



Mix Sustentável

O QUE FLORESCE NAS FISSURAS: PRÁTICAS DE DESIGN SITUADAS NO CONTEXTO DO ANTROPOCENO.

What blooms in the cracks: situated Design practices in the context of the Anthropocene.

Lo que florece en las fisuras: prácticas de diseño situadas en el contexto del Antropoceno.

Eduarda David Marques da Silva¹ 

Luiz Claudio Lagares Izidio² 

Denilson Moreira Santos³ 

¹ Universidade Federal do Maranhão, Programa de Pós-graduação em Design, São Luís, Maranhão, Brasil

² Universidade Federal do Maranhão, Coordenação do curso de Design, São Luís, Maranhão, Brasil

³ Universidade Federal do Maranhão, Programa de Pós-graduação em Design, São Luís, Maranhão, Brasil

Correspondência para: eduarda.david@discente.ufma.br

Resumo: Este artigo propõe uma reflexão crítica sobre o papel do design no contexto do Antropoceno, compreendido não apenas como uma era geológica, mas como um regime de pensamento marcado por lógicas extrativistas,

**ORIGINAL ARTICLE –
SCIENTIFIC SECTION
RESPONSIBLE EDI-
TORS:** Lisiane Ilha
Librelotto, Dr. Eng., Paulo
Cesar Machado Ferroli, Dr.
Eng.

SUBMITTED ON

29/01/2026

ACCEPTED ON

30/01/2026

PUBLISHED ON

07/07/2026

PID

10.29183/2447-

3073.MIX2026.v12.n2.19-38



Standard License Text

This work is licensed under a Creative Commons Attribution 4.0 International License.

Copyright Statement

Authors retain the copyright and grant the journal the right of first publication, with the work simultaneously licensed under a Creative Commons Attribution

produtivistas e antropocêntricas. A partir da metáfora da flor que rompe o asfalto, inspirada no poema *A flor e a náusea*, de Carlos Drummond de Andrade, a pesquisa investiga como práticas de design situadas podem emergir das fissuras desse sistema, articulando circularidade, biomateriais e saberes tradicionais como forças de transição socioambiental. Fundamentado em autores como Escobar, Fry, Tsing, Haraway, Stengers e Ailton Krenak, o estudo compreende o design como uma prática cultural, política e relacional, capaz de mediar formas alternativas de coexistência entre humanos e não-humanos. Metodologicamente, adota-se uma abordagem qualitativa, exploratória e interpretativa, baseada na análise de dois estudos de caso desenvolvidos na comunidade de Moita Redonda (CE), vinculados ao Laboratório de Design Social da Universidade Federal do Ceará. Os projetos analisados evidenciam práticas colaborativas que valorizam a materialidade da argila, os modos de fazer locais, os tempos do processo artesanal e a relacionalidade entre diferentes agentes. Os resultados indicam que a circularidade e o uso de biomateriais, quando articulados a saberes tradicionais e cosmopolíticas situadas, ultrapassam soluções técnicas e assumem um caráter ético, político e regenerativo. Conclui-se que o design, ao florescer nas brechas do Antropoceno, pode afirmar-se como prática de cuidado, escuta e coexistência, contribuindo para a construção de futuros mais justos, enraizados e plurais.

Palavras-chave: Antropoceno; saberes tradicionais; biomateriais; design situado.

Abstract: This article offers a critical reflection on the role of design in the context of the Anthropocene, understood not only as a geological era but as a regime of thought shaped by extractivist, productivist, and anthropocentric logics. Drawing on the metaphor of the flower that breaks through asphalt, inspired by Carlos Drummond de Andrade's poem *The Flower and the Nausea*, the study investigates how situated design practices can emerge from the cracks of this system, articulating circularity, biomaterials, and traditional knowledge as forces of socio-environmental transition. Grounded in the works of Escobar, Fry, Tsing, Haraway, Stengers, and Ailton Krenak, the research understands design as a cultural, political, and relational practice capable of mediating alternative forms of coexistence between humans and non-humans. Methodologically, the study adopts a qualitative, exploratory, and interpretative approach, based on the analysis of two case studies developed in the community of Moita Redonda (Ceará, Brazil), linked to the Social Design Laboratory of the Federal University of Ceará. The analyzed projects reveal collaborative practices that value clay materiality, local making processes, artisanal temporalities, and relational dynamics among diverse agents. The findings suggest that circularity and the use

of biomaterials, when articulated with traditional knowledge and situated cosmopolitics, go beyond technical solutions and assume an ethical, political, and regenerative character. The article concludes that design, when flourishing within the cracks of the Anthropocene, can operate as a practice of care, listening, and coexistence, contributing to the construction of more just, grounded, and plural futures.

Keywords: Anthropocene; traditional knowledge; biomaterials; situated design.

Resumen: Este artículo propone una reflexión crítica sobre el papel del diseño en el contexto del Antropoceno, entendido no solo como una era geológica, sino como un régimen de pensamiento marcado por lógicas extractivistas, productivistas y antropocéntricas. A partir de la metáfora de la flor que rompe el asfalto, inspirada en el poema *La flor y la náusea* de Carlos Drummond de Andrade, la investigación analiza cómo prácticas de diseño situadas pueden emerger de las fisuras de este sistema, articulando circularidad, biomateriales y saberes tradicionales como fuerzas de transición socioambiental. Basado en autores como Escobar, Fry, Tsing, Haraway, Stengers y Ailton Krenak, el estudio comprende el diseño como una práctica cultural, política y relacional, capaz de mediar formas alternativas de coexistencia entre humanos y no humanos. Metodológicamente, se adopta un enfoque cualitativo, exploratorio e interpretativo, a partir del análisis de dos estudios de caso desarrollados en la comunidad de Moita Redonda (CE), vinculados al Laboratorio de Diseño Social de la Universidad Federal de Ceará. Los proyectos analizados evidencian prácticas colaborativas que valoran la materialidad de la arcilla, los modos de hacer locales, los tiempos del proceso artesanal y la relacionalidad entre distintos agentes. Los resultados indican que la circularidad y el uso de biomateriales, cuando se articulan con saberes tradicionales y cosmopolíticas situadas, superan soluciones técnicas y adquieren un carácter ético, político y regenerativo.

Palabras clave: Antropoceno; saberes tradicionales; biomateriales; diseño situado.

Como citar: SILVA, Eduarda David Marques da; IZIDIO, Luiz Claudio Lagares; SANTOS, Denilson Moreira. O que floresce nas fissuras: práticas de design situadas no contexto do Antropoceno. *Mix Sustentável*, Florianópolis, v. 12, n. 2, p. 19-38, 2026. DOI: <https://doi.org/10.29183/2447-3073.MIX2026.v12.n2.19-38>

Conflict declaration

Nothing to declare.

Funding source

This study was financed in part by the Brazilian agencies CNPq and CAPES.

1 INTRODUCTION

“A flower was born in the street! / Pass from afar, streetcars, buses, steel rivers of traffic.” In the verses of Carlos Drummond de Andrade (2012), the image of a flower breaking through the asphalt brings us the strength of life in the face of the city's harshness and the daily indifference that crosses us every day. Amidst the concrete of modern civilization, where paths seem rigid and exhausted, the flower resists and insists, becoming a symbol of hope and transformation. It is based on this metaphor that this article calls us to see possibilities in the face of the challenges of the Anthropocene — a geological era marked by the consequences of human action on the planet (MOORE, 2015). Between the nausea caused by environmental and social destruction, there arises enthusiasm for other ways of creating, producing, and existing.

Although the term Anthropocene applies to name this era in which we live, recognized by human interventions that are almost irreversible for our planet (LATOUR, 2020), thinking about inhabiting it critically is more efficient than thinking about the impossibility of overcoming this moment. The Anthropocene reveals a thought structure that privileges exploitation, consumption, and profit over life. It is in this scenario of announced collapse that design finds itself called to rethink its paths, methods, and purposes.

In light of this occasion, the image created by Carlos Drummond de Andrade in the poem *A flor e a náusea* (The Flower and the Nausea) is more than poetic: it is political and deeply contemporary. In this sense, there is a certain provocation that leads us to think about resilience and the power of life (DELEUZE AND GUATTARI, 1980) amidst the rigidity of a current system that suffocates. In a world crossed by the consequences of centuries of environmental exploitation and social inequality, thinking about the role of design in this circumstance is also an invitation to reinvention, for this heir to industrial and capitalist logic can also be a tool of rupture (FRY, 2011; ESCOBAR, 2018; TONKINWISE, 2015).

Just as Drummond's flower challenges the aridity of concrete, this article starts from the idea that it is possible to cultivate alternatives that break with the prevailing destructive logic, pointing toward a design more committed to life. In this sense, we invoke Arturo Escobar's (2016) thought on the ontological potential of design as a path to relate design to the agency of world-building, being capable of shaping the material form of the world and from there creating meanings in a political and social dimension.

Consequently, some practices such as circularity and the development of biomaterials become suggestive fields to work within this perspective; however, considering that these approaches, although very important, are not recent and, in many cases, have already been co-opted by the very system they intend to transform. They have become palliative solutions when detached from a broader critique of the logic of capitalist growth.

Based on a qualitative, exploratory, and interpretive approach using case studies, this article is part of

the understanding that it is not just circularity or the use of biomaterials in themselves that symbolize this discontinuity, but rather the way these perspectives can be re-signified through dialogue with traditional knowledge, ancestral technologies, and other forms of life. These sensitive and contextual articulations carry the force of change necessary to break with the logics of the Anthropocene.

The metaphor of the flower breaking through asphalt, which gives this work its name, is used as a symbol of latent power: a force born from gaps, encounters, and resistance. From it, we seek to investigate how design — understood as a cultural and political practice — can contribute to facing contemporary challenges by articulating circularity and biomaterials in dialogue with traditional knowledge, through listening, doing, and learning with local practices.

Considering this context, the central question guiding this research is: in what way can the articulation between circularity, biomaterials, and traditional knowledge reorient the role of the flower breaking through asphalt, which gives this work its name, is used as a symbol of latent power: a force born from gaps, encounters, and resistance. From it, we seek to investigate how design — understood as a cultural and political practice — can contribute to facing contemporary challenges by articulating circularity and biomaterials in dialogue with traditional knowledge, through listening, doing, and learning with local practices. Considering this context, the central question guiding this research is: in what way can the articulation between circularity, biomaterials, and traditional knowledge reorient the role of design as an agent of transition in the face of the socio-environmental crises of the Anthropocene?

2 ANTHROPOCENE: BETWEEN RUINS AND POSSIBILITIES

The discussion about the Anthropocene goes beyond geological delimitation and enters the ethical, political, and epistemological fields. By naming this era as “the era of humans” we are, in a way, attributing direct responsibility for environmental transformations to anthropic actions, but also rendering invisible historical inequalities between different human groups¹.

Although the term Anthropocene is widely used to highlight the scale of human impacts on Earth systems, some authors find it problematic to attribute a homogeneous responsibility to “humanity” as a universal category. Such an approach tends to obscure the historical, social, and geopolitical asymmetries that characterize the unequal contribution of different human groups to the ecological crisis, especially by

¹ Although the term *Anthropocene* is widely used to highlight the scale of anthropogenic impacts on Earth systems, it carries problematic implications by attributing a homogeneous responsibility to “humanity” as a universal category. Such an approach tends to obscure the historical, social, and geopolitical asymmetries that characterize the unequal contribution of different human groups to the ecological crisis, particularly by overlooking the fact that traditional populations, Indigenous peoples, and communities in the Global South—historically marginalized—have been disproportionately affected by processes in which they have had little involvement.

disregarding that traditional populations, indigenous peoples, and communities in the Global South, historically marginalized, have been disproportionately affected by processes in which they had little participation.

For Latour (2019), the Anthropocene calls us to compensate for modes of knowledge production and life organization, demanding a new cosmopolitics — a reconfiguration of relations between humans and non-humans, science and society, nature and culture. Latour (2020) reminds us that we lived until then within a stable scenario — the Holocene — which served as a silent background for human action, as if we were exclusive protagonists on a well-built stage.

However, this “framework of stability” has been broken. With the Anthropocene, the very stage of existence moves: the backstage, the theater structure, and the environment become active parts of the scene, competing with humans for the role of historical agents. To exemplify more clearly, Green (2021, p. 33-34) emphasizes that “we need to find a way to survive ourselves — to move forward in a world where we are powerful enough to heat the entire planet, but not powerful enough to stop that warming”.

In this new plot, the Earth ceases to be the passive background of human action to become a force that challenges, responds, and collapses under the weight of civilizational choices. The geological stability that for millennia allowed the flourishing of human societies — and their habits of production, reduction, and consumption — gives way to radical instability. It is this turn that forces us to review not only the modes of material production but also the forms of knowledge that sustain them.

In the Anthropocene, as Viana et al. (2024) observe, “civilized man” appears as the antagonist of contemporary ecosystemic crises — driving destructive changes while simultaneously being called to rethink his role. Furthermore, by citing the ethics of ecological coexistence, the authors suggest *Buen Vivir* (Good Living) as a horizon: a way of life rooted in territories, relationships, and local practices, favoring shared experiences and fairer knowledge.

Exploring life amidst the rubble of late capitalism in *The Mushroom at the End of the World*, Tsing (2015) brings to light the idea of life in the ruins. According to her, even after the devastation caused by industrial systems, life persists — hybrid, precarious, but resistant. Collaborative networks between species and between humans and non-humans reveal possibilities for survival outside conventional logics of progress.

She invites us to look at what blooms on the margins, at possibilities that do not follow the logic of progress but manifest in the ruins of global capitalism as precarious yet resilient forms of collaborative life — precisely where the system failed. Just like the flower that breaks the asphalt, these modes of life teach us to imagine futures from the gaps and residues of the present. The image of the flower, the inspiration for this article, finds its political translation here: it is in the fissures of the modern world that the possibilities of another life in common emerge.

Stengers (2015) argues that the Anthropocene is also a time of catastrophes, requiring deceleration and the construction of a politics of care. For her, “responding” is not about finding universal answers but about assuming a situated commitment to that which affects us. Care, then, becomes a kind of “political technology” of attention to the relations that sustain life. This implies slower, more sensitive project practices committed to territories and their cosmologies — moving design out of its technical role. Therefore, the flower, in this context, symbolizes these underground alliances that, even if invisible, insist on growing under the asphalt of progress and domination narratives. In this scenario, the field of Design is directly challenged. Philosopher Tony Fry (2020) highlights that design, historically rooted in an instrumental and anthropocentric view, needs to be radically re-signified. For Fry, it is necessary for designers to challenge the traditional view of the world and adopt open, inclusive, and reflective practices — capable of overcoming cultural and geographical barriers.

This transition points to the urgency of a more equitable coexistence among all agencies — human and non-human — in a logic of relationality that does not separate nature and culture, technique and affection. In their new book, *Relationality: An Emergent Politics of Life Beyond the Human* (ESCOBAR et al., 2025), they treat design from a relational perspective with the world and the construction of possible futures. The authors present the political activation of relationality as essential for reinventing ourselves through other myths that allow us to perceive again the webs of relationships that form us and the wisdom of caring for them. For them, relationality is a deliberate shift to the uncertain terrain that pulses between transitions in place and the place of transitions in life.

American anthropologist Anna Tsing teaches us about relationships that place relationality as a condition for life, provoking us by saying: “we learn other sociabilities by experiencing them, not through projects, but as ways of life” (TSING, 2019, p. 124). This premise is important because it invites us to relate in a different way, based on experience, learning from other forms of freedom, different from human ones.

Therefore, a critique of the Anthropocene as a regime of thought is established here, accompanied by the reflection that the crisis can also be an opening for alternative modes of existing, doing, and designing. Endorsing this idea, Green (2021, p. 109) writes: “But all of this is a misconception. I depend entirely on what I consider the outside world. I am subordinate to it. Ultimately, there is no way for humans to escape the obligations and limitations of nature. *We are nature*”.

3 CIRCULARITY, BIOMATERIALS, AND TRADITIONAL KNOWLEDGE: FORCES OF TRANSITION

The critique of the modern design paradigm is not recent, but it becomes increasingly urgent in the context of the Anthropocene. This is because design, as a practice historically aligned with the interests of Western modernity and industrial capitalism, consolidated itself as one of the engines of productivist,

extractivist, and deliberate logic.

As Fry (2009; 2020) points out, design as we know it does not just project objects, but also futures — and often, unsustainable futures. His concept of *defuturing* denounces how design participates in environmental and social manipulation by perpetuating systems that cancel out possibilities for existence in the future. Furthermore, Tonkinwise (2015) argues that design needs to become a critical, speculative practice oriented by values, not just by functionalities or market demands. For him, the desired transition requires an ethical and epistemological repositioning of the designer: no longer as a problem solver, but as a mediator of relationships and a provoker of meanings. This implies decolonizing design — that is, shifting it from the center of modern, technical, and universalizing thought to make room for plural epistemologies and local practices.

The first part of the theoretical discussion reveals the exhaustion of modern foundations and design's participation in maintaining an unsustainable model. In this second part, the goal is to explore transition paths. From the metaphor of the flower breaking the asphalt emerges the possibility of cultivating design practices that oppose the dominant extractivist and anthropocentric logic.

It is on this horizon that proposals such as circularity and the use of biomaterials gain strength. However, it is important to consider, as Fry (2020) warns, that these concepts, while promising, are not without risks. Detached from a deeper commitment to socio-environmental reparation and a consistent critique of hegemonic structures of progress, these approaches can easily be co-opted by the system — becoming technocratic or palliative solutions that mask sustainability without changing structures of domination.

The adoption of biomaterials, for example, can repeat logics of predatory removal if not accompanied by ethical, territorial, and cultural criteria. Many sustainable practices are still trapped in the technical rationality of development, treating it as a form of modernization and disregarding the complex interrelationships between human beings and the environment. This implies that sustainable design, if not anchored in an approach that respects local epistemologies and the autonomy of territories, may end up reproducing the same extractivist dynamics that aim only at exploitation without structural transformation (Escobar, 2018). Thus, the use of so-called natural materials can easily be instrumentalized by a technocratic vision of sustainability if not anchored in situated epistemologies committed to local ways of life.

That said, the critique emphasizes that much of what is sold as sustainable today serves more to maintain the system than to transform it. Circularity supports the idea of keeping materials and products in use for as long as possible, regenerating natural systems and avoiding waste. Biomaterials, in essence, propose a connection with biological cycles, replacing synthetic inputs with materials of renewable and biodegradable origin.

In the context of this research, a general definition of circularity and biomaterials is adopted, understanding them not only as biological materials in a strict sense but as elements coming from nature that,

due to their renewability, biodegradability, or cyclic integration into ecosystems, have potential for sustainable and regenerative practices in design. Clay, despite being an inorganic material, is considered in this study as a biomaterial due to its natural abundance, low environmental impact, high durability, and widespread use by traditional communities in artisanal manufacturing processes.

In territories such as those in Latin America, these articulations are especially deep. The dialogue between design and local knowledge can create more rooted alternatives that start from the needs, experiences, and knowledge of the communities. Traditional materials such as clay, coconut fiber, and buriti, for example, can be resized and better worked within collaborative practices that respect the natural and cultural cycles of each context.

Tsing's (2015, 2019) critique of the idea of "scale" is central to this discussion, as she points out that capitalism seeks replicable solutions on a large scale, ignoring the complexity of local contexts. In contrast, practices involving biomaterials and circularity, rooted in the knowledge of territories, carry a transformative capacity. They are not limited to efficiency but express ways of life, respecting the cycles of materials and the time of things.

Tsing illustrates this perspective by highlighting how interdependent life forms bloom in the ruins left by capitalism, as exemplified by the collection of matsutake mushrooms, which is characterized by a non-linear practice, sensitive to the environment, and based on its own relationships and temporalities. This approach inspires a design that values processes and bonds instead of standardized solutions or immediate results.

Haraway (2016) proposes the term Chthulucene as a critical alternative to the Anthropocene. For her, the emphasis on the "human" reinforces a dominant narrative that ignores the entanglements and interdependencies between species, materials, and temporalities. Instead of focusing on catastrophe, Haraway invites us to "stay with the trouble" which is an act of resistance against quick and palliative solutions, and furthermore, to imagine ways of inhabiting the planet through multi-species alliances and practices of care. The trouble, in this case, is the civilizational system itself that sustains the Anthropocene.

In this vein, compensating design involves shifting it from its solutionist function to a proposed practice that accepts, understands, observes, and fabricates together with the world. It is a provocation to the imagination: how to create worlds conceived in the midst of collapse? Following the same logic, she also contributes to this discussion by proposing "making-with," a principle that opposes the method of design that "intervenes upon" the world. Therefore, the challenge is different: to re-signify circularity and the use of biomaterials based on a dialogue with popular practices, ancestral technologies, and traditional knowledge. It is about "making kin" (HARAWAY, 2016) — establishing alliances with forms of knowledge that do not separate technique and life, material and spiritual, human and more-than-human. This epistemological openness resonates with Stengers' (2015) proposal for an ecology of practices, where different forms of

knowledge can coexist and collaborate without being hierarchized.

In this expanded field, the thought of Ailton Krenak becomes fundamental. In *Ideas to Postpone the End of the World* (2019) and *Ancestral Future* (2022), Krenak proposes a radical critique of the idea of a single humanity and the separation between nature and culture. For him, indigenous knowledge does not belong to the past but represents specific possibilities for the future — futures anchored in ancestry, dreams, affection, and attention to the territory. Postponing the end of the world, therefore, is betting on the plurality of possible worlds and recognizing that the Earth does not belong to us, but welcomes us.

Krenak (2022) helps to broaden the notion of project: not as the construction of solutions, but as the cultivation of bonds and modes of conviviality. This position of perspective requires that design reconnect to the territory — not just as a physical space, but as a space of relationships. Understanding local practices, learning from traditional knowledge, and walking with other rhythms becomes an essential part of a politics of care.

In this sense, circularity and the use of biomaterials only express a capacity for discontinuation when articulated with these cosmopolitics. These sensitive articulations can activate the transformative effect of the flower breaking the asphalt. Therefore, we argue that it is not circularity or biomaterials per se that transform design into a political practice — but rather how they articulate and intersect with other modes of existence.

Design that aims to break with the Anthropocene is that which welcomes the unfinished, adopting a posture of observation and adaptation. It is a situated design that respects specific contexts and commits to the realities in which it operates, recognizing local knowledge, its own rhythms, and diverse narratives. It is also interdependent, breaking with the idea of absolute autonomy or dominance over nature. In this sense, it understands that every creation affects and is affected — and therefore needs to be conducted with responsibility, in co-authorship with the world (ESCOBAR, 2018; FRY, 2011; HARAWAY, 2016). Instead of controlling, design listens; instead of imposing, design coexists. In this case, it proposes to be a political and ethical act that welcomes uncertainty, territories, and caring relationships as an essential part of its practice.

4 METHODOLOGICAL PROCEDURES

This work stems from a qualitative, exploratory, and interpretive approach, sustained by a decolonial, situated epistemology sensitive to the territory. The investigation seeks to understand how the articulation between circularity, biomaterials, and traditional knowledge can reorient the role of design in the face of Anthropocene crises, connecting to the idea of a project as the cultivation of bonds and not just as a proposition of solutions.

As a methodological strategy, the research makes use of the analysis of two case studies developed in

the community of Moita Redonda, in the municipality of Cascavel, Ceará, within the scope of the Social Design Laboratory (UFC). Both projects were published as academic articles by Adson Queiroz in co-authorship with other researchers and result from extension and experimental actions carried out in collaboration with artisans and community residents.

Table 1 - Selected works.

Title	Year	Authors
Between pots and bacteria: a report on (one) the multifaceted universe of (social) design	2021	Adson Viana Pinheiro Queiroz Anna Lúcia dos Santos Vieira e Silva Cláudia Teixeira Marinho
Shaping the relationship between design and craftsmanship for regeneration: pigment recovery in Moita Redonda/CE	2024	Adson Viana Pinheiro Queiroz Anna Lúcia dos Santos Vieira e Silva Gabrielly Santos Sampaio Guilherme Philippe Garcia Ferreira Lya Brasil Calvet

Source: prepared by the authors (2025).

The first case, “Between pots and bacteria” (VIANA et al., 2021), explores the intersection between social design and biotechnology to address the scarcity of toá (white clay used as a pigment). The study involved mapping microorganisms and identifying ways to biologically recover these materials, demonstrating how design can act as a bridge between scientific knowledge and ancestral practices.

The second case, “Shaping the relationship between design and craftsmanship for regeneration” (VIANA et al., 2024), deepens this perspective by focusing on the regeneration of pigments in the same community. The project emphasizes the importance of design in valuing local identity and maintaining the ecological cycles of the territory, positioning the designer as a facilitator of collaborative processes.

The analysis was conducted through a critical-reflexive reading of these reports, seeking to identify elements that characterize a "situated practice" (HARAWAY, 1988) and a "politics of care" (STENGERS, 2015). The data were organized into two main analytical categories: (1) Circularity and biomaterials as relational practices and (2) Design as a mediator of worlds and traditional knowledge.

5 RESULTS AND DISCUSSION

The case studies analyzed here were developed in Moita Redonda, in the countryside of Ceará, and involve design practices articulated with local knowledge, biomaterials, and collaborative processes. Both were

conducted in partnership with artisans from the community and documented in academic projects that aim to investigate the relationships between matter, territory, and regeneration. More than just describing these experiences, the interest here lies in understanding how they connect to the challenges of the Anthropocene and the search for a design committed to other forms of existence.

The selected initiatives — one focused on experimentation with microorganisms in the production of ceramic pigments and the other dedicated to the regeneration of local artisanal practices — offer clues as to how design can operate from the margins, establishing practices that challenge the extractivist model. Based on them, the analysis proposes an immersion into the material, temporal, and relational dimensions of the project, seeking to reveal how circularity and traditional knowledge are activated as resistance and invention in peripheral contexts.

Both initiatives are deeply connected to the territory and its material, affective, and symbolic conditions, offering alternative paths to think of design as a situated and relational practice. They are, therefore, exemplary cases for investigating how the principles of circularity and sustainability can be re-signified through listening and collaborating with local knowledge. Because of this, the interpretive analyses were carried out in layers.

5.1 Materiality and product life cycle

In the analyzed projects, clay and natural pigments are not merely raw materials, but agents of knowledge, memory, and a bond with the land. The choice of materials stems from a sensitive recognition of the territory and its resources. The white clay (toá), used in “Between pots and bacteria,” carries ancestry and knowledge transmitted orally, but it is also subject to scarcity, environmental degradation, and the invisibility of the knowledge systems that manipulate it (VIANA, 2021).

The logic of circularity appears, in the analyzed projects, as both a possibility and a challenge. A possibility because materials are treated within natural cycles, with attention to regeneration and reuse; a challenge because the Anthropocene acts as a force that threatens these cycles: it contaminates soils, alters the climate, hinders access to materials, and precarious the ways of life that sustain them. Circularity, in this context, must be constantly reconstructed against the tide of extractivism.

5.2 Local ways of making and relationship with the material

For Viana (2021; 2024), artisanal making is not merely technical; it is affective, ethical, and territorial, stating that “these initiatives share the common goal of driving transformations through Design in a situated manner, valuing cultural, identity, and territorial elements” (VIANA, 2024, p. 2).

The relationship between people and clay is mediated by the body, gesture, and time. In both projects, design presents itself as a field of welcome and collaboration, where the community's knowledge is central. Decisions are not projected from the outside in but emerge from interactions with people, materials, and the place.

Materiality here is alive: the clay is touched, felt, and cared for. It dries, reacts, and responds. The hands that mold also listen. In this sense, the projects reveal a type of circularity that lies not only in the logic of reuse but in the reciprocity of the relationship between body, matter, and territory.

5.3 Relationality between human and non-human

“In microbiological analyses, it was revealed that, in fact, there was the presence of microorganisms in the local raw material, capable of solubilizing iron oxide, directly influencing the intensity of coloration” (VIANA, 2023, p. 9). According to the author, the presence of bacteria, microorganisms, and natural processes in the analyzed projects challenges the idea that the designer is the sole author (VIANA, 2021). Creation is shared with invisible agents, such as fungi and bacteria present in the clay or water, which activate chemical and chromatic reactions. This more-than-human perspective breaks with modern design control and proposes a design that accompanies, responds, and cares.

The sensitivity of the relationship with matter and the rhythms of nature is also a political gesture, which challenges the separation between culture and nature, central to anthropocentric thought. Design transforms into a relational practice — a mediation between diverse agents, human and non-human, visible and invisible.

5.4 Temporality of the process

The timings of artisanal making stand in opposition to the timings of the market. Drying, gathering, decanting, combustion, biostimulation — all these processes require waiting, care, and coexistence. This prolonged temporality, which includes its own pauses and rhythms, challenges the productivist model of the Anthropocene, which accelerates and consumes. Viana (2021, p. 320) emphasizes that:

Listening to the artisans, observing the territory, documenting and graphically synthesizing social needs to understand all existing biodiversity, prospecting individuals from the community and prospecting microorganisms capable of bio-depigmenting and solubilizing the iron oxide contained in the red clay (which is more abundant) in order to propose an effective and low-cost socio-environmental technology alternative, were the means found to respect the various elements of the territory and seek improvements for the socio-environmental system in question.

More than just resisting, these projects affirm a regenerative time, a time that pays attention to the

environment. Waiting is not unproductive; it is part of the knowledge. This temporal choice is, therefore, a gesture of resistance against the accelerated time of the ecological crisis and economic pressure.

5.5 Values associated with the territory

The design that emerges in Moita Redonda is inseparable from the territory: it is born from the relationship with the place, its history, its materials, and its ways of life. Clay is not just a resource; it is the ground, it is memory, it is sustenance.

Of these, about 32% (nearly 50 family units) work by modeling four types of clay for the production of handicrafts, their main source of income, which provides most with no more than a minimum wage. Their productions are centuries-old, generational, mostly female-led, and were influenced by the intense cultural exchange between indigenous people and settlers in the region.” (VIANA, 2021, p. 319).

The analyzed projects demonstrate how regenerative practices can emerge from the edges, the margins, and the cracks of the system.

The Anthropocene, here, is not a geological abstraction: it manifests in the difficulty of accessing materials, in the fragility of artisanal subsistence modes, and in the invisibility of communities and their knowledge. But it is precisely in these fissures that alternatives bloom — small, daily, and collaborative gestures that propose other possible worlds.

These findings suggest that the articulation between circularity, biomaterials, and traditional knowledge has the mastery to reorient the role of design, shifting it from a practice centered on the solution to a practice of “attendance” presence, and coexistence. For Viana (2024, p. 4), “[...] by rescuing ancestral techniques and local products, artisans and designers can, together, act as agents of cultural conservation, perpetuating memories.” In the analyzed projects, design operates as a mediator of worlds: it follows the cycles of matter, incorporates slow tempos, and activates bonds between humans and non-humans. Circularity, when situated, comes to mean care for the rhythms of life; biomaterials become expressions of affection and ecology; and traditional knowledge points to epistemological paths that break with modern logic. Thus, design emerges as a transition practice that flourishes in the cracks — cultivating alternatives that resist collapse and reinvent the common.

6 CONCLUSION

The metaphor of the flower that breaks through the asphalt, which guided this work since the introduction, finds its strength in the developed projects: it does not represent an innovation that comes from

above, imposing or industrialized, but rather that which flourishes in the cracks, in the encounters, and in the daily gestures of resistance and reinvention. The design that proposes to break with the Anthropocene is one that sprouts alongside the diverse, the ancestral, and the local — a design that perceives, accompanies, and cultivates.

The experiences carried out in the community of Moita Redonda revealed that it is possible to compensate for the role of design beyond problem-solving or productive efficiency. From the analysis of circularity, biomaterials, and traditional knowledge, the developed projects point toward a design committed to the cycles of life, territories, and regeneration — not only ecological but also social, symbolic, and epistemological. In this context, design ceases to be a neutral tool to affirm itself as a political and cultural practice, capable of mediating transitions toward more just, rooted, and plural futures.

Finally, this work does not intend to offer definitive answers but is interested in opening paths. Future research can deepen the analysis of regenerative practices in other community contexts, explore more systematically the articulations between design and indigenous cosmologies, or even investigate how circular practices can consolidate into public policies and institutional structures. Furthermore, it is relevant to map and experiment with other materials that express values of utilization, cyclic integration, and respect for the time of matter, contributing to the construction of more rooted and sustainable design repertoires. In times of crisis and uncertainty, it is urgent to continue cultivating alternatives that, like flowers, know how to be born even over concrete. As Carl Sagan (1980, p. 83) wrote, “we seek a connection with the cosmos. We want to include ourselves in the large scale of things [...] in deeper ways, involving the origin of matter, the habitability of the Earth, the evolution and the destiny of the human species.”

Thinking of design as a rooted, sensitive, and relational practice is also to compensate for our permanence on the planet — not as dominators, but as a living part of a larger cycle.

Acknowledgements

To Professor Luiz Claudio Lagares Izidio, PhD, for the enriching support and collaboration of ideas. To Professor Denilson Moreira Santos, PhD. To Professor Raquel Gomes Noronha, PhD, for introducing me to the sensitive role of Design in the context of the Anthropocene and for developing a work of care and attention within the design-materials-autonomy web. To the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES), for the financial support through the granting of a Master's scholarship, process no. 88887.974745/2024-00.

REFERENCES

- ANDRADE, C. D. **A rosa do povo**. 1. ed. São Paulo: Companhia das Letras, 2012. 200 p.
- BASTIAN, W. **Design consciente: caminhos para um impacto positivo**. São Paulo: SP Arte Eventos Culturais, 2025. Disponível em: <https://www.sp-arte.com/index.php/editorial/design-consciente-caminhos-para-um-impacto-positivo>. Acesso em: 7 abr. 2025.
- DELLEUZE, G.; GUATTARI, F. **Mil Platôs**. Tradução: Ana Lúcia de Oliveira, Aurélio G. Neto e Célia P. Costa. Vol. 1. Rio de Janeiro: Editora 34, 1995. 644 p.
- ESCOBAR, A. **Autonomía y Diseño. La realización de lo comunal**. Popayán: Universidad del Cauca. Sello Editorial, 2016. 528 p.
- ESCOBAR, A. **Design for the pluriverse: radical interdependence, autonomy and the making of worlds**. Durham: Duke University Press, 2018. 312 p.
- ESCOBAR, A.; OSTERWEIL, M.; SHARMA, K. **Relationality: An Emergent Politics of Life Beyond the Human**. 1 ed. London: Bloomsbury Visual Arts, 2024. 232 p.
- FRY, T. **Defuturing: a new design philosophy**. 1. ed. London: Bloomsbury Visual Arts, 2020. 282 p.
- FRY, T. Design as politics. 1. ed. Oxford: Berg, 2020. 288 p. FRY, Tony. **Design futuring: Sustainability, ethics and new practice**. 1. ed. London: Bloomsbury Visual Arts, 2009. 286 p.
- GREEN, J. **Antropoceno: notas sobre a vida na Terra**. 1. ed. Rio de Janeiro: Intrínseca, 2021. 384 p.
- HARAWAY, D. J. **Ficar com o problema: fazer parentes no Chthuluceno**. Tradutora: Ana Luiza Braga. São Paulo: n-1 edições, 2023.
- KRENAK, A. **Futuro ancestral**. 1. ed. São Paulo, Companhia das Letras, 2022. 128 p.
- KRENAK, A. **Ideias para adiar o fim do mundo**. 2. ed. São Paulo, Companhia das Letras, 2020. 104 p.
- LATOUR, B. **Onde aterrar?** 1. ed. Rio de Janeiro: Bazar do Tempo, 2020. 160 p.
- LATOUR, B. **Políticas da natureza: como associar a ciência à democracia**. 1 ed. São Paulo: Editora Unesp, 2019. 351 p.
- MOORE, J. W. **Capitalism in the web of life: ecology and the accumulation of capital**. 1. ed. London: Verso, 2015. 318 p.
- SAGAN, C. **Cosmos**. Tradução: Paul Geiger. 1. ed. São Paulo, Companhia das Letras, 2017. 487 p.
- STENGERS, I. **No tempo das catástrofes – resistir à barbárie que se aproxima**. Tradução: Eloisa A. Ribeiro. São Paulo: Cosac Naify, 2015. 212 p.
- TONKINWISE, C. Design for transitions – From and to what?. **Design Philosophy Papers**, v. 13, n. 1, p. 85–92, jan. 2016. DOI: <https://doi.org/10.1080/14487136.2015.1085686>. Disponível em: <https://www.tandfonline.com/doi/abs/10.1080/14487136.2015.1085686>. Acesso em: 6 abr. 2025.
-

TSING, A. L. **O cogumelo no fim do mundo**. Tradução: Jorgge M. Barreto e Yudi Rafael. 1 ed. São Paulo: n-1 edições, 2022. 206 p.

TSING, A. L. **Viver nas ruínas: paisagens multiespécies no Antropoceno**. Tradução: Thiago Mota Cardoso et al. Brasília: IEB Mil folhas, 2019. 284 p.

VIANA, A. P. Q.; VIEIRA E SILVA, A. L. S.; MARINHO, C. T. Entre potes e bactérias: relatos sobre (um) o universo multifacetado do design (social). In: II Colóquio de Pesquisa e Design: De(s)colonizando o Design, 2., 2021, Fortaleza. **Anais [...]**. Fortaleza: Universidade Federal do Ceará, 2021. Disponível em: <https://design.ufc.br/wp-content/uploads/2021/07/iicpd.pdf>. Acesso em: 3 abr. 2025.

VIANA, A. P. Q. et al. Moldando a relação design e artesanato para regeneração: recuperação de pigmentos em Moita Redonda/ CE. In: IV Colóquio de Pesquisa e Design em Arte: arte, design, (re)invenção política e transformação social, 4., 2024, Fortaleza (CE). **Anais [...]**. Fortaleza: Universidade Federal do Ceará, 2024. Disponível em: <https://www.even3.com.br/anais/iv-coloquio-de-pesquisa-em-design-e-arte/706713-moldando-a-relacao-design-e-artesanato-para-regeneracao--recuperacao-de-pigmentos-em-moita-redondace/>. Acesso em: 6 abr. 2025.

YIN, R. K. **Estudo de caso: planejamento e métodos**. Tradução: Daniel Grassi. 2. ed. Porto Alegre: Bookman, 2001. 206 p.
