeds to promote forest restoration in three river basins and protect water quality and availability. The activities led by XSN occur in an area dominated by soy production, also referred to in academic analyses as 'Soyland' (see Hecht & Mann, 2008; Ofstehage, 2016). Both initiatives actively promote forest-making in their regions and have been carving inspiring and diverse place-based transformative pathways by mobilizing local communities, gathering multiple partnerships and developing daily practices of resistance to commodity expansion within contrasting contexts at the state level.

Adopting a process-oriented and cross-scale perspective – linking local and state levels – this thesis contributes to the transformations literature by bringing empirical and conceptual insights from these two empirical cases. Such insights are relevant not only for the Amazonian context but also for furthering theorization on transformation pathways more broadly. Throughout this manuscript, I make the case that transformations are a multidimensional process mediated by narratives, politics and socio-cognitive values that shape everyday practices on the ground and are subject to unruly, non-linear and contradictory swings. To develop this argument, the thesis is laid out as follows.

Chapter 2 elaborates on the concept of the agrarian frontier as a space of contested landscape transformations. I describe the Amazon's arc of deforestation where commodity expansion and forest-making practices co-exist and dispute the territory. After presenting the two sides of this agrarian frontier, I present different perspectives of transformations toward sustainability and elaborate my own approach to understand how place-based forest restoration initiatives emerge, are nourished, and survive amid commodity expansion. I provide an analytical framework describing three phases of transformative pathways in which local agency is central: the triggering phase when an initiative is created, the nourishing phase when an initiative is consolidated, and the resilience phase when an initiative navigates unforeseen and disruptive crises.

Chapter 3 provides a contextualization of the Brazilian Amazon, highlighting the diversity of realities, histories, cultures, and territorial development in different

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[9] RECA is located in the municipality of Nova Califórnia, which is formally part of the state of Rondônia, and 20 km away from the border with Acre. As we shall see in Chapter 3, the initiative is closely connected to the Acrean context, and in this thesis it will be analyzed as one of Acre's regional reference of place-based forest restoration initiatives.

states. The chapter further presents the research design used throughout the thesis and motivates the choices of Acre and Mato Grosso, as well as the two place-based initiatives in these states. Finally, the chapter details the methodological approach of this thesis, explaining the qualitative mix of methods employed.

Chapter 4 presents the public sector's contrasting narratives and policies toward forests in Acre and Mato Grosso: the former based on forest citizenship, the latter based on green commodities. Although thoroughly analyzed at broader (global/national) and local (municipality/community) scales, the role of the state-level narratives and politics deserves further scrutiny as a key political arena that mediates global-to-local processes. Helping to bridge this gap, the chapter addresses state-level transformations by analyzing the nexus between public narratives and policies and how they shape different approaches to forest protection and sustainable development.

Chapter 5 analyzes two place-based initiatives: the RECA Agroforestry Project, influenced by Acre's political context, and the Xingu Seed Network, influenced by Mato Grosso's political context. The chapter presents the transformative pathways led by these initiatives and the forest-making practices they have been implementing on the ground since 1989 and 2007, respectively. To analyze their transformative pathways, I have studied three phases of their development processes – triggering, nourishing and resilience – and, based on the fieldwork results, I have identified the different factors and processes that supported the initiatives in each phase.

Chapter 6 brings together the analysis of the two state-level narrative-policy nexuses and the two place-based initiatives to discuss the multiple dimensions of transformations towards sustainability. It highlights the cross-scale and process-dependent nature of place-based transformative pathways. It further discusses the role of place-based initiatives in unmaking the politico-institutional lock-in by transforming politics; unmaking the techno-economic lock-in by transforming practices; and unmaking the socio-cognitive lock-in by transforming values. The chapter emphasizes that such multidimensional transformations are enabled by forest-making in agrarian frontiers.

Finally, Chapter 7 summarizes the main arguments and presents the conclusions of this thesis. The chapter summarizes the research, highlights the main contributions, offers key insights for scholars, policymakers and practitioners, and also makes suggestions for future research.

2. Agrarian frontiers as spaces of contested transformations*

The concept of a frontier has long been used to describe dynamics of capital expansion through incorporation and primary accumulation of resources (see Wallerstein, 1974). According to this perspective, frontiers are the margins of a dominant system which are socially constructed through processes of capitalist production and consumption (Harvey, 2004; de Angelis, 2004). Agrarian frontiers, in particular, are critical for this capitalist accumulation through the use, management and extraction of natural resources, triggering and magnifying socioecological tensions throughout the landscape (see Tsing, 2003; Ioris, 2021). In this sense, agrarian frontiers are key spaces of disputed landscape transformations, where unsustainable patterns of dispossession, commodity expansion and deforestation meet resistance from sustainable place-based initiatives, as is the case of the transformative pathways of forest restoration which we will explore in Chapter 5.

The production of new agrarian frontiers does not happen randomly. Rather, they are shaped by clear socio-cultural, techno-economic, and institutional strategies. First and foremost, frontier production relies on the discursive strategy that reframes a region as a supply of resources that is up for grabs. Such reframing is supported by the construction of new imaginaries over 'newly found' commodity resources whose exploitation is imperative (see Arsel et al., 2016; Rasmussen & Lund, 2018). This image production and mystification is an essential step to construct the need for further expansion of dominant land-use systems onto the frontier, often in the name of economic development (see Ioris, 2021). The need for creating new agrarian frontiers is particularly advertised in areas that, according to capitalistic standards, are economically and socially under-performing (see Wood, 2006; Bastos Lima & Kmoch, 2019).

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* Segments of this chapter are based on the previously published articles: Russo Lopes, G., & Bastos Lima, M.G. (2022). Understanding deforestation lock-in: Insights from Land Reform settlements in the Brazilian Amazon. *Frontiers in Forests and Global Change*, Section People and Forests, 5, 951290. https://doi.org/10.3389/ffgc.2022.951290; and Brondízio, E., Andersson, K., Castro, F., Futemma, C., Salk, C., Tengo, M., Londres, M., Tourne, D., González, T., Molina Garzon, A., Russo Lopes, G., & Siani, S. (2021). Making place-based sustainability initiatives visible in the Brazilian Amazon. *Current Opinion in Environmental Sustainability*, 49, 66-78. https://doi.org/10.1016/j.cosust.2021.03.007

Governments play a large role in the process of frontier production. They provide support to specific stakeholders and sectors while (often actively) maintaining weak institutional arrangements that pave the way for informality, land-grabbing, and violence at the system's margins (Kelly & Peluso, 2015; Rasmussen & Lund, 2018; Borras et al., 2020). Bastos Lima & Kmoch (2019) describe this process in four phases: 1) pre-frontier abandonment and lack of public services, 2) selective support from the state to specific incumbent actors, 3) overlooked harms of frontier production such as local dispossession, and 4) a biased and superficial sustainability agenda which facilitates greenwashing and green grabbing (see also Fairhead et al., 2012). The disproportionate returns on the capital invested by private actors in frontier regions (see Walker, 2006) contrasts with the dispossession of local communities throughout the multiple stages of frontier production.

In the case of the Amazon, the production of frontiers has been fostered and reinforced by the public ideas, images and narratives that have historically portrayed it as an underdeveloped region, shaping broader societal perceptions over the forest (see Section 1.2). These factors fuel perception of the Amazon as what Ioris (2021) describes as a 'perpetual frontier', a space with fragmented territories that undergo different (and continuous) stages of resource extraction. This process is often defined by political, socio-economic and cultural dynamics coming from outside the region: "the Amazon has not become a perpetual frontier because it is huge and remote, rather it has remained distant and alien because it has been perennially misunderstood, devalued and treated as a frontier to be conquered" (Ioris, 2021, p.4).

Agrarian frontiers, however, are contested spaces where the dominant pattern of resource extraction is challenged by bottom-up grassroots responses (see Barney 2009; Bachi et al., 2023). As described in Chapter 1, the arc of deforestation in the Amazon has been a fertile territory for the development of critical place-based transformative pathways in which local agency plays a key role. Classic analytical categories of capitalist expansion (e.g. class, mode of production) are often insufficient to explain the multiple waves and dimensions of frontier production in the Amazon (see Cleary, 1993). Similarly, a strict focus on broad processes of capitalistic appropriation can offer a misleading, generalizing and oversimplified characterization of the diverse socioenvironmental processes that take place in the Amazon:

> The frontier conflicts associated with these [land-use] changes were correspondingly complex. (…) In addition, the actions of regional elites and grassroots mobilization of peasants, Indians, rubber-tappers, and independent miners repeatedly subverted the military [government]'s agenda and the institutions that large capital attempted to impose on the region. The result was not a single process of linear change but instead a diversity of contested frontiers with highly varied outcomes (Schmink & Wood, 1992, p.13).

In this vein, Castro & Futemma (2021, p.1) highlight how Amazonian agrarian frontiers can be venues where "new encounters among multiple knowledge sources may promote mutual learning and inspire innovation" which can lead to sustainable practices. Place-based forest restoration initiatives are examples of this process. Through forest-making and socio-cognitive relations mediated by nature, these initiatives create innovative responses to dominant commodity land uses (see Brondízio et al., 2021). As such, they reinterpret, reinvent and reframe land-use dynamics in agrarian frontiers. In this sense, I argue that the Amazon's arc of deforestation is a key space of such contested (un)sustainable landscape transformations, dominated by commodity expansion but also enabling creative ways of resistance from traditional peoples and local communities.

Local contestations in the Amazon's arc of deforestation have taken new and varied forms with the growing relevance of forest restoration activities (as seen in Section 1.3). The multi-level political support for forest restoration (see Table 1) nudges the expansion of forests into other existing land uses. Such dynamics bring a new layer of dispute to agrarian frontiers, offering insights into the plurality and complexity of landscapes' transformations in these marginal spaces (see Schmink & Wood, 1992; Castro & Futemma, 2021). Building on the above-mentioned analyses, I characterize the Amazon's arc of deforestation as an agrarian frontier where commodities overrun native vegetation while the practices of forest restoration reclaim deforested and degraded areas. To understand this double-sided, contested and imbalanced process, the lens of transformations toward sustainability will be applied. In the following sections, I first elaborate on the different theoretical approaches within the transformations literature. Then, I expand on the concept of 'lock-in' to understand the enduring patterns of commodity production and deforestation in the Brazilian Amazon. This is followed by a section on the concept of 'transformative pathways' that analyzes local resistance through forest-making in frontier regions. Finally, I propose a 'place-based approach' to transformative pathways, focusing on the process-based and cross-scale nature of landscape transformations. We now turn to the theoretical approaches.

2.1. Theoretical approaches to transformations

'Transformations toward sustainability' has emerged as a normative and polysemic concept to address societies' deep-seated problems and propose potential solutions for sustainable futures. Increasingly used by policymakers and practitioners (see Future Earth, 2014; Atmadja et al., 2021), the term has also acquired multiple meanings in academic debates. According to Patterson et al. (2017, p.1), the concept "refers to fundamental changes in structural, functional, relational, and cognitive aspects of

socio-technical-ecological systems that lead to new patterns of interactions and outcomes." The definition of fundamental changes, however, remains subject to different interpretations.

Some authors focus on providing analytical frameworks to guide the interpretation of transformative processes. O'Brien (2018), for example, proposes a three-dimensional framework of 'spheres of transformation' to inquire into climate change governance, going from 'practical changes' (e.g. technology, agricultural techniques), to 'political changes' (e.g. law, regulations, power structures) and 'personal changes' (e.g. belief, worldviews). Linnér & Wibeck (2020) offer an integrated framework to address the mechanisms driving the dynamics of transformation. Based on the combination of 'scale', 'pace' and 'scope', the authors propose four broad categories of transformation: quantum leap (fast and society-wide), convergent (fast and sectorial), emergent (slow and society-wide), and gradual (slow and sectorial). Such analytical approaches exemplify the multidimensionality of transformations and how they can be analyzed through different angles.

Critical perspectives, however, call attention to the depoliticizing potential of such a polysemic concept (e.g., Blythe et al., 2018; Turnhout & Lahsen, 2022). Feola (2015, p. 377) highlights the "high conceptual elasticity and lack of empirical grounding of the concept of transformation [which] generate the risk of voiding the term of meaning." This conceptual elasticity further enables possible elite capture by actors who benefit from unsustainable practices and legitimization of dominant systems (see Persha & Andersson, 2014; Feola et al., 2021). To avoid the risks of depoliticization and appropriation by elites, it is important to analyze transformations toward sustainability from a bottom-up and empowering perspective that strengthens the local resistance of place-based initiatives (see Stirling, 2014; van den Berg et al., 2021).

In this thesis, I conceptualize transformations toward sustainability as political processes based on local agency that seek to unmake dominant systems and business-as-usual practices of resource extraction, while also proposing alternative, restorative and inclusive ways of relating to nature. To understand the theoretical debate within such a prolific field, Scoones et al. (2020) provide an insightful literature review. They analyze three "contrasting political traditions, which reflect distinct but overlapping understandings of social processes that generate transformative change" (p. 66): structural, systemic, and enabling approaches.

The *structural approach* addresses transformation at a societal level through a historical lens. According to this perspective, transformations result from radical and often revolutionary shifts (see Scoones et al., 2020). They happen in specific moments in history and under key conditions that allow for a deep reconfiguration in economic, political and cultural structures (see Fraser, 2017). Analyses based on this

approach usually build upon the seminal works of Marx (1859), Polanyi (1944), and Gramsci (1971). Contemporary studies using this lens provide a counter narrative to hegemonic perspectives on transformations (Ferguson, 2015). For the purposes of this thesis, however, this theoretical approach tends to rely on social generalizations, downplaying human agency in the transformation process. Also, there is a focus on past processes, as opposed to predictions or aspirations toward desired futures (see Muiderman et al., 2020).

In contrast to this historical perspective, the *systemic approach* addresses transformative processes through systems thinking, proposing the analysis of two main types of systems (see Moore et al., 2014; Cabrera et al., 2008). On one hand, transitions theory focuses on socio-technical systems and how technological artefacts[10] organize socioeconomic dynamics (Lawhon & Murphy, 2011). Transitions theory describes the processes that produce and sustain a dominant system, as well as the socio-technological innovations that can gradually reconfigure and destabilize such systems at different levels. The creation and endurance of dominant systems relies on multiple mechanisms that bind them together, known as 'lock-in' mechanisms. A lock-in is a stagnant condition that creates inertia and a tendency toward the reproduction of mainstream patterns, and a path dependency for upcoming innovations (see Unruh, 2000; Geels, 2019). This approach has been applied, for example, to analyses of agri-food system transitions (see El Bilali, 2019) and energy transitions (see Geels et al., 2017). In this thesis, I apply the concept of 'lock-in' to characterize the deep-seated, intricate and self-reinforcing mechanisms that uphold large-scale deforestation and commodity production in the Brazilian Amazon's arc of deforestation. Such mechanisms pose systemic obstacles to local resistance for forest-making on the ground, as we shall see in Section 2.2.

Additional examples of a *systemic approach* to transformations, on the other hand, come from analyses of socio-ecological systems using resilience thinking. This theory conceptualizes nature and society as interconnected components, acknowledging that social processes are mediated (and physically limited) by nature (Rockström et al., 2009; Sterk et al., 2017). This perspective is based on the premise that societies are embedded in natural environments that, in turn, have a 'carrying capacity' to support human activities (Rockström et al., 2009). The concept of resilience, in this context, refers to the ability of a socio-ecological system to return to its equilibrium state and harness the conditions to 'bounce back' whenever shocks happen (Sterk et al., 2017). Originally developed in the field of ecology, it was later applied to social and political research, grounded in notions of planetary boundaries,

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[10] Technological artefacts are men-made objects or tools that contribute to technical or scientific breakthroughs. An emblematic example of that is the *spinning jenny*, a spinning frame that revolutionized the European textile industry in the 18th century, and the social relations around it.

environmental stewardship, and adaptive governance (Folke, 2016; Bennett et al., 2018). This approach moves away from anthropocentric analysis and highlights how societies and transformations are shaped by nature (Lewis & Maslin, 2015; McAlpine et al., 2015). In this thesis, the concept of resilience is applied when analyzing the continuity of place-based initiatives over time and the ways through which they handle disruptive shocks and crises.

The structural and systemic theoretical approaches, however, fall short in addressing the political dimension of transformations, especially at the local level (see Meadowcroft, 2011; McDonnell, 2020). Critics argue that a focus on problem-solving technologies as well as ecological limits to human activities often offers a controlled and unidirectional stand on societal shifts and overlooks the political and power relations that underlie transformations (see Vaughan & Lenton, 2011; Muiderman et al., 2020). Furthermore, these approaches lack a more prominent acknowledgement of local actors as agents (and protagonists) of transformative change (see Scoones et al., 2020).

Filling in these gaps, the *enabling approach* analyzes transformations toward sustainability as processes mediated by politics and uncertainties (Scoones et al., 2020). This perspective largely draws insights from political ecology, and is useful to analyze multiple local-resistance movements, such as environmental justice movements, agrarian struggles, and mobilizations for strengthening forest-based livelihoods (Moser, 2016; Temper et al., 2018; Feola et al., 2021; van den Berg et al., 2021). In this sense, it highlights the processes underlying transformations over time, as well as the many possible forms to reach them.

> Enabling approaches focus less on specific desired configurations of the system state than structural approaches, and less on the management of system dynamics than system approaches. Instead, these [enabling] approaches emphasize creating the social attributes — capacities — that empower individuals and communities to take action on their own behalf (Scoones et al., 2020, p.67).

As an example of an enabling approach, the concept of transformative pathways was developed as a continuous thread of unruly, contradictory, and non-linear fundamental changes (see Scoones, 2016). The concept especially emphasizes the plurality of transformations being led on the ground, and the role of human agency in steering them in different directions (see Stirling, 2014; Ely, 2022). In fact, transformative pathways entail a process of 'creative destruction' as, on one hand, they resist, object to, deconstruct and ultimately unmake capitalist patterns of resource extraction and, on the other hand, envisage, create, foster and make sustainable alternative forms of relating to nature (see Kivimaa & Kern, 2016; Feola 2021). In this thesis, I apply the concept of transformative pathways to analyze the multiple and innovative ways

through which place-based forest restoration initiatives promote landscape transformations toward sustainability through forest-making in the Amazon's arc of deforestation.

I analyze place-based forest restoration initiatives as the primary agents of transformations toward sustainability on the Amazon's agrarian frontiers. These transformations emerge from pathways based on knowledge co-production, community building and solidarity bonds that empower bottom-up and locally-grounded mobilizations (see Leach et al., 2010; Feola et al., 2021; Brondízio et al. 2021). I further highlight the role of socio-cognitive processes and everyday praxis in shaping such transformative pathways, promoting transformations not only in land uses, but also in social relations and values in frontier regions (see Mehta et al., 2021; Ojha et al., 2022). Such approaches provide useful insights into transformative pathways as a continuous thread of smaller changes developed and reproduced by place-based initiatives over time (see McPhearson et al., 2021; Fisher et al., 2022).

In sum, based on the above-mentioned theoretical approaches, I analyze landscape transformations as a multidimensional process involving changes in politics, practices and values. To analyze such transformations, I argue that a deeper understanding is required on how the arc of deforestation has become locked into commodity expansion, and how place-based initiatives actively practice forest-making as a form of resistance on agrarian frontiers, as we shall see in the following sections.

2.2. A system locked into commodity expansion

Lock-in is a concept often used in economics and energy studies to understand how dominant systems are consolidated and resist change. The concept draws from earlier scholarship on path dependency and is commonly applied to fossil-fuel and energy systems in general (Unruh, 2000; Seto et al., 2016; Wesseling & Van der Vooren, 2017; Janipour et al., 2020; Trencher et al., 2020). Lock-in consists of factors and processes that constitute and uphold a dominant system and bolster their resistance to change by increasing the returns derived from mainstream practices. According to Unruh (2000), the consolidation of a dominant system is driven by "cohesive forces" that create, coordinate, and perpetuate "the knowledge, skills and resources needed to maintain a technological system" (Unruh, 2000, p. 822). Geels (2019) proposes a broader categorization of such cohesive processes into three main lock-in mechanisms that operate simultaneously at different levels, which is insightful for understanding the persistent deforestation patterns along the Amazon's agrarian frontier.

Politico-institutional lock-in includes regulations, standards, and biased political representation that favors regime incumbents. Such structures create an uneven playing field that disproportionately benefits conservative, reformist, or incremental

agendas while impeding major changes that could revamp power relations (see Bastos Lima & Persson, 2020). In the Amazon, this lock-in is characterized by the highly oligopolistic agro-industrial complexes that involve networks of agricultural production led by large-scale farmers and a handful of commodity traders (Wesz, 2016; Zu Ermgassen et al., 2022). Those agribusiness players have become increasingly powerful in Brazil, both economically and politically (Kroger, 2017; Ferrante & Fearnside, 2019; Bastos Lima, 2021), as part of a wider global supply chains of consumers, financiers, processed-food industries, and agrochemical input providers (Medina, 2022). Their growing power, in turn, creates a snowball effect that materializes in policies, secures economic gains, and further consolidates their dominant position. The literature has long shown that retaining earnings within companies' internal cash flow and reinvesting them in their own growth is often the principal source of investment that reinforces their dominance (Henwood, 1998).

Agroindustry groups, such as Brazil's soy growers or industry associations, are a key example of this lock-in category. Not only are they formidable political lobbies (Kroger, 2017), but also they have also become increasingly-relevant governance actors, negotiating voluntary land-use rules and possible compensations for forest conservation on private properties (Bastos Lima & Persson, 2020). Typically, the activities of such private-sector associations become intertwined with key governmental agencies, which become increasingly oriented toward providing for sectoral needs (see Unruh, 2000, p. 824; see also Galbraith, 1967). The state and private sector become enmeshed in a common language, routine practices that are unquestioned, and a 'revolving door' whereby people from key industries take up appointed positions in government and vice-versa (Unruh, 2000; Meghani & Kuzma, 2011) – as we shall see in the case of Mato Grosso analyzed in Chapter 4. The result is sometimes regulatory capture, when public policies end up being shaped to serve vested sectoral interests instead of society at large (Lowi, 1979; dal Bó, 2006).

Techno-economic lock-in encompasses investments and infrastructure that create barriers to radical change. In the Amazon, this type of lock-in is marked by the prevalent technological arrangements associated with expanding industrial monocultures, such as patented genetically-modified soy seeds and chemical inputs, known as the 'technological package' for industrial agriculture (McMichael, 2009; Clapp, 2021; Giraudo, 2020). More recently, leading agroindustries have also become increasingly active in finance, in what Clapp et al. (2017) have termed the 'financialization' of agriculture. Commodity traders, for example, have become major financiers of soy farming while also profiting from price speculation and grain-market volatility (Salerno, 2017; Spadotto et al., 2021). Core companies, thereby, have not only strengthened their dominance, but also promoted the growth of such industrial agri-

food systems that are overrunning tropical ecosystems (McMichael, 2012; Clapp, 2021; Pendrill et al., 2022).

Technical and higher-education institutions also play a key role in steering land-use practices in favor of regime incumbents. For one, universities have long been important players in promoting input-intensive, 'green revolution' agriculture in places such as the United States and Brazil (Nehring, 2022). Relationships between agribusiness and agronomic research institutes continue to deepen, which has had a practical impact in shaping the provision of private research practices such as agronomic R&D, as well as public services such as rural extension (see Bragança et al., 2022) or credit lines (Assunção et al., 2020; Russo Lopes & Bastos Lima, 2022). This happens because higher-education disciplines which are seen as "the source of 'rules of thumb' that are (…) applied routinely" by "a large, self-sustaining network of like-minded professionals and institutions that are invaluable to the growth of the system" (Unruh, 2000, p. 823). This epistemological dynamic creates a technical baseline that nudges private and public investment into dominant practices and limits the economic possibilities for alternatives.

Finally, the *socio-cognitive lock-in* is related to more intangible and subtle processes, including lifestyles, social capital, attitudes and identities that reinforce certain land-use practices. It includes what Seto et al. (2016) refer to as a behavioral lock-in, but also goes deeper into local actors' underlying values, including beliefs, self-perceptions, mindsets and worldviews (Trencher et al., 2020). Socio-cognitive lock-in is particularly relevant, as it shapes and underpins the very perception of reality by 'binding' the rationality of local actors in ways that facilitate or hinder the acceptance (or even the imagining) of alternative land-use systems (Ostrom, 2003; Nelson, 2008). Therefore, politico-institutional and techno-economic lock-in are ultimately supported by the socio-cognitive embeddedness of the dominant system of commodity production (le Polain de Waroux et al., 2021). Socio-cognitive processes, in this sense, are crucial for sustaining or challenging dominant systems, especially on frontiers where landscape transformations are accelerated (see Ioris, 2020).

Public narratives can be considered the foundations of a socio-cognitive lock-in. When endorsed by elite groups, public narratives have a big potential to mold governmental policies and cultural norms at a societal level (le Polain de Waroux et al., 2021; Lazar & Chithra, 2022), and values and perceptions at an individual level (Meyfroidt, 2013; Rueda et al., 2019). They influence technical, economic and political instruments that favor dominant systems, with clear effects on local land-use behaviors (see Milhorance, 2022; Russo Lopes & Bastos Lima, 2022). The role of media outlets is also critical in developing such narratives. In Brazil, large media conglomerates have fostered national communication campaigns in support of agribusiness, contributing to the (cognitive) consolidation of 'agribusiness as we know

it' as a social fact (Santos et al., 2019). This process further translates into a normalization of personal preferences toward land clearing for agriculture, in some cases even within smallholder communities (see Hoelle, 2015). These processes create an overarching 'deforestation culture' in support of land-clearing practices in the rural Amazon. Thus, the socio-cognitive lock-in shapes, influences and binds broader political dynamics as much as collective and individual values and practices (see Hoelle, 2015; Garrett et al., 2017; Rueda et al., 2019).

The agribusiness sector has long shaped public support to obtain societal legitimacy and a social license to operate in Brazil. Furthermore, Brazilian agribusiness has successfully built a self-branding narrative, framing itself as a sector responsible for 'feeding the world' and as the country's main driver of economic growth, while hiding all socioenvironmental impacts associated with it (Lahsen, 2017; Santos et al., 2019; Bastos Lima, 2021; Russo Lopes et al., 2021). Such discursive processes have much wider socio-cognitive consequences (see Campbell & Dixon, 2009): they uphold the prevalent system not only as the most feasible, but also as the only possible way ahead, shaping ideas that commodity expansion is inevitable, and alternatives to it are arguably out of reach (see Muiderman et al., 2020; Fisher et al., 2022).

More broadly, societal buy-in and favorable socio-cognitive attitudes have shielded deforestation-driving agricultural sectors in Brazil (e.g., soy, cattle ranching) from environmental critiques or links to global environmental change and social injustices (Lahsen, 2017; Bastos Lima, 2021). Even in face of perceived regulatory or divestment threats from consumer markets abroad, socio-cognitive coalescing around large agribusiness has strengthened in Brazil, where the sector is commonly portrayed as 'patriotic' and framed in terms of a nationalistic resistance against foreign interference (Bastos Lima, 2021). Such individual and collective attitudes facilitate broad political support that strengthens agribusiness' grip on public regulations, in a self-reinforcing cycle that reproduces the current dominant system.

These multiple lock-in mechanisms are mutually reinforcing and often hinder transformative pathways toward sustainability on the ground (Seto et al., 2016). This tripartite lock-in framework proposed by Geels (2019) is particularly useful to analyze how these mechanisms support deforestation practices in the Amazon. It captures the main obstacles faced by place-based initiatives in the pursuit of forest-making. This is particularly acute in the Amazon's arc of deforestation, an agrarian frontier where lock-in mechanisms are more intensively at play (see Bastos Lima & Kmoch, 2021). On one hand is a dominant and well-structured land-use system of commodity production, on the other, place-based initiatives that resist at the system's margins and seek to expand practices of forest-making into degraded areas. Hence, agrarian frontiers are these marginal zones that allow for a wide variety of (un)sustainable landscape transformations to exist.

2.3. Local resistance through forest-making

The Amazon is an incubator of local sustainability innovations and efforts that confront the overarching deforestation pressures (Otsuki & Castro, 2020; Futemma et al., 2020). Through both individual and collective action, place-based initiatives stand out in their ongoing resistance in the face of a system locked into commodity expansion (see Russo Lopes & Bastos Lima, 2022). Their resistance is grounded in strengthening and expanding practices of forest conservation and restoration (see Temper et al., 2018; Brondízio et al., 2021). This entails an active and ongoing struggle to reproduce a forest-based way of living that is marginalized by the dominant deforestation-based commodity system. I conceptualize this struggle as forest-making.

Place-based initiatives are local endeavors grounded in human agency, community building, grassroots mobilization and collective action. They are carried out by actors who have ownership (and take the risks) in implementing ideas and actions, even if the initiatives are externally initiated or supported. Place-based initiatives involve individuals, rural communities, organizations, associations, cooperatives, and networks, which are important local agents of transformations toward sustainability (see Burke, 2010; Porro et al., 2012; Sanches et al., 2021). They can occur at a large scale in collective territories, as in the case of protected areas for sustainable use, traditional rural settlements or indigenous lands (Castro, 2012; Nolte et al., 2013), as well as in smaller scales through local initiatives dispersed over the territory, such as community activities of ecotourism, artisanship with biomaterials, and non-timber forest product harvest,[11] as explored in Section 1.3 (see also Figure 2).

Although locally-led and -grounded, these initiatives maintain connections and partnerships at broader scales. They may be connected to similar initiatives in other municipalities, grassroots associations at the state or national level, or social movements that operate internationally, as we shall see in the case of Acre in Section 4.3. They may also be connected to external actors that provide local support, such as governments at multiple administrative levels, intergovernmental agencies, foreign companies, external donors, and non-governmental organizations. These interactions can take place physically through in-person interchanges, field visits and thematic conferences, as well as virtually through digital technologies whose usage has exploded during the Covid pandemic, as I further explore in Section 5.4. As such, place-based initiatives often transcend the scope of local communities and

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[11] Non timber forest products (NTFP) are the biological, medicinal and spiritual materials collected from forests for human use and consumption. They include fruits, nuts, oils, fungi, fibers, resins, honey, fish, and game, among others (see Seidler & Bawa, 2001; Bettinger et al., 2017).

participate in broader processes of articulation and interaction that develop cross-scale networks of engagement (Brondízio et al., 2021).

The forest-making carried out by these initiatives involves practices of forest restoration, but also relies on the transformation of local values in relation to forests. The concept of relational values has emerged as a powerful lens to analyze such human-nature interactions in a more nuanced way (see Stenseke, 2018; Chan et al., 2018). This concept holds that people not only ascribe to nature either intrinsic values (e.g., ethnic, aesthetic, religious) or instrumental values (e.g., commercial, profit-seeking, scientific). People also attribute values to nature because of the relations they develop with the surrounding environment, as well as the social relations that emerge from forest-based activities (Riechers et al., 2015; Chan et al., 2018; Himes & Muraca, 2018). Such values form principles, preferences and attachments that can go a long way in explaining people's silent praxis of everyday life in frontier contexts of the Amazon (Steenbock et al., 2021; Pereira & Guebara, 2022; Londres et al., 2023b). A growing literature shows how these value transformations are based on an ethics of care (Jax et al., 2018; Arora et al., 2020; Bieling et al., 2020), and helps understand how place-based initiatives can specifically break through the commodity socio-cognitive lock-in (Stenseke, 2018; Chan et al., 2018; Russo Lopes & Bastos Lima, 2022).

Often overlooked, the forest-making led by place-based initiatives has an increasingly relevant role in the efforts to halt deforestation and drive forest restoration at multiple scales. Throughout the region, they promote multidimensional innovations at the system's margins, including alternative approaches to manage, conserve and restore landscapes (Falcão et al., 2015; Sanches & Futemma, 2019), promote regenerative agriculture and agroforestry (Yamada & Gholz, 2002; Brondízio, 2008; Porro & Miccolis, 2011), reduce poverty (Humphries et al., 2020), empower women (Kainer & Duryea, 1992), promote value-aggregation and market access (Baggio & Kuhl, 2018), and make environmental governance more inclusive (Espada et al., 2019). Place-based initiatives also have a critical significance for scaling down and locally implementing the sustainability goals agreed on by international arenas, as the forest restoration commitments established worldwide (see Table 1 in Section 1.3). Place-based initiatives, therefore, are essential for cutting transformative pathways toward sustainability on the ground to tackle environmental change and social inequalities.

This is especially evident in agrarian frontiers, where the sheer existence of these initiatives challenges and resists the well-structured dominant system of commodity production, as we have seen in Section 2.2. Moreover, the continuity and resilience of forest-making in such contexts represent the feasibility of alternative and more sustainable ways of producing food, protecting water resources and, ultimately,

relating to the surrounding environment (see Russo Lopes et al., 2021). Forest-making, thus, is an essential part of contesting power imbalances in rural landscapes, opening spaces to reclaim land uses in agrarian frontiers, and transforming current mainstream deforestation practices into more sustainable ones.

Although highly relevant for sustainable landscape transformations, forest-making led by place-based initiatives remains understudied as a transformative pathway. Even more so are the processes that allow these initiatives not only to be created, but also to flourish over time and navigate times of crisis. Analyzing the continuity of place-based initiatives entails a deeper inquiry into how these initiatives came into being, how they were consolidated, and how they deal with external disruptions. It also involves a better understanding of how local agency can shape transformations in values, practices and politics. Contributing to filling this gap, in the following section I develop a process-based and cross-scale analytical framework for proposing a place-based approach to transformative pathways toward sustainability.

2.4. A place-based approach to transformative pathways

As explored in Section 2.1, transformative pathways toward sustainability are a nonlinear and contradictory process led by local actors who promote fundamental changes through everyday practices (see Leach et al., 2010; Stirling, 2014). As put by Ely (2022, p.38), transformative pathways are driven by "human agency, collective action, political mobilization and emancipation, and aim to challenge incumbent interests and control", thereby fostering and strengthening the agency of place-based initiatives in face of systemic pressures. As such, these processes entail an ongoing negotiation between cross-scale interests, compounded by contextual disruptions that often favor the dominant system's beneficiaries. The concept brings to the fore the tensions of making and unmaking transformations across scales and over time, as place-based initiatives challenge dominant practices while creating new alternatives (see Feola et al., 2021). To analyze such processes, I propose an analytical framework that presents a *place-based approach to transformative pathways*, highlighting three main conceptual aspects: the role of local agency, the processual nature of transformations, and the cross-scale interactions that shape them.

First is the critical role of local agency in carving transformative pathways. Locally-led and -grounded, place-based initiatives that practice forest-making can contribute to multidimensional landscape transformations, particularly in frontier regions (see Chazdon & Brancalion, 2019). They include positive ecological impacts, such as balanced water cycles, connectivity for biodiversity protection, temperature regulation, and carbon sequestration. They also have positive socio-cognitive effects, such as knowledge co-production, solidarity bonds, community building and

relational values towards nature (see Bieling et al., 2020; Steenbock et al., 2021; Russo Lopes & Bastos Lima, 2023). Place-based initiatives have a particular attachment to their territories, and this human–nature connectedness (see Riechers et al., 2021; Bastos Lima & Palme, 2022) has been increasingly highlighted by some researchers as a way to understand how the experiences in nature can lead to personal fulfilment and a meaningful life (see Knippenberg et al., 2018; van den Born et al., 2018). In this sense, through forest-making, place-based initiatives promote transformations at multiple dimensions, being the protagonists of transformative pathways toward sustainability throughout agrarian frontiers of the Amazon.

Second is the conceptualization of transformations as a process of *silent praxis of everyday life*. In the arc of deforestation, I characterize the forest-making led by place-based initiatives as small-scale daily activities that continuously counter systemic pressures of commodity expansion. Those can be seen as a silent praxis (see Mehta et al., 2021; Ojha et al., 2022), implemented far away from the social and political spotlight in frontier areas framed as remote (see Bastos Lima & Kmoch, 2019; Ioris, 2020; Bachi et al., 2023). This silent praxis of everyday life is thus an act of daily resistance exercised on the fringes of a dominant system, allowing place-based initiatives to emerge and exist over time (see Scott, 1985). Through such subtle and continuous praxis of resistance, place-based initiatives may be able to overcome significant politico-institutional, techno-economic and socio-cultural lock-in and develop innovative ways of forest-making (see Russo Lopes & Bastos Lima, 2022). Interwoven and reproduced over time, such silent praxis of everyday life creates smaller positive changes that threads transformative pathways towards sustainability in the Amazon. This aspect highlights the processes underlying of transformations which, for analytical purposes, I categorize in three different phases below (see Figure 3).

Third, transformative pathways are cross-scale and mediated by state governments. Transformations materialize throughout the landscape as a result of multilevel political processes, such as international trade flows, multilateral regulations, multistakeholder agreements, and national legislation, as much as the behaviors and preferences of local actors. In this scenario, sub-national states can be an important global-to-local link (see Piketty et al., 2015). They mediate decision-making processes at broader scales (e.g., global agreements, national legislation) as well as narrower scales (e.g., municipal regulations, local practices) (Vanhala et al., 2021). They are key players that define how globally-agreed goals, including the commitments on forest restoration (see Table 1 in Section 1.3), will be translated into state-level institutional contexts (Gregersen et al., 2012). At the state level, forests are framed by public narratives and materialize in public policies that incentivize or limit (un)sustainable land-uses on the ground (see Kelly & Crandall, 2022). I

conceptualize this process as a narrative-policy nexus, developed by the interaction between state governments and societal actors, which I further address in Chapter 4. Such a nexus can reinforce dominant lock-in mechanisms established at broader scales, or it can open up spaces that buffer and filter such systemic pressures (see Figure 3). The way forests are framed at the state level, therefore, interacts with and influences the development of place-based initiatives on the ground. In this sense, state-level politics is a key (and somewhat understudied) political arena that mediates lock-in mechanisms and shapes place-based transformative pathways throughout the Amazon.

Figure 3. An analytical framework for place-based transformative pathways on the Amazon's agrarian frontiers
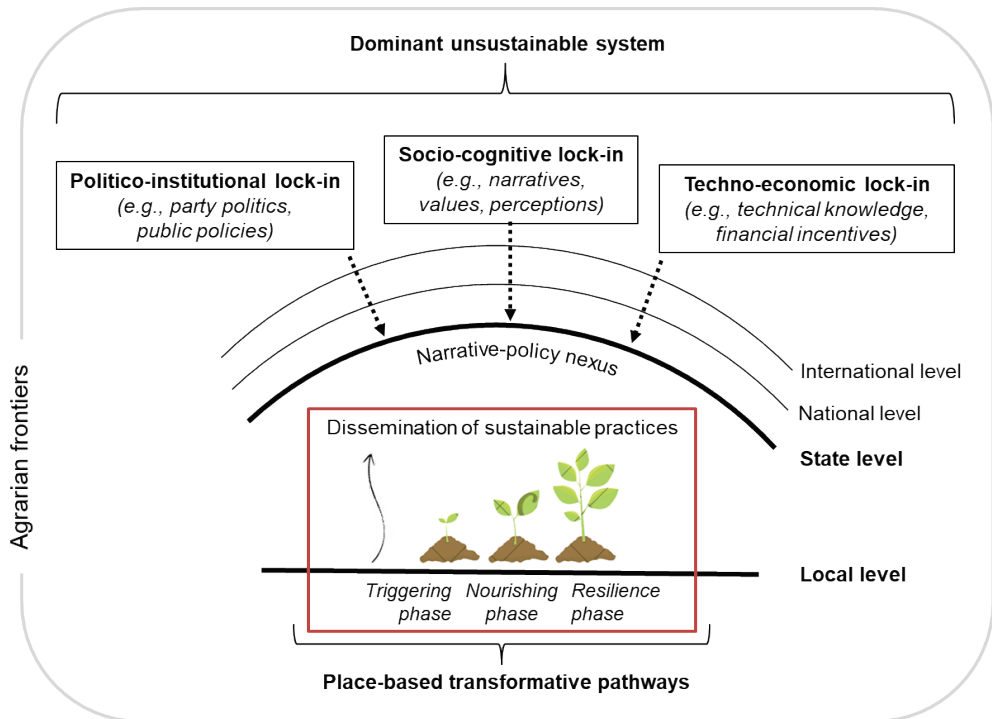
To analyze how place-based transformative pathways develop over time, it is important to adopt a process-based approach(see Patterson et al., 2017). Ostrom (2003) analyzed the process of development of local initiatives for community-based management of natural resources, and recent authors analyze broader processes of upscaling, replicating and amplifying such initiatives throughout the landscape (Bennett et al., 2016; Lam et al., 2020). Providing more empirical insights, Bachi et al. (2023) studied the emergence of local initiatives in an agrarian frontier of the

Brazilian Cerrado; while Olsson et al. (2016) looked into the different developmental phases of local initiatives in Sweden, United States, Thailand and Australia. Building on these studies, I elaborate a three-phased categorization to analyze place-based transformative pathways on agrarian frontiers of the Amazon.

The *triggering phase* refers to the period when an initiative is created. It unfolds when an abstract idea gathers the conditions to become a real-life project with the involvement of a community and the materialization of activities on the ground (see Bennett et al., 2016). This process often entails finding the financial means to start a collective endeavor, technical expertise to implement alternative land-use practices, social capital to engage community members and local knowledge to develop context-specific solutions to situated challenges (see Brondízio et al., 2021). In many cases, it also entails contact with public authorities to either understand how to comply with existing regulations or to flag the need to create new regulatory frameworks that better adapt to local demands (see Schmidt & McDermott, 2015).

The *nourishing phase* refers to the period when an initiative becomes more structured throughout the years. After the implementation of its first activities in practice, an initiative needs to be nourished so that its activities can be reproduced over time. This involves keeping the existing members engaged, inspiring new members to join, and also sensitizing younger members to the importance of such a collective endeavor. These elements are what Lam et al. (2020) call the 'amplification processes' of initiatives. This is particularly important where younger generations are influenced by the politico-institutional, techno-economic and socio-cognitive lock-in that favor unsustainable practices (see Hoelle, 2015, for a case study in Acre). Also, during this phase the capabilities to deal with broader social, political and economic changes are developed, such as new regulations, market demands, available products and techniques, or regional deforestation pressures. Therefore, during the nourishing phase the initiative's members and its leadership face a steep learning curve aiming to ensure the social reproduction of the initiative, while harnessing the core values that allowed for the initiative to emerge in the first place.

The *resilience phase* refers to the period when an initiative faces disruptive crises. In contrast to gradual or contextual modifications described in the nourishing phase, disruptive crises are changes that alter the fundamental conditions (e.g. social, cultural, political, economic) which allowed for the initiative to be created. They are abrupt and unforeseen shifts, such as the recent Covid pandemic which, in Brazil, was compounded by a political crisis, an upsurge in racism towards forest peoples as well as a dismantling of environmental institutions (see Castro et al., 2020; Russo Lopes & Bastos Lima, 2020; Hochstetler, 2021). During this stage, these initiatives have to develop a new set of skills to navigate challenging times. This entails reducing an initiative's exposure to risk and vulnerability, while also increasing its internal

coherence, building trust amongst its members, and strengthening solidarity amid uncertainty (see Stirling, 2014; Athayde et al., 2016). Thus, resilience thinking contributes to identifying the elements that enable place-based initiatives to survive such adverse contexts.

These three phases are an analytical attempt to represent the many processes which place-based initiatives go through. Rather than teleological or sequential, they are complementary, non-linear and can overlap. For instance, after going through a resilience phase, as a response to an external disruption, an initiative can be re-founded and go through a triggering phase again, where new ideas and practices will be inaugurated. In the same vein, an initiative can go through its nourishing phase, developing the internal conditions for consolidation, and at the same time face an unforeseen disruption and have to navigate a resilience phase concomitantly, dealing with external challenges. The purpose of this categorization, far from defining fixed phases for the analysis of pathways, is to propose an analytical differentiation that allows a closer look at the specific set of skills and support needed in different moments of place-based transformative pathways. This approach can help researchers, policymakers, and practitioners see the specificities of each phase and generate more integrated analyses, policies and collaborative work according to time and context.

The proposed analytical framework, therefore, opens possibilities to understand place-based transformative pathways as processes based on local agency which, influenced by state-level politics, challenge dominant lock-in mechanisms established at other scales. The place-based approach contributes to the analysis of forest-making practices as pockets of resistance that seek to overcome systemic barriers in agrarian frontiers. It further allows for an analysis that is sensitive to the shifts in values, perceptions, needs and context across scales, as well as to the pressures that favor deforestation and commodity expansion in the Brazilian Amazon. Place-based transformative pathways, thus, offer a politicized alternative to business-as-usual approaches to sustainability, in which socioenvironmental degradation and power imbalances are reproduced rather than challenged.

To investigate how place-based initiatives are able to transform landscapes in agrarian frontiers through forest-making, the diverse contexts of Amazonian states and local communities need to be accounted for. In the following chapter, I present a step-wise research design to analyze *two place-based forest restoration initiatives that carve transformative pathways toward sustainability in two contrasting frontier states*. Departing from an outline of the diversity of realities that exist in the arc of deforestation, I seek to understand how place-based initiatives may practice forest-making in different socioenvironmental contexts.

3. Converging transformative pathways in contrasting frontier spaces[*]

3.1. Research design

As previously described in Chapter 1, the Amazon is a vast and highly heterogeneous territory. The biome covers approximately half of Brazil (~4,2 million km^2), and hosts a population of over 24 million inhabitants (IBGE, 2021; Mapbiomas, 2021). The dominant image of evergreen forests masks the Amazon's wide range of ecological systems, including highlands, savannas and floodplains with distinct native vegetation and ecological functions (Moran, 1993; Milliken et al., 2010).[12] Similarly, the common image of forest peoples living in harmony with nature (see Brown & Purcell, 2005) masks the broad variety of rural populations, such as indigenous peoples (Porto-Gonçalves, 2001), rubber-tappers (Vadjunec et al., 2011), native seed collectors (Sanches et al., 2021; Maciel et al., 2018), African-descended *quilombolas* (Henrique et al, 2017), fishing communities (Castro & McGrath, 2003), family farmers (Nuggent, 1993; Adams et al., 2009; Alencar et al., 2016), large-scale farmers and ranchers (Milhorance & Bursztyn, 2018; Tovar et al., 2021), as well as the region's growing urban population (Browder & Godfrey, 1997; Becker, 2016).

The Brazilian Amazon extends through nine states with unique histories, geographies, cultures, and land-use dynamics (see Table 2). Each state represents a jurisdictional space in which local politics interplay with broader social, environmental and economic processes (see Milhorance et al., 2022; Valdiones et al, 2021). In the Amazon's agrarian frontier, this political diversity can be grouped into two extremes of a nuanced continuum, according to the way forests are represented in politics and society – the *forest states* and the *commodity states*. Each category enables different patterns of transformative pathways toward sustainability on the ground, influenced by the state-level political context. This thesis focuses on the states of Acre and Mato

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[12] For the purposes of this thesis, I use the terms *forest* and *deforestation* to also encompass other less common types of native vegetation in the region.

Grosso which are symbols of these two opposite development models in the Brazilian Amazon. Both states are located on the arc of deforestation (Fearnside et al., 2009), and yet have contrasting deforestation dynamics (Figure 4 below) as well as histories of territorial occupation, political structures, and social movement mobilization (see Barrozo, 2010 for an account of Mato Grosso, and Schmink, 2011 on Acre). In Acre, we can say that the emergence of place-based forest restoration initiatives is expected, due to the favorable political context, while in Mato Grosso their existence goes against the political odds.

Table 2. Territorial characteristics of Amazonian states

State	Total area (km²)	Share of state legally-protected area	Total population	Share of area in the Amazon	Total Amazon deforestation (km²)	Share of land use in Amazon area	
Amazonas	1,559,168	58%	4,269,995	100%	28,484	Native vegetation	98%
						Agriculture	2%
Pará	1,245,871	57%	8,777,124	99%	157,374	Native vegetation	83%
						Agriculture	17%
Mato Grosso	903,207	20%	3,567,234	57%	147,938	Native vegetation	66%
						Agriculture	34%
Maranhão	329,642	33%	7,153,262	35%	25,753	Native vegetation	53%
						Agriculture	46%
Tocantins	277,467	20%	1,607,363	9%	8,726	Native vegetation	28%
						Agriculture	71%
Rondônia	237,765	42%	1,815,278	99%	62,950	Native vegetation	64%
						Agriculture	36%
Roraima	223,644	66%	652,713	100%	8,594	Native vegetation	95%
						Agriculture	5%
Acre	164,124	48%	906,876	100%	15,779	Native vegetation	88%
						Agriculture	12%
Amapá	142,471	46%	877,613	100%	1,639	Native vegetation	98%
						Agriculture	2%
Sources	IBGE (2021)	MMA (2021) & ISA (2021)[13]	IBGE (2021)	Mapbiomas (2021)	INPE (2022)	Mapbiomas (2021)	

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[13] Referring to indigenous territories and conservation units located entirely within each single state.

Acre is one of the smallest states in the Brazilian Amazon, encompassing about 152,000 km^2. It has a large area of native vegetation, with almost 88% of the state's territory consisting of native forests, of which 48% are in legally-protected areas (Table 2). Acre's government has a history of implementing overarching mechanisms for forest protection, restoration and valorization grounded in the concept of forest citizenship, small-scale and traditional livelihoods and place-based sociobiodiversity production systems, as we shall see in Chapter 4 (see also Schmink, 2011; Vadjunec et al., 2011). The state is internationally recognized for its successful forest protection strategies and political support to traditional rural communities (Schmink et al., 2014; Schwartzman, 2015).

Only recently has Acre been more intensively integrated into the frontier dynamics of the arc of deforestation (see Tovar et al., 2021). The state has become part of an unfolding agrarian frontier known as AMACRO (in a reference to the triple border between the states of Amazonas, Acre and Rondônia in the Brazilian Amazon). The region faces a rapid expansion of cattle ranching, which is causing acute and unsustainable landscape transformations (see INPE, 2022; Trase 2022). According to Reydon et al. (2022), "the distance from the [state] capitals and [the weak] institutional enforcement has led to the disruption of the rule of law" in the AMACRO region. Furthermore, since 2019, Acre's state government has become aligned with the commodity-based narrative promoted by the conservative national government in power between 2019 and 2022. This political shift led to partial dismantling of the policy framework for forest protection historically designed in that state (see Kröger, 2020). As an illustration, the state governor was elected with the motto of "*Rondonizing the state of Acre*" (Pontes, 2019, para. 1), making reference to the agribusiness-oriented development model adopted in the neighboring state of Rondônia.

Mato Grosso, in turn, is among the largest states in the Brazilian Amazon and is about six times the size of Acre, around 903,000 km^2, being 20% located in the state's legally-protected areas. However, only 57% of the state's territory is part of Amazon biome, of which 66% remains as native vegetation. Mato Grosso is a consolidated region of commodity expansion, and is Brazil's largest producer and exporter of commodity crops (see Santos Lopes et al., 2017). The state's cumulative historical deforestation is the second largest in the Brazilian Amazon, second only to Pará (see Table 2). In contrast to Acre, Mato Grosso is an old agrarian frontier characterized by well-developed export infrastructure and concentrated land tenure (Barrozo, 2010; Milhorance & Bursztyn, 2018). Ioris & Ioris (2020, p.1) describe Mato Grosso as a case of a 'brand-old frontier' that continues to be socially and spatially reconfigured for increased commodity production. Recently, the state government started to include sustainability issues in its commodity-centered political incentives by adding market-driven mechanisms for forest conservation and reforestation, including

REDD+ and carbon offsetting schemes (Jepson, 2009; PCI, 2022), as we shall see in Chapter 4.

The two states are actively engaged in global environmental negotiations for reducing tropical deforestation and restoring forests. They are regular participants in the UN climate change conferences, in the Governors' Climate and Forests Task Force (see di Gregorio et al., 2020), and they are the only Brazilian states accredited to date to receive state-wide investments from REDD+ for Early Movers (REM), an initiative financed by the German development bank KfW (see Guerra & Moutinho, 2020, and also Duchelle et al., 2014a on specific REDD+ projects in both states). Nevertheless, until 2019, the two states exemplified contrasting roles of forests in sustainable development: as a central element of the state's culture and development in Acre (see Schmink et al., 2014), and as a barrier to commodity expansion in Mato Grosso (see Jepson, 2009; see also Tovar et al., 2021 for a comparison between these states).

The selection of Acre and Mato Grosso is motivated by their dissimilar historical contexts and contemporary land-use configurations, and yet their shared protagonism in the environmental agenda in national and international arenas (see di Gregorio et al., 2020; Tovar et al., 2021). The analysis of their history, actors and the way policies and narratives frame forests in both states will set the stage to analyze how state-level politics and place-based transformative pathways interact with each other.

In both states, various forest-based sustainability initiatives exist. They range from market-based and green economy approaches, such as deforestation-free cattle ranching, REDD+ mechanisms, payments for ecosystem services, carbon-offsetting bonds, and large-scale reforestation projects, all the way to small-scale, bottom-up and empowering approaches, such as place-based initiatives implementing agroecology, community-based ecotourism, artisanal handicraft production, artisanal fisheries, and sustainable timber management (Brondízio et al., 2021). Place-based forest restoration initiatives, in particular, are relevant agents of landscape transformation in these states. They practice forest-making in different ways, such as through the implementation of agroforestry systems in degraded areas for food production, or the dispersal of native seeds in deforested areas to reforest watersheds. To understand how similar initiatives unfold in these different land-use and political contexts, I analyze two place-based forest restoration initiatives, one in each state. They are both emblematic initiatives in the Brazilian Amazon and act as regional references of forest restoration, inspiring similar initiatives elsewhere.

Figure 4. Land use in the Amazonian states of Acre and Mato Grosso
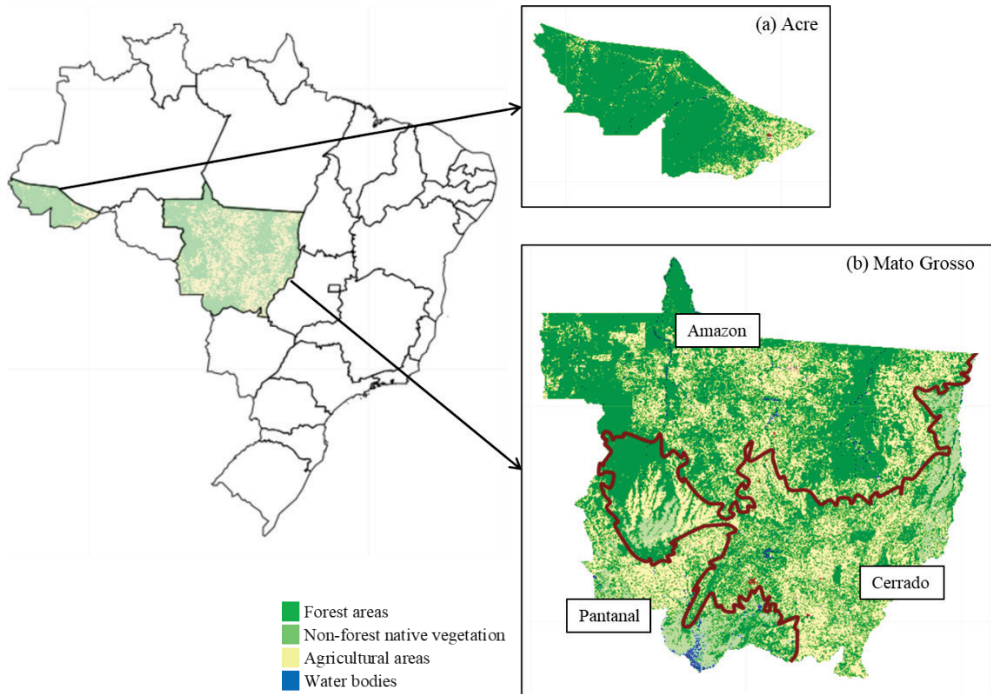
The thick burgundy lines in panel (b) show the boundaries among the three principal ecological biomes present in Mato Grosso.
Source: Own elaboration based on Mapbiomas, 2021

The first case is the RECA Agroforestry Project, an initiative is located in the municipality of Nova Califórnia, which is now part of the neighboring state of Rondônia, but has close ties to the history, identity, politics and culture of Acre (see Mello, 1990).[14] The cooperative founded in 1989 by family farmers migrating from other Brazilian states due to national land reform policies. They partnered with traditional rubber-tapper communities[15] to develop agroforestry systems which were adapted to Amazonian conditions. Agroforestry is a term to describe multifunctional and multi-crop land-use systems that combine various plant species of different

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[14] Nova Califórnia is located in a narrow strip of land known as the *Ponta do Abunã*, which borders the states of Acre, Rondônia, and Amazonas as well as the country of Bolivia. The region was disputed by Acre and Rondônia until Brazil's national constitution of 1988, which defined the region as part of the state of Rondônia. Nova Califórnia is currently a district of Porto Velho, the capital of Rondônia, which is 360 kilometers away; in fact, it is significantly closer to population centers in Acre, being only about 20 kilometers from the state border and 150 kilometers from Acre's state capital, Rio Branco.

[15] Rubber tappers are small-scale traditional communities that live off artisanal latex extraction in rural areas of the Amazon. In Brazil (and particularly in Acre), they are an important icon of socioenvironmental struggles for land rights and forest conservation (see Vadjunec et al., 2011).

heights (strata) in a usually small-scale area (Porro et al., 2012). Agroforestry systems can include species producing fruits, nuts, oil seeds, timber, as well as herbs and medicinal plants (see Bettinger et al., 2017; Young, 2017). These practices can be seen as a tropical expression of the notion of 'food forests', very common in Europe, that refers to urban forestry and forest gardens as food production solutions that "have the potential to provide healthy food, sufficient livelihoods, environmental services, and spaces for recreation, education, and community building" (Albrecht & Wiek, 2021, p. 91). The idea behind RECA, thus, is to produce food in family-farming plots through sustainable practices that create income opportunities and restore degraded forests. In fact, the initiative's slogan "planting forests of food" highlights these priorities (see Santos, 2022). RECA recovers areas which were mainly deforested due to land reform policy incentives and requirements (see Paula Pereira et al., 2022; Russo Lopes & Bastos Lima, 2022).

Figure 5 shows some views along the road (BR-364) from Rio Branco, capital of Acre, to Nova Califórnia. The trip is about 200 km, and takes approximately 3,5 hours by car. In the top-left picture we can see the landmark signaling the border between Acre and Rondônia; the top-right picture was taken just across the border, to show how close Nova Califórnia is from Acre; and the two bottom pictures were taken inside the municipality of Nova Califórnia, showing some areas of native vegetation in the region.   The second case is the Xingu Seed Network, a place-based native-seed collection network that promotes forest restoration in Mato Grosso, throughout 21 municipalities in the Xingu, Araguaia and Teles Pires river basins. Established in 2007, it unites indigenous peoples, family farmers and urban dwellers in the collection of native seeds to support regional forest restoration practices. Such local actors hold and develop contextualized knowledge on how to gather, clean, store and plant seeds of native tree species to promote restoration within traditional territories and private properties. The Xingu Seed Network has the support of local NGOs and social movements, and it partners with local governments, private companies and some progressive soy farmers in the region. The main purpose is to re-plant forests to restore rivers, springs and water bodies, as much as to comply with Brazil's national land-use legislation, the Forest Code.[16] In doing, so, the Xingu Seed Network promotes socioenvironmental transformations by building a sense of

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[16] The Forest Code (Law 12.651) is Brazilian legislation approved in 2012 to regulate land uses and define mandatory areas for forest conservation. These mandatory areas are divided into two categories: permanent preservation areas (APP), which include the native vegetation on mountain tops and near water bodies (e.g., rivers, lakes, springs), and legal reserves (RL), which are a percentage of the property that must be conserved as native vegetation (in the Amazon, RLs must include 80% of a property, while in other biomes it is as low as 20%). Whenever such mandatory areas have been deforested, they must be restored, according to the law (see Azevedo et al., 2017).

community, increasing local solidarity networks, creating income opportunities, and empowering local peoples, particularly women, as we shall see in Chapter 5.

Figure 5. Road from Rio Branco to Nova Califórnia

Source: Own fieldwork pictures

Figure 6 shows examples of the views along the road from Cuiabá, Mato Grosso's state capital, to the current headquarters of the Xingu Seed Network in Nova Xavantina. The trip is about 650 km in federal roads (mainly BR-070), and it takes approximately 12 hours by bus. The pictures were taken in different parts of this road from the bus window where I sat. All the pictures show large-scale agricultural fields and infrastructure used for commodity crops.

These two place-based initiatives share the objective of restoring forests in degraded landscapes and promoting forest-based livelihoods for local peoples. However, they do so in different ways, influenced by different political contexts at the state level, as we shall see in Chapter 4. The RECA Agroforestry Project focuses on food production through agroforestry systems, and is influenced by the context of forest protection and valorization in Acre. The Xingu Seed Network, in turn, focuses on replanting native forest, primarily in riparian areas to restore water bodies, and is embedded in the commodity-centered political, cultural and territorial dynamics of Mato Grosso.

Figure 6. Road from Cuiabá to Nova Xavantina

Source: Own fieldwork pictures

3.2. Methods

As explained above, this thesis analyses two different place-based initiatives in contrasting contexts of the Amazon's agrarian frontier – Acre as an example of a forest state recently reached by the arc of deforestation and Mato Grosso as a commodity state in a consolidated area of heightened deforestation. The analysis of both initiatives was based on three main sources of data generated from a mixed-methods approach: (1) interviews and fieldwork observations, (2) document analysis, and (3) an online survey.

This mixed-method approach helps understand the diversity of the Brazilian Amazon's agrarian frontier, both in terms of sub-national states' narratives and policies, and place-based forest restoration initiatives. The methodological strategy provides insights into cross-scale relations between state and local levels. As such, it enriches the analysis of how the dominant commodity system, consolidated at broader scales and influenced by state-level politics, interact with land-use practices on the ground. In the same vein, the mix of methods allows analysis of the different processes that enable place-based initiatives to resist such systemic pressures of commodity expansion, persistently carving and spreading transformative pathways toward sustainability.

3.2.1. Interviews and field observations

Interviews and fieldwork observations took place in three stages: (i) a first round of field visits and interviews in 2019, (ii) a second round of in-depth interviews by phone in 2021, and (iii) a third round of interviews during a return visit in 2022. The first round of fieldwork visits and interviews took place between June and September 2019 to contextualize the dynamics of forest conservation and restoration in each state and identify key place-based initiatives that were promoting transformative pathways toward sustainability on the ground. During this trip, I conducted 72 semi-structured interviews, 36 in Acre and 36 in Mato Grosso (Table 3; for more details on the interviewees see Annex). The interviews ranged from 40 to 150 minutes and took place in Portuguese.

Table 3. Stakeholders engaged during the first round of interviews

Sector	Description	Interviews in Acre	Interviews in Mato Grosso
Contextualization Group			
Academia	Scholars and researchers	3	3
Private Sector	Companies and privately-owned businesses	3	3
Public Sector	Policymakers and public servants at the municipal and state levels	7	3
Civil Society	Socioenvironmental NGOs at local, regional and national scales	7	14
Land-Users Group			
Local Actors	Traditional peoples and local communities, such as indigenous peoples, rubber tappers (*seringueiros*), afro-descendants (*quilombolas*), and family farmers	15	10
	Middle-to-large landowners	1	3
Total		**36**	**36**

The interviews were initially conducted with key informants in the two state capitals, Rio Branco (AC) and Cuiabá (MT) and, through snowball sampling, I further engaged with local actors in rural areas who implement and/or are closely involved in forest-based activities. Interviewees consisted of two main groups. The contextualization group includes representatives of academia, the private sector, the public sector, and civil society. These actors provided a broad characterization of each region. Within this group, there were also key representatives of institutions and organizations in each state, which offered valuable insights into state-level politics (see Table 4). The land-users group includes local actors, a category encompassing traditional peoples and local communities, such as indigenous people, rubber tappers

(*seringueiros*) and afro-descendants (*quilombolas*), family farmers and technical extension workers who assist these communities, as well as middle-to-large landowners. The land-users group provided local actors' perspectives on landscape transformations on the ground and it is the primary source of data used in the analysis.

Table 4. Institutions engaged in each state

Sector	Interviews in Acre	Interviews in Mato Grosso
Academia	Federal University of Acre 3 interviews in total	Mato Grosso State University Research station in a large-scale soy farm 3 interviews in total
Public Sector	State Secretariat of the Environment State Secretariat of Public Planning and Finances State Secretariat of Culture State Institute for Climate Change State office of the National Agency for Agricultural Research (Embrapa) Municipal Secretariat of Forests and Family Agriculture for Xapuri 7 interviews in total	State Secretariat of Family Agriculture State Board of the Produce, Conserve and Include policy Municipal Secretariat of the Environment for Alta Floresta 3 interviews in total
Civil Society	Amazon Environmental Research Institute Institute of Forestry and Agricultural Management and Certification World Wildlife Fund Brazil Research and Extension Group on Agroforestry Systems of Acre SoS Amazonia 7 interviews in total	Amazon Environmental Research Institute Institute of Forestry and Agricultural Management and Certification Earth Innovation Institute Center for Life Institute Environmental Defense Fund The Nature Conservancy Socioenvironmental Institute 14 interviews in total

The selection of interviewees was opportunistic but sought, as much as possible, to ensure a gender and generational balance. The interviews were unrecorded and anonymized. The quotes throughout the thesis result from on-site notetaking and were directly translated by me aiming to keep the original meaning of each statement. The data collection and storage was conducted according to the ethics regulations and guidelines from the Faculty of Humanities of the University of Amsterdam, with the approval number 2019-FGW_OTHR-10187.

The semi-structured interviews were focused around a set of guiding questions designed to explore local perceptions about forest conservation, restoration and deforestation practices in each frontier region. The interviews consisted of open questions on the interviewees' involvement in land-use practices, which initiatives they considered promising, successful or transformative, which aspects they regarded as transformative, the reasons why people conserve or restore forests, and the main barriers to forest-based practices in their regions.

The aim of the interviews was to identify what local actors perceived as the processes that lead to landscape transformations toward sustainability, and which initiatives were considered the 'bright spots' in each region. The responses were coded, categorized and analyzed through inductive coding divided into three thematic frames of drivers of forest restoration. These are (a) politico-institutional processes, with code labels such as '*the legislation requires*', '*fear of embargo or fine,*' or '*to comply with the law,*' (b) techno-economic processes, with code labels such as '*economic profits,*' '*cost-benefit,*' '*income stability,*' '*reduce environmental impacts,*' or '*access to sustainable land-use techniques,*' and (c) socio-cognitive processes, whose code labels hint at intangible factors such as '*individual motivations,*' '*personal beliefs,*' '*changes in mentalities,*' '*intrinsic passion,*' '*cultural identities,*' and '*spiritual value of forests.*' These coding guidelines were applied with the aim of ensuring consistency, accuracy and reliability in the qualitative data analysis.

Table 5. Initiatives visited during fieldwork

Category	Description	Activities	Leading Actors
Ecotourism	Tourism services based on forest conservation.	Birdwatching, observation of rare plants, experiences of forest livelihoods and contact with traditional communities. These range from community-managed projects to luxurious resorts.	Traditional peoples, local communities, family farmers, medium-to-large landholders
Agroforestry	Productive systems combining native forests and agricultural land uses.	Collection of non-timber forest products (e.g., latex, Brazil nuts, açaí berries, palm heart, copaiba oil. Some include sustainable timber management and artisanal production of natural furniture and bio-jewelry.	Traditional peoples, local communities, family farmers, private companies
Seed collection	Gathering, cleaning, storing and commercializing native seeds for forest restoration	Growing forests by planting young individual trees (seedlings) or by dispersing seeds through direct sowing (*muvuca*).	Traditional peoples, local communities, family farmers, urban dwellers, NGOs, government agencies and private companies
Carbon compensation	Financial return for carbon stocked by forests.	REDD+ projects involving payment for ecosystem services, and carbon-offsetting schemes that issue financial bonds to be traded in international carbon markets.	Traditional peoples, local communities, medium-to-large landholders, government agencies and private companies
Sustainable supply chains	Agricultural production based on socio-environmental criteria.	Deforestation-free commodities (i.e., cattle), and sociobiodiversity value chains (i.e., Brazil nuts, latex, native fruits).	Traditional peoples, local communities, family farmers, medium-to-large landholders and private companies

Based on the interviews, several place-based initiatives were identified and described by local actors as '*successful,*' '*promising*' or '*transformative*' due to their

longstanding forest-based land-use practices. I conducted site visits to 25 initiatives – 12 in Acre and 13 in Mato Grosso. The initiatives were categorized into five main land-use categories: ecotourism, agroforestry, seed collection, carbon compensation and sustainable supply-chains (Table 5). They were located in rural areas of each state, in the municipalities of Canarana, Nova Xavantina and Alta Floresta in Mato Grosso, Xapuri and Brasiléia in Acre, and Nova Califórnia in Rondônia.

The methodological step of identifying transformative place-based initiatives was aligned with the broader efforts of the AGENTS Project (Amazonian Governance to Enable Transformation to Sustainability),[17] a research consortium of which this thesis is a part. Together, the project members have built a database of 89 variables describing approximately 200 place-based initiatives implementing forest-based practices in more than 140 municipalities of the Brazilian Amazon (see Brondízio et al., 2021; Londres et al., 2023a). Considering the vastness of the Amazon and the multiplicity of place-based initiatives, this is a small sample based on local actors' inputs. It does not aim to be statistically representative; rather, it provides a variety of relevant case studies which, in the perception of local actors, are considered the type of 'bright spots' that create transformative pathways in the Amazon (Bennett et al., 2016; Bachi et al., 2023).

Based on data from the interviews, site visits and the collective AGENTS database, I selected the RECA Agroforestry Project and the Xingu Seed Network. During the fieldwork and rounds of interviews in Acre, the RECA Agroforestry Project has been recurrently pointed out as the regional reference, and the RECA members also emphasized their connection, participation and engagement with Acre's politics. My first contact with RECA members, in fact, occurred in Rio Branco, capital of Acre, which hints for the close connection between the initiative and the state of Acre. The Xingu Seed Network, in turn, was pointed out as a successful case by the actors interviewed in Mato Grosso. In sum, these initiatives were perceived and reported as well-established place-based initiatives in their regions that serve as inspiring examples of forest-making throughout these states.

In-depth phone interviews took place in December 2021. This remote interview method was chosen due restrictions on mobility and interpersonal contact during the global Covid pandemic. Previous site visits and contact with initiative members facilitated the effective implementation of this method. Four key members engaged in management and technical activities of each initiative were asked, among other questions, how each initiative emerged, how their members were able to reproduce their

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[17] The AGENTS Project is a research consortium between six universities: University of Amsterdam, Swedish University of Agricultural Sciences (Sweden), Stockholm Resilience Center (Sweden), Indiana University (United States), Colorado University (United States), and State University of Campinas (Brazil). See: https://agents.casel.indiana.edu/

activities for more than a decade in frontier regions, and how they were navigating the then-ongoing Covid crisis. These interviews were also performed in Portuguese, and lasted on average 60 minutes each. The interviewees' names remain undisclosed to ensure their anonymity (Table 6). This second round of in-depth interviews complemented the first round of fieldwork interviews by providing insights into the processes that lead and sustain transformation pathways toward sustainability over time.

Table 6. Stakeholders engaged during the second round of interviews

RECA Agroforestry Project	
Interviewee 1	Family farmer and former management-team member
Interviewee 2	Family farmer and part of the current management team
Interviewee 3	Second-generation family farmer
Interviewee 4	Initiative founder and family farmer
Xingu Seed Network	
Interviewee 1	Part of the current management team
Interviewee 2	Indigenous engagement leader
Interviewee 3	Family-farming engagement leader
Interviewee 4	Technical leader

The third round of interviews was conducted in August 2022 during a return visit to both initiatives. The main purpose of the visit was to present the thesis' preliminary analyses and co-validate the results with members from both initiatives. This was an important step to deepen the academic co-production analysis and empirically ground the theoretical contributions. The debates on the results with the local actors generated insightful feedback and inputs that were also included in the analysis. The visits took place in Nova Califórnia and Nova Xavantina, where the headquarters of the RECA Agroforestry Project and the Xingu Seed Network are located, respectively. In Nova Califórnia, I had a collective meeting with seven members of RECA in person, and in Nova Xavantina I had a collective meeting with eighteen members of Xingu Seed Network, of whom thirteen were in person and five online (Table 7).

3.2.2. Document analysis

Through the interviews and fieldwork, I have identified two main policy documents that represent Acre and Mato Grosso's mainstream narratives and policies about forests (see Tovar et al., 2021). In Acre, the Ecological-Economic Zoning (abbreviated

Table 7. Stakeholders engaged during third round of interviews

RECA Agroforestry Project	
Return visit	7 initiative members in person
Xingu Seed Network	
Return visit	13 initiative members in person, 5 online

ZEE in Portuguese) serves as the basis for a broad framework of forest-valorization policies. Between 1999 and 2018, the ZEE document developed the concept of *florestania* which became a state-level narrative bringing together forests and citizenship, as we shall see in Chapter 4. In Mato Grosso, Produce, Conserve and Include (PCI) is the main policy document that lays out the statewide policy on sustainable development and low-carbon agriculture. The PCI has been institutionalized through a state-level decree and produced spinoff documents, such as the PCI Pitchbook. The narrative of a modern frontier, portraying Mato Grosso as a key territory for the production of green commodities, derives from the analysis of these documents (see Table 8).

The analysis of such policy documents has been done mainly through content analysis of their self-declared goals and descriptions of implementation mechanisms. I have categorized them as *market-based goals and techno-economic mechanisms*, such as private investments, monetary compensation for conservation, sustainability certification, payment for ecosystem services, and a top-down approach based on quantitative targets. This is opposed to broader *cultural goals and socio-cognitive mechanisms*, such as local empowerment through environmental education, cultural valorization of forests, technical support to forest-based livelihoods, political empowerment of place-based initiatives, and inclusion of forest communities in decision making. Through this differentiation, I characterized the mainstream public narratives in each state, outlined how they frame forest conservation, and assess how they nudge land uses in different directions.

In addition to the policy documents, I have also analyzed institutional documents of the RECA Agroforestry Project and the Xingu Seed Network (Table 9). These documents allowed for the characterization of each initiative's history of development, as well as of the broader transformative pathways promoted by each of these place-based initiatives. In this sense, the document analysis complemented and triangulated the data obtained through the different rounds of interviews and fieldwork.

Table 8. Policy documents analyzed in Acre and Mato Grosso

State	Policy Document	Year	Source
Acre	Ecological-Economic Zoning Phase I	2000	http://semapi.acre.gov.br/wp-content/uploads/sites/20/2022/02/ZEE-I.pdf
	Ecological-Economic Zoning Phase II	2007	http://semapi.acre.gov.br/wp-content/uploads/sites/20/2022/02/ZEE-II.pdf
	Ecological-Economic Zoning Phase III	2020	http://semapi.acre.gov.br/wp-content/uploads/sites/20/2021/12/COMPLETO-Resumo-Executivo-do-ZEE-Acre-Fase-III_V16_WEB.pdf
Mato Grosso	Produce, Conserve and Include Strategy	2015	http://pci.mt.gov.br/
	State-level Decree nº 468	2016	https://www.jusbrasil.com.br/diarios/112251130/doemt-31-03-2016-pg-2
	PCI Pitchbook	2019	https://www.idhsustainabletrade.com/uploaded/2019/05/PCI-PitchBook-final-online.pdf

3.2.3. Online survey

An online survey was another methodological adjustment to the limitations posed by Covid-related travel restrictions. The online survey was carried out in July 2021 using the *Qualtrics* software. The survey consisted of three multiple-choice questions and two open-ended questions. The multiple-choice questions inquired into how place-based initiatives in Acre and Mato Grosso (a) came into existence, (b) consolidated over time, and (c) navigated crises – focusing on the Covid pandemic as an example of a multidimensional political and public-health crisis. The open-ended questions sought to capture local perceptions on the positive and negative landscape transformations brought about by the Covid pandemic. The survey was sent to the same group actors from the first round of interviews, who further disseminated it to other stakeholders as they considered relevant. The survey was answered anonymously and had 80 respondents, including members from academia, the private sector, the public sector, civil society and local actors, all working with or living in the Brazilian Amazon.

3.3. Positionality

Researchers in the social sciences have been increasingly encouraged to write about their positionality and how it affects the research process. The goal is to include a layer of personal information on the researcher's background and previous experiences to clarify how it influences the way the research is conducted (e.g., methods chosen) and interpreted (e.g., broader significance of the research results; see

Table 9. Institutional documents analyzed from the RECA Agroforestry Project and Xingu Seed Network

Initiative	Institutional Document	Source	Research Purpose
RECA Agroforestry Project	Our Mission	https://www.projetoreca.com.br/en/mission/	Identify the initiative's declared priorities
	Our Roots: We Value Our History	https://www.projetoreca.com.br/en/about-us/	Understand the initiative's self-perception and self-image
	Timeline	https://www.projetoreca.com.br/en/timeline/	Get information on the initiative's development history
	Our Supporters	https://www.projetoreca.com.br/en/our-supporters/	Map out the initiative's connections and partnerships across scales and sectors
	Our Projects	https://www.projetoreca.com.br/en/projects/	Assess the mechanisms through which agroforestry activities are implemented
	Our Products	https://www.projetoreca.com.br/en/produtos/	Identify the main food products from the local agroforestry systems
	Social Organization	https://www.projetoreca.com.br/en/social-organization/	Analyze the socioenvironmental impacts of the transformative pathways adopted by this place-based initiative of forest restoration and understand how they navigated the Covid pandemic
	The Role of Women	https://www.projetoreca.com.br/en/the-role-of-women/	
	Education	https://www.projetoreca.com.br/en/education/	
	Agroforestry Systems	https://www.projetoreca.com.br/en/agroforestry-systems/	
	Organic Composting	https://www.projetoreca.com.br/en/organic-composting/	
	Certification	https://www.projetoreca.com.br/en/certification/	
Xingu Seed Network	What is the Xingu Seed Network?	https://www.sementesdoxingu.org.br/sobre	Identify the initiative's declared priorities, self-perception and self-image
	Who Are We?	https://www.sementesdoxingu.org.br/quem-somos	Identify the main local actors engaged in the initiative
	Where Are We?	https://www.sementesdoxingu.org.br/onde-estamos	Understand the scope and scale of action of forest restoration activities of this initiative
	History of the Xingu Seed Network	https://www.sementesdoxingu.org.br/historia-da-rede-de-sementes-do-xingu	Get information on the initiative's development history
	Partners and Supporters	https://www.sementesdoxingu.org.br/parceiros-e-apoiadores	Map out the initiative's connections and partnerships across scales and sectors

Initiative	Institutional Document	Source	Research Purpose
	Xingu Seeds: the Largest Network of Native Seed Collectors in Brazil	https://youtu.be/aXE8Cv2Qge4	Analyze the socioenvironmental impacts of the transformative pathways adopted by this place-based forest restoration initiative and understand how they navigated the Covid pandemic
	15 Years Collecting Seeds	https://www.sementesdoxingu.org.br/noticias/rede-de-sementes-do-xingu-retoma-atividades-gradualmente-e-bate-recorde-de-coleta	

Sikes, 2004). Positionality is shaped by multiple dimensions of a person's existence, including gender, sexuality, race, socioeconomic status, geographic origin, native language, and culture (see Bourke, 2014). This intersection of identities shapes a person's life experiences and, therefore, their individual mindset, beliefs and perceptions. In regard to knowledge production, positionality shapes the researcher's

> [O]ntological assumptions (an individual's beliefs about the nature of social reality and what is knowable about the world), epistemological assumptions (an individual's beliefs about the nature of knowledge) and assumptions about human nature and agency (an individual's assumptions about the way we interact with our environment and relate to it) (Holmes, 2020, p.1).

Hence, in the same way I emphasize that the worldviews of research participants shape their behaviors and mentalities, my own worldviews also shape my approach to the research topic and the aspects that I prioritize during the research. To clarify where I come from and how I relate to the forest restoration led by local communities in the Brazilian Amazon, I will tell more of my personal background.

I am (at the time of writing) a 33 year-old cis woman who was born in Nova Iguaçu and raised in Niterói, two municipalities of Rio de Janeiro state. These are highly-urbanized and densely-populated areas of the Atlantic Forest, a biome which has only 12.5% of its native vegetation remaining (see IBF, 2020). I am from a middle-class family and I had access to many privileges while growing up due to race and economic status. My ancestors were mainly immigrants from Italy and Portugal and, to a lesser extent, Brazilians of indigenous roots. In this sense, in Brazil I am regarded as a white woman – although in Europe I am mostly seen as 'Latina'.

I have studied in private schools and universities due to scholarships granted for academic performance. These scholarships allowed me to pursue a bachelor's degree in International Relations at the Pontifical Catholic University of Rio de Janeiro (PUC-Rio) and a master of science degree in Globalization, Environment and Social Change at Stockholm University (SU) in Sweden. Later, I started working for a socioenvironmental NGO, the Amazon Environmental Research Institute (IPAM, in

the Portuguese acronym), in Brasília, as a socioenvironmental researcher. In 2019, I moved to the Netherlands to start my PhD at the Centre for Latin American Research and Documentation at the University of Amsterdam (CEDLA-UvA). Through this professional and academic trajectory in the social sciences I have developed my approach to sustainability and socioenvironmental processes through social, historical and political lenses.

I am interested in how human beings interconnect, form bonds and are able to reinvent day-to-day activities over time. I am also interested in how coming together, belonging to a community, sharing experiences and having collective objectives can help individuals overcome challenging contexts. In my view, such social processes are even more fascinating when we add nature as a living system that interacts with and also builds relations with human beings. The multiple (and sometimes opposed) ways that humans see and attribute meaning to their surrounding environments is a continuous source of inspiration for my personal and academic reflections.

My own way of relating to the natural environment has shifted throughout my life. Growing up in urban Rio de Janeiro, Brazil's many types of native vegetation were somehow alien to me, associated with mosquitoes and high temperatures. The first time I went to the Amazon I was about 23 years old, out of personal interest. I travelled to Manaus specifically to see the Amazonas Theater. The region was an unchartered territory to me and I was impressed by how such a sumptuous (and highly Europeanized) building was constructed in a city in the middle of the forest in 1884 – when Brazil was still an Empire run by Dom Pedro II, a monarch who was next-in-line to the Portuguese throne. From an early age, this uniqueness and the contradictions of Brazil's construction as a country have astonished me. I went to the Amazon to further explore the improbable process of forging a single country out of so many different regions, but my worldview expanded in many more ways than I could initially foresee.

This trip to Manaus introduced me to new worlds of tastes, foods, smells and accents. I tried the indigenous *tacacá* soup, I had my favorite fish for the first time, the *tambaqui*, and I got to know the Amazon's main means of transportation, the small *voadeira* boat. I also visited the museum of rubber tapping, a clearing in the middle of the forest that tells the story of the many communities that produced artisanal rubber in the region. I witnessed the ingenious solutions these local communities found for everyday issues, such as food storage or sleeping. I also saw how local elites (often the landowners of rubber-tapping areas) had a very different lifestyle, which included extravagant habits such as sending clothes and linen by boat to be washed in Europe because they thought the water was cleaner there.

Since then, I became more and more interested in knowing the different ways through which Brazilians exist in the world, their habits, cultures and livelihoods,

especially in rural areas. During my master's degree I went to Pará for fieldwork in land reform settlements. After that, through my work experience in IPAM, I had the opportunity to travel extensively for two years in the Amazon and also the Cerrado, the savanna in the center of Brazil where most of soy production happens. I have been to Acre, Amazonas, Pará, Rondônia, Mato Grosso, Maranhão, Tocantins, Goiás and Distrito Federal to interview members of local communities, understand their challenges (particularly due to commodity expansion) and learn about their pathways to exist and resist in their territories. I have been to indigenous territories, *quilombola* areas, land reform settlements, family-farming communities, private-conservation areas for ecotourism and carbon-offsetting bonds, large-scale agricultural operations (cattle ranches, and soy and açaí monocultures), and medium-scale farms that inter-crop soy with maize, cotton and even watermelons. Figure 7 shows some of the experiences I had while conducting fieldwork for this thesis in Acre and Mato Grosso.

Throughout all these fieldwork experiences, I have been regarded by different actors in quite contrasting ways. On one hand, local communities often see me as an important visitor 'coming from abroad,' and they treat me as well as they can; they have slaughtered pigs to celebrate the presence of research groups and have offered me types of food that were not always available for local women. While such situations

Figure 7. Snapshots of fieldwork experiences in Acre and Mato Grosso

Source: Own fieldwork pictures

show their satisfaction in receiving people willing to hear their stories and possibly talk about them even in other countries, they also represent a bias risk in how these actors may respond to questions, as they very much want to please me as a researcher. On the other hand, I have the impression that larger landowners, who are more powerful actors, often regard me as a small city girl who knows little or nothing about rural activities. I am indeed quite short (1.54 m), and my accent from Rio de Janeiro gives away my urban background. I try to benefit from this situation by indeed asking basic questions and letting these actors lead me through their ways of thinking and worldviews.

I believe that the contact with such a variety of local actors from diverse rural areas of Brazil has contributed to form a mosaic of experiences in my mind. This mosaic enables me to have the clarity that, as much as there isn't a single Brazil as a homogeneous country, neither is there a single homogenous Amazon. Each and every context bears its own uniqueness and contradictions that need proper understanding within any academic research. The element that most binds rural communities together is the living forest that these peoples interact with as part of their a strong attachment to and identification with their territories and connection to the surrounding nature. The co-production of a life together with the forest is what differentiates place-based initiatives and local communities from commodity farmers who take their plantations to whichever frontier is most profitable at the moment.

In the next chapter, I explore how such diversity of actors and contexts is encapsulated by state-level governments, which are jurisdictions that bear evident particularities and whose politics directly affect land uses and livelihoods on the ground. States are a key unit of analysis as they mediate the political interactions between local actors, national policies and international agreements. They provide valuable insights into how cross-scale processes take different shapes on the ground, as we shall see in the analysis of public policies and narratives in the states of Acre and Mato Grosso.

4. State-level politics: The role of public narratives and policies

As discussed in Chapter 2, transformative pathways led by place-based forest restoration initiatives are connected to political, socioeconomic and cultural processes at multiple scales. While place-based initiatives emerge in localized contexts and are led by local actors, they also have connections, partnerships and networks of collaboration at broader scales (see Lam et al., 2020; Brondízio et al., 2021). State-level politics can mediate such cross-scale processes through public narratives and policies, which further shape the development of place-based initiatives on the ground (see Figure 3 in Section 2.4). In this chapter, I analyze the role of states as an intermediary administrative level that influences landscape transformations toward (un)sustainable directions.

I propose the concept of the narrative-policy nexus to analyze state-level politics as a multidimensional and co-produced process. The narrative-policy nexus shapes the politico-institutional, techno-economic and socio-cognitive context at the state level, which can facilitate or hinder the emergence of place-based transformation pathways throughout the landscape. Such a nexus results from the state-society interactions, where government agencies, non-governmental organizations, interest groups and social movements negotiate and co-produce approaches to agricultural and forest-based land-uses at the state level (see Abers et al., 2014). The narrative-policy nexus, therefore, implies an interplay between the way forests are socio-cognitively framed by dominant public narratives, and the way policies elaborate political, technical and economic mechanisms according to such framings.

I argue that attention to the sub-national state as an analytical unit can provide a better understanding of the diversity of approaches to sustainable development and forest restoration in agrarian frontiers such as the arc of deforestation. This lens further helps understand how place-based initiatives carve different transformative pathways under distinct sub-national contexts of the Amazon. Based on document analysis as well as interviews with state agencies, civil society organizations and academics in both states (see Table 4 in Section 3.2), I develop this argument in the four subsequent sections of this chapter. First, I present the theoretical and conceptual debate on sub-national forest governance. In the following two sections, I respectively describe and analyze the development of distinct narrative-policy nexuses in Acre and in Mato Grosso in regard to forests. Finally, I discuss the implications of

such empirical analysis for the study of states as a relevant arena for cross-scale political mediation.

4.1. Sub-national forest governance

Sub-national governments have gained particular relevance as an analytical unit in forest governance following the debates on political decentralization and federal systems (Colfer & Capistrano, 2005; Gregersen et al., 2012). Their potentially-higher degrees of legitimacy due to increased local participation can facilitate the implementation of policies and programs formulated at broader scales (see di Gregorio et al., 2020; Kelly & Crandall, 2022). This is particularly true in the context of forest-rich countries which face limited institutional capacity at the national level (see Agrawal & Ostrom, 2008; Milhorance et al., 2021; Valdiones et al., 2021). Sub-national governments, therefore, are able to open spaces for varied experimentation based on contextualized principles and needs of different localities (Andersson, 2006; Ostrom, 2010; Molina-Garzón et al., 2021).

The agency of sub-national governments in forest protection, however, has proven to also have a dark side, especially in the Global South where such governments are usually allied with local elite groups (see Persha & Andersson, 2014). Under this context, formal redistribution of decision-making authority to lower government levels has limited ability to broaden citizenship and democratic processes. Focused mainly on municipal governments, several authors concluded that authority devolution to municipal governments under limited institutional capacity, instead of promoting broad participation, may enhance the power of local elites and create more challenges for the inclusion of marginalized groups in political processes (see Andersson, 2006). To effectively use decentralization to include and empower these marginalized groups, Ribot et al. (2006) emphasize the need for accountable institutions and autonomous decision-making at the local level. Larson & Soto (2008) note the importance of understanding who receives power in decentralization strategies and what are their conceptualizations of democracy, participation and (sustainable) development.

The focus on municipal governments has limited the understanding of other relevant political arenas where landscape transformations are conceived, shaped and implemented. In federative countries like Brazil, states are such a relevant political arena. They enjoy a substantial degree of administrative autonomy, holding their own budget and taxation capacities as well as the prerogative to design state-level institutions and manage socioenvironmental databases (Gregersen et al., 2012; Andrade et al., 2017; Valdiones et al., 2021). The emergent concept of jurisdictional approaches (see Stickler et al., 2018) highlights the state level as a relevant political

boundary for forest policies (Bastos Lima et al., 2017). To date, this perspective has tended to focus on the role of state governments in receiving and managing international financing for sustainability outcomes through market-based mechanisms such as carbon offsetting and REDD+ schemes (e.g., Boyd et al., 2018).

I argue, however, that the relevance of state-level governments goes beyond such techno-economic solutions. States are territories where unique histories, cultures and identities form a political unit where narratives and policies are negotiated among different state-society stakeholder configurations (see Abers et al., 2014; Kelly & Crandall, 2022). In the Amazon, states are a playing field where political framings of forests are created and landscape transformations are imagined, designed and contested (see Peluso & Vandergeest, 2020; Messinger & DeWitt, 2015). In sum, the political context at the state level plays a key role in shaping place-based transformative pathways through their unique narrative-policy nexuses (see Section 2.4).

As described in Section 3.1, Amazon states differ in terms of size, population, land uses, deforestation patterns, legally-protected areas, among other features (see also Table 2 in Section 3.1). Some states, for example, have historically developed statewide mechanisms specifically designed for forest protection and valorization. This is the cases of cash-transfer programs like 'Bolsa Floresta' in Amazonas (Alves-Pinto et al., 2018) and 'Pro-Extrativismo' in Amapá (Viana, 2014), which are cash-transfer programs that remunerate forest-holders for their conservation activities; as well as the broad political framework of *florestania* in Acre, which we shall see in Section 4.2. Other states are more focused on promoting large-scale agriculture, as in Rondônia and Mato Grosso (see Fearnside et al., 2009; see also Section 4.3). Some states are also active in multilateral negotiations through sub-national connections, such as the Amazon's Consortium of Governors and the Governors' Climate and Forests Task Force (see di Gregorio et al., 2020). These socioeconomic, political, geographic and historic characteristics influence the development of different narrative-policy nexuses (Porto-Gonçalves, 2001; Brondízio et al., 2021). By their framing of the role of forests in society, states can promote or hinder the emergence of place-based transformative pathways.

State-level politics also have direct effects on legal compliance (or lack of), and on the implementation of sustainability goals defined at broader scales (Bizzo & Michener, 2017; Milhorance et al., 2021). States create institutional settings that influence the local impact of international and regional commitments on forest restoration, such as the UN Decade on Restoration (see Table 1, Section 1.3). The achievement of the restoration goals foreseen in these commitments largely depends, for instance, on the land registries and databases managed by state governments, which are crucial for the design and monitoring of implementation mechanisms (see Valdiones et al., 2021). The availability and access to such land-use data is an example of

how state-level politics can embolden or weaken the ambition of broader commitments and shape how they are translated to local scales. In the words of an interviewee engaged in nationwide sustainability discussions, "the state level is indeed where the socioenvironmental agenda gets strengthened or blocked." (Mato Grosso Civil Society 2, see Annex).

Through a narrative-policy nexus, states can also play a relevant role in challenging (or reinforcing) the political priorities stemming from national politics. By designing state laws, guidelines, official definitions and bureaucratic procedures, states can facilitate or create obstacles to national regulations, such as the National Plan for the Recovery of Native Vegetation (see Section 1.3) and Brazil's land-use legislation, the Forest Code (see Section 3.1). States can obstruct the implementation of progressive federal policies, or they can also sustain the socioenvironmental agenda in the context of institutional dismantling. An example of the latter was the role of state-level governments throughout the right-wing turn in Brazilian politics from 2019 and 2022 (see Hochstetler, 2021). "The role of sub-national states gains a lot of significance in a scenario of anti-environmental policy." (Mato Grosso Civil Society 5, see Annex) The participation of Amazonian states at the UN Climate Conference (COP27) in 2022 illustrates this; while the official national government pavilion focused on the Brazil's renewable-energy efforts, the Amazon Consortium of Governors ran a separate pavilion whose main focus was forest-based sustainability solutions (Climainfo, 2022). States, in this sense, can be active participants in political circles, buffering how national priorities land in state-level contexts.

Therefore, states are relevant analytical units to show the diversity of contexts in the Amazon, to better understand how narrative-policy nexuses perform a cross-scale political mediation and how they influence land uses on the ground. The two states analyzed in this chapter illustrate how the state-level arena may open political space for state-society interactions where landscape transformations are conceived, contested, disputed and negotiated. The narrative-policy nexuses in Acre and Mato Grosso represent core processes at play in the Amazon's agrarian frontier. Although connected to similar political configurations at higher scales, these states represent contrasting perspectives on forest restoration and landscape transformations. On one hand, the *florestania* narrative materialized in the Ecological Economic Zoning (abbreviated ZEE in Portuguese) policy in Acre, during the period of 1999-2018. On the other hand, the modern frontier narrative emerged from the Produce, Conserve and Include (PCI) policy in Mato Grosso between 2015 and 2019. To understand the construction of these nexuses, the two following sections respectively analyze Acre and Mato Grosso's historical backgrounds, main political actors in forest governance, and the socio-cognitive images over forests constructed during the addressed periods.

4.2. Acre: The forest citizenship state

Acre is a small Amazonian state with 88% of its natural vegetation intact, 48% of which is in protected areas (see Table 2 in Section 3.1). Acre is in the western-most region of the Brazilian Amazon (see Figure 4 in Section 3.1), in the AMACRO frontier region where, as shown in Chapter 3, the arc of deforestation has been recently expanding (Reydon et al., 2022). In fact, almost all deforestation in the state is concentrated in its southern portion (INPE, 2022).[18] The state's history of territorial struggles and conflicts over forest access has created the enabling conditions for the emergence of forest-oriented narratives and policies within state agencies (Vadjunec et al., 2011; Schmink et al., 2014), as we shall see below.

Historically, forest protection, restoration and valorization have been a priority in state-level politics. In the late 19th century, the region of Acre was characterized by abundant native rubber-tree groves. It became part of the global trade of natural latex to supply the increasing demand from the booming automobile industry (Ranzi, 2008, see also Porro et al., 2012). Part of Bolivia in the period up to 1899, the growing economic importance of the region paved the way for conflicts between local forest dwellers trying to protect their socioenvironmental and territorial rights, and external actors – e.g., foreign landowners, and governmental authorities – who sought to exploit latex. Such conflicts led Acre to a short period of independence, followed by its territorial annexation into Brazil in 1904 (Ranzi, 2008).

When the rubber boom ended, Acre entered a long period of relative isolation from national and global commercial hubs. The rubber groves, abandoned by the large-scale landowners, were informally occupied and appropriated by their rural workers – the rubber tappers – who developed a forest-based livelihood combining the extraction of forest products (mainly latex and Brazil nuts) with subsistence agriculture. The endurance of local populations in rural areas of Acre was a result of rural struggles and resistance by individuals and communities who had an attachment to their territories and surrounding forests. Some scholars call this acute sense of local identity connected to forests and self-determination as "Acre-ness" (*acreanidade*) (see Morais, 2008). In this sense, territorial contestations, social mobilization, and forest-based livelihoods are key building blocks of the environmental subjectivity that has been consolidated among Acrean local peoples and traditional communities.

Forest identity and territorial attachment paved the way for the emergence of a socioenvironmental movement in the 1980s in response to the conflicts between local forest-based communities, and loggers and cattle ranchers, who were the leading

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[18] Since 2019, political shifts in Acre and in the national government have been further facilitating a sharp expansion in cattle ranching in the state's southern region (see Mapbiomas, 2021).

actors of a new wave of natural-resource extraction in the region (see Schmink, 2014). The loggers and ranchers are a social group comprising medium-to-large scale actors. They were attracted to the Amazon by a series of national-development programs of territorial occupation, which incentivized widespread deforestation for agricultural expansion (Ranzi, 2008; Alencar et al., 2016), as seen in Section 1.2. These newcomers encountered steadfast resistance from the rubber tappers and indigenous communities, who defended their traditional territories through human blockades, known as *empates* – aiming to contain the advance of deforestation by loggers (Hecht & Cockburn, 2010; Vadjunec et al., 2011).

Such *empates* were a peaceful resistance movement that gave rise to the Forest Peoples Alliance under the leadership of the rubber tapper and unionist Chico Mendes. This alliance engaged different forest-based communities, such as indigenous and rubber-tappers, in a cross-scale strategy of social mobilization, seeking support for their territorial struggle in broader political arenas (Bunker, 1988). Mendes' murder in 1988 brought international attention to the Amazon by connecting the territorial conflicts and deforestation in Acre with the emergent climate-change agenda (Hochstetler & Keck, 2007). Framed as 'forest guardians' by transnational activist groups, rubber tappers were politically empowered to claim their rights to a special type of land-tenure category based on collective rights and forest-based sustainable production (see Vadjunec et al., 2011). As a response to such claims, in the 1990s the national government established the extractive reserve (RESEX) and the agro-extractivist categories of land reform settlements (PAE; INCRA, 2020). These transformative territorial models of collective land rights were an outcome of a bottom-up process co-produced by rubber-tappers and activist scholars, which was then out-scaled and amplified to similar models in other Brazilian states as well as other countries (Maciel et al., 2018).

The cross-scale mobilization based on forest identities and local resistance is the roots of the development of Acre's forest citizenship narrative later in the 2000s. The recognition of collective territories is an outcome of the creative and innovative ways of resistance from multiple social movements in Acre, and the political space at the state level that allowed them to do so. Forest peoples found ways through the fringes of a dominant system of resource extraction to exert their agency and connect their local demands for territorial rights to international demands for forest protection. This strategy had direct effects on the advancement of the socioenvironmental agenda in Brazil, leading to the strengthening of national policies and institutional apparatus for forest protection, such as formal-titling programs for forest peoples, demarcation of indigenous territories, creation of a national system for protected areas, and the elaboration of environmental regulations, to name but a few (Schmink et al., 2014; Castro, 2012; Brondízio et al., 2021). Keck & Sikkink (1998) call this

process a "boomerang effect" in which national governments are bypassed by transnational alliances between local communities and international actors, to exert influence back on national politics. This perspective, however, overlooks the role of subnational states in this process.

As an autonomous jurisdiction, Acre's state government played an important role in supporting the socioenvironmental demands from forest peoples. It contributed to an inclusive decision-making process that led to the construction of narrative and policies of forest valorization (see Tovar et al., 2021). Throughout five consecutive administrations, a coalition led by the progressive Workers' Party (1999-2018) mobilized the state's forest identities and the legacy of Chico Mendes' social movement to gain political legitimacy and implement the project of a forest citizenship state (Guimarães Júnior, 2010). Not only did the government promote inclusive forest governance and provide public services in rural areas, but also it created forest-oriented jobs in the public sector and opened the political space for co-production of place-based transformative pathways (see Schmink, 2011).

Grassroots and social-movement leaders occupied public positions throughout this period, and directly influenced the process of narrative- and policy-making (see Abers et al., 2014). As a result, the narrative of *florestania* has been co-produced among public agencies, grassroots organizations, NGOs and progressive researchers (Schmink, 2011). The term mashes up the Portuguese words for forest (*floresta*) and citizenship (*cidadania*), emphasizing forest valorization and popular participation as core principles in state-level politics (Vadjunec et al., 2011). Over the nearly two decades, from 1999 to 2018, the narrative of *florestania* was envisaged, designed and implemented through a continuous interaction between state and society (see Guimarães Júnior, 2010; Abers et al., 2014).

The idea of *florestania* is the epitome of Acre's history of social mobilization and forest-based identities, which facilitated the development of place-based initiatives. During this period, the state's forest-citizenship approach was grounded in support for small-scale and traditional forest-based livelihoods, as well as incentives for sociobiodiversity production (Schmink, 2011). In the period of *florestania*, Acre's forest-citizenship narrative has been constructed by framing forest conservation and restoration as essential parts of the state's development (Morais, 2008). Strengthening forest-based identities and the notion of Acre-ness, this narrative provides a socio-cognitive foundation that facilitates the emergence and consolidation of place-based transformative pathways.

Florestania is formally described in Acre's ZEE policy document. It is framed as a multidimensional concept that "goes beyond the citizenship of forest peoples" (Acre, 2010, p. 8), highlighting the critical role of forests for all citizens across the state:

> [It is] the cultural foundation of a sustainable-development project that wants to collaborate and gather partners to build the society of the 21st century. (…) [It is] the vision of the government and society about the new style of local and regional development that we want and that are building in our state, based on the appreciation of the socio-cultural and environmental heritage and on popular participation, [that is what] what we call *florestania*. (Acre, 2010, p. 8-10)

The ZEE, in turn, is the state's territorial planning policy which materialized the *florestania* narrative into policy-making. It created the legal and political foundations for state-level policies of forest protection and valorization (see Tovar et al., 2021). The ZEE was financed by the state's public budget with support from national and international donors – Brazil's National Bank for Economic and Social Development (BNDES), the Inter-American Development Bank (IDB), the Pilot Program to Conserve the Brazilian Rainforest (PPG-7) and a German public bank (KfW) (Acre, 2010).

The ZEE policy is based on the definition of four types of territorial zones (see Acre, 2020): sustainable agricultural and forestry production systems (Zone 1), sustainable use of natural resources and environmental protection (Zone 2), priority areas for territorial planning (Zone 3), and urban areas (Zone 4). Zone 1 is the areas of expansion and consolidation of agricultural activities, which take place on private farms as well as smallholder areas, such as family farms in land reform settlements and rubber-tapping communities. These are the areas in which restoration practices usually take place, recovering land patches previously cleared for agriculture. Zone 2 is the areas of forest conservation, including indigenous territories as well as conservation units with full-protection and sustainable-use designations. Zone 3 is the areas with undefined land tenure, including public forests and not-yet-formalized territories of traditional populations (e.g., indigenous, fishing communities, rubber tappers). Zone 4 refers to the state's cities, mainly located in four river basins (Juruá, Purus, Tarauacá and Envira).

The ZEE designed mechanisms to protect forest peoples' territorial rights through the creation of state-level protected areas and traditional territories. The policy further provided key techno-economic incentives, such as technical assistance, public credits, tax breaks and subsidies for forest-based practices. It also developed rural infrastructure for the production and commercialization of sociobiodiversity products (see Acre, 2010). Examples are the condom factory constructed to add value to local latex production, the wooden-floor factory to stimulate community-based sustainable timber management, the ecotourism project in the Chico Mendes Extractive Reserve, and the establishment of a subsidy for latex production above the product's market price to ensure the producers' livelihoods in spite of market fluctuations (Acre, 2010). Benefitting from international financing streams, the ZEE also sought

to design market-based mechanisms oriented to the needs of local communities by establishing socioenvironmental safeguards. This was the case of the statewide jurisdictional system for payment for ecosystem services (SISA), in partnership with the REDD+ for Early Movers (REM) program of the German bank KfW (Duchelle et al., 2014b; IMC, 2022). Finally, the government stimulated entrepreneurship within cooperatives and local-producers' associations, adapting public bureaucratic structures to foster forest-based activities, strengthen community-based management, promote forestry education and co-design commercialization strategies (Schmink, 2011).

The *florestania*/ZEE nexus was a milestone for forest governance in the Amazon, demonstrating that forest-based development can be both viable and successful in the region (see Schmick et al., 2014). Acre's narrative-policy nexus centered on forests, empowered forest peoples and allowed the state to become a sort of a barrier to the advance of the arc of deforestation into the Amazon during that period (see Schmink et al., 2014; INPE, 2022). The multidimensional framework of financial incentives, political support and socio-cultural valorization of forests empowered place-based initiatives and fostered local agency. The result was the emergence and consolidation of diverse place-based transformative pathways based on forest conservation and restoration throughout the state.

As a forest-citizenship state, Acre has become a reference for other states as well as for national and international regulations regarding forest protection (see Vadjunec et al., 2011). The socio-cognitive valorization of forests in Acre also provided support for the emergence of place-based initiatives in neighboring states. This was the case of the RECA Agroforestry Project, as we will see in Chapter 5. Although located just across the border in Rondônia, RECA has close ties to Acre and has benefitted from the *florestania*/ZEE narrative-policy nexus to consolidate its agroforestry activities. It is worth noting that Rondônia is another of the AMACRO states, but where deforestation has been quickly advancing (Reydon et al., 2022). In contrast to Acre, politics in Rondônia have been largely influenced by the commodity-centered trajectory of territorial development led by Mato Grosso, to which we now turn.

4.3. Mato Grosso: The modern frontier state

Mato Grosso is the third-largest Amazonian state, located on the south-eastern edge of the region. The state is at the core of the arc of deforestation, and only 20% of its territory is legally protected in the form of conservation units or indigenous territories (see Table 2 in Section 3.1). Mato Grosso's territory is composed of three relevant biomes: the Amazon rainforest (57% of the total area), the Cerrado savannas

(37%) and the Pantanal wetlands (6%; see also Figure 4 in Section 3.1); the numbers in the rest of this section refer only to the Amazon portion of the state. Mato Grosso has the second-largest total deforested area in the Brazilian Amazon, second only to Pará (INPE, 2022). As Brazil's leading soy and cattle producer (Trase, 2021), the agribusiness sector has a significant influence on Mato Grosso's state-level politics (see Ioris, 2017). The state is characterized by large-scale cash crops, export-oriented infrastructure and concentrated land tenure (Barrozo, 2010; Milhorance & Bursztyn, 2018).

The strong influence of agribusiness elites is rooted in Mato Grosso's historical development. Located closer to southern Brazil, where the country's relatively wealthy and populous urban centers are located, territorial occupation in the state has been marked by pathfinding campaigns during colonial (19th century) and post-colonial (20th century) periods (Russell-Wood, 2005; Passos, 2010). Based on the premise of 'empty areas,' these campaigns promoted the colonization of rural areas, in a process that neglected the diversity of indigenous and traditional peoples who lived in the region. Pioneers were granted official property titles while local communities were gradually – and forcibly – displaced (Barrozo, 2010). This practice of land grabbing by dispossession continued into the 20th century. A series of national occupation programs attracted a large number of migrants from other areas of Brazil and facilitated the continuation of land-grabbing practices in the region (see Ioris, 2017).

As explored in Chapter 1, the narrative of a 'demographic vacuum' was the basis for imagining the state as a new frontier and set the stage for renewed waves of land appropriation. Examples are the 'March to the West' in Getúlio Vargas's government in the 1940s (Passos, 2010), and land reform projects during the military regime between the 1960s and the 1980s (Alencar et al., 2016). Under the military regime, private companies were not only allowed to occupy public lands through concession contracts, but also to access public subsidies and low-interest credit lines to 'develop' these lands – often through land clearing and displacement of forest peoples (Barrozo, 2010; Russo Lopes & Bastos Lima, 2022). Such processes led to the privatization of state-owned areas and land concentration under the control of large-scale private actors (see Ioris, 2017). Privileged by public incentives and encouraged to occupy 'empty' rural areas, these private actors benefitted from systemic lock-in mechanisms which favored commodity expansion.

The policies driving territorial occupation deepened land-grabbing practices, territorial conflicts, and displacement of indigenous and traditional communities (Passos, 2010, Barrozo, 2010). In some cases, entire communities were completely displaced or even exterminated (Barrozo, 2010). The Xingu Indigenous Park is a key example in this regard. Created in 1961, it was the first and largest indigenous

territory ever demarcated in Brazil, covering over 26,000 km^2. It is an area of continuous forests that houses multiple ethnicities of four linguistic affinities (Tupi, Arawak, Carib, and Gê). These ethnicities used to live dispersed throughout the state, but were forced by the federal and state governments to relocate to a single common territory in the 1960s (see Garfield, 2004).

The Xingu Indigenous Park is emblematic of the ongoing disputes around landscape transformations in the Amazon's agrarian frontier. On one hand, the larger actors' commodity-centric outlook on the landscape frames the indigenous territory "as a barrier to economic growth, an enemy", as explained by an interviewee (Mato Grosso Local Actors Large 3, see Annex). In this sense, although the park provides key ecosystem services, such as water cycling and temperature regulation (see Silvério et al., 2015), forest conservation is persistently portrayed by the agribusiness sector as an obstacle to development and deforestation as a necessary cost for progress (see Santos et al., 2019; Russo Lopes et al., 2021).

On the other hand, local communities find innovative ways to deal with such systemic pressures and asymmetric power relations through social mobilization, such as the Xingu Indigenous Territory Association (ATIX). Other strategies to respond to such commodity-centered perspectives are the forest-based livelihoods, such as the production of honey on the indigenous lands, and the place-based forest restoration initiatives, such as the Xingu Seed Network, which is further explored in Chapter 5. In this context, indigenous peoples also criticize the use of the term 'park' to designate the indigenous lands, for its connotation of entertainment or leisure, rather than emphasizing the area as a traditional territory. In the words of an interviewee, "The indigenous peoples from Xingu never liked it being called a park; it is a territory that encompasses many indigenous lands" (Mato Grosso Local Actor 1, see Annex).

The way the territory was originally established and the way it is presently portrayed by agribusiness elites shows the techno-economic and market-oriented approach that permeates sustainability policies in Mato Grosso (see Tovar et al., 2021). It further highlights how the state government is able to align and magnify the lock-ins of the dominant commodity system established at broader scales. The disputes taking place in the Xingu region also demonstrate how agrarian frontiers are spaces of contested landscape transformations and how different states have different approaches to socioenvironmental struggles. In fact, social mobilization, forest identities and place-based initiatives in the Xingu Indigenous Park are emblematic examples of local resistance through forest-making in this deforestation-intensive frontier state, as discussed in Section 2.3.

Over the decades, Mato Grosso's landscape and politics became increasingly dominated by large-scale commodity production and agribusiness elites. Particularly

since the 1970s, the soy production began to expand northward throughout the country was largely sponsored by efforts of the federal government through public agencies. It first expanded into the Cerrado savannas and, later in the 1990s, also into the Amazon biome. The Brazilian Company for Agricultural Research (Embrapa), for instance, conducted extensive research and investment to develop new varieties of soy that could grow in tropical environments and acid soils.[19] Such endeavors also relied on the financial support from international partnerships such as the Japan International Cooperation Agency (JICA; Weinhold et al., 2013).

The technical breakthroughs in soy breeding resulted in seeds adapted to the climate and day-length conditions of Mato Grosso state, including the Cerrado and the Amazon areas (see Hosono & Hongo, 2016). This allowed soy croplands to expand northward, replacing native vegetation, fueling the unsustainable landscape transformations and creating the Amazon arc of deforestation. The territorial expansion of soy was accompanied by a substantial migration of soy farmers in the same direction. These were middle-scale landholders who often had formal access to property and capital and opted to sell their small plots in southern-Brazilian states to buy significantly-larger areas in these agrarian frontier states, particularly Mato Grosso (Ferreira Filho & Vian, 2014; Ofstehage, 2018). As land in frontier regions was relatively cheap, these migrant farmers were able to acquire larger farms and contributed to a renewed phase of land concentration in the state. Large-scale farmers prospered from soy production and the increasing prices of exported commodities in the 2000s, consolidating themselves as the state's new elites (see Ioris, 2017).

In this sense, federal-level efforts to strengthen soy production encountered widespread support from Mato Grosso's agribusiness elites (Ioris, 2017). In contrast to Acre, Mato Grosso's government has been long ruled by conservative parties. In 2002, this process culminated in Blario Maggi, who was Brazil's largest soy magnate, being elected governor. He remained in office from 2003 until 2006 (Fearnside et al., 2009). As such, state-level authorities invested in extensive infrastructure for soy exports, which in turn attracted further private investment from soy traders and large-scale soy farmers (Hecht & Mann, 2008).

The continued support from the public and private sectors for commodity production allowed for the emergence and consolidation of the 'modern frontier' narrative (see Jepson, 2009). As a result, Mato Grosso has been praised as a symbol of highly technological, capitalized and modernized agriculture, which is framed as the driver of the state's development, progress and economic growth. The modern

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[19] In the 1990s, the research from Embrapa further led to the development and dissemination of genetically-modified varieties of seeds (GMO; see Embrapa, n/d).

frontier narrative was yet another facet of the systemic incentives for expansion of large-scale agriculture.

However, with the rise of the global socioenvironmental agenda in the new millennium (see Section 1.2), Mato Grosso faced growing pressure for bolder sustainability criteria its agricultural policies. Concerns over increased greenhouse gases (GHG) emissions associated with widespread land clearing (see Richards et al., 2015), as well as demands from multi-stakeholder voluntary agreements (e.g., the Soy Moratorium) and the need to comply with internationally-agreed goals (e.g., the Paris Agreement), Mato Grosso engaged in a renewed modern frontier narrative which focused on reframing the state's large-scale agriculture as 'green commodities,' taking sustainability aspects into account (see Fearnside, 2003).

As a result, this renewed modern frontier narrative materialized in state-level politics through the statewide PCI (Produce, Conserve and Include) policy document. Developed by governmental agencies, international NGOs, researchers and private corporations (Milhorance & Bursztyn, 2018), PCI sets the stage for a sustainable commodities agenda mainly focused on reducing GHG emissions through financial incentives and market-based solutions. Local communities and traditional populations, in turn, were allowed little input in this policymaking process – especially when compared to the political process in Acre discussed in the previous Section (see also Tovar et al., 2021).

PCI was launched in 2015 at the Paris Climate Conference, allowing the state government to showcase its initiative in a global arena. Described as "The biggest global effort to mitigate climate change ever devised by a subnational state" (PCI, 2022, para. 1), the program was initially proposed as a multi-stakeholder voluntary commitment, became an official public instrument through a state decree (n.468/2016), and then turned into an independent organization, as we shall see below. The PCI contains three pillars, each addressing one dimension of a proposed sustainability agenda. The *produce* pillar seeks to raise overall agricultural production as well as productivity in rural areas, including sustainable forest management and reforestation activities, apart from cattle ranching and commodity crops. The *conserve* pillar aims to promote forest conservation, reduce deforestation and implement the mechanisms mandated by the Brazilian Forest Code. The *include* targets access of smallholders to local and institutional markets, opening credit lines and regularizing land tenure for family farmers (PCI, 2022). Each of the pillars has specific goals, and each goal has specific targets in absolute numbers and percentages compared to pre-defined baselines (see Table 10).

Table 10. Mato Grosso's PCI goals

Pillar	Description	Goals
Produce	Expand and increase in the efficiency of agricultural and forestry production	**Cattle ranching** Improve low-productivity pasturelands. Increase productivity in existing pasturelands. **Agriculture (soybeans, corn and cotton)** Expand the area of commodity crops in degraded pasture areas; increase total production. **Biofuels** Increase biofuel production by 2030. **Native Forest** Expand the area under sustainable forest management. **Planted Forest** Expand the area of planted forests in already-deforested areas. Increase the production of planted timber.
Conserve	Conserve and restore native vegetation to comply with the existing legislation	**Deforestation** Maintain 60% of Mato Grosso under native vegetation cover. Reduce deforestation rates in the Amazon areas by 84% by 2024 and by 90% by 2030. Reduce deforestation in the Cerrado by 83% by 2024 and by 95% by 2030. Eliminate illegal deforestation by 2030. Compensate 10,000 km^2 that was legally deforested. **Environmental Regularization (Forest Code)** Register 90% of rural properties in the Rural Environmental Registry (CAR). Restore 100% of degraded permanent protection areas (APPs). Regularize 100% of legal reserves (RLs).
Include	Socioeconomic inclusion of family farming and traditional populations	**Production and Market Inclusion** Expand Technical Assistance and Rural Extension (ATER) services for family farms. Increase the share of family farming in the state's internal market. Increase the share of family farming products in institutional markets. Increase access to credit. **Land-Tenure Regularization** Regularize the land tenure of 70% of family-farming plots by 2030.

Through the policy goals, it can be seen how the PCI program embeds the political priorities of the modern frontier narrative. For one, the *produce* pillar is the most robust one, with relatively more goals. It focuses on "efficiency," "increased productivity," "forest production" and "increased grain production" in absolute numbers (see also Milhorance & Bursztyn, 2018). The goals related to native forests are actually included in the *produce* pillar rather than the *conserve* one, which hints at the auxiliary role of forests as an asset for agricultural production. The *conserve* pillar, instead, focuses on legal compliance with national land-use legislation, the Forest

Code. The conservation goals aim only for a halt in illegal deforestation, while recognizing the need to compensate for the farmers' right to legal deforestation. Moreover, the conservation goals emphasize the need for forest restoration only when mandated by the Forest Code, as in the case of permanent protection areas and legal reserves (see footnote 16 for a more detailed explanation). Note that the conservation goals implicitly acknowledge that 40% of the state is accounted for legal deforestation when they say that 60% of the state should be maintained with native vegetation cover. Finally, the *include* pillar emphasizes mechanisms to increase the market share of family farmers and enable their access to credit, without mentioning if these credit lines will be as subsidized as the ones used for large-scale agriculture (see Russo Lopes et al., 2021). Furthermore, the *include* goals exclusively refer to family farming and leave traditional populations unmentioned, particularly their struggle for recognition and territorial rights (see Tovar et al., 2021).

In the context of the PCI, another institutional document has been developed, labeled the "PCI Pitchbook: An overview of initiatives that support corporate engagement in Mato Grosso, Brazil" (PCI, 2019). The purpose of this document is to showcase sustainability initiatives throughout the state to attract private investment and cater to corporate environmental, social and governance strategies. As highlighted in the document's title, the selected initiatives should *support corporate engagement* in the state, as opposed to taking a more bottom-up and enabling perspective in which the government or corporate engagement would provide support for local communities. According the PCI's executive director, "This pitchbook aims to provide a 'menu' of some of the on-the-ground programs in Mato Grosso that are ripe for corporate engagement" (IDH, 2019, para. 6).

The initiatives in the PCI Pitchbook range from green commodity production, such as certified soy and deforestation-free cattle ranching, all the way to place-based initiatives grounded in local agency, such as the Xingu Seed Network (see PCI, 2019). While the PCI Pitchbook can increase the visibility of these place-based initiatives, it does so through a depoliticized approach to forest governance (see Tovar et al., 2021). The consequence is a risk of appropriation and elite capture of grassroots mobilization by imposing upon them the logic of the dominant commodity system.

The PCI builds on a green commodities and legislation-oriented perspective on sustainability, in which the three pillars – production, conservation and inclusion – are dealt with separately and by different actors. It relies on a rationale that sustainable commodity production can be achieved through technological development, productivity maximization and legal compliance with existing legislation (Milhorance & Bursztyn, 2018), without tackling power imbalances and asymmetries. In this context, place-based initiatives are framed by the government as a way

to provide legitimacy for the 'green' large-scale commodity expansion led by the private sector. As such, the PCI proposes a market-driven techno-managerial approach to the landscape, where 'productive' farming areas are designated for commodity expansion whereas conservation and inclusion are relegated to 'unproductive' forested areas.

Institutionally, the PCI is coordinated by a multi-stakeholder committee created within the state bureaucracy (Milhorance & Bursztyn, 2018). It is financially supported by multiple national and international agencies, such as Brazil's National Bank for Economic and Social Development (BNDES), the World Bank and the German public bank KfW (PCI, 2022). These financing institutions also influence state-level politics. According to interviews during fieldwork, Mato Grosso's state government aimed to discontinue the PCI after the 2019 conservative turn at the national level. This intention was thwarted by the World Bank deciding to renew existing credit lines only if the PCI remained in place, as put by an interviewee: "Mato Grosso had a debt with Bank of America which was being transferred to the World Bank under the conditions of an austere fiscal policy and environmental safeguards, such as the validation of the Rural Environmental Registry and the maintenance of the PCI" (Mato Grosso Private Sector 1, see Annex).

As another strategy to avoid discontinuation, more progressive actors in Mato Grosso (e.g., civil society organizations, social movements) sought to relocate the PCI management structures away from the state apparatus. Originally a state policy, the PCI became an independent organization in 2019, namely, the PCI Institute[20] (PCI, 2022). As an independent organization, the PCI could access its own funding sources (unrestricted by the availability of public funds), maintain a multistakeholder forum active, and keep with the sustainability strategy in the state. This shift towards self-governance might have contributed to the PCI's continuation; however, it reinforced the depoliticization of the its structures (see Tovar et al., 2021). Outside the public sphere, the obstacles for adequate participation of local communities increased, as the PCI Institute started to be financed by private institutions. In this context, the PCI's techno-managerial and market-oriented approach became heightened in this new governance arrangement. Local communities continued excluded from policymaking and place-based forest restoration initiatives continued to be instrumentalized as support for sustainable commodity production.

Thus, the modern frontier/PCI nexus does not acknowledge or support place-based transformative pathways through forest-making. The focus on large-scale commodities disfavors enabling, bottom-up and local agency-oriented approaches to forest conservation and restoration. This depoliticizing strategy is supported by

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[20] See: https://www.pcimt.org/index.php/en/institutional-en/the-pci-institute

agribusiness elites aiming to meet the sustainability requirements of international and national financing agencies, without really transforming unsustainable business-as-usual practices. According to this narrative-policy nexus, large-scale farmers are considered the 'drivers of development', while family farmers and traditional communities are included as 'forest guardians' and responsible for meeting the sustainability criteria at the state level. Ultimately, this nexus reinforces the historical distinction between development and conservation and fails to recognize – let alone address – economic inequalities, social injustices and power imbalances.

4.4. States as mediating political arenas

State-level politics in the Amazon play an important role in either loosening or reinforcing systemic lock-in mechanisms, ultimately impacting statewide landscape transformations. Narratives and policies are important building blocks in this process, as they carry material and intangible elements with transformative power to move toward or away from sustainability. The way the narrative-policy nexus is constructed differs according to state-level contextual factors and may have contrasting socioecological outcomes. The cases of Acre and Mato Grosso reveal how similar challenges of sustainability and forest restoration can be addressed in divergent ways, consolidating distinctive land-use systems in each state.

In Acre, the history of territorial resistance against external actors forged a strong forest identity among local actors (Acre-ness) and strengthened bonds among marginalized rural groups, such as indigenous peoples and rubber tappers. The Forest Peoples Alliance illustrates how grassroots demands for traditional territories and political leadership have been connected to alliances with transnational environmentalism to support a progressive political stand in state-level politics. This process gave rise to the forest citizenship narrative embedded in *florestania*, a concept co-produced through state-society interactions to guide Acre's sustainable development model and support place-based transformative pathways. Such an approach links forest protection and valorization with broader social demands such as justice, education, health, infrastructure and economic development (Acre, 2010; Schmink, 2011).

The ZEE materializes this narrative in policy terms. It addresses forest conservation and restoration not only as a techno-economic issue (e.g., access to credit, market share, technical assistance), but also as a politico-institutional matter (e.g., opening political spaces for discussion, inclusion of marginalized groups in decision making) and a socio-cognitive process (e.g., socioenvironmental education, support for local mobilizations, cultural valorization of forest-based livelihoods). The ZEE, thus, sought to trigger a multidimensional process throughout society in which forests

occupy a central place. The ZEE contrasts with the PCI as a more thorough – and more complex – policy document that provides legal foundations and political guidelines for many other political mechanisms of forest valorization throughout the state. Grounded in this bottom-up and multidimensional approach, Acre resisted the consolidation of its territory as an agrarian frontier dominated by commodities, and practices of forest-making remained the state's main land uses.

One key aspect of the *florestania*/ZEE nexus in Acre has been the ability to unmake dominant commodity-centric lock-in mechanisms and halt widespread commodity expansion in the state. This enabled the low deforestation rates in Acre during the analyzed period (INPE, 2022). A key strategy to counteract the politico-institutional lock-in at the state level was to support the political participation and territorial claims of marginalized rural groups to confront territorial dispossession. Acre's government did so by establishing indigenous lands, traditional territories, conservation units, and special land reform settlements, creating a mosaic of forest-oriented territories that addressed the needs of local communities and traditional populations. Concerning the techno-economic lock-in, state efforts sought to strengthen forest-based livelihoods through multiple mechanisms. Those included infrastructure benefitting smallholder production, subsidies to socioenvironmental products such as artisanal latex, creation of factories to add value to forest-based production, as well as market-based mechanisms such as a statewide system of payment for ecosystem services (SISA; see IMC, 2022). Regarding the socio-cognitive lock-in, the valorization of forests counteracted the assumptions that commodity expansion is necessary for rural development. Through the forest citizenship perspective, the state government sought to ensure that forest conservation and restoration went beyond legal requirements and profit-maximization; rather, forests were framed as a central part of Acre's identity, culture and development model.

In Mato Grosso, the territorial occupation, centered around large-scale agriculture, evolved into political alliances between state governments and agribusiness elites (Ioris, 2017; Barrozo, 2010). Historically, local communities and traditional populations were dispossessed and excluded from decision making, consolidating agribusiness elites as the protagonist of the state's commodity model of economic development. The modern frontier narrative has set the stage for unsustainable landscape transformations following a green commodities logic in which low-carbon agriculture is depicted as the only ingredient needed for sustainability. Such an approach embraces technological innovation, market-based mechanisms and a techno-managerial institutional architecture as the key elements of sustainable development. Consequently, in the policy realm the PCI frames forests as a supporting element to meet the sustainability criteria legally required for agricultural exports. Besides,

forests are instrumentalized as providers of ecosystem services for agriculture, such as pollination, temperature regulation and water cycling.

The narrative-policy nexus at play in Mato Grosso upholds the lock-in of the dominant commodity system. The PCI reinforces the politico-institutional lock-in by favoring commodity expansion as a political priority in the state. The policy emphasis is placed on the *produce* pillar, to which all the other goals cater. In this sense, the PCI creates superficial sustainability solutions that enable green commodity production but fail to enable the agency of place-based initiatives or address imbalanced power relations in the state. When it comes to the techno-economic lock-in, the PCI reinforces commodity expansion by incentivizing increased commodity production and productivity through technological breakthroughs. Also, the inclusion of marginalized rural groups is targeted only at family farmers (with no mention of traditional populations such as indigenous peoples) and through market-based mechanisms, such as increased market share and credit lines. The modern frontier narrative is used by rural elite groups not only to lock in their position in the state's politics and economy but also to frame commodity expansion as the only possible and desirable future toward prosperity and economic growth. Agribusiness' ability to develop new narratives adapted to the growing sustainability demands from international consumer markets (e.g., Europe, United States) further upholds the dominant socio-cognitive lock-in. As such, the cultural environment in the state remains stuck on notions of green commodities, associating deforestation and commodity expansion with economic development and progress.

By reinforcing and reproducing dominant lock-in mechanisms, the narrative-policy nexus in Mato Grosso promotes the continuity and expansion of the commodity-centered development model. The top-down and depoliticizing approach embedded in the modern frontier/PCI nexus serves the interests of agribusiness elites. At the same time, it undermines the contribution of forest-based livelihoods to sustainable transformations, and disempowers place-based initiatives that seek to carve transformative pathways through forest-making in the state. Table 11 summarizes the main features of the contrasting narrative-policy nexuses at play in Acre and Mato Grosso.

These contrasting realities along the Brazilian Amazon's arc of deforestation point at the role of states in approaching forest restoration, constructing different imaginaries over the forest, and opening more or less space for inclusive policy-making. When it comes to forest conservation and restoration, Acre's narrative-policy nexus empowers traditional peoples and local communities as agents of landscape transformations. There is public support as well as the abovementioned cultural valorization of the place-based initiatives that practice forest-making in the

Table 11. Narrative-policy nexuses in Acre and Mato Grosso

	Acre	**Mato Grosso**
Narrative	Forest citizenship (*florestania*)	Modern frontier
Policy	Ecological-Economic Zoning (ZEE)	Produce, Conserve and Include (PCI)
Party Politics	Center-left administrations	Center-right administrations
Main Protagonists	Grassroots social movements	Agribusiness elites
Approach to Sustainability	Bottom-up, multidimensional and politicized	Top-down, techno-managerial and depoliticized
Analyzed Period	1999-2018	2015-2019
Objective	Broad socioeconomic, environmental and cultural valorization of forests	Legal compliance and sustainable commodity production
Territorial Scope	Integrative approach emphasizing the rural-urban nexus	Jurisdictional approach with a focus on rural areas
Financing Sources	National and international banks	National and international banks

state. This is done through public subsidies, infrastructure investments focused on smallholders' needs, recognition of land rights and the establishment of political spaces for co-creating strategies of forest restoration between state and society. The narrative-policy nexus in Mato Grosso, conversely, adopts a target-oriented take on reforestation, emphasizing the spatial enlargement of tree cover (see Section 1.3). Mato Grosso's approach focuses on legal compliance with the Forest Code, seeking to reforest the areas mandated by the law, while also acknowledging the legal right to deforest. In this sense, reforestation is restricted to certain legally-mandated areas for the benefit of the state's agricultural production.

States' narratives are also able to generate imaginaries over the role of forests in society and their contributions to sustainable development. The centrality of the cultural valorization of forests in Acre contrasts with the view of forests as an auxiliary element that enables 'green' commodity production in Mato Grosso. While the former proposes an integrated and multidimensional view of forest conservation and restoration throughout the landscape, based on a politicized approach to forest citizenship, the latter proposes a depoliticized and instrumentalized take on the landscape, reinforcing the opposition between conservation and production areas. Such intangible socio-cognitive processes influence the ways that place-based transformative pathways emerge and develop through forest-making. In this sense, states can either open up space for social innovation and imagining sustainable futures, or they can impose a market-based rationale over place-based initiatives on the ground.

Another key point is to understand how state-level politics may facilitate or hinder the creation of open and inclusive spaces of participation in decision making and forest governance. In the case of Acre, an alliance among local actors, state government, organized civil society and progressive researchers shaped a decentralization of forest governance processes grounded in the participation of forest peoples and place-based initiatives. As a result, such processes reinforced democratic decisions in which local demands were central, leading to increased forest protection in the analyzed period. In the case of Mato Grosso, contrastingly, agribusiness elite groups captured the state's narrative and policy arrangements on forest governance, reinforcing patterns of exclusion of marginalized rural groups, as well as the legitimation of the techno-managerial, legislation-driven and market-oriented solutions to promote forest restoration.

Taken together, the narrative-policy nexuses at the state level has a strong influence on landscape transformations. Acre's *florestania*/ZEE nexus is permeated by an enabling approach to transformations toward sustainability. It does so by valuing and supporting the forest-based livelihoods of traditional peoples and local communities, as well as acknowledging and promoting the local agency of place-based initiatives in carving transformative pathways through forest-making. Mato Grosso's modern frontier/PCI nexus, in turn, represents a business-as-usual approach to landscape transformations. Embedded in the dominant system of commodity expansion, it reinforces lock-in mechanisms and designs minimal superficial changes to keep, as much as possible, dominant structures unaltered. These two narrative-policy nexuses influence how place-based transformative pathways emerge and develop over time, breaking through dominant structures, unmaking systemic hurdles and opening new spaces for forest-making, as we shall see in the next chapter.

5. Place-based initiatives: Carving transformative pathways*

In the previous chapter, I discussed how state-level politics has shaped distinctive narrative-policy nexuses in two emblematic Amazonian states. In this chapter, I focus on the two place-based initiatives most highlighted in the fieldwork interviews in each state. I analyze how they have emerged, evolved and are influenced by these states' contrasting political contexts and constructed imaginaries over forests. In Acre, where forests play a central role in the state development model, place-based initiatives are supported and fostered by the state's conservation and restoration agenda. In Mato Grosso, where forests have an auxiliary role to the state's agricultural development policies, place-based initiatives receive superficial support (if any), and are often marginalized or captured by elites in policymaking (see Tovar et al., 2021).

I analyze two place-based initiatives that are examples of continuity in the Brazilian Amazon's arc of deforestation. These are the RECA Agroforestry Project, which develops agroforestry systems in degraded pasturelands near the border of Acre and Rondônia, and the Xingu Seed Network (XSN), which collects native seeds to promote forest restoration in local communities' territories and in soy farms in Mato Grosso. I base this analysis on field observations carried out in 2019 and 2022, document analysis on institutional materials from both initiatives (see Table 9 in Section 3.2.2) as well as three rounds of interviews: a first exploratory round with 72 semi-structured in-person interviews in 2019 (see Table 3 in Section 3.2.1), a second in-depth round with 8 phone interviews in 2021 (see Table 6 in Section 3.2.1), and a return visit with collective meetings with 7 members of RECA and 18 members of XSN in 2022 (see Table 7 in Section 3.2.1; see also Annex). I also triangulate the qualitative data with the online survey that took place in July 2021 and received 80 anonymous responses from local actors in both states (see Section 3.2.3).

In both states, these place-based initiatives practice forest-making and represent forms of resistance against the broader commodity system, whose dominance is

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upheld by lock-in mechanisms stemming from other scales (see Russo Lopes & Bastos Lima, 2022). Such initiatives seek to restore the social and ecological functions of degraded landscapes as well as create social relations mediated by nature and relational values to the surrounding environment (see Chapter 2). Depending on state-level politics, they can do so with different levels of facilitation and public assistance. To understand how these place-based initiatives emerged in the two different frontier contexts of Acre and Mato Grosso, I analyze how their place-based transformative pathways developed under contrasting pressures and opportunities.

In the next sections, I expand on the multiple forms transformative pathways take on the ground, the different phases of development that place-based initiatives go through over time – triggering, nourishing and resilience, and finally I discuss how forest-making can promote multidimensional transformations in agrarian frontiers.

5.1. The diversity of transformative pathways

Place-based initiatives are collective endeavors that connect different communities throughout the landscape and entail multiple partnerships across scales (Brondízio et al., 2021). Conceptualized by Bennett et al. (2016) as "bright spots" or "seeds of the good Anthropocene," they are the agents that carve transformative pathways toward sustainability on the ground (see also Bachi et al., 2023). Based on local knowledge, social mobilization and community practices, academic studies have been prolific in analyzing the contribution of place-based initiatives to protecting forests where people's livelihoods depend on natural resources (Agrawal & Gibson, 1999; Ostrom, 2010; Ruiz-Mallén et al., 2015; Brondízio et al., 2021). The role of collective action has also been stressed as a key element for the creation of place-based initiatives within various social groups, from traditional peoples (le Tourneau, 2015) to middle-scale farmers (Futemma et al., 2020).

Other studies further show that many initiatives in the Brazilian Amazon have been fostered since the 1990s by the growing importance of forests in the global agenda of environmental governance (see also Section 1.2). At the national and subnational levels, forest-oriented public policies have been developed (see le Tourneau et al., 2013; Brandão et al., 2020; Brondízio et al., 2021), as seen in Section 4.1. Also, international financing mechanisms have been implementing projects targeted at forest protection (see van der Hoff et al., 2018), such as PES and REDD+ projects (see Duchelle et al., 2014b). Another example is the Amazon Fund, which received to date approximately 1 billion euros from international donors for the support of socioenvironmental projects (Gandra, 2023). Another example is the support from regional, national and international environmental NGOs (Buclet, 2006), such as the Sustainable Rural Settlements' Project in Pará and the Indigenous Agents of

Agroforestry in Acre. Stemming from these multi-level strategies to halt deforestation and promote sustainable livelihoods, many place-based initiatives were created during this period; yet, many were short lived. A significant part disappeared after the discontinuation of the initial support, in spite of their critical socioenvironmental importance for the valorization, protection and restoration of forests (Brondízio et al., 2021).

Some initiatives, however, have been able to overcome challenges, have flourished over time and have amplified their positive impacts throughout the landscape by inspiring similar endeavors elsewhere. In most cases, these initiatives managed to create social relations mediated by forests and strengthen human-nature connectedness throughout their territories (Burgos-Ayala et al., 2020; Pérez-Ramírez et al., 2021). Their outcomes often go beyond material gains, as they inspire innovative practices (Gram-Hanssen, 2021), create environmental awareness (Heyck, 2010), and strengthen social movements (Schwartzman et al., 2010; Villamayor-Tomas, S., & García-López, 2021).

The cases of the RECA Agroforestry Project (RECA) and the Xingu Seed Network (XSN) represent collective undertakings that have been making forests for over fifteen years along the arc of deforestation, in the western (Acre/Rondônia) and eastern (Mato Grosso) sides of the Amazon, respectively (Figure 8). They illustrate consolidated efforts to build place-based transformative pathways in agrarian frontiers where land-use dynamics are characterized by commodity expansion. In these frontiers, commodity crops overrun native forests while these place-based initiatives seek to restore deforested areas through forest-based livelihoods. These contested spaces are characterized by the tension between the dominant commodity system, whose lock-in mechanisms are either reinforced or diluted by state-level politics (see Chapter 4), and alternative systems of forest-making that resist and seek to unmake these dominant unsustainable structures.

The RECA Agroforestry Project is focused on the implementation of multi-crop agroforestry systems in degraded pasturelands of the municipality of Nova Califórnia. This municipality is located in a region named Ponta do Abunã, an area disputed between Acre and Rondônia until 1989, when it was officially assigned to Rondônia. Still, Nova Califórnia shares Acre's land use history of rubber-tapping groves (*seringais*), where rubber tappers lived off the native forests. Also, the region remains closely connected to the cultural and territorial identity of Acre, as well as its influential narratives and policies. During the fieldwork and interviews in Acre, the RECA Agroforestry Project was recurrently pointed out as a regional reference. In the same vein, members of RECA have emphasized their connection, participation and engagement with Acre's politics, and interviews with RECA members were conducted in Rio Branco, capital of Acre (see Annex). These links to Acre are also due

to the proximity to the state border (20 km) and to the capital Rio Branco (150 km), in contrast to Rondônia's capital, Porto Velho (360 km). Despite the distance, Nova Califórnia remains a district of Porto Velho, where cattle ranching is a consolidated land use quickly expanding westward over native vegetation. As part of Rondônia, Nova California has been politically and economically integrated into the Amazon's agrarian frontier, expanding from Mato Grosso into Rondônia and Acre.

Figure 8. Location of the place-based forest restoration initiatives along the arc of deforestation
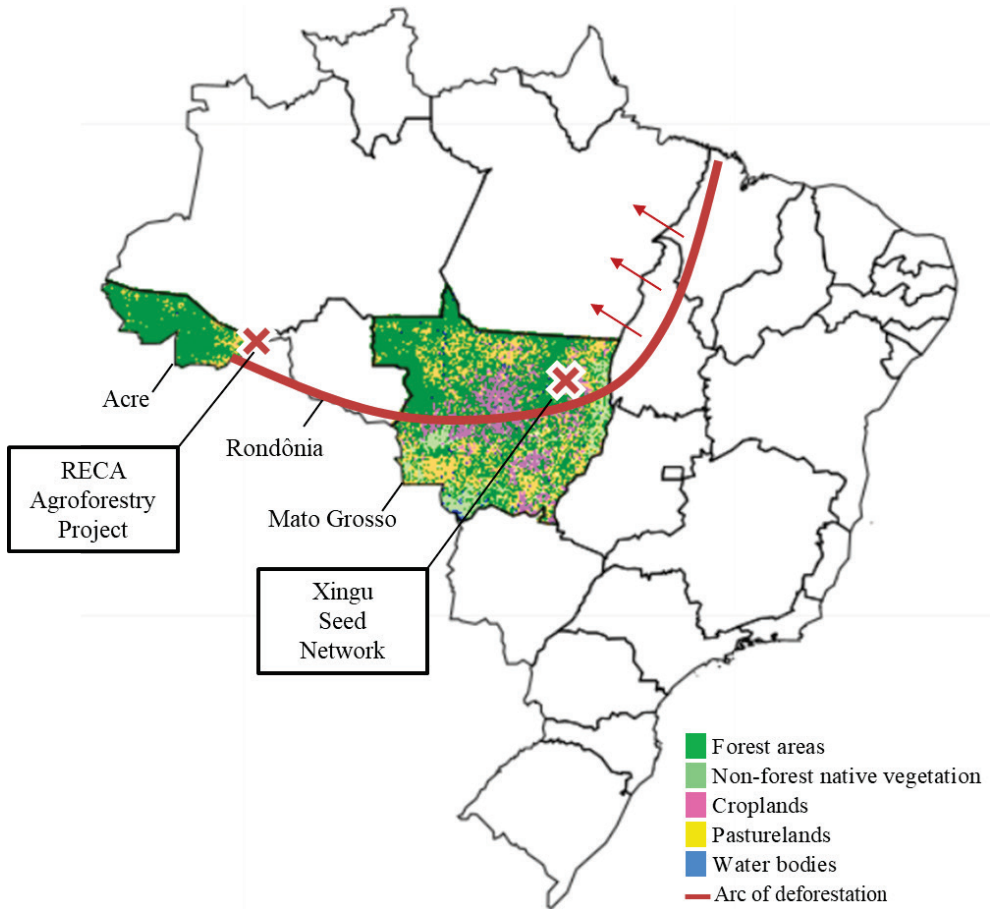
Source: Own elaboration based on Mapbiomas, 2021

The RECA Agroforestry project was established in 1989, but its history started earlier in the 1980s, when a land reform settlement was created in the region. Plots of 1 km^2 were allocated to migrant family farmers, mainly from southern states of Brazil (Welch & Sauer, 2015; Alencar et al., 2016). As part of the national development programs, migrant family farmers were incentivized to transform the traditional

rubber-tapping areas (see Section 4.2) into open fields for agriculture and cattle-ranching as part of the land reform requirements to 'develop the land' and acquire land rights (Paula Pereira et al., 2022; Russo Lopes & Bastos Lima, 2022).

The region's weak land governance, however, limited the access of land reform beneficiaries to formal land titles as well as benefits such as credit and technical assistance (RECA, 2022; see also Alencar et al., 2016). In addition, access to notaries was limited by the large distance and poor roads to Rondônia's capital city, which fostered informal land transactions that favored commodity expansion (Russo Lopes & Bastos Lima, 2022). Although the expansion of pasturelands in the region has been mainly led by large-scale farmers (Fearnside et al., 2009), smallholders also engaged in cattle ranching as a capital investment (see Garrett et al., 2017) and, more recently, as a symbol of social status embedded in a 'cowboy culture' (see Hoelle, 2015). Such political, socioeconomic and cultural processes have been transforming Nova Califórnia from an agrarian frontier dominated by forests into an agrarian frontier dominated by commodity expansion, mainly cattle ranching. As Figure 9 demonstrates, the activities of RECA are responsible for restoring and maintaining the few remnants of native vegetation that exist in the region.

Figure 9. Land uses in the district of Nova Califórnia in 1985 and 2021
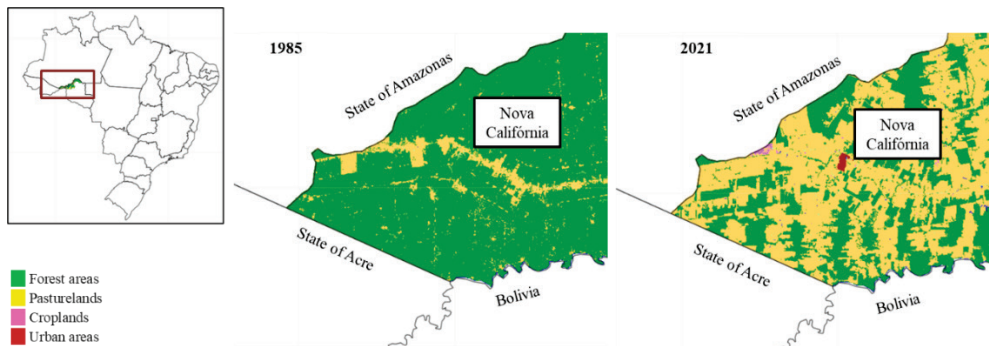
Source: Own elaboration based on Mapbiomas, 2021

It was in this context of increasing deforestation pressures that the RECA Agro-forestry Project was founded by migrant family farmers and local rubber-tapping communities (RECA, 2022). The initiative has been successfully developing agro-forestry systems over the last three decades. Agroforestry is a multi-crop land-use system that brings together different species and is widely adopted by local communities in the Amazon (see Porro et al., 2012). In RECA, they implement robust agro-forestry systems which co-locate up to 40 species, including native fruits (e.g., açaí, palm heart, cupuaçu, guava), native trees (e.g., copaíba, andiroba, rubber, Brazil nut) and other sociobiodiversity products and medicinal plants (e.g., honey, babaçu, arnica; see Figure 10). Through these activities, RECA has been resisting

governmental and market incentives to deforest and carving place-based transformative pathways through forest-making.

Figure 10. Examples of agroforestry systems in RECA

Source: Own fieldwork photos

Organized in a cooperative structure, the members of RECA promote forest restoration through agroforestry systems on their lands and sell their forest products to RECA (see Maciel et al., 2017). The place-based initiative then commercializes the collective production to its external partners. Forest restoration, hence, takes place through the production of forest products (see Figure 11). At present, the initiative has more than 300 families that cultivate more than 10 km^2 of agroforest (see Table 12). Those agroforestry areas are able to restore critical ecosystem functions, such as temperature regulation, recovery of natural habitats, and ecological connectivity (Silva et al., 2009; Lima et al., 2015; see also Porro et al., 2012; Chazdon & Brancalion, 2019), which are key processes for a transformative pathway toward sustainability in the Amazon.

Figure 11. Dynamics of the RECA Agroforestry Project
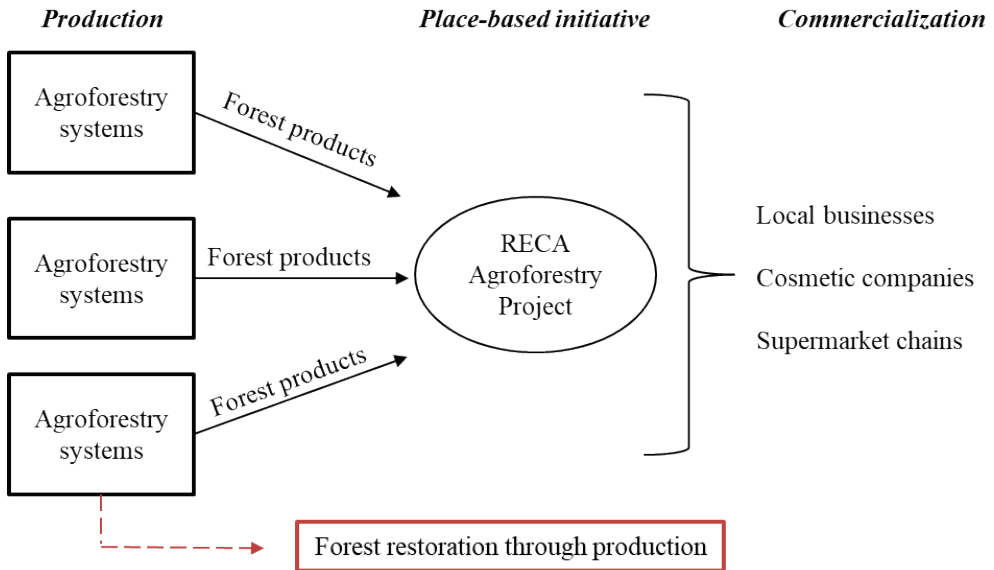
The Xingu Seed Network is a more recent initiative established in 2007 in the municipality of Canarana, Mato Grosso. This area is located in the state's north-eastern region, where the Amazon vegetation transitions into the Cerrado savannas (see Figure 8; see also Figure 4 in Section 3.1). Marked by deforestation and commodity expansion, this region can be characterized as an old agrarian frontier of soy expansion, labelled in academic analyses as 'Soyland' (see Hecht & Mann, 2008; Ofstehage, 2016). The landscape is dominated by large-scale grain production, particularly intercropped soy (primary harvest) and maize or cotton (secondary harvest). According to Cacho (2016, p. 421), these soybean municipalities share broad similarities, such as "a predominant migration from southern Brazil, private colonization processes, a range of middle scale soy farmers, indigenous territories, land reform settlements".

In fact, Canarana is contiguous with the Xingu Indigenous Park, Brazil's largest indigenous territory (see Section 4.4). Today, 94% of this territory remains conserved, contrasting with the soy fields swiftly expanding around the indigenous territory (see Figure 12). In this sense, the Xingu Indigenous Park represents a forested island amid large-scale soy fields (see Silvério et al., 2015). A major impact of large-scale deforestation around the park is the shrinking of water bodies, whose area decreased by 10% between 2007 and 2021 (from 43,000 to 39,000 ha; Mapbiomas, 2021; see also Brando et al., 2013).

Figure 12. Land uses in the Xingu River basin in 1985 and 2021
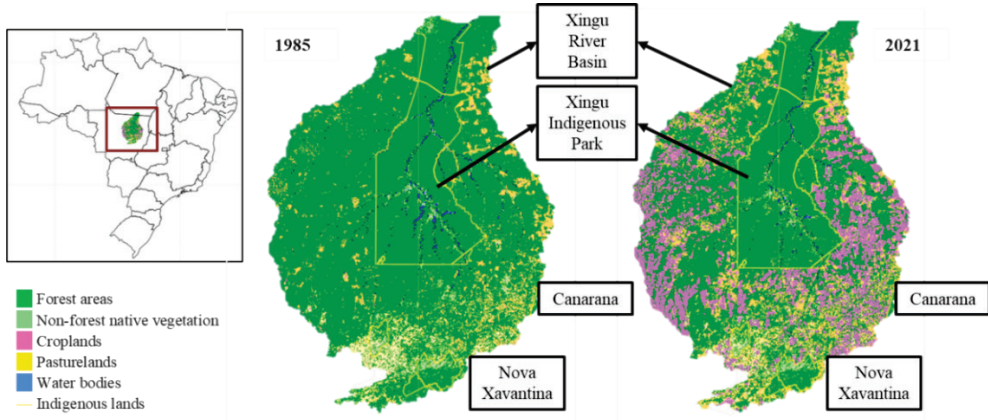
Source: Own elaboration based on Mapbiomas, 2021

The Xingu Seed Network was born as a response to this expansion of soy production around the indigenous territory and has rapidly grown to become the largest seed collection network in Brazil (XSN, 2022). Land clearing along the riverbanks and agrochemical use have greatly degraded the water quality and quantity of rivers and streams in the Xingu basin (Brando et al., 2013). In this context of longstanding and fast-paced commodity expansion (Fearnside, 2003), the indigenous peoples from the Xingu Indigenous Park initiated the `Y Ikatu Xingu campaign in 2004 to conserve and restore riverbanks and springs in the Xingu river basin to ensure water conservation (Sanches & Futemma, 2019).

Largely supported by the Instituto Socioambiental (ISA), a national indigenist NGO, multiple stakeholders were mobilized for a collective action to protect the Xingu headwaters. On one hand, diverse local communities – including indigenous peoples, family farmers and urban dwellers – were engaged as members of the initiative and started the practice of collecting native seeds. On the othe hand, a broad spectrum of external partners was also mobilized to strengthen forest restoration in the region. Those included social movements which provided support for the participation of multiple local communities, as well as municipal and state governments and progressive soy farmers, who sought to comply with the legal forest restoration requirements of the Forest Code (see also Section 4.3). Such diverse mobilization culminated in the creation of the Xingu Seed Network in Canarana in 2007, which enabled regional forest restoration practices based on an innovative technique of native seeds dispersal (see Section 5.2.3 below; see also XSN, 2022). Figure 13 exemplifies the variety of native seeds collected by the initiative's members and used in the restoration practices.

Figure 13. Examples of native seeds collected in the XSN

Source: Own fieldwork pictures

At present, the initiative is based in Nova Xavantina and has two other seed-storage facilities (*casas de sementes*) in Canarana and Porto Alegre do Norte. The initiative is present in 21 municipalities and engages more than 560 individual collectors in urban areas,[21] as well as 12 land reform settlements[22] and three indigenous territories that encompass six different ethnicities.[23] These territories are spread throughout the Xingu, Araguaia and Teles Pires river basins, and the Xingu Seed Network as a whole has already produced seeds for the restoration of 74 km^2 of forest (see Table 12). Due to its large territorial scope and the diversity of its members, the Xingu Seed Network operates through a decentralized and polycentric decision-making structure. As I further explore in the sections below, individual seed collectors are organized into community groups, who coordinate seed collection and deliver it to one of the initiative's three storage facilities. The Xingu Seed Network then mediates

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[21] Urban residents may engage in seed collection as a seasonal and complementary economic activity.

[22] Zumbi dos Palmares, Caeté, Santa Clara, Fartura, Manah, Dom Pedro, Brasil Novo, Bordolandia, Macife, Jaragué, Banco da Terra, Pé da Serra.

[23] Xingu Indigenous Park, Maraiwatsede and Pimentel Barbosa; from the ethnicities Ikpeng, Kawaiwete, Matipu, Xavante, Waujá and Yudjá.

the collective commercialization of the seeds to its external partners, such as soy farmers, private companies and environmental NGOs, who carry out forest restoration in their own areas. Forest restoration, hence, takes place through the commercialization of native seeds (Figure 14).

Figure 14. Dynamics of the Xingu Seed Network
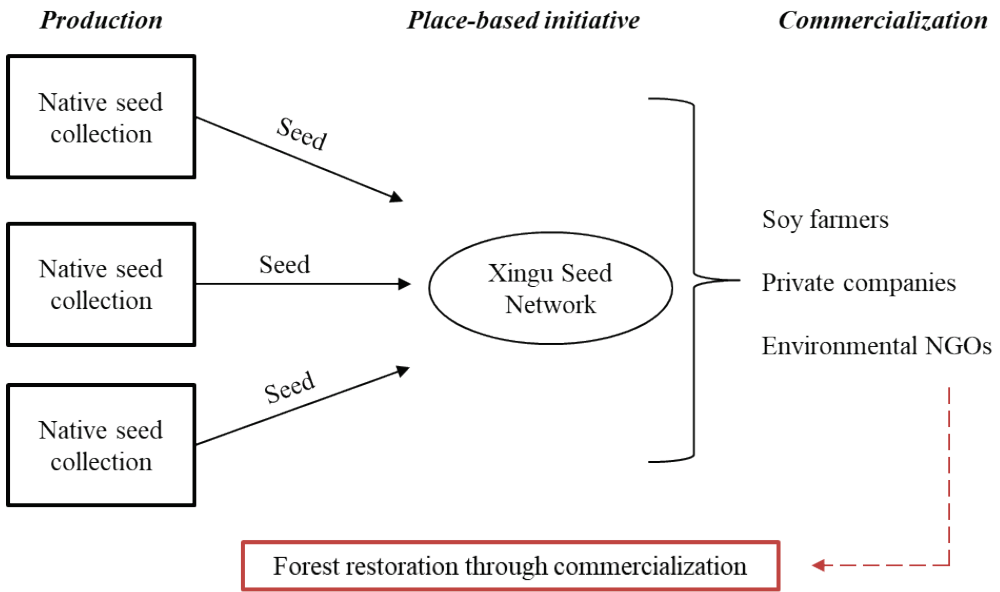
Source: Own elaboration

The RECA Agroforestry Project and the Xingu Seed Network are important examples of place-based initiatives with a regional reach. Throughout the years, they have expanded their forest-making practices to broader areas, and inspired other initiatives in different regions. According to the local actors interviewed in Acre and Mato Grosso, these two initiatives represent steady cases of place-based transformative pathways toward sustainability over time. Despite their contrasting contexts, both initiatives operate amid typical land-use dynamics of agrarian frontiers, facing pressures from deforestation and commodity expansion. Although bearing some key differences in priorities, groups of members, restoration practices and governance arrangements, both initiatives share elements in their history and development that can illuminate the factors that support the emergence and continuity of place-based transformative pathways in frontier regions.

Table 12. Characteristics of the case studies

	RECA Agroforestry Project	**Xingu Seed Network**
Year Founded	1989	2007
Municipalities	Nova Califórnia municipality, on the border of Acre and Rondônia	Three indigenous territories, 21 municipalities and 12 settlements in the Xingu, Araguaia and Teles Pires basins.
Main Actors	Migrant family farmers and rubber tappers	Indigenous people, family farmers and urban dwellers
Main Activities	Agroforestry systems	Native seed collection
Main Goals	Food production	Water conservation
Members	>300 families	>560 individual collectors
Landscape Outcomes	10 km^2 of agroforest	74 km^2 of restored forests

In the following sections, I describe and analyze the three different phases of these initiatives' development: the triggering phase when they are created; the nourishing phase when their activities are (re)shaped and (re)produced over time; and the resilience phase when they navigate disruptive crises. As discussed in Section 2.4, each phase has a particular set of challenges for the emergence and continuity of place-based transformative pathways. As such, pathways are unruly and non-linear, and these phases are not mutually exclusive. A resilience phase may be followed by a re-foundation of the initiative, representing a new triggering phase. In the same vein, a nourishing phase, when the initiative is trying to consolidate, might overlap with a resilience phase, when the initiative has to deal with contextual disruptions. For analytical purposes, however, I present each phase in the sections below through a temporal perspective.

5.2. The triggering phase: Building the foundations

As noted in the previous section, the RECA Agroforestry Project and the Xingu Seed Network were established at different historical moments, within contrasting land-use contexts, and exposed to different forms of deforestation pressure. This section explores the origins of these two initiatives.

RECA was born in the 1980s into an agrarian frontier dominated by forests, an area with large remnants of native vegetation that were being converted to agriculture due to government-induced land reform programs, infrastructure building (the BR-364 highway) and the establishment of large-scale cattle ranches benefiting from

the early stages of commodity expansion (see Schmink, 2011). Small-scale family farmers who migrated to the Nova California region as part of a land reform program faced a highly adverse situation. Access to credit and technical assistance from the public sector was virtually nonexistent, soil and climate conditions were very different from where they came from, and the lands themselves were often isolated from transportation infrastructure – let alone public services such as healthcare or education (RECA, 2022; Paula Pereira et al., 2022). Moreover, land reform policies required newcomers to deforest part of their lands, which were previously well-conserved traditional rubber groves (*seringais*). Land clearing by settlers was particularly important to prove economic activity, the 'development of the land,' and secure land rights (Alencar et al., 2016; Russo Lopes & Bastos Lima, 2022). "*When [the migrants] arrived, they had to deforest everywhere. If it weren't for RECA, the region would no longer have whatever forest is left.*" (RECA Interviewee 3)

As a result, many migrant family farmers opted to deforest their plots and engage in cattle ranching, as this was the easiest and cheapest way to occupy land and access land rights (see Garrett et al., 2017; Russo Lopes & Bastos Lima, 2022). The political, economic and logistical challenges mentioned above often limited the success of their agricultural activities. In this context, RECA emerged as a collective effort to find alternative land-use systems more suitable for the region that could support local forest-based livelihoods (see Maciel et al., 2017). By adopting agroforestry systems, RECA promoted restoration of previously-deforested areas, developing income alternatives for local communities, and promoting social and cultural bonds among its members. "*[RECA] is about transforming the lives of families. It's working to bring security and autonomy without having to harm the environment.*" (RECA interviewee 1) Figure 15 exemplifies the forest-based activities implemented by RECA members.

Conversely, the Xingu Seed Network is a more recent place-based initiative that started in 2007 as a local response to widespread deforestation. The initiative was formed by three main social groups: indigenous people (60%), especially women from the Xingu Indigenous Park; family farmers (32%) from land reform settlements in the neighboring municipalities, and urban residents (8%) of nearby towns (XSN, 2022). These groups came together to mobilize their local knowledge for the collection of native seeds. The main goal was to support the forest restoration efforts that were taking place in the region after the `Y Ikatu Xingu campaign to conserve water and protect riverbanks and springs.

In this sense, the Xingu Seed Network was ignited by the transboundary socioenvironmental impacts of soy expansion, particularly in regard to regional water availability. The impacts of deforestation in the area decreased the extent and volume of

Figure 15. Examples of forest-based activities in RECA Agroforestry Project

The top-left picture shows the process of drying Brazil nuts; the top-right picture shows the organically produced Brazil nuts in the background, the bottom-left picture shows the production of native oil; and the bottom-right shows the restoration of a degraded areas through agroforestry. *Source:* Own fieldwork pictures

water bodies in the Xingu basin and contaminated many of them with residues of agrochemicals applied to the croplands (Brando et al., 2013; Mapbiomas, 2021). Such large-scale unsustainable landscape transformations impacted the traditional livelihoods inside the Xingu Indigenous Park as much as the agricultural production in the surrounding municipalities (Silvério et al., 2015; Spera et al., 2016).

The shared negative impact on water conservation triggered the need for collective forest restoration efforts along rivers to recover water bodies. Much of this degraded area was located on private property outside the indigenous territory. As such, the need to restore forests to safeguard water availability was compounded by the soy farmers' need to comply with the Forest Code (see Section 4.3; see also Urzedo et al., 2016). "*The XSN came with the objective of recovering the environmental liabilities, which are mainly inside large and medium-sized properties.*" (XSN Interviewee 1)

In this sense, the Xingu Seed Network was created due to the engagement of multiple (and asymmetric) actors, including local communities, social movements, civil society organizations, municipal government agencies and also large-scale soy farmers. It was under these specific conditions that this place-based forest restoration initiative could emerge in the heart of Mato Grosso's agrarian frontier of soy expansion. As in the case of RECA, members of the Xingu Seed Network also stress the importance of the initiative's role as a resistance and buffer against the deforestation pressures in the region. "*There was this culture of deforestation back then. But with the XSN, the members have this possibility of generating income from the seeds, from the knowledge over their own territory. Due to the XSN work, standing forest started to have a new value.*" (XSN Interviewee 4) Figure 16 demonstrates the dominant soy areas in the region as well as the seed production led by the Xingu Seed Network.

Figure 16. Examples of forest-based activities in the Xingu Seed Network

The top-left picture shows an example of the soy areas neighboring the Xingu Indigenous Park; the bottom-left picture shows the various native seeds collected by the XSN, and the picture on the right shows the XSN nursery of native species.
Source: Own fieldwork pictures

The triggering phase is thus characterized by factors that support the development of place-based transformative pathways in adverse contexts. These factors create the conditions for the agency of local actors to address the impacts of unsustainable land-use patterns and offer more sustainable livelihoods in their regions. Both cases show that, despite their different contexts of new and old agrarian frontiers, place-based forest restoration initiatives may emerge under particular circumstances. Three aspects in particular were critical for both initiatives at this phase, namely: (1) the

perception of a common problem, (2) financial and institutional support, and (3) knowledge co-production.

5.2.1. Perception of a common problem

The initial trigger of the place-based transformative pathways developed by the RECA Agroforestry Project and the Xingu Seed Network was the perception of a common problem shared by different social groups. In the case of RECA, the arrival of migrant family farmers promoted significant landscape transformations in the region. As explained above, the previously-conserved rubber groves were redistributed by the government to newcomers, who then had to deforest them to ensure their land rights (see Section 5.1). This government-induced migration caused disruptions to traditional forest-product extraction (e.g., latex), which was based on collective land governance. An example of that is the way rubber tappers coordinated latex extraction by attributing a 'rubber path' to each family within a collective forest area. This gave each family a specific route of rubber trees to harvest latex from (see Russo Lopes & Bastos Lima, 2022). Such collective land governance was replaced by individual plots of land demarcated by the land reform projects.

Even though migrant family farmers and rubber-tappers had different social dynamics and land-use patterns, they experienced common problems. Examples are the lack of governmental support, poor access to basic services (e.g., health care, education) and the expansion of large-scale cattle-ranching estates in this agrarian frontier. Agribusiness elites benefitted from the region's weak land governance to buy out the smallholders' properties (see Russo Lopes & Bastos Lima, 2022) or to promote 'silent evictions' through indirect threats or illegal practices aimed at the expulsion of local communities, facilitating land concentration (see Russo Lopes et al., 2021). Despite their different livelihoods, these shared challenges led to collective mobilizations of rubber tappers and migrant family farmers. These local mobilizations reproduced the collaborative rationale of broader political coalitions, such as the Forest Peoples Alliance (see Section 4.3).

The perception of a common problem by migrant family farmers and rubber-tappers thus fostered the social engagement and collective action that triggered the creation of RECA. This collaboration largely benefitted from the history and past political experiences of family farmers in southern Brazil (see Wolford, 2010; Robles, 2019). "*What historically worked very well for RECA was that the people who came from the south had experience with associativism and cooperativism, although they knew nothing about the Amazon.*" (RECA Interviewee 2) This pattern of collaboration enabled the emergence of pathways that were highly transformative for their contexts and promoted innovative forms of relating to the territory. It further strengthened local agency as well as autonomy from powerful actors, such as large-

scale landowners and agribusiness elites (see Castro Ribeiro & Costa Matos, 2021). *"No one wanted to be anyone's employee. They wanted to be independent."* (RECA Interviewee 1) In this sense, the construction of a shared perception between these groups of local communities was a key milestone that enabled the initiative to come into being by building organizational capacity and co-producing knowledge, as we shall see below.

In the case of the Xingu Seed Network, the construction of a shared perception of a common problem happened at two levels: externally among different actors throughout the landscape, and internally among the initiatives' different member groups. Externally, the dialogue between multiple – and in some cases antagonistic – stakeholders was critical for the emergence of this initiative. As explored above, the `Y Ikaty Xingu campaign gathered multiple actors (e.g., local communities, large-scale soy farmers, municipal governments, social movements, NGOs) around the need to recover the Xingu headwaters through forest restoration (see Sanches et al., 2021). The mediation of ISA, an indigenist NGO, was very important to translate (literally and culturally) the concerns of indigenous and non-indigenous groups into a shared understanding. This mediation enabled the formation of a common perception of deforestation as a problem which affected water availability for all, including local communities, and the private and public sectors (Sanches & Futemma, 2019). *"The mobilization of actors, the ability to bring people to a common agenda were very important. Indigenous peoples, family farmers, larger farmers, etc. Bring together people who don't usually talk to engage in a shared debate."* (XSN Interviewee 4).

In this context, the buy-in from the soy sector was a milestone for this multistakeholder collaboration around the Xingu Seed Network. Although the overall soy sector in Mato Grosso is largely conservative and eager to secure the legal right to deforest their lands, more progressive soy farmers perceived forest restoration as a way to ensure water availability as well as comply with the legal requirements of the Forest Code (see Cacho, 2016). One example in this regard is a large-scale soy farm of 530 km^2 which partners with the Xingu Seed Network to restore the riverbanks and springs on the property (see AFB, 2023). As we shall see in the next section, this buy-in was an important source of support during this early stage of development.

Another triggering step for the creation of the Xingu Seed Network was the construction of a shared perception over forest restoration amongst different members of the initiative. As mentioned above, the XSN congregates seed collectors from multiple local communities – indigenous people, family farmers and urban dwellers from 21 municipalities in the region. These communities have different geographical, social and cultural backgrounds, and – unlike RECA – lacked a long-term history of collaboration. The more diverse these groups are, the more bonding elements are

needed to ensure long-term collaboration. An interviewee highlights how the trust between such different social groups was built over time: "*In the beginning, there was a lot of suspicion between indigenous and non-indigenous peoples. But with the meetings, we saw that everyone has the same challenges, the same problems. (...) That's what made us succeed.*" (XSN Interviewee 2)

The creation of a shared perception of a common problem was thus facilitated by the engaged social movements who co-created a deep and bottom-up dialogue process. "*The meetings between the grassroots groups were fundamental to understand what the members wanted the XSN to be and where they wanted to go, within the reality of each group involved.*" (XSN Interviewee 3) The ability to engage and create collaborations between various types of local communities was the foundation for XSN's emergence, and provided the basis for the consolidation of this place-based transformative pathway over time.

In both the cases of the RECA Agroforestry Project and the Xingu Seed Network the process of creating the perception of a common problem between different actors was decisive for their creation. It fostered a sense of collaboration and belonging to a broader group, and built a community of peers with a shared vision for practices of forest restoration in each region. However, the expansion of commodities in both of these agrarian frontiers required more than just a shared vision from these place-based initiatives to overcome some systemically locked-in challenges.

5.2.2. Financial and institutional support

Another triggering factor crucial for the emergence of both initiatives was the financial and institutional support from external partners. In the RECA Agroforestry Project, the initial support came from two partners: the Catholic Church through its "Ecclesial Base Communities"[24] and the Dutch financing institution CEBEMO. The latter is also a Catholic philanthropic foundation "that executed the Dutch parliament's decision to finance the work of missionaries as a special form of assistance to developing countries" (Cordaid, 2023). An interviewee highlighted that "*The Catholic Church played a very important role in the creation of RECA. Bishop Dom Moacir was like a godfather to RECA, a great supporter.*" (RECA Interviewee 1) while another one further details that "*the first resource ever received was a loan from the diocese. Then, in early 1989, there was also funding from the Dutch fund.*" (RECA Interviewee 4)

With this funding in hand, RECA was able to provide the first set of small grants to its members. These grants were implemented as micro-credit lines for the

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[24] "Ecclesiastical Base Communities" were local parish groups associated with the Catholic Church's Liberation Theology movement that addressed topics of social justice within rural communities in the Amazon during the 1980s (see Hewitt, 1990).

initiative's members to invest in the purchase of agricultural tools and the first seed-lings for restoring the degraded landscapes. This enabled many of the rubber tappers and migrant family farmers to plant agroforests, as it was a much-needed triggering assistance that they lacked from the government. An interviewee highlights the rel-evance of such external support at the triggering phase: "*A family-farming organiza-tion is a fragile seed, so it's important to act fast, to identify the leadership and sup-port these leaders, according to the needs of the farmers.*" (RECA Interviewee 4)

In XSN, the initial support came from many external partners. A crucial source of support in this early stage was the partnership with ISA. "*ISA mobilized many resources to structure the XSN on the ground: there were campaigns, courses, work-shops, training on seed collection, research on the* muvuca *sowing technique, advo-cacy in public policies.*" (XSN Interviewee 4) Other external partners, such as social movements and grassroots organizations, also provided critical support in the mobi-lization of different communities to join the initiative: "*In the beginning, the XSN was a network of organizations that gave support to the formation of seed-collector groups in the territories*." (XSN Interviewee 4) The Xingu Seed Network also re-ceived support from large-scale soy farmers, which was key to ensuring a stable de-mand for native seeds over the years. This element was essential to create a reliable flow of commercialization for the native seeds collected by local communities. The relevance of this process was to safeguard the income generated by seed collection and, consequently, engage local communities in this forest-based activity. "*They [large progressive farmers] began to value the standing forest, to understand the benefit of restoration. This created the demand for seeds, which was important for the XSN.*" (XSN Interviewee 2).

Both the RECA Agroforestry Project and the Xingu Seed Network are examples of initiatives that result from a broader coalition of actors that perceived a common problem and sought to collectively act on it. In this context, external partners have a particular importance during the triggering phase, as their initial support has created the financial and institutional foundations for these initiatives to engage with such different actors and operate in agrarian frontiers pressured by commodity expansion (RECA, 2022; XSN, 2022).

5.2.3. Knowledge co-production

The shared perception of a common problem and support from external partners must be grounded in tailored practices of forest-making, adequately adapted for local contexts. In this sense, a third foundational element in this triggering phase was the co-production of knowledge between local communities. This was another milestone in the development of place-based transformative pathways, grounded in local knowledge and empowering local agency. These aspects enable local communities

to create innovative solutions alternative to unsustainable land-use patterns. As a space of knowledge encounters (see Castro & Futemma, 2021), the agrarian frontiers of Acre and Mato Grosso brought different actors together through forest restoration.

In RECA, the interaction between family farmers and rubber tappers gave way to an experimentation process to develop agroforestry techniques suitable to the Amazon region. This was a new endeavor for rubber tappers because they had to engage more actively in landscape management (e.g., planting seedlings, selecting which species to plant, caring for their growth), as opposed to harvesting forest products, such as Brazil nuts and latex. For the migrant family farmers, agroforestry was also a new endeavor, as the soil, crops, and climatic conditions of the Amazon were quite different from their original lands. Although migrant family farmers already had substantial agricultural knowledge, it was often unsuitable for generating good results in the Amazon landscape.

In this context, rubber tappers had extensive knowledge about the local landscape, while migrant family farmers had previous knowledge of agricultural management. Together, these groups partnered in trial-and-error experimentation on how to build agroforestry systems adapted to the region (RECA, 2022). Over time, they tried out specific land-use characteristics, such as the spacing between trees, the mixture of different species, and the timing of planting. At present, the multi-crop agroforestry systems implemented by cooperative members are robust and involve up to 40 species (RECA, 2022). The knowledge co-produced between these groups allowed them to develop a contextualized understanding of the functioning of agroforestry systems in the Amazon. This process has been the basis for the ongoing studies carried out by the initiative in partnership with academic institutions on how to improve the quality of native products and new possible uses for their sociobiodiversity production. An example of this is the potential use of seeds from *cupuaçu*, an Amazonian native fruit, to produce chocolate (see Nobre & Nobre, 2018).

Also in the case of Xingu Seed Network, an innovative sowing solution was developed to suit forest restoration needs in their regional context: the *muvuca* technique. The *muvuca* is an innovative technique for sowing native seeds direct in the soil, as opposed to the conventional restoration method of planting individual seedlings (see Guimarães et al., 2021). Co-produced by local communities, civil society organizations and researchers from Mato Grosso's state university, *muvuca* allows forest restoration through the use of large-scale agricultural machinery, such as the sowing machine (see Figure 17). As such, *muvuca* makes restoring large areas faster and cheaper, especially in agrarian frontier regions where agricultural machinery is available. While planting single seedlings of native trees spaced regularly throughout the restoration area, "muvuca *uses large-scale agricultural machinery for*

restoration. Due to that, there has been more demand for seeds, thus, the need to collect the seeds." (XSN Interviewee 2)

Figure 17. Didactic scheme on the muvuca technique

Source: Own fieldwork picture

Apart from the environmental benefits, the *muvuca* also entails positive social impacts. The need for an enormous amount of seeds to sow with large-scale machinery sets in motion the sociobiodiversity value chain, providing a complementary income opportunity for forest peoples. "*If the restoration was done by seedling, it wouldn't work. The* muvuca *generates demand for seeds in a region with many seeds and potential collectors.*" (XSN Interviewee 4) In this sense, *muvuca* is transformative because it engages vulnerable groups from both rural and urban areas in seed collection, empowering their local agency, contextualized knowledge, and forest-based livelihoods.

The *muvuca* sowing technique also facilitates the engagement of soy farmers who are seeking reduced-cost forms of complying with the Forest Code. Consequently, this innovation allows the engagement with progressive soy farmers by training their personnel and using their own machinery for restoration, rather than depending on externally-provided reforestation services through planting seedlings. Hence, the *muvuca* sowing technique is a powerful way to re-signify the technology used by large-scale agribusiness in agrarian frontiers. It redirects the technological

infrastructure designed for commodity expansion toward the support for place-based transformative pathways. In doing so, it transforms the technological tools of frontier production into a way of forest-making.

Another aspect of knowledge co-production in the Xingu Seed Network is carried out by the seed-collection groups. Together with technical assistants, they develop a locally-grounded knowledge of native seeds. This involves insights into the seed species' overall characteristics, ecological functions, and management practices (e.g., collecting, cleaning, storing). Such co-production and exchange of local knowledge has led to a process of self-valorization among the initiative's members, which strengthened their connection with the surrounding nature. "*As a result of the XSN's work, local actors began to conserve the forest, to see the monetary and non-monetary value of having more shade, more water, more fruit, etc.*" (XSN Interviewee 3) This shows the material and intangible valorization of forests and the transformations in people's values about how they perceive and interact with forests.

In sum, the recognition of a common problem among participants was a fundamental first step to foster engagement for action. However, external support was vital to structure these initiatives, and knowledge co-production was needed to materialize their vision into practice. During this phase, place-based initiatives create the foundations to develop social relations mediated by nature, within the initiative and among its partners. These elements are particularly relevant when place-based transformative pathways require the support of asymmetric partners, such as large-scale soy farmers in the case of XSN, or rely on the creation of socioenvironmental technologies, such as *muvuca* in XSN and agroforestry systems in RECA.

Forest restoration takes time and requires a long-term commitment to allow the vegetation to grow and the ecosystems to recover. Furthermore, it needs nourishing to foster deep connections and relational values between humans and nature, and ultimately enables place-based transformative pathways. In the next section, I discuss another set of challenges that must be overcome to ensure the continuity of both initiatives over time.

5.3. The nourishing phase: Reproducing everyday practices

After their creation, place-based initiatives face many challenges to maintain their activities over time and run the risk of being discontinued (see Brondízio et al., 2021). Place-based transformative pathways can fail due to outside pressures, such as widespread land grabbing in the Amazon (Reydon et al., 2020), political changes that facilitate deforestation (Ferrante & Fearnside, 2019), cultural valorization of commodity production as a symbol of social status (see Hoelle, 2015), among others. The risk of discontinuity and unmaking is particularly acute in agrarian frontiers

where such pressures are heightened and can cause the processes developed at the triggering phase (perception of a common problem, external support and knowledge co-production) to fade away.

Beating these odds, the RECA Agroforestry Project and the Xingu Seed Network have continued to exist and flourish embedded in different contexts of frontier expansion. The cases, however, are situated in very distinct political contexts, as explored in Chapter 4. RECA capitalized on the socioenvironmental agenda in the global arena in the 1990s as well as on the bottom-up, inclusive and participatory approach to forests carried out in the neighboring state of Acre in the 2000s (see Section 4.3). RECA's place-based transformative pathway was in line with Acre's political context, in which forest conservation and restoration were central to the *florestania* narrative. "*RECA's work is different from commodity production. Caring for the forest goes beyond just keeping it standing. It is also the valorization of local knowledge, the respect for living beings. It is another culture and mentality.*" (RECA Interviewee 2). Through the understanding of forest protection as a multidimensional process, involving policies, economic incentives and a cultural valorization of nature, RECA sought to ground its activities in the *florestania*/ZEE nexus, then dominant in Acre. Although they could not formally access the policy mechanisms established in the *florestania* period (e.g., subsidies, credit lines, investment in infrastructure), the initiative benefitted greatly from Acre's forest-oriented policy context to upscale its forest restoration practices and reproduce its activities among new generations of members (see Figure 18).

In contrast, the Xingu Seed Network was consolidated under the modern frontier/PCI nexus in Mato Grosso, which puts forward a top-down, techno-managerial, depoliticized approach to forest conservation and restoration. The initiative developed its activities in face of the deforestation pressures and commodity expansion (see Section 4.4). Framing the sustainability debate as a synonym for low-carbon agriculture, the state's narrative-policy nexus allowed little room for fundamental changes in business-as-usual land-uses and power distributions. The modern frontier narrative emphasizes the role of agribusiness in bringing progress, economic growth and income to the state, neglecting and marginalizing local communities that have a place-based connection to their territories, such as indigenous peoples and family farmers (see Tovar et al., 2021). In the same vein, the Produce, Conserve and Include (PCI) policy focuses on halting illegal deforestation, promoting forest restoration to comply with the Forest Code and compensating for the agribusiness sector's 'right to deforest' (see Guerrero et al., 2021). The PCI further showcases place-based corporate engagement initiatives through the PCI Pitchbook (PCI, 2019). Even amidst this commodity-centric context, the Xingu Seed Network has consolidated its

Figure 18. RECA's current facilities and plans for future expansion

The left picture shows RECA's commercialization center; the top-right picture shows an example of its industrial facilities and machinery, and the bottom-right picture shows the initiative's plans for future expansion.
Source: Own fieldwork pictures

restoration practices grounded in local agency. Between 2007 and 2018, the initiative has grown to be Brazil's largest seed-collection network, producing 196 tons of native seeds while generating USD 1.1 million in revenue (PCI, 2019, XSN, 2022; see Figure 19 on the next page).

To grow and consolidate over time, another set of factors was needed during the nourishing phase. Below, I elaborate on five factors that were essential for the both initiatives throughout this phase: (1) innovative governance arrangements, (2) consolidated partnerships, (3) storytelling, (4) inclusion of women and youth, and (5) inspiration to other initiatives.

5.3.1. Innovative governance arrangements

The innovative governance arrangements developed by both the RECA Agroforestry Project and the Xingu Seed Network have been an important factor in the nourishing phase. Through such arrangements, these initiatives were able to harness members' engagement and participation, foster local agency, and harness a sense of community and ownership toward the initiative's everyday activities.

RECA's innovative governance arrangement is rooted in decentralized decision-making processes. The initiative has 10 groups of members, organized around

Figure 19. Seed packages and storage in the Xingu Seed Network

Source: Own fieldwork picture

geographical location and personal bonds. Each group has its local leadership and women's representative, and they coordinate the production, transportation and selling of the harvest from individual members to RECA, which then sells the collective production to its commercial partners across the country (see Figure 11 in Section 5.1). The groups also coordinate collective work (*mutirão*, in Portuguese) to meet group members' needs. Examples of this type of work are fence maintenance, repairs to houses, or distribution of organic fertilizer. Each group has the independence to carry out such activities according to their own pre-defined rules, but the decisions concerning RECA as a project have to be taken through the cooperative's assemblies with the representation of most groups.

The social capital and strong relational ties between RECA's founders, directors and members also facilitate this decentralized decision making by fostering collaboration and trust among the initiative's members. Castro Ribeiro & Costa Matos (2021, p. 3861) describe these ties within RECA as "strong relationships that show the sense of belonging and the importance of people's participation, solidarity and mutual trust to solve collective problems." Justen et al. (2015) corroborate this idea by analyzing how RECA's formal and informal mechanisms contribute to participation. The results of this thesis point in the same direction, as interviewees stressed the importance of decentralization to ensure the community's engagement and to

make the members feel included as owners of the initiative. "*In RECA the associate [member] is the owner of the business. We have a voice, we are heard, the assemblies allow for participation.*" (RECA Interviewee 1). Another initiative member further explains that "*The decentralized management model contributes to everyone talking and participating. Everyone feels part of the process.*" (RECA Interviewee 4)

In the case of the Xingu Seed Network, the governance structure is even more decentralized and widespread due to the larger size of the initiative as well as its geographic scope. The XSN is also organized in smaller seed-collection groups. Each group is coordinated by a pair of roles: the technical coordinator, who is hired by the Xingu Seed Network to offer technical assistance services to the communities, and the local coordinator, who is a leader in that particular community. Together, they define key operational and logistical criteria for seed collection. They assess what is the collection capacity of that community per year, define who are the ac-credited collectors in that community, and assign the amount of seed to be gathered by each collector each season, depending on the demand from external partners.

The fact that each group is autonomous in self-managing these tasks allows the initiative to keep its reliability and legitimacy among such diverse local communi-ties. This is a key aspect of their development and continuity, especially because the social relations, cultural dynamics and worldviews from the initiative's members are very diverse. Indigenous people from different ethnicities, multiple groups of family farmers who migrated from different regions of Brazil due to the land reform, and urban dwellers in nearby cities have divergent priorities and forms of organization. By developing such an innovative governance arrangement, the Xingu Seed Network recognizes and acknowledges this diversity and allows local communities to exercise their agency due to the initiative's institutional adaptability.

The Xingu Seed Network's arrangement is an example of polycentric govern-ance. According to Ostrom et al. (1961, p. 831) this concept "connotes many centers of decision making that are formally independent of each other." Throughout the years, the members of the XSN have been co-producing this polycentric arrangement in the initiative's meetings and capacity-building sessions. The main goal was to en-sure a decision-making process that was decentralized and flexible enough to ensure that the needs of different social groups could be met at the same time (see Sanches et al., 2021). In this sense, polycentric governance has been essential to foster the inclusion of the different groups involved in the Xingu Seed Network.

Hence, the innovative governance arrangement allowed for the creation of spaces for trust-building and collaboration. In this sense, both the RECA Agroforestry Pro-ject and the Xingu Seed Network have counted on decentralization to account for their internal diversity and to foster members' engagement, active participation and inclusive decision-making during the nourishing phase. Creating innovative

arrangements has empowered the autonomy, independence and self-management of place-based initiatives, which is key to enabling their transformative pathways in the Brazilian Amazon's arc of deforestation.

5.3.2. Consolidated partnerships

Financial and institutional support in the early stages is crucial, but the steady availability and flexibility of such support is equally important. Internal and external changes demand the ability to adjust the support from partners according to the initiative's contextual needs. This challenge has been observed in both analyzed initiatives, and they tried to overcome that by diversifying the financing sources and consolidating key institutional partnerships.

In RECA, the initial financial support received to create the initiative (e.g., Catholic Church, CEBEMO) has been followed by other financing partnerships at multiple levels. They include financial support from Acrean civil society, social movements, national agencies, and international organizations.[25] RECA also carried out local projects in partnership with the Amazon Fund, the Technical Cooperation Agency of the German Government (GIZ) and the Bank of Brazil (RECA, 2022). These projects made possible, for example, the construction of a small-scale factory for processing fruit pulp and oils, local production of organic fertilizers, a water filtration system, and machinery for harvesting and transporting agroforest products. "*The partnership and collaboration with various organizations has been very important […] to address the community's needs in the right moments, when the community was mobilized and engaged.*" (RECA Interviewee 1)

RECA has also developed solid structures for production and distribution of its products, consolidating key institutional partnerships. RECA's main commercial relations at present are with the cosmetics companies Natura (from Brazil) and L'Occitane (from France), to whom they sell the larger part of their agroforestry production, especially natural inputs, such as cupuaçu butter, tonka beans, and açaí extract (RECA, 2022). RECA also has commercial relations with local businesses and intermediaries, and regional supermarket chains, to whom they sell frozen fruit pulp. These partnerships are built through long-term contracts, so that the community can invest in producing specifically what these companies need, while the companies commit to ensuring demand for those products throughout the years. "*The question*

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[25] Namely: PESACRE (Research and Extension Group for Agroforestry Systems in Acre), Embrapa's office in Acre, CPT (Pastoral Land Commission), INPA (National Institute for Amazon Research), MMA (Ministry of the Environment), Italy's MLAL (Lay Movement for Latin America), PDA (Amazon Development Project), CCFD (Catholic Committee Against Hunger for World Development) and the NGO Friends of the Earth (see RECA, 2022).

of responsibility and reliability were important for RECA to continue to exist, and the long-term partnerships were fundamental." (RECA Interviewee 2)

The same goes for the experience of the Xingu Seed Network. The continuous support from ISA in the triggering stage was crucial for the creation of this place-based initiative, as it gave the administrative structure needed at an early stage. With time, this close connection turned into a form of external support, which allowed the Xingu Seed Network to develop an autonomous pathway. This change in the interaction between both institutions was key to nourishing the Xingu Seed Network and enabling it to develop independently. Meanwhile, XSN also developed institutional partnerships with other social movements and grassroots organizations throughout the territory, strengthening the way the initiative is grounded in local agency.

Regarding financial support, the Xingu Seed Network also diversified its partnering institutions and received grants from the European Union, UKAID, the Amazon Fund, the Technical Cooperation Agency of the German Government (GIZ), among others (XSN, 2023). In the same vein, the initiative deepened its partnership with progressive soy farmers which continued to support the initiative and gradually expanded their demand for seeds and restoration services based on *muvuca*. Partnerships with soy farmers were particularly recognized as an achievement by the Xingu Seed Network: "*The farmers' mentality changed when they saw their production getting cheaper, that restoration worked and is good for them. So instead of doing it just once, they restore their properties every year.*" (XSN Interviewee 2) The same idea is reinforced by another initiative member: "*The theme of restoration is becoming more and more established. So there is a demand, which is neither continuous nor predictable, but has grown. Collectors know that if they collect, they will sell the seed whether this year or the next.*" (XSN Interviewee 3)

Hence, the sustained institutional and financial support from consolidated partnerships has been key for nourishing the place-based transformative pathways led by both RECA and the Xingu Seed Network. Engagement with actors from the private sector, however, has also led to the promotion of market-based mechanisms as a means to support the activities of both initiatives.

In the case of RECA, the partnerships with Natura and L'Occitane drove the need for organic certification to cater for consumers' demands. Some members are being certified through Organic Brazil and the USDA Organic schemes. However, this is a lengthy and costly process and not always perceived as beneficial by RECA members. As explained by member A: "*There are producers who don't even use pesticides, but they don't have the certificate because it's too bureaucratic.*" (RECA Interviewee 1) Another ongoing market-based mechanism in RECA is the Carbon Project with Natura. This is a payment for ecosystem services scheme that pays farmers for the carbon stocks in their plots. Nevertheless, the individual payment is

conditioned to collective levels of carbon stocks amongst all the properties which participate in Natura's project. As such, the Carbon Project has been led to instances of internal dissent within RECA, as compliant farms (the ones that have carbon stocks according to the criteria) can receive lower payments due to noncompliant neighbors.

Similar to RECA, the Xingu Seed Network has also engaged in three main market-based sustainability mechanisms. First, there are the carbon-offsetting schemes, in which companies compensate for their emissions by restoring forests through the Xingu Seed Network. An example of that is an international music festival mega-event that partnered with the Xingu Seed Network to become 'carbon neutral.' (see Yamaoka, 2016) Second, the initiative engages with media celebrities to raise awareness and funds for forest restoration. An example in that regard is the partnership with a Brazilian internationally-known top model who has been a supporter of the Xingu Seed Network since its beginning and, in 2020, partnered with them to plant 40,000 trees in the Amazon.[26] Third, the XSN is one of the initiatives showcased in Mato Grosso's PCI Pitchbook. As discussed in Section 4.3, the PCI Pitchbook is a document intended to attract private investments to local initiatives (both place-based and large-scale) framed under a green-economy rationale. The aim is to support corporate sustainability programs and provide support to corporate engagement throughout the state.

These actions brought media exposure and increased both initiatives' nationwide visibility as emblematic transformative pathways in the Amazon. However, they also highlight the tensions embedded in landscape transformations (see Feola, 2021). They especially highlight the contradictions between the bottom-up agency place-based initiatives seek to assert, and the market demands that often reinforce the systemic lock-in mechanisms and hinder fundamental shifts in business-as-usual practices. Throughout the nourishing phase, these initiatives also had to learn how to deal with the opportunities and limitations of corporate engagement, seeking to assert their autonomy and avoid being appropriated or captured by market demands of elites. These elements show the need for engaging in new partnerships, as well as the associated challenges of pursuing transformative pathways under the dominant paradigm of commodity expansion.

5.3.3. Collective storytelling

In addition to material aspects of financial and institutional arrangements, the continuity of a place-based initiative is also grounded in intangible factors that underpin the social and cultural bonds among its members. One key aspect in this regard is an

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[26] See: https://site-antigo.socioambiental.org/pt-br/noticias-socioambientais/gisele-bundchen-isa-e-rede-de-sementes-do-xingu-vao-plantar-40-mil-arvores-na-amazonia

initiative's storytelling in which the motivations for its emergence, the role of the engaged actors and the key facts of the initiative's trajectories are highlighted and repeated. This collective storytelling instils a sense of belonging and common identity among community members. It is also crucial for the development of imaginaries and envisioned futures that promote alternatives to commodity expansion (see Muiderman et al. 2020). When recurrently shared over time, it is passed over generations and consolidates as an internal cohesion and bonding element (Wasserman & Taylor, 2021).

In the RECA case, members stress the initial importance of the cooperation between the migrant family farmers and the traditional rubber tappers living in the region, as well as the role of traditional knowledge in this process. "*The experience of those who were already there in the region was fundamental to build RECA.*" (RECA Interviewee 2) The collaboration and mutual support between these two social groups was also mentioned in the multiple interviews with members of different ages, genders and groups. "*RECA was really born out of the need to survive in the region and remain on the land. From there they [migrant farmers] partnered with the local populations, copying the techniques that already existed.*" (RECA Interviewee 1) This shared story has been institutionalized in the initiative's history and presented on their website (RECA, 2022, para. 2):

> Early on, we realized the land in that area was nothing like that in the south and southeast of Brazil: the open forest meant constant sun and the land perished. In the face of so much neglect and abandonment [from the government], we realized we needed to come together to transform our reality into something really worthy and new for all of us. We started to meet with the region's original peoples, the rubber tappers, and planned solutions to improve everyone's lives, seeking alternatives that respected the climate and the way of life of local peoples. We combined the knowledge on organization and cooperation brought by people from other states with regional knowledge about the forest.

In the Xingu Seed Network, water-related concerns occupy a central place in the collective storytelling. This is because it connects a diverse set of actors, from indigenous and family farmers to governments and large-scale agribusiness (XSN, 2022). Availability and access to clean water is critical not only for traditional livelihoods, but also for agricultural yields and public policies; therefore, it has been a gathering force to mobilize efforts in a common direction, and support forest restoration practice as a solution. "*Restoration was the chosen path because water quality is important for everyone. At that moment, it was a great insight.*" (XSN Interviewee 1)

The notion of collaborative interaction between asymmetric and often conflicting actors can be deemed as idealistic; nevertheless, the emphasis on collaboration under

different interests, perceptions and power positions points to common goals with broader regional relevance. This storytelling has not only played an important part in the members' self-perception, but also fueling their motivation to keep engaged and working together toward an encompassing goal. Also, it has been crucial to inspire and engage newer generations of members. Storytelling, in this context, serves as a mobilizing element by providing a reference for the justification, valorization and, ultimately, the existence of such initiatives over time.

In sum, storytelling is a key intangible socio-cognitive process of constructing shared values, connectedness to nature and collective meaning (see Winskell & Enger, 2014). In the analyzed case studies, this process highlights the importance of forests for individual and collective livelihoods within the community. Such discursive practices at the local level co-exist and interact (aligning or antagonizing) with state-level public narratives over economic growth, the role of forests in society and sustainable development (see Chapter 4). Storytelling, thus, is interwoven with other practices of self-valorization within an initiative, to acknowledge the worth of the forest-making and the people who implement it.

5.3.4. Inclusion of women and youth

In the nourishing phase, the inclusion of women and youth members is another key element which helps to strengthen the initiatives and reproduce them over time (see Mello & Schmink, 2017). According to Franco et al., (2021, p.8), the participation of women in local initiatives can lead to "a greater dissemination of the objectives (…) in everyday places where women predominate."

In the case of RECA, there are specific dialogue arenas for women in its governance arrangements: "*Today RECA has 10 regional groups. And in each group there is a coordinator, a leader and a women's representative.*" (RECA Interviewee 4) The initiative's website also highlights this emphasis on women's participation by saying "*The multiple types of knowledge that made our history would not be complete without the knowledge of women, and the important role of women farmers and coordinators in our groups, contributing to the expansion of gender social constructions. RECA recognizes the need to value the **female workforce** and ensures their representation in all groups and meetings, (...) legitimizing equal space for RECA female farmers.*" (RECA, 2023, para.1, emphasis from the original).

This is also a reality in the Xingu Seed Network. "If you look at women specifically, they have income from seed collection which did not exist before. It contributes to a process of empowerment as well, as many women have been depressed, and the seed network leads to a greater socialization, going to meetings, being part of a group, exchanging ideas." (XSN Interviewee 3) In their institutional report, the XSN also highlights that "More than 80% of the workforce is made up of women"

(XSN, 2023, para. 2). The inclusion of women helps disseminate the participation of this specific social group, decrease gender imbalances and embed the initiative's relevance throughout the community's broader social fabric.

In the same vein, intergenerational dialogue is also key in both initiatives. Including the youth in decision-making processes helps to retain younger members – a group that tends to leave their communities – engaged in the initiative. This is more clearly observed in RECA, an initiative that has existed for over three decades and is now entering a third generation of members. The practices of storytelling also help to engage this group by creating a memory of the initiative's trajectory and relevance. Nevertheless, RECA members stress the challenge of keeping the initiative running and inspiring new generations in a context of fast-expanding commodity production. This engagement of newer members is an ongoing effort which requires investment in youth education, and adjustments in RECA's strategy according to their perspectives. A second-generation member, underlines: "*A key element is the attitude of older members, who continue to highlight the importance of RECA for the families, for the region and for the whole world. They make it clear how the work of today is also important for future generations.*" (RECA Interviewee 3) They continue by stressing that "*the oldest members insist on teaching the new generations and taking their children to meetings so that from a young age children understand how important RECA is for everyone.*" (RECA Interviewee 3)

In contrast, the Xingu Seed Network, a 15-year old initiative, only recently started to experience this challenge. Members, however, show the same concern and attention for the social reproduction of their initiative as in the case of RECA. "*We focus on valuing people, local knowledge, traditional food, and also on transmitting this knowledge between generations.*" (XSN Interviewee 1)

Thus, the inclusion of women as agents that embed the initiative's values in the broader social fabric and the development of an intergenerational dialogue with the initiative's youth are two ways to nourish a transformative pathway over time. In frontier regions, the success of these strategies also serves to motivate other initiatives elsewhere, as we shall see below.

5.3.5. Inspiration to other initiatives

When place-based initiatives undertake long-term forest restoration in frontier regions, they are increasingly perceived as regional references that can inspire similar initiatives elsewhere. In this sense, the RECA Agroforestry Project and the Xingu Seed Network are examples that forest-based livelihoods are possible and desirable, even in adverse contexts of high deforestation pressures (see Bachi et al., 2023). These place-based initiatives lead the way for amplifying forest-making throughout the arc of deforestation. "*RECA is the reference for the entire region. Because when*

you see that something is working well, it gives you extra motivation." (RECA Interviewee 3)

Likewise, as Brazil's largest seed-collection network, the Xingu Seed Network is also a role model for smaller seed networks. This is the case, for example, of the Portal da Amazônia Seed Network, in the municipality of Alta Floresta, Mato Grosso, and the Cerrado Seed Network, in the national capital, Brasília. The XSN also engages with other similar networks in a collective forum named *Redário*, where seed collectors from all over the country come together to exchange information and experiences. They discuss how to handle, clean and store seeds as well as administrative information on taxes and duties. The members of the Xingu Seed Network stress that their vision is to stimulate other place-based initiatives to emerge and consolidate nationwide: "*We don't want to exist alone, we want to inspire and form new networks,*" (XSN Interviewee 3) Inspiration, thus, is a fundamental step to upscale place-based initiatives and value the transformative pathways carved by them (see Lam et al., 2020).

In sum, inspiring other initiatives is a key element that nourishes place-based transformative pathways over time, and helps them resist lock-in mechanisms from the dominant commodity system. These processes contribute to the overarching reproduction of forest-based practices and, therefore, the continuity of such initiatives as pockets of resistance grounded in forest restoration practices in agrarian frontiers dominated by commodity production.

5.4. The resilience phase: Navigating uncertainty[*]

In addition to the challenges faced during the triggering and nourishing phases, place-based initiatives often have to deal with unforeseen disruptions. This occurs when the conditions around the initiatives change fundamentally (e.g., new political administrations, economic recessions, cultural shifts). This is what I call the resilience phase, or the periods when place-based initiatives have to go through the uncertainty generated by external crises. Such periods can vary in length or intensity, and may occur in different moments of the initiative's development. They require the initiatives to develop an adequate (and often new) set of capabilities to continue to exist under these critical conditions.

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[*] This section is based on the previously published articles: Russo Lopes, G., & Bastos Lima, M.G. (2020). Necropolitics in the Jungle: COVID-19 and the marginalisation of Brazil's forest peoples. *Bulletin of Latin American Research*, 39, 92-97. https://doi.org/10.1111/blar.13177; and Castro, F., Russo Lopes, G., & Brondízio, E. (2020). The Brazilian Amazon in times of COVID-19: from crisis to transformation? *Ambiente & Sociedade*, 23, 1-11. https://doi.org/10.1590/1809-4422asoc20200123vu2020L3ID

To analyze the resilience phase of the RECA Agroforestry Project and the Xingu Seed Network, I focus on the Covid pandemic (2020-2023) as an exemplar of a double crisis. The pandemic coincided with the aftermath of a conservative political turn in Brazil (Hunther & Power, 2019). The collision of these two contextual disruptions embedded a public health crisis into a political one, which mutually reinforced each other. Although the impacts from this period are still unfolding, this is a relevant case to explore the factors that have been supporting place-based initiatives throughout their resilience phases.

The election of a right-wing presidential mandate (2019-2022) marked a key shift in Brazil's federal politics. It was the apex of a political crisis that had been developing for years, and severely impacted the country's socioenvironmental landscape (Menezes & Barbosa, 2021). This conservative political turn was also seen in state-level governments. In Acre, the forest-oriented left-wing governments (five terms between 1999-2018) were replaced by an agribusiness-oriented administration, aligned with the right-wing federal policies (elected in 2019 and re-elected in 2022; see Kröger, 2020). In Mato Grosso, the conservative political orientation of the state-level government was reinforced, consolidating and deepening the state's support for agribusiness elites (see Coy et al., 2020).

At the federal level, the government started a process of dismantling the policy framework for social and environmental protection (Milhorance, 2022), and increasing the support for deforestation-driven commodity expansion in the country (Ferrante & Fearnside, 2019). Moreover, the government pushed a discriminatory discourse of racism and violence against marginalized social groups (da Silva & Larkins, 2019; Rapozo, 2021; Burni, & Tamaki, 2021). These political actions directly (and disproportionately) impacted the place-based initiatives and forest-based livelihoods of local communities in the Amazon (see Russo Lopes & Bastos Lima, 2020). Supported by the neoliberal military and agribusiness sectors, the right-wing administration has tapped into an authoritarian vein of democratic backsliding (Ribeiro Hoffman, 2020). This is the context in which the pandemic broke out in Brazil, exacerbating the political crisis.

Worldwide, the pandemic has been a public health emergency that imposed severe changes in lifestyles (Balanzá-Martínez et al., 2021), and claimed millions of lives (JHU, 2021). Nevertheless, the pandemic in Brazil has been particularly acute, exacerbating the lurking inequalities throughout the country (Castro et al., 2020). In response to the pandemic, the right-wing federal administration tried a herd-immunization approach based on conservative ideologies, authoritarian policies and a disdain for scientific knowledge (Ribeiro Hoffman, 2020). In this context, state-level governors became protagonists of Covid-related measures. Some states implemented different types of lockdown, while others (including Acre and Mato Grosso)

remained aligned with the hands-off policy stemming from the federal level (see Calil, 2021). The results from an online survey applied in 2021 (see Section 3.2.3), point to the negative socioenvironmental impacts of such a hands-off approach to the pandemic, including an "increase in rural violence" and "heightened pressures of deforestation and fires."

In fact, deforestation rates in the Amazon, which were already rising in previous years, soared during the pandemic (INPE, 2022). The public-health crisis was used as a shield to mask and deepen the systematic unmaking of environmental protection mechanisms (Abessa et al., 2019). This context of increasing deforestation further marginalized local communities in rural areas, who were more vulnerable to the impact of the pandemic due to a lack of public health assistance and infrastructure (Ferrante & Fearnside, 2019; Conde, 2020; Castro et al., 2020). "*The current [2019-2022] government is a challenge, especially with the pandemic. Some people left the XSN because they suffered a lot with the Covid crisis, losing someone close.*" (XSN Interviewee 3) In the same vein, respondents to the 2021 online survey (see Section 3.2.3) highlighted the "precarious access to public services, such as health, employment and nutrition" and a "widespread governmental neglect" during the pandemic.

Another pressing outcome of this period was the impact on the country's food security. In 2020, more than half of Brazilian households faced instances of food insecurity, while 9% of the households were in hunger, particularly in rural areas (Maluf & Santos, 2021). At the same time, the disruptions caused by the Covid pandemic prevented the food produced by place-based initiatives from reaching regional markets. An initiative member flags some of the problems affecting the food supply chain: "*We suffered a lot, it was difficult to negotiate products, the prices were low. Inflation was also very intense, some inputs increased by 100% of the original price.*" (RECA Interviewee 1) Another member complements, "*It was a really bad moment, we had to dispose of some of the crops and all the [cooperative's permanent] employees were fired at some point.*" (RECA Interviewee 2) Such perceptions were also backed up by the survey responses, which pointed out the disruptions in commercialization chains and the large impact on smallholders' agricultural and forest-based production.

The analysis of the Covid pandemic as a disruptive period, therefore, helps us understand how place-based initiatives navigate fast-changing contexts marked by uncertainty and multidimensional challenges. Amid a public health crisis, deforestation and state neglect, place-based initiatives had to show high levels of resilience to outlive this phase. Grounded in their history of collaboration, these initiatives relied on social capital, collective action, and communal thinking to support their members (Brondízio et al., 2012; Castro et al., 2020). The data from the survey shows that the strong community bonds built during the triggering phase and the capabilities

developed during the nourishing phase have been the anchor that allowed them to survive this crisis by focusing on processes of (1) development of safety nets, (2) digital connections, and (3) long-term solidarity.

5.4.1. Development of safety nets

A first element mentioned both in the survey as well as in the interviews as a crucial element during the Covid pandemic was the development of inter-personal safety nets. Those were built on the existing bonds of trust between initiative members, developed during triggering and nourishing phases (see also Castro Ribeiro & Costa Matos, 2021; Sanches et al., 2021). Throughout the pandemic period, place-based initiatives played a key role in creating a sense of mutual care and security amidst the lack of public support (see Castro et al., 2020; Russo Lopes & Bastos Lima, 2020).

Throughout the pandemic, RECA was "*taking care that the members do not lose this perception that RECA is still a strength for them.*" (RECA Interviewee 1) This has been done by continuing the initiative's regular activities adapted to the new situation, and collaborating on a safety net where members assist and care for each other. Such a safety net helped ensure that the needs of the members were, as much as possible, met. Examples in this sense are the exchange of information about the pandemic situation, assisting elder members of the community, and interpersonal support in case of loss of family members. "*Usually, when these crises happen are the times when people come together the most.*" (RECA Interviewee 2)

In the Xingu Seed Network, a similar process took place. Building on the shared experiences and trust bonds developed over the years, members could rely on each other and be a source of support. They created a thread of inter-personal relations that provided the community with a safety net in times of need. The initiative also undertook tasks beyond their original forest restoration activities to assist their members. "*We carried out many activities, healthcare protocols, distribution of hygiene materials, vaccination campaigns. All these actions made the collectors stay engaged and prevented discouragement.*" (XSN Interviewee 3)

These actions demonstrate how much support place-based initiatives can provide for their community members, transcending their initial scope. In disruptive periods, these initiatives enhance the collective ability to respond to shocks and improve everyone's capabilities to deal with a lack of information and public assistance. Hence, developing safety nets in times of uncertainty and providing extended support to the initiatives' members has been a critical factor to build resilience and navigate crises; nevertheless, it was the digital connections that made possible the continuous communication and interaction during the context of social distancing.

5.4.2. Digital connections

As described in the previous sections, interpersonal bonds and community building have been key elements in the triggering and nurturing phases. During the pandemic, however, personal interactions were disrupted by the need for social distancing to halt the spread of the virus (see Castro et al., 2020). Although challenging, ensuring communication during this period was a crucial step to building resilience.

An initiative member explains how digital communications were fundamental to adjust their everyday practices in this disruptive period: "*The daily contact used to be very close and everyone always talked about RECA and its importance. This ended with the pandemic; we lost the personal encounters and exchange of ideas.*" (RECA Interviewee 3) The member continues pinpointing the impacts of such a shift: "*The lack of field visits and support to members was a problem. Producers became disheartened and some even increased deforestation. Here is where technology played a big role. It helped maintain the activities and the connection within RECA.*"

The Xingu Seed Network went through an analogous process: "With the pandemic, many adaptations were made when we were unable to go to the field. The digital channels, such as WhatsApp and online calls, were essential to maintain the activities. In addition, we provided support for the groups without internet access." (XSN Interviewee 4) As some rural communities lacked access to the internet, the Xingu Seed Network supported their inclusion by also using regular cell phone interactions or satellite connections to the internet. "The cell phone, the internet and the WhatsApp groups helped a lot for the members to keep in touch, send materials and have group discussions." (XSN Interviewee 3)

Digital inclusion remains a challenge in the Amazon, but there are some recent improvements. The federal government has been implementing public policies on digital inclusion; in the Wi-Fi Brazil program, for instance, 30% of the connection points have been installed in the Northern states of the Legal Amazon, totalizing about 4,000 public spaces with satellite connection in 400 municipalities (Brazil, 2021). These connection points are located in places such as public schools, health care centers, local community centers and indigenous territories. The investment in digital connections is often directed at the digital inclusion of communities for educational purposes, especially since the outbreak of the Covid pandemic (see Melo Neto & Oliveira, 2023; da Silva et al., 2023).

In this sense, technology is increasingly becoming key to a sustainable and inclusive development in the Amazon (see Nobre & Nobre, 2018). As more Amazonian communities find ways to have digital access through local dynamics of collaboration and solidarity, more interconnections are fostered, and place-based experiences are shared. This can be seen as the development of *digital rural communities* that

connect geographies and scales throughout the biome. In the context of the pandemic, such digital technologies and connections proved to be essential tools for providing the mutual support needed in times of disruptive crisis.

5.4.3. Long-term solidarity

Throughout the pandemic, the RECA Agroforestry Project and the Xingu Seed Network built resilience by relying on the long-term solidarity relations built over time with their consolidated partners. Solidarity was manifested in different ways. On one hand, buyers were committed to honor previously-signed contracts, ensuring stability in demand for the initiatives' products. On the other hand, external partners such as social movements and civil society organizations manifested their solidarity by helping reorganize the initiative's activities amid widespread uncertainty and disinformation.

Members from both initiatives expressed the relevance of such solidarity partnerships. One interviewee highlights "*Our customers are more than customers, they are actually partners,*" (RECA Interviewee 3) while another says that "*During the pandemic, what gave us a little more stability was our partnerships. This is how we managed to get through this situation in a more adaptive way.*" (RECA Interviewee 2) In XSN, a member underlines that "*What we have is a partnership and not a service provision. It is a very close relationship with the partners, of trust, of product quality.*" (XSN Interviewee 1) She is complemented by another member: "*Partnerships were very important, this pact with the buyers, the maintenance of the projects and the demand for the seeds. This is what kept the XSN active [during the pandemic].*" (XSN Interviewee 3)

This type of long-term partnerships can be seen as an example of a solidarity economy dynamics, built around collaborative economic relations (see Singer & Primavera, 2017). Part of traditional practices in the Amazon, those are economic transactions grounded on human relations that seek to empower the involved partners and reduce inequalities (see Fernandes et al., 2013). As such, the long-term solidarity relations, built during the triggering and nourishing phases of the analyzed initiatives, were even more vital to build resilience under disruptive contexts. These results show that the adequate support from external partners has been crucial for the multidimensional changes promoted by place-based forest restoration initiatives both in the landscape and in social relations.

5.5. Unpacking transformative pathways

The two case studies presented in this chapter demonstrate how place-based forest restoration initiatives can challenge the dominant commodity system in agrarian

frontiers. Both the RECA Agroforestry Project and the Xingu Seed Network share some key commonalities that help us understand how place-based transformative pathways emerge and develop over time in the Amazon's arc of deforestation. As explored in the previous sections, these initiatives were triggered by different stakeholders' common perception of a problem, the financial and institutional support from external partners and the co-produced local knowledge contextualized and adapted to each region. They were nourished by innovative governance arrangements, consolidated partnerships, collective practices of storytelling, inclusion of women and youth, as well as serving as inspirations to similar initiatives elsewhere. In the disruptive period of the Covid pandemic, the initiatives relied on long-term solidarity bonds, digital connections and the development of inter-personal safety nets. The results from the RECA Agroforestry Project and the Xingu Seed Network show us three important aspects of place-based transformative pathways based on forest-making. First, the continuous resistance led by these initiatives. Second, the interplay between place-based transformative pathways at the local level and the political contexts at the state level. Third, the multiple dimensions of transformations stemming from such pathways.

Place-based transformative pathways are a continuous process of resistance through silent praxis of everyday life in agrarian frontiers. In the politicized context of the Amazon, the continuity of place-based initiatives can be broken at any time. This is largely because the dominant lock-in mechanisms are constantly pushing local actors into unsustainable practices (see Section 2.3; see also Russo Lopes & Bastos Lima, 2022). To overcome these systemic mechanisms, place-based initiatives harness a sense of community, build trust bonds, and foster solidarity to create bottom-up, autonomous and inclusive transformative pathways at the system's fringes. In itself, the existence of these initiatives in the arc of deforestation is a powerful token of resistance which shows that forest-based livelihoods are possible even under high deforestation pressure. In doing so, these initiatives have become seeds of transformation in their regions, and act as a reference for other forest-based endeavors throughout the Amazon.

Local agency is central to this process; however, it is not without challenges. Such place-based transformative pathways are permeated by tensions and contradictions. They are based on ongoing negotiations and clashes along the way, among the initiatives' members as well as with their partners. A RECA member emphasizes the perks of harnessing internal alignment in the long run: "*Was RECA successful? No, RECA is being successful. Because the [internal] problems and challenges continue to this day.*" (RECA Interviewee 2) The case of the Xingu Seed Network, in turn, demonstrates the complexity of mediating the interests of multiple, asymmetric (and often antagonistic) partners. "*XSN brings together several actors that traditionally*

fail to dialogue. Despite the controversies that may exist, the key is to recognize the importance of the other and the contribution that everyone can make." (XSN Interviewee 2) Through their everyday silent practices, both initiatives are able to reaffirm their values, their ways of relating to nature, and their commitment to forest-making. Those are the elements that help ground these initiatives in their own local agency and allow them to face systemic pressures and power imbalances in frontier regions over time.

A second important aspect of place-based transformative pathways at the local level is how they interact with political contexts at the state level. As discussed in Chapter 4, Acre's longstanding framework of forest protection, which includes social and cultural valorization of native vegetation, helped foster and consolidate place-based initiatives along these lines. RECA benefitted from this political context under the *florestania*/ZEE nexus, particularly in its nourishing phase. Mato Grosso, as the national epicenter of agricultural commodity production and export, has approached sustainability through market-based policies, while excluding local communities from effective participation in politics (Tovar et al., 2021). Even so, place-based forest restoration initiatives have resisted the strong state-level support for commodity expansion, as is the case of the Xingu Seed Network whose nourishing phase took place under the modern frontier/PCI nexus (Figure 20).

Figure 20. Timeline of the case studies and the state-level narrative-policy nexuses
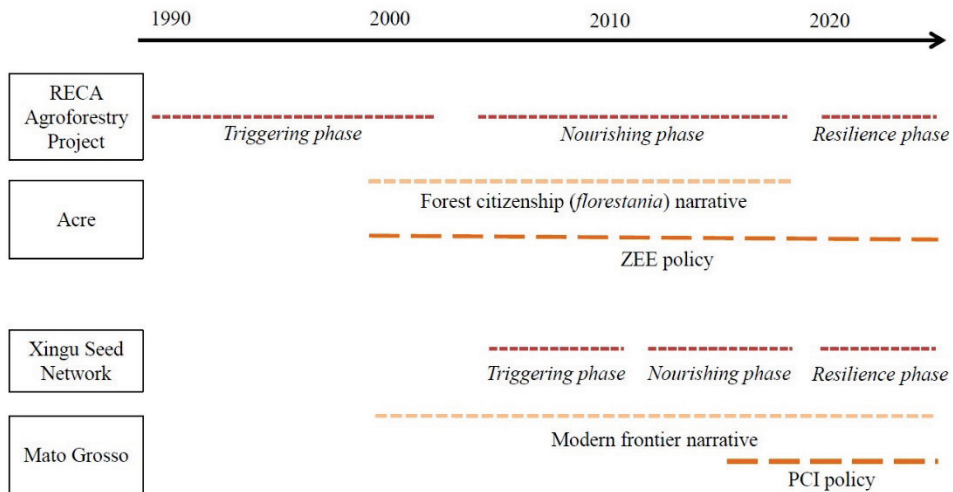
Source: Own elaboration

Different political contexts have led to different challenges for the development of place-based initiatives. In Acre, a major setback has been the conservative turn in state-level politics since 2019 (see Kröger, 2020). The new leaders have been

disavowing the forest-based development model put forward by *florestania* and disempowering place-based forest restoration initiatives. Moreover, the state has been tapping into and strengthening the lock-in mechanisms for commodity expansion, leading to increased deforestation rates even in traditional territories (see INPE, 2022). In turn, place-based initiatives in Mato Grosso have to face the systemic pressure that seeks to appropriate their activities into a business rationale – of which the PCI Pitchbook is a key example (see Section 4.3). Market-oriented mechanisms often push initiatives originally designed as bottom-up, empowering and autonomous endeavors into the superficial logic of business-as-usual solutions for the private sector. "*We explore the possibilities of new markets and new networks, but the very DNA of the Xingu Seed Network is forest restoration,*" (XSN Interviewee 1) as opposed to corporate sustainability strategies' offsetting projects. Transformative pathways, thus, are embedded in contexts of changing political priorities and have to deal with systemic power imbalances. As such, they are political processes that result from a cross-scale interplay between state and society.

A third key aspect of place-based initiatives is that forest-making in agrarian frontiers can lead to multidimensional transformative pathways. Academic analyses and policy agendas are often based on an underlying divide between production and conservation/restoration orientations, aiming to 'reconcile' economic growth and environmental protection (see Couto Pereira, 2010; Alves-Pinto et al., 2017; Brandão et al., 2021). According to this logic, the expansion of large-scale 'productive' systems can be compensated by designating 'conservation/restoration' areas with no or restricted use of nature (see Zimmerer, 2011). The analysis of these case studies, however, shows that this conceptual divide – and the consequent need for 'reconciliation' – is often misleading to understanding of local realities on the ground. Moreover, this separation can help normalize the idea of 'sacrifice zones' for nature protection which compensate and legitimize large-scale commodity expansion elsewhere in spite of the associated socioenvironmental impacts (see Oliveira & Hecht, 2016).

The two analyzed case studies show that production and conservation can be intrinsic parts of the same territory, facilitating and strengthening each other (Brondízio et al., 2021). The cases of RECA and XSN are examples of what Porto-Gonçalves & Leff (2015) call a "bio-cultural territory," referring to the multidimensional functions performed by these initiatives and the embedded practices of forest restoration (see also Pereira & Guebara, 2022). The claim over the territory and the imaginaries over alternative ways to relate to it – such as overturning the separation between production and conservation/restoration – ensure the existence, resistance, and reproduction of place-based initiatives in agrarian frontiers as an alternative to large-scale, monocrop, export-oriented productive systems. Based on this holistic approach to the territory, Porto-Gonçalves & Leff (2015, p. 73) explain:

> These social actors emerge from their resistance to being absorbed (de-territorialized) by globalization and their claims to redefine their environments and their cultural identities in order to build their sustainable worlds. (…) These populations do not only resist against dispossession and de-territorialization: they redefine their forms of existence through emancipation movements, by reinventing their identities, their ways of thinking, their modes of production and their livelihoods.

In this sense, forest restoration practices are "a means to many ends" (Chazdon & Brancalion, 2019, p. 24). In RECA, for example, agroforestry systems have been primarily aimed at food production, even though they also resulted in income generation, forest restoration and ecological connectivity. The initiative's motto, "planting forests of food," illustrates this perspective (see Santos, 2022; see also Section 3.1). In contrast, the main goal of XSN has been forest restoration near riverbanks and springs to ensure water conservation, although the collection of native seeds also contributes to income generation and empowerment of local communities. At the same time, it benefits larger farmers by facilitating legal compliance with the Forest Code and securing water availability for agricultural production. In both case studies, forest restoration practices have had environmental benefits – such as biodiversity protection through the revegetation of natural ecosystems (see Silva et al., 2009), temperature regulation and GHG mitigation (see Silvério et al., 2015), and recovery of riverbanks and springs (see Sanches et al., 2021). They have also had social benefits such as income from forest products (see Lima et al., 2015), political participation (see Schmink, 2014), and inclusion of marginalized groups (see Mello & Schimink, 2017).

Forest-making, however, goes beyond positive social and ecological outcomes throughout the landscape. It further encompasses the intangible process of transforming individual and collective values that shape and underpin alternative forms relating to nature – also called relational values, as discussed in Section 2.4. Forest-making, in this sense, entails a cultural valorization of forests (see Silva et al., 2009), the development of social dynamics mediated by nature (see Russo Lopes & Bastos Lima, 2023), and a caring perspective toward the surrounding environment (see Arora et al., 2020).

In academic analyses, environmental degradation in the Amazon has been explained not necessarily by profit-seeking behaviors (see Garrett et al., 2017), but by value systems that foster instrumentalist views of nature and attitudes of domination through resource extraction (Ioris, 2021; Russo Lopes & Bastos Lima, 2022). Contrastingly, the findings in this chapter show that values of attachment to the territory, solidarity bonds and human-nature connectedness pave the way to transformations toward sustainability. Acknowledging the role of relational values and socio-

cognitive dimensions of forest-making could be an avenue for countering deforestation-intensive land-use systems (see Fischer & Riechers, 2019).

In the next chapter, I discuss the theoretical and conceptual implications of the results presented here. I further highlight how forest-making in frontier regions can open transformative pathways, entailing multidimensional changes in politics, practices, and values.

6. Transformations in politics, practices and values

Transformative pathways entail fundamental changes that challenge dominant unsustainable systems and make space for sustainable alternatives. This research provides evidence that place-based forest restoration initiatives in the Amazon are key agents that carve such transformative pathways (see also Londres et al., 2023a). These initiatives are usually grounded in territorial attachment, connection to nature, and ethics of care and solidarity (see Arora, 2020; Russo Lopes & Bastos Lima, 2023). Often overlooked and invisibilized by public and private actors, they represent an understudied driver of sustainable landscape transformations in agrarian frontiers (see also Brondízio et al., 2021; Bachi et al., 2023). In this chapter, I discuss the empirical results presented in Chapters 4 and 5, in light of the theoretical discussions on transformations toward sustainability introduced in Chapter 2. This chapter, therefore, proposes an understanding of transformative pathways as a thread of smaller changes in politics, practices and values which can, over time, lead and uphold broader landscape transformations.

Forest-making is a relevant form of carving place-based transformative pathways in agrarian frontiers. This is far from an entirely novel process; studies in the field of historical ecology reveal the longstanding role of local communities in making forests in the tropics. Concepts such as 'cultural forests' and 'anthropogenic forests' (see Balée, 2013), as well as 'multidimensional forests' (see Londres et al., 2023b) emphasize the close connection between societies and nature and how they mutually shape (or, in fact, make) each other. Balée (2013) argues that pre-Colombian societies enhanced biodiversity by managing, shaping and interacting with forests, while Posey (2003) describes forest-making by indigenous groups in their hunting sites (see also Denevan, 1966). As explored in Chapter 1, indigenous thinkers go one step further to stress how societies and forests not only interact, but also are indivisible parts of a whole, and how everything on Earth is an expression of nature (see Krenak, 2019). Through these lenses, we can see that forest-making in the Amazon is a deep-rooted, traditional practice that represents the foundation of contemporary place-based forest restoration initiatives.

In contrast to forest-making during the pre-colonial period, contemporary societies deal with a more complex set of factors to make forests. They include the conservative national political context, the urgent call for climate action, and a deep-seated commodity-based development approach. Such complex contexts require multidimensional transformations to unmake unsustainable lock-in mechanisms and

open space for forest-making. In the next section, I introduce this double-edged process by applying the concepts of making and unmaking transformations toward sustainability (see Feola et al., 2021; Blythe et al., 2018) to the cases of the RECA Agroforestry Project and the Xingu Seed Network. In the subsequent sections, I focus on three dimensions of transformations that emerged from the place-based initiatives analyzed in this thesis: transformation of politics by unmaking the politico-institutional lock-in (Section 6.2), transformation of practices by unmaking the techno-economic lock-in (Section 6.3), and transformation of values by unmaking the socio-cognitive lock-in (Section 6.4). Finally, I look into the concept of forest-making and the multidimensionality of place-based transformative pathways (Section 6.5).

6.1. Dynamics of transformations and inherent tensions

Place-based transformative pathways can be analyzed as a double-edged interplay between making and unmaking processes. The unmaking of dominant politico-institutional, techno-economic, and socio-cognitive lock-in mechanisms in the Amazon refers to policies, practices and values that uphold the expanding and deforestation-driven commodity system (see Chapter 2). At the same time, the creative practices of envisioning, proposing and making sustainable alternative systems in the Amazon refer to new conceptualizations of forest citizenship, forest restoration, and nature-society relations – particularly in agrarian frontiers (see Chapters 4 and 5).

Feola et al. (2021) characterize the making and unmaking of transformations as distinctive, yet complementary processes. They note that such dynamics drive "the deconstruction of capitalist modernity and construction of post-capitalist realities" (Feola et al., 2021, p.1). In the same vein, Kivimaa & Kern (2016) label this process as a creative destruction, through which existing dominant structures are opposed and refused, while new ones are carved and developed. This process is seen in the Amazon's agrarian frontier, where place-based forest restoration initiatives deliberately deconstruct patterns of resource extraction and relations of domination toward nature. Meanwhile, they also actively carve spaces for new social relations based on human-nature connectedness and values of solidarity and care. Hence, unmaking dominant lock-ins and making alternative realities are two processes that go hand in hand, mutually reinforcing each other continuously and concomitantly.

'Unmaking', in this sense, is different than simply 'unlocking.' The latter is applied in the transitions literature as a pre-condition for the destabilization of existing capitalist industries (see Turnheim & Geels, 2013), whereas unmaking presupposes an unruly, contradictory and imperfect process that is subject to leaps forward and setbacks over time (Feola et al., 2021). Importantly, this conceptual distinction highlights that the emergence of sustainable practices or technologies does not suffice to

displace existing unsustainable systems. Feola (2019, pp. 983-987) identifies multiple strategies of unmaking dominant unsustainable structures. Those include mobilizing alternative knowledge, actively changing material and symbolic social practices, and sacrificing current unsustainable behaviors for future sustainability benefits. Other forms of unmaking are the strategy of cracking capitalism, as proposed by Holloway & Sergi (2010), of creating pockets of post-capitalist relations and holding space for care and solidarity throughout society. Finally, everyday practices of resistance (Scott, 1985) can also be transformative when outright confrontation is unfeasible. The refusal to uphold dominant systems by abstaining from reproducing unsustainable practices is particularly relevant for this thesis (see Chapter 5).

These place-based transformative processes, however, are neither linear nor consensual. They are subject to what I call *inherent tensions* about what should be transformed, why, how and by whom (see Fisher et al., 2022; Turnhout & Lahsen, 2022). These tensions stem from the power asymmetries, socioeconomic inequalities, and opposing worldviews which may hinder fundamental changes in nature-society relations. Furthermore, these tensions can promote superficial solutions to unsustainable practices, or even legitimize imbalanced power structures as what Blythe et al. (2018) call "the dark side of transformations." They describe latent risks as the possible shortcomings in the transformations discourse that might subvert the objective of empowering local communities.

The cases of the RECA Agroforestry Project and the Xingu Seed Network enact multiple making and unmaking strategies through their silent praxis of everyday life, entailing an ongoing resistance to the commodity system in agrarian frontiers. These initiatives are examples of what Scoones et al. (2020) label as an 'enabling' approach to transformations toward sustainability (see Chapter 2). Grounded in local agency, based on bottom-up processes, and led by historically-marginalized local communities, place-based forest restoration initiatives seek emancipatory and autonomous ways of living through forest-making. At the same time, they also undergo latent risks and tensions which the initiatives have to learn how to navigate – rather than entirely avoiding or mitigating. The political context in which these place-based initiatives operate, as discussed in Chapter 4, also plays a role in how much such inherent tensions can be strained or loosened over time. In the next section, I discuss how these two place-based initiatives engage with transformations in the realm of politics in the Amazon.

6.2. Transforming politics: Unmaking the politico-institutional lock-in

The Amazonian agrarian frontier is often characterized by narratives that support recurrent trends of resource extraction (see Chapter 2; see also Ioris, 2021; Bastos

Lima & Kmoch, 2021). However, agrarian frontiers are contested political spaces where narratives and policies have been transformed over time. As discussed in Chapter 1, the Amazon's forests have been reconfigured and resignified over the decades. Portrayed as a 'demographic vacuum' during the developmentalist military governments, they were reframed as the 'lungs of the world' during the onset of socioenvironmentalism, and more recently seen as a source of 'green commodities.' (see also Bidone, 2021)

Academic debates on transformations to sustainability highlight the role of these narratives in shaping the politics of transformation, especially the ones focusing on resource scarcity as a justification for capitalist accumulation (Scoones, 2016). These discursive strategies are part of the 'political sphere' which can facilitate or constrain processes of transformation (O'Brien, 2018). Patterson et al. (2017) also emphasize the centrality of politics in the transformations debate, with particular attention to power dynamics. These studies demonstrate the relevance of narratives and state-society relations in shaping transformations in politics. Peluso & Vandergeest (2020) describe the concept of 'political forests' to explain how these narratives frame the role of forests in society (see also Bebbington et al., 2021). Narratives are the foundations for policies and sustainable development models being carried out in the Amazon. They also shape what is envisioned as a desirable future for the region (see Muiderman et al., 2020). Alternative narratives, therefore, can support forest-based development throughout the Amazon. Through forest-making, place-based initiatives contribute to this process by shifting the historical view of the Amazon as source of commodities (e.g., wood, minerals, cattle, soy) into a renewed view of the Amazon as source of practices, values and ideas that can restore landscapes and improve local, regional and global wellbeing.

This research helps overcome a gap we see in many studies about politics, which is a focus on how governments steer transformations through "norms, rules, regulations, institutions, regimes and incentives" (O'Brien, 2018, p. 156). The emphasis is often on central or federal governments, while the role of states remains understudied (see Chapter 4). The study of the narrative-policy nexuses in the states of Acre and Mato Grosso shows how the sub-national level deserves further attention within land-use dynamics, especially in the arc of deforestation. Throughout its history, Acre has constructed a public narrative-policy nexus in which the Amazon occupies a central place as source of forest-based practices and ideas. Mato Grosso, in contrast, has produced a public narrative-policy nexus that reinforces the image of the Amazon as source of (green) commodities. These two contrasting roles attributed to forests in society are examples of opposite futures envisioned for sustainable development within the same country and biome.

In both cases, however, narrative-policy nexuses are not free from inherent tensions materialized in distinct ways in each case. In Mato Grosso, the techno-managerial and market-oriented sustainability policies in the Produce, Conserve and Include (PCI) policy have encountered resistance from agribusiness elites, particularly after Brazil's conservative turn in 2019. From the onset, the right-wing federal government, the state government and agribusiness elites became more vocal about the need for public support for deforestation-driven commodity expansion. This has weakened the modern frontier/PCI nexus, forcing this sustainability policy to move away from state government and become an independent institution, the PCI Institute, as seen in Chapter 4. This process exemplifies instances of political discontinuity, even in the case of green commodities' sustainability strategies such as the PCI.

The case of Acre shows that, more than discontinuity, narratives and policies can undergo what I call a *radical reversion*. This means a deliberate dismantling of the narrative-policy nexus in place, compounded by the active steering of landscape transformations into degrading and unsustainable directions. Since 2019, when the federal and state conservative governments aligned with each other, Acre's longstanding history of forest protection and socioenvironmental mobilization has been radically reversed (see Kröger, 2020). This stemmed from the sharp contestations the *florestania*/ZEE nexus faced from the state's agribusiness sector. As a result, a renewed Ecological-Economic Zoning (abbreviated ZEE in Portuguese) under the new government (Phase III, elaborated in 2020), deleted mentions of *florestania* and increased the emphasis on cattle ranching throughout the state (see Acre, 2021). This process demonstrates how, as proposed by Stirling (2014), transformations toward sustainability are messy and unruly processes.

Although state-level politics is an important arena that shapes landscape transformations, politics also involves relations between the state and civil society (Abers et al., 2014), power structures in social relations (Avelino, 2017), the local praxis of resistance (see Scott, 1985; Mehta et al., 2021; Ojha et al., 2022), as well as the conflicts and struggles embedded in these political processes (see Scoones, 2016; Blythe et al., 2018). The empirical findings show how place-based forest restoration initiatives are active agents in the politics of making and unmaking transformations. Despite external pressures, they refuse to support, engage or reproduce the public narratives and policies that favor commodity expansion. The very existence of these initiatives in agrarian frontiers is a politicized demonstration that forest-based ways of living are possible and desirable, as they challenge the political logic that deforestation paves the way for development (see Russo Lopes et al., 2021). By engaging in state-society interactions and participating in the available political spaces, such initiatives can thus transform politics based on their silent praxis of everyday life.

At the same time, place-based forest restoration initiatives also create more sustainable realities through forest-making. Based on local agency, these initiatives reclaim agrarian frontiers as spaces of transformations toward sustainability. The findings provide empirical insights for a growing body of literature that conceptualize agrarian frontiers as plural and disputed regions, rather than arenas solely of capitalist accumulation. The two case studies are examples of what de Jong et al., (2021) calls a 'restoration frontier,' described as "a progressively expanding physical area of land that is subjected to forest restoration" (p. 2225). In the same vein, Buchadas et al. (2022) characterize a 'conservation frontier' as a barrier to the expansion of deforestation, arguing that "frontiers can be seen as spaces where multiple land uses, including conservation, interact" (p.12; see also Schmink & Wood, 1992). In contrast to green grabbing, where forested territories and reforestation initiatives are incorporated into capitalist structures (see Fairhead et al., 2012), place-based forest restoration initiatives are autonomous pathways shaped by marginalized actors. Based on these studies and also on the results from Chapters 4 and 5, we can see that the Brazilian Amazon's arc of deforestation is both a space of capitalist appropriation and post-capitalist resignification, where contradictory landscape transformations dispute the territory at full intensity. In this sense, the forest-making can be seen as an advancing forest frontier that represents an alternative to resource extraction and disseminates landscape transformations toward sustainability.

Forest-making also transforms politics through creation of grassroots interaction networks that provide inspiration for similar initiatives elsewhere. As place-based initiatives emerge and develop over time, their practices and accomplishments disseminate the political message that forest-making can empower local communities, foster sustainable livelihoods and transform realities – even in face of high deforestation pressures (see Bachi et al., 2023). According to Lam et al. (2020), this amplifying pattern has transformative power across locations. This is because place-based initiatives can increase their impact throughout the landscape by, among other strategies, collaborating with similar initiatives. Such a process strengthens local agency, allows for mutual assistance through safety nets, and builds collective resilience to endure disruptive periods. This process has been facilitated by the increasing digital connectivity in the region, through what I call *digital rural communities* in the arc of deforestation. Through these communities, marginalized rural groups can interact, connect, and support each other to mobilize a bottom-up political resistance to the dominant commodity system.

The process of transformation of politics is continuously confronted by power struggles. In the words of Blythe et al. (2018, p. 1216), "Power dynamics underscore the ability of people and communities, institutions and social ecological systems to deal with change and to negotiate and steer transformation." In this sense,

powerful actors, who are regime incumbents, often seek to dilute the attempts at fundamental changes and turn them into superficial practices that ultimately uphold the dominant system. The research findings reveal mechanisms of depoliticization of place-based transformative pathways in agrarian frontiers. A recurrent strategy is the justification of commodity expansion in the name of development and poverty alleviation (see Bastos Lima et al., 2021; Aragão et al., 2022) – consequently framing local resistance movements as irrational, lunatic or retrograde (see Russo Lopes et al., 2021). As an anecdotal reference, in his speech at the 2020 World Economic Forum, the then Brazilian Minister of Economy argued that: "the worst enemy of the environment is poverty, (…) people destroy the environment because they need to eat" (Salomão & Coelho, 2020, para. 2). Such discursive methods may lead to the disarticulation and delegitimization of local resistance, upholding the politico-institutional lock-in (see Russo Lopes & Bastos Lima, 2022). However, local actors engaged in place-based initiatives resist this pressure by refusing and challenging such narratives. During an interview in Acre, a rubber tapper unintentionally responded to the former-minister's reasoning: "*The [federal] government adopts this discourse that it will bring employment, income, and development…as if the forest didn't already bring these things! Our forest has immeasurable wealth!*" (Acre Local Actor 4).

Hence, place-based transformative pathways can influence transformations within governmental politics, and they can also promote fundamental changes in the politics of everyday life. These changes, however, bear inherent tensions and are far from consensual or linear, especially in agrarian frontier contexts (see Scoones, 2016; Blythe et al., 2018; Ioris, 2021). The research findings show that transformations in politics take place at multiple scales (e.g., local, state, regional, national, international), and are continuously constructed and contested among different (and sometimes antagonistic) social groups. They are influenced by contextual shifts at multiple scales and can undergo instances of discontinuation or even a radical reversion to the opposite direction. Moreover, place-based initiatives suffer pressures of depoliticization due to power imbalances but can also survive under disruptive crises. Transforming politics toward sustainability, therefore, is an ongoing double-edged process of unmaking dominant politico-institutional lock-in and making alternative forest-based realities. New narratives, policies, and state-society interactions are translated into practices, which leads to the materialization of transformations on the ground, a process which I examine in the following section.

6.3. Transforming practices: Unmaking the techno-economic lock-in

Place-based initiatives promote significant transformations in practices through forest-making, as addressed in Chapter 5. Those include the development of innovative forest restoration techniques (e.g., agroforestry in RECA, *muvuca* in XSN), but it goes beyond that. It encompasses the very understanding and definition of what forest restoration practices are and how they are carried out. Moreover, transformations in practices involve the creation of alternative, inclusive and participatory forms of governance, as well as transformations in social practices, which become increasingly mediated by nature. This holistic approach to the role of practices in transformative pathways allows for a deeper understanding of processes on the ground. It further demonstrates how transformative pathways through forest-making reconfigure multiple dimensions of local realities and livelihoods.

These findings enlarge the techno-managerial perspectives on transformations, which focus on tangible and commensurable aspects. O'Brien (2018), for example, proposes the notion of a 'practical sphere of transformation' to account for "actions, interventions, strategies and behaviors that directly contribute to a desired outcome" (p. 155). The author continues by saying that such technical responses produce results that can be measured, monitored, reported and verified, and consequently, "progress in the practical sphere is easily tracked by indicators" (p. 155). Possibly due to this commensurability and possibility of defining quantitative targets, a large part of the literature focuses on the practical aspects of transformations. As explored in Chapter 2, the analysis of socio-technical systems underlines how techniques and technologies mediate transformations (Lawhon & Murphy, 2011; Geels, 2019). The socio-ecological systems perspective also highlights the importance of developing formal and informal adaptive practices that can be evaluated and monitored to foster resilience in transformative processes (see Colding & Folke, 2001; Olsson, 2016; Sterk, 2017). Such approaches, thus, emphasize technology as well as technical innovation as drivers of fundamental change.

The sole focus on technology and innovation can limit the interpretation of the role of practices and neglect more subtle processes of everyday life (see Scott, 1985; Blythe et al., 2018). In fact, an important aspect of transformations in forest restoration practices is the co-production of knowledge among multiple and diverse local actors. Stirling (2014) emphasizes the relevance of plural and diverse knowledge in transformative pathways. Some authors further use the concept of 'retro-innovation' to refer to transformative practices that mobilize and reconfigure old and new knowledges to promote fundamental changes (see Zagata, 2020; Londres et al., 2023a). Knowledge co-production, in this sense, is a collective learning endeavor which properly acknowledges the role of traditional ontologies (see Reyes-García et al.,

2016). The Amazon's arc of deforestation is a space where these different forms of knowledge interplay, bringing together traditional knowledges, academic analyses, and technological innovations. Castro & Futemma (2021) describe this process in one agrarian frontier of the Amazon where the encounter of multiple ontologies and worldviews has enabled the emergence of creative, bottom-up and place-based transformative pathways. Both case studies discussed in Chapter 5 support this theoretical postion on the role of knowledge co-production in facilitating transformations of practices in agrarian frontiers.

The interaction between multiple sources of knowledge produces contextualized and locally-relevant sustainable practices. This is the case of the *muvuca* sowing technique and the "forests of food" that grow through agroforestry systems. Such examples of co-produced techniques not only enable bottom-up transformations in practices, but also reorient the purpose of technologies toward more sustainable pathways. This is the case of the large-scale sowing and harvesting machinery used in soybean fields, which later were reconfigured to sow native seeds. This resignification implies attributing new meanings to technologies originally set for unsustainable practices. Through their co-produced local innovations, place-based forest restoration initiatives actively seek to transform material and symbolic dominant practices in rural areas of Brazil.

The practice of forest-making further expands the meaning of forests and forest restoration. Rather than just being the surrounding nature, forests become part of local communities' life. Forest-making mediates the social relations and the interactions with the territory (see Krenak, 2019), and in this sense, presupposes an entwined relationship between humans and nature, which brings about some relevant considerations on the notion of restoring forests. Agroforests (in the case of RECA) are multi-crop systems that may not be considered a restored forest. However, looking at the starting point of the degraded land which later became agroforestry systems as well as the communities' close connection with the vegetation, the case studies are in line with Chazdon & Brancalion's (2019) argument that forest restoration means multidimensional landscape transformation. I argue, therefore, that reestablishing the social and ecological functions of natural environments is a key element of forest restoration practices.

Transformative pathways led by place-based forest restoration initiatives also entail fundamental changes in governance practices. Both cases are characterized by innovative governance arrangements which break through the techno-economic lock-in often oriented toward large-scale endeavors (see Russo Lopes & Bastos Lima, 2022). Decentralized and polycentric decision-making processes in RECA and XSN, respectively, allow for the inclusion and participation of local communities, strengthening their agency. By proposing creative forms of self-governance, place-

based initiatives find ways to subvert the top-down structures of local organization imposed by the public sector, which are often unsuited for local realities (see Brondízio et al., 2021). In doing so, place-based initiatives transform governance practices and create empowered, grounded and contextualized landscape transformations that harness inclusive and forest-based social relations within the community. These findings provide empirical insights into how bottom-up processes can be fostered in frontier regions.

In addition to new practices of governance, practices of interactions with external partners have also supported the unmaking of techno-economic lock-in. As discussed in Chapter 5, place-based forest restoration initiatives are autonomous bottom-up processes, yet they need support from partners throughout their triggering, nourishing and resilience phases. In both cases, partnerships with NGOs, social movements and progressive private actors were key for the emergence and the consolidation of place-based transformative pathways. They were also critical for the development of long-term solidarity that allowed such pathways to endure moments of crisis. In this sense, adequate support from external partners, tailored for local communities' needs at each phase of the initiative's development, is also an important process in transforming existing practices toward sustainability.

Partnerships, however, bear inherent tensions, particularly when there are significant power asymmetries. Place-based initiatives have to navigate the tension of being appropriated by the external partners' interests and agendas. This process is more evident in Mato Grosso, where the political context is dominated by agribusiness elites, and place-based forest restoration initiatives have to engage with asymmetric partners. The Xingu Seed Network seeks to develop autonomous and empowering transformations. Yet, the initiative is framed in state-level politics as a market-based sustainability solution for the private sector, of which the PCI Pitchbook and partnerships with private-sector entertainment mega-events are key examples (see Chapter 5). Grounded in the green economy logics, these partnerships conflict with the enabling logics of the place-based initiatives (see Ferguson, 2015; Scoones et al., 2020).

Partnerships with soybean farmers also pose challenges for the XSN due to highly asymmetric relations. Large-scale farmers are land users that often contribute to commodity production and expansion (see Russo Lopes et al., 2021); on the other hand, they also need to comply with forest restoration requirements of environmental legislation such as the Forest Code (see Section 4.3). Their partnership with XSN, therefore, can turn the local communities' labor and knowledge into a form of (cheap) service provision for their restoration needs – rather than empowering the development of place-based transformative pathways. As such, this is an inherent tension that brings together two of the risks described by Castro (2013) and Blythe

et al. (2018). First is the shift of responsibility for conservation and restoration toward marginalized rural communities. Second is the engagement of powerful actors, such as agribusiness elites, with place-based forest restoration initiatives as a way to justify business-as-usual patterns of commodity expansion.

Finally, engaging with market-based mechanisms brings to place-based forest restoration initiatives the inherent tension of fostering economically-driven relations with forests. This process, which some authors label as forest commodification (see Büscher & Arsel, 2012) or neoliberal conservation (see Holmes & Cavanagh, 2016; Sheng et al., 2019), can lead to the dissolution of community bonds and to internal disputes that were previously non-existent (see Bastos Lima, 2019). Debates on the concept of 'motivational crowding' further describe how the introduction of monetary incentives can crowd out previously-existing (non-economic) motivations to conserve or restore forests (see Costedoat et al., 2016; Ezzine-de-Blas et al., 2019; Bamwesigye et al., 2020; Wollbrant et al., 2022). Instances of motivational crowding out have been observed in the case of RECA with the introduction of a payment for ecosystem services scheme through the Carbon Project with the cosmetics company Natura. The project's original purpose was to increase the income of families that conserved and restored their plots of land. However, the monetary rewards have been generating mistrust toward project members who are incapable (or unwilling) to achieve the externally-determined targets, which leads to a negative perception toward such conservation and restoration projects (see Section 5.3.2).

In sum, place-based transformative pathways in frontier regions entail transformations in practices. Place-based initiatives are continuously unmaking the techno-economic lock-in by creating alternative practices of knowledge building, internal governance and external partnerships. Based on co-production and (retro)innovation, practices of forest-making offer sustainable and inclusive ways of using the land, producing food, restoring forests, engaging with technology and governing such processes. Meanwhile, they also develop the capacities to deal and negotiate with the tensions of appropriation and motivational crowding inherent to such fundamental changes. Transformations in practice, however, rely on and are upheld over time by deeper transformations in values, which I explore in the next section.

6.4. Transforming values: Unmaking the socio-cognitive lock-in[*]

Transformations in politics and practices are underpinned by deeper transformations in values. Those are the subtle and intangible processes of reshaping the way people

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[*] This section is based on the previously published article: Russo Lopes, G., & Bastos Lima, M. G. (2023). Eudaimonia in the Amazon: Relational values as a deep leverage point to curb tropical deforestation. *Conservation*, 3(1), 214-231. https://doi.org/10.3390/conservation3010016.

relate to nature, and eventually to each other. In the academic literature, some examples have been analyzed in rural areas of the United States (see Koontz, 2001) and Australia (see Greiner & Gregg, 2011), where local actors increasingly value, for instance, landscape aesthetics, wildlife protection, enjoyment of their lands, and family wellbeing (see also Martín-López et al., 2007; Constantino et al., 2021). O'Brien (2018) labels this type of change as the 'personal sphere of transformations,' encompassing changes in beliefs, values, worldviews, and paradigms. The results of this thesis are aligned with the understanding that changes in values occur at the personal level. Yet, as explored in Chapters 4 and 5, we can also see that values further influence collective practices and inform public narratives and policies, steering political priorities toward forest valorization or commodity production.

Based on the studied cases, transformations in values can be seen as the utmost driver and upholder of transformations toward sustainability over time. Due to the permeability in multiple layers of society, transformed values bring along transformations in many other dimensions. The results reveal the key importance of analyzing transformations in values to make sense of landscape transformations in agrarian frontiers, where place-based forest restoration initiatives unmake socio-cognitive lock-in by reshaping forest values. The dominant socio-cognitive lock-in, defined by Hoelle (2015) as 'cowboy culture,' refers to the set of values that incentivize deforestation-intensive commodity expansion (see also Rueda et al., 2019). Place-based initiatives challenge the perceptions of forests as an obstacle to development, and shape alternative values based on an ethics of care and solidarity (see Stirling, 2014; Arora et al., 2020). In the transformations literature, many studies highlight the role of such values to promote changes in land-use systems by shifting the ways local communities perceive and relate to their environment (see Brondízio et al., 2021; Fisher et al., 2022; Bachi et al., 2023). Feola (2019) characterizes this intangible process as cracking capitalism from within. Even when embedded in contexts of commodity expansion, place-based forest restoration initiatives create pockets of forest-based values at the margins of the dominant system. Based on these results, and in response to Hoelle (2015), I argue that the transformations in values can lead then to a 'forest culture,' where sociobiodiversity and forest-based livelihoods are acknowledged and celebrated by local communities and gradually by other societal actors.

Bringing the dimension of values into the transformations debate also helps recognize the plurality of perceptions and worldviews that exist in the Amazon. To use a term proposed by Elliott (2017), local actors are embedded in a 'tapestry of values,' hinting at their patterns of diversity and interconnection. This recognition contributes to overcoming stereotypical distinctions between modern, efficiency-maximizing and profit-seeking sets of 'instrumentalist' values around forests, and the ethnic,

cultural, religious and traditional sets of 'intrinsic' values (see Bieling et al., 2020). The examples of Acre and Mato Grosso portray a much richer picture of local agency than what is found in mainstream analyses that interpret local actors' behaviors as responses to 'carrots or sticks' (referring to incentives or sanctions; see Nepstad et al., 2014; Börner et al., 2015; Trancoso, 2021). These findings support an understanding of human agency shaped by relational values to forests, showing how engagement in forest restoration can have a beneficial and transformative impact on the environment and on people themselves (see Bieling et al., 2020; Schneider & Weber, 2022; Russo Lopes & Bastos Lima, 2023).

In this sense, local actors report significant improvements in psychological wellbeing due to a closer connection to nature through forest-making (Russo Lopes & Bastos Lima, 2023). This process is increasingly analyzed in the literature as a form of 'mental health ecosystem services' (Bratman et al., 2019). The IPBES framework of nature's contributions to people recognizes the role of 'psychological experiences,' as discussed in Chapter 1. Examples include how local actors feel empowered by growing medicinal plants that help them heal many illnesses locally, how they take pleasure of talking to their trees along rubber-collection paths (interview with Acre Local Actor 2, see Annex). Through this intimate relation with nature, local actors notice the subtle changes in the environment due to their actions and care, as a kind of large-scale gardening with people well-embedded in natural systems. Such interaction with the surrounding environment makes them feel part of the ecosystem by actively making forests. This process strengthens the reasons for questioning the dominant socio-cognitive lock-in, according to which forests are seen as obstacles to wellbeing.

Forest-making, therefore, transforms values and instils a sense of purpose and meaning to the silent praxis of everyday life. It further enhances the relevance of daily activities, elevating individual actions as critical to the wellbeing of others in their immediate communities, regions, and surrounding environment. It positively affects local actors' self-perception and sense of personal worth (see van den Born, 2018; Schneider & Weber, 2022). In the context of the Amazon, caring, interacting, and contributing to forest restoration may be particularly valuable to the historically-undervalued and marginalized local communities in frontier regions (Russo Lopes & Bastos Lima, 2020; Brondízio et al., 2021). Contributing to the debate on values, the results show how forest-making entails an enhanced sense of wellbeing and self-worth by interconnecting local practices with processes at broader scales.

This kind of situated experience becomes key to personal fulfilment and self-valorization as much as to the formation of social and cultural dynamics mediated by the attachment to nature in those communities (see Russo Lopes & Bastos Lima, 2023). Forest-making, hence, can be regarded as a humanizing process of

recognizing one's self-worth, as well as a source of a more purposeful life. Referred in the academic literature as 'eudaimonia,' this notion of a well-lived, meaningful life where one's potentials can flourish (see Knippenberg et al., 2018; van den Born et al., 2018) is supported by the RECA and XSN case studies (see also Russo Lopes & Bastos Lima, 2023).

Place-based forest restoration initiatives show the ultimate potential of forest-making in transforming values. By harnessing care and solidarity, as well as a closer connection to nature and to their territories, place-based initiatives are empowered to resist the dominant commodity system in agrarian frontiers. Value change is further amplified by support of digital technologies as explored in Section 6.1. Digital connectivity is increasingly important in the Amazon to disseminate values across its vast geography. Digital technologies, nonetheless, also hold inherent tensions as they can disseminate forest values as well as reinforce the dominant-socio-cognitive lock-in and reverse transformative pathways – a tension that local communities have to deal with and navigate. The study of digital technologies as channels of value dissemination, therefore, can provide helpful insights for the analysis of amplification processes, as proposed by Lam et al. (2020).

Another tension inherent in value transformations is the possibility of elite capture and greenwashing. Agribusiness elites can mobilize forest-based values as a political strategy to implement business-as-usual solutions without changing structures of power (see Blythe et al., 2018). This is a way to superficially encompass local demands for forest conservation and restoration, meeting the growing sustainability demand from consumer markets, and yet maintain the dominant system of commodity expansion (see Bastos Lima & Persson, 2020). For example, the concepts of *buen vivir* and *rights of nature*, originally developed to empower local communities, strengthen local agency, and protect forest-based livelihoods, later suffered instances of elite capture and greenwashing (see Latta & Wittman, 2010; van Teijlingen & Hogenboom, 2016). Such processes led by political elites can lead not only to the halting of transformative pathways, but can also deepen the lock-in mechanisms through public policies that ultimately uphold resource extraction. However, even under such threats, their original meanings of fundamental changes remain as latent seeds of transformation, which can sprout later or in other contexts.

These examples show how transformations in values are a crucial process, and yet very subtle. Transformative values can be the game-changer for promoting meaningful changes, or can also be floating signifiers with limited immediate impact. Moreover, as value transformations are a subjective process, they pose important methodological challenges for researchers to assess when a value has been indeed transformational or when it is just part of a vested political agenda. In spite of such

limitations, the case studies show that transforming values is an essential pillar in transformations toward sustainability.

6.5. Multidimensional transformations

Transformative pathways entail transformations in politics, practices, and values, as seen in the RECA and XSN case studies. Table 13 summarizes these processes. Transformations in each of these dimensions are part of the double-sided dynamics of unmaking dominant commodity lock-in and making forests in agrarian frontiers. Transformations in politics involve changes at the governmental level, through narrative-policy nexuses, which are subject to discontinuity and radical reversion. They further involve changes at the community level, through the silent praxis of everyday life, which then face the tensions of depoliticization. By making forests, place-based initiatives reject the dominant politico-institutional lock-in, reclaiming agrarian frontiers as disputed spaces of landscape transformations and creating networks of political mobilization across the arc of deforestation. Place-based initiatives adopt new practices, challenging the dominant techno-economic lock-in by co-producing local knowledge, resignifying technology and proposing (retro)innovations involving forest restoration techniques, governance arrangements and adequate partnerships. Asymmetries of power with external partners and motivational crowding due to market-based mechanisms emerge as inherent tensions to this process. Finally, transformations in values through forest-making involve confronting relations of domination of nature by fostering values based on care, solidarity, attachment to the territory, and human-nature connection. However, values rarely have widely-agreed meanings and depend on individual subjectivities, making them prone to hijacking by vested interests, resulting in an ever-present risk of elite capture and greenwashing.

This analysis of two place-based forest restoration initiatives embedded in different socioenvironmental and political contexts has allowed for a nuanced interpretation of transformative pathways as a multidimensional process with no clear ending point. This perspective supports the concept of making and unmaking developed by Feola et al. (2021); however, it is not fully consistent with their focus on transformations as a process of deconstructing capitalism and constructing post-capitalist alternatives (see also Blühdorn, 2017). A sole emphasis on broad capitalist structures under-acknowledges the transformative pathways led by place-based initiatives such as those analyzed in this thesis, which may not combat capitalism on a societal scale. In this sense, I argue that more than overtly challenging capitalism, what these initiatives have been doing is navigating capitalism and inaugurating alternative care-based relations in their own local environments. They partner with powerful actors

Table 13. Multidimensionality of place-based transformative pathways

	Transformations in politics	Transformations in practices	Transformations in values
Unmaking dominant commodity lock-in	Refusal to support or reproduce unsustainable narratives and policies Resistance through silent praxis of everyday life	Challenging dominant systems by co-producing local knowledge Actively seeking to change material and symbolic practices throughout society	Opposing values based on domination and exploitation of nature Creating pockets of alternative social relations at the system's margins
Making forests in agrarian frontiers	Reclaiming agrarian frontiers as spaces of local resistance Amplifying impacts by inspiring similar initiatives elsewhere	Resignifying technology Proposing innovative governance arrangements Building adequate partnerships	Fostering relational values based on care and solidarity Attachment to the territory Human-nature connection
Inherent tensions	Discontinuity Radical reversion Depoliticization	Appropriation by asymmetric partners Motivational crowding out	Elite capture Greenwashing

at times, engage in state-level politics whenever possible, and operate in the capitalist dynamics of agrarian frontiers on their own terms. Through new ideas, values, inter-actions and practices, these initiatives deconstruct the dominant lock-in and foster transformations through forest-making, without necessarily focusing on ending the capitalist system.

Forest-making is a way to carve place-based transformative pathways in agrarian frontiers. It aims to harness ways of relating to nature and to other people, rather than commodity production (see Russo Lopes & Bastos Lima, 2022). The multidimensionality of forest-making is key to fundamentally changing the current pattern of degradation in the Amazon's agrarian frontiers. Such transformations of politics, practices and values, however, occur at different paces and scales, according to categories proposed by Linnér & Wibeck (2020). Consequently, their power to steer fundamental changes depends on to what extent these three dimensions are mutually aligned. Contextual differences can create incongruities in the ways transformations take place in each of these dimensions, as much as periods of alignment can generate synergetic advances in all dimensions.

Transformative pathways are processes that remain always in progress, imperfect, non-linear, and interwoven with tensions. Therefore, these pathways can be better understood as *pulses of transformation*, a term that seeks to describe periods of alignment that allow for sudden leaps toward sustainability. These pulses are interposed with other periods of misalignment and setbacks, when the conditions are unfavorable to forest-making. Place-based forest restoration initiatives then go through *dormancy periods* and become like dormant seeds in agrarian frontiers. During such periods, they simply hold space for local resistance through their silent praxis of everyday life, waiting for the next alignment moment to leap forward and flourish again. This dormant existence alone can already be seen as a transformative process. Alternatively, a failed transformative pathway in one context may find space to flourish elsewhere through the amplification process and inspiration to other initiatives. In sum, addressing place-based transformative pathways across space and time, as a sequence of *pulses of transformations* and *dormancy periods*, helps us understand the creative and ingenious strategies that place-based initiatives develop to face the overwhelming pressures of the dominant system. To quote Simas (2021, p.15) again, this approach helps us understand how local communities "invent life where usually only death is able to triumph."

7. Conclusions

7.1. The argument: Transformations can happen, even in challenging contexts

The aim of this thesis was to understand what factors have contributed to and supported place-based transformative pathways. To do so, I analyzed two forest restoration initiatives in two contrasting states of the Brazilian Amazon's arc of deforestation, looking into the way forest-society relations have been shaped over time. A cross-scale perspective showed that the emergence and development of the RECA Agroforestry Project and the Xingu Seed Network at the local level were connected with state-level political contexts (see Chapter 4). I introduced the concept of place-based transformative pathways to acknowledge the relevance of local agency and the protagonism of local communities in transforming agrarian frontiers (see Section 2.4 and Chapter 5). I also proposed the concept of forest-making to refer to the multidimensional transformations in politics, practices and values, simultaneously engendered by place-based transformative pathways (see Chapter 1 and 6). The analysis of both initiatives showed that landscape transformations toward sustainability are feasible, desirable and can flourish even in contexts dominated by deforestation and commodity expansion.

Chapter 1 set the stage by introducing the enduring patterns of deforestation in the tropics, and how the efforts to halt such it have been insufficient to date. The Brazilian Amazon, in particular, has experienced yearly deforestation rates as high as 10,000 km^2 since 2019 (INPE, 2022). This process contributes to approaching a tipping point which can lead to ecological dieback and turn much of the rainforest into a dry savanna, impacting both forests and local communities. The chapter further showed how deforestation has been compounded by land-use conflicts, climate change, a long-standing history of social, economic and racial inequalities, and, more recently, a devastating Covid pandemic. The right-wing national government in place from 2019 to 2022 deepened the marginalization of forest peoples in rural areas of Brazil. Even in this dire context, the Amazon remained as an incubator of plural place-based initiatives that resist deforestation pressures through the cracks and at the margins of the dominant commodity system. These initiatives counter-act commodity expansion and reclaim the arc of deforestation as a place where forests can be restored.

Forest-making in agrarian frontiers was theorized in Chapter 2, as part of the theoretical debate around transformations toward sustainability. The concepts of agrarian frontiers, lock-in mechanisms, and transformative pathways were presented as building blocks of the theoretical framework. The goal was to understand the complex dual process of making and unmaking transformations led by local actors on the ground. Presenting the structural, systemic and enabling approaches in the transformations debate (see Section 2.1), the chapter conceptualized the Amazon's agrarian frontier as a space of landscape transformation disputed by the expansion of large-scale agriculture and the resistance of place-based initiatives. The chapter further explored how the dominant commodity system has been upheld by three lock-in mechanisms, namely politico-institutional (e.g., party politics, public policies), techno-economic (e.g., technical knowledge, financial incentives), and socio-cognitive (e.g., narratives, values, perceptions; see Section 2.2). In this sense, the concept of place-based transformative pathways I proposed offers an analytical perspective to understand how such lock-in mechanisms can be challenged by forest-making (see Section 2.3). The chapter concluded by highlighting three insights from this conceptual proposition (see Section 2.4). First was the relevance of territorial attachment, human-nature connectedness and relational values to forests as critical elements underpinning transformative pathways. Second was the protagonism, agency and resistance of local peoples in transforming the landscape through the silent praxis of everyday life. The third was the cross-scale nature of place-based transformative pathways, which are embedded in broader political contexts that can nudge transformations in different directions.

Chapter 3 described the research design and methods adopted to carry out this analysis. I explained the criteria for the selection of two contrasting and emblematic states in the arc of deforestation and two place-based forest restoration initiatives. The state of Acre represents a recently-developing agrarian frontier, renowned for its history of forest protection, valorization and socioenvironmental mobilizations, whereas Mato Grosso is Brazil's largest soy producer and exporter, an agrarian frontier long dominated by commodity expansion. For each state, I selected one place-based forest restoration initiative, perceived by local actors as a regional reference: the RECA Agroforestry Project, highlighted by local actors in Acre, and the Xingu Seed Network, pointed out by local actors in Mato Grosso. The data collection relied on three rounds of semi-structured interviews and two rounds of fieldwork observations in both states, complemented by an online survey and document analysis of public policies as well as institutional materials from the case studies, all of which were conducted between 2019 and 2022.

Chapter 4 addressed state-level politics as a key mediating arena for cross-scale processes of transformation. The narrative-policy nexus concept was proposed to

analyze how contrasting forest governance arrangements can be shaped by Amazonian states within the same biome and country. I looked into the *florestania*/ZEE nexus in Acre (1999-2018) and the modern frontier/PCI nexus (2015-today) in Mato Grosso, comparing their different approaches to the role of forests and forest restoration in society. In Acre, the *florestania* narrative had a more holistic approach to forest protection and valorization, entangling the concepts of forests and citizenship as the basis for the state's development model. The Ecological-Economic Zoning (abbreviated ZEE in Portuguese) was a policy materialization of the narrative, creating the political, economic and technical incentives for forest conservation and restoration. Conversely, the modern frontier narrative in Mato Grosso highlighted large-scale commodity production as the main driver of economic growth, financial prosperity, and income generation in the state. This narrative materialized in the Produce, Conserve and Include (PCI) policy, which focuses on the role of forests as a supporting element for 'green' commodity production in the state. Designed through top-down processes with limited participation of local communities, this policy left unaddressed key grassroots demands, especially the struggle for territorial rights. I argued that state governments can either support place-based transformative pathways or reinforce dominant lock-in mechanisms that favor commodity expansion.

Chapter 5 analyzed the transformative pathways carved through forest-making by two place-based initiatives: the RECA Agroforestry Project (since 1989), and the Xingu Seed Network (since 2007). Despite contrasting state-level contexts, these case-studies are among a range of initiatives that implement forest restoration in agrarian frontiers. The analysis distinguished three phases within each initiative's trajectory. The triggering phase is characterized by the development of a shared perception of a common problem among different social groups, reliance on financial and institutional support from early partners, and co-production of grounded knowledge over local territories. The nourishing phase consists of more structured innovative governance arrangements, consolidated partnerships, and the development of intangible resources, such as collective storytelling, social inclusion and empowerment of women and youth, and providing inspiration to other similar initiatives elsewhere. The resilience phase happens in periods of hardship when initiatives have to navigate disruptions, such as the public health crisis during the Covid pandemic and the political dismantling of socioenvironmental policies by the national government. Tapping into interpersonal safety nets, long-term solidarity bonds, and the development of new digital connections were some of the mechanisms observed in both initiatives during this phase. The phase-oriented analytical perspective revealed that transformative pathways are permeated by uncertainties and that these particular cases had specific needs during each phase to (re)produce and consolidate their forest-making.

In Chapter 6, I discussed the main research results presented in Chapters 4 and 5, in light of the theoretical debates presented in Chapter 2. The findings from the analyzed forest restoration initiatives in the Amazon highlight that place-based transformative pathways are a dual process. They consist of unmaking the lock-in mechanisms that uphold the dominant unsustainable system, and the making of alternative and more sustainable realities. Nevertheless, as non-linear, tensioned and at times contradictory processes, such pathways were not free from internal and external dilemmas. Their ability to navigate these challenges depend on their capacity to promote multidimensional transformations in politics, practices and values. This counter-hegemonic process in agrarian frontiers, which I call forest-making, entails forest restoration in the face of high deforestation pressures and inherent tensions, such as radical reversions, depoliticization, appropriation, elite capture and greenwashing. In this challenging context, I proposed that place-based transformative pathways can be understood as *pulses of transformations* and *dormancy periods* – the former is set in motion when the contextual conditions are favorable and allow for leaps forward, while the latter takes place when the context is unfavorable and the initiatives have to deal with setbacks. Despite a lack of visible changes, dormancy periods may be transformative in the long run, as part of a local resistance waiting to flourish at a later stage. Such a diachronic perspective of place-based transformative pathways allows for a better grasp of the multiple, diverse and creative strategies that forest restoration initiatives developed to navigate capitalism in agrarian frontiers.

7.2. Main conceptual contributions: The multiple dimensions of forest-making

As summarized in the previous section, this thesis has offered insights into the transformative pathways toward sustainability that result from forest-making in the Brazilian Amazon. The study offers conceptual contributions that may feed into to the debates in the field of transformations to sustainability more broadly, and on agrarian frontiers more specifically. The research has exemplified the diversity of place-based transformative pathways by analyzing two cases of forest-making in the arc of deforestation: the RECA Agroforestry Project, based on food production, and the Xingu Seed Network, based on ecosystem restoration. Through this analysis, this thesis has answered the two sub-questions and the main research question introduced on Chapter 1.

The sub-question of *how state-level politics interplays with local-level place-based transformative pathways* addressed the cross-scale dynamics of place-based transformative pathways. Based on the results presented in Chapter 4 and the discussion in Chapter 6, I conclude that the construction of narratives and policies frames

the role of forests in society and is influenced by interactions between state and society. This is what I labelled the narrative-policy nexus, which shapes the political context and the approach to forest governance in each state of the Amazon. Through this nexus, states can attenuate the dominant commodity lock-in mechanisms and strengthen local agency by opening up political spaces of co-producing transformative politics with local communities, as in the case of Acre. Conversely, states may also reinforce lock-in mechanisms and funnel place-based initiatives into a business-as-usual and market-oriented sustainability strategy, which excludes local participation and favors rural elite groups, as in the case of Mato Grosso. These state-society interactions, therefore, are key to understanding how state-level governments facilitate or obstruct the emergence and development of place-based transformative pathways at the local level, and how place-based initiatives respond to such political pressures.

The second sub-question of *how place-based transformative pathways develop over time in agrarian frontiers* zoomed at the fundamental changes carved by place-based forest restoration initiatives at the local level. I conclude that place-based transformative pathways are composed of phases. In the case studies, I identified the triggering phase, when initiatives build their foundations, the nourishing phase, when initiatives consolidate and reproduce their activities, and the resilience phase, when initiatives navigate uncertain periods. Place-based initiatives have different needs during each phase, and addressing them properly is crucial for their continuity over time. In doing so, they enact meaningful transformations in politics, practices and values that inaugurate alternative ways of relating to the surrounding environment. These replace relations of dominance of and resource extraction from nature with an ethics of care and solidarity in which humans and forests are connected. This three-phase perspective can also be well suited to look into the trajectory of other case-studies in forest contexts.

Ultimately, this thesis has answered the main research question of how place-based forest restoration initiatives carve transformative pathways toward sustainability in agrarian frontiers of the Brazilian Amazon. Based on a cross-scale analysis of the political contexts at the state level and the initiatives at the local level (see Chapters 4, 5 and 6), I conclude that place-based forest restoration initiatives carve transformative pathways by unmaking systemic lock-in mechanisms and making forests in agrarian frontiers. The development of place-based initiatives in agrarian frontiers relies on the continuous challenge and opposition to the dominant system by navigating capitalism and promoting local examples of transformations in politics, practices and values. Although this process bears many inherent tensions, both place-based initiatives analyzed in this thesis have continuously carved for decades transformative pathways through a silent praxis of everyday life. Their experiences

and impact provide valuable insights which contribute to theoretical debates on agrarian frontiers, forest restoration, and transformations toward sustainability.

Agrarian frontiers are often conceptualized as spaces of resource extraction and capitalist accumulation, but this study has shown that inspiring and transformative pathways can also emerge in such spaces. A more nuanced perspective to agrarian frontiers as plural, diverse and disputed spaces of landscape transformation allows us to address these regions as dynamic spaces. Not only are they subject to large-scale patterns of resource extraction, but also to bottom-up contestations and local resistance that operate through the cracks of the dominant system. Apart from resource extraction, the land-use dynamics in agrarian frontiers create conditions for encounters between multiple ontologies and for grassroots mobilization of local communities. In this context, place-based initiatives of forest-making are key agents of reclaiming the arc of deforestation as a region that can also harness restorative practices over time.

This connects to the second contribution related to debates on forest restoration, which often focus on the ecological functions of the landscape. The concept of forest-making proposed in this thesis connects to a renewed understanding of landscapes that goes beyond their ecology. Forest-making encompasses not only the land-use practices of forest restoration, but also the intangible and subtle transformations in the ways humans relate to the environment and, consequently, to each other. In this thesis, I have demonstrated how forest-making can be a way of people living embedded in the forest, of existing as a part of the surrounding ecosystem and being an active caretaker of it. These findings dialogue with a growing body of studies that adopts a more holistic approach and emphasize the multidimensional roles performed by landscapes in societies. In line with the propositions of some indigenous thinkers, this study shows that the multidimensionality of forest-making is what enables place-based initiatives' long-term resistance to the sharp deforestation pressures from commodity expansion.

The multifaceted aspects of forest-making contributes to the broader theoretical debate on transformations toward sustainability. This thesis has presented three conceptual perspectives on transformation: structural, systemic and enabling approaches (see Section 2.1). The empirical findings analyzed in Chapter 5 align with the enabling approach, and show how place-based initiatives carve transformative pathways as unruly and non-linear processes of transformations, embedded in uncertainties and contradictions. This process has been shaped through a double-edged dynamic of unmaking, opposing and refusing dominant systems, while simultaneously making spaces for envisaging, proposing, and co-producing sustainable alternatives. In contrast to perspectives on unmaking as a break with capitalist systems, I argue that place-based initiatives not necessarily combat capitalism, but rather navigate

capitalistic structures in agrarian frontiers. That may include partnering with elite groups, making use of (predominantly capitalist) market relations, engaging with state-level politics and promoting forest restoration on their own terms.

This thesis as well as the research within the AGENTS Project help to show that the sheer existence of initiatives like RECA and the XSN in the arc of deforestation is a transformation toward sustainability in itself (see Brondízio et al., 2021; Londres et al., 2023a). Especially in moments of disruptive crisis, when many locally-based endeavors are washed away, they hold space for forests and act as references for other initiatives, disseminating their practices and values, and amplifying their impacts. I propose, therefore, the understanding of place-based transformative pathways as a sequence of pulses of transformation, which are moments when fundamental changes can advance and leap forward, and dormant periods, when there are setbacks in transformative processes. During the dormant periods, place-based initiatives can become a sort of dormant seed, waiting to sprout when contextual conditions allow. This understanding of transformations as a pulsing process denote the complexity and multidimensionality of transforming commodity land-use systems through forest-making in the Brazilian Amazon.

Taken together, a place-based approach to transformative pathways helps to shed light on the protagonism of local communities as agents of change, the importance of their ongoing silent praxis of everyday life, and the ways in which political contexts can help or hinder transformative processes. This thesis highlighted the critical importance of place-based forest restoration initiatives to counteract the dominant commodity system in agrarian frontiers. It further demonstrates the crucial relevance of local resistance in the arc of deforestation to promote leaps forward during the favorable pulses of transformation, and to endure setbacks through dormancy periods. Therefore, the analysis of transformative pathways requires methods that go beyond the assessment of tangible performance over limited periods of time, to further encompass intangible processes, such as values of care, solidarity and human-nature connectedness.

7.3. Future studies: Distinguishing superficial from fundamental change

Transformation toward sustainability is a concept under construction and a practice in progress, which at times makes it difficult to grasp. The ongoing and multi-level dynamics of transformation also makes them susceptible to subversion and appropriation by vested interests, allowing patterns of degradation to continue rather than promoting the much-needed fundamental changes toward sustainable alternatives. Another feature that makes the analysis of transformations complex is their mutation throughout time. One may think that, for instance, when a place-based initiative

ends, its transformative pathway is interrupted. However, transformations may well reemerge after a dormancy period or they might resurface elsewhere in another form or scale. In a world with fast-expanding deforestation, climate change and social injustice, it is crucial that we advance in studying how transformative pathways toward sustainability travel across geographies, scales and time.

One important step in this direction is to further theorize what constitutes fundamental change, as opposed to superficial change that upholds dominant systems. This is key to avoiding the concept becoming a floating signifier. One way to do that within the study of forest governance is to base such definitions on the perceptions of local communities and traditional populations in rural areas. As historically marginalized social groups, their views on transformations toward sustainability can be a compass to identify which changes are meaningfully changing dominant power structures, and which are barely cosmetic solutions. Besides, the inclusion of subaltern ontologies and thinkers from the Global South is also critical to bring in more plural perspectives on what is a fundamental change in different contexts. Hence, more grounded, diverse and locally-relevant definitions of transformations as well as sustainability are essential to the study of transformative processes as well as to influencing politics and materializing them as actions on the ground.

Although often disregarded in light of commodity expansion, place-based forest restoration initiatives have long been the protagonists of transformations toward sustainability in the Brazilian Amazon. They are agents of change in the arc of deforestation, disseminating sustainable and restorative practices throughout the landscape. They further act as a reference for forest-based livelihoods within the Amazon, as well as in other biomes of the country and abroad. The recognition of these place-based initiatives as key drivers of transformative change in agrarian frontiers is essential to empower, strengthen and disseminate their transformative pathways. Such recognition can also contribute to more integrative and restorative academic analyses, policymaking and actions on the ground. Future research on other cases of transformative pathways can help to generate a solid body of knowledge on the landscape transformations led by place-based initiatives. It is important to analyze case-studies in other states of the arc of deforestation, other Brazilian biomes (e.g., Cerrado, Pantanal, Mata Atlântica), other Latin American countries, as well as other tropical countries in the Global South. Theorization on transformations toward sustainability can also benefit from empirically grounded analyses, and a broader scope of case studies can help overcome the limitations of a two-case analysis. As such, future studies will offer the much-needed geographical, political, and sociocultural plurality to the field.

The adoption of other methodological strategies can also provide key contributions to the transformations debate. Ethnographies, in particular, would complement

the mixed-methods approach adopted in this thesis. The results achieved with the present methodology already unveil complex and intertwined processes. Yet, a deeper analysis of specific case studies could further untangle some of the characteristics and dynamics of place-based transformative pathways. A thorough ethnographic approach can help identify and explore rooted nuances of such processes; for example, how different social groups (e.g., women, youth) within local communities, and also among rural elites, experience such transformations.

Finally, a crucial avenue ahead is to deepen the understanding of the role of values in transformative pathways. This thesis' research process has convinced me that the dissemination of values between the individual, communal and governmental levels can be a crucial process to foster transformations toward sustainability at multiple levels. In the same vein, such dissemination process can also spread opposite types of values that lead to socioenvironmental degradation – for instance, in the name of economic growth. This is why a more thorough grasp on the ways through which values are forged in different arenas of forest governance and how they spread across space and time can add invaluable insights to the transformations literature. This thesis has highlighted the relevance of values in underpinning transformations in other dimensions (e.g., politics, practices); while the collected data provides an important exploration of the realm of values, a more thorough explanation on how multi-level value dissemination takes place across geographies, scales and time was beyond its research scope. A broader transdisciplinary approach to this topic within land-use studies can benefit from the rich and longstanding academic debates on values and also imaginaries in the humanities and the social sciences. The link between these avenues of research and strategic policy advocacy can enable academic findings to help counteract the enduring patterns of deforestation and its associated social inequalities worldwide.

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Annex

Interviewee	Place	Interviewee	Place
		First round of interviews (August-September 2019)	
Acre Academia 1	Rio Branco	Mato Grosso Academia 1	Cuiabá
Acre Academia 2	Rio Branco	Mato Grosso Academia 2	Canarana
Acre Academia 3	Rio Branco	Mato Grosso Academia 3	Canarana
Acre Private Sector 1	Xapuri	Mato Grosso Private Sector 1	Cuiabá
Acre Private Sector 2	Xapuri	Mato Grosso Private Sector 2	Alta Floresta
Acre Private Sector 3	Rio Branco	Mato Grosso Private Sector 3	Alta Floresta
Acre Public Sector 1	Rio Branco	Mato Grosso Public Sector 1	Cuiabá
Acre Public Sector 2	Rio Branco	Mato Grosso Public Sector 2	Cuiabá
Acre Public Sector 3	Rio Branco	Mato Grosso Public Sector 3	Alta Floresta
Acre Public Sector 4	Rio Branco	Mato Grosso Civil Society 1	Cuiabá
Acre Public Sector 5	Xapuri	Mato Grosso Civil Society 2	Cuiabá
Acre Public Sector 6	Rio Branco	Mato Grosso Civil Society 3	Cuiabá
Acre Public Sector 7	Rio Branco	Mato Grosso Civil Society 4	Cuiabá
Acre Civil Society 1	Rio Branco	Mato Grosso Civil Society 5	Cuiabá
Acre Civil Society 2	Rio Branco	Mato Grosso Civil Society 6	Cuiabá
Acre Civil Society 3	Rio Branco	Mato Grosso Civil Society 7	Cuiabá
Acre Civil Society 4	Rio Branco	Mato Grosso Civil Society 8	Cuiabá
Acre Civil Society 5	Rio Branco	Mato Grosso Civil Society 9	Cuiabá
Acre Civil Society 6	Rio Branco	Mato Grosso Civil Society 10	Cuiabá
Acre Civil Society 7	Rio Branco	Mato Grosso Civil Society 11	Alta Floresta
Acre Local Actors 1	Xapuri	Mato Grosso Civil Society 12	Alta Floresta
Acre Local Actors 2	Xapuri	Mato Grosso Civil Society 13	Alta Floresta
Acre Local Actors 3	Xapuri	Mato Grosso Civil Society 14	Alta Floresta
Acre Local Actors 4	Xapuri	Mato Grosso Local Actors 1	Canarana
Acre Local Actors 5	Xapuri	Mato Grosso Local Actors 2	Canarana
Acre Local Actors 6	Xapuri	Mato Grosso Local Actors 3	Canarana
Acre Local Actors 7	Rio Branco	Mato Grosso Local Actors 4	Canarana
Acre Local Actors 8	Rio Branco	Mato Grosso Local Actors 5	Canarana
Acre Local Actors 9	Rio Branco	Mato Grosso Local Actors 6	Alta Floresta
Acre Local Actors 10	Rio Branco	Mato Grosso Local Actors 7	Alta Floresta
Acre Local Actors 11	Rio Branco	Mato Grosso Local Actors 8	Alta Floresta
Acre Local Actors 12	Nova Califórnia	Mato Grosso Local Actors 9	Alta Floresta
Acre Local Actors 13	Nova Califórnia	Mato Grosso Local Actors 10	Alta Floresta
Acre Local Actors 14	Nova Califórnia	Mato Grosso Local Actors Large 1	Alta Floresta
Acre Local Actors 15	Nova Califórnia	Mato Grosso Local Actors Large 2	Alta Floresta
Acre Local Actors Large 1	Rio Branco	Mato Grosso Local Actors Large 3	Alta Floresta
		Second round of interviews (December 2021)	
RECA Interviewee 1	Phone	XSN Interviewee 1	Phone
RECA Interviewee 2	Phone	XSN Interviewee 2	Phone
RECA Interviewee 3	Phone	XSN Interviewee 3	Phone
RECA Interviewee 4	Phone	XSN Interviewee 4	Phone
		Third round of interviews (August 2022)	
7 RECA members in person	Nova Califórnia	13 XSN members in person, 5 online	Nova Xavantina

Summary

Forest-making in agrarian frontiers: Place-based transformative pathways toward sustainability in the Brazilian Amazon

The aim of this thesis is to understand what factors contribute to and support place-based transformative pathways in the Brazilian Amazon's arc of deforestation. This is an agrarian frontier dominated by large-scale commodity production, where most of the Amazonian deforestation takes place. Chapter 1 introduces the enduring patterns of deforestation and commodity production, and how the efforts to halt these processes have been insufficiently comprehensive to date. The Brazilian Amazon, in particular, is approaching a tipping point which can lead to ecological dieback and turn much of the rainforest into a dry savanna, impacting both forests and local communities. This is compounded by land-use conflicts, climate change, a long-standing history of social, economic and racial inequalities, and, more recently, a devastating Covid pandemic. The right-wing national government in place between 2019 and 2022 deepened the marginalization of forest peoples in rural areas of Brazil. Even in this dire context, the Amazon remained as a microcosm for plural place-based initiatives that resist deforestation pressures through the cracks and at the margins of the dominant commodity system. Hence, in this thesis, I ask *how place-based forest restoration initiatives carve transformative pathways toward sustainability in agrarian frontiers of the Brazilian Amazon*.

I propose the concept of forest-making to characterize the process by which these initiatives carve out place-based transformative pathways, counteracting commodity expansion and reclaiming the arc of deforestation as a space where forests can be restored. Chapter 2 theorizes on forest-making in agrarian frontiers, as part of the theoretical debate on transformations toward sustainability. The concepts of agrarian frontiers, lock-in mechanisms, and transformative pathways are developed as building blocks of the theoretical framework. The goal was to understand the complex dual process of unmaking systemic lock-ins and making sustainable transformations on the ground. Deforestation and commodity expansion are supported by systemic lock-in mechanisms of various forms: politico-institutional (e.g., party politics, public policies), techno-economic (e.g., technical knowledge, financial incentives), and socio-cognitive (e.g., narratives, values and perceptions). To analyze how place-based forest restoration initiatives have existed and resisted for decades in agrarian frontiers, I adopt a place-based approach to transformative pathways seeking to highlight three main points. First is the relevance of territorial attachment, human-nature connectedness and relational values to forests as critical elements underpinning

transformative pathways. Second is the protagonism, agency and resistance of local peoples in transforming the landscape through the silent praxis of everyday life. And third is the cross-scale nature of place-based transformative pathways, which are embedded in broader political contexts that can nudge transformations in different directions. In this sense, the concept of place-based transformative pathways I propose offers an analytical perspective to understand how coherent and systemic lock-in mechanisms can be challenged by forest-making.

In this research, I analyzed two forest restoration initiatives in two contrasting states of the Brazilian Amazon's arc of deforestation, looking into the ways forest-society relations were shaped over time. The Brazilian Amazon has a great diversity of realities, histories, cultures, and territorial development in its different states. The emergence and development of place-based initiatives at the local level are connected with diverse political contexts at the state level. State-level politics, in this sense, plays a key role in mediating transformations, buffering or reinforcing lock-in mechanisms through public narratives and policies. Chapter 3 describes my research design, analyzing two contrasting states in the arc of deforestation: Acre, a new frontier state, renowned for its history of forest protection and socioenvironmental mobilizations, and Mato Grosso, Brazil's largest soy producer and exporter, which is a consolidated frontier of commodity expansion. For each state, one place-based forest restoration initiative was selected, perceived by local actors as a regional reference: the RECA Agroforestry Project near the border of Acre and Rondônia, and the Xingu Seed Network, in Mato Grosso. The analysis relies on three rounds of semi-structured interviews and two rounds of fieldwork observations in both states, complemented by an online survey and document analysis of public policies as well as institutional materials from the case studies, all of which were conducted between 2019 and 2022.

State-level politics is a key mediating arena for cross-scale processes of transformation; however, the role of states deserves further scrutiny in the transformations debate. Helping to bridge this gap, I analyze how contrasting forest governance arrangements in Amazonian states can be shaped by what I call a "narrative-policy nexus." Chapter 4 looks into the *florestania*/ZEE nexus in Acre (1999-2018) and the modern frontier/PCI nexus (2015-today) in Mato Grosso. In Acre, the *florestania* narrative had a holistic approach to forest protection and valorization, entangling the concepts of forests and citizenship as the basis for the state's development model. The ZEE (Ecological-Economic Zoning, in the Portuguese acronym) was a policy materialization of such a narrative, creating the political, economic and technical incentives for forest conservation and restoration. Conversely, the modern frontier narrative in Mato Grosso highlighted large-scale commodity production as the main driver of economic growth, financial prosperity, and income generation in the state.

This narrative materialized in the PCI (Produce, Conserve and Include) policy, which focuses on the role of forests as a supporting element for 'green' commodity production. Designed through top-down processes with limited participation of local communities, this policy left unaddressed key grassroots demands, especially the struggle for territorial rights. Therefore, I argue that state governments can either support place-based transformative pathways or reinforce systemic lock-in mechanisms that favor commodity expansion.

Among a wide range of initiatives that make forests in agrarian frontiers, the RECA Agroforestry Project has been highlighted as a regional reference for local actors in Acre, and the Xingu Seed Network in Mato Grosso. They have been carving place-based transformative pathways in different state contexts, respectively, since 1989 and 2007. Chapter 5 distinguishes three different phases of each initiative's trajectory. First, the triggering phase is characterized by the development of a shared perception of a common problem among different social groups, reliance on financial and institutional support from early partners, and co-production of grounded knowledge over local territories. Second, the nourishing phase consists of more structured innovative governance arrangements, consolidated partnerships, and the development of intangible resources, such as collective storytelling, social inclusion and empowerment of women and youth, and providing inspiration to other similar initiatives elsewhere. Third, the resilience phase consists of periods of hardship when initiatives have to navigate disruptions, such as the public health crisis during the Covid pandemic and the political dismantling of socioenvironmental policies by the national government. Tapping into interpersonal safety nets, long-term solidarity bonds, and the development of new digital connections were some of the mechanisms observed in both initiatives during this phase. The phased analytical perspective revealed that transformative pathways are permeated by uncertainties and that these particular cases had specific needs at each phase to (re)produce and consolidate their forest-making. The empirical analyses of both initiatives show that landscape transformations toward sustainability are feasible, desirable and can flourish even in contexts dominated by deforestation and commodity expansion.

The empirical findings from the analyzed forest restoration initiatives in the Amazon showed that place-based transformative pathways are dual processes. They consisted of unmaking the lock-in mechanisms that uphold the dominant unsustainable system, and the making of alternative and more sustainable realities. Nevertheless, as non-linear, tensioned and at times contradictory processes, such pathways were not free from internal and external dilemmas, such as radical reversions, depoliticization, appropriation, elite capture and greenwashing. Chapter 6 discusses that, even in the face of high deforestation pressure in agrarian frontiers, place-based initiatives promote multidimensional transformations in individual values, collective practices

and, to some extent, government narratives and policies. They do so by actively making forests a counter-hegemonic process that entails forest restoration as well as a reconfiguration of human-nature relations.

Hence, I argue that place-based transformative pathways are based on pulses of transformation and dormancy periods – the former set in motion when contextual conditions are favorable and allow for leaps of change forward, while the latter take place when the context is unfavorable and the initiatives have to deal with setbacks. Despite a lack of visible changes, dormancy periods may be transformative in the long run, as part of a local resistance waiting to flourish at a later stage. Such a diachronic perspective of transformative pathways allows for a better grasp of the multiple, diverse and creative strategies that place-based initiatives developed to navigate capitalism in agrarian frontiers. Recognizing these initiatives as crucial agents of change toward sustainable futures is a key step in counteracting enduring patterns of deforestation in the tropics. Chapter 7 summarizes the main arguments of this thesis, offering insights for scholars, policymakers and practitioners and making suggestions for future research.

Resumo

Fazendo florestas em fronteiras agrárias: Caminhos locais de transformação para sustentabilidade na Amazônia Brasileira

O objetivo desta tese é entender quais fatores contribuem e fortalecem caminhos locais de transformação para sustentabilidade no arco do desmatamento da Amazônia Brasileira. Esta é uma fronteira agrária dominada pela produção de commodities em larga escala, onde ocorre a maior parte do desmatamento amazônico. O Capítulo 1 apresenta como a dinâmica de desmatamento e produção de commodities é persistente, e como os esforços para aplacar esses processos tem sido insuficientes até o presente momento. Em particular, a Amazônia Brasileira se aproxima de um ponto de inflexão que pode levar à degeneração ecológica e converter a floresta tropical em uma savana seca, impactando tanto a floresta quanto as comunidades locais. Esse processo vem sendo potencializado por conflitos pela terra, mudanças climáticas, um longo histórico de desigualdades sociais, econômicas, raciais e, mais recentemente, uma devastadora pandemia de Covid. Além disso, o governo de direita que comandava o país entre 2019 e 2022 aprofundou a marginalização dos povos da floresta em áreas rurais do Brasil. Mesmo nesse contexto lúgubre, a Amazônia permaneceu sendo um microcosmo de diversas iniciativas territoriais, que resistem às pressões do desmatamento pelas frestas e às margens do sistema de produção de commodities dominante. Nesse sentido, ao longo desta tese, eu procuro responder a pergunta de *como iniciativas territoriais de restauração florestal abrem caminhos locais de transformação para a sustentabilidade em fronteiras agrárias da Amazônia Brasileira*.

Eu proponho a ideia de "fazer florestas" (*forest-making*, no termo em inglês) para caracterizar o processo pelo qual essas iniciativas criam, talham e moldam diversos caminhos de transformação, se contrapondo à expansão de commodities e reivindicando o arco do desmatamento como um espaço de restauração florestal. O Capítulo 2 teoriza sobre esse processo de fazer florestas em fronteiras agrárias, engajando com o debate acadêmico sobre transformações para a sustentabilidade. Os conceitos de fronteiras agrárias, amarras do desmatamento (*lock-in*, em inglês), e caminhos de transformação são os elementos principais da teorização. Este capítulo teve como objetivo entender o processo complexo e dual de, por um lado, desfazer as amarras sistêmicas que promovem o desmatamento e, por outro, implementar transformações para sustentabilidade na prática. A dinâmica de desmatamento e expansão de commodities é mantida por amarras sistêmicas de diferentes tipos: político-institucional (ex: políticas públicas, disputas eleitorais), técnico-econômicas (ex: conhecimento

técnico, incentivos financeiros), e sócio-cognitivas (ex: narrativas, valores e percepções).

Eu proponho uma abordagem local ao conceito de caminhos de transformação para analisar como iniciativas territoriais de restauração florestal vem existindo e resistindo há décadas nesses contextos de fronteiras agrárias. O objetivo dessa abordagem é enfatizar três pontos principais. O primeiro é a relevância do vínculo territorial, da conexão entre seres humanos e natureza, e dos valores atribuídos às relações com a floresta como sendo elementos fundamentais para o desenvolvimento de caminhos de transformação. O segundo é o protagonismo, a agência e a resistência das populações locais, que transformam o território ao seu entorno por meio da práxis silenciosa da vida cotidiana. O terceiro ponto é a natureza multi-escalar dos caminhos locais de transformação, que estão inseridos em contextos políticos mais amplos e que, por sua vez, influenciam essas transformações em direções opostas. Sendo assim, o conceito proposto nesta tese de caminhos locais de transformação oferece uma perspectiva analítica para entender como o processo de fazer florestas é capaz de desafiar o sistema dominante e suas amarras.

Nesta pesquisa, eu analisei duas iniciativas de restauração florestal em dois estados diferentes do arco do desmatamento na Amazônia Brasileira, buscando compreender como as relações entre floresta e sociedade foram forjadas ao longo do tempo. A Amazônia Brasileira apresenta uma grande diversidade de contextos, histórias, culturas e desenvolvimento territorial em seus estados. A criação e o desenvolvimento de iniciativas territoriais no âmbito local está interligada com os diversos contextos políticos no âmbito estadual. Nesse sentido, a política estadual é um fator essencial que media os processos de transformação, reforçando ou amortecendo os mecanismos e amarras sistêmicas por meio de narrativas e políticas públicas. O Capítulo 3 descreve o desenho de pesquisa utilizado nessa tese, analisando dois estados contrastantes do arco do desmatamento: o Acre, que é uma fronteira em expansão e um estado renomado por seu histórico de proteção da vegetação nativa e mobilizações socioambientais, e o Mato Grosso, maior produtor e exportador de soja do Brasil, que é uma fronteira consolidada de expansão de commodities. Em cada estado foi selecionada uma iniciativa territorial de restauração florestal, apontada por atores locais como referências regionais: O Projeto RECA, na fronteira entre Acre e Rondônia, e a Rede de Sementes do Xingu, no Mato Grosso. A análise tem como base três rodadas de entrevistas semi-estruturadas e duas visitas a campo em ambos os estados, além de um questionário online e da análise documental de políticas públicas e materiais institucionais dos estudos de caso. Todos os métodos foram implementados entre 2019 e 2022.

A política estadual é uma arena crucial que media processos multi-escalares de transformação; no entanto, o papel dos estados merece maior atenção acadêmica no

debate sobre transformações. Crontribuindo para superar essa lacuna, eu analiso como diferentes arranjos de governança florestal nos estados Amazônicos podem ser influenciados pelo que eu chamo de "nexo entre narrativa e política." O Capítulo 4 analisa o nexo Florestania/ZEE no Acre (1999-2018) e o nexo Fronteira Moderna/PCI no Mato Grosso (2015-today). No Acre, a narrativa da Florestania trouxe uma abordagem holística para a proteção e a valorização das florestas, interligando os conceitos de floresta a cidadania como a base do modelo de desenvolvimento do estado. O Zoneamento Ecológico-Econômico (ZEE) é uma materialização dessa narrativa, criando incentivos políticos, econômicos e técnicos para conservação e restauração florestal. Por outro lado, a narrativa de uma Fronteira Moderna no Mato Grosso enfatiza o papel da produção de commodities em larga escala como o principal motor do crescimento econômico, prosperidade financeira e geração de renda no estado. Essa narrativa vem sendo materializada na política de Produzir, Conservar e Incluir (PCI), que ressalta o papel das florestas como um elemento de apoio à produção 'sustentável' de commodities. Planejada por meio de processos impostos de cima pra baixo e com limitada participação de comunidades locais, essa política vem negligenciando importantes reivindincações de base, como o direito à terra. Portanto, eu defendo que os governos estaduais podem apoiar a emergência de caminhos locais de transformação para sustentabilidade ou reforçar as amarras sistêmicas que sustentam a expansão de commodities.

Dentre uma grande variedade de iniciativas que fazem florestas em fronteiras agrárias, o Projeto RECA foi ressaltado pelos atores locais do Acre como uma referência regional, e a Rede de Sementes do Xingu, pelos atores locais do Mato Grosso. Essas iniciativas vem abrindo caminhos de transformação em diferentes contextos estaduais desde 1989 e 2007, respectivamente. O Capítulo 5 descreve três fases diferentes das trajetórias te cada iniciativa. Em primeiro lugar vem a fase de ativação, que é caracterizada pela formação de uma percepção compartilhada entre diferentes grupos sociais sobre problemas comuns, pelo recebimento de apoio financeiro e institucional dos parceiros de primeira hora, e pela co-produção de conhecimentos locais sobre seus territórios. Em segundo lugar vem a fase da adubação, que consiste em arranjos de governança mais estruturados, parcerias mais consolidadas, e o desenvolvimento de vínculos comunitários intangíveis, como as estórias coletivas, a inclusão e empoderamento de mulheres e jovens, e a inspiração à iniciativas similares em outras regiões. Em terceiro lugar vem a fase da resiliência, que se trata dos períodos desafiadores nos quais as iniciativas tem de navegar choques externos, como a crise de saúde pública desengatilhada pela pandemia de Covid e o desmonte das políticas socioambientais promovido pelo então governo federal. As redes interpessoais de apoio, os laços de solidariedade a longo prazo, e o desenvolvimento de novas conexões digitais foram alguns dos mecanismos observados que permitiram

ambas as iniciativas a passar por esta fase. Essa perspectiva analítica faseada demonstrou que os caminhos de transformação estão permeados por incertezas, e que as iniciativas analisadas tinham necessidades bem específicas em cada uma das fases para se (re)produzir e se consolidar através do processo de fazer florestas. A análise empírica de ambos os casos demonstra que as transformações para sustentabilidade são possíveis, desejáveis, e podem florescer mesmo em contextos dominados pelo desmatamento e pela expansão de commodities.

Os resultados empíricos das iniciativas de restauração florestal na Amazônia analisadas nesta tese revelam que os caminhos locais de transformação são processos duais. Eles consistem em desfazer as amarras sistêmicas que mantêm o sistema dominante de degradação socioambiental e, ao mesmo tempo, criar realidades alternativas mais sustentáveis. Sendo assim, esses processos são não-lineares, tensionados e por vezes contraditórios, estando sujeitos à dilemas internos e externos, como reversões radicais, despolitização, apropriação, captura pelas elites e *greenwashing*. O Capítulo 6 discute como, mesmo em contextos de alta pressão de desmatamento em fronteiras agrárias, iniciativas territoriais promovem transformações multidimensionais em valores individuais, práticas coletivas e, em alguma medida, narrativas e políticas públicas. Elas transformam suas realidades por meio do processo de fazer florestas, uma resposta contra-hegemônica que envolve restauração florestal assim como uma reconfiguração das relações entre a natureza e os seres humanos.

Nesse sentido, eu argumento que os caminhos locais de transformação são baseados em pulsos de transformação e períodos de dormência – o primeiro ocorre quando existem condições contextuais favoráveis que permitem avanços e mudanças significativas, enquanto o segundo ocorre quando o contexto é desfavorável e as iniciativas tem que enfrentar revéses e contratempos. Apesar da ausência de mudanças visíveis, os períodos de dormência podem ser bastante transformadores no longo prazo, formando uma resistência local que irá florescer em um momento futuro. Essa perspectiva diacrônica sobre os caminhos locais de transformação nos ajuda a entender melhor as estratégias diversas, variadas e criativas que as iniciativas territoriais desenvolvem para navegar a dinâmica capitalista nas fronteiras agrárias. Reconhecer essas iniciativas como cruciais agentes de mudanças em direção a futuros sustentáveis é um passo fundamental para reverter os persistentes padrões de desmatamento nos trópicos. O Capítulo 7 resume os principais argumentos dessa tese, trazendo insights para academia, setor público, sociedade civil e movimentos sociais, além de oferecer algumas sugestões para pesquisas futuras.

Samenvatting

Forest-making in agrarische grensgebieden: Plaatsgebonden transformatieve wegen naar duurzaamheid in de Braziliaanse Amazone

Het doel van dit proefschrift is om te begrijpen welke factoren bijdragen en ondersteuning bieden aan plaatsgebonden transformatieve wegen naar duurzaamheid in de gordel van ontbossing van het Braziliaanse Amazonegebied. Deze gordel is een agrarisch grensgebied dat wordt gekenmerkt door grootschalige grondstoffenproductie en waar de meeste ontbossing in de Amazone plaatsvindt. Hoofdstuk 1 beschrijft de aanhoudende patronen van ontbossing en grondstoffenproductie en hoe de inspanningen om deze processen een halt toe te roepen tot nu toe onvoldoende zijn geweest. Het ecosysteem van de Braziliaanse Amazone in het bijzonder nadert een omslagpunt dat kan leiden tot ecologische achteruitgang en waarbij een groot deel van het regenwoud kan veranderen in een droge savanne, met gevolgen voor zowel bossen als lokale gemeenschappen. De omvang van dit probleem wordt verder versterkt door conflicten over landgebruik, klimaatverandering, een lange geschiedenis van sociale, economische en raciale ongelijkheden en, meer recentelijk, de verwoestende Covid-pandemie. De rechtse nationale regering die tussen 2019 en 2022 aan de macht was versterkte de marginalisering van bosbewonende volkeren. Zelfs in deze precaire context bleef het Amazonegebied echter een microkosmos voor meervoudige plaatsgebonden initiatieven die de ontbossingsdruk aan de rand van het dominante grondstoffenproductiesysteem wisten te weerstaan. Daarom beantwoord ik in dit proefschrift de vraag *hoe plaatsgebonden bosherstelinitiatieven transformatieve wegen banen naar duurzaamheid in de agrarische grensgebieden van de Braziliaanse Amazone*.

Ik stel het concept van *forest-making* – het maken van bossen – voor om het proces aan te duiden waarmee deze initiatieven plaatsgebonden transformatieve wegen banen, de uitbreiding van grondstoffenproductie tegengaan en de gordel van ontbossing terugwinnen als een zone waar bossen kunnen worden hersteld. Als onderdeel van het theoretische debat over transformaties naar duurzaamheid richt hoofdstuk 2 zich op *forest-making* in agrarische grensgebieden. De concepten van agrarische grensgebieden, lock-in-mechanismen en transformatieve wegen worden hierin beschreven. Deze vormen de basis van het theoretische kader. Het doel van dit hoofdstuk was om inzicht te krijgen in het complexe tweedelige proces van het ontbinden van systemische lock-ins, en het doorvoeren van duurzame transformaties in de praktijk. De dynamiek van ontbossing en de uitbreiding van grondstoffenproductie wordt ondersteund door verschillende vormen van systemische lock-in-mechanismen:

politiek-institutioneel (bv. partijpolitiek, openbaar beleid), techno-economisch (bv. technische kennis, financiële prikkels) en sociaal-cognitief (bv. verhalen, waarden, percepties). Om te analyseren hoe plaatsgebonden bosherstelinitiatieven decennialang konden overleven in agrarische grensgebieden, benader ik het concept van transformatieve wegen op een plaatsgebonden manier. Ik benadruk daarbij drie zaken: ten eerste is er de relevantie van territoriale gehechtheid, verbondenheid tussen mens en natuur, en relationele waarden voor bossen als cruciale elementen die transformatieve wegen ondersteunen. Ten tweede is er de hoofdrol, de keuzevrijheid en het verzet van lokale volkeren bij het transformeren van het landschap door de stille praktijk van het dagelijks leven. Ten derde is er de schaaloverschrijdende aard van plaatsgebonden transformatieve wegen, als onderdeel van een bredere politieke contexten die deze transformaties in verschillende richtingen kunnen sturen. Als zodanig biedt het door mij voorgestelde concept van plaatsgebonden transformatieve wegen een analytisch perspectief om te begrijpen hoe coherente en systemische lock-in-mechanismen kunnen worden tegengegaan door het maken van nieuwe bossen.

In dit onderzoek heb ik twee bosherstelinitiatieven geanalyseerd in twee verschillende Braziliaanse staten in de ontbossingsgordel van het Braziliaanse Amazonegebied. Daarbij heb ik gekeken naar de manier waarop relaties tussen bos en samenleving zich in de loop der tijd hebben gevormd. Elke staat in de Braziliaanse Amazone heeft een grote diversiteit aan contextuele omstandigheden, geschiedenis, culturen en territoriale ontwikkeling. De opkomst en ontwikkeling van plaatsgebonden initiatieven op lokaal niveau is zodoende verbonden aan de diverse politieke contexten op het niveau van de staat waarin ze plaatsvinden. Dit houdt in dat politiek op staatsniveau een sleutelrol speelt bij het bemiddelen van transformaties en bij het tegengaan of versterken van lock-in-mechanismen door middel van publieke verhalen, ideeën, opvattingen en beleid. Hoofdstuk 3 beschrijft de onderzoeksopzet en analyseert twee verschillende staten in de gordel van ontbossing: Acre, een nieuwe grensstaat en bekend om haar voorgeschiedenis van bosbescherming en sociaal-milieumobilisaties, en Mato Grosso, de grootste sojaproducent en -exporteur van Brazilië en een gevestigde waarde wat betreft de uitbreiding van haar grondstoffenproductiegebied. Voor beide staten werd één lokaal bosherstelinitiatief geselecteerd dat door lokale actoren werd gezien als een referentie in hun regio. Het gaat om het *RECA Agroforestry Project* nabij de grens van Acre en Rondônia, en het *Xingu Seed Network* in Mato Grosso. De analyse is gebaseerd op drie rondes van semi-gestructureerde interviews en twee rondes van veldwaarnemingen in beide staten. Dit werd aangevuld met een online enquête en documentanalyses van overheidsbeleid, en met institutioneel materiaal uit de casestudies die allen werden uitgevoerd tussen 2019 en 2022.

Politiek op staatsniveau is een belangrijke arena waarin de bemiddeling voor grootschalige transformatieprocessen plaatsvindt; desondanks is de rol van staten

onderbelicht in het transformatiedebat en verdient deze verder onderzoek. Om deze kloof te helpen overbruggen analyseer ik hoe aan de hand van een *narrative-policy nexus*, zoals ik voorstel dit concept te noemen, uiteenlopende regelingen rond bosbeheer in Amazonestaten kunnen worden gevormd. Hoofdstuk 4 gaat in op de *florestania*/ZEE nexus in Acre (1999-2018) en de *modern frontier*/PCI nexus (2015-heden) in Mato Grosso. In Acre benaderde het *florestania*-narratief bosbescherming en -valorisatie op een holistische manier en verstrengelde daarbij de concepten van bossen en burgerschap met elkaar als basis voor het ontwikkelingsmodel van de staat. De ZEE (Portugees acroniem voor Economisch-Ecologische Zonering) was een beleidsmatige concretisering van de *florestania*-vertelling waarbij de politieke, economische en technische stimulansen voor bosbehoud en -herstel werden gecreëerd. Het *modern-frontier*-narratief in Mato Grosso daarentegen benadrukte grootschalige grondstoffenproductie als de belangrijkste motor van economische groei, financiële welvaart en het genereren van inkomsten voor de staat. Dit narratief kwam tot uiting in het PCI-beleid (Produceer, Conserveer, Includeer), dat zich richt op de rol van bossen als ondersteunend element voor 'groene' grondstoffenproductie in de staat. Dit beleid, dat is ontstaan door top-downprocessen met beperkte deelname van lokale gemeenschappen, negeerde de belangrijkste eisen van de bevolking, met name betreffende de strijd voor territoriale rechten. Daarom beargumenteer ik dat deelstaatregeringen ofwel plaatsgebonden transformatieve wegen kunnen ondersteunen, ofwel systemische lock-in-mechanismen kunnen versterken die de expansie van grondstofproductie bevorderen.

Onder de vele initiatieven die *forest-making* in agrarische grensgebieden tot doel hebben wordt, zoals eerder aangehaald, het *RECA Agroforestry Project* gezien als regionale referentie door lokale actoren in Acre, en het *Xingu Seed Network* als referentie in Mato Grosso. Sinds respectievelijk 1989 en 2007 hebben deze projecten plaatsgebonden transformatieve wegen uitgewerkt binnen hun statelijke contexten. Hoofdstuk 5 onderscheidt drie verschillende levensfasen voor deze initiatieven: ten eerste wordt de activeringsfase gekenmerkt door a) de ontwikkeling van een gedeelde perceptie van een gemeenschappelijk probleem onder verschillende sociale groepen, b) de afhankelijkheid van financiële en institutionele steun van vroege partners, en c) de coproductie van gefundeerde kennis over lokale territoria. Ten tweede bestaat de voedende fase uit meer gestructureerde en innovatieve bestuursregelingen, geconsolideerde partnerschappen en de ontwikkeling van immateriële middelen, zoals collectieve verhalen vertellen, sociale inclusie en emancipatie van vrouwen en jongeren, en het bieden van inspiratie voor andere soortgelijke initiatieven elders. Ten derde bestaat de veerkrachtfase uit periodes van tegenslag waarin deze initiatieven door verstoringen moeten navigeren, zoals de volksgezondheidscrisis tijdens de Covid-pandemie en de politieke ontmanteling van sociaal-milieubeleid door de

nationale overheid. Het aanboren van interpersoonlijke vangnetten, langdurige solidariteitsbanden en de ontwikkeling van nieuwe digitale verbindingen waren enkele van de mechanismen die in beide initiatieven tijdens deze fase werden waargenomen. Dit gefaseerde analytische perspectief toonde aan dat transformatieve wegen doortrokken zijn van onzekerheden en dat deze specifieke gevallen in elke fase specifieke behoeften hadden om hun activiteiten rond *forest-making* te (re)produceren en te consolideren. De empirische analyses van beide initiatieven laten zien dat landschapstransformaties met duurzaamheid als doel haalbaar en wenselijk zijn en kunnen gedijen, zelfs in contexten die worden gedomineerd door ontbossing en de uitbreiding van grondstoffenproductie.

De empirische bevindingen van de geanalyseerde bosherstelinitiatieven in het Amazonegebied tonen aan dat plaatsgebonden transformatieve wegen duale processen zijn. Ze bestaan uit het ongedaan maken van de lock-in-mechanismen die het dominante onhoudbare systeem in stand houden, en het creëren van alternatieve en duurzame contexten. Desalniettemin waren dergelijke trajecten, als zijnde niet-lineaire, omstreden en soms tegenstrijdige processen, niet vrij van interne en externe dilemma's, zoals radicale omkeringen, depolitisering, toe-eigening, elitegijzeling en greenwashing. Hoofdstuk 6 bespreekt dat, zelfs in het licht van de hoge ontbossingsdruk in agrarische grensgebieden, plaatsgebonden initiatieven multidimensionale transformaties bevorderen in individuele waarden, collectieve praktijken en, tot op zekere hoogte, regeringsnarratieven en overheidsbeleid. Ze doen dit door actief bossen te maken, een contra-hegemonisch proces dat zowel bosherstel als een herconfiguratie van mens-natuurrelaties met zich meebrengt.

Daarom beargumenteer ik dat plaatsgebonden transformatieve wegen zijn gebaseerd op *pulsen van transformatie* en *rustperiodes*. De eerste wordt in gang gezet wanneer de contextuele omstandigheden gunstig zijn en zodoende grote veranderingen mogelijk maken, terwijl de tweede plaatsvindt wanneer de context ongunstig is en de initiatieven te maken krijgen met tegenslagen. Ondanks een gebrek aan zichtbare veranderingen kunnen rustperiodes op de lange termijn transformerend zijn, als onderdeel van een lokaal verzet dat wacht om in een later stadium tot uiting te komen. Een dergelijk diachroon perspectief van transformatieve wegen zorgt voor een beter begrip van de veelvoudige, diverse en creatieve strategieën die plaatsgebonden initiatieven hebben ontwikkeld om door het kapitalisme in agrarische grensgebieden te navigeren. Het erkennen van deze initiatieven als cruciale factoren voor verandering in de richting van een duurzame toekomst is een belangrijke stap in het tegengaan van aanhoudende patronen van ontbossing in de tropen. Hoofdstuk 7 vat de belangrijkste argumenten van dit proefschrift samen, biedt inzichten voor wetenschappers, beleidsmakers en praktijkmensen en doet suggesties voor toekomstig onderzoek.