Ethnic Favouritism in Environmental Disaster Payouts *

Raahil Madhok†
University of Minnesota

Sumeet Gulati‡
University of British Columbia

Pushpendra Rana§
Indian Forest Service

January 7, 2026

Abstract

We examine how political reservation affects environmental disaster relief. Using restricted-access data on human–wildlife conflict in the Himalayas, we find tribal communities face more conflict yet receive less compensation. Our model predicts minority leaders favor coethnics, reducing discrimination. Exploiting quasi-random variation from India's reservation system, we show compensation per attack is higher and rises faster with tribal population share in tribal-led villages. This *ethnic favoritism* occurs because tribal claimants negotiate more effectively under coethnic leadership. Although overall conflict is lower under tribal leaders, welfare analysis shows tribal communities secure greater overall compensation, as representation helps navigate corruption and promotes fairness.

Keywords: Political reservation, tribal communities, human-wildlife conflict, India
JEL Codes: Q01, Q54, Q56, D72, H11

*We thank John List, Patrick Baylis, and Frederik Noack for helpful comments. We also thank audiences at Macalester College, Queensland University of Technology, University of Exeter (Land, Environment, Economics and Policy Institute), NatCap TEEMS, UNU-MERIT, Universidade de Santiago de Compostela, the C-EEM Workshop on Environment and Natural Resources, the AERE Conference, and the annual CECFEE research and policy workshop for invaluable feedback. All errors are our own.

†Department of Applied Economics; rmadhok@umn.edu.

‡Food and Resource Economics; sumeet.gulati@ubc.ca.

§Indian Forest Service; pranaifs27@gmail.com.

1 Introduction

Environmental disasters caused nearly $300 billion USD in damages globally in 2022. While approximately 70% of private losses in developed countries were insured, the corresponding figure in developing countries was a mere 14% (Straub, 2022). As the frequency and severity of environmental disasters increases, the global poor will be especially exposed. With limited wealth and few coping strategies, the state is the primary, and often only, source of disaster relief for them.

Accessing government-provided relief is far from guaranteed. Regardless of the type of disaster, marginalized communities across the developing world face numerous barriers to its access: geographic isolation and low education limit awareness; bureaucratic discretion, corruption, rigid payment rules, and limited fiscal capacity determine who ultimately receives relief; and, finally, institutional biases against historically marginalized groups undermine access at every stage. While these barriers are common across countries and political systems, what varies is whether institutions exist to counteract them. Mandated political representation is one such policy solution.

Can political representation of historically marginalized groups improve access to government-provided disaster relief? In the absence of such representation, systemic barriers can exclude these communities from obtaining relief. Understanding how to reduce these barriers is therefore crucial, as environmental disasters cause widespread and severe damage. They destroy infrastructure, livestock, and crops; reduce labor productivity; inflict psychological trauma; and trigger distress migration. Moreover, political representation matters not only for material outcomes but also for political legitimacy: citizens' experiences during environmental disasters shape their perceptions of state capacity and influence future electoral behavior.

We study political representation and post-disaster relief in the context of human-wildlife conflict (HWC), an understudied environmental disaster. Despite receiving far less attention, HWC shares key characteristics with commonly recognized disasters such as floods, droughts, or fires. HWC also damages infrastructure, destroys standing and stored crops, kills livestock, claims human lives, and inflicts far-reaching psychological trauma (Mayberry et al., 2017). It also parallels the severity of other disasters: in developing countries, farmers who suffer wildlife attacks lose about half of their annual income (Braczkowski et al., 2023). In India, the human death toll from elephant attacks alone is at least one-third that of floods (Economic Times, 2024; Parida, 2020). And lastly, like other disasters, HWC imposes an uneven burden on indigenous and minority communities (World Bank, 2023). Despite these similarities, HWC receives far less attention, perhaps due to its limited scale. For example, floods affect entire communities, attracting national or international attention, while HWC usually only impacts individual households.[1]

Our setting is Himachal Pradesh, India, where the state government provides financial relief for HWC victims. This setting is well-suited for answering our research question for several reasons. First, Himachal Pradesh is home to over 5,000 animal species and 36 protected areas (Gokhale, 2015), in other words a biodiversity hotspot. It is also facing acute landscape fragmentation (Madhok, 2025), which is increasing the frequency and intensity of human–wildlife interactions. Second, Himachal Pradesh has emerged as a recent epicentre for disaster-related losses, as evidenced by the distribution of damages from the 2023 and 2025 floods in India (Tiwari, 2025).[2] Third, 6% of the population belongs to the Scheduled Tribe (ST) community, one of India's most socioeconomically disadvantaged and politically excluded groups. Tribal communities rely heavily on forest-based livelihoods, making them particularly vulnerable to HWC. Yet their access to compensation requires navigating a forest bureaucracy often dominated by caste elites (Doner, 2022).

Although the Indian Constitution mandates political reservations to address structural inequities faced by Scheduled Castes and Scheduled Tribes, the effectiveness of these provisions in improving access to environmental disaster relief remains an open question.

We address this question using novel, restricted-access data on every HWC compensation claim approved by the Himachal Pradesh government between 2012 and 2020. The dataset includes detailed information on location, date of attack, predator species involved (e.g., leopard, bear), number and type of livestock killed, human injury or death, and the compensation awarded to victims. We obtained these data through collaboration with the Indian Forest Service, providing among the first insights into the political economy of disaster relief in India. A descriptive exploration reveals: (i) tribal communities live closer to forests, increasing their exposure to wildlife encounters; (ii) they experience more HWC incidents, although estimates are somewhat imprecise; (iii) and most critically, victims in tribal villages receive significantly lower compensation for incidents involving human injury or death compared to victims in less-tribal villages. These findings highlight a troubling pattern: tribal groups face greater risk from wildlife attacks and appear to experience inequities in the relief they receive.

To elaborate how such inequities in relief arise, we develop a political economy model of disaster relief with selective discrimination against a minority group.[3] The executive branch is legally obligated to manage HWC by incurring abatement costs, and to com-

[1]To be fair, there is increasing coverage of conflict with charismatic animals recently (Osorio et al., 2025).

[2]In addition, Priya et al. (2017) shows that the frequency and intensity of extreme precipitation during the summer monsoon (June–September) has significantly increased over the Western Himalayas (WH) and the adjoining upper Indus basin in recent decades, making such floods and landslides more likely recently.

[3]The model builds on the political reservation and special interest politics literature (Anderson et al., 2015; Grossman and Helpman, 2008).

pensate all disutility from HWC. The executive also retains discretion over compensation, and can withhold payments from the minority either to redistribute to the majority, or to capture as rent for itself. With this setup, we compare HWC levels and discrimination under three governance scenarios: (i) a benevolent government seeking to minimize the combined costs of HWC and compensation, (ii) a majoritarian government where the elected executive always represents the majority and pursues political objectives beyond social cost minimization, and (iii) a reserved government where a minority representative is always elected yet remains politically motivated.

Our model generates four testable predictions. First, less HWC is tolerated under a government reserved for minority leaders, because these leaders prioritize abatement over discriminating against their own group. In contrast, majoritarian governments allow more HWC, as greater conflict enables more discrimination and redistribution toward the majority. Second, minorities receive higher per-incident payouts under reservation due to the absence of discrimination. Third, the model predicts *ethnic favouritism*—the tendency of political leaders to allocate resources preferentially to members of their own ethnic or social group—toward the minority: compensation per HWC incident in a village rises faster with minority population share under reserved elections. Fourth, if corruption incentives are sufficiently large, aggregate compensation paid to citizens under a reserved government surpasses that under a majoritarian regime.

The remainder of the paper tests these predictions using two quasi-experimental designs and one simulation procedure. The first design exploits a distinctive feature of India's political reservation system, which generates plausibly exogenous variation in minority representation. Reserved legislative seats for STs are allocated to states and districts based on their share of the national and state tribal population, respectively. Constituencies within each district are then ranked by their tribal population share, and reservations are assigned sequentially from the highest ranked constituency until the district's quota is met. We use this cutoff rule for identification, designating the three constituencies just below the reservation threshold in each district as our matched comparison group. This matching strategy ensures that reserved and matched unreserved constituencies are similar in tribal population share and district characteristics. The main limitation is that these constituencies often fall into different forest divisions—the executive body responsible for approving HWC compensation claims—making it difficult to disentangle impacts of political reservation from institutional differences.

Our second empirical strategy addresses this concern by extending the matched comparison group to include *all* unreserved constituencies that share a forest division with a reserved constituency. This within-forest-division design increases sample size, statistical power, and due to the historical delineation of forest divisions in India, also ensures that cross-constituency comparisons are made within the same ecological environment. While less tied to the seat reservation formula, holding constant the institutional authority that administers compensation enables us to isolate effects of political representation from administrative differences.

Empirical estimates from both designs corroborate our model predictions. First, we find that tribal leaders tolerate less HWC compared to non-tribal leaders. Villages in reserved constituencies experience 6% less conflict with wildlife compared to those holding general elections. Second, compensation per incident is dramatically higher under tribal leadership; victims in reserved constituencies receive payouts 47%-57% higher than victims *of the same type of animal attack* in general election constituencies. These two findings are consistent with the theory that tribal leaders face no incentives to discriminate and thus focus on abatement, leading to less HWC and higher payouts per incident.

Third, we find clear evidence of ethnic favouritism in HWC payouts. We establish this novel finding with a matched difference-in-difference design comparing the disparity in payouts between more- and less-tribal villages in reserved constituencies to the same disparity in unreserved constituencies. Villages with a 10 percentage point (pp.) larger tribal population share receive about 3%-5% more compensation per incident when the leader is tribal compared to when the leader is non-tribal. This suggests that ethnically aligned villages receive greater relief.

Before testing the model's fourth prediction, we first probe the mechanisms underlying our ethnic favouritism result. Compensation rates are officially fixed based on the type of livestock lost, raising the question: how do tribal claimants secure higher payouts when represented by tribal leaders? We conducted informal interviews with forest officers and government veterinarians in Himachal Pradesh, which revealed that the claim process may be subject to negotiation. Claimants may bargain with inspectors to classify their livestock as a higher-value breed (e.g., a pashmina goat rather than a local breed). They can also negotiate the reported quantity of livestock lost to increase the total compensation. The success of bargaining likely depends on the relationship between claimants and local political leaders.

We identify bargaining over the reported quantity of livestock lost as the most plausible mechanism driving ethnic favoritism in compensation. We test this formally by sequentially introducing fixed effects for livestock breed and then for the number of animals lost into our main difference-in-differences specification. Our estimated effect remains robust to controlling for breed, but becomes statistically insignificant once we control for the number of animals lost. This pattern suggests that variation in reported quantity—rather than breed—is central to the observed ethnic favouritism. Anecdotal evidence obtained from our interviews is consistent with this result.

We then present a numeric and empirical simulation to test the model's fourth prediction: when the corruption parameter is sufficiently large, political reservation can raise aggregate transfers even though tribal leaders reduce conflict overall. First, we parameterize the model and numerically vary values for corruption intensity and majority influence. The model predicts that if $> 40\%$ of transfers are lost to corruption under majoritarian rule, reservation increases aggregate transfers due to its reduction in grift, even though there are fewer HWC incidents. To test this, we we use the estimated difference-in-difference model to simulate aggregate transfers in a counterfactual without reservation. We find that aggregate compensation in reserved constituencies would have been lower without reservation, suggesting (i) a tendency for rent-seeking within the compensation bureaucracy, and (ii) that the reduction of this tendency under political reservation is responsible for delivering fairer and more generous relief to tribal communities.

Taken together, our findings highlight how political reservation can help marginalized groups achieve more equitable disaster relief in an institutional environment where informal bargaining and rent-seeking already exist. We are not endorsing the informal bargaining we document, such as misreporting livestock numbers. Rather, given that Himachal Pradesh is experiencing intensifying levels of HWC and other disasters, our findings suggest that political reservation enables tribal communities to secure greater compensation per incident, and overall from the state government.

Our study contributes to several strands of research by offering a micro-level analysis of a unique environmental disaster in a large developing country. First, we advance the literature on environmental economics and disaster impacts. Prior work has largely examined aggregate economic effects, primarily in the United States (Deryugina, 2017; Deryugina et al., 2018; Marcoux and Wagner, 2023) or at a global scale (Botzen et al., 2019; Kahn, 2005; Hsiang and Jina, 2014).[4] Leveraging unique individual-level data, we examine how relief is distributed across villages and over time—data that are not publicly available in India[5] or, to our knowledge, in any other country. Finally, we introduce human–wildlife conflict as an environmental disaster, a significant yet underexplored dimension of environmental risk.

Second, we contribute to the political economy literature on minority representation and resource allocation. Existing research in India has focused on poverty alleviation (Pande, 2003; Chattopadhyay and Duflo, 2004; Clots-Figueras, 2012; Bhalotra and Clots-Figueras, 2014; Chin and Prakash, 2011; Kaletski and Prakash, 2016) and the political determinants of environmental outcomes (Balboni et al., 2023, 2021; Burgess et al., 2012;

[4]An exception is Gordon et al. (2024), who analyze earthquake relief in Nepal using granular data. We extend this approach by combining detailed claim-level data with a political economy perspective, emphasizing ethnic alignment between victims and local leaders.

[5]Previous work in India has thus been limited to state-level analysis (Karanth et al., 2018)

Gulzar et al., 2021; Jagnani and Mahadevan, 2024; Lipscomb and Mobarak, 2016), but we are unaware of any study examining how leader identity shapes disaster relief. We also build on work on bargaining and public transfers. Olken (2007) show that grassroots monitoring in Indonesia does little to improve public goods provision; we extend this by demonstrating that local influence over targeted spending becomes effective when paired with coethnic political representation. Similarly, Reinikka and Svensson (2004) find that wealthier Ugandan schools leverage bargaining power to secure larger shares of education funds; we show that ethnic alignment with leadership also boosts bargaining power, highlighting another mechanism in transfer allocation. Finally, we join a long-standing theoretical literature in political economy (Besley and Coate, 1997; Anderson et al., 2015; Chattopadhyay and Duflo, 2004; Gulati, 2008) by formalizing how political reservation can shape compensation distribution and by generating specific, testable predictions. Our difference-in-differences strategy provides a direct link between theory and evidence.

Third, we integrate economic tools into the ecological literature on HWC. As Dickman et al. (2011) notes, economic analysis remains underutilized in conservation science. Our study formalizes an economic logic for understanding HWC relief and applies causal inference methods to generate policy-relevant insights.

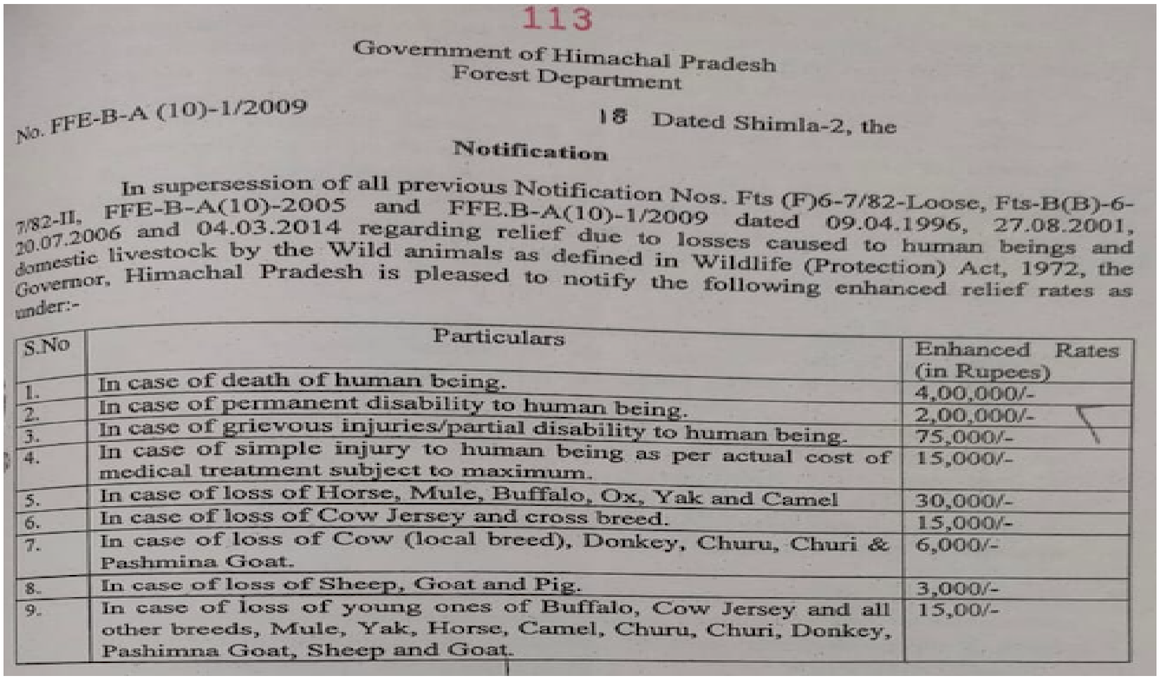
The next section provides institutional background. Section 3 presents the data and documents three stylized insights about inequities in HWC exposure and compensation. Section 4 sets up a political economy model to articulate the logic giving rise to discrimination in disaster relief. Section 5 tests model predictions and presents empirical results. Section 6 discusses mechanisms. Section 7 presents a welfare analysis, and exploration of the parameters underlying our theory. Section 8 allows readers to evaluate external validity as proposed by List (2020), and finally Section 9 concludes.

2 Background

This section provides background on HWC in India and the bureaucracy that disburses compensation following wildlife attacks. It also describes India's tribal community—our study group—and the system of affirmative action designed for their empowerment.

2.1 Human-Wildlife Conflict

Human-wildlife conflict (HWC) shares many characteristics with conventional environmental disasters. As humans encroach deeper into wildlife habitat, escalating human-wildlife encounters lead to crop destruction, livestock loss, and human death. In India, Human-Elephant Conflict (a subset of HWC) claims about 500 human lives per year (Eco-



113

Government of Himachal Pradesh
Forest Department

No. FFE-B-A (10)-1/2009 18 Dated Shimla-2, the

Notification

In supersession of all previous Notification Nos. Fts (F)6-7/82-Loose, Fts-B(B)-6-7/82-II, FFE-B-A(10)-2005 and FFE.B-A(10)-1/2009 dated 09.04.1996, 27.08.2001, 20.07.2006 and 04.03.2014 regarding relief due to losses caused to human beings and domestic livestock by the Wild animals as defined in Wildlife (Protection) Act, 1972, the Governor, Himachal Pradesh is pleased to notify the following enhanced relief rates as under:-

S.No	Particulars	Enhanced Rates (in Rupees)
1.	In case of death of human being.	4,00,000/-
2.	In case of permanent disability to human being.	2,00,000/-
3.	In case of grievous injuries/partial disability to human being.	75,000/-
4.	In case of simple injury to human being as per actual cost of medical treatment subject to maximum.	15,000/-
5.	In case of loss of Horse, Mule, Buffalo, Ox, Yak and Camel	30,000/-
6.	In case of loss of Cow Jersey and cross breed.	15,000/-
7.	In case of loss of Cow (local breed), Donkey, Churu, Churi & Pashmina Goat.	6,000/-
8.	In case of loss of Sheep, Goat and Pig.	3,000/-
9.	In case of loss of young ones of Buffalo, Cow Jersey and all other breeds, Mule, Yak, Horse, Camel, Churu, Churi, Donkey, Pashimna Goat, Sheep and Goat.	15,00/-

Figure 1: HWC Compensation Rates (Government of Himachal Pradesh, 2018)

nomic Times, 2024). And while not traditionally counted as HWC, snake bites take an additional 50,000-64,000 lives annually (Mohapatra et al., 2011). To put these fatalities in perspective, floods in India cause 1500 deaths every year (Central Water Comission, 2012; Singh and Kumar, 2013; Parida, 2020). While elephants inflict the most damage (Gulati et al., 2021; Sukumar, 2003), conflict with large carnivores like tigers and leopards also cause human injuries, deaths, and major financial losses (Karanth and Madhusudan, 2002).

HWC is an especially important, devastating, and frequent environmental disaster for those living near India's forests. Like other environmental disasters, its burden is unevenly shared, an important environmental justice concern. As we show in Insight 1 (Section 3.4), India's tribal communities are more vulnerable to HWC. A key policy tool for mitigating the unequal burden is compensation for losses, a topic we turn to next.

2.2 The Compensation Bureaucracy in Himachal Pradesh

India's Wildlife (Protection) Act (1972) recommends compensating financial losses from HWC, but does not mandate it. Most states in India offer independently determined ex-gratia compensation for human injury, death, livestock loss or other property losses from HWC (Karanth et al., 2018). In Himachal Pradesh, residents are eligible for compensation for livestock loss, human injury, or the associated loss of life, and rates range from ₹3000 for livestock loss to ₹400,000 for loss of a human life (Figure 1). Rate changes over the

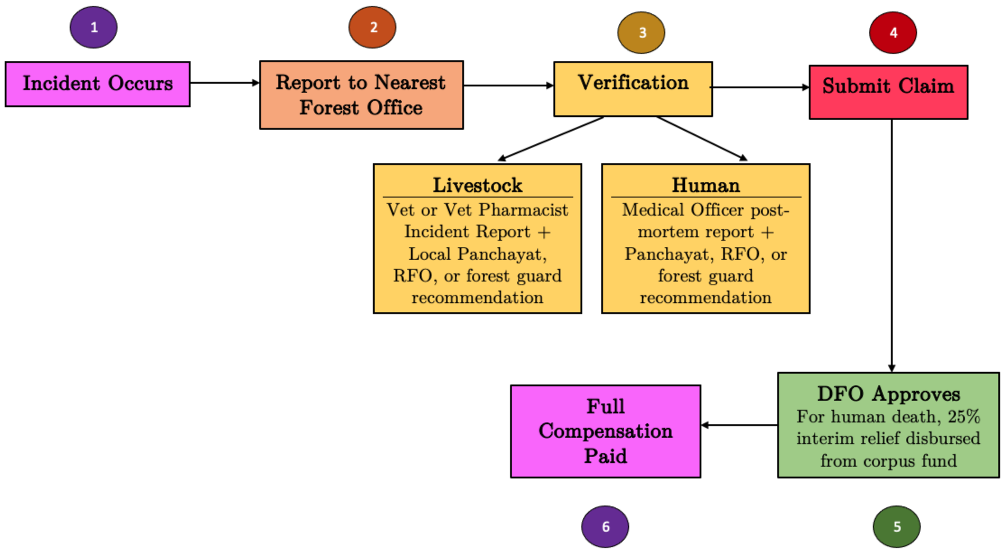


Figure 2: Filing a Claim for HWC compensation in Himachal Pradesh

years are documented in Table A1. Crop destruction is not compensated.[6]

Compensation claims are administered by the State Forest Department, which follows a chain of command illustrated in Figure B2 and explained in more detail in Appendix C. The bureaucratic structure is central to understanding how individuals file HWC compensation claim and informs key elements of our empirical design in Section 5.1. Importantly, roles within the forest bureaucracy and the promotion of bureaucrats is determined by the democratically elected state government. As a result, elected constituency leaders wield power over the compensation bureaucracy, allowing citizens to hold public officials accountable via their elected representatives.[7]

Figure 2 illustrates the process of obtaining compensation and describes how victims interact with the bureaucracy at each stage. On suffering a loss due to HWC, an individual first reports the incident to the nearest forest office within seven days. A formal claim must be filed within one month with the nearest Regional Forest Officer (RFO). The claim can be filed where the applicant lives or where the loss occurred and includes details such as the predator animal, type and number of livestock lost, location and time of the event, and photographic evidence. The full list of reported items is described in the Data section.

In the case of livestock loss, a local veterinarian visits the incident site to verify that livestock death was caused by wildlife. However, many Himalayan regions are so remote

[6]India's Central Government is expected to include wildlife-related crop losses under the national crop insurance scheme beginning in the 2026 Kharif season (Sharma, November 19, 2025).

[7]That this authority is exercised frequently was verified via informal interviews with forest officials. One senior official said "In Himachal Pradesh the politicians exercise tight control on their bureaucracy. Our state politicians frequently transfer forest officials based on their preferences."

that the nearest forest or veterinary office is hours or days away. These remote mountainous areas are often where minority populations—tribal communities and pastoralists—experience conflict. The Himachal Pradesh government therefore grants locally elected representatives, including the village chief (Pradhan), and the local veterinarian pharmacist the authority to verify cattle losses.[8] While this rule improves bureaucratic efficiency, it also creates opportunities for strategic bargaining between victims and local officials to affect compensation amounts, especially if the two belong to the same ethnic group. We explore this process as a mechanism underlying ethnic favouritism in Section 6.

In the event of human death, only medical officers can submit a postmortem report. For grievous injury cases, the medical officer submits a partial or permanent disability certificate as well as medical treatment costs. For simple injuries, a prescription slip is submitted. The RFO then scrutinizes the application and submits it to the Divisional Forest Officer or the Wildlife Warden, who authorizes all claims.

While this compensation system is designed to mitigate financial losses from HWC, unequal access to the system remains a concern. Marginalized communities, especially tribal groups, face barriers to access when petitioning a forest bureaucracy dominated by caste elites and rooted in colonial power imbalances (Doner, 2022).[9] As we document in Insight 3 (Section 3.4), tribal communities receive less compensation than non-tribals for the same type of HWC damage. Next, we present an overview of India's tribal population and the system of affirmative action aimed at reversing historic discrimination.

2.3 Scheduled Tribes and Political Reservation

Scheduled Tribes India's tribes, or *Adivasis*, are widely regarded as its earliest inhabitants. Pre-independence censuses refer to tribes as "animist", "hill and forest tribes", and "backward tribes" (Ambagudia, 2011). Post-independence, the label Scheduled Tribes (ST) was adopted for administrative purposes. We primarily use the term "tribe" or "tribal group" throughout the paper to avoid overuse of acronyms. Per the 2011 Census, tribes comprise 9% of India's population, and 6% of the population of Himachal Pradesh.

[8] Quote from Forest Department Notification FFE-iB-A (10)-1/2009 (Figure B1): "ii) Verification of loss of cattle that was actually caused by wild animal can be done by the Pradhan/Up Pradhan of Panchayat/Patwari/President Notified Area Committee, Chairman, Municipal Committee, Commissioner/ Mayor/Deputy Mayor, Municipal Corporation of the area/ Elected Member of the Cantonment Board area/Councillor of the area, Range Office/Deputy Ranger/Forest Guard or any other forest officer higher in rank than a Range Officer, Veterinary officer, or Veterinary Pharmacist..."

[9] An analysis of the 2025 Civil List of the Himachal Pradesh Forest Department shows minority representation broadly aligned with state population shares. Among 198 serving Range Forest Officers, 35 are Scheduled Caste (SC) and 24 Scheduled Tribe (ST). At the higher State Forest Service level (including Divisional Forest Officers and ACF posts), 11 of 96 officers are SC and 6 are ST.

We focus on tribal groups as our study group for several reasons. First, tribes in Himachal Pradesh are forest-dependent (Insight 1, Section 3.4) and often live in remote mountainous areas with limited contact with the state. Many include migratory pastoralists (Sheth and Saberwal, 2023) who seasonally move large goat and sheep herds, sometimes exceeding 1,000 animals, to high-altitude pastures near the snow line for up to three months in summer, a practice locally known as Kanda (details and term learnt via field interactions with tribal communities in Kinnaur constituency). These multi-day treks expose livestock to elevated predation risk from carnivores such as brown and black bears, snow leopards, and common leopards. While veterinary support has improved, filing compensation claims during migration remains difficult. Second, tribes face severe economic deprivation and sociopolitical exclusion. In Himachal Pradesh, their illiteracy rate is 42% higher and their salaried employment share is 133% lower than the general population (World Bank, 2017). This legacy of poverty, remoteness, and exclusion underpins India's political quota system, designed to address structural disadvantages faced by minority groups.

India's Political Reservation System India's political quota system dates back to the Poona Pact of 1932, which allocated 148 seats in provincial legislative assemblies for "depressed classes," including Scheduled Castes (SCs) and Scheduled Tribes (STs) (Das, 2000). On independence, this system was written into the constitution (Article 332) and continues to reserve seats for SCs and STs in state and national legislatures. In reserved constituencies, only candidates from the designated group may contest elections, with the aim of improving minority representation and access to public resources. Members of these groups are free to contest elections in unreserved constituencies. In this paper, we focus on STs for reasons outlined in the preceding paragraph.

Reserved seats are allocated through a multi-step process that introduces quasi-random variation in constituency selection. First, each state's share of the national tribal population determines the number of reserved seats. For example, Himachal Pradesh has 68 seats in its State Assembly and 4% of India's tribal population, resulting in $68 \times 0.04 = 3$ reserved seats. Second, these seats are distributed across districts using the same formula.[10] Third, constituencies within each district are ranked by tribal population share, and reserved seats are assigned starting from the highest-ranked constituency until the district's quota is met (Ambagudia, 2019; Bhavnani, 2017).

This third step enables the identification of counterfactual constituencies. In one of our research designs (Section 5.1), we designate the three constituencies ranked just below

[10] A district with 25% of Himachal Pradesh's tribal population receives $0.25 \times 3 = 0.75$ seats, rounded to the nearest integer (1 seat) in the final allocation.

the reservation cutoff in each district as the comparison group, approximating a matched sample based on tribal share. Matching within districts ensures balance on district-level characteristics, but need not match on other characteristics like forest bureaucracy and landscape type. We include a variety of covariates to account for such differences.

Although unreserved constituencies have lower tribal shares, tribal candidates almost never win unreserved seats, even in tribal-majority areas. This makes just-below-cutoff constituencies a strong counterfactual as they are demographically similar but would not elect a tribal leader absent reservation. This pattern has long been recognized: the Constituent Assembly established to draft India's constitution noted that "even though in a predominantly tribal constituency the chances are all in favour of a tribal candidate, the non-tribals, in view of their greater financial strength, can nullify this advantage" (Ambagudia, 2022). More recently, Jensenius (2015) shows that parties rarely nominate SC/ST candidates without reservation, and Bhavnani (2017) finds that the electoral gains from reservation vanish once seats revert to open competition. These insights underscore why unreserved constituencies form a credible comparison group for assessing the effects of political reservation.

3 Data

We study the political economy of HWC compensation using a newly assembled dataset that links geotagged compensation claims with village-level data on tribal population shares and constituency reservation status. The resulting claim-level panel spans all villages with HWC claims filed in Himachal Pradesh between 2012 and 2020.

3.1 Compensation Claims

We obtained a restricted-access panel of HWC compensation claims through our partnership with the Indian Forest Service. Each claim refers to a single HWC incident, during which multiple humans or livestock could have been killed. Our panel covers the universe of claims filed at local forest offices between 2012-2020, is geocoded at the village level, and records the date, predator animal, case type (livestock loss, human injury, or human death), livestock species killed (cow, goat, etc.), number of livestock lost, and compensation paid. For claims with multiple livestock species killed, each species is listed separately while compensation is reported as a lump sum.

Table A2 shows that leopard, bear, and macaque attacks are most common (Panel A). Bear attacks receive the highest payout, three times more than leopards and six times more than macaques. In terms of case type, livestock loss is the most common outcome

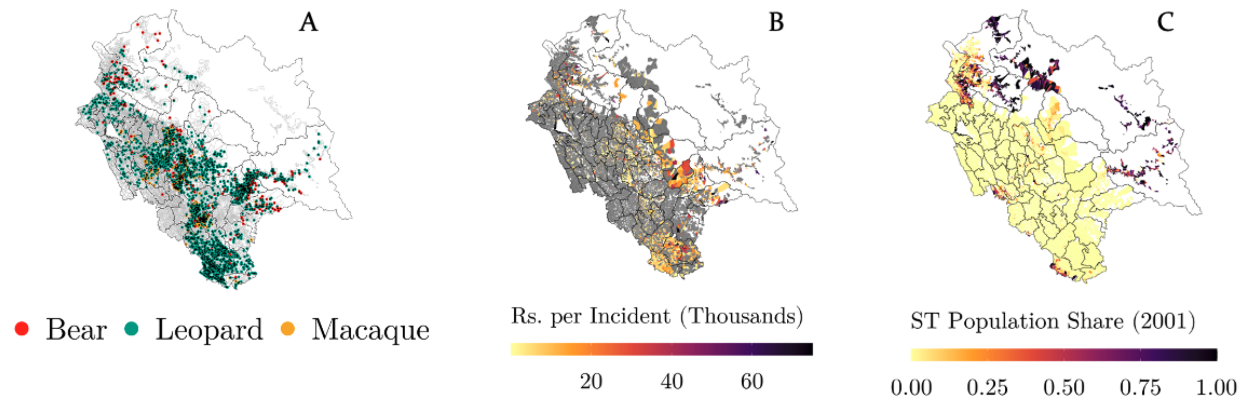


Figure 3: Distribution of Human-Wildlife Conflict, Compensation, and Tribal Population

Note: Boundary lines denote assembly constituencies. Panel A shows locations of HWC incidents. Panel B shows mean compensation within villages. Panel C shows ST population share from the 2001 census.

(Panel B), receiving compensation worth ₹9,240 per incident on average. In the unlikely event that human death occurs, compensation is fifteen times higher.

Figure 3A plots locations of HWC incidents coloured by predator animal. Leopard (green) and bear (red) attacks are common statewide, whereas Macaque attacks (yellow) occur only in the south, where tribal population is low (Panel C). We thus focus on bear and leopard incidents while decomposing our regression estimates by animal (Section 5).

3.2 Village Covariates

The first set of covariates capture village demographics. In the absence of socio-economic data on victims, we characterize HWC incidents by the tribal population and economic development of the village where each incident occurred. Tribal population share is computed using tribal and total population counts from the 2001 Census. Figure 3C shows that lower Himachal Pradesh is largely devoid of tribal communities whereas the mountainous Upper Himachal region is dominated by tribes. Village economic development is proxied by nightlights, obtained from the VIIRS satellite product (Elvidge et al., 2017). We use this to account for confounding differences in livestock herd size and value across tribal and less-tribal villages between reserved and unreserved constituencies.

The second set of covariates capture natural resource access, a key determinant of exposure to HWC. We compute the distance from each village to the nearest water body, protected area, and forest. Distance to water is measured by the straight-line distance using inland water shapefiles from the Survey of India.[11] Distance to the nearest protected

[11]Data available at: https://maps.princeton.edu/catalog/stanford-jq724hb1204

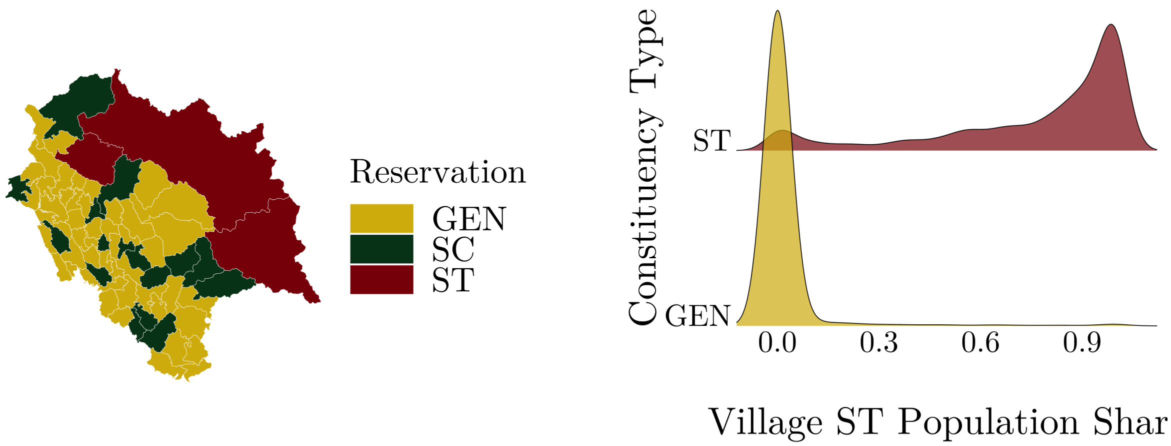


Figure 4: Political Reservation and Tribal Population

Note: Panel A is a map of assembly constituencies obtained from Datameet. Panel B shows histograms of tribal population across villages within constituency types. ST constituencies are reserved for ST candidates, SC constituencies for SC candidates, and GEN for general election constituencies.

area is measured similarly using shapefiles from the Science for Nature Data Portal.[12]

Measuring distance to the forest is more complex. We first obtain forest cover (250m resolution) for the baseline year from the Vegetative Continuous Field (VCF) satellite product (Townshend et al., 2017). We then classify pixels with $>$ 40% forest as dense based on the Indian government definition, and clump adjacent dense cells into "patches". Lastly, we compute the straight-line distance from each village to the nearest forest patch.

3.3 Political Reservation

Himachal Pradesh has 68 state assembly constituencies (Figure 4A). We obtain electoral data for each one from the SHRUG database (Asher et al., 2021), including winner name, party, and reservation status in every election. There are three constituencies reserved for tribal leaders (red), where tribal population share is highest (Figure 3C). There are also 16 SC reserved constituencies scattered around the state (green). The remaining 49 are unreserved, where general elections are held (yellow).

Constituencies have a median of 239 villages. Figure 4B shows the tribal population distribution across villages within constituencies. Most villages in tribal reserved constituencies are over 60% tribal (red). However, there is also a mass near zero, implying that some villages in tribal reserved constituencies have a small tribal population. This characterizes a unique empirical setting for studying targeted spending toward co-ethnics

[12] Shapefiles available for download at: https://data.mendeley.com/datasets/6jhr4xfs3x/1/files/48675100-c852-4847-82eb-82c5afe64454

Table 1: Three Empirical Insights from the Data

	Distance to Nearest:		HWC	Compensation
	(1)	(2)	(3)	(4)
	Forest	P.A.	# Conflicts	Human
Village ST Share	-1.090***	-0.653***	0.015	-0.500*
	(0.230)	(0.197)	(0.074)	(0.270)
Geography Controls	No	No	Yes	Yes
Data	village	village	village-yr	victim-yr
Estimator	OLS	OLS	Poisson	OLS
Forest Division FEs	✓	✓		
Forest Division × Year FEs			✓	✓
Predator FE				✓
Observations	17161	17161	2706	866
R^2	0.340	0.412		0.760

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Columns 1-2 use census and satellite data for all of HP, whereas columns 3-5 use our HWC panel. In column 3, data are at the village-year level. In columns 4-5, data are at the incident level. Geography controls include: distance to nearest forest, protected area, water body, and nightlights. Standard errors are clustered by village.

since leader ethnicity is the majority in some villages and the minority in others.

Table A3 summarizes HWC payouts in reserved and non-reserved constituencies. On average, payouts are about ₹8,000 higher per incident in reserved constituencies compared to non-reserved constituencies. This is true even controlling for animal (Panel A) or case type (Panel B). While there may be many explanations, we explore the possibility that higher payments under reservation are intended to mitigate discrimination.

3.4 Stylized Data Insights

Having described the data, we now highlight key data patterns relating to inequities in HWC exposure and compensation. These insights lay the groundwork for the formal model that follows in Section 4.

Insight 1. *Scheduled Tribes are more exposed to HWC.*

The first insight from the data is that tribes are more exposed to HWC by virtue of living closer to forests. We establish this empirically by comparing how village proximity to forests varies with tribal population share:

$$log(Distance_{vf} + 1) = \alpha + \beta \cdot ST_{vf} + \theta_f + \epsilon_{vf} \quad (1)$$

The subscripts v and f index the village and forest division, respectively. $Distance_{vf}$ measures kilometers from the village centroid to the nearest forest patch. We add one to *Distance* before taking the logarithm to account for zero values, i.e., villages inside forested areas. ST_{vf} is village tribal population share. θ_f is a forest division fixed effect which accounts for some divisions having higher forest cover than others.

We find $\beta < 0$, implying that tribal-dominated villages are closer to the forest edge compared to less-tribal villages in the same forest division (column 1, Table 1). Villages with larger tribal populations are also closer to protected areas (column 2). These results reflect a general pattern of natural resource dependence among tribal communities.

Insight 2. *Scheduled Tribes experience greater wildlife conflict.*

The second insight is that tribes experience more wildlife conflict. To show this, we estimate the correlation between tribal population and a village-year count of HWC events:

$$Conflicts_{vft} = \alpha + \delta \cdot ST_{vf} + \mathbf{X}'_{vft}\Omega + \theta_{ft} + \epsilon_{vft} \quad (2)$$

where v, f, and t index the village, forest division, and year, respectively. $Conflicts_{vft}$ denote the number of HWC incidents and ST_{vf} is village tribal population share. $\mathbf{X}'_{vft}$ is a vector of geographic covariates including distance to forests, water, protected areas, and nightlights. θ_{ft} are forest division-by-year fixed effects, which account for potential rotation of divisional forest officers who are in charge of administering HWC claims. We estimate δ with poisson maximum-likelihood since the outcome are event counts.

We document a positive but statistically insignificant association between tribal population share and HWC incidence. While $\delta > 0$ implies that villages with higher ST shares experience more HWC incidents compared to those in the same forest division with lower ST shares (Table 1, column 3), estimate imprecision prevents us from asserting this difference as meaningful.

Insight 3. *Scheduled Tribes receive smaller compensation amounts for similar conflict events.*

The third insight is that tribes are compensated less for wildlife attacks, which hints at possible discrimination. We establish this with a panel regression on claim-level data:

$$log(Payout_{iavft}) = \alpha + \zeta \cdot ST_{vf} + \mathbf{X}'_{vcft}\Omega + \theta_{ft} + \eta_{ia} + \epsilon_{iavft} \quad (3)$$

where i, a, v, f, and t index the incident, predator animal, village, forest division, and year, respectively. $Payout_{iavft}$ denotes compensation paid on claim i and, as before,

ST_{vf} is tribal population share. $\mathbf{X}'_{vft}$ is the same set of covariates as Equation 2 and θ_{ft} are forest division-by-year fixed effects, which account for forest officer rotation. Animal fixed effects, η_{ia}, ensure that comparisons are made between incidents involving the same predator. We estimate the equation for incidents involving humans because payouts are directly comparable across incidents and typically filed as single-incident claims. In contrast, livestock-related claims often involve multiple animals, each compensated at a different rate depending on the species, making per-incident comparisons less simple.

We find $\zeta < 0$ for HWC cases involving human death or injury (Table 1, Column 4), suggesting that villages with larger tribal populations receive systematically lower compensation for the *same type of animal attack*. A 10 percentage point (pp.) increase in the tribal population share is associated with a 5% reduction in compensation.

Summary of Empirical Patterns These three data insights highlight both the vulnerability of India's tribal population, in terms of exposure to HWC, as well as the inadequacy of the compensation bureaucracy for mitigating damages. The fact that tribal communities receive lower compensation for similar conflict hints at possible discrimination. It also raises the question of whether mandating tribal representation in local politics can help re-direct transfers toward tribal communities and undo such inequities.

4 Model

This section develops a political economy model of a public bad with selective discrimination.[13] The model illustrates how discrimination in compensation for the public bad can arise and generates testable predictions about how political reservation alters incentives for discrimination. Proofs are in Appendix E. We test model predictions in Section 5 using India's political reservation system as a natural experiment.

4.1 Set-up

Group Utility The economy consists of two groups $i \in \{s, n\}$, denoting Scheduled Tribes, s, and non-tribes, n. These groups can be equivalently viewed as the minority and majority, respectively. Population is normalized to unit mass, with π denoting the share of minority group s. Each group is potentially exposed to a public bad, X, which we interpret as HWC for the remainder of the model. Utility for group i linearly increases

[13]The model combines insights from existing models of political reservation (Besley and Coate, 1997; Besley et al., 2004; Anderson et al., 2015; Old, 2020; Chattopadhyay and Duflo, 2004), special interest politics (Grossman and Helpman, 2008), and their application to environmental contexts (Aidt, 1998; Gulati, 2008).

in private income, y_i, and decreases with exposure to the public bad:

$$U_i(y_i, X) = y_i - \alpha_i X,$$

where α_i parameterizes the marginal disutility from X. We assume $\alpha_s \geq \alpha_n$ to incorporate Insight 1, that s is more vulnerable to HWC. We also assume s is poorer than n, given by $0 < y_s \leq y_n$, in line with official statistics (Ministry of Tribal Affairs, 2023).

Abatement Costs Given wild animal populations, human encroachment, and other landscape features, a natural equilibrium level of HWC emerges, $\bar{X}$. The executive arm of an incumbent government can set $X < \bar{X}$ at an Abatement Cost (AC) given by:

$$AC = \frac{\beta}{2}(\bar{X} - X)^2,$$

where β parameterizes the marginal cost of abatement actions such as investing in conservation education, fencing, and other measures.

Discrimination In principle, the executive must compensate losses from X. Without discrimination, group i is compensated $\alpha_i X$ and final utility is $U_i = y_i$. In practice, the executive can discriminate against s by reducing their compensation and redistributing a portion of withheld funds to n. This follows from Insight 3, where we showed that STs receive lower payouts than non-tribals for similar types of HWC. Formally, letting $\delta \in [0, 1]$ be the proportion of discrimination, s is paid $(1 - \delta)\alpha_s X$ instead of $\alpha_s X$. Assuming $\delta > 0$ implies that discrimination against n is not possible. [14]

Political Costs of Discrimination Discrimination also induces rent-seeking behaviour. Let θ be the proportion of funds withheld from s lost to grifters. Both discrimination itself and rent-seeking lower re-election chances. The Political Cost (PC) of discrimination is:

$$PC = \underbrace{\theta\delta\pi\alpha_s X}_{\text{corruption cost}} + \underbrace{\frac{\delta^2}{2}\pi}_{\text{alienation cost}},$$

where $\theta\delta\pi\alpha_s X$ is the portion of diverted compensation from s lost to corruption. We assume that the corruption cost of rent-seeking increases linearly in the proportion of

[14] In our model, discrimination is represented as transferring resources from the minority to the majority, analogous to the executive operating under an implicit budget constraint equal to aggregate losses from HWC in society. In Himachal Pradesh, this reflects the reality. Discussions with forest officials confirmed that annual budgets are limited and often insufficient, with payments frequently deferred to future financial years. We also met a Divisional Forest Officer (see Figures 2 and B2) who had to travel to Shimla to petition the Forest Service Headquarters for the release of funds just so that compensation could be paid.

rent seeking, θ. In addition, $\frac{\delta^2}{2}\pi$ is the political cost of alienating the tribal minority, s. We assume that this increases quadratically in the proportion of discrimination, δ.

With discrimination, compensation to s is $(1-\delta)\alpha_s X$, and final utility is $U_s = y_s - \delta\alpha_s X$. Compensation to n becomes $\alpha_n X + \frac{(1-\theta)\delta\alpha_s X}{1-\pi}$, and final utility is $U_n = y_n + \frac{\pi}{(1-\pi)}(1-\theta)\delta\alpha_s X$. Summing compensation to both groups, the total Cost of Compensation (CC) is:

$$CC = [\pi\alpha_s + (1-\pi)\alpha_n - \theta\delta\pi\alpha_s]\, X$$

Next, we derive the level of δ and X under a social planner and compare it to two elected political outcomes, one under general and the other under reserved elections.

4.2 The Social Planner

To benchmark the socially optimal allocation, a social planner chooses the proportion of discrimination, δ^*, and the level of the public bad, X^*, to minimize social costs:

$$\arg\max_{\delta, X} \{-(CC + AC + PC)\}$$

Taking the first order conditions yield:

$$\delta^* = 0$$
$$X^* = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right)$$

The detailed derivation is in Appendix E.1. In words, the planner does not discriminate because doing so only adds to political costs, without any aggregate benefit. The optimal allocation of X is the natural level less the linear population weighted sum of marginal damages for each group divided by the marginal abatement cost.[15]

4.3 Election Process

We now model the political process, either a general election (n wins) or a reserved election (s wins).[16] Politicians are citizens and have the same preference as their ethnic group, a simplifying assumption which enables us to abstract from political selection. The politician from group i chooses δ and X to minimize social costs, which increases re-election chances, while also caring about their own utility[17]:

$$\arg\max_{\delta, X} \{-(CC + AC + PC) + \gamma U_i\} \qquad \text{where } i \in \{s, n\}$$

[15]We assume that the parameters in our model satisfy the conditions necessary for $X^* > 0$, in other words, we assume that $\bar{X} > \frac{1}{\beta}\left(\pi\alpha_s + (1-\pi)\,\alpha_n\right)$.

[16]This assumption is backed by the fact that $< 2\%$ of STs win unreserved seats (Old, 2020).

[17]This assumption is common in special interest–incumbent models (Grossman and Helpman, 2008).

Where γ is a weight on group i's utility. We solve for optimal δ and X under general and reserved elections, and then present a set of theoretical results about ethnic favouritism in HWC compensation.

General Elections A representative from the majority non-tribal group n is always elected. After substituting their utility into Equation 4.3, the first order conditions of their maximization problem yield:

$$\delta^g = \frac{\gamma(1-\theta)}{(1-\pi)}\alpha_s X^g > 0 \tag{4}$$

$$X^g = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n - \frac{\gamma(1-\theta)\pi}{(1-\pi)}\delta^g \alpha_s\right) \tag{5}$$

The detailed derivation is in Appendix E.2. In words, Equation 4 implies that there is discrimination against the minority under general elections. The majority incumbent obtains personal benefit from discrimination and therefore discriminates until the marginal benefit equals the re-election cost from alienating the minority. Discrimination increases in the weight that n places on their utility, and falls as rent-seeking rises.

Equation 5 implies that a larger amount of HWC may be tolerated by the majority incumbent as increasing HWC increases the personal benefit from discrimination. Note that if $X^* > 0$ is positive, then $X^g > 0$ as well.

Reserved Elections A representative from the minority tribal group s is required to be elected. After substituting their utility into Equation 4.3, the first order conditions yield:

$$\delta^r = \delta^* = 0 \tag{6}$$

$$X^r = X^* = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right) \tag{7}$$

The detailed derivation is in Appendix E.3. Like the social planner, the minority executive does not discriminate. This is because we assumed discrimination only reduces compensation to the minority, and there is no way to discriminate against the majority (i.e. $\delta \in [0,1]$)[18]. This also implies that HWC under reservation is equivalent to HWC under the social planner. Since the tribal executive acts like a social planner in equilibrium, the welfare implications of political reservation is fairly straightforward:

[18] While we make a restrictive assumption of no possible discrimination against the majority, a more plausible version—that the cost of discrimination against the majority is higher than the cost of discriminating against the minority—will also yield a similar outcome. This is because even under reservation, government machinery and law enforcement are dominated by the majority, making it harder for the minority to discriminate as successfully as the majority. For this more plausible assumption, we will see a reduced level of discrimination, instead of its elimination.

Proposition 1 (Welfare implications of political reservation)**.** *Social welfare under reserved elections is higher than social welfare under general elections.*

Proof. δ^*, X^* maximize social welfare. Given that $\delta^g \neq \delta^*$ and $X^g \neq X^*$, and that our social welfare function is the negative sum of three cost functions, of which at least two are strictly convex (as they include square terms), then by definition social welfare is strictly higher under reserved elections than general elections. □

4.4 Testable Predictions

We close the model with equilibrium comparative statics that yield predictions about the impact of reservation on wildlife conflict, compensation, and discrimination. Each theoretical prediction has an empirical analog, which we test in the next section.

Prediction 1 (Conflict tolerance under reserved elections)**.** *Less human-wildlife conflict is tolerated under reserved compared to general elections.*

Proof. $X^g - X^r = \frac{1}{\beta}\gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta^g \alpha_s > 0$, since $\delta^g > 0$ from Equation 4. □

Under general elections, the leader from majority group n tolerates additional HWC because more conflict implies more scope for discrimination and, as a result, more utility-enhancing redistribution towards their own group. Under reserved elections, the leader from s faces no benefit from discrimination and thus focuses only on abatement.

We test Prediction 1 with a *simple difference* regression that compares the HWC frequency in reserved and unreserved constituencies (Section 5.2). Our second prediction evaluates how payouts for these incidents varies across the two types of constituencies.

Prediction 2 (Compensation paid to s under reservation)**.** *Under reserved elections, s receives higher compensation relative to general elections.*

Proof. $\alpha_s X^* - (1-\delta^g)\alpha_s X^g = \delta\alpha_s X^* > 0$. See Appendix E.4 for full proof. □

When moving from general to reserved elections, two competing forces affect compensation to the minority. First, removing discrimination increases compensation per incident. Second, lower HWC decreases overall compensation (Prediction 1). The elimination of discrimination dominates because the marginal damage from HWC is larger for minorities ($\alpha_s \geq \alpha_n$), providing higher utility from fair compensation compared to n.

Our empirical test of Prediction 2 compares average payouts to tribal groups in reserved versus unreserved constituencies. Formally, we test $\frac{CC^r}{X^r} - \frac{CC^g}{X^r} \geq 0$ with a *simple difference* design on victim-level data (Section 5.3). In the absence of data on victim identity, this serves as a valid test since reserved villages are 70% tribal (Table A4).

The third prediction, and key theoretical result of the paper, arises from a comparative static that varies tribal population share. The comparative static evaluates the change in average compensation per incident as the proportion of tribal constituents rises in reserved relative to the same change in unreserved constituencies.

Prediction 3 (Ethnic Favouritism: Tribes)**.** *The increase in average compensation when tribal population share rises is higher under reservation than the increase under general elections.*

Proof. $\frac{\partial}{\partial \pi}\left[\frac{CC^r}{X^r}\right] - \frac{\partial}{\partial \pi}\left[\frac{CC^g}{X^g}\right] = \delta \alpha_s \theta > 0$. Full proof in Appendix E.5. □

When tribal population share rises, average compensation paid also rises since their marginal dis-utility is higher ($\alpha_s \geq \alpha_n$). Under general elections, part of this increase is diverted by rent-seeking. In reserved elections, however, the full increase in compensation reaches the constituents. As a result, compensation per incident rises faster with the tribal population share under reserved elections, a phenomenon we call *ethnic favouritism*.

Our target theoretical parameter, $\delta \alpha_s \theta$, is designed to map to a *difference-in-difference coefficient* given our data. We explain this mapping from the theory to the empirics next.

5 Main Results

This section presents evidence of ethnic favouritism in environmental disaster payouts by empirically testing each model prediction. Our identification strategy relies on a policy rule that generates quasi-random variation in which political seats are reserved for minorities, giving rise to plausible control groups: other constituencies that are similar but face general elections (see Section 2.3).

5.1 Empirical Design

We test Predictions 1–3 by comparing HWC outcomes across villages in reserved constituencies to similar unreserved constituencies. The ideal counterfactual constituency shares socio-economic and institutional characteristics with reserved ones. We design two complementary empirical strategies to define such counterfactuals, both grounded in institutional features of India's reservation and forest administration systems.

The first design leverages the reserved seat allocation rule described in Section 2.3. In each district, we select the three constituencies just below the tribal population share cutoff for comparison. This matched comparison group more closely resembles reserved constituencies than using all unreserved constituencies in the state. One limitation is that matching only ensures similarity in tribal population shares and district characteristics;

other dimensions may remain unbalanced. Table A4 confirms that although matched unreserved constituencies are more comparable to reserved ones than the statewide unreserved pool, some covariates differ significantly (columns 4 and 5). We thus include a rich set of covariates in all specifications. Another limitation is that matching largely restricts variation *across* forest divisions. Only one below-cutoff constituency lies within the same forest division as the reserved constituency, making it difficult to disentangle the impact of political representation from institutional differences across forest bureaucracies.

The second design addresses this limitation by exploiting the forest bureaucracy structure (Figure 2) for identification. We augment the matched comparison group by adding all unreserved constituencies that share a forest division with reserved ones. This expands the sample from 6 to 26 constituencies and enables comparisons between villages in reserved and unreserved constituencies *within* the same forest division, thus holding constant the divisional officer overseeing HWC claims. This design increases statistical power and isolates the effect of reservation from variation in forest bureaucracies.

Despite different comparison groups, both research designs exploit village-level variation in tribal population shares within and across constituencies. Recall that constituencies contain a median of 239 villages, with substantial dispersion in tribal composition (Figure 4B). The same constituency leader therefore represents some villages where they are the majority and others where they are the minority. This creates an ideal setting for studying ethnic favouritism since leader identity is fixed within constituencies, but their ethnic alignment with constituents varies from village to village.

Several threats to validity merit discussion. First, both designs use restricted samples and thus produce only locally valid estimates. We therefore present full-sample analogs of all regressions as robustness checks. Second, gerrymandering may threaten identification. However, Iyer and Reddy (2013) finds that the redrawing of constituencies in 2008 was largely devoid of political manipulation. Third, reservation may encourage minorities to report incidents they otherwise would not. If this only increases the number of reports without changing the distribution of claim amounts, it adds precision without bias. Yet if the distribution does change under reservation, e.g., by lowering the cost of reporting for low-value damages, then our estimates will be biased downward, counter to our prediction that payments rise under reservation. We develop a test for reporting bias in Section 5.4.1 and find no evidence. Thus, if our results validate the theory, they do so despite potential reporting bias, not because of it.

5.2 Results: HWC in Reserved Constituencies

Estimation Framework Prediction 1 from the model states that HWC is lower under reserved elections. We test this with the following village-level equation:

$$HWC_{vcft} = \alpha + \delta \cdot R_{cf} + \mathbf{X}'_{vcft}\Omega + \theta_{ft} + \epsilon_{vcdt} \tag{8}$$

where HWC_{vcft} is the number of HWC incidents in village v, of constituency c, in forest division f, at time t. R_{cf} indicates whether the constituency seat is reserved for tribes. The time index is dropped since reservation status does not change during our study period. In the matched sample, $R_{cf} = 0$ for the three unreserved constituencies in the district just below the tribal population cutoff. In the extended sample, $R_{cf} = 0$ for all unreserved constituencies that share a forest division with reserved ones. In the full sample, $R_{cf} = 0$ for all unreserved constituencies in the state. $\mathbf{X}'_{vcft}$ is a vector of village covariates described in Section 3.2. Forest division-by-year fixed effects, θ_{ft}, account for divisional forest officer identity. We include these since HWC claims amounts are approved by divisional officers, a position which can be shuffled annually.

δ is the empirical analog of $X^G - X^*$ from the model. $\delta < 0$ is the empirical confirmation of Prediction 1, which states that the number of HWC claims in constituencies reserved for tribes is lower than in unreserved constituencies. The intuition is that, absent reservation, the marginal benefit of discrimination exceeds the abatement cost of reducing HWC. Once the incentive for discrimination is removed under reserved elections, the minority chooses to uniformly abate, lowering HWC incidence in reserved constituencies.

Results and Robustness Table 2 reports estimates of Equation 8, where the outcome is log of total HWC incidents. Column 1 presents estimates from the matched sample, which mainly uses variation across forest divisions for identification. Column 2 presents estimates from the extended sample of reserved and unreserved constituencies sharing a forest division, which uses both within- and across-division variation. Column 3 shows full-sample estimates where all unreserved constituencies serve as the comparison group.

We find $\delta < 0$ and is statistically significant across all three samples. Political reservation for tribal leaders leads to fewer HWC incidents, consistent with Prediction 1 of the model. The matched and extended samples yield nearly identical point estimates: villages in reserved constituencies experience about 6% fewer HWC incidents than those facing general elections. Robustness of the two estimates implies that institutional differences across forest divisions do not bias δ in the matched sample. Bonferroni-corrected p-values are provided in the table footer to adjust for multiple hypothesis testing.[19]

[19] Testing multiple related hypotheses without adjustment inflates the probability of false rejections.

Table 2: Political Reservation and Incidence of Human-Wildlife Conflict

	(1) Matched Sample	(2) Extended Sample	(3) Full Sample
ST Reserved	-0.062***	-0.060***	-0.051*
	(0.013)	(0.018)	(0.028)
Geography Controls	Yes	Yes	Yes
Village ST Share	Yes	Yes	Yes
Bonferroni p-value	0.026	0.016	0.215
Forest Division × Year FEs	✓	✓	✓
Observations	232	674	2425
R^2	0.123	0.130	0.160

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the village-year level. The outcome is log number of conflicts reported. Column 1 uses the matched sample of reserved constituencies and unreserved ones below the cutoff. Column 2 uses the extended sample of all reserved and unreserved constituencies sharing a forest division. Column 3 uses the full sample where all unreserved constituencies in the state serve as the comparison group. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by forest division.

Table A5 explores alternative specifications and sensitivity checks in the matched sample. Columns 1 and 2 decompose the estimates by predator animal.[20] Lower aggregate incidence of HWC in reserved constituencies is driven by fewer conflicts with bears (column 2), whereas villages in these constituencies experience greater leopard attacks (Column 1). A possible, but untestable, explanation is that since bear conflict commands the highest payouts (Table A2) and is most associated with human injury and death, reserved constituencies shift abatement resources away from leopards and towards bears, leading to more leopard conflict. Column 3 tests robustness to a matched sample with five constituencies (instead of three) just below the cutoff as the comparison group. Since the outcome is a count variable, column 4 presents estimates using a Poisson pseudo maximum likelihood estimator. Column 5 measures the outcome in levels. The coefficient remains robust across these three specifications. Our estimates from the extended sample

While List et al. (2023) propose a more powerful procedure that exploits the joint dependence structure of test statistics and covariate adjustment, available implementations do not accommodate clustered standard errors, which are central to our empirical design. We therefore adopt the Bonferroni correction, which is appropriate in our setting given the small number of tests within each theoretical prediction (three).

[20]We cannot decompose by case type since there are only 47 human cases in the matched sample.

are also very similar across the same five robustness tests.

5.3 Results: HWC Payouts in Reserved Constituencies

Estimation Framework Prediction 2 from the model states that average payouts are higher in reserved constituencies. We test this with the following claim-level specification:

$$Log(Payout_{iasvcft}) = \phi \cdot R_{cf} + \mathbf{X}'_{vcft}\Omega + \theta_{ft} + \eta_{ia} + \mu_{is} + \epsilon_{iasvcft} \tag{9}$$

where *Payout* is compensation paid (in ₹) for incident i, with predator animal a, leading to HWC case type s (human or livestock loss), in village v, of constituency c, in forest division f, at time t. R_{cf} indicates constituency reservation status, with the comparison group ($R_{cf} = 0$) defined as before for each estimation sample (Section 5.2). $\mathbf{X}'_{vcft}$ is a vector of village covariates and θ_{ft} are division-by-year fixed effects, which account for forest officer rotations. We also include predator fixed effects, η_{ia}, and case fixed effects, μ_{is}, to ensure comparisons are made between reserved and unreserved constituencies for the same type of animal attack, and the same type of case.

ϕ is the empirical analog of $\delta\alpha_s X^*$ from the model, and $\phi > 0$ is the empirical verification of Prediction 2. Note that $\phi > 0$ means that tribal representation increases *average* compensation in reserved constituencies, not that benefits are directed *towards* the leader's co-ethnic group. We investigate the latter in Section 5.4.

Results and Robustness Table 3 presents estimates of Equation 9 for the matched sample (column 1), extended sample (column 2), and full sample (column 3). The outcome is the log of compensation (in ₹). We find $\phi > 0$ across all samples: tribal representation in local politics significantly increases average payouts, consistent with Prediction 2 from the model. Point estimates are similar under the matched and extended sample, indicating that victims in reserved constituencies receive 47%-57% higher payouts than victims of the same type of wildlife attack in unreserved constituencies. Since matching mainly exploits across–forest-division variation while the extended sample uses both across- and within-division comparisons, robustness of the two estimates suggests that confounding differences across forest bureaucracies are unlikely to drive the matched sample results. Bonferroni p-values are provided in the footer to adjust for multiple hypothesis testing.

Table A6 conducts the same sensitivity analyses as the previous section using the matched sample. Higher average payouts appear to be driven by greater compensation for leopard attacks (column 2). In contrast, the coefficient for bears (column 1) is negative and statistically insignificant.[21] At the incident level, we are unable to test heterogeneity

[21] Few bear attack incidents in this subsample (N=85) may be a reason for estimate imprecision.

Table 3: Political Reservation and Compensation for HWC

	(1) Matched Sample	(2) Extended Sample	(3) Full Sample
ST Reserved	0.571***	0.475***	0.462***
	(0.037)	(0.077)	(0.100)
Village ST Share	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes
Bonferroni p-value	0.000	0.000	0.000
Forest Division × Year FEs	✓	✓	✓
Predator FEs	✓	✓	✓
Case FEs	✓	✓	✓
Observations	288	934	3256
R^2	0.525	0.616	0.587

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the victim-year level. The outcome is log compensation. Column 1 uses the matched sample of reserved constituencies and unreserved ones below the cutoff. Column 2 uses the extended sample of all reserved and unreserved constituencies sharing a forest division. Column 3 uses the full sample where all unreserved constituencies in the state serve as the comparison. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. All specifications include animal, case, and division-year fixed effects as well village controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by forest division.

by case type as there are insufficient cases of human injury/death between matched constituencies. In terms of robustness, the coefficient remains similar when the comparison group consists of five constituencies just below the cutoff instead of three (column 3). The coefficient also remains positive and significant when the outcome is in levels (column 4). The same alternative specifications yield robust coefficients under the extended sample.

Having established that mean payouts in reserved constituencies are higher, we next turn to the main question of the paper: whether higher payments reflect tribal leaders directing transfers toward their own communities. This requires looking *within* reserved and unreserved constituencies and comparing the payout distribution *across* villages.

5.4 Results: Ethnic Favouritism in Reserved Constituencies

Estimation Framework Prediction 3 from the model states that tribal constituency leaders target transfers toward coethnic villages, which we refer to as ethnic favouritism. We identify this behaviour with a difference-in-difference design that compares payouts between villages with high and low tribal population shares in reserved constituencies (first difference) to the same difference in unreserved constituencies (second difference).

In the standard difference-in-difference design, policy timing creates time variation and differences are compared across treatment and control groups before and after policy implementation. Our analog exploits tribal population share as the measure of treatment intensity (Section 2.3), with the resulting difference-in-difference estimator capturing how payouts vary between less- and more-tribal villages across reserved and unreserved constituencies in each of our estimation samples. The estimating equation is:

$$\begin{aligned} Log(Payout_{iasvcft}) = \xi \cdot (R_{cf} \times ST_{vcf}) + \beta \cdot R_{cf} + \delta \cdot ST_{vcf} + \mathbf{X}'_{vcft}\Omega \\ + \gamma_c + \theta_{ft} + \eta_{ia} + \mu_{is} + \epsilon_{iasvcft} \end{aligned} \tag{10}$$

As before, $Payout$ is the compensation paid (in ₹) for incident i, with animal a, leading to HWC case type s (human or livestock), in village v, of constituency c, in forest division f, and at time t. $\mathbf{X}'_{vcft}$ are village covariates (Section 3.2). We include division-by-year fixed effects, θ_{ft}, predator fixed effects, η_{ia}, case fixed effects, μ_{is}, and constituency fixed effects, γ_c. Inclusion of γ_c distinguishes Equation 10 from the other specifications because it allows us to make within-constituency comparisons across villages with varying tribal population shares. R_{cf} is constituency reservation status, defined as before for each estimation sample (Section 5.2). It enters interacted with village tribal population share, ST_{vcf}, so that the interaction coefficient, ξ, captures the difference-in-difference effect. Standard errors are clustered at the constituency level.

The coefficient of interest, ξ, is the empirical analog of $\delta\alpha_s\theta$ from the model. $\xi > 0$ is the empirical verification of Prediction 3—that average compensation rises faster with tribal population share under reservation than under general elections. As discussed in the model, the intuition is that since the incentive for rent-seeking is eliminated under reservation, the full increase in compensation in tribal-dominated villages (which experience more HWC) reaches the victims.

Results and Robustness Difference-in-difference estimates of Equation 10 are presented in Table 4. We find that $\xi > 0$ across the three samples, consistent with Prediction 3 from the model; tribal leaders exhibit coethnic preferences and direct transfers toward villages with larger tribal populations. Point estimates are stable across samples and can be interpreted as follows: when constituency leaders are tribal, villages under their governance with 10 pp. larger tribal population shares receive 3.5%-4.6% higher payouts *for the same type of animal attack* compared to when the leader is from the majority. Section 6 provides more concrete qualitative and quantitative evidence that this finding is indeed driven by

Table 4: Ethnic Favouritism in Environmental Disaster Payouts

	(1) Matched Sample	(2) Extended Sample	(3) Full Sample
ST Reserved × Village ST Share	0.460***	0.349**	0.499***
	(0.096)	(0.131)	(0.139)
Village ST Share	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes
Bonferroni p-value	0.027	0.063	0.003
Constituency FEs	✓	✓	✓
Forest Division × Year FEs	✓	✓	✓
Predator FEs	✓	✓	✓
Case FEs	✓	✓	✓
Observations	288	928	3252
R^2	0.530	0.617	0.596

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the claim-year level. The outcome is log compensation. Column 1 uses the matched sample of reserved constituencies and unreserved ones below the cutoff. Column 2 uses the extended sample of all reserved and unreserved constituencies sharing a forest division. Column 3 uses the full sample where all unreserved constituencies in the state serve as the comparison. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the tribal population share. All specifications include constituency, division-year, animal, and case fixed effects, and village controls for: distance to forest, distance to nearest PA, distance to nearest water, and nightlights. Standard errors clustered by forest division.

ethnic favouritism. Similar to our interpretation of the previous findings, robustness of the matched and extended sample estimates suggests that confounding differences across forest bureaucracies are unlikely to explain the matched sample results. Bonferroni p-values are provided in the footer to adjust for multiple hypothesis testing.

Table A7 explores sensitivity of the estimates to alternative samples and functional forms. Ethnic favouritism is particularly strong in compensation for leopard attacks (column 1), whereas we find no evidence of favouritism in compensation for bear attacks (column 2). Note the small number of observations for bear conflict. Coefficient magnitude and precision are virtually unchanged when the matched comparison group consists of five constituencies just below the cutoff instead of three (column 3). The coefficient is also stable when the outcome is in levels, although precision declines (column 4). The same alternative specifications yield robust coefficients under the extended sample.

Table A8 shows the matched sample estimates adjusted for alternative standard error clustering. Column 1 replicates the baseline for comparison, where errors are clustered by constituency. However, given that the forest policy decision-making unit is the circle or forest division (Figure B2), unobserved determinants of payout amounts may be correlated within these administrative units. Yet columns 2 and 3 show that estimate precision is very similar under division and circle clustering.

Another view is that the appropriate cluster is ecological, not administrative. Since compensation varies by livestock type, unobserved determinants of compensation may be correlated within livestock predator ranges, which do not adhere to administrative boundaries. In the absence of range maps, we instead investigate spatial correlation by implementing Conley (1999) standard errors for various choices of the kernel cutoff distance (Table A8, columns 4-7). Reassuringly, precision remains similar, even when allowing for longer distance spatial correlation up to 200km. The extended sample estimate is also robust to these alternative clustering techniques.

5.4.1 Reporting Bias

As discussed in Section 5.1, the validity of our estimates of ethnic favouritism depends on the extent of reporting bias. If reservation only increases the likelihood that tribal individuals file claims, then this adds more data points and improves precision of ξ without biasing it. Bias arises only if such changes are systematic. For instance, if tribal claimants underreport minor damages in unreserved constituencies due to costly barriers, then compensation amounts in those constituencies are right-censored. If political representation enables reporting of smaller claims, then their inclusion in the estimation sample attenuates ξ. Yet, despite potential downward bias, we still find $\xi > 0$ (Table 4), implying that ethnic favouritism dominates reporting bias, or there is no reporting bias.

Below, we formally rule out reporting bias by showing that the distribution of compensation amounts does not change in tribal-dominated villages under reservation. We first bin the number of claims in a village into three quantiles of compensation values and then estimate the following village-level difference-in-difference equation:

$$Claims_{vcft} = \varphi \cdot (R_{cf} \times ST_{vcf}) + \beta \cdot R_{cf} + \delta \cdot ST_{vcf} + \mathbf{X}'_{vcft}\Omega + \gamma_c + \theta_{ft} + \epsilon_{vcft}$$

where $Claims \in \{\text{low, medium, high}\}$ is the number of claims of low, medium, or high value. All subscripts and terms are the same as Equation 10. φ is the test for reporting bias. When the outcome is number of low-value claims, $\varphi > 0$ implies that reservation prompts tribal claimants to report more minor damages, potentially downward biasing ξ in Equation 10. Lack of reporting bias is indicated by $\varphi = 0$.

Table A9 presents the results. We find no evidence of reporting bias in the matched sample (columns 1-3) nor in the extended sample (columns 4-6). The interaction coefficient in all columns is statistically insignificant, indicating that political reservation does not induce victims in tribal-dominated villages to report more low-, medium-, or high-value claims. These findings strengthen confidence in the credibility of our research design and the interpretation of our ethnic favouritism estimates.

6 Mechanisms: What Drives Ethnic Favouritism?

Having established evidence of ethnic favouritism, we now turn to an analysis of mechanisms. This section addresses the question of how tribal claimants secure higher payouts under greater co-ethnic political representation—a pattern that is especially puzzling given that compensation rates are formally fixed (Figure 1).

Through informal interviews with Himachal Pradesh forest officers, veterinarians, and victims, we learned that although official compensation rates are fixed, the *classification* and reported *number* of livestock killed may be informally negotiated. Herders can bargain to reclassify animals as higher-value breeds or to overstate the number killed to increase compensation[22]. It is clear that the success of such negotiations depends on access to, and relationships with, local political leaders, forest officials, and veterinarians to secure higher payouts despite fixed official rates.

To empirically test whether bargaining on breed or numbers explains our findings, we sequentially add fixed effects for each dimension—first for livestock breed, then for the number of animals lost—to the difference-in-difference specification (Equation 10). This successively removes variation attributable to each type of bargaining, allowing us to assess whether ethnic favouritism persists using the residual variation. If the estimated difference-in-difference effect disappears after accounting for a given dimension, we interpret that as evidence that the corresponding bargaining channel was driving the result.

To operationalize bargaining on species, we construct a fixed effect equal to one if the lost livestock is a buffalo, cow, donkey, horse, any of their young, or a jersey breed. Zero indicates sheep, pig, or goat. Including this as a fixed effect lets victims bargain *within* broad species types (e.g., reclassifying a local cow to a jersey), but not *across* (a goat cannot be reclassified as an ox). To operationalize bargaining on numbers, we categorize the number of livestock lost into five bins: “1”, “2”, “3”, “4”, and “5+”. Including these as fixed effects ensures comparisons are made between claims for the same number of animals, in which case remaining variation must stem from bargaining over breed.

Table 5 presents evidence that bargaining over reported quantities of livestock plausibly drives ethnic favouritism in HWC payouts. We use the full sample for this analysis

[22] An example could be the reclassification of a local cow (compensation of ₹6,000) to a cross-breed, or Jersey to raise compensation to ₹15,000 (Figure 1).

Table 5: Mechanisms: Negotiation Reported Livestock Breed and Numbers

	(1) Baseline	(2) Breed FEs	(3) Num FEs	(4) Breed + Num FEs
ST Reserved × Village ST Share	0.499***	0.514***	0.099	0.122
	(0.139)	(0.123)	(0.089)	(0.081)
Village ST Share	Yes	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes	Yes
Bonferroni p-value	0.004	0.001	1.000	0.568
Breed FEs		✓		✓
Num. Killed FEs			✓	✓
Constituency FEs	✓	✓	✓	✓
Forest Division × Year FEs	✓	✓	✓	✓
Predator FEs	✓	✓	✓	✓
Case FEs	✓	✓	✓	✓
Observations	3252	2947	2944	2944
R^2	0.596	0.643	0.671	0.780

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the victim-year level. The estimation sample is the full sample where all unreserved constituencies serve as the comparison group. The outcome is log compensation. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the tribal population share. All specifications include village controls for: distance to forest, distance to nearest PA, distance to nearest water, and nightlights. Standard errors clustered by forest division.

because adding two more sets of fixed effects—on top of the four already included in Equation 10—leaves both the matched and extended sample underpowered.[23] Column 1 replicates the baseline findings (column 3, Table 4) for comparison. Column 2 introduces breed fixed effects, effectively shutting down bargaining across broad species types while still allowing room to bargain within similar breeds and on quantity killed. The coefficient remains virtually unchanged, suggesting minimal strategic species reclassification. In contrast, column 3 shows a sharp drop in magnitude and loss of statistical significance when fixed effects for the number of livestock lost are added. The null result persists in column 4 when breed and quantity fixed effects are included together. Together, these estimates indicate that ethnic favouritism operates primarily through inflating reported

[23]Using the full sample is not a major concern due to the stability of the main difference-in-difference estimates across the three estimation samples (Table 4).

livestock quantities, rather than misclassification of species[24].

A counterargument is that that null effects with number fixed effects may not mean that shepherds bargain on numbers to obtain higher payouts—it may just mean that shepherds in treatment villages have larger livestock herds and therefore face greater losses per HWC incident. For this to be true, herd size or livestock losses would need to rise faster with tribal population share (the treatment) in reserved constituencies compared to unreserved ones. While this could happen as a byproduct of targeted income transfers to minorities in reserved constituencies (Pande, 2003; Chin and Prakash, 2011), we control for village-level wealth in all our regressions, helping rule out this explanation. A similar alternative explanation is that our findings may be explained by a shift in the *composition* of livestock toward higher-value animals in tribal-dominated villages of reserved constituencies. However, the baseline estimate remained highly stable with livestock breed fixed effects in Table 5 (column 2), helping rule out this alternative explanation.

Lastly, one may argue that tribal-dominated villages in reserved constituencies face more dangerous predators, leading to greater losses and higher claims. But all our regressions include predator fixed effects, ruling out this explanation. Given little leeway in human compensation cases, the lack of support for these three alternative explanations strengthens the case that ethnic favouritism—most plausibly through bargaining over livestock numbers—is the most compelling narrative underlying our findings.

It is important to acknowledge that ethnic favouritism through bargaining is a type of corruption. We wish to clarify that we are not arguing that corruption is beneficial; in fact our results do not imply that. Rather, our findings imply that political reservation may be addressing existing power imbalances and allow fairer outcomes for marginalized groups in a world where bargaining and corruption already exist.

7 Welfare Analysis

In Proposition 1 we predict that political reservation raises social welfare. We do not directly test welfare impacts, but by evaluating overall compensation received, we can provide insight on the mechanisms, and some of the parameters that impact welfare.

In our model (Section 4), welfare is partly determined by two key parameters: cor-

[24] Starting in 2010, the Himachal Pradesh Government began using the AGRISNET (Agricultural Research & Information Network) portal to manage animal husbandry data. Officials now record all large livestock—such as cow and buffalo—in this database, and also tag each animal with a unique database number. The database stores details like breed, estimated milk production, and age. On predation by a wild animal, the veterinarian verifies breed from the database, and also removes the deceased animal from it. This has made reclassification across breeds significantly more difficult.

Table 6: Parameter Choices for Numerical Simulation

Parameter	Description	Value	Justification
α_s	Marginal disutility (tribal)	1.1	Table 1, Column 1
α_n	Marginal disutility (non-tribal)	1.0	Normalized baseline
$\bar{X}$	Natural HWC level	5.0	Ensures interior solutions
β	Marginal abatement cost	1.0	Normalized
π	Tribal population share	0.057	HP average (2011 Census)
θ	Corruption rate	[0.01, 0.99]	Simulation parameter
γ	Political weight on majority	[0.01, 2.0]	Simulation parameter

ruption in the compensation bureaucracy, θ, and the political weight of the majority, γ. These determine whether lower transfers to minorities under majoritarian rule reflect rent-seeking or deliberate redistribution toward the majority. While (θ, γ) are unobserved, their relative strength can be inferred from how aggregate compensation changes under reservation. Our object of interest is the difference in total compensation between reserved and unreserved constituencies:

$$CC^* = [\pi\alpha_s + (1-\pi)\alpha_n]\, X^*$$
$$CC^g = [\pi\alpha_s + (1-\pi)\alpha_n - \theta\delta^g\pi\alpha_s]\, X^g,$$

The sign of $\Delta CC = CC^* - CC^g$ informs the size of the relevant unobserved parameters (θ, γ) as follows. Through our empirical results, we established that tribal leaders (i) reduce wildlife conflict, and (ii) increase per-incident payouts. Aggregate compensation, a product of wildlife conflict and the payout for it, can therefore rise or fall depending on the relative magnitudes of these two impacts. When $CC^* > CC^g$, reservation not only reduces conflict but also increases total transfers, implying that eliminating rent-seeking more than offsets the decline in HWC incidents. When $CC^* < CC^g$, gains from fewer HWC incidents are also accompanied by lower aggregate transfers, implying that eliminating corruption is insufficient to offset reduced HWC. This can indicate that corruption is relatively limited under majoritarian rule. We investigate this possibility below.

7.1 Numerical Simulation

To characterize the parameter region where reservation increases aggregate compensation, we evaluate ΔCC across values of (θ, γ). The challenge is that substituting equilibrium expressions for δ^* and δ^g (Equations 6 and 4) and for X^* and X^g (Equations 7 and 5) into ΔCC yields a highly nonlinear function involving nested polynomials in π, θ, γ, α_s, α_n, $\bar{X}$, and β, rendering an analytical solution unfeasible.

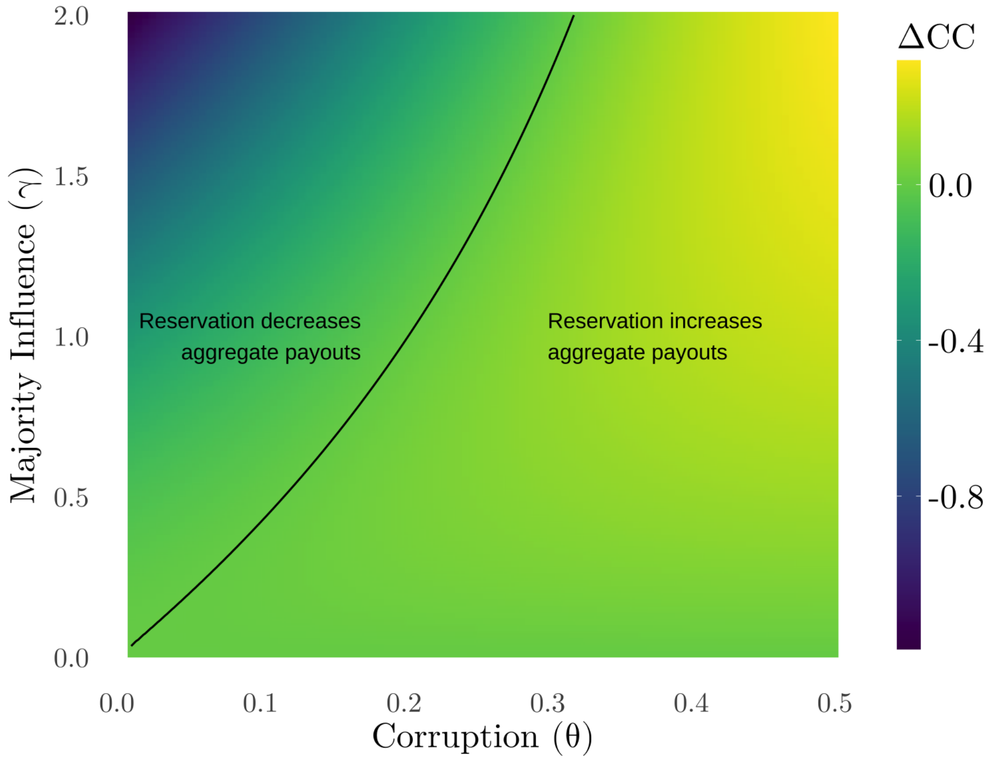


Figure 5: Simulated Cost of Compensation

Note: Simulated values of ΔCC across the (θ, γ) parameter space. Black contour indicates the locus where $CC^r = CC^g$, separating the region where political reservation increases or decreases aggregate transfers.

We therefore fix all model parameters except (θ, γ) and numerically simulate ΔCC over a grid spanning $\theta \in [0.01, 0.5]$ and $\gamma \in [0.01, 2.0]$. Our parameter choices are summarized in Table 6. For each parameter pair, we solve for equilibrium outcomes and compute ΔCC. Figure 5 visualizes the ΔCC surface across the parameter space. The black contour traces the locus where $CC^* = CC^g$, separating the regions where reservation increases or decreases aggregate payouts. This yields our fourth prediction:

Prediction 4. *If the proportion of corruption (θ) exceeds 40% of diverted compensation, or if it outweighs the majority's influence ($\theta > \gamma$), total compensation under reservation surpasses that in unreserved constituencies.*

The intuition is as follows. Above the contour, corruption (θ) is sufficiently high that eliminating rent-seeking under tribal leadership more than offsets the reduction in conflict, prompting higher aggregate transfers. Below the contour, majority influence (γ) dominates, which means that the larger volume of compensable HWC incidents under majoritarian rule outweighs losses from discrimination. Removing this distortion thus reduces total transfers. The threshold $\theta \geq 0.4$ marks the point where reservation unambiguously raises aggregate compensation regardless of γ. Put differently, if more than 40% of diverted compensation is lost to corruption under majoritarian rule, then reservation unambiguously improves transfers by reducing graft and ensuring fairer payouts.[25]

Next, we turn back to our data and use the estimated regression model to compute ΔCC in Himachal Pradesh. Guided by the numerical simulation results, we can then infer the extent of corruption in the compensation bureaucracy as well as the welfare implications of political reservation in Himachal Pradesh.

7.2 Empirical Simulation

We use our empirical model to simulate how aggregate compensation in reserved constituencies would change under a counterfactual where reservation is removed. If aggregate compensation falls in the counterfactual, then by Prediction 4 we can infer that corruption under majoritarian rule is sufficiently high that reservation improves welfare by delivering higher and fairer payouts to tribal communities.

We follow a three step procedure: (i) predict counterfactual outcomes from our difference-in-difference model, (ii) calculate in-sample aggregates, and (iii) compare with fitted values. We use our extended sample estimates for this exercise (Table 4, column 2). Using the same notation as the theoretical model, let g denote the general election scenario and $Payout^{g}_{iasvcft}$ denote payouts to victim i in the scenario where constituencies are unreserved. Corresponding predicted compensation can then be written as:

$$\begin{aligned} Log(Payout^{g}_{iasvcft}) = \hat{\xi} \cdot (R^{g}_{cf} \times ST_{vcf}) + \hat{\beta} \cdot R^{g}_{cf} + \hat{\delta} \cdot ST_{vcf} + \mathbf{X}'_{vcft}\hat{\Omega} \\ + \gamma_c + \theta_{ft} + \eta_{ia} + \mu_{is} \end{aligned}$$

where R^{g}_{cf} denotes realizations of reservation status under the general election scenario (i.e., by replacing $R_{cf} = 1$ in the data with $R_{cf} = 0$). We then sum these claim-level predicted values into constituency-level counterfactuals, CC^{g}, the total compensation paid to HWC victims in the general election scenario. Comparison with in-sample fitted values, CC^{BAU} (business as usual) yields the change in aggregate compensation costs when moving from a political system without mandated minority representation to one with mandated representation:

$$\Delta CC = \mathrm{CC}^{BAU} - \mathrm{CC}^{g}.$$

[25]Note that our prediction is not an if and only if statement. Further, our result derives from a specific set of assumptions around parameters and functional forms.

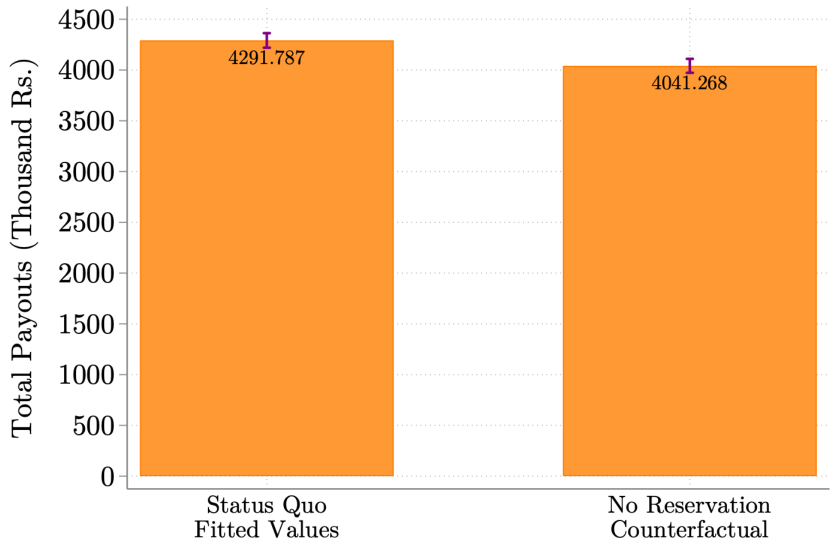


Figure 6: Estimates of Aggregate Compensation Costs

Note: Bar heights are total compensation under business as usual (left) and the general election counterfactual (right). Values are means over 1000 bootstrap draws and purple intervals are standard deviations.

To account for uncertainty in the predicted values, we bootstrap this prediction and aggregation procedure with 2000 draws and report the mean over bootstrap samples. Figure 6 reports estimates of CC^{BAU} (left bar) and CC^{g} (right bar). ΔCC is approximately ₹250,000. In other words, aggregate financial transfers would have been about $250/4292 \approx 6\%$ less without minority representation and the prospect of ethnic favouritism.

Together, the empirical and numerical simulations suggest that corruption under majoritarian rule in Himachal Pradesh is sufficiently large to distort compensation. The fact that aggregate compensation would fall without reservation implies that political representation enables tribal communities to recover transfers that would otherwise be lost to graft. Political representation thus reduces compensable incidents while improving access to compensation, and this increase in per-incident payouts more than offsets the decline in incidents. In line with the model, this places Himachal Pradesh in the parameter region where corruption dominates majority influence, implying that reservation improves welfare by delivering fairer and more generous relief to vulnerable communities.

8 Generalizability

Using data from Himachal Pradesh, India we show how political reservation for Scheduled Tribe communities impacts compensation received after exposure to an understudied natural disaster: human-wildlife conflict (HWC). To what extent do our insights extend to marginalized communities facing more commonly reported environmental disasters such as floods, droughts, and landslides in Himachal Pradesh, elsewhere in India, and in other low income settings? Based on List (2020)'s framework on external validity in economics, our study group are those claiming compensation for HWC in Himachal Pradesh, while our target population are marginalized communities impacted by other common environmental disasters in Himchal Pradesh, the rest of India, and other developing countries. We assess external validity following the transparency checklist recommended by List (2020), reproduced below:

1) Selection:

(a) *Representativeness relative to the general population:* Scheduled Tribe Communities are more remote, live closer to forests (see Insight 1), and have fewer assets and less access to salaried jobs than the average citizen (World Bank, 2017). This paper focuses on tribal communities in Chamba, Lahaul & Spiti, Kinnaur, Kullu, Shimla, and Kangra—districts that span a wide income range. Chamba and Kangra have incomes far below the state average, while Lahaul & Spiti and Kinnaur approach or exceed it.[26] Althought Himachal Pradesh overall is relatively prosperous—its per capita income in 2017 was 48% higher than India's average Reserve Bank of India (2024)—India's mean PPP-adjusted income was \$4.50 per day, well below most global poverty lines except the extreme poverty threshold of \$3.00 (World Bank Group, 2025; Roser, 2021). Thus, while Himachal Pradesh is richer than India overall, most tribal communities are likely economically disadvantaged.

(b) *Representativeness relative to target population:* Our study is directly relevant for communities in Himachal Pradesh experiencing other commonly reported environmental disasters. Recent high-profile disasters in India, such as the 2023 and 2025 extreme rain events, caused nationwide flooding, with particularly severe damage in Himachal Pradesh. Tiwari (2025) shows that Himachal Pradesh experienced the highest farm-level losses in the country, and that disaster relief throughout the country was inadequate. Chandel (2025) and Tiwari (2025) identify Mandi, Kullu, Kangra, and Shimla as the most impacted districts in the 2023 and 2025 floods, which overlaps with our studied population. As a result, preferences, beliefs, and constraints facing households affected by HWC are likely similar for citizens impacted by floods within the state.

Similar patterns likely apply for vulnerable populations impacted by natural disasters in developing countries. Rentschler et al. (2022) estimates that 1.81 bil-

[26] See Appendix D.

lion people—about 23% of the global population—are exposed to a 1-in-100-year flood event, with 69% in South and East Asia, mostly China and India. Low- and middle-income countries host 89% of the flood-exposed population; 9% face both high flood risk and extreme poverty below \$1.90/day, and 43% live on less than \$5.50/day. Our study group live in high flood risk areas and earn income likely lower than \$4.50/day, making them an appropriate setting to study political representation for comparable high-risk, poor regions in the developing world, where governments have limited disaster relief budgets.

2) Attrition: Our study does not experience attrition like a field experiment running over time. While we do observe villages over time, the random nature of HWC implies that our sample of claimants may differ across years. As such, conventional concerns about sample attrition are not applicable.

3) *Naturalness:* HWC occurs naturally and randomly, so subjects are not on an artificial margin when seeking compensation. Recent flood patterns in the Western Himalayas and concurrent increases in HWC may coincide over time. As a result, choices and outcomes are likely similar in both studied and target settings, particularly in poor, flood-prone countries. We also expect norms and stakes across India and South Asia to resemble those in our study area.

4) Scaling: Reservation of seats for Scheduled Caste and Tribal communities in India (as described in Section 2) is set to expire January 25, 2030. Usually, reservation is extended using a Constitutional Amendment (the last one was the 104th Amendment in 2019). Our findings document benefits of political reservation in Himachal Pradesh, but we do not conduct a full benefit-cost analysis. Nor do we profess to know how these benefits and costs would scale or compare under the nationwide policy.

In summary, our findings on how political reservation shapes HWC relief for Scheduled Tribes in Himachal Pradesh likely generalize beyond the specific communities we study.

9 Conclusion

This paper examines how ethnic favouritism shapes the allocation of environmental disaster relief. Because the global poor lack insurance and rely on the state for relief, systemic barriers to accessing government assistance raise concerns about the reach and effectiveness of disaster aid. While affirmative action policies aim to remove such barriers, their success at equitably delivering disaster relief is poorly understood.

Our study setting concerns Human-Wildlife Conflict (HWC) in Himachal Pradesh, India, a largely overlooked type of disaster responsible for massive income loss and a significant death toll. Using novel data on HWC compensation claims, we document that India's tribal community are most vulnerable to wildlife attacks, yet are compensated less than non-tribals for the same type of damage. These empirical patterns hint at possible discrimination against one of India's most vulnerable and politically excluded groups.

Our political economy model shows that political representation of tribal communities can undo discrimination in payouts. Specifically, the gap in payouts between tribal and non-tribal areas narrows when political seats are reserved for tribal candidates, a phenomenon we call ethnic favouritism. Difference-in-difference estimates confirm the model predictions. We find that villages with higher tribal population shares receive larger payouts per incident when their constituency leader is also tribal. These results imply that political representation redirects disaster aid toward those who need it most.

A numerical solution to the model shows that when corruption is high enough under majoritarian rule, political representation unambiguously increases aggregate transfers because it cuts rent-seeking and ensures compensation reaches victims. Our empirical simulation based on the estimated difference-in-difference model places Himachal Pradesh in this high-corruption region in the absence of political reservation. In other words, reservation recovers transfers that would otherwise be lost to graft, thereby improving the welfare of tribal communities.

Some caveats are in order. First, we attribute lower payouts to tribal communities as evidence of discrimination. We are careful in this attribution by conditioning on predator type, case type, and geographic determinants of HWC. However, we acknowledge that other unobserved factors may explain the difference in payouts. Second, we are unable to measure welfare directly since key model parameters that determine welfare—such as corruption intensity and majority influence—are unobserved. We therefore use simulation methods to infer welfare mechanisms indirectly. Lastly, we focus on "wide" ethnic alignment between constituency leaders and HWC victims. In practice, victims do not interact with the constituency leader to obtain compensation; they interact with local elected officials or representatives of the local forest office, whom the constituency leader influences through authority over Divisional Forest Officers. Identifying the effect of "narrower" ethnic alignment requires data on forest officer identity, which we leave for future work.

The main policy insight from our paper is that ensuring political representation for marginalized groups has the potential to direct resources toward the most vulnerable, which is crucial for mitigating damages during environmental disasters. As climate change continues to exacerbate the frequency and extent of environmental disasters, integrating these lessons into policy design will be crucial for fostering environmental justice.

References

Aidt, Toke S, "Political internalization of economic externalities and environmental policy," *Journal of Public Economics*, 1998, *69* (1), 1–16.

Ambagudia, Jagannath, "Scheduled tribes and the politics of inclusion in India," *Asian Social Work and Policy Review*, 2011, *5* (1), 33–43.

_ , "Scheduled tribes, reserved constituencies and political reservation in India," *Journal of Social Inclusion Studies*, 2019, *5* (1), 44–58.

_ , "Paradoxes of Political Inclusion: Political Reservation for Scheduled Tribes in India," in "Politics of Representation," Springer, 2022, pp. 57–77.

Anderson, Siwan, Patrick Francois, and Ashok Kotwal, "Clientelism in Indian villages," *American Economic Review*, 2015, *105* (6), 1780–1816.

Asher, Sam, Tobias Lunt, Ryu Matsuura, and Paul Novosad, "Development research at high geographic resolution: an analysis of night-lights, firms, and poverty in India using the shrug open data platform," *The World Bank Economic Review*, 2021, *35* (4), 845–871.

Balboni, Clare, Robin Burgess, and Benjamin A Olken, "The origins and control of forest fires in the tropics," *Working Paper*, 2023.

_ , _ , Anton Heil, Jonathan Old, and Benjamin A Olken, "Cycles of fire? Politics and forest burning in Indonesia," in "AEA Papers and Proceedings," Vol. 111 American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203 2021, pp. 415–419.

Besley, Timothy and Stephen Coate, "An economic model of representative democracy," *The quarterly journal of economics*, 1997, *112* (1), 85–114.

_ , Rohini Pande, Lupin Rahman, and Vijayendra Rao, "The politics of public good provision: Evidence from Indian local governments," *Journal of the European Economic Association*, 2004, *2* (2-3), 416–426.

Bhalotra, Sonia and Irma Clots-Figueras, "Health and the political agency of women," *American Economic Journal: Economic Policy*, 2014, *6* (2), 164–197.

Bhavnani, Rikhil R., "Do the Effects of Temporary Ethnic Group Quotas Persist? Evidence from India," *American Economic Journal: Applied Economics*, 2017, *9* (3), 105–123.

Botzen, WJ Wouter, Olivier Deschenes, and Mark Sanders, "The economic impacts of natural disasters: A review of models and empirical studies," *Review of Environmental Economics and Policy*, 2019.

Braczkowski, Alexander R, Christopher J O'Bryan, Christian Lessmann, Carlo Rondinini, Anna P Crysell, Sophie Gilbert, Martin Stringer, Luke Gibson, and Duan Biggs, "The unequal burden of human-wildlife conflict," *Communications Biology*, 2023, *6* (1), 182.

Burgess, Robin, Matthew Hansen, Benjamin A Olken, Peter Potapov, and Stefanie Sieber, "The political economy of deforestation in the tropics," *The Quarterly journal of economics*, 2012, *127* (4), 1707–1754.

Central Water Comission, "State-Wise Data on Damage Caused due to Floods During 1953–2011," 2012.

Chandel, Ajitesh Singh, "Geospatial and statistical assessment of monsoon-induced disasters in Himachal Pradesh: insights from the 2023 floods and landslides," *All Earth*, 2025, *37* (1), 1–48.

Chattopadhyay, Raghabendra and Esther Duflo, "Women as policy makers: Evidence from a randomized policy experiment in India," *Econometrica*, 2004, *72* (5), 1409–1443.

Chin, Aimee and Nishith Prakash, "The redistributive effects of political reservation for minorities: Evidence from India," *Journal of development Economics*, 2011, *96* (2), 265–277.

Clots-Figueras, Irma, "Are female leaders good for education? Evidence from India," *American economic journal: applied economics*, 2012, *4* (1), 212–244.

Conley, Timothy G, "GMM estimation with cross sectional dependence," *Journal of econometrics*, 1999, *92* (1), 1–45.

Das, Bhagwan, "Moments in a History of Reservations," *Economic and Political Weekly*, 2000, pp. 3831–3834.

Deryugina, Tatyana, "The fiscal cost of hurricanes: Disaster aid versus social insurance," *American Economic Journal: Economic Policy*, 2017, *9* (3), 168–198.

_, Laura Kawano, and Steven Levitt, "The economic impact of Hurricane Katrina on its victims: Evidence from individual tax returns," *American Economic Journal: Applied Economics*, 2018, *10* (2), 202–233.

Dickman, A. J., E. A. Macdonald, and D. W. Macdonald, "A review of financial instruments to pay for predator conservation and encourage human-carnivore coexistence," *Proceedings of the National Academy of Sciences*, 2011, *108* (34), 13937–13944.

Doner, Kathryn Victoria Bahnken, "Seventy Years Later: Caste in the Indian Bureaucracy," *Sociology Between the Gaps: Forgotten and Neglected Topics*, 2022, *7* (1), 7.

Economic Times, "Over 2,500 people died in five years in human-elephant conflicts: Govt data," https://ecoti.in/MdoTgZ 2024.

Elvidge, Christopher D, Kimberly Baugh, Mikhail Zhizhin, Feng Chi Hsu, and Tilottama Ghosh, "VIIRS night-time lights," *International Journal of Remote Sensing*, 2017, *38* (21), 5860–5879.

Gokhale, Yogesh, "Green Growth and Biodiversity in Himachal Pradesh," *The Energy and Resources Institute Working Paper*, 2015.

Gordon, Matthew, Yukiko Hashida, and Eli P Fenichel, "Targeting Disaster Aid: Visibility and Vulnerability after the 2015 Nepal Earthquake," *Working Paper*, 2024.

Grossman, Gene M and Elhanan Helpman, "Protection for sale," in "40 Years of Research on Rent Seeking 2," Springer, 2008, pp. 131–148.

Gulati, Sumeet, "Free trade and the burden of domestic policy," *Canadian Journal of Economics/Revue canadienne d'économique*, 2008, *41* (3), 817–837.

_, Krithi K Karanth, Nguyet Anh Le, and Frederik Noack, "Human casualties are the dominant cost of human–wildlife conflict in India," *Proceedings of the National Academy of Sciences*, 2021, *118* (8), e1921338118.

Gulzar, Saad, Apoorva Lal, and Benjamin Pasquale, "Representation and forest conservation: Evidence from India's scheduled areas," *American Political Science Review*, 2021, pp. 1–20.

Hsiang, Solomon M and Amir S Jina, "The causal effect of environmental catastrophe on long-run economic growth: Evidence from 6,700 cyclones," Technical Report, National Bureau of Economic Research 2014.

Iyer, Lakshmi and Maya Reddy, "Redrawing the Lines: Did Political Incumbents Influence Electoral Redistricting in the World's Largest Democracy?," *Harvard Business School Working Paper No. 14-051*, 2013.

Jagnani, Maulik and Meera Mahadevan, "Women Leaders Improve Environmental Outcomes: Evidence from Crop Fires in India," *Mimeo*, 2024.

Jensenius, Francesca Refsum, "Development from Representation? A Study of Quotas for the Scheduled Castes in India," *American Economic Journal: Applied Economics*, 2015, *7* (3), 196–220.

Kahn, Matthew E, "The death toll from natural disasters: the role of income, geography, and institutions," *Review of economics and statistics*, 2005, *87* (2), 271–284.

Kaletski, Elizabeth and Nishith Prakash, "Does political reservation for minorities affect child labor? Evidence from India," *World Development*, 2016, *87*, 50–69.

Karanth, K. U. and M. D. Madhusudan, "Mitigating human-wildlife conflicts in southern Asia," in J. Terborgh, C. Van Schaik, L. Davenport, and M. Rao, eds., *Making Parks Work: Strategies for Preserving Tropical Nature*, Island Press, 2002, pp. 250–264.

Karanth, Krithi K, Shriyam Gupta, and Anubhav Vanamamalai, "Compensation payments, procedures and policies towards human-wildlife conflict management: Insights from India," *Biological Conservation*, 2018, *227*, 383–389.

Lipscomb, Molly and Ahmed Mushfiq Mobarak, "Decentralization and pollution spillovers: evidence from the re-drawing of county borders in Brazil," *The Review of Economic Studies*, 2016, *84* (1), 464–502.

List, John A, "Non est disputandum de generalizability? A glimpse into the external validity trial," Technical Report, National Bureau of Economic Research 2020.

__, Azeem M Shaikh, and Atom Vayalinkal, "Multiple testing with covariate adjustment in experimental economics," *Journal of Applied Econometrics*, 2023, *38* (6), 920–939.

Madhok, Raahil, "Infrastructure, institutions, and the conservation of biodiversity in India," *Journal of the Association of Environmental and Resource Economists*, 2025, *12* (6), 1705–1745.

Marcoux, Kendra and Katherine R.H. Wagner, "Fifty Years of US Natural Disaster Insurance Policy," *Handbook of Insurance, Vol. I: 55-79*, 2023.

Mayberry, Allison L., Alice J. Hovorka, and Kate E. Evans, "Well-Being Impacts of Human-Elephant Conflict in Khumaga, Botswana: Exploring Visible and Hidden Dimensions," *Conservation and Society*, 2017, *15* (3), 280–291.

Ministry of Tribal Affairs, "Annual Report 2022-23," *Government of India*, 2023.

Mohapatra, Bijayeeni, David A Warrell, Wilson Suraweera, Prakash Bhatia, Neeraj Dhingra, Raju M Jotkar, Peter S Rodriguez, Kaushik Mishra, Romulus Whitaker, Prabhat Jha et al., "Snakebite mortality in India: a nationally representative mortality survey," *PLoS neglected tropical diseases*, 2011, *5* (4), e1018.

Old, Jonathan, "Mandated Political Representation and Low-Level Conflict: Evidence from India," *Mimeo*, 2020.

Olken, Benjamin A, "Monitoring corruption: evidence from a field experiment in Indonesia," *Journal of political Economy*, 2007, *115* (2), 200–249.

Osorio, Fernanda Diaz, Sanchaya Sharma, Nitin Sekar, and Sumeet Gulati, "Where the Wild Elephants Are: Assessing the Distribution of Asian Elephants Using Media Reports," *Gajah*, 2025, (58).

Pande, Rohini, "Can mandated political representation increase policy influence for disadvantaged minorities? Theory and evidence from India," *American economic review*, 2003, *93* (4), 1132–1151.

Parida, Yashobanta, "Economic impact of floods in the Indian states," *Environment and Development Economics*, 2020, *25* (3), 267–290.

Priya, P, R Krishnan, Milind Mujumdar, and Robert A Houze Jr, "Changing monsoon and midlatitude circulation interactions over the Western Himalayas and possible links to occurrences of extreme precipitation," *Climate Dynamics*, 2017, *49* (7), 2351–2364.

Reinikka, Ritva and Jakob Svensson, "Local capture: evidence from a central government transfer program in Uganda," *The quarterly journal of economics*, 2004, *119* (2), 679–705.

Rentschler, Jun, Melda Salhab, and Bramka Arga Jafino, "Flood exposure and poverty in 188 countries," *Nature communications*, 2022, *13* (1), 3527.

Reserve Bank of India, "Handbook of Statistics on Indian States," https://www.rbi.org.in/Scripts/Statistics.aspx 2024. Includes state-wise data on Net State Domestic Product (NSDP) and per capita income at current and constant prices.

Roser, Max, "Global poverty in an unequal world: Who is considered poor in a rich country? And what does this mean for our understanding of global poverty?," *Our World in Data*, 2021. https://archive.ourworldindata.org/20251209-133038/higher-poverty-global-line.html.

Sharma, Harikishan, "Big announcement under PM Fasal Bima Yojana: Crop insurance to cover losses due to wild animal attacks, paddy inundation from 2026 kharif season — indianexpress.com," https://indianexpress.com/article/india/big-announcement-under-pm-fasal-bima-yojana-crop-insurance-to-cover-losses-due-to-wil November 19, 2025. [Accessed 10-12-2025].

Sheth, Aniruddh and Vasant Saberwal, "Pastoralism in Transition: Anecdotes from Himachal Pradesh-A Commentary," *HIMALAYA-The Journal of the Association for Nepal and Himalayan Studies*, 2023, *42* (2), 146–152.

Singh, Omvir and Manish Kumar, "Flood events, fatalities and damages in India from 1978 to 2006," *Natural hazards*, 2013, *69*, 1815–1834.

Straub, Stefan, "Climate change and La Niña driving losses: the natural disaster figures for 2022," *Munich Re*, 2022.

Sukumar, R., *The Living Elephants: Evolutionary Ecology, Behavior, and Conservation*, Oxford University Press, 2003.

Tiwari, Ankita, "India's Weather Fury: 13,000 Lives Lost, Crops Ravaged, Relief Falls Short," https://www.ndtv.com/india-news/indias-weather-fury-13-000-lives-lost-crops-ravaged-relief-falls-short-9836427 Dec 2025. Reported at 10:11am IST.

Townshend, John, Matthew Hansen, Mark Carroll, Charlene DiMiceli, Robert Sohlberg, and Chengquan Huang, "Annual global automated MODIS vegetation continuous fields (MOD44B) at 250 m spatial resolution for data years beginning day 65, 2000-2014, collection 5 percent tree cover, version 6.," Technical Report, University of Maryland, College Park 2017.

World Bank, "Himachal Pradesh: Social Inclusion," *Himachal Pradesh - Social Inclusion Brief*, 2017.

_ , "Human-Wildlife Conflict: Global Perception Survey Data," *Global Wildlife Program Report*, 2023.

World Bank Group, "June 2025 Update to Global Poverty Lines," https://www.worldbank.org/en/news/factsheet/2025/06/05/june-2025-update-to-global-poverty-lines June 2025. Defines the international extreme poverty line (now $3.00 per person per day) and related poverty thresholds.

Online Appendix

A Appendix Tables

Table A1: Policy Changes Summary for Wildlife-Related Compensation in Himachal Pradesh

Aspect / Year	1986	1988	1996	2001	2002	2006	2014	2018	2021
Compensation Rates	First year of data	No change	Detailed injury tiers, increase in rates.	Minor injury removed, increase in compensation rates.	Minor injury restored.	Only simple injury increases in rate.	Increase in compensation rates.	Increase in compensation rates.	Increase in compensation rates.
Category Structure	Shed/jungle & breed splits.	Introduced additional livestock categories.	No change	No change	No change	No change	Merged shed/jungle & breed distinctions.	No change.	No change.
Verification Authorities	RFO + local officials.	Adds Panchayat Pradhan & Guard.	Adds Revenue Lambardar.	Interim relief (25%) process established.	No change	No change.	Includes Patwari & Veterinary Pharmacist.	Adds Mayor & corpus fund trigger.	No change.
Filing Time Windows	Report 3 d / Claim 1 m.	Report 5 d / Claim 1 m.	Report 5 d / Claim 1 m.	Report 5 d / Claim 1 m.	Report 5 d / Claim 1 m.	Report 5 d / Claim 1 m.	Report 30 d / Claim 3 m.	Report 7 d / Claim 1 m.	Report 7 d / Claim 1 m.

Table A2: Summary Statistics of HWC Compensation

	Number of Incidents	Mean Compensation (Thousand ₹)	Std. Dev. (Thousand ₹)
Panel A: Animal Type			
Bear	348	29.70	37.59
Boar	4	24.34	34.30
Fox	8	5.00	0.00
Jackal	1	2.44	.
Leopard	3001	9.82	15.95
Macaque	831	4.74	15.28
Sambhar	1	6.61	.
Wolf	8	3.67	1.19
Total	4202	10.45	19.57
Panel B: Case Type			
HumanDeath	20	147.50	89.55
HumanMajorInjury	127	50.26	21.38
HumanNA	1009	6.37	21.76
LivestockLoss	3048	9.24	10.31
Total	4204	10.44	19.57

Note: Panel A summarizes compensation by animal type. Panel B shows the same for case type. "Human NA" denotes human-related cases where death or injury type is unknown.

Table A3: Summary Statistics: Compensation by Reservation Status

	Reserved			Non Reserved		
	Obs.	Mean (Thousand ₹)	SD	Obs.	Mean (Thousand ₹)	SD
Panel A: Animal Type						
Bear	60	17.20	18.64	287	32.35	40.03
Leopard	137	19.48	24.70	2828	9.41	15.33
Total	197	18.79	23.00	3666	10.37	19.92
Macaque				551	3.86	17.42
Panel B: Case Type						
HumanDeath	3	150.00	0.00	16	150.00	100.00
HumanMajorInjury	4	64.50	21.00	106	52.09	21.76
HumanNA	8	15.73	24.14	734	7.00	25.34
LivestockLoss	190	15.24	14.11	2826	8.88	9.91
Total	205	18.20	22.73	3682	10.37	19.91

Note: Panel A summarizes compensation by animal type. Panel B shows the same for case type. "Human NA" denotes human-related cases where death or injury type is unknown.

Table A4: Covariate Balance

	(1) Treatment	(2) Control	(3) Matched Control	(4) Difference	(5) Matched Difference
Village ST Share	0.76	0.03	0.30	0.73***	0.46***
Dist. to Forest	1.74	0.92	0.33	0.82*	1.42***
Dist. to Protected Area (km)	8.38	10.34	8.63	-1.96***	-0.24
Dist. to Water (km)	105.09	35.09	32.14	70.00***	72.95***

Note: Columns 1 reports sample means in ST reserved constituencies. Columns 2 and 3 report sample means in *all* non-reserved constituencies, and non-reserved constituencies in the matched control group, respectively. Column 4 is a t-test for the difference in means between columns 1 and 2. Column 5 is the same for columns 1 and 3. * $p < .1$, ** $p < .05$, *** $p < .01$

Table A5: Robustness: Political Reservation and HWC Incidence

	(1)	(2)	(3)	(4)	(5)
Outcome: # of conflicts	Leopard	Bear	All	All	All
ST Reserved	0.154***	-0.249***	-0.054***	-0.141***	-0.154***
	(0.031)	(0.025)	(0.010)	(0.027)	(0.033)
Village ST Share	Yes	Yes	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes	Yes	Yes
Sample	Matched	Matched	Matched	Matched	Matched
Matched Controls	3	3	5	3	3
Specification	log-lin	log-lin	log-lin	Poisson	lin-lin
Forest Division $\times$ Year FEs	✓	✓	✓	✓	✓
Observations	232	232	241	232	232
R^2	0.234	0.211	0.121		0.113

* $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the village-year level. The outcome is number of of HWC conflicts. "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. Columns 1 and 2 subset the matched sample by predator animal. Column 3 is a log-linear specification using five constituencies below the cutoff as the matched control group. Column 4 uses a Poisson estimator. In column 5 the outcome is in levels. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by forest division.

Table A6: Robustness: Political Reservation and HWC Payouts

Outcome: log payout (₹)	(1) Leopard	(2) Bear	(3) All	(4) All
ST Reserved	0.893***	-0.618	0.434***	7.465***
	(0.067)	(0.277)	(0.009)	(1.028)
Village ST Share	Yes	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes	Yes
Sample	Matched	Matched	Matched	Matched
Matched Controls	3	3	5	3
Specification	log-lin	log-lin	log-lin	lin-lin
Forest Division × Year FEs	✓	✓	✓	✓
Predator FEs			✓	✓
Case FEs	✓	✓	✓	✓
Observations	191	85	300	288
R^2	0.498	0.734	0.529	0.627

* $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the claim-year level. The outcome is log of compensation amount (in ₹). "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. Columns 1 and 2 subset the matched sample by predator animal. Column 3 is a log-linear specification which uses five constituencies below the cutoff as the matched control group. In column 4 the outcome is in levels. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by forest division.

Table A7: Robustness: Ethnic Favouritism in HWC Payouts

Outcome: log payout (₹)	(1) Leopard	(2) Bear	(3) All	(4) All
ST Reserved × Village ST Share	0.925**	-0.032	0.420***	10.165
	(0.316)	(0.268)	(0.095)	(5.266)
Village ST Share	Yes	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes	Yes
Sample	Matched	Matched	Matched	Matched
Matched Controls	3	3	5	3
Specification	log-lin	log-lin	log-lin	lin-lin
Constituency FEs	✓	✓	✓	✓
Forest Division × Year FEs	✓	✓	✓	✓
Predator FEs			✓	✓
Case FEs	✓	✓	✓	✓
Observations	191	84	300	288
R^2	0.513	0.750	0.539	0.631

* $p < .1$, ** $p < .05$, *** $p < .01$. Data are at the claim-year level. The outcome is log compensation amount (in ₹). "ST Reserved" indicates whether the constituency is reserved. "Village ST Share" is the village tribal population share. Columns 1 and 2 subset the matched sample by predator animal. Column 3 is a log-linear specification which uses five constituencies below the cutoff as the matched control group. In column 4 the outcome is in levels. All specifications include forest division-by-year fixed effects as well as village-level controls for: distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by forest division.

Table A8: Matched Sample: Robustness—Alternative Standard Errors

	Standard Error Boundary			Conley Spatial Error Cutoff			
	Constituency	District	Circle	20km	50km	100km	200km
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ST Reserved × ST Share	0.460*	0.460*	0.460*	0.460**	0.460***	0.460***	0.460***
	(0.201)	(0.107)	(0.107)	(0.225)	(0.091)	(0.133)	(0.049)
Constituency FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Division × Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Case FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Predator FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	288	288	288	288	288	288	288
R^2	0.530	0.530	0.530	0.530	0.530	0.530	0.530

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. Coefficient estimates and standard errors from baseline specification with alternative clustering. Column 1 replicates the main estimate with clustering at the constituency level. In columns 2-3, standard errors are clustered by forest division and forest circle, respectively. Columns 4-7 implement Conley (1999) standard errors for four different values of the kernel cut off distance (in km).

Table A9: Reporting Bias

	Matched Sample			Extended Sample		
	(1) Low	(2) Med	(3) High	(4) Low	(5) Med	(6) High
ST Reserved × Village ST Share	-0.149	0.253	0.040	-0.139	0.240	-0.034
	(0.081)	(0.276)	(0.072)	(0.115)	(0.246)	(0.082)
Village ST Share	Yes	Yes	Yes	Yes	Yes	Yes
Geography Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constituency FEs	✓	✓	✓	✓	✓	✓
Forest Division × Year FEs	✓	✓	✓	✓	✓	✓
Observations	232	232	232	668	668	668
R^2	0.236	0.256	0.324	0.380	0.263	0.350

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. The unit of observation is a village-year. The outcomes are the number of compensation reports in a village of low (first quantile), medium (second quantile) and high (third qantil) value. "ST Reserved" indicates whether the incident occurred in a reserved constituency. "Village ST Share" is village tribal population share. All regressions include constituency and forest division-by-year fixed effects as well as controls for distance to forest, distance to nearest PA, distance to nearest water body, and nightlights. Standard errors clustered by forest division.

B Appendix Figures

The following guidelines will be followed for grant of relief:-

i) Production of postmortem report in case of loss of human life, certificate in case of grievous injury, partial & permanent disability and prescription slip as well as verification of actual cost of Medical treatment in case of simple injury (including Monkey bites) from the Medical officer of a Government Institution/Govt. recognized Medical Institution, as the case may be.

ii) The verification of loss of cattle that was actually caused by wild animal can be done by the Pradhan/Up Pradhan of Panchayat/Patwari/President Notified Area Committee/ Chairman, Municipal Committee, Commissioner/ Mayor/Deputy Mayor, Municipal Corporation of the area/Elected Member of the Cantonment Board area/Councilor of the area, Range Officer/Deputy Ranger/Forest Guard or any other forest officer higher in rank than a Range Officer, Veterinary Officer or Veterinary Pharmacist or officer authorized by Veterinary officer of the area.

iii) All DFOs in HP shall be the final authority to sanction all cases of relief claims on account of losses caused by the wild animals to humans and domestic livestock.

iv) The DFOs shall release 25% of the amount of relief prescribed for human loss/permanent & partial disability/grievous injury on receipt of report as interim relief immediately to the family of the deceased/affected person after due

Figure B1: Excerpt from HP Forest Department Notification on HWC Compensation

Full document available here.

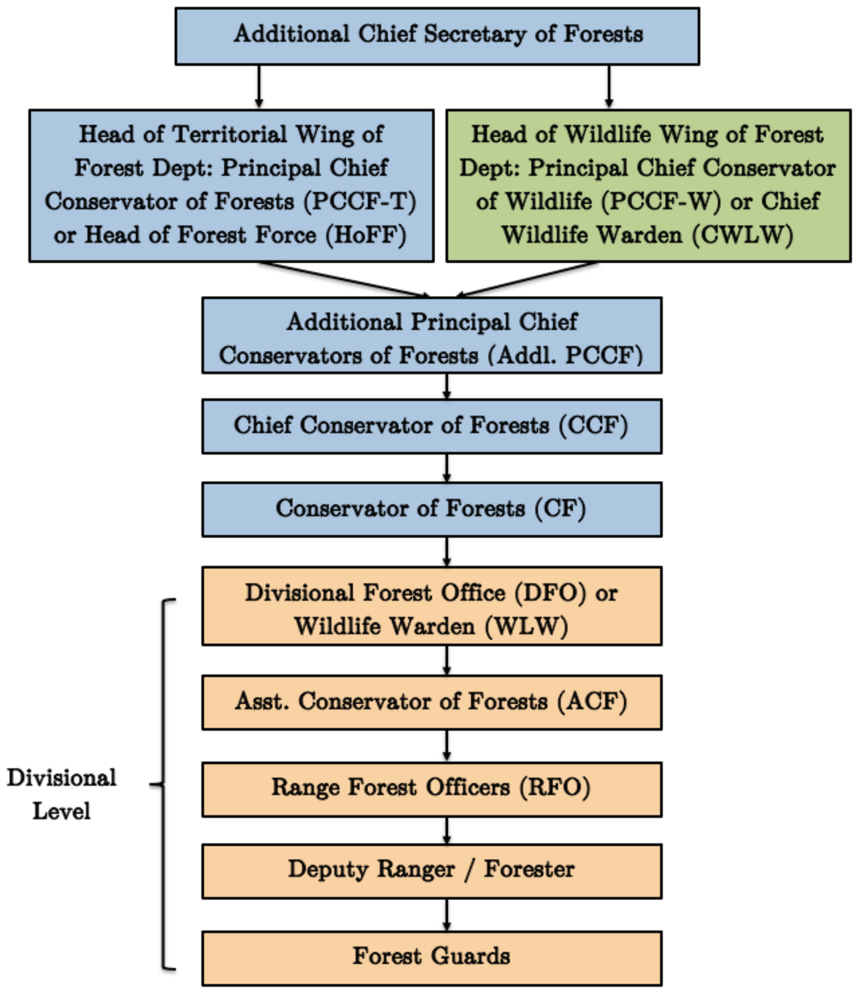


Figure B2: Himachal Pradesh Forest Department Chain of Command

C The Forest Bureaucracy in Himachal Pradesh

The State Forest Department of Himachal Pradesh comprises two independent wings: Territorial and Wildlife (Figure B2). The Territorial Wing is headed by the Principal Chief Conservator of Forests (PCCF), also known as the Head of Forest Force (HoFF), while the Wildlife Wing is led by the PCCF (Wildlife), who also serves as the Chief Wildlife Warden (CWLW). Both report to the Additional Chief Secretary (Forest)[27]. The Territorial Wing consists of 8 circles and 37 forest divisions, each managed by a Divisional Forest Officer–Territorial (DFO-T). The Wildlife Wing consists of 3 circles, and 7 wildlife divisions, each managed by a Divisional Forest Officer–Wildlife (DFO-W). If the conflict occurs in a territorial division, the DFO-T is authorized to handle wildlife matters including compensation. While DFO-Ts primarily report to the HoFF, the CWLW may coordinate with them on wildlife-specific activities such as censuses and awareness programs. DFO-W's are also authorised to handle wildlife matters and forest matters in their divisions. All divisions are further divided into forest ranges, managed by the Range Forest Officer (RFO), who oversee daily operations.

D Estimates of Per Capita Income in the Relevant Districts in Himachal Pradesh

We list per capita income (INR) for a particular year for our relevant districts below. Data source urls are provided alongside. a) Chamba: ₹98,006 (FY 2015–16) see https://www.indiastatpublications.com/District_Factbook/Himachal_Pradesh/Chamba. b) Lahaul & Spiti: ₹192,292 (FY 2015–16), see https://www.indiastatpublications.com/District_Factbook/Himachal_Pradesh/Lahul_and_Spiti. c) Kinnaur: ₹217,993 (FY 2015–16) see https://www.indiastatpublications.com/District_Factbook/Himachal_Pradesh/Kinnaur. d) Kullu: ₹119,231 (FY 2015–16) see https://www.indiastatpublications.com/District_Factbook/Himachal_Pradesh/Kullu. e) Shimla: ₹222,227 (FY 2022–23), see https://thenewshimachal.com/2023/03/himachal-economic-survey-2022-23/. f) Kangra: ₹86,637 (FY 2015–16), see https://www.indiastatpublications.com/District_Factbook/Himachal_Pradesh/Kangra. And Himachal Pradesh average per capita income in FY 2022–23 is ₹222,227, see https://thenewshimachal.com/2023/03/himachal-economic-survey-2022-23/.

[27]Secretaries and forest officials serve at the discretion of the elected State Cabinet. Their appointments, roles, and continuance in office are thus subject to decisions of the democratically elected government.

E Theory Appendix

E.1 Social Planner Maximization (Equation 4.2)

The Social Planner problem is:

$$\arg\max_{\delta,X} \{-(CC + AC + PC)\} \tag{11}$$

FOC δ: We present the possibility of a corner solution as it is relevant in this case. A full FOC for a constrained maximization has three components, the partial derivative of the social planner problem w.r.t. δ, the constraint that δ is non-negative, and the product of the choice variable, and its partial derivative which equals zero. This gives:

$$-\delta\pi \leq 0; \delta \geq 0; \text{ and } \delta(-\delta\pi) = 0. \tag{12}$$

As $\pi > 0$, Equation 12 is satisfied iff $\delta^* = 0$. In other words, the benevolent government chooses not to discriminate against the minority. This is because discrimination has no aggregate benefit, only adding to political costs.

FOC X: For its choice of HWC, a corner solution is not relevant, so we only present the partial derivative of the planner problem w.r.t. X and equate it to zero.

$$-\pi(\alpha_s - \alpha_n + \alpha n) + \beta(\bar{X} - X) = 0. \tag{13}$$

Equation 13 can be rewritten as,

$$X^* = \bar{X} - \frac{1}{\beta}\left(\pi\left(\alpha_s - \alpha_n\right) + \alpha_n\right), \tag{14}$$

implying that the optimal allocation of X is the natural level less the linear population weighted (by population weight) sum of the marginal damages for each group divided by the marginal cost of reduction. We assume that the parameters in our model satisfy the conditions necessary for $X^* > 0$, in other words, we assume that $\bar{X} > \frac{1}{\beta}\left(\pi\alpha_s + (1-\pi)\,\alpha_n\right)$.

E.2 Majority Politician Maximization

The majority group, n, always wins under general elections. After substituting their utility into Equation 4.3, the maximization problem is:

$$\arg\max_{\delta,X}\left\{-(CC+AC+PC)+\gamma\left(y_n+\frac{\pi}{(1-\pi)}(1-\theta)\delta\alpha_s X\right)\right\}.$$

FOC δ For its choice of discrimination, δ^g, a corner solution is not relevant, and thus we set the partial derivative w.r.t. δ equal to zero, which gives:

$$-\delta\pi+\gamma(1-\theta)\frac{\pi}{(1-\pi)}\alpha_s X^g=0. \tag{15}$$

FOC X**:** For its choice of X, a corner solution is also not relevant, so we only present the partial derivative with respect to X and equate it to zero, which gives:

$$-\left(\pi\left(\alpha_{ST}-\alpha_{NT}\right)+\alpha_{NT}\right)+\beta(\bar{X}-X)+\gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta\alpha_{ST}=0 \tag{16}$$

The above first order conditions give us:

$$\delta^g=\frac{\gamma(1-\theta)}{(1-\pi)}\alpha_{ST}X^g, \tag{17}$$

and

$$X^g=\bar{X}-\frac{1}{\beta}\left(\pi\left(\alpha_s-\alpha_n\right)+\alpha_n-\frac{\gamma(1-\theta)\pi}{(1-\pi)}\delta^g\alpha_s\right), \tag{18}$$

which implies a positive amount of discrimination against the minority when the incumbent majority is in power. Note that if $X^*>0$, then $X^g>0$ also.

E.3 Minority Politician Maximization

Under reserved elections, only the minority, s, can run for office. After substituting their utility into Equation 4.3, the maximization problem is:

$$\arg\max_{\delta,X}\left\{-(CC+AC+PC)+\gamma\left(y_s-\delta\alpha_s X\right)\right\}$$

FOC δ For its choice of discrimination δ, a corner solution in the FOC is relevant. A full FOC for a constrained maximization has three components, the partial derivative of the maximization problem w.r.t. δ, the constraint that δ is non-negative, and the product of the choice variable and its partial derivative, which equals zero. This gives:

$$-\delta\pi-\gamma\alpha_{ST}X^r\leq 0;\delta\geq 0;\text{ and }\delta(-\delta\pi-\gamma\alpha_s X^r)=0. \tag{19}$$

FOC X For its choice of X, a corner solution is not relevant, so we only present the partial derivative of the maximization problem and equate it to zero:

$$-\left(\pi\left(\alpha_s-\alpha_n\right)+\alpha_n\right)+\beta(\bar{X}-X)-\gamma\delta\alpha_s=0 \tag{20}$$

Since $\{\pi,\gamma,\alpha_s\}>0$, Equation 19 is satisfied iff

$$\delta^r=0$$

which implies that

$$X^r=X^*=\bar{X}-\frac{1}{\beta}\left(\pi\left(\alpha_s-\alpha_n\right)+\alpha_n\right) \tag{21}$$

Despite a political preference, discrimination and the choice of conflict under minority reservation are the same as those from the benevolent government.

E.4 Proof of Prediction 2

Prediction 5 (Compensation paid to s under reservation)**.** *Under reserved elections, s receives higher compensation relative to general elections.*

Proof. In reserved elections, tribal compensation is $\alpha_s X^*$, and in general elections tribal compensation is $(1-\delta^g)\,\alpha_s X^g$. When discrimination is removed, however, HWC is also lower. To be able to determine the overall effect, we need to evaluate the difference between them,

$$
\begin{aligned}
&\alpha_s X^* - (1-\delta^g)\,\alpha_s X^g \\
=&\alpha_s\left(X^* - X^g\right) + \delta\alpha_s X^g \\
=&\alpha_s \frac{1}{\beta}\gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta^g\alpha_s - \alpha_s\frac{1}{\beta}\gamma(1-\theta)\frac{\pi}{(1-\pi)}\delta^g\alpha_s + \delta\alpha_s X^* \\
=&\delta\alpha_s X^* > 0
\end{aligned}
$$

□

E.5 Proof of Prediction 3

Proof. We can write the average compensation under reservation as: $\frac{CC^r}{X^r} = [(\alpha_s - \alpha_n)\pi + \alpha_n]$ and average compensation under general elections is: $\frac{CC^g}{X^g} = [(\alpha_s - \alpha_n)\pi + \alpha_n - \delta\pi\alpha_s\theta]$. Next we take the partial derivative of these two terms.

$$
\begin{aligned}
&\frac{\partial}{\partial\pi}\left[\frac{CC^r}{X^r}\right] = \frac{\partial}{\partial\pi}\left[(\alpha_s-\alpha_n)\pi + \alpha_n\right] = \left[\alpha_s - \alpha_n\right]. \\
&\frac{\partial}{\partial\pi}\left[\frac{CC^g}{X^g}\right] = \frac{\partial}{\partial\pi}\left[(\alpha_s-\alpha_n)\pi + \alpha_n - -\delta\pi\alpha_s\theta\right] = \left[\alpha_s - \alpha_n - \delta\alpha_s\theta\right]. \\
&\frac{\partial}{\partial\pi}\left[\frac{CC^r}{X^r}\right] - \frac{\partial}{\partial\pi}\left[\frac{CC^g}{X^g}\right] = \delta\alpha_s\theta.
\end{aligned}
$$

Given our assumptions we know that:

$$\delta\alpha_s\theta > 0.$$

Thus average compensation rises faster when the proportion of tribal constituents rise under reservation than under general elections. This is mostly because there is no rent seeking in tribal elections, which allows the full increase in compensation to increase as tribal populations (that have higher damage) increase. □