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Climate Brides: (Un)Tying the knots between climate change and child marriage

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Abstract

Although both climate change and child marriage have received sustained policy and research attention, their intersection remains critically underexplored. This article examines how climate stress—arising from rapid-onset disasters and slow-onset processes such as drought and salinisation, and intensified by displacement and weak governance—reshapes marriage practices in South Asia, where climate vulnerability and gendered precarity converge with particular intensity. Drawing on ethnographic research in drought-affected western India and case studies from the Indo-Bangladesh border, southern India, and Afghanistan documented through the Climate Brides project, the paper traces how child marriage functions as an infrastructure of adaptation—a mechanism for redistributing labour, debt, and care under conditions of crisis. Across cases—from *Gate-Cane* weddings in Maharashtra to trafficking-linked unions in the Sundarbans, post-tsunami marriages in Tamil Nadu, and *Toyana* exchanges in Afghan displacement camps—early and forced marriage emerge not as cultural residues but as adaptive, if extractive, responses to livelihood erosion and the retreat of state support. Using feminist political ecology and social reproduction theory, the article calls for interdisciplinary, justice-oriented approaches that recognise child marriage as part of the gendered infrastructures of climate adaptation.

Keywords: climate change, child marriage, displacement, economic precarity, climate brides, marriage of survival

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Introduction

Although both child marriage and climate change have been the focus of substantial research, their intersection remains critically underexplored. In recent years, the connection has received growing attention, particularly after major climate events such as the 2020 Cyclone Amphan in Bangladesh[1] and the 2022 floods in Pakistan.[2] The COVID-19 pandemic likewise highlighted how social and economic disruptions can accelerate risks of early and forced marriage.[3] It also amplified vulnerabilities such as educational disruption, food insecurity and gendered labour burdens, with activists warning of significant setbacks in efforts to curb early and forced marriage.

This convergence is especially visible in South Asia, where climate vulnerability and child marriage overlap with particular intensity. The region is home to 45% of the world's child brides—one in three girls marry before the age of 18[4]—and it ranks among the most climate-exposed globally. In the past two decades, more than 750 million people in South Asia have been affected by at least one climate-related disaster.[5] Yet in child protection and disaster response frameworks, child marriage is still often treated either as a moral or legal violation, rather than as a practice shaped by livelihood precarity, ecological stress, and the reorganisation of gendered labour under agrarian decline and displacement.

Evidence from diverse settings suggests that, under conditions of scarcity and insecurity, marriage can function as a household strategy to redistribute economic burdens, access labour, or manage debt. Yet these dynamics are rarely captured in demographic surveys or climate adaptation assessments, which tend to privilege indicators such as income, education, or health while neglecting the marital

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1 R I Montu, 'Deepening Climate Crisis Fuels Child Marriage in Bangladesh', *Inkstick*, 28 October 2024, retrieved 30 June 2025, https://inkstickmedia.com/deepening-climate-crisis-fuels-child-marriage-in-bangladesh.

2 Al Jazeera Staff, '"My Childhood Just Slipped Away": Pakistan's "Monsoon Brides"', *Al Jazeera*, 8 March 2025, https://www.aljazeera.com/features/2025/3/8/my-childhood-just-slipped-away-pakistans-monsoon; A Irfan, 'Pakistan's Climate Crisis of Child Marriage', *Atmos Earth,* 27 March 2023, https://atmos.earth/pakistan-floods-child-marriage.

3 United Nations Children's Fund (UNICEF), '10 Million Additional Girls at Risk of Child Marriage Due to COVID-19', UNICEF, 7 March 2021, https://www.unicef.org/press-releases/10-million-additional-girls-risk-child-marriage-due-covid-19.

4 United Nations Children's Fund (UNICEF), 'A Profile of Child Marriage in South Asia', UNICEF, 5 May 2023, https://data.unicef.org/resources/a-profile-of-child-marriage-in-south-asia.

5 World Bank, 'Climate', World Bank, n.d., https://www.worldbank.org/en/programs/south-asia-regional-integration/climate-change.

transitions through which households reorganise care, labour, and survival. As adaptation research has noted, institutions, social relations, and behaviours remain under-analysed levers of change.[6] As a result, marriage—despite its near-universality and social centrality—remains largely absent from these conversations.

This article examines how climate change interacts with the drivers of child marriage in South Asia. Both rapid-onset disasters (floods and cyclones) and slow-onset processes (drought, salinisation, and land degradation) undermine livelihoods, displace communities, and disrupt education, healthcare, and legal protections. Here, climate stress refers to the cumulative effects of environmental degradation and the socioeconomic pressures it generates. In such contexts, marriage is not simply cultural inertia but a gendered infrastructure mobilised to absorb and redistribute these stresses across households and generations.

Through case studies of *Gate-Cane* weddings in drought-prone western India, post-tsunami marriages in Tamil Nadu, marriage–trafficking linkages in the Sundarbans delta along the Indo-Bangladesh border, and *Toyana* exchanges in Afghan displacement camps, the article illustrates how child marriage functions simultaneously as an adaptive infrastructure of household survival and a vector of exploitation within broader systems of gendered labour. These examples show that early and forced marriage are not reducible to culture or tradition but are embedded in the political economies of risk, labour, reproduction, and displacement.

Using feminist political ecology and social reproduction theory, the article rejects linear causal explanations and instead traces the contingent pathways through which climate stress interacts with gender, caste, class, religion, and the erosion of state support to shape marital practices. By doing so, it makes three key contributions: first, it demonstrates that the link between climate change and child marriage is empirically evident; second, it shows that existing demographic and adaptation frameworks fail to capture this relationship; and third, it argues for a systematic, interdisciplinary, and ground-up framework that integrates feminist and ecological perspectives to study marriage as part of the social dimensions of climate adaptation. Such an approach also has implications for anti-trafficking and protection policy, illuminating how blurred boundaries between marriage, migration, and coercion are produced and sustained under conditions of climate precarity.

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6 C Singh, 'Human Dimensions of Climate Change Adaptation: Gaps and Knowledge Frontiers', *Dialogues on Climate Change*, vol. 2, issue 1, 2025, pp. 71–81, https://doi.org/10.1177/29768659241297772.

Marriage as Survival: Climate precarity, gendered reproduction, and the logics of crisis

Feminist scholarship has challenged culturalist explanations of child marriage, showing it to be less a residue of tradition than a social institution embedded in political economy, social reproduction, and gendered labour regimes.[7] In many patriarchal systems, particularly those organised around patrilineal inheritance, daughters are regarded as temporary members of the household, with marriage serving as the mechanism through which their value is redistributed socially and economically.[8]

Marriage in these contexts performs overlapping functions: it reallocates care, reduces household expenditure, enables transfers through dowry or bride price, and safeguards family reputation. These decisions are not simply cultural but reflect shifting household needs, resource scarcity, and intergenerational strategies for navigating uncertainty and sustaining social reproduction.[9] Yet, while such arrangements help secure household survival, they also reinscribe gendered hierarchies, positioning girls and women as the primary sites through which families absorb economic and social risk.

Climate change interacts with these dynamics in uneven and differentiated ways across scales and identities, from household to community to region. It is not a discrete trigger but a set of interlinked processes that exacerbate existing inequalities, mediated by gender, class, caste, and geography.[10] Environmental

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7 S Sen and A Ghosh (eds.), *Love, Labour and Law: Early and Child Marriage in India*, SAGE Publications/Stree, New Delhi/Kolkata, 2021; S Sen, *Women and Labour in Late Colonial India: The Bengal Jute Industry*, Cambridge University Press, Cambridge, 1999; N Rao, 'Marriage, Violence, and Choice: Understanding Dalit Women's Agency in Rural Tamil Nadu', *Gender and Society*, vol. 29 issue 3, 2014, pp. 410–433, https://doi.org/10.1177/0891243214554798; N Kabeer, 'Women, Wages and Intra-Household Power Relations in Urban Bangladesh', *Development and Change*, vol. 28, issue 2, 1997, pp. 261–302, https://doi.org/10.1111/1467-7660.00043.

8 T Dyson and M Moore, 'On Kinship Structure, Female Autonomy, and Demographic Behavior in India', *Population and Development Review*, vol. 9, no. 1, 1983, pp. 35–60, https://doi.org/10.2307/1972894; R Kaur, 'Dispensable Daughters and Bachelor Sons: Sex Discrimination in North India', *Economic and Political Weekly*, vol. 43, issue 30, 2008, pp.109–114; P Mishra, 'Sex Ratios, Cross-region Marriages and the Challenge to Caste Endogamy in Haryana', *Economic and Political Weekly*, vol. 48, issue 35, 2013, pp. 70–78.

9 A Malhotra, *The Causes, Consequences and Solutions to Forced Child Marriage in the Developing World*, Testimony submitted to U.S. House of Representatives Human Rights Commission, International Centre for Research on Women, 2010; Rao.

10 F Sultana, 'Gendering Climate Change: Geographical insights', *The Professional Geographer,* vol. 66, issue 3, 2014, pp. 372–381, https://doi.org/10.1080/00330124.2

variability, whether through drought, flooding, or slow-onset processes like salinisation, reshapes household economies in ways that can make marriage appear a practical option for redistributing labour, care, or financial responsibility. Evidence suggests it is often the accumulated effects of prolonged anomalies—what some scholars describe as slow violence[11]—rather than one-off shocks, that recalibrate marriage practices.[12]

Examples from across regions illustrate this dynamic. In Burkina Faso, prolonged drought has been linked to increases in child marriage, interpreted by some researchers as a household strategy for redistributing risk and resources.[13] During the 1992 drought in Southern Africa, reports emerged of families marrying off daughters earlier in anticipation of receiving bride price, which could help mitigate economic losses.[14] In Kenya's Rift Valley, North[15] and Archambault[16] documented how acute food insecurity led to the emergence of

013.821730; M Alston *et al.*, 'Are Climate Challenges Reinforcing Child and Forced Marriage and Dowry as Adaptation Strategies in the Context of Bangladesh?', *Women's Studies International Forum*, vol. 47, Part A, 2014, pp. 137–144, https://doi.org/10.1016/j.wsif.2014.08.005; R Pearse, 'Gender and Climate Change', *Wiley Interdisciplinary Reviews: Climate Change*, vol. 8, issue 2, 2016, pp. e451, https://doi.org/10.1002/wcc.451; S Arora-Jonsson, 'Virtue and Vulnerability: Discourses on Women, Gender and Climate Change', *Global Environmental Change*, vol. 21, issue 2, 2011, pp. 744–751, https://doi.org/10.1016/j.gloenvcha.2011.01.005.

11 R Nixon, *Slow violence and the environmentalism of the poor*, Harvard University Press, 2013.

12 L E Ortensi, F Tosi, and R Rettaroli, 'Estimating the Relationship between Prolonged Weather Variability and Accelerated Marriage in Bangladesh', *World Development*, vol. 195, 2025, pp. 106994, https://doi.org/10.1016/j.worlddev.2025.106994; S Ainul and S Amin, 'Environmental Vulnerability and Early Marriage in Southern Bangladesh', Paper presented at the Population Association of America Annual Meeting in San Diego, California, 2015; C McLeod, H Barr, and K Rall, 'Does Climate Change Increase the Risk of Child Marriage? A Look at What We Know—and What We Don't—With Lessons from Bangladesh and Mozambique', *Columbia Journal of Gender and Law*, vol. 38, no. 1, 2019 pp. 96–145, https://doi.org/10.7916/cjgl.v38i1.4604.

13 J Ø Nielsen, 'Drought and Marriage: Exploring the Interconnection between Climate Variability and Social Change through a Livelihood Perspective', in K Hastrup (ed.), *The Question of Resilience: Social Responses to Climate Change*, Det Kongelige Danske Videnskabernes Selskab, Copenhagen, 2009, pp. 159–177.

14 C Eldridge, 'Why Was There No Famine Following the 1992 Southern African Drought? The Contributions and Consequences of Household Responses', *IDS Bulletin*, vol. 33, issue 4, 2002, pp. 79–87, https://doi.org/10.1111/j.1759-5436.2002.tb00047.x.

15 A North, 'Drought, Drop Out and Early Marriage: Feeling the Effects of Climate Change in East Africa', *Equals. Beyond Access: Gender, Education and Development*, issue 24, 2010, p. 6.

16 C S Archambault, 'Ethnographic Empathy and the Social Context of Rights: "Rescuing" Maasai Girls from Early Marriage', *American Anthropologist*, vol. 113, issue 4, 2011, pp. 632–643, https://doi.org/10.1111/j.1548-1433.2011.01375.x.

so-called 'famine brides', wherein girls were married off to access livestock, food, or remittance flows. In South Asia, dowry systems, displacement, and trafficking converge with climate stress to produce similar though context-specific patterns.[17] These cases do not suggest a universal or causal relationship but underline how marriage can function as a gendered infrastructure of adaptation, shaped by the intersection of agrarian decline, debt, and highly stratified labour markets.

Displacement further shapes these dynamics. When families are pushed into camps or settlements, weakened social and legal protections—and fragmented humanitarian responses—make marriage appear a way of securing social standing or support for adolescent girls. At the same time, such arrangements can expose girls to heightened risks of coercion or exploitation, particularly when linked to debt, cross-border movement, or unfamiliar households.[18] Marriage in these settings is best understood not as cultural inertia but as part of the everyday infrastructures—the informal social systems that substitute for absent state support—through which households redistribute resources and responsibilities under conditions of precarity.[19]

Despite mounting evidence, marriage remains largely invisible within adaptation planning and protection frameworks. Large-scale demographic surveys record age at first marriage but seldom connect it to climate variability, while climate vulnerability assessments track livelihoods and health but not household decisions around union formation.[20] What would it mean if adaptation planning treated marriage rates as an early-warning indicator of precarity—a question that reframes

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17 Alston *et al.*; K J Ahmed, S M A Haq, and F Bartiaux, 'The Nexus between Extreme Weather Events, Sexual Violence, and Early Marriage: A Study of Vulnerable Populations in Bangladesh', *Population and Environment*, vol. 40, 2019, pp. 303–324, https://doi.org/10.1007/s11111-019-0312-3.

18 B Trew, 'Too Young to Wed: Poverty and Hunger Are Driving up Numbers of Child Brides in South Sudan', *Independent,* 21 February 2019, https://www.independent.co.uk/news/world/africa/south-sudan-child-brides-marriage-wedding-war-conflict-a8788646.html; McLeod, Barr, and Ral; J Demetriades and E Esplen, 'The Gender Dimension of Poverty and Climate Change Adaptation', in R Mearns and A Norton, (eds.), *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*, The World Bank, Washington, DC, 2010, pp. 133–143.

19 See also, on displacement and governance of crisis: J Hyndman, *Dual Disasters: Humanitarian Aid after the 2004 Tsunami*, Kumarian Press, 2011; and on militarisation of care: C Enloe, *Maneuvers: The International Politics of Militarizing Women's Lives*, University of California Press, 2000.

20 A R Carrico *et al.*, 'Extreme Weather and Marriage among Girls and Women in Bangladesh', *Global Environmental Change*, vol. 65, 2020, pp. 102160, https://doi.org/10.1016/j.gloenvcha.2020.102160; Singh; C Singh, D Solomon, and N Rao, 'How Does Climate Change Adaptation Policy in India Consider Gender? An Analysis of 28 State Action Plans', *Climate Policy*, vol. 21, issue 7, 2021, pp. 958–975, https://doi.org/10.1080/14693062.2021.1953434.

marriage not as a static outcome but as a dynamic signal of systemic stress? Similarly, child marriage prevention initiatives often prioritise normative change or legal enforcement, with insufficient attention to the material conditions, including ecological precarity, labour extraction, and the erosion of state support, that shape household decision-making. This disconnect obscures one of the central ways households adjust to environmental stress.

Reframing marriage as part of the infrastructures of climate adaptation makes it possible to move beyond linear explanations or culturalist accounts. It directs attention to how households mobilise marriage under conditions of environmental and economic change, and why interventions that focus narrowly on legal reform or behavioural change often miss their mark. Recognising these dynamics is essential for developing frameworks that are analytically robust and responsive to the everyday strategies of survival.

Research Methods

This article draws on multi-sited ethnographic research conducted during my doctoral fieldwork (October 2020–August 2021) in the drought-affected Marathwada region of western India, complemented by additional material from the Climate Brides project and secondary sources. Grounded in feminist methodological principles of intersectionality, reflexivity, and attention to structures of power,[21] the research approached marriage as a practice shaped by gendered labour, ecological variability, and uneven state support.[22] All participants provided informed consent, and all names have been anonymised.

In Marathwada, I conducted semi-structured interviews with nearly 90 harvesters (65 women and 24 men); supplemented by group discussions with around 80 participants; and dialogues with local stakeholders, including village headmen, welfare workers, and labour contractors. A central focus was on informal *Gate-Cane* weddings, in which adolescent couples marry quickly to migrate together as labour units. This ethnographic lens provided a close view of how marriage is mobilised within household economies, kinship obligations, and the precarious rhythms of agrarian migration.

The additional case studies—including child marriage and trafficking in the Sundarbans delta, marriages following the 2004 tsunami in Tamil Nadu, and *Toyana*-based exchanges in Afghan displacement camps—were developed through

[21] J Hyndman, 'The Field as Here and Now, Not There and Then', *Geographical Review*, vol. 91, no. 1–2, 2001, pp. 262–272, https://doi.org/10.2307/3250827.

[22] D Rocheleau, B Thomas-Slayter, and E Wangari, *Feminist Political Ecology: Global Issues and Local Experience*, Routledge, 2013.

Climate Brides,[23] an open-source multimedia platform I created as an extension of this research. The platform curates podcast interviews, infographics, and literature reviews to document how climate, marriage, and gendered labour intersect across South Asia. For this article, I draw specifically on three podcast interviews with Prof Upasona Ghosh (2023) on the Sundarbans, journalist Ruchi Kumar (2022) on Afghanistan, and Prof Nitya Rao (2022) on India. These materials offered a broader perspective on how climate-related marriage practices are framed and understood across different institutional and ecological contexts.

Together, these materials reflect a layered methodological approach. The Marathwada ethnography provides depth and context-specific insight, while the podcast interviews and secondary sources extend the analysis to other South Asian settings. The paper does not offer a direct comparison across cases; rather, it uses these varied materials to identify patterns, highlight regional specificities, and illustrate how marriage is mobilised within adaptation strategies. This combination strengthens the analysis while also underscoring the need for more systematic, interdisciplinary frameworks to study these dynamics.

Tracing Marriage under Climate Stress

This section presents four empirically grounded case studies that explore how early and forced marriage operates as a gendered survival strategy within contexts of climate-related environmental stress in South Asia. Together, they illustrate the structural entanglements between ecological disruption, economic vulnerability, and marital regulation, and show how marriage is reconfigured into an adaptive, yet extractive, infrastructure of labour and social reproduction.

Gate-Cane Weddings in the Drought-affected Marathwada Region, India

Marathwada, in western India, is marked by chronic drought, groundwater depletion, and agrarian decline. Cane harvesters largely belong to landless and historically oppressed Dalit and Banjara communities, whose livelihoods depend on precarious agricultural and migrant labour. According to the National Family Health Survey 5 (2019–21), nearly 40% of women in the region reported being married before the age of 18—almost double the national prevalence. While child marriage is a long-standing practice here, its contemporary forms are deeply entangled with the demands of industrial agriculture and the stresses of climate and market variability.

As rain-fed farming has become increasingly untenable, families rely on seasonal migration to the sugarcane fields of Maharashtra and Karnataka. Contractors

[23] See 'Climate Brides', https://www.climatebrides.com.

recruit married couples under the *ek koyta* (translated as one sickle) labour system, in which a pair is counted as a single unit. Historically, sugarcane migration was male-dominated; evidence from studies[24] and interviews with elder harvesters indicates that until the early 1960s, it was common for men to migrate for work while women remained in the villages. Since the 1970s, however, prolonged droughts and expanding cane cultivation have drawn women into the *koyta* system—first as members of smaller family groups of three, and eventually as part of two-member, marriage-based labour units. This shift effectively made marriage a precondition for labour mobility and an infrastructural mechanism for assembling productive labour under climate stress.

Gate-Cane weddings—hastily arranged, often informal unions performed before harvest—emerged within this context. They serve as mechanisms to convert adolescent girls from household dependents into deployable labour, while binding couples into exploitative labour regimes that merge reproductive and productive work. As one father explained: 'What will she do alone in the village anyway? With marriage, she can become both wife and worker. That's how she enters the labour force.' For contractors, marriage is also a form of labour discipline. One remarked: 'A single man is of no use. If he's not married, there's every chance he'll abscond, get drunk, and disappear. Marriage keeps him tied to the fields. The younger they are, the easier it is to control [them].'

Drought further accelerates these decisions. A 17-year-old girl married during the 2014 drought recalled: 'There is no *bhakri* [bread], no water, nothing. Cane was the only way to earn an income.' The *uchal*—an advance payment typically ranging from INR 60,000 to 100,000 (USD 680–1,100)—functions both as a wedding subsidy and a debt-bond, effectively binding couples to six months of physically demanding labour. Within this system, high interest rates are imposed on pending *uchals*—that is, when workers are unable to cut enough cane in one season to repay their advances—creating a cycle of dependency that restricts mobility and choice. Young women enter these unions without legal protections, formal consent, or individual pay. As one 19-year-old harvester put it: 'There is no name, no slip, no record of me. Only the *koyta* gets paid—and he [the husband] is the *koyta*.'

The intergenerational trajectories of one family underscore these shifts. A grandmother, married at eight during the drought of the 1970s, remained with her natal family until puberty. Her daughter-in-law, wed at twelve in the 1990s, entered the household and migrated to the cane fields within a year. The most recent daughter-in-law, married at fifteen in 2014, left for migrant labour within two weeks. Over time, even as the age at marriage has marginally increased—

[24] J Breman, 'Seasonal migration and co-operative capitalism: Crushing of cane and of labour by sugar factories of Bardoli', *Economic and Political Weekly*, vol. 13, no. 31–33, 1978, pp. 1317–1360.

though often still below 18—the interval between marriage and labour migration has progressively shortened, embedding these early unions more tightly within extractive circuits of industrial agriculture and climate-stressed migration economies.

These dynamics reveal how marriage in Marathwada functions not only as a social institution but as an infrastructure of labour and extraction. Climate stress intersects with industrial agricultural regimes and entrenched gender norms to recalibrate marriage into a mechanism that mobilises, disciplines, and appropriates the labour of adolescent girls.

Tsunami Brides in Post-disaster Tamil Nadu, India

The Indian Ocean tsunami of 26 December 2004 devastated coastal Tamil Nadu, a state in southern India, killing more than 14,000 people and displacing nearly 3 million. In Cuddalore district alone, 391 of the 550 dead were women. Relief assessments noted that women were disproportionately affected because they were more likely to be indoors or attempting to save dependents when the waves struck. In the immediate aftermath, this loss produced a marked demographic imbalance, as significantly more men than women survived—an imbalance that would soon reshape household structures and marriage patterns.[25]

In the weeks following the tsunami, relief camps were overcrowded and unsafe, with reports of harassment and insecurity, particularly for adolescent girls. Many of these girls—some recently orphaned—were married off, often to older men who had lost wives and children. Unlike the slow-onset droughts of Marathwada, where marriage became embedded in seasonal labour cycles, these unions emerged abruptly, framed as a form of protection, moral recovery, and household stabilisation. As one 16-year-old recalled her mother saying: 'How long can I look after a pretty girl like you? Please see it my way—I only want you to be safe."'[26]

Government compensation packages—approximately USD 2,000 per deceased family member—also shaped these unions.[27] Widowers used compensation money to propose marriages, while bereaved families interpreted such offers as signs

[25] S Fisher, 'Violence Against Women and Natural Disasters: Findings From Post-Tsunami Sri Lanka', *Violence Against Women*, vol. 16, issue 8, 2010, pp. 902–918, https://doi.org/10.1177/1077801210377649; C Felton-Biermann, 'Gender and Natural Disaster: Sexualized Violence and the Tsunami', *Development*, vol. 49, issue 3, 2006, pp. 82–86, https://doi.org/10.1057/palgrave.development.1100276.

[26] C Philp, 'Tsunami's Teenage Brides Take Place of the Lost Women', *The Times*, 6 June 2005, https://www.thetimes.com/life-style/sex-relationships/article/tsunamis-teenage-brides-take-place-of-the-lost-women-xvzk3dqvb97.

[27] The USD 2,000 compensation in 2004 would equal roughly USD 3,400 in 2025 values.

of financial security.[28] Dowries were often waived, and marriages were arranged quickly. An Oxfam report documented 210 marriages involving girls under 18 in Nagapattinam district within three months of the tsunami.[29] Official statistics downplayed underage marriage, but with many birth records destroyed, age verification was difficult. As one girl explained: 'My school teacher vouched for me and told them I was 18. Nobody questioned it.'[30] In this context, compensation operated not only as relief but as a new currency in marital negotiation.

In an interview for the Climate Brides podcast, Prof Nitya Rao observed: 'When there is a disaster, I think, then you have much more of early marriages. I think after the 2004 tsunami in Tamil Nadu itself, there were a lot of recorded cases where fathers had died, you know, mothers were getting their daughters [married], and also other people had died. So, there were bachelors, there were young girls, there were dead fathers. So, there was a lot of early marriage going on. With increasing climate variability, I think, apart from early marriage, there is also quite a bit of a very fine line between migration and trafficking of young women.'[31]

These marriages were often conducted quickly and with minimal oversight. In a context where many women had died and protective infrastructures were absent, marriage became a way for families to navigate bereavement, displacement, and uncertainty. The tsunami case illustrates how marriage can operate as an infrastructure of adaptation, mobilised to redistribute care, provide perceived protection, and secure household survival—while simultaneously blurring into exploitative practices such as trafficking.

Marriage and Trafficking in the Climate-stressed Sundarbans, India–Bangladesh Border

The Sundarbans, a densely populated coastal delta shared by India and Bangladesh, is among the most ecologically fragile and economically marginalised regions in South Asia.[32] Repeated climate events—sea level rise, salinisation, cyclones, floods,

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28 S N Bhanoo, 'Some of India's "Tsunami Brides" Fare Better than Others', *SFGate*, 24 December 2007, https://www.sfgate.com/news/article/some-of-india-s-tsunami-brides-fare-better-than-3234072.php.

29 Oxfam International, *The Tsunami's Impact on Women* [Briefing note], Oxfam International, 25 March 2005, https://policy-practice.oxfam.org/resources/the-tsunamis-impact-on-women-115038.

30 Philp.

31 R R Subramanian, 'Episode 01: Nitya Rao on Bombay Ducks, Polygamy, Disaster, and More', *Climate Brides Podcast*, 9 July 2022, https://www.buzzsprout.com/1999556/episodes/10908505-episode-01-nitya-rao-on-bombay-ducks-polygamy-disaster-and-more.

32 B Jackson, *Climate Change, Migration and Human Trafficking: Assessing the Impact of Climate Change, Migration, and Human Trafficking Risks for Populations in the Bangladesh and India Sundarbans*, University of Nottingham, 2023.

and storm surges—have eroded livelihoods rooted in agriculture, aquaculture, and forest produce. Cyclones such as Aila (2009), Bulbul (2019), and Amphan (2020) displaced thousands, submerged farmland, and destabilised already fragile household economies. Nearly half of households in the Indian Sundarbans are landless and reliant on casual wage labour, with disaster relief often delayed or inaccessible.[33] Under such intersecting pressures of slow degradation and sudden shocks, marriage emerged as a mechanism to manage economic pressure, reduce dependents, and secure perceived safety for adolescent girls.

The convergence of environmental displacement and entrenched trafficking networks renders the Sundarbans a hotspot for exploitative marriages. After Cyclone Bulbul, Sarita, 23, from the South 24 Parganas district, was married through a broker following the destruction of her family's land. Promised stability and a new beginning in Rajasthan, a state in northwestern India, she was instead trafficked into unpaid domestic work and reproductive servitude. Similar accounts proliferated after Cyclone Amphan, with NGOs documenting rising numbers of adolescent girls moved across districts or borders under the guise of dowry-free marriage offers or job placements.[34]

Brokers play a central role in this dynamic, reconfiguring marriage as a vehicle for trafficking and linking ecological shocks to circuits of labour exploitation and mobility. Families facing acute survival pressures and lacking alternatives often accepted such arrangements despite doubts. As Dr Upasona Ghosh observed in an interview for the Climate Brides podcast: 'The parents know what is good or bad for their girls, but survival is the priority. A dowry-free marriage offer can feel like a relief—even when there are doubts about the groom's intentions.'[35]

Intersectional vulnerabilities compound these risks. Girls from Muslim, Scheduled Caste, and undocumented migrant households—already marginalised by caste, religion, and the absence of entitlements—were particularly exposed. Male out-migration further depleted local livelihoods, increasing the likelihood that girls would be withdrawn from school and married off soon after disasters. The International Rescue Committee estimates that climate-related events in

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33 U Ghosh, S Bose, and R Bramhachari, *Living on the Edge: Climate Change and Uncertainty in the Indian Sundarbans*, STEPS Working Paper 101, STEPS Centre, Brighton, 2018.

34 International Rescue Committee (IRC), 'Bangladesh: IRC Study Reveals Staggering 39% Surge in Child Marriage Due to Climate Change', IRC, 6 December 2023, https://www.rescue.org/eu/press-release/bangladesh-irc-study-reveals-staggering-39-surge-child-marriage-due-climate-change.

35 R R Subramanian, 'Episode 04: Upasona Ghosh on Cyclones, Borders, and Child Trafficking in the Sundarbans', *Climate Brides Podcast*, 26 January 2023, https://www.buzzsprout.com/1999556/episodes/12123585-episode-04-upasona-ghosh-on-cyclones-borders-and-child-trafficking-in-the-sundarbans.

Bangladesh's coastal districts have raised child marriage rates by 39%.[36] Once married, many girls were transported to other Indian states or across the Bangladesh–India border, where they were absorbed into exploitative labour or domestic servitude.

Local organisations such as the Bandhan Mukti Collective have sought to trace missing girls and assist survivors, but face systemic challenges, including stigmatisation, fragmented legal frameworks, porous borders, and limited state support. In this context, marriage in the Sundarbans operates less as a rite of kinship than as an improvised infrastructure of adaptation and mobility—one that redistributes household risk and care while simultaneously serving as a conduit for coercion and exploitation.[37]

Toyana Practices in Internally Displaced Persons Camps, Afghanistan

Afghanistan's prolonged environmental crisis—driven by rising temperatures, recurrent droughts, and the breakdown of water governance—has deepened over the past decade, undermining agrarian livelihoods in provinces such as Badghis, Faryab, and Ghor.[38] As crops fail and livestock perish, families face acute food insecurity and migrate to overcrowded displacement camps. These camps—shaped as much by ecological collapse as by decades of conflict and state fragility—offer few formal protections. Within this context, early and forced marriage has re-emerged as a systemic household strategy to navigate precarity, often framed by families as necessary for survival.

At the centre of these arrangements is *Toyana*, a bride price system historically rooted in tribal kinship networks. While traditionally serving to cement alliances or provide informal debt relief, *Toyana* has been reconfigured under conditions of drought, displacement, and shrinking humanitarian aid. Once embedded in reciprocal exchange, it now operates as a monetised survival economy and gendered mechanism of redistribution, in which daughters' futures are bargained to offset hunger or debt. Payments are made in cash, grain, or livestock, with transactions often noted in ledgers and subject to negotiation. As one mother in

[36] *Ibid.*

[37] D Kumar, 'Climate Crisis in the Sundarbans Makes Women Vulnerable to Trafficking', *IndiaSpend*, 11 October 2024, https://www.indiaspend.com/climate-change/climate-crisis-in-the-sundarbans-makes-women-vulnerable-to-trafficking-927311.

[38] International Organization for Migration (IOM), 'Climate Crisis Drives Displacement, Worsens Afghanistan's Humanitarian Needs: IOM Report', IOM, 27 February 2025, https://afghanistan.iom.int/news/climate-crisis-drives-displacement-worsens-afghanistans-humanitarian-needs-iom-report.

Nawabad Farabi-ha in northern Afghanistan told aid workers: 'It was either her marriage or our funerals.'[39]

Journalist Ruchi Kumar, in an interview for the Climate Brides podcast, documented how these transactions vary depending on local context and the desperation of families. In camps in Herat, a wealthy agricultural businessman paid a high *Toyana* for an eight-year-old girl. In contrast, in Mazar, a slightly better-off displaced family arranged a marriage with payments spread out over time, often in kind—groceries, clothing, or an animal for Eid—rather than lump sums. Mothers sometimes kept notebooks recording partial payments, anxious about whether the full sum would ever materialise. As one woman told Kumar: 'They know we are desperate, so they might just pay us half.'[40]

Life in displacement camps amplifies the commodification of marriage, intensifying the circulation of girls as economic assets within systems of survival. With schools shuttered or inaccessible, girls are withdrawn from education, married early, and placed in households already under strain. Human Rights Watch has documented cases of girls as young as 10 being married, with families justifying these unions as protection against hunger, Taliban abduction, or the erosion of family honour.[41] Displaced grooms often retain some mobility or earning potential, while girls are confined to reproductive labour and dependency.

Despite lacking sanction in Islamic law, *Toyana* remains both culturally entrenched and economically pivotal, with payments sometimes amounting to several thousand dollars—exceeding Afghanistan's per capita GDP.[42] Tribal councils in provinces such as Ghazni and Jawzjan have attempted to cap bride prices, but enforcement remains inconsistent and is often undermined by state retreat and institutional fragmentation, as families continue to depend on *Toyana* as a vital income source. The Taliban's return to power in 2021 has further constrained

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39 Quoted in: R Kumar, 'In Afghanistan, Climate Change Drives an Uptick in Child Marriage', *Undark,* 17 November 2021, https://undark.org/2021/11/17/in-afghanistan-climate-change-drives-an-uptick-in-child-marriage.

40 R R Subramanian, 'Episode 02: Ruchi Kumar on Climate, Conflict, and Bride Price in Afghanistan', *Climate Brides Podcast*, 14 August 2022, https://www.buzzsprout.com/1999556/episodes/11110032-episode-02-ruchi-kumar-on-climate-conflict-and-bride-price-in-afghanistan.

41 H Barr, 'The Taliban and the Global Backlash against Women's Rights', Human Rights Watch, 6 February 2024, https://www.hrw.org/news/2024/02/06/taliban-and-global-backlash-against-womens-rights.

42 F R Muzhary, 'The Bride Price: The Afghan Tradition of Paying for Wives', Afghanistan Analysts Network, 25 October 2016, https://www.afghanistan-analysts.org/en/reports/context-culture/the-bride-price-the-afghan-tradition-of-paying-for-wives.

women's mobility, employment, and education, described by UN experts as a form of 'gender apartheid'.[43] Within camps, this has reinforced perceptions of marriage as one of the few available protections for girls, even as it simultaneously entrenches their vulnerability. In this setting, *Toyana* absorbs the costs of drought, displacement, and institutional collapse by converting girls' futures into immediate relief. What once functioned as a kinship practice of alliance has become a mechanism of adaptation to intertwined ecological and political precarity.

(Un)Tying the Knots: Marriage, governance, and the gendered infrastructure of climate adaptation

The case studies of *Gate-Cane* unions in Marathwada, tsunami marriages in Tamil Nadu, marriage trafficking in the Sundarbans, and *Toyana* practices in Afghanistan's displacement camps collectively unsettle dominant interpretations of child marriage. While global prevalence is declining, these practices endure and at times intensify, not as anomalous responses, but through their recalibration under environmental, political, and economic stress. Marriage in these contexts is not a vestige of tradition but a dynamic infrastructure strategically mobilised where livelihoods, mobility, and protection are under strain, and where state and humanitarian institutions have withdrawn or failed.

Marriage as Infrastructure: Adaptive, coercive, unequal

Across these settings, marriage functions as an informal yet institutionalised infrastructure—a mechanism through which labour, care, and value are circulated under conditions of scarcity. In Marathwada, conjugal pairing operates as a labour contract within the *ek koyta* system, where adolescent brides become both mobile and productive yet remain invisible in wage records and legal protections. In Afghanistan, *Toyana*-based marriages substitute for cash income, commodifying daughters as assets exchangeable for livestock, grain, or debt relief. These practices do not signal cultural persistence but material adaptation.

Yet adaptability is not synonymous with equity. The contrast between tsunami widows in Tamil Nadu and marriages brokered under coercive or deceptive arrangements in the Sundarbans illustrates how marriage is differently reconfigured depending on context: in one, absorbed into local rebuilding as a stabilising institution; in the other, instrumentalised by brokers into circuits of exploitation. Across cases, adolescent girls emerge as the default absorbers of risk, with their reproductive and productive labour appropriated without compensation or protection. What appear as adaptive strategies are also extractive regimes, where

[43] V Mishra, 'Afghanistan Faces "Perfect Storm" of Crises, UN Warns', UN News, 17 September 2025, https://news.un.org/en/story/2025/09/1165870.

marriage is mobilised to redistribute risk downward onto the most vulnerable.

Climate Temporalities and the Recalibration of Marriage

The temporality of climate stress, including its pacing, duration, and predictability, shapes not only when but how marriage is mobilised as an adaptive practice. In slow-onset contexts such as Marathwada, and in compound settings like the Sundarbans—where gradual salinisation and livelihood decline intersect with recurrent cyclones—marriage becomes embedded in seasonal cycles, debt arrangements, and the gradual erosion of agrarian livelihoods. Over time, child marriage is routinised within everyday adaptation, framed as normal rather than exceptional.

In contrast, rapid-onset events like the 2004 tsunami generate abrupt disruptions. In Tamil Nadu's relief camps, marriage was mobilised to quickly reorganise households, framed as protection and stability amid displacement. In Afghanistan, however, protracted droughts and governance restrictions have created a chronic temporality of crisis, transforming *Toyana* into a semi-permanent survival economy, no longer primarily about kinship but about negotiating scarcity over the long term. These temporalities often overlap, as short-term shocks compound long-term erosion.

These patterns show that climate stress does not mechanically 'cause' child marriage; rather, its temporal dynamics shape how marriage is mobilised, what problems it is imagined to solve, and who bears the costs. Adaptation frameworks, which often privilege rapid-onset disasters, overlook the slow erosion of livelihoods through which coercion becomes normalised. Policy responses must therefore distinguish between the everyday institutionalisation of coercion under chronic stress and the intensification of coercive responses during sudden shocks.

Juridical Voids and Paralegal Governance

Marriage under conditions of climate stress often unfolds within fragmented legalities and paralegal spaces. In India, the *Prohibition of Child Marriage Act* (2006) is unevenly enforced, particularly across migratory and informal economies such as the *ek koyta* system. In Bangladesh, birth certificates are easily circumvented, sometimes with the complicity of local leaders, as documented by Human Rights Watch.[44] In Afghanistan, the near-total rollback of women's legal rights since 2021, compounded by institutional collapse, has made marriage one of the few remaining avenues for securing food, shelter, and limited mobility.

[44] Barr.

These contexts illustrate the emergence of paralegal governance, in which contractors, customary leaders, brokers, and even humanitarian actors informally regulate marriage practices. Legal absence does not create a void; it generates alternative infrastructures of authority that mediate access to resources while entrenching patriarchal control and economic exploitation. In this sense, the governance of marriage under climate stress cannot be read solely through state law but must account for these layered, intersecting regimes of regulation and adaptation.

Labour, Gender, and the Redistribution of Risk

Marriage in these contexts also functions as a covert labour regime—a system through which reproductive, productive, and affective labour are reorganised under climate duress. Adolescent brides are not only displaced into reproductive roles but drawn into the social reproduction of households that depend on their unpaid care, emotional labour, and income-generating work. In Marathwada, brides cut cane and manage makeshift campsites, while in the Sundarbans girls married under coercive or deceptive arrangements perform domestic work, agricultural labour, and remittance support. In Afghan camps, marriages mobilise girls as caregivers and reproducers within households sustained by their unacknowledged labour.

These forms of labour are classed, caste-marked, and racialised, and often mediated by mobility: Dalit girls in drought-prone Maharashtra, stateless girls in Bangladesh, and displaced rural girls in Afghanistan are disproportionately targeted. While coercive, these marriages can also become sites of negotiation and agency, where girls forge fragile solidarities and strategies of endurance within systems that deny them autonomy. Recognising this does not romanticise exploitation but highlights how adaptation is enacted through the redistribution of labour, care, and risk onto marginalised female bodies.

From Adaptive Practice to Extractive Paradigm

The cases presented here challenge interpretations of child marriage as cultural residue or developmental failure. They demonstrate instead that marriage persists as a relational infrastructure of adaptation—one that redistributes labour, stabilises social reproduction, and reallocates risk in ways that sustain broader systems of patriarchal and economic governance. Its persistence is less a marker of cultural lag than of institutional retreat, as households fill the void left by inadequate welfare, education, and protection systems.

This reframing carries implications far beyond South Asia. As climate variability intensifies globally, the turn to informal, gendered infrastructures such as marriage, kinship, and migration, may become a defining feature of adaptation. Understanding marriage in this way underscores the need for systematic,

interdisciplinary frameworks capable of analysing its place within the architectures of adaptation—frameworks that are attentive to nuance, avoid linear causality, and foreground the near-universal nature of marriage as a social institution. Tracking marriage practices could even serve as an early-warning indicator of deepening precarity, offering a lens through which feminist, climate, and policy scholarship might better align adaptation research with the lived realities of those navigating environmental change.

Pathways Forward and Key Contributions

The cases examined in this paper show how marriage is mobilised as an infrastructure of adaptation under conditions of environmental and economic stress. These practices are not cultural residues but institutionalised responses to eroded livelihoods, weakened state protections, and the unequal distribution of social reproduction—revealing how adaptation itself is shaped by gendered hierarchies and extractive political economies.

If marriage already functions as a mechanism for absorbing climate-related disruptions, what does this portend for women's autonomy as climate change intensifies? How might institutions meant to safeguard women—schools, relief systems, and legal frameworks—be hollowed out or reconfigured in ways that deepen reliance on marriage as a strategy of survival? What new forms of constrained choice and coercion might emerge when access to mobility, livelihoods, and protection is increasingly mediated through marital and kinship arrangements?

These questions demand sustained feminist inquiry. The task is not only to document harms but to imagine alternative infrastructures of care and redistribution—at household, community, and state levels—that do not depend on the disposability of girls. If marriage has become an architecture of adaptation, the challenge ahead is to envision futures where rights, autonomy, and collective resilience are secured without tethering them to marital status.

For research, three priorities emerge. First, longitudinal and multi-sited studies are needed to trace how climate variability reconfigures marriage practices across both rapid-onset disasters and slow-onset. Second, applied research should engage grassroots women's organisations to map how relief, adaptation, and protection schemes reshape the marriage–livelihood nexus in practice. Third, scholars and practitioners must collaborate to design tools such as early-warning indicators, community-based monitoring systems, and feminist policy audits that make marriage practices legible within adaptation planning. Tracking shifts in marriage rates and forms—centred on women's and girls' lived experiences—could function as indicators of deepening precarity, signalling points of intervention for displacement, food insecurity, or livelihood stress.

At the policy level, recognising marriage as part of the architecture of adaptation requires moving beyond culturalist framings to embed it within the political economy of climate governance. This means integrating marriage-related data into disaster risk assessments, resourcing women's collectives to track coercive practices after environmental shocks, and designing climate programmes that explicitly reduce reliance on early and forced marriage through food security, debt relief, and accessible education for girls in intersectionally vulnerable settings.

Finally, centring marriage in these debates offers distinctive insights for two broader fields. In human trafficking studies, it demonstrates how the boundary between consensual unions and coerced exploitation is fluid, requiring a shift from juridical binaries toward structural analyses of coercion. In climate adaptation research, it foregrounds the intimate and reproductive spheres, often sidelined in planning, and shows how households redistribute risk through gendered institutions like marriage. Taken together, these insights open new cross-disciplinary pathways between feminist political economy, adaptation governance, and human rights research.

Studying marriage as an infrastructure of adaptation thus broadens the analytic frame: from legal compliance to redistribution, from protectionism to autonomy, and from climate 'impacts' to feminist climate justice. This paper has sought to establish the contours of such an approach, providing a foundation for the development of a systematic framework that can guide future interdisciplinary and ground-up research on marriage, adaptation, and gendered precarity.

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