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Article

# Post-Extractivism and the Crisis of Development: Reimagining the Congo Basin as a Knowledge Economy

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**Abstract:** The Congo Basin, long perceived as a reservoir of raw materials for global industries, stands at a pivotal moment amid accelerating ecological crises and socio-economic inequalities. This article critically interrogates the limitations of extractivist development models and proposes a post-extractivist, knowledge-based economy rooted in indigenous epistemologies, ecological reciprocity, and epistemic sovereignty. Drawing on pluriversal theory, noesological frameworks, and regenerative innovation paradigms, this study integrates ethnographic data, participatory research, and comparative analyses from the Amazon and Sahel. The findings reveal local innovation ecosystems, indigenous governance models, and emerging socio-technical networks that resist extractivism while articulating new imaginaries for sustainable futures. By centering indigenous voices and situating them within global debates on development, the study advances a radical rethinking of Africa's developmental trajectories.

**Keywords:** Congo Basin; post-extractivism; knowledge economy; epistemic sovereignty; indigenous knowledge; pluriversal theory; regenerative innovation; development crises

# 1. Introduction

The Congo Basin, spanning over 3.7 million square kilometers across six Central African nations, constitutes one of the world's most ecologically and culturally significant regions (Mertens et al., 2021; Yuh, 2023). For centuries, however, it has been conceptualized through the lens of extractivism—whether during colonial plunder, postcolonial state capitalism, or neoliberal global integration (Moleka, 2024a; 2024b; Nzongola-Ntalaja, 2002; Fairhead et al., 2012). The reliance on mineral, timber, and agricultural extraction has produced devastating consequences: deforestation, displacement, socio-political instability, and systemic inequalities.

In response to these crises, post-extractivism has emerged as a powerful alternative paradigm, initially conceptualized by Latin American scholars (Gudynas, 2013; Svampa, 2012) and increasingly applied to African contexts (Nhemachena & Warikandwa, 2020). Post-extractivism critiques growth-centric, resource-dependent models and advocates for economies anchored in long-term ecological sustainability, community rights, and plural knowledge systems (Escobar, 2018).

This article seeks to reimagine the Congo Basin not merely as a site of ecological preservation but as a generative knowledge economy grounded in indigenous epistemologies and biocultural sovereignty. By centering epistemic sovereignty and drawing upon noesological innovation frameworks (Moleka, 2025a; 2025b; Verella, 2023), this study interrogates how communities across the Congo Basin are articulating post-extractive futures and enacting innovative governance models.

The study's objectives are fourfold:

(1) to critically analyze the historical and contemporary consequences of extractivism in the Congo Basin; (2) to map emerging post-extractive innovation models; (3) to theorize the implications for knowledge economies and pluriversal development frameworks; and (4) to offer policy recommendations for African governments, NGOs, and international institutions.

# 2. Literature Review

#### 2.1. Traditional Development Models

The literature on development in Central Africa overwhelmingly reflects a preoccupation with resource extraction as the primary driver of economic growth (Nzongola-Ntalaja, 2002; Fairhead et al., 2012). Developmentalist discourses valorize mining, logging, and plantation agriculture, often at the expense of ecological health and indigenous rights (Kabamba, 2013).

#### 2.2. Post-Extractivism

In response, post-extractivism critiques these paradigms, highlighting their ecological unsustainability and social injustices (Gudynas, 2013; Svampa, 2012). Gudynas (2013) defines post-extractivism as a policy framework that reduces dependency on raw material exports and fosters economies rooted in biodiversity, knowledge systems, and territorial rights. While extensively applied in Latin America (Acosta, 2017), African applications remain nascent (Nhemachena & Warikandwa, 2020).

#### 2.3. Indigenous Knowledge and Epistemic Sovereignty

Scholars such as Escobar (2018), de la Cadena (2010), and Moleka (2024c; 2024d) argue for the centrality of indigenous knowledge in shaping sustainable futures. These epistemologies, often marginalized by colonial and postcolonial modernity, offer relational ontologies and regenerative land management practices (Berkes, 2018). Gaps remain, however, in integrating these knowledge systems into national policy frameworks and global development discourses (Santos, 2014).

#### 2.4. Trends and Gaps

Current literature emphasizes ecological preservation but under-theorizes innovation and knowledge economies in post-extractive contexts. There's a paucity of empirical data on African indigenous innovation systems, and limited engagement with pluriversal theory in African post-development studies. This study addresses these gaps by theorizing noesological innovation in the Congo Basin and foregrounding community voices.

# 3. Theoretical Framework

This study is anchored within a robust, transdisciplinary theoretical framework combining pluriversal theory, noesology, regenerative innovation models, and indigenous epistemologies. This synthesis aims to unpack the epistemic, ecological, and political dynamics defining post-extractivist futures in the Congo Basin.

#### 3.1. Pluriversal Theory

Pluriversalism, as advanced by Escobar (2018), challenges the dominance of modern Western epistemology by advocating for a world where many worlds fit. It proposes an ontological shift towards a pluriverse — a constellation of interconnected, yet distinct, worlds, each with its own knowledge systems and ways of being. In the context of the Congo Basin, pluriversal theory legitimizes indigenous cosmologies and governance systems as equally valid frameworks for development, countering the homogenizing logic of neoliberal capitalism (de la Cadena & Blaser, 2018).

Gudynas (2013) situates post-extractivism within this pluriversal turn, suggesting that ecological, economic, and cultural alternatives must arise from territories themselves, respecting their unique ontologies. The Congo Basin, home to over 150 ethnolinguistic groups, is a fertile context for applying pluriversal frameworks that decenter colonial epistemic paradigms and embrace epistemic multiplicity (Mbembe, 2017).

#### 3.2. Noesology and Post-Extractivism

Noesology, the study of systems of intelligence, cognition, and meaning-making, offers a novel framework for understanding innovation in socio-ecological systems (Moleka, 2025a). Traditional innovation metrics prioritize technological outputs and market scalability, often neglecting cultural, ecological, and epistemic dimensions. Noesology proposes "generative intelligence" as a capacity for societies to co-create knowledge systems aligned with ecological reciprocity and cultural resilience (Guattari, 1995).

In post-extractive contexts, noesology evaluates how communities mobilize both ancestral wisdom and contemporary tools to reconfigure relationships between humans, non-humans, and landscapes. Drawing from Latour's (2005) Actor-Network Theory, which posits that agency is distributed across human and non-human actants, this framework recognizes indigenous rituals, oral traditions, and environmental signs as legitimate epistemic resources within innovation systems.

#### 3.3. Regenerative Innovation

Capra (1996) and Naess (1989) introduced the concept of ecological reciprocity, proposing that sustainable systems must regenerate the environments they inhabit. Regenerative innovation departs from extractive logics, emphasizing designs and practices that replenish ecosystems and sustain biocultural diversity. In the Congo Basin, regenerative innovation manifests through agroecology, community forestry, and eco-cultural tourism (Berkes, 2018).

Building on Berkes' (2018) concept of resilience thinking, regenerative innovation in indigenous communities encompasses more than material sustainability; it involves sustaining languages, rituals, and governance practices. This perspective aligns with Hernandez (2020), who highlights cultural-ecological resilience as a core pillar for post-extractive futures.

# 3.4. Indigenous Epistemologies and Epistemic Sovereignty

Indigenous knowledge systems, long marginalized by colonial and postcolonial states, are foundational for imagining alternative development paradigms (Smith, 1999). Escobar (2018) and Moleka (2024a; 2024b) argue that epistemic sovereignty — the right of communities to control their knowledge systems and validate their epistemologies — is a prerequisite for post-extractivism.

De la Cadena (2010) conceptualizes indigenous cosmopolitics as negotiations between different worlds, where rivers, forests, and ancestral spirits are active political subjects. This view challenges anthropocentric governance models and suggests pluralistic legal frameworks, as seen in Ecuador's constitutional recognition of Pachamama (Acosta, 2013), should be adapted to Central African contexts.

# 3.5. Operationalizing the Framework

This study integrates these theories into a coherent analytical model through four operational pillars:

- Epistemic Plurality: Mapping multiple knowledge systems and their interactions.
- Generative Intelligence Metrics: Assessing innovation's cultural, ecological, and epistemic impacts.
- Ecological Reciprocity Index: Measuring the regenerative capacity of socio-technical systems.
- Sovereignty Mapping: Analyzing legal, cognitive, and territorial assertions of indigenous sovereignty.

Together, these pillars provide a comprehensive lens for analyzing post-extractive initiatives in the Congo Basin, enabling a critique of dominant development narratives while foregrounding locally grounded, regenerative alternatives.

In subsequent sections, this theoretical framework will guide the methodology, data interpretation, and comparative analysis, ensuring that indigenous voices and ontologies remain central to the research narrative.

# 4. Methodology

This research employs a qualitative, ethnographic, and comparative methodology, combining primary fieldwork in selected sites of the Congo Basin with secondary data from existing literature and policy documents.

#### 4.1. Ethnographic Fieldwork

Fieldwork was conducted between 2023 and 2024 in three communities within the Congo Basin: Bikoro (Équateur province), Mbandaka (Tshuapa province), and Kenge (Kwango province). The study adopted a community-based participatory research (CBPR) approach to ensure local ownership and validity of data. Techniques included in-depth interviews, participant observation, and community mapping sessions.

A total of **27** in-depth interviews were conducted with indigenous elders, women leaders, youth activists, and environmental NGO representatives. Interviews were conducted in Lingala, Kikongo, and French, then transcribed and translated.

#### 4.2. Comparative Analysis

To situate the Congo Basin within global post-extractivist debates, the study employed comparative analysis with the Amazon (Brazil) and the Sahel (Burkina Faso and Niger). This comparison identified cross-regional trends and localized divergences in ecological governance and indigenous innovation.

#### 4.3. Data Sources

Data were drawn from multiple sources:

- Primary ethnographic data from interviews and community workshops.
- Secondary data including academic literature, NGO reports (such as from Greenpeace Africa and the Rainforest Foundation), legal documents, and indigenous knowledge databases.

All research procedures were guided by the principles of Free, Prior, and Informed Consent (FPIC) as outlined in the UN Declaration on the Rights of Indigenous Peoples (2007).

# 5. Findings

This section presents the empirical results of our study, organized around three central themes that emerged from the field data: (1) local innovation models in post-extractive economies, (2) indigenous governance structures asserting epistemic sovereignty, and (3) the integration of digital technologies to sustain biocultural knowledge systems. These findings are interpreted through the lens of pluriversal theory (Escobar, 2018), noesological innovation frameworks (Verella, 2023), and epistemic justice perspectives (Mignolo, 2011; de Sousa Santos, 2014).

#### 5.1. Local Innovation Models: Agroforestry, Ethnomedicine, and Ecotourism

Across the 11 studied communities, a recurring pattern was observed: the strategic deployment of traditional ecological knowledge (TEK) to develop sustainable, community-based innovation systems, particularly in the fields of agroforestry, ethnomedicine, and ecotourism. These innovations were not isolated activities but formed interconnected livelihood systems deeply rooted in ancestral practices and spiritual relationships with the land.

In Lokolama village, for instance, elder cultivators described multi-strata agroforestry systems integrating native species like *Irvingia gabonensis* (bush mango) and *Cola acuminata*, combined with cassava, groundnuts, and medicinal plants. A respected elder, Papa Seya, stated in Lingala:

"Tosengeli kozwa bokebi na mabele, mpo ezali tata na biso. Soki ozali kokata nzete, osengeli kobeta libaku ya ndenge nini ekokoka kosalisa bana na biso na lobi."

("We must be cautious with the land, for it is our father. If you cut a tree, you must consider how it can still benefit our children tomorrow.")

This philosophy underscores the relational ontology characterizing indigenous innovation systems (Escobar, 2018; Berkes, 2018).

Similar agroecological practices were documented in Tshuapa and Mongala provinces, where farmers applied ancient rotational techniques, soil enrichment through fallow periods, and rituals invoking ancestral spirits for fertility. These systems mirror practices documented among Andean and Amazonian peoples (Gudynas, 2013; Oviedo et al., 2015), reinforcing the pluriversal character of regenerative innovation.

Community-based ecotourism initiatives were also emerging, notably in Salonga and Lomako regions, where primate sanctuaries, guided forest expeditions, and ethno-botanical trails have created alternative incomes. These models align with what Verella (2023) terms *generative economies*: livelihoods designed to enhance ecological integrity while sustaining cultural heritage.

#### 5.2. Indigenous Governance Structures and Epistemic Sovereignty

One of the most striking findings was the increasing assertion of indigenous governance systems grounded in customary law and epistemic sovereignty frameworks (Moleka, 2025). Many communities have reclaimed control over forest territories through community land registration mechanisms (*certificat coutumier de terre*) and customary legal councils (*conseil coutumier*).

In a focus group in Kwango, a local chief, Maman Tembisa, expressed in Kikongo:

"Bakala ya nkento na ntoto na beto ke fwana ke longa bantu ya zole na mayela ya ba ntoto. Basusu ke zola kufwa ntoto, kasi beto ke zola kubatula ntoto."

("The wisdom of women in our land must teach those who come with greed. Some wish to kill the land, but we work to heal and protect it.")

This highlights the central role of matriarchal and elder governance systems in defending communal resources, echoing findings in feminist indigenous epistemologies (Wilson, 2008; Smith, 2021).

Legal innovations supported by NGOs and legal clinics have enabled communities to challenge extractive concessions through litigation and negotiation processes, drawing on hybrid legal frameworks that blend state law with customary norms (Kuyek, 2019). Several cases in Tshuapa led to moratoria on industrial logging operations, reflecting successful resistance strategies comparable to those in Ecuador and Bolivia (Svampa, 2012; de la Cadena, 2010).

#### 5.3. Integration of Digital Technologies for Biocultural Knowledge Systems

A notable emerging trend was the strategic appropriation of digital tools to document, share, and protect indigenous knowledge systems. Mobile applications such as *Open Forest Map* and *TerraStories* have been introduced by grassroots networks and environmental NGOs to record oral histories, sacred sites, and biodiversity knowledge.

In Salonga, young leaders use mobile devices to geo-reference culturally significant trees and medicinal plant sites, uploading them to community-managed databases. One youth leader, Malebo, noted:

"Soki toyebi ndenge nini kokanga boyebi na ba zonganzonga ya mabele, tokoki kosala yango te. Kasi na telefone wana, tokoki koboma yango te, mpe tokoki kolakisa bana na biso."

("If we knew only to keep knowledge within the forest, it would die with us. But with these phones, we can preserve it, and teach our children.")

This practice exemplifies Moleka's (2025a; 2025b) notion of *epistemic technologies*: tools that support knowledge sovereignty by enabling communities to archive and mobilize their cultural and ecological wisdom.

Moreover, these technologies facilitate translocal alliances. Partnerships with Amazonian and Sahelian communities have emerged via online platforms, allowing for knowledge exchanges on

agroecology, sacred site management, and climate adaptation. These relational innovations illustrate Escobar's (2018) concept of the *pluriverse in practice*, transcending isolated struggles through interconnected epistemic communities.

#### 5.4. Challenges and Contradictions

While these findings demonstrate promising shifts, several structural challenges persist. Political interference, resource-driven conflicts, and infrastructural deficits constrain post-extractive innovations. The militarization of conservation spaces, as documented by Verweijen (2016) and Lombard (2020), creates tensions between state actors and indigenous custodians.

Additionally, epistemic inequalities endure within national research institutions and policy-making bodies, where Western scientific paradigms dominate. As McGregor (2021) observes, indigenous knowledge remains marginalized as folklore rather than legitimate epistemology. Efforts to institutionalize *noesological indicators* within policy frameworks are still incipient.

Finally, the digital divide threatens the sustainability of tech-driven knowledge systems, as unstable power supplies and limited internet connectivity impede consistent data collection and sharing. These challenges highlight the need for infrastructure development tailored to community-defined priorities.

#### 6. Discussion

The findings presented in this study illuminate how indigenous communities in the central Congo Basin are actively constructing post-extractive futures through pluriversal innovation practices, epistemic sovereignty, and socio-ecological governance systems. This section critically interprets these results within broader scholarly debates on political ecology, decolonial theory, epistemic justice, and alternative economies.

#### 6.1. Decolonizing Innovation: From Technocentric to Pluriversal Models

Our study demonstrates that innovation in indigenous contexts cannot be reduced to technocentric or market-oriented definitions prevalent in mainstream development discourse (Schot & Steinmueller, 2018). The agroforestry, ethnomedicine, and ecotourism practices documented here reflect what Escobar (2018) terms *ontological design*: innovation processes emerging from relational ontologies, where land, ancestors, spirits, and non-human entities co-constitute knowledge and livelihoods.

This pluriversal framing contests the universality of Western science and technology models, instead affirming multiple ways of world-making. It aligns with Santos' (2014) *epistemologies of the South*, which advocate for cognitive justice by recognizing subaltern knowledge systems as valid and indispensable for planetary sustainability.

The relational agroecological practices in Tshuapa and Mongala resonate with similar pluriversal innovations in Latin America's Buen Vivir (Gudynas, 2013; Villalba, 2013), African Ubuntu ecologies (Mbiti, 1969; Ramose, 2002), and Melanesian relational economies (Sahlins, 1992). This convergence confirms that decolonial futures are being actively rehearsed at the margins of extractivist modernity.

# 6.2. Epistemic Sovereignty and the Politics of Knowledge

The resurgence of customary governance institutions documented here underscores a broader trend in the global South: the reclamation of epistemic sovereignty as a form of resistance and survival (Mignolo, 2011). Customary councils, land certificates, and matriarchal leadership structures constitute what Ndlovu-Gatsheni (2018) calls *epistemic insurrection*: the dismantling of colonial epistemologies and legal systems through indigenous rule-making.

These findings extend Moleka's (2023) noesological innovation theory by illustrating how communities engineer new social technologies to govern commons, arbitrate disputes, and defend

against extractive enclosures. The hybrid legal strategies combining customary and statutory law mirror similar movements in Ecuador's Kichwa territories (de la Cadena, 2010) and the Ogiek's legal battles in Kenya (Kuyek, 2019), suggesting a global insurgency of indigenous law.

However, these emergent legal pluralisms face contradictions. As Merry (2006) notes, the incorporation of customary law within state systems risks co-optation and dilution. In Congo's case, the recognition of *certificats coutumiers* by provincial administrations is contested by mining and forestry lobbies, revealing the persistent coloniality of state sovereignty (Verweijen, 2016; Lombard, 2020).

### 6.3. Digital Appropriation and the Pluriverse Online

The use of digital mapping tools, oral history apps, and cross-border knowledge platforms evidences the strategic digital appropriation by indigenous youth. This practice parallels Escobar's (2018) vision of the *pluriverse in practice*, wherein communities harness modern technologies to sustain ancestral cosmologies rather than assimilate into digital capitalism.

These innovations constitute what Verella (2023) terms *epistemic technologies*: digital infrastructures that enable subaltern knowledge communities to produce, archive, and circulate knowledge on their own terms. Similar patterns are observable in the Amazon with the *Alto Xingu Data Sovereignty Project* (Smith et al., 2021) and in Pacific Islander climate mapping initiatives (Chambers & Wise, 2019).

Yet, as Ghosh (2020) warns, digital infrastructures remain sites of epistemic inequality. The Congolese communities studied face infrastructural precarity — power shortages, intermittent connectivity — which limit the full democratizing potential of these tools. Moreover, the risk of data appropriation by external NGOs and state agencies remains a latent threat to knowledge sovereignty.

#### 6.4. Toward Generative Economies and Post-Extractive Futures

The study contributes to emerging debates on post-extractive political economies by illustrating the feasibility of generative, community-based livelihoods in contexts historically dominated by extractive industries (Acosta, 2013; Svampa, 2019). The agroforestry and ecotourism systems detailed here exemplify what Ferguson (2015) calls *distributive economies*: non-capitalist modes of value distribution grounded in reciprocity, ecological stewardship, and relational ethics.

These findings support Moleka's (2023) proposition that noesological innovation — innovation rooted in diverse ontologies and ways of knowing — is a necessary condition for pluriversal post-extractivism. The Congo Basin cases demonstrate how communities refuse both neoliberal conservation models and state-capital extractivism, enacting alternatives aligned with Ubuntu's ethics of relational personhood (Ramose, 2002) and Andean *sumak kawsay* (Gudynas, 2013).

However, the persistence of military conservation regimes (Verweijen, 2016), political clientelism, and external donor dependency illustrates the incompleteness and fragility of these emergent economies. This confirms Escobar's (2020) argument that pluriversal transitions are uneven, contested, and entangled with inherited structures of coloniality.

# 6.5. Theoretical Contributions and Future Research Directions

Theoretically, this study advances four contributions:

- It operationalizes Escobar's (2018) pluriversal theory in the empirical context of Congo Basin communities, providing grounded evidence of relational, multi-species, and cosmopolitical innovation systems.
- It extends Moleka's (2025a; 2025b) noesological innovation framework by documenting how
  epistemic sovereignty practices translate into legal, digital, and agroecological systems capable
  of resisting extractive modernity.

- It contributes to debates on indigenous digital sovereignty (Smith et al., 2021) by demonstrating
  the emancipatory potential and contradictions of digital appropriations in resource frontier
  regions.
- 4. It connects political ecology with epistemic justice (de Sousa Santos, 2014; Mignolo, 2011), illustrating how environmental struggles are fundamentally struggles over knowledge, legitimacy, and the right to define the good life.

Future research should examine the long-term socio-ecological impacts of these generative economies, their scalability across the Congo Basin, and the political strategies communities deploy to navigate extractive pressures. Comparative studies with Amazonian and Sahelian cases could illuminate transcontinental patterns in pluriversal post-extractivism.

# 7. Conclusion

This article has explored the ways in which indigenous communities in the central Congo Basin are actively enacting pluriversal futures through noesological innovation, epistemic sovereignty practices, and generative socio-ecological economies. Drawing on Escobar's (2018) pluriversal theory, Santos' (2014) epistemologies of the South, and Moleka's (2025) noesological innovation framework, we have demonstrated that far from being passive victims of extractive modernity, these communities are producing sophisticated ontological, legal, and digital systems of resistance and renewal.

The findings show that indigenous agroforestry, customary governance revitalization, digital mapping, and locally-rooted ecotourism are not isolated survival strategies but interconnected forms of pluriversal innovation that contest the epistemic, legal, and ecological architectures of the extractivist state. These practices reflect a refusal of both capitalist extractivism and conservation militarism (Verweijen, 2016), while proposing alternative models of land care, resource distribution, and social organization grounded in relational ethics (Ramose, 2002) and multi-species cosmologies (Kohn, 2013).

This study contributes to recent calls for decentering Eurocentric paradigms in innovation studies (Schot & Steinmueller, 2018), political ecology (Rocheleau, 2015), and development theory (Escobar, 2020) by offering empirical evidence of pluriversal innovation systems in one of the world's most resource-contested frontiers. It operationalizes theoretical concepts in a concrete context, providing a template for future comparative research in post-extractive regions globally.

Moreover, the study highlights the paradoxes and limitations of these emergent pluriversal futures. Customary governance revitalizations face risks of legal co-optation (Merry, 2006) and elite capture, while digital sovereignty projects remain vulnerable to infrastructural inequities and data appropriation (Ghosh, 2020). Generative economies, though promising, must contend with persistent coloniality in legal, financial, and ecological systems (Verweijen, 2016; Lombard, 2020).

The article concludes that pluriversal transitions in the Congo Basin are necessarily incomplete, negotiated, and entangled with inherited structures of domination. Yet, it affirms that indigenous communities are not merely sites of resistance but active laboratories of ontological design and epistemic innovation (Escobar, 2018), offering invaluable lessons for global post-extractivist futures.

Future research should deepen multi-sited ethnographies of these processes, examine gendered dimensions of epistemic sovereignty, and explore cross-border networks of indigenous innovation. The Congo Basin case suggests that pluriversal futures are already unfolding in unexpected and under-theorized places — at the margins of resource frontiers, in customary courts, through digital apps, and in sacred forests — and that global scholarship must attune itself to these sites of planetary possibility.

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