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The cascading effects of climate change on children: extreme floods, family mobility and child well-being in Amazonia

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ABSTRACT

Climate change is a systemic crisis with an important intergenerational dimension, as its detrimental effects are expected to escalate over time. While the Children's Climate Risk Index (CCRI) provides valuable insights into measurable generational vulnerabilities, it tends to overlook the intricate and cascading impacts of weather changes on children's lives. This paper reflects on the less visible dimensions of children's climate risk by examining a burgeoning trend of seasonal migration in Amazonia's floodplains. Combining in-depth participant observation and draw-and-tell interviews with children, the paper focuses on identifying the different factors that shape children's diverse experiences of flood impacts. The article examines how age and gender shape decisions around family mobility, and how different patterns of economic migration affect children left behind. The findings reveal that climate change is eroding vital social networks for children and exposing them to material and emotional hardship. The conclusion reflects on the importance of a more nuanced understanding of children's climate risk and presents potential directions for attending to relational precarity in climate programming.

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Climate impacts; child well-being; migration; rural livelihoods; flood

1. Introduction

Climate change is a systemic crisis with an important intergenerational dimension, as its detrimental effects are expected to escalate over time. Recognizing the heightened vulnerability of children to this crisis, the United Nations' Children's Fund (UNICEF) has introduced the Children's Climate Risk Index (CCRI), which combines indicators of child vulnerability with forecasts of environmental crises to anticipate children's exposure to climate hazards (UNICEF, 2021b). The CCRI made a valuable contribution to quantifying children's climate vulnerability, but its dependence on objective indicators fails to capture the full spectrum of climate impacts affecting children (Bartlett, 2008; Sanson et al., 2019). Given how climate change can act as a catalyser of other vulnerabilities, there are less visible, yet equally detrimental, generational effects that require more research attention (Hanna & Oliva, 2016).

The rise of migration is often considered the greatest climate-induced social crisis (Selby et al., 2021). In 2020 alone, the number of children internally uprooted by climate-related disasters surpassed three times the total of children displaced by violent conflict (UNICEF, 2021a). Yet, the true number of children affected by climate mobility is likely much higher, as weather shifts disrupt livelihoods and trigger voluntary economic migration – a phenomenon not captured by existing data on climate displacement (Kaczan & Orgill-Meyer, 2020). Seasonal and permanent mobility have also become a crucial adaptation strategy in drought- and flood-prone areas (Kaczan & Orgill-Meyer, 2020; Warner & Afifi, 2014). However, the impacts of this type of climate mobility on children remain understudied (Colón & Szaboova, 2021).

This article examines children's lives in a context where migration is a common strategy to cope with growing weather uncertainty. By combining in-depth participant observation with draw-and-tell interviews, the paper provides valuable insights into the experiences of both older children who move with their parents and the younger ones left behind. Engaging with literature on child well-being, the paper argues that weather disruptions are weakening crucial social networks and, consequently, exposing children to both physical and emotional distress. This, in turn, highlights the importance of understanding how age and gender influence children's (im)mobility, to improve predictions of climate risk and develop more effective policy responses.

2. Beyond material climate risks: climate mobility and child well-being

Research into the impacts of climate change on younger generations is vital for understanding age-specific climate vulnerabilities. However, the majority of existing studies focus on forecasting children's susceptibility to disasters and slower-onset climate change through the development of statistical projections that quantify risks (Bartlett, 2008; Fiala et al., 2023; Hanna & Oliva, 2016). One prominent example of this is the Children's Climate Risk Index (CCRI) developed by UNICEF (2021b). The CCRI employs two objective indicators – exposure to environmental hazards and child vulnerability – to assess the likelihood of weather-related disruptions aggravating the challenges experienced by children living in areas with health, infrastructure, and income deficits.

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The use of child indicators to monitor generational vulnerabilities is not novel, since these criteria are commonly used to monitor child rights globally and establish where development programmes need to be replicated (Ben-Arieh, 2008). However, child indicators have also been criticized for lacking sensitivity to more complex factors that can equally impact children's lives and well-being (Ben-Arieh et al., 2014). Nuance is generally better grasped by qualitative research, although such studies of generational climate impacts are still scarce (for a notable exception, see Tanner et al., 2022). This is attributed in part to the contextual variations in the ways climate impacts are experienced (Hanna & Oliva, 2016; Treichel, 2020) and, more significantly, to the diverse resilience levels of children depending on their culture, income, age, and gender (Mitchell & Borchard, 2014). This hinders the understanding of climate-induced social crises in contexts that are experiencing gradual environmental change.

Several studies have emphasized that uncertainty about the future is a key source of anxiety for younger generations coping with the climate crisis (Crandon et al., 2022; Finnegan, 2023; Ojala, 2016). Holmberg and Alvinius (2022) have even proposed a perception of children as a climate precariat: a social group that is more exposed to the erosion of social and economic stability caused by climate change. Building on Butler's (2004) conceptualization of precarity as the dismantling of formerly stable ways of living, their theory contends that climate change is exacerbating precarity for younger generations. This escalating uncertainty about the weather has already become a catalyst for youth migration, especially in communities exposed to seasonality or lacking resources to cope with fluctuating food prices (Baez et al., 2017; Kaczan & Orgill-Meyer, 2020). Seasonal or permanent mobility have also become a common preventive adaptation strategy for families affected by weather uncertainty, as migration allows them access to alternative income sources (Kaczan & Orgill-Meyer, 2020; Warner & Afifi, 2014).

This surging pattern of climate-induced migration has led to a rise in the number of children on the move, now estimated to constitute 14% of the overall migrant population (Colón & Szaboova, 2021). However, critical knowledge gaps persist in understanding how climate change drives child migration and what risk children face in contexts of human mobility (Selby et al., 2021). The literature on children on the move is not climate-specific, but it separates children affected by migration into two different groups: those on the move and those left behind, emphasizing that each grapples with distinct challenges (Marcus et al., 2023; Yeoh & Lam, 2009). Examining these differences in the context of climate-induced migration is essential for developing effective policies and interventions.

Subjective ideas of 'what is best for children' can significantly influence family decisions around who moves and who stays behind. The literature on climate mobility underscores that decisions regarding migration are shaped by various factors, including perceptions of danger at the destination, access to resources, attachment to the place of residence, and the presence of social safety nets in both places (Adams, 2016; Upadhyay et al., 2023). Moreover, different generations can diverge on the best decision around migration. For instance, adults may argue that the migration of one family member suffices to ensure economic gains for the entire household, but children who endure family separation tend to recount their experiences as one fraught with harsh emotional costs (Carranza, 2022; Ciborowski et al., 2022). Understanding the age-specific impacts of climate-induced mobility is crucial to inform better policies for families and their children.

Child well-being is a key concept to advance research in this area, as it brings attentions to three dimensions shaping the experiences of children: the material, the subjective and the relational (Sumner, 2010). While child indicators (and the CCRI) capture well the material dimension, researchers have emphasized that relationships are just as crucial for child well-being, given how children rely heavily on adults and peers to fulfil their material needs, and to develop their identity (Camfield & Tafere, 2009; Jones & Sumner, 2011). The relational dimension of well-being reflects on these key networks, while subjective well-being relates to a child's perception of a good life.

By focusing solely on quantifiable indicators, the CCRI risks downplaying the importance of social and subjective experiences for children, and proposing simplistic solutions to prevent their material losses. With the aim to contribute to add nuance to this debate, this paper offers a qualitative study of age-based climate impacts based on the experiences of Shipibo children in the Peruvian Amazonia. The case study contributes to a wider discussion on why families pursue certain climate adaptation strategies, and how these strategies impact children's livelihoods, with attention to direct and indirect climate impacts on both boys and girls.

3. Methodology

The sections below detail the context and original purpose of this research, along with methods of data collection and ethical considerations.

3.1. Context

This research initially aimed to explore the impacts of social programmes targeting Indigenous children in the Peruvian Amazonia. The findings disclosed in this paper emerged through an iterative process of refining research questions, particularly after observing how climate impacts were worsening families' dependency on such programmes. The original case study was designed in dialogue with stakeholders such as UNICEF Peru and the local Indigenous organization FECONAU (Federation of Native Communities of the Ucayali), who shared their knowledge of the area with me.

The location, social dynamics, and infrastructure of different villages were also pivotal in my decision of a field site. The Shipibo people offered a promising case study because of their established connections with my gatekeepers, and because they are remarkably well-serviced in comparison with other ethnic groups. Both factors facilitated my access to different communities at the scoping stage of this research. The place where I conducted this study was chosen for the presence of amenities such as a medical unit and a water well, which are rare features in the region, but significantly reduced the risks of fieldwork for a solo researcher.[1] The chosen village also had three school

levels (early childhood, primary, and secondary), which allowed students to complete their studies within the community. Although this infrastructure may influence families' mobility decisions, it did not curb the environmental and economic disruptions caused by extreme floods. Moreover, existing research supports the claim that the patterns of seasonal migration observed in this community are also found in other sites with varying levels of access to basic services (Collado Panduro, 2021; Sherman et al., 2016, INEI, 2017).

In my first visit to every village, I was accompanied by someone who knew the context and could personally introduce me to the chief. This could be either a Shipibo consultant or a non-Indigenous staff from one of the organizations that supported this research. The study was conducted in a Shipibo village with 600 residents along the Ucayali River, where the Shipibo people has traditionally dwelled (Figure 1). The exact name and location of the studied village will be withheld to preserve the anonymity of research participants.

Historically, the Shipibo opted to live in higher grounds as a protective measure against seasonal floods. Nevertheless, due to the colonization of Amazonia, they were pushed into less favourable areas (Morin, 1998). The acknowledgement of Indigenous land rights in Peru only occurred in 1978, under a law that concurrently granted the State ownership of the remainder of the forest, thereby constraining the mobility of Indigenous peoples beyond their territory. At present, about 90% of Shipibo villages are susceptible to annual flooding (INEI, 2017).

River dwellers in the floodplains base their livelihoods on two main annual events: the dry and wet seasons. The fluctuation of the river water level averages seven metres between these two extremes, and affects navigability, agricultural production and the regional economy (Ronchail et al., 2018). In the past, the pattern of river growth was predictable, occurring from January to March, with extreme floods happening only once every decade (Tournon, 2002). This predictability allowed families to stay in their villages during most rainy seasons. However, climate change has disrupted the time, duration, and scale of floods (Espinoza et al., 2020). These changes have rendered the production of plantain (a staple food) unviable for many villages during the wet season, as this crop can only withstand being underwater for three weeks (Tournon, 2002). The possibility of losing food resources created a sense of insecurity about the previously predictable rainy season (Langill & Abizaid, 2020). Consequently, many people choose to migrate temporarily, with recent studies suggesting that 75% of the Shipibo population may seek paid job opportunities elsewhere during this season (Collado Panduro, 2021; Sherman et al., 2016).

Shipibo communities may have strong ties to other territories. An ethnographic study conducted in 1994 revealed that heavily flooded communities would either relocate temporarily to higher Shipibo villages or rely on neighbouring territories for sustenance (Tournon, 2002). The research also identified a trend of relocation to Pucallpa, the urban capital of Ucayali, which is seldom flooded. At the time, it was estimated that 18% to 25% of the Shipibo population resided in the city, providing accommodation for extended family members during these events (ibid.). Although there is no reliable census data on the urban Shipibo population, observations suggest that the attraction for urban centres has only grown in recent decades (Espinosa, 2009).

3.2. Data collection and ethics[2]

Incorporating children's perspectives into research poses various challenges, particularly when researching their well-being. Children's definitions of well-being emerge at the intersection of agency and societal expectations, and depend on their level of knowledge regarding their circumstances (Ben-Arieh et al., 2014). Moreover, children's knowledge is often

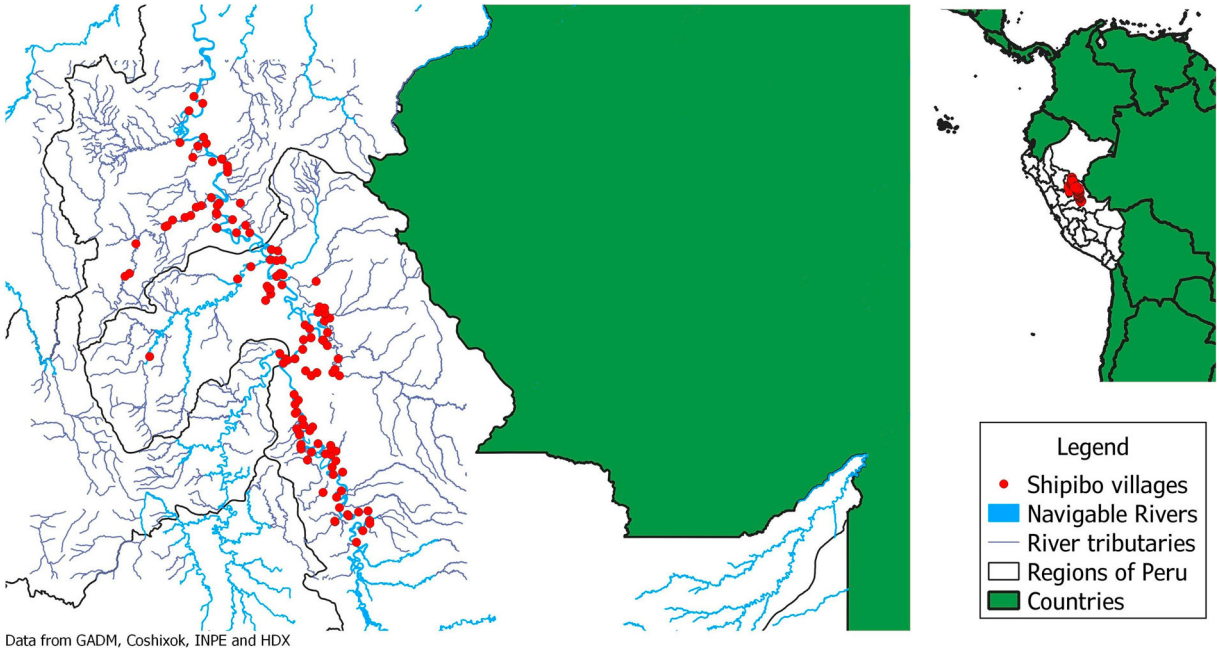

Figure 1. Map of Shipibo communities and rivers of the Amazon basin. Source: author.

mediated by adults, and researchers must be attentive to invisible influences guiding a child's utterances (Spyrou, 2018). A child-centred approach requires being attentive to children's present lives and aspirations while recognizing that children might not be fully aware of the outcomes of their actions (Qvortrup, 2014). For these reasons, several researchers have suggested that a combination of methods, along with a critical analysis of contextual factors, might be the best approach to study children's perspectives on well-being (Crivello et al., 2008; Jones & Sumner, 2011). This framework guided the design of the present study, which combined participant observation with creative participatory methods.

My primary fieldwork was conducted from August 2019 to March 2020, encompassing the period preceding the rainy season and the flood itself. Upon my arrival, I obtained verbal consent from children, their parents, and other gatekeepers such as teachers and the village chief mostly during a communal assembly. Initially, I gathered data through participant observation and informal interviews that provide a contextual background to the findings in this paper. I also carried out drawing exercises with 73 students in the primary school, with ages ranging from 6 to 16 years old. The most active participants had between 8 and 13 years old. All data was collected in Spanish, as requested by parents during the first communal assembly, and all participants demonstrated a good level of verbal fluency in this language. This fieldwork was abruptly interrupted by the first COVID-19 outbreak, but this pause also allowed me to conduct a preliminary round of data analysis that unveiled the relevancy of climate disruptions for my study. Then, I included specific questions about floods, environmental change, and seasonal mobility in the exercises planned for the second fieldwork.

I resumed data collection in July 2021, inspired by the draw-and-tell method that had proven effective in initiating conversations with children during my previous fieldwork (see de Carvalho, 2021). I worked with a team of local Indigenous research assistants who collected data on my behalf in Shipibo language, after being authorized to do so by the local authorities. The change of researchers, language of inquiry and method of data collection contributed to enhance the rigour of this research by either validating or challenging my preliminary fieldnotes.

The second fieldwork required the provision of health safety equipment and individual art supplies for all children and the researchers, along with guidelines outlining specific exercises and questions for the research assistants (see de Carvalho, 2022). Two of these drawing exercises provided data for this paper. The first one was a collective mapping of the village with 48 children, followed by a focus group. The second one consisted of individual interviews prompted by the phrase 'draw a child with a bad and a good life' (Crivello et al., 2008) with 7 girls and 6 boys who had participated in the previous exercise. The research assistants collected data in Shipibo language and recorded interviews whenever this was authorized by their interlocutors. Audio recordings were then transcribed and translated into Spanish by a Shipibo linguist to ensure the accurate representation of children's statements. In August 2022, I returned to the village to validate research findings with the community.

4. Results

In February 2020, as the river gently encroached upon the village, children engaged in joyous play amid the risen waters. Even the youngest members of the community ventured out in small canoes and swam freely between houses and novice fisherfolk seised the opportunity to catch an abundance of fish from the comfort of their elevated porches. This idyllic scene, characteristic of a 'typical' flood, coincided with the end of school holidays in the rainy season, and fostered a positive association between mild flooding and enjoyment for both children and their families.

Inundations are a normal part of life in the Amazonian floodplains, lasting for periods that may vary from a few days to over a month. Houses in the floodplains are strategically elevated on stilts, raising the floor level by at least one metre to withstand these events. This architectural adaptation ensures a semblance of normalcy and continuity in everyday life during a typical rainy season, albeit with some adjustments such as the use of canoes within the village. However, when the river surges too high, too soon, or for too long, it can impede families' ability to remain in their community.

The uncertainty about the onset of floods was a common concern. Families need time to protect their crops from a potentially waterlogged soil. Typically, upon observing indicators such as the early blossoming of mango flowers, or abrupt changes in the river's water flow, families may choose to uproot the most vulnerable plants, such as cassava, to prevent them from rotting underwater. They might also prepare salted fish and fermented food to cope with the inundations for up to four weeks. Nonetheless, all these mitigation efforts require families to anticipate a flood risk. As weather patterns change, unexpected floods emerge as a substantial threat to Shipibo livelihoods. Since 2011, when an extreme inundation resulted in the loss of all crops and a surge in dengue fever cases, a growing number of families has been choosing to migrate from December to March to secure an alternative income source. This has led to a pattern of seasonal migration as a strategy of preventive adaptation.

Decisions concerning seasonal mobility depend on several factors such as family composition, access to resources and networks in the place of destination (Adams, 2016; Upadhyay et al., 2023). Likewise, the patterns of migration in this village varied. The types of mobility could be divided into three categories: (i) families migrating together; (ii) migration of one or both parents; or (iii) migration of adults and children aged 13 and above. Each of these strategies has specific consequences for children, as shown in Figure 2. These will be further discussed below.

4.1. Family migration

While whole family migration is a rare and drastic measure, it has been triggered in response to serious threat to people's permanence in the village. The 2011 flood serves as a stark example of this. Facing the complete inundation of their houses and crops, most families were forced to relocate. Those who moved were not making a voluntary choice but fleeing conditions of food insecurity and homelessness.

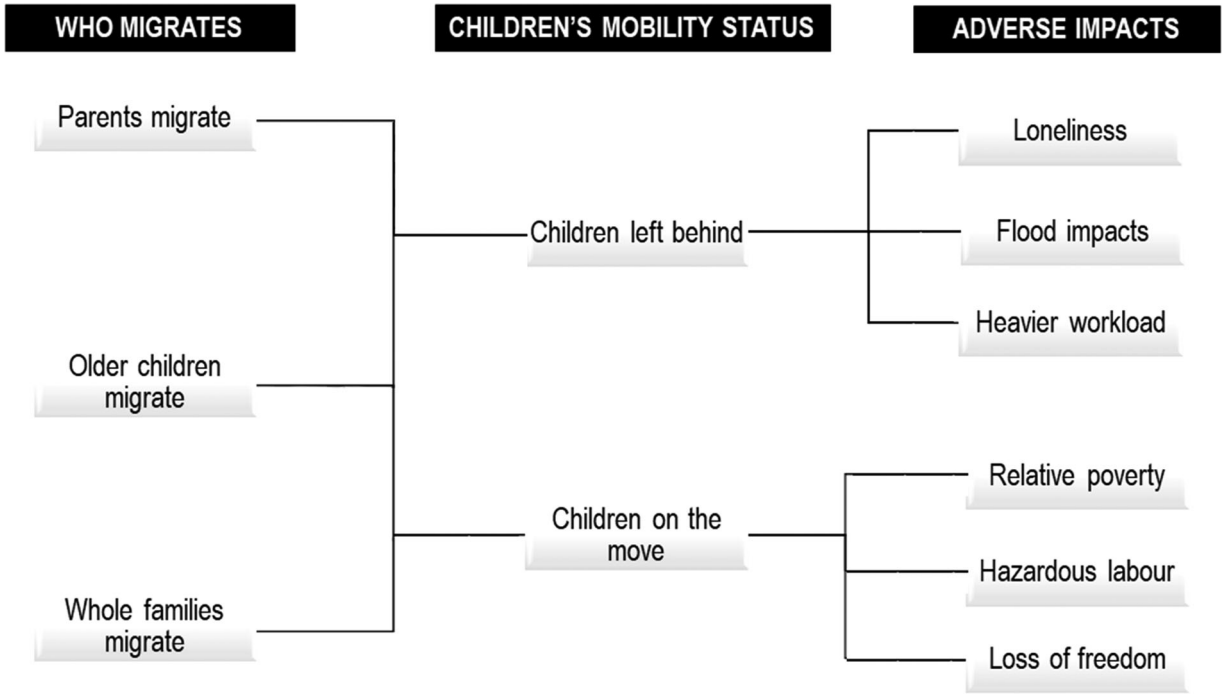

Figure 2. Patterns of seasonal (im)mobility and adverse impacts on children. Source: author.

Nonetheless, even then there were groups of women, elders, and children who remained in the village.

It can be argued that family separation is a cheaper option, particularly since the community has a government-funded medical unit and receives frequent food parcels from a national programme of child nutrition. However, there are other important and more subjective motivations for staying put. For instance, people's permanence in their land ensures the constant occupation of the community's territory and mitigates the risk of a potential territorial invasion. The communal land title, obtained only forty years ago, is seen as both a valuable asset and a vulnerable one. Elders, in particular, would argue that this was a hard-won right requiring protection. Their arguments resonates with Adams (2016) theory that attachment to place, even in harsh conditions, can be a powerful motivator of immobility.

4.2. Parental migration

The migration of one or both parents is the most common strategy of seasonal mobility. The decision of who moves often hinges on gender and age, as reported by other studies (Langill, 2021; Upadhyay et al., 2023). In the Shipibo culture, men and women are generally assigned distinct activities based on their gender. While women tend for the food garden, embroider, and care for children and the house, men focus on fishing, hunting, and negotiating with outsiders (e.g. tourists and government staff). Although women may occasionally sell their embroidered crafts in public, it is not uncommon for men to negotiate the prices they should charge. These gendered roles make men more likely to migrate, while women take care of the family.

The occupational patterns of migrating men and women also differ. Men often worked in coca plantations, though they may also find jobs in construction sites or factories. Conversely, women predominantly find work in restaurants or in street vending, particularly in cities with a high tourist presence. To a lesser extent, women can also work picking leaves in coca plantations. Nonetheless, since women are seen as children's caregivers, their migration was often described as 'abandonment' by other adults. This word choice sheds light on the contradictions of parental migration, given the prevalent nature of this practice. When asked directly about this, parents would describe the decision to leave children behind as an act of care, given the high costs of living at their destination, uncertainties regarding their potential income and living conditions, or risks associated with the type of work that they would engage in.

When both parents were absent, children were left under the care of an older sibling or maternal grandmother. Grandmothers are deeply involved in child rearing even when parents are around, since the care of elders is seen as crucial to acquire 'good habits', such as speaking Shipibo language, learning to sew and identifying medicinal plants. This naturalizes a practice of informal fostering or child circulation, also found in other contexts (Ciborowski et al., 2022; Leinaweaver, 2014). Nonetheless, the experience of being left behind was not easy on children. Echoing evidence from other studies (Carranza, 2022; Yeoh & Lam, 2009), children emphasized feelings of loneliness and abandonment, compounded by the uncertainty of when they would see their parents again:

> [Since my mum left] I don't feel hungry. I don't feel nothing. Only when my grandma talks to me, I feel happy. She advises me to go see her when I miss my mum so that I can feel happy again. (Alfonso, 12-year-old boy)

Another pivotal consequence stemming from parental migration was the reallocation of subsistence labour, leading

to an increased burden on children within the household. The distribution of workload exhibits slight variations depending on the family's composition, since not all households had a mixed-gender structure (see also Punch, 2001). While activities such as fishing and hunting may be equitably shared irrespective of gender, domestic chores exclusively fall under girls' responsibility. This assumption fixated girls in the village much more than their male siblings. Consequently, when children reached an age when they could be invited to relocate with their parents, their gender was a crucial determinant of their eligibility for the journey.

4.3. Children on the move

The opportunity for children to migrate alongside their parents arises from the alignment of the rainy season with extended school holidays in Amazonia, which allows children to travel without detrimentally impacting their school attendance records. The mobility of children, particularly boys, can provide an additional source of income for rural households. When accompanying their fathers and older sibling in their journeys, boys generally have the necessary contacts and knowledge to secure a temporary placement in factories or farms, albeit they can also work as street vendors or load carriers. Instances of underage girls working in the city were much rarer. Girls moved more often to support income-earning family with unpaid domestic labour. These arrangements certainly come with specific risks (see Leinaweaver, 2008), but the nature of girls' migration imbued them with a clearer understanding of their living context. In contrast, boys typically travelled without much prior knowledge of their place of destination. Boys' labour was also hazardous and exposed them to risks owing to the informal nature of their work arrangements. Nevertheless, for both boys and girls, the invitation to migrate was perceived as a recognition of strength and maturity, often evoking envy from peers.

Children predominantly moved to the cities of Pucallpa, Lima, Ica and Cuzco – most of which have a settled Shipibo population and are part of a touristic route in Peru. Pucallpa is reachable via a 5-hour boat journey from the village and was the nearest and most economical option. Precisely because of this proximity, it did not seem to capture children's interest as much as other places. Lima, as the national capital, is the most attractive destination for young migrants across the country (see Aufseeser, 2021). Akin to Ica and Cuzco, Lima grapples with water shortages that can increase the costs of food and other commodities. Nonetheless, the relative allure of the city continues to draw young migrants into their informal markets.

Despite the potential social status of seasonal mobility, in the collective mapping exercise children consistently portrayed life in the city as one characterized by constrained freedoms. Participants of different age groups conveyed apprehension about walking alone on city streets, juxtaposing this experience with the safe social world of their village, where they could 'roam around happily'. The negative emotions associated with urban life were further shaped by children's experience of relative poverty. As articulated by Alejandra, a 13 years old girl: '[a child in the city has a bad life] because their mum doesn't buy what they want [biscuits], because she needs to buy food'. In comparison to urban contexts, life in the village seemed abundant. In the mapping exercise, children emphasized particularly how much they appreciated the freedom to gather food and fish without the need for money.

4.4. Children left behind

The experience of young children left behind mirrored that of children whose parents migrated. Nonetheless, it was compounded by further reduction of children's social networks. In a village where friendships revolve around kinship, the departure of cousins and siblings resulted in an absence of available peers. In draw-and-tell activities about well-being, both boys and girls described a good life to be one 'with many cousins and siblings', while a bad life was unanimously depicted as being 'lonely without kin' (Anely, a 13-year-old). Jake, an 8-year-old boy, portrayed a bad life as one where 'there is not one sister to feed you, all your brothers go away, [and] even if you want to go fishing you can't because they have taken all the hooks'.

The relational scarcity triggered by family mobility created an association between the flood season and a sense of insecurity. This became evident in the collective mapping exercise, when children were tasked with describing their flood experiences. Although participants did start their drawings by depicting material and tangible impacts, such as river pollution, their conversations clearly linked these immediate disruptions to restrictions in their social lives that ultimately impacted their subjective well-being. Figure 3 compiles the flood impacts identified by the participants and their multiple reverberations in children's lives.

The image above shows how flood disruptions blurred the boundaries between material, subjective, and relational disruptions, and epitomizes the complexity of well-being (Camfield et al., 2010). For instance, children associated river pollution to fish scarcity, pointing out that it is the lack of food that triggers economic migration. However, they also described the negative feelings prompted by an empty village. Because children were aware of the risks of land invasion, they believed that a reduction of the village's population exposed them even more to this threat (see de Carvalho, 2021). Similarly, the direct impact of an increased number of snakes and mosquitoes also had important repercussions in their subjective well-being. Since the presence of dangerous animals renders the river unsafe for swimming, it also limits the repertoire of play activities that children can pursue, causing boredom. Children expressed a similar frustration about flooded streets, as the need to move around in canoes – an activity that generally enjoyed during the dry months – restricted further their connection to other children.

5. Discussion

This study shows how the change in flood patterns in Amazonia is triggering a seasonal economic exodus with multiple consequences for children. While temporary migration is not a novel occurrence in Shipibo communities, the severity and unpredictability of floods are exacerbating insecurities for

Figure 3. Escalating flood impacts according to children. Source: author.

families who depend on subsistence agriculture. This case is illustrative of how climate change can serve as a threat multiplier that intensifies pre-existing social issues (IPCC, 2022). Moreover, given how the current scale of migration is unparalleled, this paper considers climate change as a driver of a new phenomenon, in which young children are consistently left behind by their parents and peers.

In examining the impacts of climate-induced migration, this research echoes the findings of other studies that underscore the emotional costs of family separation for children (Carranza, 2022; Ciborowski et al., 2022; Marcus et al., 2023). Additionally, the data shows that the burden of family separation is further aggravated by the direct impacts of floods, which restrict the social lives of the children left behind. These findings reiterate the importance of subjective and relational well-being for children (Camfield & Tafere, 2009; Jones & Sumner, 2011), particularly when the emotional hardship faced by immobile children is compared to the social status gained by their migrating peers. It is likely these contrasting early experiences will shape the decisions that children will make in the future, potentially leading to an increase in youth economic migration – a trend already observed elsewhere (Baez et al., 2017; Warner & Afifi, 2014).

This paper also advances understanding of climate migration by delving into the motivations of who moves and who does not. The existing literature extensively explored factors influencing adult migration decisions, such as age, gender, protection of assets, and subjective attachments to place of residence (Adams, 2016; Upadhyay et al., 2023). However, few studies have reflected on the specificities of child migration in climate-affected contexts. Selby et al. (2021, p. 39) suggested that gender did not affect children's climate mobility, based on interviews with 239 children in five different countries. Conversely, this study suggests gender is a crucial factor determining a child's mobility, as well as the experiences of children who stay behind. This difference in findings is likely due to the combination of participant observation with interviews in this research. Incorporating participant observation allowed for the analysis of local gender dynamics that were also not mentioned by participants during interviews in this study. Specifically, participant observation showed that girls experience a much more restricted mobility, mainly due to gendered divisions of labour within their community, and girls are also left with a higher share of domestic chores when their parents migrate. Furthermore, this research allowed the observation of an age-related threshold for economic migration, tied to perceptions of child maturity, mobility costs and safety at the place of destination. These findings, while limited to this context, suggest that gender and age are core factors shaping children's climate mobility.

Finally, it is worth highlighting some important contradictions in people's perspectives on migration. Although parental mobility was a widespread practice, the community also passed judgement on the families who 'abandoned' their children with elders. A similar paradox unfolded in the narratives of children who desire to migrate despite describing urban life in negative terms. These data, along with a consistent pattern of return after the flood season, contribute to challenge the notion that permanent migration is a desirable solution to climate hardship (see also Adams, 2016). In fact, the community's territory is viewed as a place of high cultural value, where children learn 'good customs', and the protection of their land title stands as the main rationale behind elders' resistance to migration even in extreme circumstances.

6. Conclusion

Existing measures of children's climate risk, such as the CCRI, oversimplify the experiences of children in climate-affected communities by framing child vulnerability solely in terms

of material deficits. This article delves into the intricate experiences of children engaged in seasonal migration and their peers left behind, showing the importance of less visible impacts in children's descriptions of climate precarity. These insights contribute to research and policy on children's climate risk by expanding the conceptualization of child well-being beyond material impacts. The study emphasizes two well-being dimensions – the relational and subjective – that are often disregarded by large-scale studies of generational climate risk. Prioritizing children's relational and subjective precarity is crucial to inspire new research exploring how the erosion of traditional livelihoods disrupts children's lives and aspirations, and to identify measures to enhance their relational security.

This study supports an understanding of climate change as a threat multiplier (IPCC, 2022) by shedding light on the difficult migration choices faced by rural families in climate-affected subsistence economies grappling with a risk of land invasion. The data indicates that concerns about preserving land rights can play a pivotal in the decision for elders and children to remain in the community while adults migrate. Future research in similar contexts should focus on collaboratively identifying measures to mitigate these impacts, such as sustainably enhancing the resilience of subsistence agriculture against environmental disruptions or augmenting families' freedom through strengthened guarantees of their land rights.

Lastly, this research also underscored the pivotal role of age and gender as determinants of child mobility, and markers of children's experiences of immobility as well. These findings indicate a need for child-sensitive climate programmes to address power imbalances within households and cater to the needs of differently impacted children. They also highlight the importance of more research exploring how climate change impacts diverse groups of children, to add nuance to existing assessments of children's climate risk.

Notes

1. According to the Peruvian National Institute of Statistics (INEI, 2017), only 42% of Shipibo villages have a medical unit and secondary schools, and only 24.7% have a water well.
2. This methodology was approved by the ethics committee of the University of East Anglia's School of International Development.

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