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Exploring pregnancy maps to understand toxic reproductive risks. Embodied experiences of toxic contamination in goldmining and coca farming communities in the Bajo Cauca region (Colombia)

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ABSTRACT

In this paper, I discuss the potential of pregnancy maps, a body cartography technique emerging from the critical Latin American praxis of *cuerpo-territorio*, with a focus on the investigation of embodied experiences of reproduction to re-centre women's reproductive priorities and concerns in environmental policymaking. The paper contributes to the debate on Environmental Reproductive Health by questioning reductionist understandings of body-environment relations and reconceptualising toxic reproductive disruptions by looking at the everyday life experiences of women inhabiting contaminated territories. I draw on 14 pregnancy mapping workshops conducted among goldmining and coca farming communities in the Bajo Cauca region (Colombia) that are in close everyday contact with mercury and glyphosate to argue that engagement with women's understanding and experiences of reproductive risks is essential to design more gender-just environmental policies.

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1. Introduction

Despite growing interest among policy-makers in the gendered impacts of toxic contamination and, in particular, the correlation between chemicals and reproductive disruptions, (Wang et al. 2016; WHO 2010a, 2010b), women's lived experiences of toxic reproductive risks are virtually absent in the public debate on Environmental Reproductive Health.

On the contrary, institutional attention to women's biophysical body (Mansfield 2008) and alterations in its reproductive functions leads to conceptualising reproductive risks as 'disembodied' (Jokela-Pansini 2022, 2) from

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everyday life experiences and the specific socio-economic and cultural contexts in which toxic risks unfold. The subjective, racialised, and gendered ways through which different social actors experience, navigate, and enact toxic exposure are largely overlooked in this debate (Chen 2012). In particular, the tension between toxic exposure and care is silenced by an institutional narrative that portrays those social actors who are most exposed to contamination as toxically impaired, defective, and needing to be fixed. This narrative overlooks the efforts undertaken by women exposed to toxic risks to sustain processes of biological and social reproduction in the household and at the community level (Di Chiro 2008; Hoover 2018). Increased policy concern for women in contaminated territories therefore leads to a paradoxical 'hyper materialisation' (Schmidt 2024, 2) and objectification of women's bodies, rather than to the promotion of more effective inclusion in environmental policy-making. In particular, reproductive priorities and concerns that do not fit within a reductionist framing of toxic contamination as a biomedical impairment are excluded from environmental debates (Jokela-Pansini 2022).

This article builds on feminist perspectives on toxic contamination and, in particular, on feminist work on toxic embodiment to engage with women's everyday experiences of reproductive toxic risks. Drawing on the critical Latin American research praxis of *cuerpo-territorio* (Colectivo Miradas Críticas desde el Territorio desde el Feminismo 2017; Cabnal 2010; Zaragocin and Caretta 2021), understood as a 'visceral' method (Sweet and Ortiz Escalante 2015) that can interrogate how different social actors inhabit complex and contaminated environments, I propose *pregnancy maps* as a methodological pathway to centre subjective experiences of contamination in the debate on Environmental Reproductive Health. I argue that pregnancy maps can complement the Latin American praxis of *cuerpo-territorio* by adding a focus on processes of biological, social, and cultural reproduction to the investigation of the body-territory relationship.

The inclusion of women's embodied reproductive experiences through pregnancy maps in environmental policy-making has the potential to provide important 'counter-explanations' (Sweet and Ortiz Escalante 2017, 597) to reductionist institutional narratives of toxic contamination. Firstly, this method challenges disembodied understandings of toxic risks by highlighting the ways in which social categories of identity frame the experience of toxic exposure while being co-determined by trans-corporeal relations with the social and material environment (Alaimo 2010; Nading 2020). Understanding social identities and toxic risks as co-determined in women's everyday experiences allows us to bring social and political elements back into this debate in order to design more socially just risk-issue framings (Jokela-Pansini 2022). In particular, looking at toxic risks in the everyday contexts where they unfold uncovers the interplay between processes of toxic contamination and broader issues of environmental reproductive justice

(Hoover 2018). Further, investigating how different social actors enact their relationship with their environment opens the space to move beyond the conceptualisation of the reproductive body as a passive biomedical object and to interrogate the ways in which women embody toxic contamination while also enacting everyday practices of resistance and care (Alaimo 2010; Chen 2012).

I draw on the reproductive experiences of women inhabiting the Bajo Cauca region (Antioquia, Northwestern Colombia) who are exposed to protracted and overlapping processes of toxic contamination related to gold extraction and coca production (Cadavid-Muñoz et al. 2022; Molina, Arango, and Sepúlveda 2017) to critically rethink mainstream conceptualisations of reproductive risks. Drawing on 13 months of fieldwork, 14 pregnancy mapping workshops, and the reproductive life stories of 68 research participants collected across four municipalities, I argue that environmental policies for the control of mercury and glyphosate contamination (e.g. for mercury see Rubiano-Galvis, Diaz Leiva, and Goldstein 2023; for glyphosate see Widger 2021) fall short in conceptualising the interplay between agency, social identities, and risks. In the context of racialised impoverished extractivist geographies in Colombia, where toxic contamination emerges from a complex web of relationships among armed and corporate actors and the state (Vélez-Torres and Méndez 2022; Hurtado & Vélez-Torres 2020), ahistorical, decontextualised, technical framings of toxic contamination lead to significant policy pitfalls. In particular, the focus on individual 'body burdens' and 'disabled landscape' (Rubiano-Galvis, Diaz Leiva, and Goldstein 2023, 6) takes attention away from collective and structural reproductive disruptions elicited by toxic contamination. Identifying these disruptions as they materialise and become embodied in women's reproductive life stories is crucial to construct gender-just policies for chemical risks management. Building on this ethnographic work, this article aims to address the question of how women inhabiting toxic environments experience their relationship with the environment during pregnancy and how they conceptualise toxic reproductive disruptions. Furthermore, it discusses the methodological changes that are necessary to effectively integrate women's experiential and embodied knowledge of toxic risks in environmental policy-making.

What follows is a review of the debate on Environmental Reproductive Health and a discussion of *cuerpo-territorio* as a methodological pathway to operationalise feminist understandings of toxic contamination in the research praxis. I then introduce my proposal of complementing this praxis by adding a specific focus on reproduction through pregnancy maps (2). Section three gives background information on the processes of toxic contamination related to coca farming and goldmining in the Bajo Cauca region (3) and is followed by a discussion of my methodological choices (4), the analysis of the results emerging from fieldwork in the Bajo Cauca region (5), and some conclusive remarks (6).

2. Bodies, territories, and environmental reproductive health

2.1. Environmental reproductive risks and the biomedical body

Since the first International Summit on Environmental Challenges to Reproductive Health and Fertility, in 2007, interest in the relationship between the environment and women's reproductive health has grown substantially in institutional debates. In 2018, environmental exposure entered the framework of Non-Communicable Diseases as a determinant of risk shifting the attention from behavioural factors to environmental risks (Herrick 2020). Epidemiological studies provide increasing strong evidence that exposure to toxic chemicals is correlated with alterations in women's menstrual cycle, hormonal disruptions, infertility, and miscarriages (Ordoñez, Abrahams, and Mendez 2021; Wang et al. 2016; Women Engage for a Common Future 2017). Across different policy efforts, Environmental Reproductive Health has been defined as concerned with *exposures to environmental contaminants (.), particularly during critical periods of development (.), and their potential effects on all aspects of future reproductive health throughout the life course* (Woodruff et al. 2008).

As the debate on Environmental Reproductive Health unfolds, policy efforts to integrate gender in multinational conventions for the control of chemicals and toxic pollutants multiply. In 2017, for example, the UNDP developed a six-step guide to mainstream gender in efforts for the management of chemicals and waste (UNDP 2017). This guide recognises differential and disproportionated gendered exposure to toxic chemicals and introduces gender as a key determinant of vulnerability to them. Other multilateral conventions for the control of specific chemicals or toxic waste have also begun mentioning gender as an important variable (e.g. Basel Convention for the control of hazardous chemicals, or the Minamata Convention for the control of mercury). Across different policy efforts (UNDP 2011, 2017; United Nations Development Programme 2021; WHO 2010a, 2010b), preventing exposure to toxic contaminants by using improved technologies to identify harmful chemicals in the environment, screening for biological accumulation in the body, and producing more epidemiological studies is increasingly established as a public health priority. Policy interventions are here mostly envisioned as 'evidence-based', and public health experts are invited to produce more scientific evidence to inform environmental decision-making processes (Woodruff et al. 2008).

Yet, rather than opening an opportunity to interrogate the relationship between 'health and nature' and understanding health through the terms of a 'nature-society relationship' (Mansfield 2008, 1015), these institutional narratives are underpinned by a biomedical reductionist understanding of toxic risks that decontextualizes the reproductive impairment of the biological body from women's lived experiences of contamination. While labelling reproductive impairment as the primary policy concern, this framework overlooks

other everyday life, context-specific concerns associated with reproduction understood, in broader terms, as a range of individual and collective processes of 'sustaining life' (Di Chiro 2008). While the knowledge and health behaviour of women exposed to toxic contamination are mentioned among the factors that can 'compound exposure' (WHO 2010a: 3), they are not sufficiently integrated into this debate, and subjective experiences of contamination are considered only insofar as access to knowledge over precautionary measures and routes of exposure are recognised as factors of vulnerability (WHO 2010a). This is problematic because, by constructing women's bodies as 'bodies at risk' (Jokela-Pansini 2022, 3) and centring the biomedical body as a policy object, this narrative leads to disciplinary interventions on women's bodies that are only aimed at preserving their reproductive functionality and do not open spaces for their effective participation in policy-making (Mansfield 2012). Therefore, while epidemiological evidence is crucial to understand the impacts of chemicals on biomedical reproductive health, interrogating how contamination is enacted in women's everyday reproductive experiences is equally important to retrieve the real-life concerns of those exposed to toxic contamination (Hoover 2018; Di Chiro 2008).

Recentring women's experiences of contamination by looking at everyday toxic embodiments (Cielemęcka and Åsberg 2019) has important implications. First, it allows us to retrieve the *social* body (Mansfield 2008) beyond its reproductive biological functionality. This implies recognising the body as implied in processes of subject formation, and to therefore recognise toxic disruptions as also disruptive of social identities (Alaimo 2010; Agard-Jones 2013; Chen 2012; Nightingale 2011). In this sense, toxicity is a 'condition' (Chen 2012, 196) that emerges at the interface between the experience of the subject and the environment, rather than a biomedical status, and is therefore always subjectively enacted. In fact, according to poststructuralist feminist theory (Butler 1990), everyday embodied performances represent the dynamic ground on which gender identities emerges, in a constant material and symbolic relationship with the environment (Nightingale 2011). Insofar as, in contaminated geographies, toxins become a key component of the relationship between embodied subjectivities and the environment toxic contamination does not solely disrupt women's biomedical reproductive functionality, but also frames their social roles and identities, as well as the everyday world they inhabit (Alaimo 2010; Nading 2020).

Second, engagement with embodied reproductive experiences allows us to recognise the collective, socio-political, and cultural nature of reproductive processes. Important work by Giovanna Di Chiro (2008) and Elizabeth Hoover (2018) frames reproduction as an individual as well as collective process that spans biological, cultural, and social dimensions. Processes of biological reproduction are inextricably linked with the possibility of given social groups to live in a socio-culturally specific way. Reproductive disruptions generated

by toxic chemicals therefore need to be conceptualised also in terms of socio-cultural losses and as the rupture of networks of social relations and everyday practices (Ulloa 2016; Zaragocin 2019). As such, the focus of concern in contexts of toxic contamination should be the disruption of ‘the intersecting complex of political-economic, socio-cultural and material environmental processes required to maintain everyday life’ (Di Chiro 2008, 281). While the focus on individual biological experience leads to the design of individual, behavioural, precautionary measures to control toxic risks (Mansfield 2012), limiting spaces for collective action and mobilisation (Layne 2001), engagement with toxic embodiments can make space for different reproductive priorities and concerns to emerge and for imagining different, collective, political solutions.

2.2. Engaging the body-territory

Important cross-disciplinary research on health has been conducted to engage the body as an active research component through creative methods such as body cartography (Luckett and Bagelman 2023; MacGregor 2009; Jokela-Pansini 2022; Sweet and Ortiz Escalante 2017). Yet, although Anglophone scholars have extensively written on body cartography (Cornwall 1992), and foundational work by Liz Bondi (2005), Isabel Dyck (1999, 2005) and Longhurst (1995, 1997, 2005) opened the ground to centring emotions, the body and the everyday in feminist geography, in this paper, I build specifically on Latin American scholarship on the *cuerpo-territorio* (Zaragocin and Caretta 2021). This praxis emerges from communitarian territorial feminist movements (Paredes 2008; Motta 2021; Cruz 2020b; Colectivo Miradas Críticas desde el Territorio desde el Feminismo 2017; Ulloa 2016) and is based on the premise that ‘there is no ontological difference between territory and the body’ (Zaragocin and Caretta 2021, 1504). In contexts of resource extraction, overexploitation of natural resources and settler colonialism, ‘what is done to the body is done to the territory and vice-versa’ (Zaragocin and Caretta 2021, 1504). *Territorio* is here used to describe the interface between global forces that shape resource allocation and the distribution of different environmental burdens and the communitarian political projects of ‘local, place-based, territorially anchored local groups’ (Sandoval, Robertsdotter, and Paredes 2017, 43). Investigating the role that territory plays for communitarian social movements in Colombia, Escobar (2008) defines *territorio* as the lived, embodied, socio-culturally, and politically specific ways to inhabit a place. Drawing on ethnographic activist works conducted with Indigenous Mexican communities, Cruz (2020a) conceptualises women’s bodies as a territory, in itself, which has been occupied by (and at the same time defended from) patriarchal and colonial power. This territory is also located in intimate relation with the

territory it inhabits and that frames its social, cultural, gendered, and racialised identity (ibid.).

The praxis of *cuerpo-territorio* (Cruz and Jimenez 2020) therefore investigates the relationship between the individual and collective body (Cruz 2020a) in the context of environmental conflicts and changing environmental conditions. As a 'visual, hands-on and participatory method' (Zaragocin and Caretta 2021, 1514), it allows creative connections between the body and the participant's life stories as located in a specific place.

2.3. Mapping pregnancy

Several feminist geographers have engaged with an analysis of the geographies of reproduction (Calkin, Freeman, and Moore 2022; England, Fannin, and Hazen 2018), which span from pregnant embodiment to national and international modes of reproductive governance. This scholarship has also focused, specifically, on the experience of pregnant embodiments as constitutive of a new body geography. Young (1984), for example, claims that the embodied mother-baby relation changes the internal geography of women's bodies, revealing an entirely new 'paradigm of bodily experience' (164) and constituting a split in subjectivity. Other scholars conceptualise pregnancies as always located 'in space,' and explore the experience of moving through specific spaces during pregnancy (Longhurst 2005) as well as changes in reproductive practices, such as breastfeeding in different geographies (Pope 2001; Mahon-Daly and Andrews 2002). In this article, I expand on these attempts to investigate the geography of the pregnant body and the reproductive geographies it inhabits (Calkin, Freeman, and Moore 2022), and propose to use pregnancy maps to engage with women's experiences of the body-territory relationship during pregnancy. In particular, I look at pregnancy as a specific type of environmental engagement (Eden 2016) that shapes the body-territory relationship.

The pregnancy maps that I refer to are constructed through a collective drawing activity during which participants are asked to represent all the changes that the body faces along the menstrual cycle and during pregnancy, and investigates changes in the body-territory relationship during each of these phases. While scholars in reproductive health show increased interest in framing reproductive experiences as a trajectory to understand the time-dependent elements involved in accessing reproductive health services (Coast et al. 2018), in pregnancy maps, attention is focused on the *territorio* (Escobar 2008) as a determinant of reproductive experiences. It therefore contributes to efforts in anthropology and feminist geography to investigate the role that broader 'reproductive environments' (Theidon 2022, 80) beyond the womb play in shaping women's reproductive experiences. Pregnancy maps aim to represent the different experiences of the pregnant body as it

moves through space, navigating risks through the different stages of pregnancy. The drawing of a generic, collective body, allows a shift in focus from individual behaviours and self-blaming narratives to collective and structural barriers to the enjoyment of reproductive rights (Ross and Solinger 2017). To guide the research participants, the facilitator presents a number of guiding questions about how the experiences of pregnancy and motherhood change the participant's body and its relationship with the environment such as:

- *How does the body change during the different stages of pregnancy?*
- *Is any of these stages riskier than others for the baby or the mother? What precautions should women take in each of these stages?*
- *What activities do women usually engage with in the different stages of pregnancy? What activities should they not be performing?*
- *Are there particular places that women go to or avoid going during these stages of pregnancy?*
- *Is there any connection between the pregnant body and the surrounding environment?*

Beyond the maps themselves, what emerges as a valuable source of knowledge are the conversations generated by drawing the map and the comparison between the different experiences of pregnancy shared by the research participants.

In the second step, an in-depth focus on individual experiences is taken through semi-structured interviews aimed at collecting reproductive life stories and expanding on the experiences shared in the pregnancy map workshop. The pregnancy mapping activity is complemented by a body cartography activity built on the *cuerpo-territorio* research praxis (Colectivo Miradas Críticas desde el Territorio desde el Feminismo 2017; Cruz and Jimenez 2020; Zaragocin and Caretta 2021) but proposes a specific focus on reproduction by drawing on the following questions:

- *What signs, memories, marks, signs or scars did the experience of pregnancy leave on your body?*
- *What signs, memories, marks did the experience of being a mother leave on your body?*
- *Where did you spend most of your time during pregnancy?*
- *What places have been important/did you like/not like while carrying pregnancy?*

3. Introducing the territory: the Bajo Cauca region

To understand everyday experiences of reproductive risks in contexts of pervasive contamination, I conducted 13 months of ethnographic fieldwork in

the Bajo Cauca region (Northwestern Colombia). Since the 1970s, the presence of paramilitary groups (whose power was disputed by left-wing guerrilla groups: FARC-EP- *Fuerzas Armadas Revolucionarias de Colombia*, *Ejército del Pueblo*, ELN- *Ejército de Liberación Nacional* -and, more recently, the FARC Dissidents of the EMC-*Estado Mayor Central*), shaped the history of this region. Trapped in an 'unstable oscillation between war and peace' (Pinto García, 2019:99), this region has experienced a continuum (Vigh 2008) of humanitarian crises. Local paramilitaries (Bloque Mineros of the AUC- *Autodefensas Unidas de Colombia*- and after their demobilisation in 2006, the AGC- *Autodefensas Gaitanistas de Colombia*) are actively involved in narco-trafficking and goldmining activities (Instituto Popular de Capacitación 2021), around which the regional economy largely unfolds. Like other goldmining territories, the Bajo Cauca region represents a 'disabled landscape' in the Colombian national imaginary (Rubiano-Galvis, Díaz Leiva, and Goldstein 2023, 13), where toxic contamination emerges from the entanglement of the armed conflict, illicit economies, and state abandonment. While coca farming is mostly practised in the highlands and is associated with the use of toxic pesticides and chemicals (Acero et al. 2023), the Nechí river basin has been occupied since the 1970s by the large-scale mining company Mineros SA (formerly known as Pato Gold Mines), which holds a different mining titles for a total of approximately 50.000 hectares (Instituto Popular de Capacitación 2021). Backhoes and dredges owned by informal goldminers also occupy a significant portion of land along the Nechí and Cauca river basins. Medium to small-scale mining actors employ significant amounts of mercury in their mining practices, while the large-scale mining company stopped mercury usage in 2014, when Law No. 1658 of 2013 declared mercury usage illegal. In fact, the Bajo Cauca region is among Colombia's most mercury contaminated regions, with local studies proving elevated levels of mercury in the water of the Nechí river, local fish, and women's breast milk (Cadavid-Muñoz et al. 2022; Molina, Arango, and Sepúlveda 2017). Moreover, as an important coca-producing region, between 2000 and 2015, the Bajo Cauca was targeted by the state policy of aerial glyphosate fumigations for the forced eradication of coca crops within the context of Plan Colombia (Camacho and Mejia 2017). According to available epidemiological research, exposure to mercury and glyphosate determines the emergence of several reproductive risks: infertility, miscarriages, alterations of the menstrual cycle, and disruptions in the hormonal system (Bjørklund et al. 2019; Gibb and O'Leary 2014; Ordoñez, Abrahams, and Mendez 2021; Wang et al. 2016).

4. Methods

This paper emerges from a larger qualitative research project on gendered experiences of toxic contamination conducted in the Bajo Cauca region. As

part of my fieldwork, I conducted 14 pregnancy mapping workshops in the municipalities of El Bagre (5), Tarazá (5), Nechí (3) and Cacéres (1) to investigate women's reproductive experiences in the context of pervasive toxic contamination. Because of the different relevance of goldmining and coca farming across these municipalities, mercury contamination represented a central topic of discussion in the municipality of Nechí, while glyphosate was central to the workshops held in Tarazá. Both toxic contaminants were discussed in El Bagre and Cacéres. Specific locations in these municipalities, selected in collaboration with local organisations involved in this study, were deemed among the 'most contaminated' by local social leaders (details on the specific *veredas* are omitted for security concerns). Safe access in the context of the local armed conflict and the characteristics of the communities—Indigenous communities (2), Afro-Colombian community (1), Participants of mixed ethnic belonging (11)—were also considered in the sampling strategy.

The structure of the workshops (which was described in section 2.4) was adapted to the different characteristics of the communitarian contexts where the activities were held. In some cases, the workshops only included women, because initial contact was made with female social leaders or the representatives of women's organisations. In other contexts, for example, where farmers' organisations showed interest in the activity, an initial body cartography activity was conducted with mixed groups, and pregnancy mapping followed in a women-only space. Rather than a weakness of the research design, the adaptation of the workshop structure is crucial to the *cuerpo-territorio* praxis, which is aimed at strengthening local activist groups and movements (Cruz 2020b; Zaragocin and Caretta 2021), rather than imposing a fixed gendered logic that can be meaningless in the local context (Motta 2021). All workshops were facilitated by me, and in the two workshops with the highest number of participants, I hired a research assistant to take notes and provide logistical support. The workshop were recorded, transcribed, and manually coded by me.

Body cartography workshops had a total of 134 female participants, with an average of 11 participants in each workshop. 68 reproductive life stories collected after the workshops, through semi-structured interviews. Workshops lasted between one and a half and four hours. Participants did not receive economic compensation, which I considered unethical in this context. However, their travel expenses were reimbursed, and meals were always provided during the activities. In the larger qualitative projects, pregnancy maps and reproductive life stories were complemented with social cartography workshops and semi-structured interviews with local social leaders and representatives of environmental and medical institutions. In this paper, however, I draw specifically on the findings from the pregnancy maps and reproductive life stories.

This research received ethical approval from the LSE Research Office, and verbal informed consent was obtained from all the workshop participants.

Data has been anonymised and all the information that could identify any of the research participants removed from this article. The importance of maintaining confidentiality was thoroughly explained before the workshops and collective agreements were taken. Research participants taking part in the workshops often knew and trusted each other, as they belonged to the same organisation or were neighbours belonging to the same JAC -Juntas de Acción Comunal- or ethnic institution. This trust was reinforced by introducing activities aimed at building a supportive environment.

5. Findings

In this section, I discuss the findings of pregnancy mapping workshops conducted in the Bajo Cauca region and structure them around three main themes. In the first section, I discuss the body-territory relationship as it emerges from women's experiences of pregnancy. I then present women's own conceptualisations of environmental reproductive risks and dissect the ways in which these exceed institutional representations of toxic risks. Finally, I present the participants' reflections on their agency before toxic risks and reflect on how these should inform the design of more meaningful policy solutions and precautionary measures.

5.1. *Body-territory relations and women's reproductive everyday experiences*

Pregnancy maps locate the experience of reproduction in the *cuerpo-territorio* continuum. Elements of the territory such as the river, the moon, and some animals, emerge from these maps as playing an active role in women's reproductive lives. In the first place, research participants perceive their reproductive experiences to mirror and be regulated by environmental cycles and, in particular, the moon cycles and the river's tides. The moon regulates the movements of the foetus and determines when labour is going to start.

When the moon is new, the moon makes the baby move when you are pregnant. But this is normal pain, you feel like you are going to deliver. When the moon passes by, the baby gets agitated, there is this process with the moon. (Pregnancy mapping, El Bagre).

G., a 32-year-old woman, argues that the only thing that could take the feeling of nausea away, during the first months of pregnancy, was sitting by the river, as listening to the noise of the waves can regulate the movements of water within the placenta.

This connection between women's bodies, the river, and other natural elements, during pregnancy, is framed by Miriam, a 50-year-old Afro-Colombian goldminer from Nechí, as emerging from a symbolic and material openness that is left on women's bodies by the experience of childbirth.

Well, when you have a baby, you remain open. It does not close up from night to day. (...) This all gets opened when you have a baby and it takes time to close. For this reason, after the delivery, for some weeks, coldness can enter from there and you need to be more careful. (Own interview, Nechí).

At the same time, the continuity between body and territory is materially and symbolically enacted through everyday practices that accompany child-birth. Monica, an Embera Indigenous woman who took part in the pregnancy mapping workshops in Nechí, explains how, in her community, women 'plant' the placenta and the umbilical cord of the newborn, and then cover them with a plantain tree whose growth reflects the future life of the child.

As Indigenous people, for us, everything that comes from the baby, even the belly-button, we bury it and on top of it we put plantain. (...) I don't like to do it, because this means too much: if the child is going to survive several years, the plantain grows, grows, and keeps growing. But for a baby that is not going to survive for long, the tree dies, it gives no fruit. (Pregnancy map, Nechí).

Planting the placenta and the umbilical cord in the soil establishes a relation of both material and symbolic continuity between the body of the newborn and a specific territory, making explicit the role of the land in supporting the process of reproduction (Hoover 2018). The river also plays a central symbolic role in the reproductive life of Embera women. When an Embera girl has her first menstrual cycle, after eight days of isolation, she goes through a ritual of symbolic cleansing and celebration in the river:

We carry her to the river and we throw her in, the mother needs to be careful for her not to drown. The river... it is to give her good energy, the river's energy which wets her so that she can have strength, a lot of wisdom, and so that the river can take all the bad things away. (Pregnancy map, Nechí).

Animals are an active element of the body-territory relation that shapes women's reproductive experiences. Nadia, a 21-year-old girl from a goldmining household and a goldminer herself, tells the story of when she discovered she was pregnant because an owl passed very close to her to announce it:

My mum caught me and knew I was pregnant because we were living here in Nechí (...) one owl passed on top of me and ¡chiii! It sang on top of me. And I thought, am I pregnant? Because when the owl passes by like that it is either someone dying or a pregnancy. (Pregnancy map, Nechí).

As toxic chemicals enter the territory through processes of dispersion and concentration in the land, river, and women's bodies (Camacho 2017), they also become entangled in the *cuerpo-territorio* continuum and in the 'contact zone' (Rubiano-Galvis, Diaz Leiva, and Goldstein 2023, 12) between local and Eurocentric knowledge on toxic contaminants. Nadia, for example, tells the story of how her father, a now 50-year-old goldminer, asked her to prove

her virginity when she was 13 years old by touching a drop of mercury and keeping it in her hand. Local goldminers say that if the drop of mercury does not split in the girl's hand, this counts as a proof of her virginity. Other women recall that mercury was sometimes used to provoke a *barranco*—a landslide—in other people's land to prompt a disagreement or a fight. Mercury is, in fact, charged with strong powers that can cause landslides. Most importantly, in pregnancy maps, participants located mercury in the river, as it gets deposited in river sediments and fish, together with the toxic discharge of coca laboratories. Even though the most harmful route of exposure is through fish consumption, rather than contact with the river itself, for several research participants, the presence of mercury does, actively change the nature of the river. A., a 45-year-old fisherwoman from Nechí, says that she never feared the river before, but now, she does, because it has become 'unpredictable.' As an experienced fisherwoman, she feels that, because of mercury, mining sediments, and other changes, she can no longer navigate it. Similarly, Embera women still practise the coming-of-age ritual, but interrogate themselves on the river's capacity to sustain this ritual when gold-mining is practised along its basin. In [Image 1](#), which has been elaborated in a pregnancy mapping activity in El Bagre, the river is drawn as a central element that regulates women's experiences of pregnancy, it is also described, however, as a source of possible infections and other diseases (for example, malaria).

By taking the body-territory continuum as a starting point, the active role that territory plays in shaping women's everyday experiences of pregnancy across emotional, symbolic, and material dimensions becomes evident. This locates reproduction outside the narrow biomedical geography of the womb (Theidon 2022), highlighting the importance of recognising the reproductive environment as central to women's reproductive experiences. At the same time, toxic chemicals are located, by the above quotes, in a complex entanglement with local cultural and material practices and social relations. While [Figure 1](#) represents an attempt to represent the wide range of relationships between the body and the environment, as they emerge from the pregnancy mapping activities conducted in this project by organizing them across the three different dimensions of biological, social and cultural reproduction (Hoover 2018), this attempt has not pretense of being exhaustive. Furthermore, I recognize that these dimensions often overlap in women's reproductive life stories. Importantly, taking these reproductive life stories into consideration highlights that toxicity cannot be reduced to a biochemical change in the body but, as will be further explored in the next section, should also be understood as a disruption of the complex network of meanings, symbols, and everyday life experiences that frame reproduction.

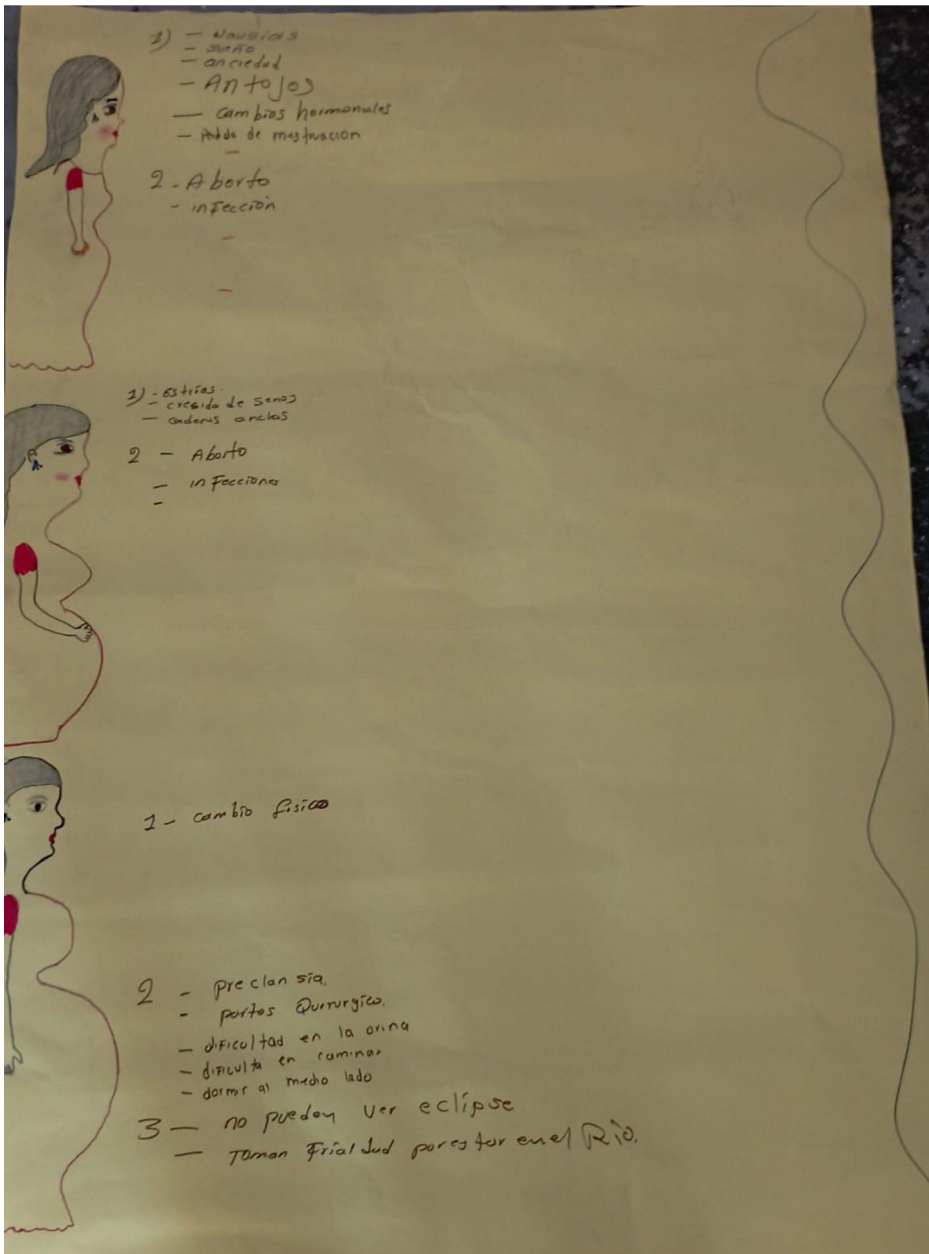


Image 1. Pregnancy map El Bagre.

5.2. Environmental reproductive risks

Toxic contamination emerges from pregnancy maps as an everyday disruption of the body-territory relationship. In the maps, reproductive risks generally emerge when the environment's capacity of sustaining processes of biological, social, and cultural reproduction is altered or lost. While in women's everyday life experiences, the loss of this capacity is broadly linked to

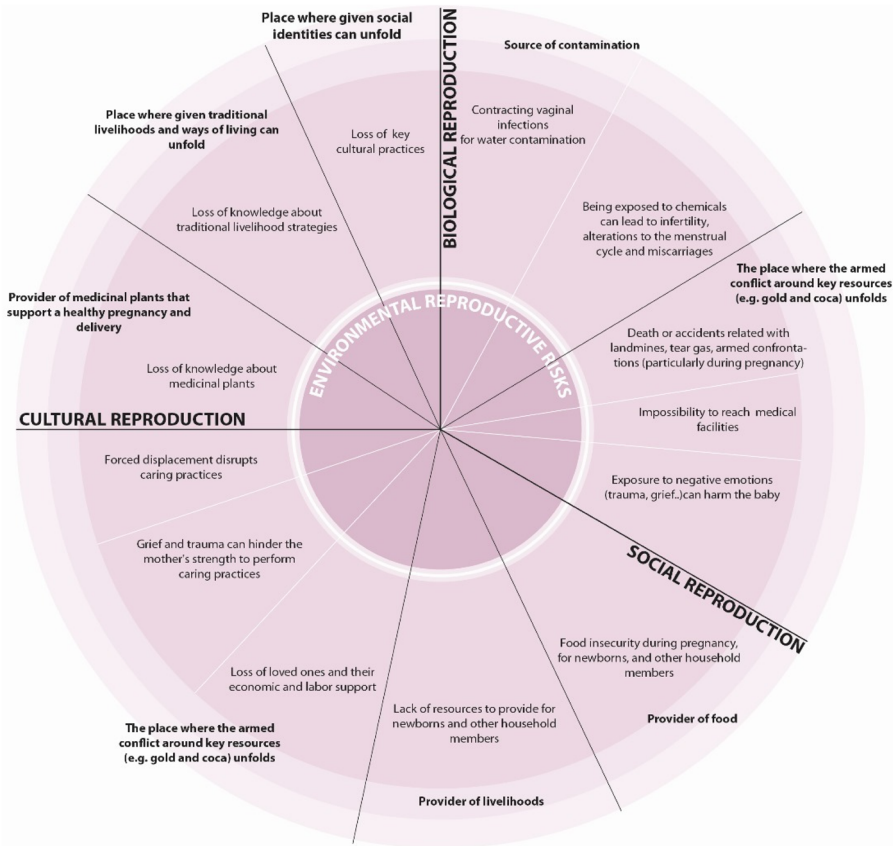


Figure 1. Body-environment relationship in processes of biological, social and cultural reproduction (own elaboration based on fieldwork data).

the presence of toxic chemicals, it is not reducible to the line of causality established between environmental hazard, exposure, and health impacts. Mercury and glyphosate are inextricably linked with livelihood losses and changes in local social relations, and are enmeshed with the presence of armed actors, new criminalities, and non-corporate actors that are involved in the gold and coca value chain (Kaufmann and Côte 2021). Mercury's presence in the territory comes with the expansion of technified goldmining, which is controlled by local armed groups. It also implies the disruption of fishing livelihoods and other traditional practices by the river (e.g. types of inundated farming, such as rice). Glyphosate, on the other hand, represents the transformation of a given territory into a military target for the Colombian government, and is linked with the forced displacement of local coca farming communities losing their livelihoods and access to productive soil in the aftermath of the fumigations (Vélez-Torres and Chiavaroli, Forthcoming). Glyphosate is, in fact, strongly associated with soil degradation and contamination, which leads to the impossibility of farming subsistence crops (Vélez-Torres and Lugo-Vivas 2021).

Research participants consistently identified socio-economic disruptions associated with contamination of the soil and river as an element that framed their reproductive experiences. The loss of livelihoods experienced in the aftermath of aerial fumigations in Tarazá, and the correlated waves of forced displacement affected levels of biological, social, and cultural reproduction (Di Chiro 2008; Hoover 2018). Image 2, which was realized in a pregnancy mapping activity in Tarazá, shows several impacts who were listed, by the participants, as memories of the impacts that glyphosate had on their pregnancy and experiences of motherhood. Women's experiences of food insecurity are listed here because they represented a risk for the development of the baby, as well as a general threat to the health of the household members: *When I was pregnant, after the fumigations, I suffered from hunger. My uncle helped me because sometimes he sent me some chickens, but my belly did not even grow because of how skinny I was. (Pregnancy mapping- Tarazá).*

At the same time, the experience of forced displacement disrupts women's caring practices, with several female coca farmers having to leave their children with relatives while looking for work further up in the highlands. A

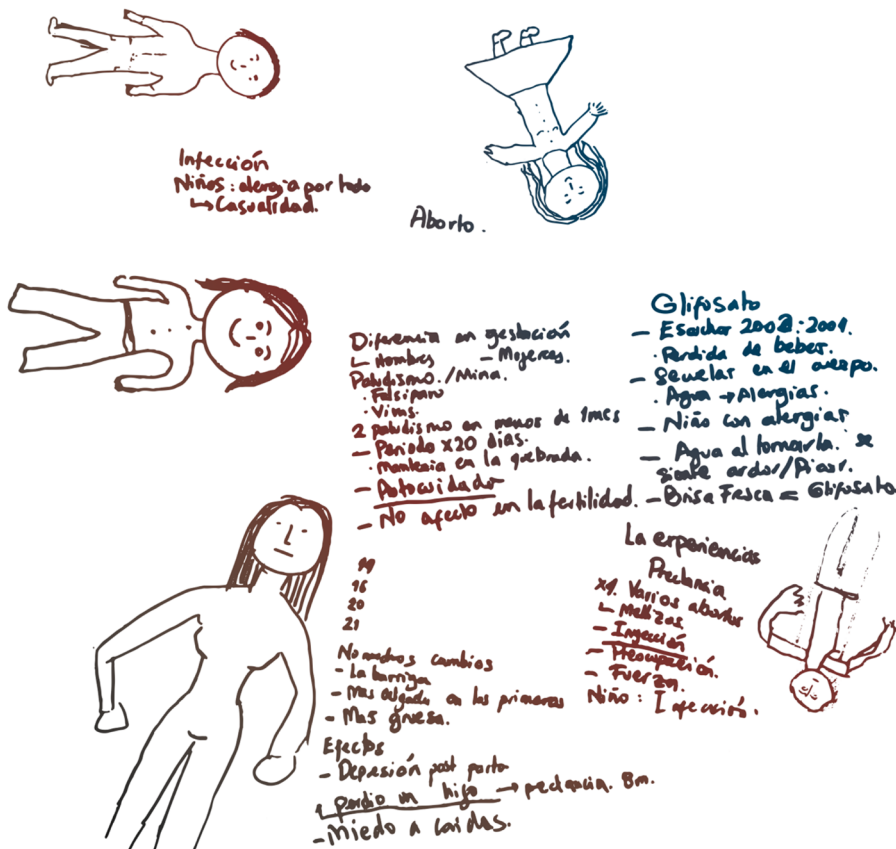


Image 2. Pregnancy mapping, Tarazá.

traditional Indigenous midwife who took part in the pregnancy map in Cáceres argues that the experience of forced displacement has significantly fragmented the tradition of midwifery because, as older women settled in other territories or moved to urban areas, communities experienced a loss of knowledge on midwifery practices.

In the case of territories with greater exposure to mercury contamination, like the *veredas* located along the Nechí river, the loss of livelihoods is especially felt by fishing households and households that rely on artisanal gold panning. As the mining activities of the large-scale company Mineros SA and of medium-scale informal miners expand along the Nechí river, the *ciénegas*, a local ecosystem of swamps that is crucial for the reproduction of fish, are being destroyed. Similarly, traditional gold panners are increasingly excluded from gold deposits and can only pan with the permission of medium-scale technified miners. For several fisherwomen from Nechí who took part in pregnancy mapping, the loss of livelihood activities is mirrored by disruptions in processes of cultural reproduction. Toxic contamination in the river, for example, deprives fishing households the possibility of transmitting a series of cultural practices to the next generations (Hoover 2018).

Changes in local livelihoods and processes of forced displacement and social fragmentation impact processes of cultural reproduction, limiting the possibility of reproducing cultural traditions and time-honoured knowledge. A crucial example is the loss of knowledge related to traditional midwifery, which profoundly alters women's experiences of reproduction. After glyphosate fumigations, wild plants collected in the territory, which were traditionally employed by local midwives, are increasingly difficult to find. At the same time, the loss of land and traditional farming livelihoods disrupts the possibility of planting other aromatic herbs and thereby conserving midwifery practices. Amalia, a midwife from Tarazá, remembers taking mugwort to clean her womb after deliveries and her two miscarriages. After being forcibly displaced from her farm in the highlands of Tarazá in the aftermath of the glyphosate fumigations, Amalia moved closer to the *vereda* centre. Her two daughters (30 and 28 years old) delivered in the Tarazá local hospital, as she is no longer practising traditional midwifery.

Lastly, beyond conceptualising the reproductive losses caused by toxic contamination only by looking at miscarriages, it is equally important to recognise other reproductive losses as pressing policy concerns. During the ethnographic fieldwork, I collected the stories of six women who experienced a miscarriage associated with glyphosate exposure (Chiavaroli 2024). These stories undoubtedly represent a pressing policy concern. Yet, in pregnancy maps, experiences such as the forced disappearance and recruitment of children are categorised as equally important reproductive losses. Insofar as toxic chemicals are entangled with the armed conflict and the expansion of the coca and gold value chain, framing the difficulties of being a mother in a complex

socio-ecological setting, the distinction with pregnancy losses, fades away in women's conceptualisation of reproductive losses. The loss of an unborn child because of glyphosate fumigations and the loss of an older child that is forcibly disappeared by the local armed groups, for example, are conceptualised, in similar terms, as a reproductive loss which are often interlinked in women's life stories, just like toxic chemicals, corporate interests and the armed conflict are interlinked in the everyday lives of local women.

5.3. Agency and the collective dimension of reproductive risks

While institutional narratives on toxic contamination associate some social categories of identity with increased vulnerability to toxic risk because of lack of knowledge and inappropriate precautionary measures (WHO 2010a, 2010b), what emerges from women's everyday life experiences is a series of structural constraints to their agency. These constraints are embedded in the experience of being a gendered and racialised subject in a given territory. Performing one's role as a woman and enacting one's social role as a mother in a toxic territory implies exposure to toxic risks. Women's relationship with toxic chemicals is characterised by a constant tension between exposure and care. The necessity of providing for one's family is a social obligation for women, creating a contradictory relationship with coca farming and goldmining as a source of livelihood.

I used to do all this... When my daughter was five years old, when she was very young, I used to cook (in the coca laboratory). So I used to put her on the side, I prepared a small bed for her, or I hooked the hammock and put a blanket there. When my husband came and fumigated, I had to put her inside the house. When she was sleeping, I also fumigated, I used to take the pump and fumigate. One day, he was close to her and had the damn bucket close to her and it fell, and she got covered. I got so angry, because why would he leave this bucket so close to her? (Pregnancy map, El Bagre).

Pregnancy maps show that, throughout the whole pregnancy, women are still expected to comply with their gendered responsibilities in relation to their household. A pregnancy map completed in Nechí, for example, shows a *batea* -the traditional wooden tool for gold-panning- which symbolizes, in this map, the risks faced by female goldminers during pregnancy (Image 3), in particular, consistent exposure to the sun and heavy lifting related to gold panning. Being forced to practise artisanal goldmining during pregnancy is clearly associated by the research participants with reproductive risk, including infections and miscarriages, related to contaminants in the water. However, gold panning, as well as coca farming, are often practised even during pregnancy and the menstrual cycle, as they are the only available source of income. Julia, a 23-year-old single mother, shares the experience of being caught by the army in a coca laboratory where she worked

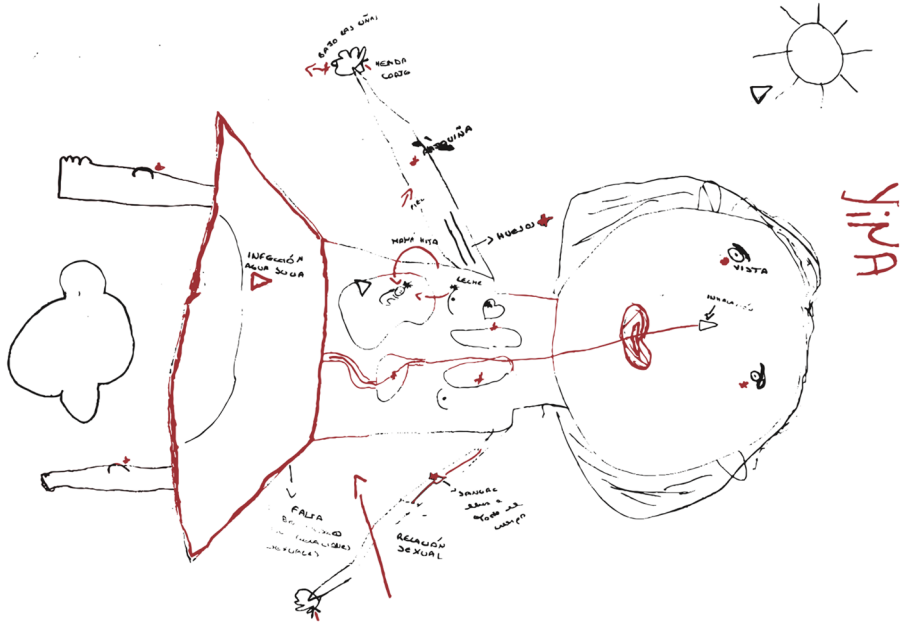


Image 3. Pregnancy mapping, Nechí.

cooking and cleaning for the coca collectors: *They told me: Don't you know that this is a crime? To come here and cook for them? I said to them: Yes, but you need to understand me, I am a single mother, I have three responsibilities in this life. These responsibilities are my three kids. Their father does not help me. If I steal, it is bad ... If I come and work, it is bad, but if I stop eating, that is also very bad. I was breastfeeding at that time (Pregnancy mapping, Tarazá).*

In one of the pregnancy maps, Sara, a 51-year-old fisherwoman shares that for her work on the boat, her body feels the waves of the river all the time, even when she is on land, where she carries the bodily memory of the waves. During both her second and third pregnancy, she worked on the river until the very last days, and the river's movements played a role in the way she felt the baby.

With the pregnant belly and all, I still did my job. I was the one throwing the fish net, but I had to use a bench in the boat, because I could not fit inside, so low, I had to sit higher. I did my work, for the whole of the fishing season. Until the day before delivery, I was there, until the 3rd of January. I did the whole fishing season. (Pregnancy mapping, Nechí).

Similarly, severe food insecurity limits women's possibilities to implement precautionary consumption habits. When discussing possible changes in diet that women are advised to implement since the alert pertaining to mercury in fish in the Nechí and Cauca rivers, several fisherwomen argue that their reliance on fish for self-consumption is an important livelihood strategy that cannot be easily substituted with other sources of income. In these

reproductive life stories, the environment is not conceptualised as 'risky' in itself. What is truly dangerous is being a low-income woman and *having no choice* but to navigate toxic exposure. Lack of knowledge of toxic risks is therefore not the most important factor in determining toxic exposure. Rather, women cannot implement precautionary behaviours because toxic risks are embedded in the experience of inhabiting, as responsible mothers, a risky territory.

These quotes show that precautionary measures that are simply based on raising awareness of toxic risks, but that neither address the socio-economic factors that force women into close contact with toxic chemicals nor the barriers they face in implementing precautionary behaviours, cannot be effective. Contextualised understandings of toxic risks, grounded in women's everyday experiences, are needed to address these barriers and formulate more meaningful risk-management models.

6. Conclusions

In this paper, I discussed the potential of *pregnancy mapping* as a participatory and creative research method that can advance the integration of women's experiences of toxic embodiments in environmental policy-making. Drawing on the research praxis of the *cuerpo-territorio* in Latin America, this method allows us to investigate how women inhabiting toxic territories experience and conceptualise toxic reproductive risk. In particular, locating reproductive toxic risks within the *cuerpo-territorio* relationship offers important counter-explanations to reductionist framings of toxic contamination concerned with reproductively unfit bodies, and has important implications for policy-making.

Importantly, pregnancy maps uncover the complex ways in which the environment underpins and supports processes of biological, cultural and social reproduction, identifying key reproductive concerns that should be included in the reproductive health agenda. In fact, rather than assuming that what matters in relation to women's health in contexts of toxic contamination is already known to policy-makers, this method allows for different reproductive concerns and priorities to emerge (Jokela-Pansini 2022). In the case study of the Bajo Cauca region analyzed in this paper, food insecurity and the loss of livelihoods and cultural knowledge and practices emerge as important reproductive priorities that exceed biomedical framings, and yet are crucial components of local experiences of reproductive injustices.

Lastly, engaging with women's everyday reproductive experiences challenges the assumption that precautionary behaviours are not implemented because of a 'cognitive bias' that shapes local practices and that can be addressed through awareness campaigns. In my ethnographic research,

navigating toxic risks emerges as a constitutive dimension of the reproductive experience of local mothers who need to deal with toxic exposure in the effort to provide for their families. The critical tension between exposure and care that emerges in this context needs to be acknowledged in environmental policy-making.

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