

# The Moderating Effect of Democracy on Climate-Induced Social Conflict: Evidence from Indian Districts

## Abstract

Do political institutions moderate the effect of environmental stress on social conflict? We posit that while the frequency of social conflict in developing agrarian states can increase during drought, democratic competition reduces conflict and can facilitate cooperation, reversing this effect. This hypothesis is tested on a sample of all districts in India over a period from 2001–2014. The dependent variable captures the number of crimes perpetrated against scheduled castes – so-called “untouchables” – and scheduled tribes – India’s indigenous groups – during a given district-year. When the effect of drought is moderated using a local electoral competition index, findings show that although droughts increase the frequency of social conflicts where political institutions are weak, they reduce it where political institutions are strong. The results are robust to alternative operationalization choices. Our findings thus have relevance both to scholars of the climate-conflict nexus and to policymakers working to address climate change’s effects.

**Keywords:** *Electoral competition; Environmental conflict; Caste violence; Democracy; Droughts; India*

The last decade has witnessed a rapid expansion of research on the relationship between environmental stress and violent conflict (e.g., Theisen, 2008; Gleditsch, 2012; O’Loughlin et al., 2012; Koubi et al., 2012; Gleick, 2014; Bretthauer, 2015). The insights provided by this strain of research notwithstanding, there are two important limitations that still persist and limit our ability to understand how climate impacts local conflict. In this study we address both limitations, discussed below, by focusing on how the intersection of environmental stress and local institutional arrangements affect social conflict.

First, limited attention was given to localized societal conflicts, which lack the militarization associated with organized armed wars and are often rooted in socioeconomic divisions that can be affected by environmental stress, and then potentially feed into an existing armed conflicts or escalate into new ones.<sup>1</sup> Indeed, several studies find the effect of environmental stress is more likely to manifest as low-level inter-group conflicts rather than large-scale civil wars, at least in Africa (Meier, Bond and Bond, 2007; Benjaminsen et al., 2012). Second, until recently, climate-conflict nexus research paid relatively little attention to the *political context* where violence takes place, even though contextual social structures and political institutions likely play a significant role in moderating the effects of environmental shocks (Salehyan, 2008; Buhaug, 2010).<sup>2</sup> Indeed, political science research has long recognized the centrality of institutions in shaping a host of political phenomena, including conflict (e.g., Przeworski, 2010; Coleman and Mwangi, 2015). Hence, there is a need for geographically-restricted analysis of the contextualized effects of environmental stressors on social conflict (Bernauer, Böhmelt and Koubi, 2012), especially outside of Africa (Adams et al., 2018).

Building on recent literature on localized social conflict (e.g., Detges, 2016; Mustasilta, 2019; Döring, 2020), we bring evidence from South Asia, a highly vulnerable region in terms of food and water security yet largely under-studied, to shed light on the impact of environmental stress on social conflict. We examine the effect of droughts on violence against underprivileged social communities in

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<sup>1</sup>A few recent studies that do address such social conflicts are primarily on pastoral conflict in Africa, a heavily studied region with respect to climate-conflict dynamics (e.g., Meier, Bond and Bond, 2007; Adano et al., 2012).

<sup>2</sup>For exceptions, see Bellemare (2015), Wig and Tollefsen (2016) and Detges (2016).

India – lower castes or untouchables (*dalits*) and indigenous ethnic groups (*adivasis*), officially designated by the Indian government as *scheduled castes* (SCs) and *scheduled tribes* (STs), respectively. We theorize and analyze the role of electoral competition in shaping the impact of droughts on violence against SCs and STs. In doing so, and by distinguishing caste-based from religion-based mobilization, we highlight the significance of the electorate’s socio-structural constitution in determining relationships between electoral competition and social conflict.

SCs and STs, which together constitute around a quarter of India’s population, are the most marginalized sections of the population and targets of an overwhelming majority of hate crimes in India.<sup>3</sup> Caste- or *jati*-based divisions are widely seen as constituting the most salient socio-political fault line in India (see Kothari, 1970; Omvedt, 1983; Rao, 2009; Dirks, 2011). Caste and tribal identities often determine the social, economic, and political opportunities available to individuals (see Narula, 1999; Guha, 2007). While the role of caste, and even tribe, in political mobilization has received a significant amount of scholarly attention, caste- and tribe-based conflicts and violence remains understudied and poorly understood. Yet, in a country where almost 60% of the population depends on predominantly rain-fed agriculture (Mathur, Das and Sircar, 2006), adverse climatic shocks can have disastrous consequences for food security (Wischnath and Buhaug, 2014) and may manifest in escalations in social conflicts, especially those centered around socially-oppressed SC and ST communities (Sainath, 1996).

Considering our interest in structural conditions and their impact, we focus on local-level electoral competition, which has received significant attention from scholars studying Hindu-Muslim violence in India (Brass, 2003; Wilkinson, 2006). We argue that as the number of credible competitors in an electoral district increases, both the uncertainty about the outcome (i.e., who will win an election) and the likelihood that political entrepreneurs will rely on narrow ethnic bases rise. In such situations, political entrepreneurs maintain their electoral viability by ensuring that ethnic identities that constitute their narrow social base remain salient. This can manifest in increased ethnic violence, including violence against SCs and STs, as political entrepreneurs may resort to deliberate intensification of

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<sup>3</sup>See *Halt the Hate* data compiled by Amnesty International India at <http://haltthehate.amnesty.org.in>.

violent or potentially violent confrontations with ‘outsiders’ (Brubaker, 2004). However, we expect the electoral calculus of political contenders in electorally competitive districts to change in the event of a drought. Droughts threaten vote consolidation among disparate, but similarly situated and affected, groups constituting the SCs and STs population, who are generally not aligned politically during normal times. This should moderate levels of violence against SCs and STs as political contenders seek to prevent the SC and ST voters to consolidate behind one contender.

To evaluate the validity of our argument, we employ district-year data on a variety of violent and non-violent crimes specifically targeted at SCs and STs between 2001 and 2014. These include crimes registered under two special laws designed to punish acts of discrimination, oppression and violence against SCs and STs: the Protection of Civil Rights Act, 1958 (PCRA) and the Scheduled Caste and Scheduled Tribe (Prevention of Atrocities) Act, 1989 (POA). Until recently, these data, compiled by the National Crime Records Bureau of India (NCRB), were available only at the state level. Building on research that links rainfall shocks to social conflict (e.g., Miguel, Satyanath and Sergenti, 2004; Wischnath and Buhaug, 2014), we estimate the effects of district-year level indicator of drought severity on crimes against SCs and STs as well as the role of electoral competition in moderating such effects. Drawing on past research (e.g., Laakso and Taagepera, 1979; Schlesinger, 1994), we rely on a *district-year* level indicator of electoral competitiveness, which measures the number of credible electoral competitors in a district, to test these expectations. In line with our hypotheses, we find that while – separately – both the incidence of drought and greater electoral competition each raise the rate of social conflict, their *simultaneous* occurrence has a pacifying effect. Substantively, increasing electoral competition in our sample from minimum to maximum generates an average *decrease* of 67% in the expected number of social conflict events during drought.

## Theoretical Motivation

Our theory builds on, and contributes to, two broad bodies of research.<sup>4</sup> The first concerns research on sociopolitical conflicts in India. This literature is primarily focused either on religious or Hindu-Muslim violence (Brass, 1974; Varshney, 2003; Wilkinson, 2006; Berenschot, 2011), or on India's numerous ethno-nationalist and leftist insurgencies (Gomes, 2015; Dasgupta, Gawande and Kapur, 2017; Nair and Sambanis, 2019; Sarbahi, 2021). Caste- and tribe-based violence is largely missing in the literature and is primarily discussed in the context of the broader theme of tribal or *dalit* identity and marginalization in mainly qualitative works (see Gorringer, 2005; Rao, 2009; Viswanath, 2014).<sup>5</sup> This omission is remarkable since: a) scholars have long argued that caste constitutes the most critical fault line in Indian politics and caste-based political mobilization has garnered significant attention from scholars (Kothari, 1970; Jaffrelot, 2003; Chandra, 2007); b) caste and tribal hierarchies determine inequities and inequalities (Anderson, 2011; Sekhri, 2014; Mosse, 2018); c) caste-and tribe-based violence remains a subject of public debate and policy focus (see Narula, 1999), and, d) caste and tribal divisions undergird both religious violence and insurgencies (Singh, 1995; Shani, 2007). In bringing attention to caste- and tribe-based violence, we leverage insights provided by works on religion-based violence (Brass, 2003; Wilkinson, 2006) and emphasize the importance of electoral politics in shaping it.

The second research agenda directly related to our study focuses on relationship between water insecurity – often the result of exogenous droughts – and social conflict. Within this expansive agenda, our findings are particularly relevant to studies that analyze water insecurity's impact on agricultural productivity (e.g., Miguel, Satyanath and Sergenti, 2004; Wischnath and Buhaug, 2014; Bellemare,

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<sup>4</sup>A detailed discussion of the literature relevant to our theoretical argument and our contributions therein is provided in the Supplemental Appendix.

<sup>5</sup>The term caste in India generally refers to *jati*, which are the innumerable subdivisions within the four main *varnas* or *caste categories* – *brahmana* or priest, *khatriya* or warrior, *vaishya* or traders and agriculturalists and *shudras* or workers and servants. The 'untouchables' or *dalits* stand outside of this social hierarchy and are treated as outcasts. The number of *jatis* in India run into several thousands.

2015), reinforcing food insecurity (Koren, Bagozzi and Benson, 2021), intensifying competition over resources (Detges, 2016, 2017; Döring, 2020), especially among agriculturally dependent and politically marginalized groups (Petrova, 2021; Koubi et al., 2021). In particular, our theory and findings add to recent studies, focused on Africa and the Middle East, that show such relationships are dependent on state institutions and provision of services (Detges, 2016; Döring, 2020), as well as work that highlights pacifying role of formal political institutions compared with more traditional institutions (e.g., Mustasilta, 2019, 2020).

Accordingly, our study makes the following contributions to these bodies of literature. First, it highlights the importance of electoral contexts to social conflict *within* a democratic system with deep socioeconomic divisions. Second, it bring attention to violence based on deep-seated social hierarchies, rooted in caste and indigeneity in India, which has received little emphasis in rigorous quantitative studies. Third, it focuses on the lower end of the political violence spectrum, highlighting a set of directed attacks that are particularly likely to reflect studied divisions, rather than generalizing about broad types of ethno-religious violence or armed insurgencies. Fourth, rather than focusing on linear associations between climate or political institutions and social conflict, it analyzes how each of two former factors *moderate* each other's effects with respect to the latter. Finally, it is focused on South Asia, a volatile world region that is also highly susceptible to the effects of climate change, but which received less attention in extant research compared with other regions such as Africa and the Middle East.

## **Theoretical Argument**

### **Droughts and Caste Violence**

Droughts feature prominently in recent research on the climate-conflict nexus (see Miguel, 2005; Maystadt and Ecker, 2014). A drought occurs “when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems” (United Nations, 1996, ix). The effects of drought are particularly pronounced in countries like India with sizable area under arid and semi-arid conditions and where a large population depends

on rain-fed agriculture (Falkenmark, 1986). The existing literature suggests three inter-related pathways linking droughts – defined here as sharp declines in water insecurity primarily due to exogenous decreases in precipitation – with increased social conflict in the context of India: (i) local agricultural productivity (or shock to the local economy); (ii) household income (or shock to household income); and (iii) limitations on access to resources such as food, agricultural inputs and water (or shock in the local distribution of resources).

First, in a hierarchical society subject to socioeconomic inequalities, a drought-induced decline in local economy resulting from reduced agricultural productivity disrupts socio-economic ties across social groups. Production levels, incomes, and consumption levels decline, inducing local socio-structural changes that upset social accords (see Bidinger et al., 1991; Ravallion, 1997).<sup>6</sup> For instance, drought may reduce the necessity to rely on agricultural laborers, who are more likely to be members of lower castes or indigenous communities, in local farms, usually owned by upper and middle castes. Thus, any elements of mutuality or reciprocity that may have existed in the local economy prior to the drought would come under strain. This is especially likely where the intensity and frequency of precipitation shocks increase over time, which erodes local populations' ability to sustain socioeconomic equality.<sup>7</sup>

A second pathway by which droughts induce social conflict is by impacting household income and increasing the vulnerability of underprivileged social groups to exploitation and oppression. For instance, droughts may force men to migrate in search of alternative job opportunities, leaving children, women, and the elderly behind (Bhatta et al., 2015). The latter are economically vulnerable, and hence serve as an easy target for caste-based discrimination (e.g., Agarwal, 1990). Declines in family income may trigger rack-renting, usury, and distress sales, and force individuals to take low-paid, or even unpaid, jobs, or be subjected to forced-labor (or *begar*) jobs. Indeed, these issues disproportionately

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<sup>6</sup>We are not alluding here to patron-client relationships a la Scott (1972), but rather to unequal economic or market exchanges between different castes with asymmetric bargaining power due to differences in their socioeconomic statuses.

<sup>7</sup>The increased intensity and frequency of precipitation shocks in recent years in India is well documented. See Mishra and Singh (2010).

affect SCs and STs (see Sainath, 1996).<sup>8</sup> Concurrently, for resource-wealthy social groups or upper caste members, a decline in household income caused by precipitation shocks can provide a higher incentive to engage in exploitative behavior towards vulnerable groups (Hardiman, 1996).

Finally, disputes over access to critical resources such as wells and land may exacerbate discrimination and social conflict (see Guru, 1991). Indeed, Bardhan (2000) finds that conflict over water is more likely in village communities inhabited by heterogeneous caste groups.<sup>9</sup> Furthermore, irrigation systems in India are often supported by privately-owned pumps (Molle, Shah and Barker, 2003; Gandhi and Namboodiri, 2009). The SCs and STs not only own a disproportionately lower share of agriculture land, but an overwhelming majority of the land holdings in their possession are significantly smaller (less than 1 hectares) (Government of India, 2018). The high fixed costs of installing these pumps makes the option prohibitively expensive and unfeasible for them (see Sekhri, 2011). Consequently, a disproportionately-high number of these pumps are owned by large landowners and companies (Anderson, 2011), who – given the skewed patterns of land ownership across main social groups – predominantly belong to upper or land-owning castes (Bakshi, 2008; Iversen et al., 2014).

By constraining resources and raising water prices, severe drought may further skew these markets against the SCs and STs, who may either be denied access to a limited supply of water, or charged exorbitant rates. Anderson (2011, 240), for instance, argues that the “main cause of poorer low-caste outcomes in high-caste dominated villages appears to be a pervasive breakdown in the functioning of private groundwater markets.” Over-pumping through bore wells, owned primarily by higher castes, may cause a depletion of water in community- or public-owned dug wells, which lower castes tend to rely on. Moreover, substantial declines in agricultural productivity may cause farmers to expand the area under cultivation to make up for losses (Damania et al., 2017), incentivizing them to encroach into community-shared resources such as forests and dried ponds. This, again, may lead to increased

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<sup>8</sup>*Begar*, or forced labor, is specifically outlawed by both the PCRA and the PoA yet often occurs in practice.

<sup>9</sup>Chidambaram (2020) finds that caste differences do not constrain cooperation over water resources in urban slum settings.



hostilities along existing social divisions (see Guru, 1991).<sup>10</sup> These three pathways linking drought and social conflicts accordingly suggest the following hypothesis:

**H1:** The frequency of social conflict should increase during periods of severe drought.

### **Electoral Competition and Caste Violence**

The focus on direct, broad relationships between climate and social conflict, we believe, provides an inaccurate picture. Specifically, we argue that at least in the context of India, *the effect of droughts is moderated by electoral competition*. Here, electoral competition has received a significant amount of attention in the literature (e.g., Wilkinson, 2006; Dunning, 2011), although not in the context of environmental politics. Scholars studying the role of electoral competition (primarily) in liberal democracies find that the quest for political survival leads to efficient results as candidates seek to maximize their chances of election and reelection for office (Wittman, 1995). There is ample evidence to suggest political competition improves government performance based on a range of measures, including improved economic output (Besley, Persson and Sturm, 2005), reduced public debt (Feld and Kirchgässner, 2001), better provision of public goods (Hecock, 2006; Bellinger, 2018), and lower corruption (Bhattacharyya and Hodler, 2010; Kolstad and Wiig, 2016). Therefore, electoral competition has the potential to moderate environmental shocks' impact by inducing constraints on corruption and increasing government responsiveness and efficiency.

There is, however, a sizable body of literature that emphasizes competition – especially in the context of *electoral*, as opposed to liberal and transitional, democracies – may not be conducive for inter-ethnic comity (Snyder, 2000; Eifert, Miguel and Posner, 2010; Dunning, 2011; Mustasilta, 2019). Indeed, scholars have long associated electoral politics with ethnic violence in India (Kabir, 1968; Brass, 2003; Wilkinson, 2006; Berenschot, 2012). We build upon the perspectives offered by Brass (2003) and Wilkinson (2006) and argue that electoral competition in the context of a drought would help

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<sup>10</sup>Some scholars argue historical exposure to frequent variations in temperature and precipitation made the population of the Indian sub-continent more resilient to these shocks (e.g., Jodha, 1991; Chen, 1991).

mitigate the incidence of violence against underprivileged ethnic communities. Political entrepreneurs are driven by the quest for political power and in a democratic polity seek to maximize their chances of election. They are adaptive and adjust their strategy to changes in electoral environment including those triggered by environmental stress.

Following Schlesinger (1994), we define electoral competition in terms of uncertainty about electoral outcomes – as the level of electoral competition in the district rises, the more uncertain electoral outcomes become (Schlesinger, 1994, 99). We further argue that the higher the number of credible competitors in a district, the higher the uncertainty around the electoral outcome, and hence more competitive the district. The existence of multiple credible competitors means competition is relatively balanced, with each of the contenders enjoying some probability of winning. The operation of a single-member district, first-past-the-post system – the electoral system prevalent in India – is expected to weed out weaker contestants and encourage their consolidation (Duverger, 1954). However, as the number of salient issue dimensions increase, the number of parties are expected to increase accordingly (Taagepera and Grofman, 1985; Lijphart, 1999). This logic implies that a higher number of competitors in an electoral district not only indicates more salient divisions, but also suggests that such competitors are credible, or else they will not survive.

In India, salient divisions are often centered around caste or *jati*, tribe, and religion (see Brass, 1965; Kothari, 1970; Chhibber, 2001; Jaffrelot, 2010). While the entire electorate can be placed into a small number of politically-salient social categories such as SCs, STs, upper castes (UCs), and the other backward castes (OBCs)<sup>11</sup>, these broad categories are internally divided into numerous social group, i.e., castes and tribes.<sup>12</sup> These divisions result in a highly-fragmented electorate in districts where any

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<sup>11</sup>The term is derived from a constitutional category of people designated as “socially and educationally backward classes of citizens,” distinct from the scheduled castes and tribes, in Article 15 of the Indian Constitution, which empowers the state to make special provisions for their ‘advancement’.

<sup>12</sup>The SCs, STs, OBCs and UCs are mutually exclusive groups and all of them are further divided into several social groups. For instance, in the state of Uttar Pradesh, 66 *jatis* are designated as belonging to the scheduled caste category. As a group, the OBCs constitute the dominant section of the population

given social group is rarely in a position to dominate others. Hence, the social bases of competing political parties often constitute coalitions spanning multiple castes, whose members frequently tend to vote similarly, but not necessarily for the same party.<sup>13</sup> In electoral districts with a higher number of credible competitors, the coalitions supporting individual competitors have narrower social bases and comprise a smaller number of castes. Political parties in such districts mobilize support from particular castes. Moreover, as the number of competitors increase and social bases of parties shrink, the approach of parties becomes much more targeted to meeting the specific needs of castes in their bases (see Chhibber and Nooruddin, 2004).

When faced with a competitive political environment, characterized by multiple credible competitors, political entrepreneurs in an electoral democracy have a strong incentive to amplify the salience of more exclusive caste identities. This manifests in a “contagion of extremist politics” as political entrepreneurs seek to entrench their respective ethnic bases (Mitchell, Evans and O’leary, 2009, 397) and may lead to an increase in ethnic violence. We hence expect that, all else equal, greater electoral competition will be associated with a higher incidence of caste violence, including violence against SCs and STs, as political entrepreneurs work to elevate the inter-caste divide and ensure the continued salience of the identity or identities associated with their political base, which suggests the following:

**H2:** The frequency of social conflict should increase with stronger electoral competition.

### **At the Intersection of Environmental Stress and Electoral Competition**

So far we have argued that drought and electoral competition *individually* will increase the incidence of ethnic violence. In this subsection, we posit that the occurrence of drought in the context of high

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across the country.

<sup>13</sup>For instance, over 91 percent of *Jats* (an OBC) and 89 percent of *Rajputs* (an UC) in the state of Uttar Pradesh voted for the Bhartiya Janata Party (BJP) during the 2019 national elections. See the Hindu-Lokniti Post-poll Survey conducted during these elections, which is available at <https://www.lokniti.org/NES2019POSTPOLL>.

electoral competition changes these political dynamics. Exogenous crises such as droughts affect the electoral calculus of political entrepreneurs in competitive districts and induce a strong incentive to mitigate violence. The driving force for this shift is *the fear of an unfavorable ethnic consolidation* among political competitors. Here we agree with Brass (2003) that ethnic violence may help consolidate ethnic voting blocs. However, we contend that violence targeted at ethnic others may work as a double-edged sword and is not always a desirable strategy. Our arguments illustrates the difference between caste-based mobilization, which aims to heighten internal divisions within the Hindu majority, and religion-based mobilization, which seeks to undercut internal divisions among Hindus and amplify the divide between Hindus and Muslims instead.

Ethnic violence works as an electoral strategy when it helps trigger a consolidation of ethnic votes in ways that maximize the likelihood of election. The demographic dominance of Hindus in most electoral districts in India makes the strategic use of Hindu-Muslim riots to heighten the salience of Hindu identity a potentially rewarding electoral strategy.<sup>14</sup> However, there are circumstances in which eth-

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<sup>14</sup>We are not claiming that violence against Muslims is an optimal strategy across all electoral districts with a Hindu majority. We are arguing that if only local demographics mattered, then political entrepreneurs who can successfully consolidate Hindu votes would have an upper hand in electoral contests. There are of course other conditions that shape the likelihood and ‘success’ of Hindu-Muslim riots (see Varshney, 2003; Wilkinson, 2006; Berenschot, 2011; Jha, 2013). Moreover, there are significant, often structural and historical, challenges to the consolidation of Hindu votes since religion-based identities are not always salient and caste divisions could be difficult to bridge. During the 2019 general elections, for instance, the alliance between Samajwadi Party (SP), with *Yadavs* as the core constituents, and Bahujan Samaj Party (BSP), with *Jatavs* as the core constituents, failed against the BJP in UP because of a long history of conflict between the land-holding *Yadavas*, an OBC, and the landless *Jatavs*, a SC (Narain, 2019). Similarly, while the castes covered by different caste categories are generally characterized by similar histories and analogous socio-cultural status, there are considerable variations among and within these categories on a host of important dimensions such as size, economic circumstances, mobilization, geographic distribution, etc., which frequently make individual castes (such as

nic violence may not be a good strategy, including in situations where ethnic vote consolidation does materialize. Such situations are more likely to arise with caste-based mobilization in India as caste demographics tend to be highly fragmented and vary significantly across districts. An obvious scenario in which ethnic violence is electorally unrewarding is when the local electoral demography does not decisively favor the ethnic identity that political entrepreneurs are seeking to heighten. The other possibilities include situations where ethnic consolidation fails to occur or when ethnic consolidation works in favor of the opposition. Importantly, a crisis may affect the salience of ethnic identities, alter electoral demography and impinge directly upon the process of ethnic consolidation and, consequently, electoral prospects of political entrepreneurs. The prospect of an unfavorable ethnic consolidation should act as a powerful incentive for political entrepreneurs to curb violence if violence is likely to reinforce such consolidation. We, therefore, concur with Wilkinson (2006) that electoral incentives may help mitigate violence, but our emphasis is on the fear of an unfavorable consolidation, not representation.

Droughts threaten political realignment by undermining the salience of narrower ethnic and group-based identities and facilitating conditions conducive for a broader consolidation among the electorate. Marginalized communities such as SCs and STs bear the brunt of droughts in India (Sainath, 1996). Interests of individual groups included within these marginalized categories may not align during normal times,<sup>15</sup> Indeed, it is common for individual castes comprising broader caste categories such as the SCs or STs to diverge in their political affiliation and support (see Joshi, 1981; Thachil and Herring, 2008; Ahuja, 2019). However, a crisis such as a drought, which negatively and disproportionately affects them, creates conditions conducive for a convergence of interests as the struggle to survive in the face of a long shared history of structural biases takes precedence.<sup>16</sup> In this context, violence against one

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*Jat* or *Ahir*) politically salient and consolidation challenging.

<sup>15</sup>On internal divisions within the *dalit* community see, among others, Morkhandikar (1990), Gorringer (2005), Ratnam (2008) and Waghmore (2013).

<sup>16</sup>The expectation that ‘unity is forged in crisis’ finds support among *dalit* activists. See Gorringer (2005, 215).

group may help galvanize SC and ST groups behind an electoral competitor.<sup>17</sup>

In competitive districts, where competitors tend to rely on narrower social coalitions comprising a smaller number of castes, the possibility of an adverse realignment among the SCs and STs, and potential consolidation of their votes presents a serious threat to the electoral viability of all competitors.<sup>18</sup> The possibility of ethnic consolidation embracing SCs and STs behind a competitor may give that competitor a substantial, even insurmountable, edge over others.<sup>19</sup> As a result, political entrepreneurs in such district have a strong incentive to suppress violence (or at least not instigate violence), as they seek to preserve their electoral viability and prevent the consolidation of support behind one political entrepreneur. There is suggestive anecdotal evidence that the fear of ethnic consolidation involving marginalized communities informs the decision calculus of political entrepreneurs in the context of drought and violence. For instance, the 2018 Bhima-Koregaon violence in the Marathwada region of Maharashtra in the midst of a major drought had created fear within the ruling BJP in the state of consolidation of *dalit* or SC votes behind the opposition. The divisions within the *dalit* community were critical to the past success of the party in the region (Ganapatye, 2018).

Thus, while we expect drought and electoral competition individually to increase the incidence of ethnic violence, electoral competition in the context of drought will induce political entrepreneurs to work to *prevent* the escalation of violence against SC and ST communities. Accordingly, this and the broader discussion suggests the following hypothesis:

**H3:** The positive effect of drought on the frequency of social conflict should decline as electoral competition is strengthened.

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<sup>17</sup>They may also attract support from other similarly-affected groups such some castes included in the OBC category, which also share a history of oppression.

<sup>18</sup>In noncompetitive districts, the lower number of credible competitor implies that a broader ethnic consolidation has already occurred.

<sup>19</sup>Together, SCs and STs constitute around a quarter of an average district Indian population.

# Empirical Analysis

## Data, Variables, Methods

Our hypotheses critically associate climatic shocks with violence, and presume that while – individually – both droughts and electoral competitiveness increase socioeconomic conflict, combined they should moderate, and possibly even eliminate, each other’s impacts. Considering the localized nature of climate change’s impact on violence, data measured at the annual country level would be inadequate for evaluating this claim.

To ensure our hypotheses are tested accurately, a dependent variable that captures socioeconomic conflict, rather than armed conflict more broadly, is needed. We operationalize this variable as the count of violent crimes against scheduled castes (SCs) – so-called “untouchables” – and scheduled tribes (STs) – indigenous people – including murders, rapes, arsons, kidnappings, and robberies, measured at the district-year level for all districts in India (590) over the 2001-2014 period. These data were obtained from the National Crime Records Bureau (NCRB), which collects this information from local police stations through state police headquarters across the country. These reports identify every crime where the target of violence was a member of an SC or ST. These data, which were until recently only available at the state level through *Crime in India* annual reports, were released to the public following efforts by one of the co-authors.<sup>20</sup> Considering this is a new and rarely used indicator, we discuss some concerns related to potential reporting bias in the Supplemental Appendix, although it is important to emphasize that any such biases within our measure are still likely to be low compared with more widely used datasets, such as the Armed Location and Event Dataset (ACLED) or the Georeferenced Event Dataset (GED). Accordingly, these data provide the most effective coverage in existence on crimes against vulnerable social groups in India. As the quality of reporting may vary across districts (and states), we include district fixed effects in all our models, in addition to reporting different robustness models, to account for these biases.

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<sup>20</sup>The *Crime in India* reports began publishing state-level data on crimes against SCs and STs separately in 1994.

The focus on violence against SCs and STs, specifically, adheres to the definition of social conflict advanced in this study. Moreover, the existence of annual information for each district allows us to map such violence at a highly-granular level. The resulting variable, *Social conflict<sub>it</sub>* hence provides a very effective way of testing our hypotheses. There were a total of 36,537 such social conflict events in our sample, with the average district experiencing 4.5 such crimes annually. We interact two explanatory variables to test the moderated effect posited above: a binary indicator denoting the occurrence of a severe drought, and a continuous index of democratic competitiveness for each district-year in our sample. The first independent variable, *Drought<sub>it</sub>*, was obtained from precipitation data measured at the 0.5° included the PRIO-Grid dataset (Tollefsen et al., 2012) and aggregated into our district-year framework by matching the centroids of each district with that of the PRIO-Grid cells. Building on past research (e.g., Bagozzi, Koren and Mukherjee, 2017), we operationalize severe droughts as districts where annual precipitation levels dropped more than 1.5 standard deviations *below* their district mean, coded as “1,” zero otherwise.

To test the moderating effect of electoral competitiveness, we operationalize our second explanatory variable as a district-year measure in a manner that closely corresponds to the index developed by Laakso and Taagepera (1979), who – in turn – modified the Herfindahl and Hirschman (Herfindahl, 1950) concentration index to account for party share. This measure accordingly weights parties by their electoral influence. Formally, this index is defined as:

$$d_{it} = \frac{1}{\sum_{i=1}^P p_{it}^2} \quad (1)$$

Where  $p$  is the vote *share* of any given party in electoral district  $i$  during year  $t$  and  $P$  is the total number of parties. The resulting *Elec. compete<sub>it</sub>* is thus defined as the inverse of the degree to which one party dominated the political system in district  $i$  during year  $t$ , i.e., the level of electoral competitiveness. Data for this variable were obtained from four national lower house of parliament, *Lok Sabha*, elections that took place in 1999, 2004, 2009, and 2014, and then interpolated to the yearly level using a last-value-carried-forward approach. The reliance on the effective number of parties to define electoral competitiveness is in line with our theoretical argument as it captures the concept of credible and



relatively-balanced contenders (see Kline, 2009). There are several potential concerns with this indicator and unit-of-analysis, which we discuss and address in the Supplemental Appendix due to space concerns.

Our models also add some variables to account for key alternative explanations. First, there is the possibility that violence arises where the state has a lower capacity to enforce the rule of law, or where there are lower population densities (and hence a smaller number of potential targets). To account for these issues, we include an indicator of average nighttime light emissions in a given district during a given year (from the Defense Meteorological Satellite Program Operational Linescan System Night-time Lights Time Series dataset), which captures the role of state capacity and presence in mitigating violence (Koren and Sarbahi, 2018). Additionally, there is the possibility that rather than droughts, the results are caused by heat waves, which past research has connected with a higher probability of civil war (Burke et al., 2009). Accordingly, and in line with this research, we include a control for average temperature in a given district during a given year, also obtained from the PRIO-Grid dataset. Another possibility (discussed above) is that political representation of SCs and STs can mitigate the risk of violence against them. We hence include two controls for whether there was a seat reserved in the parliament for an SC and ST member, respectively. We choose to restrict our analysis to these controls to avoid potential false inferences caused by including a large number of confounders. We nevertheless illustrate our findings' robustness to this concern by reporting several models that include additional confounders in Table A2, Supplemental Appendix. Summary statistics on all variables (including those used in robustness models) are reported in Table A1, Supplemental Appendix.

Considering the relatively wide range on our *Social conflict<sub>it</sub>* variable ( $0 \Leftrightarrow 74$ ) and its skewness (see Figure A1, Supplemental Appendix), we log this variable prior to entering our models.<sup>21</sup> Accordingly, we rely on ordinary least squares (OLS) regression models for statistically assessing our hypothesis. To ensure that the observed relationships are not the particular result of across-district variations, we include fixed effects for each district in our sample. To account for temporal dependence, we include linear and quadratic time trends, as used in past research with a similar design (e.g., Carey and

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<sup>21</sup>Note that every logged variable was reformatted as  $\log(X + 1)$  to ensure zero cases are not omitted.

Horiuchi, 2017). To account for heterogeneities within units of analysis, standard errors in all models are clustered by district. The moderated relationship between droughts, democratic competitiveness, and social conflict is hence identified using the following equation:

$$\ln y_{it} = \beta_1 s_{it} + \beta_2 d_{it} + \beta_3 s_{it} \times d_{it} + \beta_4 \ln y_{it-1} + \beta_{5-k} X_{it} + \beta_t t + \beta_{t2} t^2 + \omega_i + \varepsilon_i \quad (2)$$

In these equations,  $\ln y_{it}$  is a vector of (logged) *Social conflict*<sub>it</sub> by district  $i$  for each year and  $\ln y_{it-1}$  its lag;  $X_{it}$  is a matrix of control variables;  $t$  and  $t^2$  are the linear and quadratic time trends;  $\omega_i$  denote fixed effects by district;<sup>22</sup> and  $\varepsilon_i$  denotes standard errors clustered by district. In these models,  $s_{it}$  refers to *Drought*<sub>it</sub>,  $d_{it}$  to *Elec. compete*<sub>it</sub>, and  $s_{it} \times d_{it}$  to their interaction.

## Results

Table 1 reports the estimates of four OLS models used to test our hypotheses on a full sample consisting of all Indian districts for the years 2001-2014.<sup>23</sup> In all models, the coefficient of our interaction *Drought*<sub>it</sub>  $\times$  *Elec. compete*<sub>it</sub> and *Social conflict*<sub>it</sub> is negative and statistically significant (to the  $p < .01$  level), which empirically corroborates hypothesis H3.

Model 1 reports a minimalist baseline specification to test the interactive mechanisms implied by our argument. The effect of electoral competition during drought on violent crimes against SCs and STs is estimated alongside each constitutive term, controlling solely for time trend. The positive and statistically-significant (to the at least the 5% level) coefficient of *Drought*<sub>it</sub> suggests that in districts and years where competitiveness is *zero*, the frequency of violence against SCs and STs significantly

<sup>22</sup>Note that in the package we use to estimate these fixed effect models, the intercept, i.e.,  $\beta_0$ , is not included; the R package used for analysis, “lfe,” is very effective at conserving memory when unit-of-analysis fixed effects are used, one implication being that its factor structure omits the intercept (Gaure, 2013, 106). Crucially, this has no bearing on each coefficients substantive estimates, which remain identical whether the intercept is omitted or not.

<sup>23</sup>Note that we lose one year by including the lag of our dependent variable.

increases during drought. This confirms hypothesis H1 by suggesting that, absent of strong competition, droughts indeed intensify social conflict. However, note that none of our district-years has a value of zero, i.e., there is always *some* level of electoral competition. This means that in order to ascertain drought's exact impacts, one must calculate its substantive effects, as we do below. The direction, statistical significance, and magnitude of these relationships remain consistent as more control variables are added to arrive at the fully-specified model. Additionally, as expected by our theoretical argument, the effect of *Elec. compete<sub>it</sub>* in the absence of drought is also positive and significant (to the 1% level), suggesting that, in the absence of drought, democratic competitiveness increases the frequency violence against SCs and STs (hypothesis H2). These results hence confirm our theoretical claim to the pacifying impact of democratic competition on the incentives for socioeconomic conflict provided by drought.

Next, we use the estimates from our full model in Table 1 to compute each explanatory variable's moderating effect on the other's predicted impact on *Social conflict<sub>it</sub>*, holding all control variables to their means (continuous variables) or modes (for binary variables). These estimated marginal effects, along with their 95% confidence intervals, are plotted in Figure 1. The left subfigure first plots drought's impact on social conflict across the range of *Elec. compete<sub>it</sub>* (1.67  $\Leftrightarrow$  8.33). As this figure shows, when electoral competitiveness is at its sample minimum (i.e., *Elec. compete<sub>it</sub>*=1.67), *Drought<sub>it</sub>*'s coefficient is  $\sim 0.15$ , meaning that (when exponentiated) drought increases the rate of social conflict events by about 16%, on average, compared with the baseline. However, as electoral competitiveness increases, this effect strongly decreases. Indeed, when electoral competitiveness is at its sample maximum (i.e., when *Elec. compete<sub>it</sub>*=8.33), *Drought<sub>it</sub>*'s coefficient becomes  $\sim -0.71$ , meaning it *decreases* the number of expected social conflicts by about 51%, on average, compared with the baseline.

The right subfigure then plots the average impact of electoral competitiveness on social conflict in district-years where drought is absent compared with when drought occurred. Here, we observe that when *Drought<sub>it</sub>*=0, *Elec. compete<sub>it</sub>*'s coefficient is  $\sim 0.14$ , meaning that (when exponentiated), electoral competition increases the predicted number of social conflict events per district year by about 15%, on average, compared with the baseline. However, during drought (i.e., when *Drought<sub>it</sub>*=1), we observe that *Elec. compete<sub>it</sub>*'s coefficient ceases to produce a noticeable effect on the expected number of social conflicts. Accordingly, the substantive effects reported in Figure 1 provide additional support

to hypothesis H3 and, to some extent, H1, suggesting that climate shocks and electoral competitiveness have a pacifying effect on each other, thus highlighting the importance of contextualizing environmental effects.

**Insert Table 1 and Figure 1 about here**

To evaluate the sensitivity of our findings we estimate a large number of robustness models corresponding to model 4 from Table 1, which we report and discuss in detail in Tables A2–A5, Supplemental Appendix. We first evaluate our findings’ robustness to (i) including a population density indicator (which we omitted from the models above due to potential autocorrelation), as well as (ii) including additional controls, omitted from our models due to their time constant nature; (iii) operationalizing *Elec. compete<sub>it</sub>* using historical rather than contemporary values; (iv) normalizing our dependent variable by the number of SCs and STs in each district; and (v) including all attacks (violent and not) designated as “hate crimes” against SCs and STs under the Protection of Civil Rights Act, 1958 (PCRA).

In Table A3, we then report three models accounting for different operationalizations of *Social conflict<sub>it</sub>*’s spatial lag as the (vi) mean, (vii) maximum, and (viii) minimum number of spatial attacks, followed by models that employ alternative operationalizations of our main explanatory variables, including (ix) a binary high electoral competition variable, (x) lower drought severity thresholds, and (xi) adding one- and two-year drought lags and their interaction. Table A4 then illustrates our findings robustness to sample choices by parceling our sample into (xii) a subsample consisting solely of districts that do not have electoral constituencies cutting across other districts, (xiii) a subsample where the ethnically homogeneous northeastern states were removed, (xiv) a subsample where ‘union territories’ were removed, and (xv) a subsample where both union territories and northeastern states were removed.

Finally, Table A5 then illustrates our results’ robustness to endogeneity concerns by first estimating two generalized method of moments (GMM) *dynamic* models with internal instruments to demonstrate that endogeneity and serial correlation is not an overriding concern (Blundell and Bond, 1998), starting with (xvi) a ‘shallow lag’ model (that includes only two to four year lags as internal instruments) followed by (xvii) a ‘deep lag’ model that allows for all lagged dependent variable values beyond

the first year lag to serve as internal instruments. We then report (xviii) a model that includes only a linear time trend to illustrate that our findings are not driven by the reliance on a quadratic time trend (which, as  $r^2$  values illustrate, improves overall model fit); following by (xix) a model where our quadratic time polynomial is interacted with district fixed effects, in effect producing a quasi-synthetic-controls estimation process (Carey and Horiuchi, 2017); and (xx) a Poisson model with district fixed effects. Table A5, then, improves our ability to make a causal claim about the hypothesized interactive relationship. Crucially, our findings hold across all the sensitivity analyses in Tables A2-A5, suggesting that hypothesis H2, at least, cannot be immediately rejected.<sup>24</sup>

## Conclusion

Our findings have several research and policymaking implications. For scholars they suggest that any attempts to understand how climate might impact conflict in the future would be amiss without taking into account the role of political contexts in moderating these effects, at least in India and in other developing agrarian societies. These findings suggest that blanket statements about how climate change will linearly increase conflict in developing (agrarian) states might be oversimplified, and – by ignoring the role of context – likely provide an inaccurate explanation for environmental conflict, its determinants, and the ways to preempt it. A second research implication relates to the difference between droughts and famines, which is rarely emphasized in climate-conflict nexus research. In line with Sen (1999), our findings suggest that agricultural scarcity and its impact on social conflict are a primarily *political* phenomena; where political competition is strong, so is the resilience to drought's effects. Yet, this can also be a double-edged sword, because where democratic competition is high, there is more incentive to target weak socioeconomic groups, presumably for political gain (Ide, 2015; Detges, 2016).

For policymakers, our findings elicit important mechanisms governing variations in social conflict

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<sup>24</sup>It is worth noting that, while our theory and empirics are focused on a moderation of drought and electoral competition, Table A6, Supplemental Appendix suggests the viability of a mediated relationship as well.

with respect to democratization and climatic shocks. While evidence that droughts drive militarized conflicts – especially in rural agricultural areas – is limited (e.g., Von Uexkull et al., 2016; Scheffran, Ide and Schilling, 2014; Gleick, 2014; Ide, 2015), our findings show that assisting developing agrarian regions that are susceptible to climatic stress to be better prepared, and promoting democratization and political participation therein can help prevent less organized and more spontaneous violence, and save lives. Our findings and policy recommendations somewhat diverge from past research because they do suggest that in some contexts both climate and democratic competition can induce social conflict. However, these conclusions are in line with such studies’ (e.g., Buhaug, 2010) claims that supplementing “standard” environmental resilience programs with assistance directed at empowering local institutions, freedom rights, and democracy can have important externalities with respect to environmental (and other types of) conflict.

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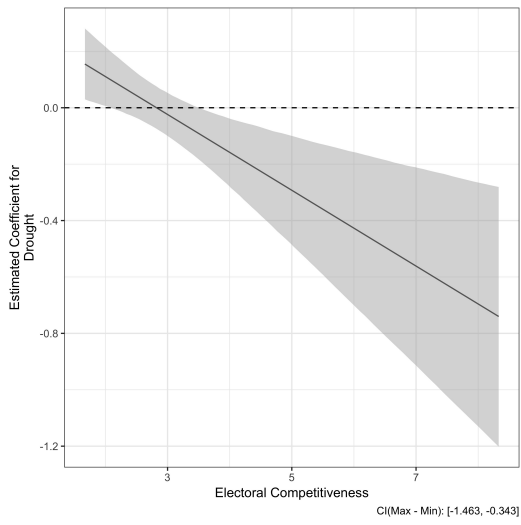
Table 1: Determinants of Social Conflict in Indian Districts, 2001–2014

	<b>Baseline</b>	<b>Medium</b>	<b>Full</b>
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
<i>Drought<sub>it</sub></i>	0.266** (0.112)	0.294*** (0.113)	0.376*** (0.115)
<i>Elec. compete<sub>it</sub></i>	0.135*** (0.021)	0.123*** (0.021)	0.138*** (0.020)
<i>Drought<sub>it</sub> × Elec. compete<sub>it</sub></i>	-0.125*** (0.037)	-0.111*** (0.037)	-0.133*** (0.038)
<i>Nighttime light<sub>it</sub></i> <sup>1</sup>	–	0.659*** (0.045)	0.690*** (0.046)
<i>Temperature<sub>it</sub></i>	–	-0.110*** (0.018)	-0.120*** (0.019)
<i>Reserved seat, SC<sub>it</sub></i>	–	–	0.031 (0.037)
<i>Reserved seat, ST<sub>it</sub></i>	–	–	0.036 (0.042)
<i>DV<sub>it-1</sub></i>	–	–	0.110*** (0.019)
<i>Time trend<sub>it</sub></i>	0.088*** (0.009)	0.103*** (0.010)	0.120*** (0.011)
<i>Time trend<sub>it</sub></i> <sup>2</sup>	-0.007*** (0.001)	-0.010*** (0.001)	-0.011*** (0.001)
Observations	8,253	8,253	7,662
R <sup>2</sup>	0.694	0.707	0.712
Adjusted R <sup>2</sup>	0.670	0.684	0.688

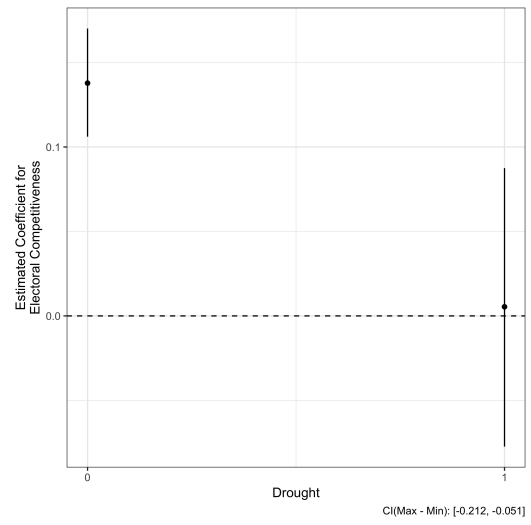
Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Values in parentheses are robust standard errors clustered by district. Fixed effects by district were included in each regression, although not reported.

<sup>1</sup> In natural log form.

Figure 1: Estimated Effect of Each Explanatory Variable on the Propensity of Social Conflict



*Elec. compete<sub>it</sub>*'s moderation of *Drought<sub>it</sub>*



*Drought<sub>it</sub>*'s moderation of *Elec. compete<sub>it</sub>*