Check for updates

Sustainable Development

WILEY

Sustainable Development

RESEARCH ARTICLE OPEN ACCESS

Prohibited Plants: Converging Sustainability Transitions and Local Development in 'Left-Behind Places'

Diana Morales[1,2] | Mónica Ramos-Mejía[3]

[1]Geography Department, Umeå University, Umeå, Sweden | [2]Centre for Technology, Innovation and Culture (TIK), University of Oslo, Moltke Moes Vei 31 Eilert Sundts Hus, Oslo, Norway | [3]Pontificia Universidad Javeriana, Bogotá, Colombia

Correspondence: Diana Morales (diana.carolina.morales.arcila@univie.ac.at)

Received: 25 August 2025 | **Revised:** 18 March 2026 | **Accepted:** 6 April 2026

Keywords: just transitions | local development | medicinal cannabis | postdevelopment | sustainability transitions

ABSTRACT

This paper examines the relationship between sustainability transitions and local development through the case of Colombia's medicinal cannabis industry. It highlights how neglecting place-specific needs and development expectations can hinder equitable transitions and reinforce existing socio-economic disparities. Using qualitative methods such as interviews, participant observation, and secondary data, we explore how regulatory and geographic barriers exclude marginalised producers from the formal sector. This exclusion limits the transition's potential for social inclusion and reflects broader patterns of uneven development. Our findings underscore the importance of integrating local knowledge and development priorities into transition strategies to promote sustainable change. The study contributes to theoretical debates by challenging modernisation paradigms and advocating for context-sensitive approaches. More broadly, it calls for inclusive policies that leverage the bioeconomy for sustainable growth in the Global South, emphasising the need for transition frameworks that address both environmental sustainability and social justice.

1 | Introduction

In many regions and countries around the world, especially in the Global South, the question of transitions to sustainability is intertwined with concerns of development (Swilling et al. 2016, 2022; Ramos-Mejía et al. 2018; Chlebna and Suitner 2026). The challenge is not minor; such development requires public policies and interventions that guarantee decent quality of living for all without destabilising the biophysical systems of our planet (Rockström et al. 2009; Dearing et al. 2014). The debate has transcended the academic sphere, and it is becoming a major political concern and a geopolitical issue. It is often brought about in Conference of the Parties (COP) discussions, and it is used to justify both the continued extraction of fossil fuels as well as the need for growing commitment to contribute funding to the transition in the Global South (Heras and Gupta 2024; Hunjra et al. 2024).

While sustainability transitions are increasingly seen as pathways to achieving the Sustainable Development Goals (SDGs), the intersections with broader development challenges complicate progress. Thus, to better understand transitions in regions where development challenges are deeply entangled with sustainability goals, we need to look beyond the factors traditionally emphasised in sustainability transitions theories (innovation and technological change) (Ramos-Mejía et al. 2018). Literature on Just Transitions already gives us some clues on how these processes affect communities differently, urging consideration of winners, losers, and conflicting interests (Avelino et al. 2024). Yet, in this paper, we aim to bridge these concerns with spatial considerations. To do so, we bring ideas of postdevelopment to the conversation between geography and transitions (Coenen et al. 2012; Truffer et al. 2015; Binz et al. 2020, 2025). We aim to contribute to this literature by arguing that local development is a critical

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2026 The Author(s). *Sustainable Development* published by ERP Environment and John Wiley & Sons Ltd.

condition for successful transition with an important caveat: Conventional understandings of development (centred on economic progress, value creation and capture, and technological innovation) fall short. Attending to local development instead requires grappling with local assets, historical marginalisation, and the kinds of futures that communities themselves imagine. Therefore, we ask: how does the lack of attention to place-specific factors and development expectations reinforce unsustainable dynamics in a socio-ecological technical regime?

To answer this question, we analyse the case of medicinal cannabis in Colombia. This is a paradigmatic case (Flyvbjerg 2006) because, first, the transition was initiated by a specific regulatory change (Law 1787 of 2016), providing a clear temporal anchor that facilitates methodological decisions. Second, the regulatory framework contained an explicit mandate to include historically marginalised producer communities, yet their subsequent exclusion reveals structural barriers that are likely present but less observable in other contexts. Third, although environmental sustainability was not a design objective, the case is embedded within Colombia's wider effort to transition from fossil fuels toward bio-based industries, shedding light on whether new bio-based sectors can escape extractive patterns and address development concerns.

Following shifts in public perception, increased availability of scientific and medical knowledge, market growth, a rise in patients using cannabis medically worldwide, and a growing number of countries legalising its use, Colombia declared medicinal cannabis legal in 2016. This legalisation came with a series of strict and complex regulations aimed at promoting an export-oriented industry built around the exploitation and transformation of natural resources, combining the use of biodiversity and biomass with knowledge to foster innovation and economic development. This case entails a transition from illegality to legality of an industry that continues to be heavily regulated and prosecuted around the world. It can be understood as a transition influenced by landscape pressures over institutional, technological and cultural changes that need to shape a regime where illegal production, violence and predatory environmental technologies are dominant factors (Jelsma et al. 2019). To conceptualise this highly complex transition dynamic and its intersections with local development, we understand this transition from the multi-level perspective (Geels 2002, 2011). While we do not engage extensively with MLP debates, we adopt one of its core insights: that transitions involve destabilising entrenched regimes to enable new configurations to emerge. Our case study shows that regime destabilisation is inextricably tied to local postdevelopment outcomes.

The paper is organised as follows: Section two provides the literature review on the relationship between sustainability transitions, local development and postdevelopment, outlining the theoretical framework and key debates within these fields. Section three details the methods used in the study, including data collection and analysis, and introduces the case study of the medicinal cannabis industry in Colombia. Section four presents the research findings, emphasising the geographies of exclusion and the challenges faced by small producers in the industry. Finally, the concluding discussion in section five contextualises the results within broader debates on sustainability transitions and proposes recommendations for more inclusive and context-sensitive development policies.

2 | Transitions and (Local) Postdevelopment

This section reviews key debates at the intersection of sustainability transitions and development, starting with how these concepts are framed in both SDG and ST literature. We highlight the limitations of national-level approaches and argue for a more place-based understanding of development that incorporates local knowledge, expectations, and power dynamics; this is, we argue for a postdevelopment approximation to the geographies of sustainability transitions.

2.1 | Development in Sustainability Transitions Literature

Since the post-Second World War period, human wellbeing has been a central concern of development policy—though conceptualised largely in economic terms. The Sustainable Development Goals later made clearer connections between economic progress and sustainability. Now, these connections have also influenced sustainability transitions research, which increasingly calls for understanding ST as structural transformations aimed at jointly advancing human wellbeing and sustainability (Swilling et al. 2016, 2022).

To achieve this, Swilling et al. (2016) proposed the notion of a socio-political regime to engage with multiple actors and power dynamics. This regime constitutes a space where actors from within and outside the formal political system can interact, potentially reshaping power relations, paradigm commitments, state organisation, and policy programmes. In a later work, Swilling et al. (2022) offer a framework integrating economic development and sustainability transitions by examining how energy transitions can drive growth. The framework links global dynamics to local actors, considers distributional impacts, and shows how developmental states engage in institutional changes, often complex and contradictory, to attract investment and advance renewable energy. For our argument, the key insight from this work is that linking transitions with development requires multi-actor arrangements shaped by uneven power dynamics. If not addressed through appropriate institutional arrangements, these imbalances can hinder transitions. For instance, Avelino and Wittmayer's (2016) study of Dutch community energy initiatives shows how state-introduced power asymmetries created new barriers: a consumer-protection framework unintentionally excluded hybrid organisational forms, preventing community-owned cooperatives, where consumers are also producers, from operating and thereby obstructing the decentralised energy initiatives the transition depended on.

Similarly, Just Transitions literature highlights how power shapes sustainability efforts. It draws attention to winners and losers and to the conflicting interests among actors in transition processes (Newell and Mulvaney 2013). Justice is typically framed as distributional, recognitional, and procedural: the fair allocation of benefits and burdens; the acknowledgement of

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

marginalised groups and their knowledge; and meaningful participation in decision-making (Wang and Lo 2021; Burke 2022; Stark et al. 2023). As this debate evolves, it is argued that addressing today's ecological, economic, and social challenges requires not only technological and social innovation but systemic transformations that confront and replace entrenched power structures (Avelino et al. 2024). Beyond recognising uneven impacts, a key contribution of Just Transitions literature for our argument is its emphasis on the fears and expectations transitions generate, such as concerns about job losses or hopes for greener spaces (Gürtler et al. 2021; Stark et al. 2023). Ignoring these dynamics risks provoking resistance to necessary change.

2.2 | Local Development and the Green Transition

Thus far, the links between development and sustainability transitions position the latter as a national-level concern. While development is indeed mediated by national governments, extensive literature has shown how its implementation, practice and definition are deeply rooted in regional and local contexts, shaped by territorial dynamics and place-specific conditions (e.g., Pike et al. 2007; Vázquez-Barquero and Rodríguez-Cohard 2019). Within transitions research, this spatial sensitivity has been taken up by the geographies of sustainability transitions literature, which demonstrates that transitions are not spatially neutral. They shape, and are shaped by, the places where they occur. In this view, place-specific elements such as institutions, knowledge, natural resources, industrial specialisation, local visions and policies are not merely contextual backdrops. Rather, they are constitutive, enable innovation, shape technology adoption, and condition whether and how transitions unfold (Coenen et al. 2012; Hansen and Coenen 2015; Binz et al. 2020, 2025). However, this literature has remained largely focused on socio-technical elements (institutions, knowledge, innovation systems, and industrial structures), paying less attention to the socio-ecological dimensions that are also place-specific and territorially embedded. One way to address this gap is by bringing local development into focus.

Although there is not one single agreed definition, local and regional development can be understood as an evolving and dynamic process for the enhancement of local capabilities, using economic growth as a means to achieve well-being, which is defined depending on the region's priorities and decisions (Pike et al. 2007, 2011; Vázquez-Barquero and Rodríguez-Cohard 2019). A local approach to development allows for the design of more effective and context-sensitive policies and strategies, which are crucial in promoting sustainable development (Donald and Gray 2019; Benner et al. 2024). The literature on local and regional development is extensive, thus, we will limit our focus on the latest developments in the field of regional studies, where the focus has been set on the notion of 'left behind places' (Pike et al. 2024).

Recent debates have focused on regions experiencing socio-economic decline and marginalisation due to economic globalisation (MacKinnon et al. 2022; Pike et al. 2024). The term has been used to explain the effects of regional inequalities in political polarisation and social discontent (Rodríguez-Pose 2018; Fiorentino et al. 2024). This literature recognises that local actors are best placed to determine development goals, including green transitions, while acknowledging that these decisions are embedded in larger scales and external influences (MacKinnon et al. 2022). Reconciling development with sustainability in left-behind regions faces multiple challenges: these regions may lack conditions to attract green industries, have lower innovation capacity, experience green discontent and distrust, and face precarious work conditions in emerging green sectors (Castellini 2019; Iammarino et al. 2019; Eadson and Van Veelen 2023; Rodríguez-Pose and Bartalucci 2024). Failing to attend to these place specificities can obstruct the niche development and regime-level embedding that sustainability transitions require. From a ST perspective, innovations do not diffuse uniformly across space but must negotiate alignment with existing regional institutions, actor configurations, and material conditions (Raven et al. 2016). Of relevance here is the recognition that green transitions are needed not only on advanced industrial regions, hoping that progress will spread geographically, but also on left behind places, providing context-specific solutions that ensure regional development, social inclusion and environmental sustainability within planetary boundaries (Eadson and Van Veelen 2023; Benner et al. 2024; Chlebna et al. 2024).

Despite progress in recognising the role of local scales in the green transition, the literature continues to focus predominantly on the economy, treating green transitions primarily as an issue of environmental efficiency and technology, tied to the fantasy of the 'green heroes', portraying green investments as ultimate solutions to both the climate crisis and regional underdevelopment (Eriksson et al. 2025). While those are indeed crucial aspects, this focus tends to overlook the possibility that green investments can reproduce uneven development and have negative impacts on local communities (*ibid*), as the Just Transitions literature reminds us.

2.3 | Postdevelopment and Sustainability Transitions: Towards a Holistic Framework

Regional sustainability transitions are often entangled with growth-oriented agendas that obscure their transformative potential (Chlebna and Suitner 2026), while techno-optimistic solutions are often only fulfilled in a limited number of regions (Gibbs 2006; Escobar 2010; Bailey et al. 2011). So, how can we reconcile the need to incorporate development into sustainability transitions while still addressing pressing social and environmental concerns? We argue that post-development thinking offers valuable insights. Viewing regional and local transitions primarily as technological endeavours (much like how development and green transitions are often framed as modernisation projects) overlooks progress made in both academic and activist circles where more holistic and pluralistic understandings of development have been progressed. These views challenge growth-oriented models and emphasise the importance of local knowledge, cultural diversity, and ecological integrity (Quijano 2010; Escobar 2015; Gudynas 2017; Demaria et al. 2019).

Post-development theories critique economic growth and development as shaped by Global North perspectives. Authors such as Escobar, Esteva, Rahnema, Latouche, and Rist show

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

how dominant development paradigms constrain people's autonomy, impose Western values, undermine ecological sustainability, and deepen global inequalities (e.g., Escobar 1995, 2015). Although development thinking has evolved, modernisation narratives centred on innovation, technology, and growth still dominate techno-economic policy and are reinforced by green-growth agendas (Buttel 2000; Perez 2010, 2017; Bailey et al. 2011). Critics argue that high-tech, eco-efficient solutions remain rooted in Western, top-down perspectives and reproduce neocolonial and neo-extractivist dynamics in green transitions (Svampa 2015; Ghosh et al. 2021; Velasco-Herrejón et al. 2022; Soto Hernandez and Newell 2022). Meanwhile, evidence shows that the anticipated decoupling of economic growth from environmental degradation has not materialised and is unlikely within required timeframes or without breaching planetary boundaries (Rockström et al. 2009; Castree et al. 2014; Steffen et al. 2015; Richardson et al. 2023). Efforts to link development and sustainability transitions must therefore move beyond conventional socio-technical modernisation and embrace alternative understandings of society–economy–nature relations (see Table 1 for a summary of the literature and its contribution to the analytical framework).

To advance a more holistic understanding of development and establish a meaningful nexus with sustainability transitions (Chlebna and Suitner 2026), inspired in postdevelopment, we propose an analytical framework that captures how transitions unfold in left behind contexts (Figure 1):

TABLE 1 | Analytical framework, summary.

Framework dimension	Corresponding literature	Core contribution	Place-specificities
Spatial	Geographies of sustainability transitions	Transitions are spatially embedded; place-specific elements are constitutive, not a backdrop	Institutions, knowledge systems, industrial path dependencies, natural resource endowments, regional innovation systems
	Local and regional development	Bottom-up, context-sensitive development; 'left behind places'; local capabilities; embeddedness in larger scales	Territorial marginalisation, innovation capacity, industrial diversification, green discontent, extra-regional networks
Political	Just transitions	Winners/losers; distributional, recognitional, procedural justice; expectations	Power asymmetries, recognition (or erasure) of marginalised groups, procedural access, discontent, trust/distrust
Epistemological	Postdevelopment	Critique of growth-oriented modernisation; plural knowledges; community-defined wellbeing; rejects universalising 'development imaginary'	Territorial aspirations, cultural diversity, ecological integrity

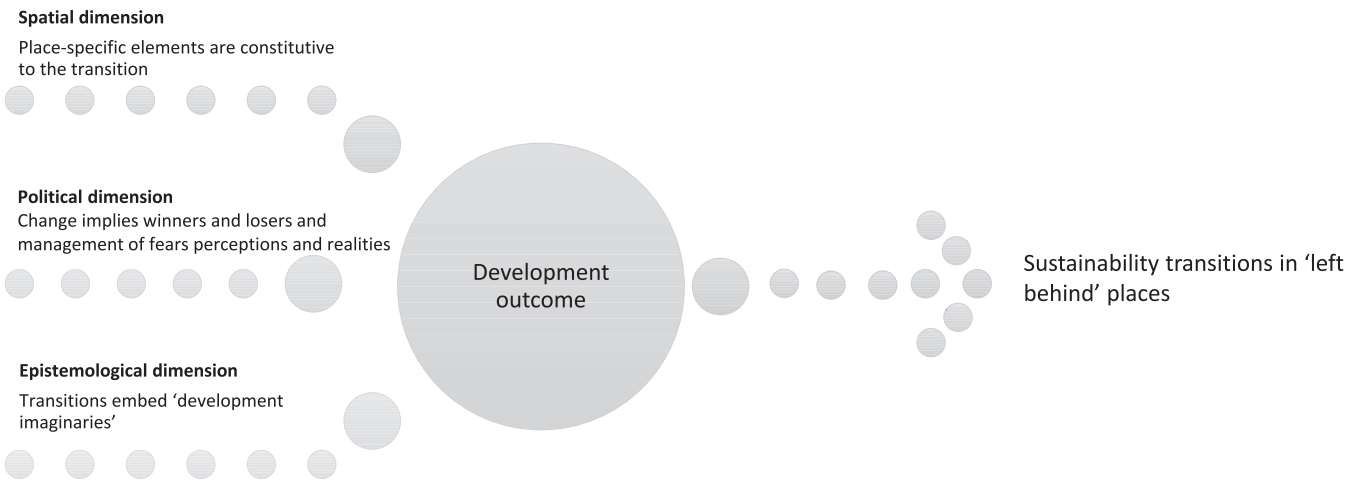

FIGURE 1 | Analytical framework: Sustainability transitions in left-behind places.

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

2.3.1 | Epistemological Dimension: Challenging Modernisation and Techno-Optimism

Dominant narratives of development and sustainability transitions equate progress with technological advancement and economic growth. This dimension questions the assumptions behind green growth and innovation-driven transitions and embraces context-sensitive understandings of development. To explore this dimension in our case study, we ask: Were assumptions about progress, technology, and growth underpinned by economic policy and investment narratives? And did these assumptions clash with local development expectations and needs?

2.3.2 | Spatial Dimension: Local Development Expectations and Territorial Specificities

Sustainability transitions are not spatially neutral; they unfold in specific territories shaped by ecological, historical, cultural, and socio-economic conditions. This recognises that sustainability transitions respond to territorial realities and should avoid reproducing uneven development patterns. To explore this dimension in our case study, we ask: What existing land uses, economic arrangements, and socio-ecological dynamics occupied the space where the new industry was to be established? And how did ecological, historical, cultural, and socio-economic conditions shape the establishment (or not) of the industry?

2.3.3 | Political Dimension: Justice

Sustainability transitions involve winners and losers and are shaped by power relations that determine whose voices are heard and whose needs are met. This dimension recognises that fears, perceptions and realities of being left behind can hinder a transition process. To explore this dimension in our case study, we ask: Which actors gained and which lost from the transition? And how were fears, perceptions, and experiences of being "left behind" addressed or overlooked?

3 | Methods and Case Study

The medicinal cannabis industry in Colombia represents a paradigmatic case (Flyvbjerg 2006) that can reveal structural barriers to sustainability transitions in contexts where development concerns are deeply intertwined in the process of change. Besides, it offers a unique opportunity to explore the intricate dynamics of a dual transition: one towards sustainability and the bioeconomy, and the other from illegality to legality and formalisation. The case can also produce insights for bio-based sectors requiring extensive regulations and inform the growing momentum for the legalisation of cannabis, framed as an opportunity for economic development (Kavousi et al. 2022) in Global South countries (Kay 2021).

The results are informed by qualitative data obtained from semi-structured interviews, participant observation and an extensive analysis of secondary data. Regarding the interviews, we conducted 28 semi-structured interviews online and in situ during June–August 2022 and April–June 2023, with actors across seven categories: licensed multinationals ($n = 2$), licensed indigenous cooperatives ($n = 2$), licensed small and medium enterprises, including formerly grey producers ($n = 17$), association representatives ($n = 2$), government officials ($n = 2$), consultants ($n = 2$), and researchers ($n = 1$).

Inclusion criteria and sampling strategies differed by category. For firms, criteria included holding an active license in 2022; being located in one of the three regions with the most active licenses (13 interviews) or in the region with the highest illegal production (3 interviews) (five additional interviews were conducted with firms in regions with few licenses); and ensuring representation across firm types, from multinationals to local cooperatives. Participants were identified through the Ministry of Justice's public registry of licensed cannabis firms. After the initial outreach, snowball sampling was used, and five further firms were recruited at a medicinal cannabis conference in Medellín in July 2022. Interviews with grey and illegal producers were not conducted for ethical and security reasons. This gap was addressed by first, incorporating news, reports, and research documenting their experiences as secondary data, and second, interviewing proxy respondents, that is, individuals knowledgeable about these groups but not direct representatives. One interview with researchers and one with government officials served as proxy interviews.

Inclusion criteria for interviews with association representatives were simpler, as only two relevant associations existed at the time of data collection. Their contact information was publicly available, and both agreed to participate; one also provided audiovisual material from past symposiums on the industry's development in Colombia, which was included as secondary data. Government officials were selected based on their involvement in licensing processes or their work with illegal cannabis production. Although their contact details were publicly accessible, only two interviews were secured. This gap was addressed through written information requests (*derechos de petición*) with specific questions (e.g., number of terminated licenses or granted patents) and by consulting publications from relevant state agencies and ministries. Consultants and researchers were included for their expertise: consultants for their professional experience advising firms, associations, or government bodies, and researchers for publications demonstrating knowledge of grey and illegal cannabis production.

The interviews used a semi-structured format, allowing conversations to flow naturally and be adapted to each participant's expertise. This flexibility helped reveal additional roles and forms of knowledge related to the medicinal cannabis industry. All participants were informed about the project and provided consent in line with the ethical approval granted by (anonymised) dated February 12, 2022. Questions focused on the rationale, operation, challenges, and opportunities involved in establishing and sustaining their firms, their roles in the industry, and their perspectives on its evolution. Interviews lasted 45–60 min, were recorded and transcribed, and only excerpts used in the paper were translated into English.

Observations and field notes were collected during the conference mentioned above and field visits. While interviews

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

and observations were key to understanding the experiences of entrepreneurs and communities entering the legal industry, secondary sources were essential for understanding the geographical dynamics of the industry and its historical trajectory. Secondary sources include national and international policy and consultancy reports, master's theses, laws, decrees, regulations, news articles, and videos from major events hosted by Colombia's largest medicinal cannabis association. We also used quantitative data on the number and location of licenses and firms, the 2022 regional innovation index, the 2021 manufacturing industry survey, patents, and regional GDP, all sourced from Colombian public agencies and ministries.

Data analysis followed a two-step coding process (Gioia et al. 2013). First, all material (interview transcripts, videos, notes, and documents) was converted into formats suitable for NVivo. Using macro codes derived from the research questions and theoretical framework, we coded broad themes such as context, agency, knowledge, place, and unevenness. A second round of coding identified subthemes within each macro category, revealing emerging patterns and enabling more nuanced interpretation. These subthemes were then linked to the study's three analytical dimensions (see Appendix C for further details on the coding strategy). One author conducted the coding, supported by regular meetings with the co-author to discuss findings, refine interpretations, and resolve any inconsistencies.

The sampling strategies have limitations. Participants' views who agreed to be interviewed may differ from those who declined, especially among multinationals and illegal or grey producers. Including association representatives, one of which was created with multinational involvement, and proxy informants helped mitigate this gap. We also recognise that the analysis reflects the researcher's interpretive lens. Although systematic coding and clear audit trails strengthen rigour, alternative interpretations remain possible.

3.1 | Case Study

Cannabis production in Colombia is deeply rooted in territorial complexities, uneven development, and violence, a history inextricably connected to the emerging legal industry (Cruz Olivera and Pereira Arana 2021). Introduced during the Spanish colony, production intensified in the 1970s during the Bonanza Marimbera (marimba being one of the many colloquial names for cannabis), when illicit cannabis transformed the Caribbean region's social, economic, and cultural dynamics within a decade. Cultivation concentrated there due to climate, Atlantic access, and peripheralisation from 20th-century modernisation efforts (Britto 2020). The Bonanza positioned Colombia as a global illicit producer and helped to shape the war on drugs (Jelsma et al. 2019; Britto 2020). Intensified enforcement later pushed cultivation south-west to Cauca, a region with significant Afro-Colombian and indigenous populations, enduring poverty, and where most illegal plantations remain (Gamarra-Vergara 2007; Redacción Semana 2018). Since, producers have faced persecution. However, criminalisation narratives shifted from 1986 onward, materialising in 2016 when medicinal cannabis production and commercialisation were legalised.

As a legal business, medicinal cannabis was conceived as export-oriented, transforming flowers into pharmaceutical extracts. Legalisation sparked expectations of a second 'green boom'. Indeed, the first 2 to 3 years, which some interviewees called a period of consolidation, were a time of great enthusiasm. Industrial development was encouraged by a series of narratives of competitive advantage based on physical geography and endorsed by the national government and the private sector. National and international investors were in a race to obtain licences, establish firms and couple with multinationals or any other investor. As of July 2023, 2404 active licences exist, with 960 registered companies by June 2022. Based on our research, four types of medicinal cannabis entrepreneurs can be identified:

- Multinational corporations
- Medium-sized domestic companies, established with or without foreign capital
- Grey producers, operating in a legal grey zone.
- Illegal producers, concentrated in marginalised regions historically affected by the war on drugs.

This paper focuses on grey producers and illegal producers, the two groups most directly excluded from participating in the new legal industry.

Interviewees noted that firms with licences near expiry were unlikely to renew due to financial setbacks. Informally, it has been said that over 300 companies have gone bankrupted by 2022, but may had not fulfilled the paperwork required to formalise the termination. This explains why, after consultation with the ministry responsible for monitoring licensing, back in January 2024, it was found that only 16 firms have officially closed business. According to the statements made by the interviewees and the information gathered for this research, a significant number of the created companies have either closed, reduced their size, survived through personal loans from partners, or diversified their products, shifting their focus to the domestic market. The most recurring problems have been, firstly, the reluctance of the financial and banking sector to open accounts and allow banking transactions, citing the absence of federal regulation in the United States as a reason for not creating products or enabling transactions for medicinal cannabis companies. Secondly, the slowness of authorities in processing licenses. Thirdly, the central government's delay in regulating and issuing the necessary regulatory decrees, as well as expansions to the allowed uses of cannabis (e.g., for food and veterinary products). Fourthly, entry barriers (licensing costs, paperwork, technology investment). Fifthly, export barriers (countries with protectionist measures). Sixthly, a lack of understanding on the part of authorities involved in export processes, marketing, and construction licensing. It is not the purpose of this paper to explore each and all those issues. However, the previous context is relevant to showcase how the creation of this industry deepened regional inequalities and how those barriers ended up excluding cannabis producers with lesser economic power.

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

4 | Exclusions and Development Outcomes

So far, the short period of medicinal cannabis industrialisation in Colombia shows an emerging sector marked by speculation, heavy investment, complex regulations, financial setbacks, some diversification, a few success stories among well-capitalised firms, and many bankruptcies. Crucially for this paper, the industry's geography reflects an uneven spatial distribution and the exclusion of illegal and grey producers.

4.1 | Spatial Exclusion: A Geography of Concentration

The rapid expansion of licences did not translate into spatially balanced industrial development. Legal firms cluster in wealthy, infrastructure-rich, and innovation-oriented regions: 70% of licences are located in regions with high or medium-high innovation indices (nine regions). 55% are in the three regions that together generate over half of Colombia's GDP. These patterns, shown in Figures 2 and 3, reveal that the geography of the legal industry replicates existing regional inequalities rather than redistributing opportunities, especially to regions with the highest numbers of illegal production.

When asked about the selection of place, interviewees pointed at the accessibility to infrastructure (ports, main roads, airports, free trade areas), personal connection to the region, and safety from illegal groups. These claims are supported by the numbers shown in Figures 2 and 3, as most of the interviewed firms are located near main cities and as far as possible from the nodes of illegality. Contrary to what was intended, the medicinal cannabis industry in Colombia has reinforced concentration in economically stronger regions, marginalising those historically involved in cannabis cultivation, particularly Indigenous and campesino communities in the southwest. The spatial mismatch between where licences are granted and where cannabis has long been produced under informal or

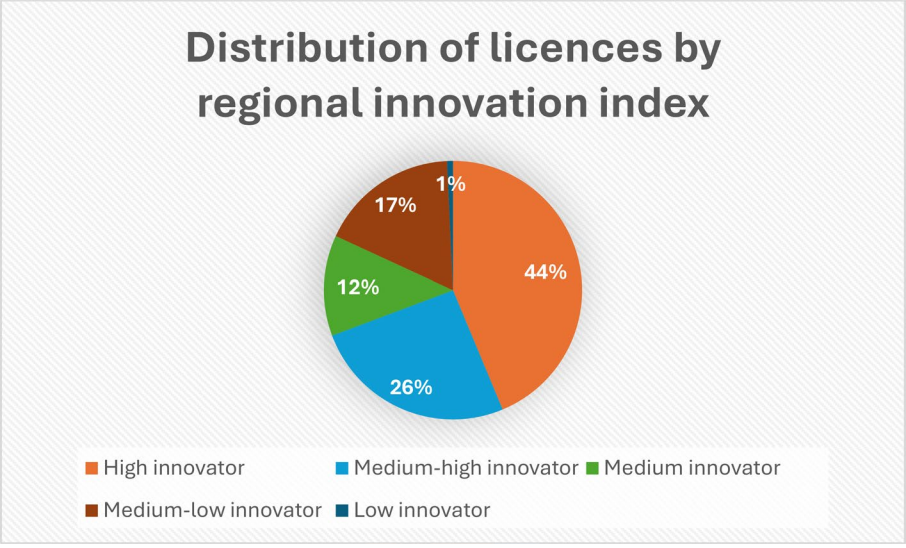

FIGURE 2 | Distribution of licenses according to the regional innovation index, 2021.

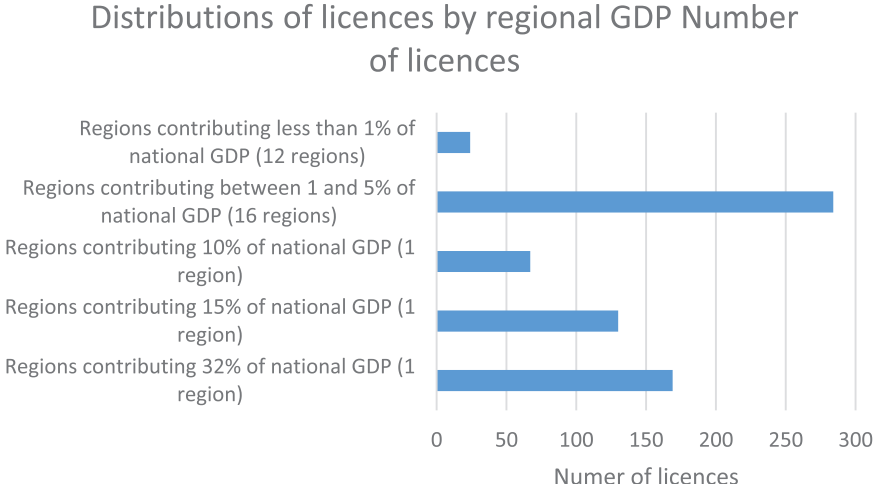

FIGURE 3 | Distribution of licences according to the regional contribution to the national GDP.

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

illegal conditions lays the foundation for the actor-based exclusions examined next.

4.2 | Actor-Based Exclusion I: Grey Producers

Grey producers are individuals who take advantage of the decriminalisation of individual consumption and ownership of up to 20 cannabis plants. They grow and transform their own produce, operating in a grey area between legality and illegality. They adhere to the limits of decriminalisation (e.g., not having more than 20 plants) but trespass the law by selling transformed products, primarily oils and ointments, within their close social and family circles (Cruz Olivera and Pereira Arana 2021). Some of these grey producers are also activists who advocated for the legalisation of cannabis for medicinal use, while others continue to advocate for a full legalisation. Some of these activists have formalised and expanded their businesses not only as an attempt to increase their economic gains but also as a way to claim justice for their long-standing efforts in lobbying for legalisation, as this interviewee describes:

> We've been working for the legalisation together with a group of mothers of children with epilepsy (...) but the government set the bar very high, the licenses are very expensive... Plus, you have to pay a lawyer and wait a very long time. There's also need for land, certifications, workers, plus the waiting to be able to plant and sell... But I talked to friends, we all agreed, it is very unfair for us to be left out of the business... so we gather the money and created the firm
>
> (Interview 16).

Despite this example of a successful shift from informality to formality, such cases are rare in the industry. Most grey producers lack the capital, specialised skills, and legal support to enter the formal industry. Their exclusion is a reflection of an unjust transition, creates challenges for the legal industry, and raises concerns for consumers. It is unjust because many of these individuals form an active civil-society group that spent years advocating for regulation and seeking to formalise their businesses, only to be excluded (interviews 16, 24, 26). This is a case of procedural justice failure. These producers also hold valuable knowledge that could have supported industrial development, potentially yielding better outcomes rather than relying on imported technologies and expertise (Morales and Marques 2025). Excluding grey producers also poses challenges because their products compete directly with legal ones in the internal market but are sold at lower prices. This exclusion also raises concerns because product consistency (e.g., CBD concentration) or quality standards cannot be traced effectively (Peyraube 2022).

4.3 | Actor-Based Exclusion II: Illegal Producers in Marginalised Regions

Illegal producers are individuals or communities at the bottom of the production chain, mostly concentrated in the department of Cauca and belonging to Indigenous or campesino groups. The scale of illegal cultivation is so large that media outlets have described it as a new 'boom marimbero', with reports of mountains lighting up at night like a nativity scene. While their exclusion from the legal industry may seem an expected consequence of illegality, the reasons many Indigenous and campesino producers engage in cannabis cultivation go far beyond profit. People engaged in illegal cultivation describe it as a matter of survival. (Cruz Olivera and Pereira Arana 2021; Interview 20).

Although found in different regions, illegal production of cannabis is prevalent in Cauca, where illegal producers are embedded in violent territorial disputes among illegal armed groups seeking control of the trade. Yet, people engaged in illegal cultivation explain how, given the remoteness of their territories, the lack of viable economic opportunities, and the state's abandonment, plus the low prices paid and the logistic difficulties to transport and commercialise other agricultural produce, illegal production appeared as the only viable option. Not only are the prices higher, but the buyers collect the produce directly from the farms (Cruz Olivera and Pereira Arana 2021, interview 20). These producers are also embedded in complex and diverse indigenous governance systems. Some communities allow but regulate production and manage conflicts, while others reject cannabis and have forbidden its cultivation within their territories. Cannabis is not an ancestral plant, yet interviews revealed that some communities have used it medicinally for generations (Interviews 18 and 20). The communities rejecting cannabis do so on the grounds of preventing social conflict. Their commitment is so strong that the Nasa Indigenous authorities (Nejwes) spent months walking across their vast territory, visiting household after household, to persuade community members not to engage in cannabis cultivation (ParadaLugo 2022). The discussion around cannabis in Cauca is deeply complex, and providing a full account is beyond the scope of this paper. What we emphasise here are the multiple layers of complexity and the long-standing social exclusion shaping the lives of these communities.

While most of the production in Cauca remains illegal, some communities have tried to formalise their cultivations and establish legal firms through creating cooperatives. One of these cooperatives shared its story of creation and establishment, which we paraphrase here as it evidences the obstacles faced, helping explain the causes of exclusion:

> When cannabis regulation began in Colombia, we organised ourselves to apply for licences. We already had some crops in post-conflict, indigenous, and rural areas, so it made sense to formalise and join the legal medicinal cannabis project and its supply chains. We had developed special strains with unique genetics suited to these territories, so we carried out agronomic evaluations and other adjustments to meet the required quality standards and adapt them to Colombia's different climatic zones. After that, we registered our varieties with the relevant agency.

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

> We obtained those registrations, but some cultivation and production licences were denied because the Cauca department was deemed unsuitable due to security issues. We were then required to relocate to 'safer' areas along the highway, closer to officially designated secure zones. Later, we also faced difficulties meeting the protocols required for producing medicinal cannabis. Small-scale growers simply did not have the financial capacity to comply: medicinal cannabis must be grown in greenhouses with specific techniques, protocols, and good agricultural practices that we could not afford. At that time, Cauca had about 20 cooperatives, but only two were able to start operations. We gathered what resources we could, but building a full-scale greenhouse that meets international standards requires investments far beyond our reach. We can barely afford bamboo greenhouses.

> Then came the issue of licensing. Licenses were taking up to two years to be granted. Cultivating medicinal cannabis becomes a failure when there are no buyers. We cannot transform the product without the license, so the flower sits in improvised cold rooms while we wait for a solution, either obtaining the license or finding another option. This creates very high costs: building and maintaining the cold rooms, paying for energy and backup power, and doing everything necessary to prevent the plants from spoiling. There has been no government support, not even with licensing procedures.

> We continue because cannabis has always been a medicinal plant for us, used in oils and ointments. We have worked with the plant, learned from it, and seen its health benefits. And we continue because we live in one of the most economically disadvantaged regions of the country, still immersed in an armed conflict that has never really ended (Interview 20).

The story of this cooperative shows how failure was largely produced by regulatory design, not by individual circumstances. Interviewees agreed that legalising medicinal cannabis was never meant to address the deep social conflicts affecting these communities. However, there is an element of social justice embedded in these discussions; it is only fair that those who have suffered the most from the war on drugs are the first to benefit from the spaces of legality and formality created by regulation (Jelsma et al. 2019).

4.4 | Barriers to Inclusion

One of the main reasons grey and illegal producers are excluded from the legal industry is the high entry barriers. Producing cannabis to pharmaceutical standards requires technological capacities that most small actors cannot meet. Beyond this, firms need sufficient financial and human resources to pay for licences, permits, and agronomic evaluations; manage extensive paperwork; secure buyers before planting; sustain operations for years without profit; and navigate complex national and international regulations. Yet the most prohibitive barrier remains the stringent production requirements, as one interviewee noted:

> In a perfect world, it makes sense to encourage product transformation in Colombia... to produce with added value and avoid what happened with coffee... but the world of cannabis is such a technical world... you have to bring it to pharmaceutical quality, for that you need a lot of technology, quality certifications, and many other things. The gap was enormous, and we were never going to reach it; we were all going to go bankrupt
>
> (Interview 5).

Another factor shaping exclusion relates to the industry's dominant business model. Most large and medium firms, both multinational and local, have adopted vertical integration looking to control the entire chain (from seed production to the transformation and export or sale). This model, common in other countries, is justified by strict regulatory demands and the need to guarantee full traceability (who holds the substance, where, in what quantity, and for what purpose). While vertical integration helps firms meet high standards of quality and consistency, it also limits space for grey and illegal producers to participate (Jelsma et al. 2019). However, two cooperatives in our sample (none with a background in illegal production) demonstrate that associative models supported by local governments and universities can create more local benefits and social impact. The first describes itself as an economic development initiative for women workers:

> We are a company focused on economic development... with about 90% of our project members being single mothers... While we are deeply committed to all aspects of the commercial side of our operations, the social impact we create is equally important to us. We strive to empower communities to progress... [In 2022] we completed our first export of dry flowers... but we also offer finished products such as coffee, facial serums, a haircare line, and relaxing drops... Our operations remain local, allowing us to stay close to the fields and hire local women
>
> (Interview 11).

The second case is a firm that prides itself on being a vertically integrated cooperative where the employees, most of them residents of the local area, also own a part of the business:

> We are an association of agricultural producers. We embraced this collaborative approach because we firmly believe in the potential benefits it can bring. We believe that these benefits should extend to everyone,

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

> but particularly to the community where we are located, which is a community facing significant challenges and limited development opportunities. Our goal is to use cannabis as a means to improve the well-being of the people in our region through our company. We want the younger generation to be motivated to stay in the area'
>
> (Interview 17).

It is worth noting that environmental sustainability was not a priority among the entrepreneurs interviewed. While most acknowledged challenges such as water and energy use, they argued they could not address them while struggling to ensure financial viability. Some assumed sustainability was inherent to the crop, claiming that cannabis 'purifies the soil', others referred to organic production. Although the environmental impacts of grey and illegal production are unknown, legalisation offers an opportunity to develop the industry responsibly. So far, however, the sector has lacked strategies or training on environmental care, efficient resource use, or climate adaptation, gaps made evident by experiences such as the following:

> Now we are waiting for the emergency authorities to arrive because it seems that we have to evacuate the farm. It has rained loads and there is a lot of soil movement; there is risk of landslides. The terraces, the house, the greenhouses, everything is moving
>
> (Interview 13).

So far, these results exemplify the three dimensions in our framework (see Figure 4). First, spatially, the industry has a very clear geographical concentration, creating a spatial mismatch between where formalisation and legalisation efforts were most needed, where cannabis knowledge resided, versus where legal firms established operations. Regulatory requirements and industrial development assumed accessible infrastructure, formal property titles, knowledge, and capacities to acquire technical certifications. The spatial distribution of these assets is uneven, conditioning the transition to navigating obstacles that peripheral regions could not afford. Second, politically, despite the explicit inclusion mandates, the industry developed reproducing systematic exclusion. Licensing costs, paperwork, and technology investments created entry barriers that favoured firms with political connections and financial capital. The result was not inclusion but a deepening of inequalities. Producers with lesser economic power, precisely those the law intended to protect, were filtered out of the benefits of the transition.

Third, epistemologically, medicinal cannabis was initially framed in narratives of competitive advantages, grounded on physical geography and an export-oriented modern industry. Policymakers and investors envisioned a second 'green boom' in which Colombia would transform flowers into pharmaceutical extracts for global markets. These narratives assumed that the country's comparative advantages (favourable climate, strategic location, sunlight) were sufficient for the transition. Yet, they overlooked the extensive knowledge embedded in decades of illicit cultivation, simply assuming that global pharmaceutical

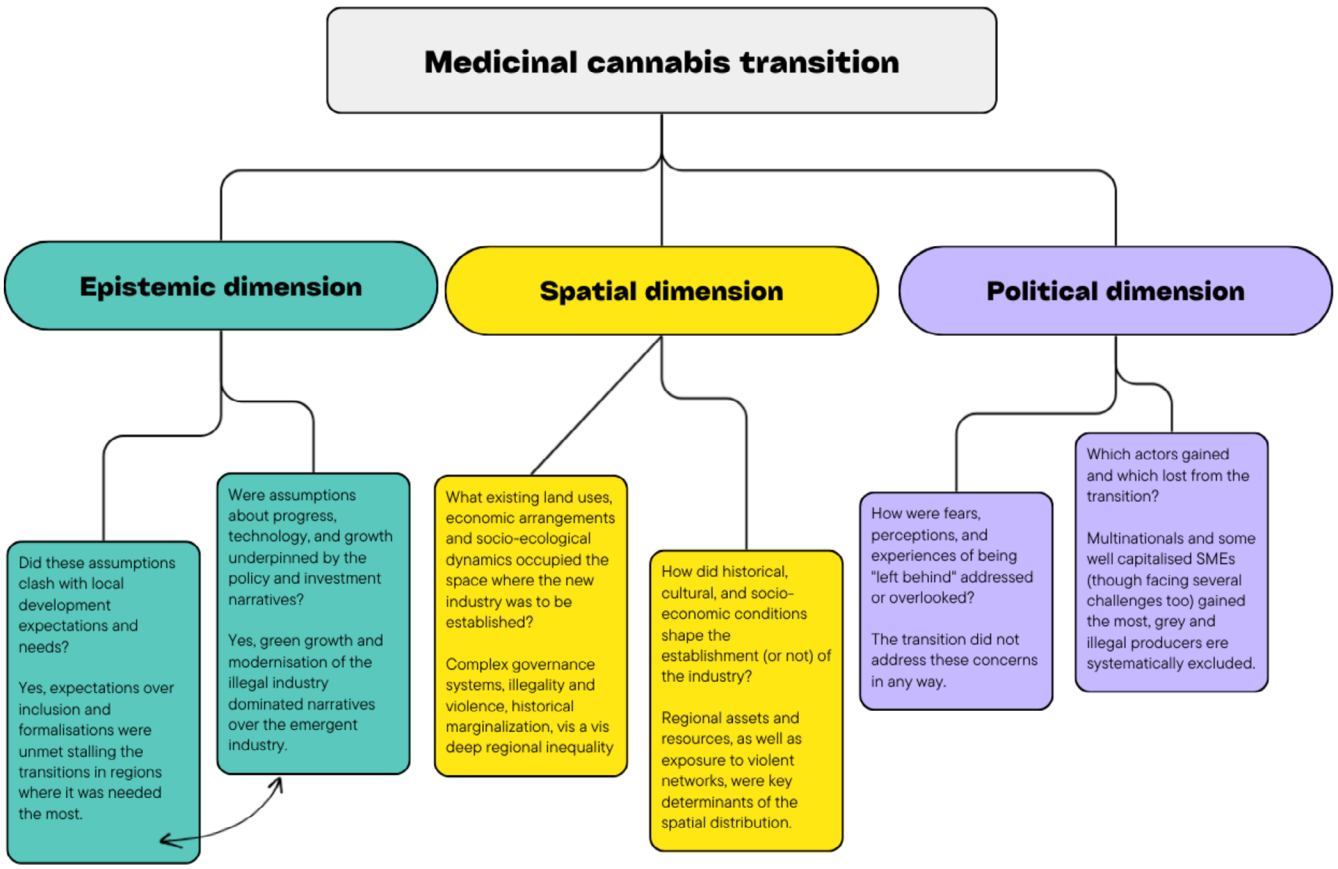

FIGURE 4 | Summary of findings according to the analytical framework. *Source:* authors.

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

models could be transferred to local contexts. The spatial and actor-based exclusions documented in this paper illustrate the limits of these assumptions. Nevertheless, some firms experimenting with alternative business models, particularly cooperative and associative forms, have demonstrated greater resilience and capacity for diversification, enabling them to generate cash flow while the broader industry continues to mature and contributing to close the exclusion gap.

5 | Concluding Discussion. Towards a Postdevelopment Transition

This paper contributes to debates on sustainability transitions and development by demonstrating how insufficient attention to place-specific dynamics and local postdevelopment expectations can cause sustainability transitions to stall, reproduce socio-economic inequalities, and generate new forms of exclusion. Crucially, we show that while transitions are often explained as processes aimed at destabilising regimes to promote more environmentally friendly modes of production and consumption, in 'left behind' regions they are deeply entangled with longstanding concerns over local development.

Building on literature that links sustainability transitions and development (Swilling et al. 2016, 2022), we argue that transitions cannot rely solely on techno-economic narratives and policy designs. Instead, they require context-sensitive, territorially grounded, and justice-oriented approaches that recognise uneven development and spatial disparities not as unfortunate side effects, but as the very points of departure for the transition (Avelino and Wittmayer 2016; Eadson and Van Veelen 2023). Our analytical framework, informed by postdevelopment thinking, draws attention to three interconnected dimensions through which these dynamics can be understood. *Epistemologically*, it challenges the modernisation and techno-optimism underpinning mainstream transition narratives, opening space for alternative visions of progress rooted in local priorities. *Spatially*, it foregrounds how transitions intersect with territorial specificities (existing assets, socio-economic arrangements, and socio-ecological conditions) that shape whether and how transitions can take root. And *politically*, it foregrounds the justice implications of transition processes: the winners and losers, the power relations that determine whose voices are heard, and the fears and expectations of being 'left behind' that, if overlooked, can generate resistance and stall change. Attending to these dimensions, we suggest, is not secondary to technological or economic transformation but constitutive of whether transitions can deliver meaningful and lasting change in left behind places.

Applying our analytical framework helps explain why the transition to a legal medicinal cannabis regime in Colombia failed to deliver the developmental and socio-environmental transformations originally envisioned. At the *epistemological dimension*, the case shows how techno-optimistic, modernisation-oriented transition narratives clashed with local realities and expectations, particularly in regions historically linked to illegal cannabis cultivation. As postdevelopment scholars note, such narratives privilege Western-centric notions of progress and overlook cultural, ecological, and community-based forms of socio-ecological organisation (Escobar 1995; Gudynas 2017). In Colombia, this clash was evident in the framing of the industry as a high-tech, knowledge-intensive sector to be established in regions lacking the infrastructure for such endeavours. At the same time, regulatory narratives ignored existing local assets and practices, such as knowledge of cultivation and community governance structures, that could have been integrated into the legal industry. This disconnect created a gap between what illegal and grey market producers expected from regulation and what the legalisation of medicinal cannabis ultimately delivered. The cannabis regime was assumed to be transformed by technological upgrading and capital investment, automatically creating local development and facilitating the transition for illegal and grey producers. However, these expectations did not align with what communities sought: an inclusive transition that acknowledged historical inequalities. As Just Transitions literature emphasises, unmet expectations generate fears, grievances, and resistance (Newell and Mulvaney 2013; Gürtler et al. 2021). Here, the failure to fulfil promises of legal inclusion undermined the transition's legitimacy.

At the *spatial dimension*, the framework draws attention to how territorial specificities shaped (and were disregarded by) the transition process. Regions like Cauca are characterised by particular socio-ecological configurations: smallholder farming systems, indigenous ontologies, informal land tenure arrangements, and histories of marginalisation and state absence. The regulatory framework, however, imposed uniform requirements (formal land titles, costly licensing fees, and export-oriented quality standards) that bore no relation to these territorial realities. By failing to recognise these place-specific conditions, the transition design reproduced the very patterns of uneven development it was expected to address. The cannabis industry evolved in ways that favoured prosperous regions with established agro-industrial capacities and access to key export infrastructure. This spatial mismatch illustrates a core claim of the geographies of sustainability transitions literature: transitions are not spatially neutral, and when they ignore territorial specificities, they risk re-inscribing existing inequalities (Coenen et al. 2012; Hansen and Coenen 2015).

The political dimension illustrates how power asymmetries between actors (multinational firms, domestic investors, grey and illegal producers) shaped who could participate in and benefit from the transition. Consistent with Just Transitions literature (Wang and Lo 2021; Burke 2022), we show that procedural and recognitional injustices played a central role in the transition's stalling. Illegal and grey producers were not meaningfully included in decision-making processes, nor were their fears or expectations adequately addressed. The transition thus reinforced existing power relations rather than transforming them. Moreover, the exclusion of illegal and grey producers is not only a justice issue but also a practical challenge for the industry's viability. This exclusion not only left behind people but also their knowledge and skills, deeply valuable for the cultivation and care of the plants adapted to local conditions. Many entrepreneurs have entered the industry driven by economic speculation rather than a commitment to sustainability but lacking the knowledge of the industry and primarily focused on generating profits through the exploitation of natural resources and land. Conversely, some other entrepreneurs, particularly those who were already part of the grey industry, are motivated by human

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

health concerns or a cultural affinity with cannabis. Only a couple of examples of entrepreneurs displayed being motivated by social concerns, creating cooperative-like organisations in an attempt to contribute to the local development of the region (although we recognise that while these motivations differ from pure capital generation, they are still largely anthropocentric). However, the regulatory framework, while designed to ensure control and safety, inadvertently excluded hybrid or community-based initiatives, echoing Avelino and Wittmayer's (2016) observation that well-intentioned regulation can produce new barriers. Without addressing the distributive, procedural and recognitional dimensions of justice, the transition lacked the social foundations needed to stabilise a new regime. Finally, our study shows that even if sustainability transitions should not be seen as complete solutions to the complex social, environmental, and institutional issues, when seen from the ground up, there is a strong expectation that transitions will have a reparative and emancipatory component, a just transition (Cruz Olivera and Pereira Arana 2021; Avelino et al. 2024). It became evident that the legalisation of cannabis as a transition strategy failed to deliver procedural justice. It did not account for the uneven development and differential capacities of the producing regions, favouring the concentration of cannabis industry activities in economically prosperous regions, rather than violence-affected or marginalised ones.

Together, the three dimensions of our framework show that the underperformance of Colombia's medicinal cannabis transition was not due to merely technical or economic aspects but also to epistemic, spatial, and political dimensions. We argue that changes in a stable and unsustainable regime are contingent on how local development expectations are met. However, while sustainability transitions often interlace with development dynamics (Swilling et al. 2016, 2022; Chlebna and Suitner 2026), development needs to be understood locally and holistically, considering the contextual realities and specific needs of marginalised communities to ensure equitable and sustainable outcomes. This requires a critical reassessment of traditional modernisation narratives, particularly those rooted in techno-optimism.

Incorporating local postdevelopment perspectives into the sustainability transitions discourse helps move beyond the dominant focus on national-level dynamics, offering a deeper understanding of how local contexts both shape and are shaped by transition processes. There is a need to reflect on the creation of development outcomes expected from industries based on the exploitation, use, and transformation of natural resources. It is not just about creating economic profits and jobs but also change processes that result in significant improvements in well-being and the simultaneous restoration of degraded ecosystems, decarbonisation, and improvements in resource efficiency.

Acknowledgments

We would like to express our deep gratitude to the interviewees who generously shared their time and insights. Their firsthand accounts provided invaluable perspectives on the complexities of the medicinal cannabis industry in Colombia and its implications for the broader transitions discourse. This research would not have been possible without their willingness to engage and openly discuss their experiences.

Funding

This work was supported by Umeå Universitet.

Conflicts of Interest

The authors declare no conflicts of interest. Microsoft Copilot was used to support the editing and improvement of this paper's readability. All content and interpretations are the sole responsibility of the authors.

References

Avelino, F., K. Wijsman, F. van Steenbergen, et al. 2024. "Just Sustainability Transitions: Politics, Power, and Prefiguration in Transformative Change Toward Justice and Sustainability." *Annual Review of Environment and Resources* 49: 519–547. https://doi.org/10.1146/annurev-environ-112321-081722.

Avelino, F., and J. M. Wittmayer. 2016. "Shifting Power Relations in Sustainability Transitions: A Multi-Actor Perspective." *Journal of Environmental Policy & Planning* 18, no. 5: 628–649. https://doi.org/10.1080/1523908X.2015.1112259.

Bailey, I., A. Gouldson, and P. Newell. 2011. "Ecological Modernisation and the Governance of Carbon: A Critical Analysis." *Antipode* 43, no. 3: 682–703. https://doi.org/10.1111/j.1467-8330.2011.00880.x.

Benner, M., M. Trippl, and R. Hassink. 2024. "Sustainable and Inclusive Development in Left-Behind Places." *Review of Regional Research* 44: 237–249. https://doi.org/10.1007/s10037-024-00216-w.

Binz, C., L. Coenen, K. Frenken, et al. 2025. "Exploring the Economic Geographies of Sustainability Transitions: Commentary and Agenda." *Economic Geography* 101: 1–27. https://doi.org/10.1080/00130095.2024.2445530.

Binz, C., L. Coenen, J. T. Murphy, and B. Truffer. 2020. "Geographies of Transition—From Topical Concerns to Theoretical Engagement: A Comment on the Transitions Research Agenda." *Environmental Innovation and Societal Transitions* 34: 1–3. https://doi.org/10.1016/j.eist.2019.11.002.

Britto, L. 2020. *Marijuana Boom: The Rise and Fall of Colombia's First Drug Paradise*. University of California Press.

Burke, M. J. 2022. "Post-Growth Policies for the Future of Just Transitions in an Era of Uncertainty." *Futures* 136: 102900. https://doi.org/10.1016/j.futures.2021.102900.

Buttel, F. H. 2000. "Ecological Modernization as Social Theory." *Geoforum* 31, no. 1: 57–65. https://doi.org/10.1016/S0016-7185(99)00044-5.

Castellini, V. 2019. "Environmentalism Put to Work: Ideologies of Green Recruitment in Toronto." *Geoforum* 104: 63–70. https://doi.org/10.1016/j.geoforum.2019.06.010.

Castree, N., W. M. Adams, J. Barry, et al. 2014. "Changing the Intellectual Climate." *Nature Climate Change* 4, no. 9: 763–768. https://doi.org/10.1038/nclimate2339.

Chlebna, C., E. Evenhuis, and D. Morales. 2024. "Economic Geography and Planetary Boundaries: Embracing the Planet's Uncompromising Call to Action." *Progress in Economic Geography* 2, no. 2: 100021. https://doi.org/10.1016/j.peg.2024.100021.

Chlebna, C., and J. Suitner. 2026. "The Transition Development Nexus. Disentangling Growth and Transformation Agendas in Regional Sustainability Transitions." *Review of Regional Research* 46: 31–51. https://doi.org/10.1007/s10037-025-00231-5.

Coenen, L., P. Benneworth, and B. Truffer. 2012. "Toward a Spatial Perspective on Sustainability Transitions." *Research Policy* 41, no. 6: 968–979. https://doi.org/10.1016/j.respol.2012.02.014.

Cruz Olivera, L. F., and I. Pereira Arana. 2021. *Laberintos de prohibición y regulación: los grises de la marihuana en Colombia, De Justicia*. Dejusticia.

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Dearing, J. A., R. Wang, K. Zhang, et al. 2014. "Safe and Just Operating Spaces for Regional Social-Ecological Systems." *Global Environmental Change* 28: 227–238. https://doi.org/10.1016/j.gloenvcha.2014.06.012.

Demaria, F., G. Kallis, and K. Bakker. 2019. "Geographies of Degrowth: Nowtopias, Resurgences and the Decolonization of Imaginaries and Places." *Environment and Planning E: Nature and Space* 2, no. 3: 431–450. https://doi.org/10.1177/2514848619869689.

Donald, B., and M. Gray. 2019. "The Double Crisis: In What Sense a Regional Problem?" *Regional Studies* 53, no. 2: 297–308. https://doi.org/10.1080/00343404.2018.1490014.

Eadson, W., and B. Van Veelen. 2023. "Green and Just Regional Path Development." *Regional Studies, Regional Science* 10, no. 1: 218–233. https://doi.org/10.1080/21681376.2023.2174043.

Eriksson, M., A. S. Lundgren, and R. H. Eriksson. 2025. "The Heroes and Killjoys of Green Megaprojects: A Feminist Critique." *Cambridge Journal of Regions, Economy and Society* 18: rsaf002. https://doi.org/10.1093/cjres/rsaf002.

Escobar, A. 1995. *Encountering Development: The Making and Unmaking of the Third World*. Princeton University Press.

Escobar, A. 2010. "Latin America at a Crossroads: Alternative Modernizations, Post-Liberalism, or Post-Development?" *Cultural Studies* 24, no. 1: 1–65. https://doi.org/10.1080/09502380903424208.

Escobar, A. 2015. "Degrowth, Postdevelopment, and Transitions: A Preliminary Conversation." *Sustainability Science* 10, no. 3: 451–462. https://doi.org/10.1007/s11625-015-0297-5.

Fiorentino, S., A. K. Glasmeier, L. Lobao, R. Martin, and P. Tyler. 2024. "'Left Behind Places': What Are They and Why Do They Matter?" *Cambridge Journal of Regions, Economy and Society* 17, no. 1: 1–16. https://doi.org/10.1093/cjres/rsad044.

Flyvbjerg, B. 2006. "Five Misunderstandings About Case-Study Research." *Qualitative Inquiry* 12, no. 2: 219–245. https://doi.org/10.1177/1077800405284363.

Gamarra-Vergara, J. R. 2007. "Economía del Departamento del Cauca: concentración de tierras y pobreza, Documentos de Trabajo Sobre Economía Regional. Banco de la República."

Geels, F. W. 2002. "Technological Transitions as Evolutionary Reconfiguration Processes: A Multi-Level Perspective and a Case-Study." *Research Policy* 31, no. 8–9: 1257–1274. https://doi.org/10.1016/S0048-7333(02)00062-8.

Geels, F. W. 2011. "The Multi-Level Perspective on Sustainability Transitions: Responses to Seven Criticisms." *Environmental Innovation and Societal Transitions* 1, no. 1: 24–40. https://doi.org/10.1016/j.eist.2011.02.002.

Ghosh, B., M. Ramos-Mejía, R. C. Machado, S. L. Yuana, and K. Schiller. 2021. "Decolonising Transitions in the Global South: Towards More Epistemic Diversity in Transitions Research." *Environmental Innovation and Societal Transitions* 41: 106–109. https://doi.org/10.1016/j.eist.2021.10.029.

Gibbs, D. 2006. "Prospects for an Environmental Economic Geography: Linking Ecological Modernization and Regulationist Approaches." *Economic Geography* 82, no. 2: 193–215. https://doi.org/10.1111/j.1944-8287.2006.tb00296.x.

Gioia, D. A., K. G. Corley, and A. L. Hamilton. 2013. "Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology." *Organizational Research Methods* 16, no. 1: 15–31. https://doi.org/10.1177/1094428112452151.

Gudynas, E. 2017. "Post-Development and Other Critiques of the Roots of Development." In *The Essential Guide to Critical Development Studies*, 84–93. Routledge.

Gürtler, K., D. Löw Beer, and J. Herberg. 2021. "Scaling Just Transitions: Legitimation Strategies in Coal Phase-Out Commissions in Canada and Germany." *Political Geography* 88: 102406. https://doi.org/10.1016/j.polgeo.2021.102406.

Hansen, T., and L. Coenen. 2015. "The Geography of Sustainability Transitions: Review, Synthesis and Reflections on an Emergent Research Field." *Environmental Innovation and Societal Transitions* 17: 92–109.

Heras, A., and J. Gupta. 2024. "Fossil Fuels, Stranded Assets, and the Energy Transition in the Global South: A Systematic Literature Review." *WIREs Climate Change* 15, no. 1: e866. https://doi.org/10.1002/wcc.866.

Hernandez, D. S., and P. Newell, 2022. "Oro Blanco: Assembling Extractivism in the Lithium Triangle." *Journal of Peasant Studies* 49, no. 5: 945–968. https://doi.org/10.1080/03066150.2022.2080061.

Hunjra, A. I., E. Bouri, M. Azam, R. I. Azam, and J. Dai. 2024. "Economic Growth and Environmental Sustainability in Developing Economies." *Research in International Business and Finance* 70: 102341. https://doi.org/10.1016/j.ribaf.2024.102341.

Iammarino, S., A. Rodriguez-Pose, and M. Storper. 2019. "Regional Inequality in Europe: Evidence, Theory and Policy Implications." *Journal of Economic Geography* 19, no. 2: 273–298. https://doi.org/10.1093/jeg/lby021.

Jelsma, M., S. Kay, and D. Bewley-Taylor. 2019. "Fair(er) Trade Options for the Cannabis Market, Policy Report 1."

Kavousi, P., T. Giamo, G. Arnold, M. Alliende, et al. 2022. "What Do We Know About Opportunities and Challenges for Localities From Cannabis Legalization?" *Review of Policy Research* 39, no. 2: 143–169. https://doi.org/10.1111/ropr.12460.

Kay, S. 2021. *Prohibited Plants. Environmental Justice in Drug Policy.*

MacKinnon, D., L. Kempton, P. O'Brien, E. Ormerod, A. Pike, and J. Tomaney. 2022. "Reframing Urban and Regional Development for Left Behind Places." *Cambridge Journal of Regions, Economy and Society* 15, no. 1: 39–56. https://doi.org/10.1093/cjres/rsab034.

Morales, D., and P. Marques. 2025. "From Marimba to Sativex. Decolonizing Knowledge in Emerging Industries." *Economic Geography* 101, no. 5–6: 436–458.

Newell, P., and D. Mulvaney. 2013. "The Political Economy of the 'Just Transition'." *Geographical Journal* 179, no. 2: 132–140. https://doi.org/10.1111/geoj.12008.

ParadaLugo, V. 2022. "La lucha de los indígenas de Jambaló (Cauca) contra loscultivos de marihuana," El Espectador. https://www.elespectador.com/colombia-20/conflicto/la-lucha-de-las-autoridades-indigenes-en-jambalo-cauca-contra-la-marihuana/.

Perez, C. 2010. "Technological Revolutions and Techno-Economic Paradigms." *Cambridge Journal of Economics* 34, no. 1: 185–202. https://doi.org/10.1093/cje/bep051.

Perez, C. 2017. "Is smart green growth the solution? Lessons from history. In Beyond the Technological Revolution Working Paper Series WP2017-01."

Peyraube, R. 2022. "Conference presentation on medicinal cannabis regulation. Canna World Summit, Medellin, Colombia."

Pike, A., V. Béal, N. Cauchi-Duval, et al. 2024. "'Left Behind Places': A Geographical Etymology." *Regional Studies* 58, no. 6: 1167–1179. https://doi.org/10.1080/00343404.2023.2167972.

Pike, A., A. Rodríguez-Pose, and J. Tomaney. 2007. "What Kind of Local and Regional Development and for Whom?" *Regional Studies* 41, no. 9: 1253–1269. https://doi.org/10.1080/00343400701543355.

Pike, A., A. Rodríguez-Pose, and J. Tomaney. 2011. *Handbook of Local and Regional Development*. Routledge.

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

Quijano, A. 2010. "Coloniality and Modernity/Rationality." In *Globalization and the Decolonial Option*, edited by W. Mignolo and A. Escobar. Routledge, Taylor & Francis Group.

Ramos-Mejía, M., M. L. Franco-Garcia, and J. M. Jauregui-Becker. 2018. "Sustainability Transitions in the Developing World: Challenges of Socio-Technical Transformations Unfolding in Contexts of Poverty." *Environmental Science & Policy* 84, no. March 2016: 217–223. https://doi.org/10.1016/j.envsci.2017.03.010.

Raven, R., F. Kern, B. Verhees, and A. Smith. 2016. "Niche Construction and Empowerment Through Socio-Political Work. A Meta-Analysis of Six Low-Carbon Technology Cases." *Environmental Innovation and Societal Transitions* 18: 164–180. https://doi.org/10.1016/j.eist.2015.02.002.

Redacción Semana. 2018. "Informe especial. El 'triángulo de oro' del cannabis. Revista Semana."

Richardson, K., W. Steffen, W. Lucht, et al. 2023. "Earth Beyond Six of Nine Planetary Boundaries." *Science Advances* 9, no. 37: eadh2458. https://doi.org/10.1126/sciadv.adh2458.

Rockström, J., W. Steffen, K. Noone, et al. 2009. "Planetary Boundaries: Exploring the Safe Operating Space for Humanity." *Ecology and Society* 14, no. 2: 32. https://doi.org/10.5751/ES-03180-140232.

Rodríguez-Pose, A. 2018. "The Revenge of the Places That Don't Matter (And What to Do About It)." *Cambridge Journal of Regions, Economy and Society* 11, no. 1: 189–209. https://doi.org/10.1093/cjres/rsx024.

Rodríguez-Pose, A., and F. Bartalucci. 2024. "The Green Transition and Its Potential Territorial Discontents." *Cambridge Journal of Regions, Economy and Society* 17, no. 2: 339–358. https://doi.org/10.1093/cjres/rsad039.

Stark, A., F. Gale, and H. Murphy-Gregory. 2023. "Just Transitions' Meanings: A Systematic Review." *Society & Natural Resources* 36, no. 10: 1277–1297. https://doi.org/10.1080/08941920.2023.2207166.

Steffen, W., K. Richardson, J. Rockström, et al. 2015. "Planetary Boundaries: Guiding Human Development on a Changing Planet." *Science* 347, no. 6223: 1259855. https://doi.org/10.1126/science.1259855.

Svampa, M. 2015. "Commodities Consensus: Neoextractivism and Enclosure of the Commons in Latin America." *South Atlantic Quarterly* 114, no. 1: 65–82. https://doi.org/10.1215/00382876-2831290.

Swilling, M., J. Musango, and J. Wakeford. 2016. "Developmental States and Sustainability Transitions: Prospects of a Just Transition in South Africa." *Journal of Environmental Policy & Planning* 18, no. 5: 650–672. https://doi.org/10.1080/1523908X.2015.1107716.

Swilling, M., I. Nygaard, W. Kruger, et al. 2022. "Linking the Energy Transition and Economic Development: A Framework for Analysis of Energy Transitions in the Global South." *Energy Research & Social Science* 90: 102567. https://doi.org/10.1016/j.erss.2022.102567.

Truffer, B., J. T. Murphy, and R. Raven. 2015. "The Geography of Sustainability Transitions: Contours of an Emerging Theme." *Environmental Innovation and Societal Transitions* 17: 63–72. https://doi.org/10.1016/j.eist.2015.07.004.

Vázquez-Barquero, A., and J. C. Rodríguez-Cohard. 2019. "Local Development in a Global World: Challenges and Opportunities." *Regional Science Policy & Practice* 11, no. 6: 885–897. https://doi.org/10.1111/rsp3.12164.

Velasco-Herrejón, P., T. Bauwens, and M. Calisto Friant. 2022. "Challenging Dominant Sustainability Worldviews on the Energy Transition: Lessons From Indigenous Communities in Mexico and a Plea for Pluriversal Technologies." *World Development* 150: 105725. https://doi.org/10.1016/j.worlddev.2021.105725.

Wang, X., and K. Lo. 2021. "Just Transition: A Conceptual Review." *Energy Research & Social Science* 82: 102291. https://doi.org/10.1016/j.erss.2021.102291.

Appendix A

Interview Participants

ID	Mode	Category	Description/Role	Location
1	Online	Firm—SME	Co-founder	Cauca
2	Online	Association	Journalist and researcher	Bogotá/Cundinamarca
3	Online	Association	Advisor	Bogotá/Cundinamarca
4	Online	Firm—Large	Director	Bogotá/Cundinamarca
5	Online	Firm—Large	Partnerships	Bogotá/Cundinamarca
6	Online	Firm—SME	CEO	Bogotá/Cundinamarca
7	Online	Firm—SME	Entrepreneur	Valle del Cauca
8	In situ	Firm—SME	Entrepreneur	Valle del Cauca
9	In situ	Public sector	Director, regional industrial cannabis production chain	Antioquia
10	In situ	Firm—SME	CEO	Córdoba
11	In situ and online	Firm—SME	CEO	Quindío
12	Online	Firm—SME	CEO	Antioquia
13	Phone	Firm—SME	Owner	Antioquia
14	In situ	Firm—SME	Chemical engineer	Valle del Cauca
15	Online	Consultancy	Director	Cauca
16	In situ	Firm—SME	Business partner	Risaralda

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

ID	Mode	Category	Description/Role	Location
17	In situ and online	Firm—SME	Director	Valle del Cauca
18	Online	Public sector	Advisor in indigenous affairs	Bogotá/Cundinamarca
19	Online	Think Tank	Researcher	Bogotá/Cundinamarca
20	WhatsApp	Cooperative	Manager	Cauca
21	Online	Firm—SME	Manager	Antioquia
22	Online	Firm—SME	Manager	Bogotá/Cundinamarca
23	Online	Firm—SME	Managers	Antioquia
24	Online	Firm—SME	CEO	Bogotá/Cundinamarca
25	Online	Consultancy	Researcher	Bogotá/Cundinamarca
26	Online	Firm—SME	Manager	Bogotá/Cundinamarca
27	Online	Firm—SME	CFO	Bogotá/Cundinamarca
28	Online	Firm—SME	CEO	Bogotá/Cundinamarca

Appendix B

Semi-Structured Interview—Guide for Questions

- For how long have you been involved in this industry/sector, and what is your job in relation to its transformation?
- Why is it important to promote the transformation of the industry?
- What kind of strategies do you carry out, or know of, to promote said transformation?
- What obstacles have you identified?
- Who do you believe are the most important actors in driving this transformation? Do you know of any relevant collaboration amongst them?
- How do you think different actors influence the transformation?
- What role do actors such as intermediaries and buyers play in the transformation?
- Do you know how the firms and producers are involved in the transformation?
- What are the most relevant regulatory frameworks and regulatory changes playing a role in this transformation?
- Why do you think this industry is important/not important for the local and national economy?
- What changes in the context, regulations, land use, etc. do you believe are needed to drive this transformation?
- To your knowledge, what are the most relevant markets for these products?
- Do you know of any international organisation, NGO, certification or firms that intervene in the transformation? Any that you believe should intervene?
- What are the potential conflicts or problems that can emerge from this transformation or the consolidation of this industry?

Appendix C

Data Structure

First-order concepts (Macro codes)	Second-order themes (Subthemes)	Analytical dimensions
Context and history knowledge indigenous and ancestral approaches	Traditional knowledge; Practice-based knowledge; Types of knowledge; Ancestral use; Local context; Place specificities; Knowledge gaps	*Epistemological dimension* Challenging modernisation and techno-optimism
Advantages business models markets	Competitive advantages; Critical perspectives; Models dictated by expectation-speculation; Speculative developments; Commodities; Competition; Protectionism; Cross-fertilisation with other industries	

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

First-order concepts (Macro codes)	Second-order themes (Subthemes)	Analytical dimensions
Place context and history advantages	Place specificities; Path dependencies; Selection of place; Place making; Local vs. imported; Use of place infrastructure; Security; Competitive advantages; Local context; Gray markets; Models prior legalisation	*Spatial dimension* Local development expectations and territorial specificities
Indigenous and ancestral approaches business models markets	Territories; Governance; Gray markets; Informal or illegal; Alternative models; Internal market; Gray markets	
Unevenness and power agency upgrading	Access; Barriers; Imbalances; Justice; Roles in the chain; Agency and power; Conflicting interests; Limits to agency; Institutional agency; Firms capabilities and political influence; Social upgrading; Gender; Legal upgrading; Certificates	*Political dimension* Justice, power, and inclusion
Agency upgrading unevenness and power	Agency as contestation; Agency and stigma; Agency determined by regulation; Agency and public sector capacities; Stigma; Extractive models; Place and extractivism; Contradictions; Pathways	

10991719, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1002/sd.71073 by Umea University, Wiley Online Library on [24/04/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License