NATURAL HAZARDS AND ELECTIONS IN INDIA: LESSONS IN ADAPTATION AND MITIGATION

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Saket Ambarkhane

INTRODUCTION

India faces extremely high exposure to ecological threats (IEP 2020) and, therefore, it is important to consider the effects of natural hazards on electoral processes in the country. India's natural disasters such as floods and cyclones are becoming increasingly common, frequent and intense, many of them exacerbated by climate change. Linking climate change with electoral processes and outcomes is no longer restricted to academia but has come to the forefront of political discourse in some countries, India among them (Masiero and Santarossa 2021; Koerth 2022). Non-governmental organizations and citizens have demanded better emergency relief measures from their elected representatives and the issue has featured in political parties' election pledges, so grave has the situation been in some areas (Jaiswal 2021; Verma 2019).

This case study first provides some background on the institutional and legal context of elections in India. The paper then explores adaptive measures adopted by the Electoral Commission of India (ECI) to safeguard the electoral process from natural hazards, with examples from state assembly elections in Himachal Pradesh, Bihar and Odisha between 2019 and 2022. Examples of measures that have been adopted at the national level include contingency planning and the utility of assured minimum facilities (AMF). The paper goes on to explore environmental efforts introduced by the ECI with a focus on electronic voting machines, the ban on single-use plastics, management of biomedical waste, and the introduction of 'green elections', albeit an overview of total carbon emissions associated with elections in India is outside the present scope.

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1. **INSTITUTIONAL AND LEGAL CONTEXT**

The ECI is a constitutional body created under article 324 of the Constitution (India 1950). The ECI conducts elections to the offices of President and Vice President of India, both Houses of Parliament, State Legislative Assemblies and State Legislative Councils. The election machinery is headed by Chief Electoral Officers (CEOs) at the state/Union Territory level, and by District Election Officers at the district level. The functions of the Commission may be delegated by the Chief Election Commissioner and Election Commissioners (under section 19A of the Representation of the People Act 1951 to the Deputy Election Commissioner or the Secretary to the Commission (India 1951). The administrative machinery for the conduct of elections is detailed in part IV of this Act (MG and Ambarkhane 2018).

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During elections, a large number of central and state government officials are deployed to work for election on duties related to polling/security/election observation etc. All such persons are deemed to be on deputation to the Commission and are subject to its control, supervision and discipline, and report only to the Commission during the period of the election (MG and Ambarkhane 2018). The overall establishment of the Commission engaged in preparation and delivery of elections is summarized in Box 1. Most work related to disaster management is dealt at the level of District Election Officer (DEO) and his/her team. This would ideally include Returning Officers, sector and zonal officers, nodal officers and so on. Returning Officers are in charge of a particular constituency where the election is being held, a sector or zonal officer is in charge of 10 or more polling stations and nodal officers are appointed by the DEO for specific tasks. An overarching policy for disaster management during elections does not exist at ECI level; however, some aspects of resilience-building measures for a natural hazard during an election are covered in the Manual on Electoral Risk Management (ECI 2023f).

The Constitution of India adopted a parliamentary form of government. Parliament consists of the President of India and the two Houses—Upper House (Rajya Sabha) and Lower House (Lok Sabha). India, being a Union of states, has separate state legislatures for each state. State legislatures consist of the Governor and two Houses—Legislative Council and Legislative Assembly. The country is divided into 543 parliamentary constituencies, each of which returns one MP to the Lok Sabha. The Federal Democratic Republic of India has 36 constituent units. All the 29 states and 2 of the 7 Union Territories have their own assemblies—Vidhan Sabhas. The 31 assemblies have 4,120 constituencies (ECI 2018b).

Since its establishment in 1950, the ECI has managed the conduct of over 17 national and over 395 state assembly elections (ECI 2021c) even during times of crisis. Several state assembly elections were held throughout the country during the Covid-19 pandemic for an electorate of over 900 million (Ambarkhane 2021; Ghoshal 2019).

Box 1. **Electoral Commission functionaries, functional divisions and field staff**

Section Commission of India
Chief Election Commissioner
Election Commissioners

ECI Secretariat
- Functionaries
- Deputy election commissioners and directors general
- Director/Principal secretary
- Secretary/Joint director/Deputy secretary/Assistant director
- Under secretary
- Section officer
- Assistants/Clerks

Functional Divisions Office
- Planning
- Electoral rolls
- Election materials
- Automation and technology
- Judicial
- Political parties
- Statistics and documentation
- Voter education and participation (SVEEP programme)
- International cooperation
- Secretarial coordination
- Election expenditure monitoring
- Training/India International Institute for Democracy and Election Management (IIIDEM)
- Conduct of elections
- Protocol
- Administration
- Finance

Field level
- Chief electoral officers
- Additional chief electoral officer
- Joint chief electoral officer
- Deputy chief electoral officer
- District election officers
- Returning officers/Electoral registration officers
- Police and Security Personnel
- Sector/Zonal officers
- Nodal officers of district election office
- Media certification and monitoring committee members
- Candidate expenditure monitoring teams
- Trainers
- Booth level officers
- Polling personnel
- Counting personnel

Source: Election Commission of India. Narrative and Statistical Report Ls Election 2014, 13 September 2018, <http://tinyurl.com/42bfvk6j>, accessed 16 January 2024.

2. **MEASURES ON PREVENTION AND ADAPTATION APPLIED AT THE SUBNATIONAL LEVEL**

India is prone to various natural hazards including floods, storms, droughts, extreme heat, and earthquakes (IEP 2022). In 2022, the Centre for Science and Environment, a New Delhi-based public interest research and advocacy

organization, tracked extreme weather events in India. It found that India experienced extreme weather events on 314 out of 365 days, meaning at least one extreme weather event was reported in some part of India on each of these days. The report concluded that these events caused more than 3,000 deaths in 2022, affected about 2 million hectares (4.8 million acres) of arable land, killed approximately 70,000 livestock animals and destroyed roughly 420,000 houses (Krishnan 2023). According to the Intergovernmental Panel on Climate Change, more intense heatwaves and future floods are projected across India (IPCC 2023: 1156−57, 1569). Himachal Pradesh, Bihar and Odisha are among the states more prone to certain types of natural hazards and as a result have developed more capacity in disaster management.

Himachal Pradesh assembly election 2022

This example is about managing the threat of infrastructure damage in an ecologically sensitive zone during elections, and contingency planning to avert this with inter-agency collaboration. Himachal Pradesh's 13th state assembly was to expire on 8 January 2023 and ECI announced election to the 14th assembly on 14 October 2022 (ECI 2022c). Twelve days later the Himachal Pradesh Chief Electoral Officer accordingly published a disaster management plan (CEO Himachal 2022) which details the state's profile in relation to hazards like floods, landslides, earthquakes and avalanches. The landslide hazard map is shown in Figure 1. Although for Himachal Pradesh flash floods are a common occurrence due to its location in the Himalayas, large infrastructure developments in ecologically sensitive zones tend to be unregulated (Panwar 2023). The Election Office's disaster management plan also details the institutional mechanisms and response strategies such as district response teams, emergency support, resource inventory, search and rescue standard operating procedures, and emergency communication directory (CEO Himachal 2022). This was the only state-level plan of its kind—i.e. electoral—to be developed in such detail in 2022, although all states do have a disaster management authority for natural hazards.
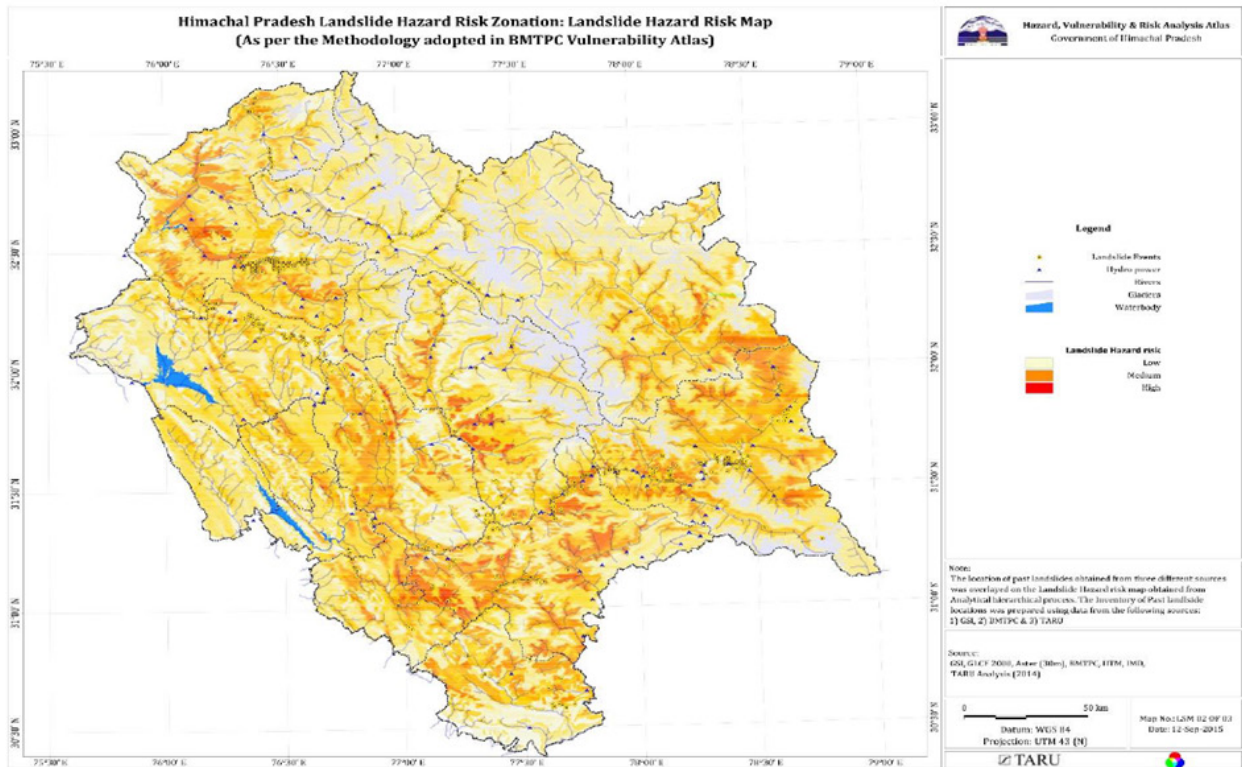
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The national Manual on Electoral Risk Management (ECI 2023f) includes a specific section on mitigation of risks from natural disasters, mostly focused on disaster prone areas. As a part of the response mechanism, 1,035 officials of the National Disaster Response Force (NDRF) were deployed in the state during the 2022 election. Himachal Pradesh State Disaster Response Force also deployed 165 officials for emergency response (CEO Himachal 2022). The Disaster Management Department along with the CEO Himachal Office also identified polling stations that are off-road and the distances involved in reaching them. This was to identify and develop an early response mechanism with district-level detail, in case of a natural disaster (CEO Himachal 2022). Thankfully, none occurred during the 2022 cycle.

Bihar state assembly election 2020

This example is about damage to infrastructure and multiple logistical challenges due to a natural disaster before an election and during the first wave of Covid-19. Contrary to expectations, there was no impact on voter turnout. In Bihar, the state assembly election was conducted in October−

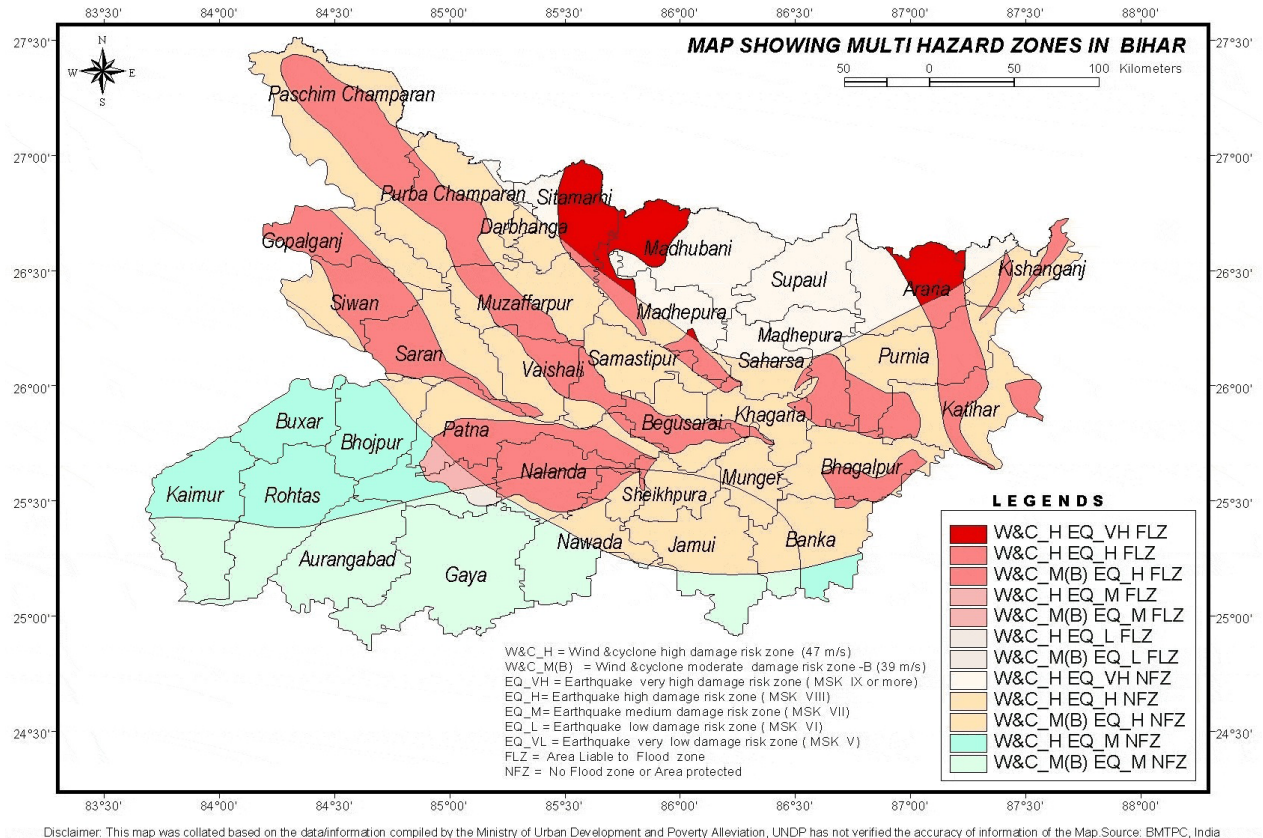Figure 1. **Landslide hazard map of Himachal Pradesh.**

Key: Red = high risk; orange = medium risk; yellow = low risk.
Source: Chief Electoral Officer's office, Himachal Pradesh.

November 2020 during the pandemic's early peak, which followed a severe flood in July (Ambarkhane 2021; Kumar 2020). At least 12 districts were flooded affecting a population of 760,000 people. The state government had initiated several steps for flood rescue and rehabilitation including deployment of 13 NDRF teams and 8 state disaster response force teams (Tripathi 2020). The mitigation strategy for floods as a hazard had to be zonal rather than general and based on the general characteristics of rivers (Disaster Management Department 2020). The floods affected 14 districts of Bihar, with the toll of damage to infrastructure being heaviest in the rural areas. Most of the polling stations were in schools and the long school closures due to Covid-19 meant these sites were dirty even before accumulation of mud from flooding. Restoration of voting infrastructure within a short span of time amid threat of infectious disease was a mammoth task (Disaster Management Department 2020). Figure 2 shows the multiple hazard zones of the state.

Due to the floods, infrastructure such as roads, bridges and schools in 12 districts was damaged which led the electoral authorities to create and publicize auxiliary polling stations (CEO Bihar 2021). There were 33,792 auxiliary polling stations set up in addition to the 72,723 main polling stations. This challenge involved identifying over 2,500 additional buildings and the

Figure 2. **Multi-hazard zones in Bihar**

Key: Red = high damage risk zone; light brown = moderate damage risk zone; blue = low damage risk zone (wind and cyclone, earthquake and flood—combined).
Source: Bihar Disaster Management Authority.

same number of additional booth level officers for voter verification, as well as 'Convincing the public whose livelihood was severely impacted due to the flood to participate in democratic process' (CEO Bihar 2021). Further, a large number of migrant workers originally from Bihar had returned to the state due to lack of jobs during Covid-19. Hence, a special registration drive was conducted to enrol them in time for the elections (Ambarkhane 2021).

Despite the tight timescale for this, the 10 most flood-affected districts managed to increase voter turnout between 0.4 and 3.4 per cent as compared with Bihar's previous election (ECI 2021a). Hence, the devastation caused due to flood and the health and migration crisis due to the Covid-19 pandemic did not deter the voters from exercising their franchise and the efficient arrangements by the CEO office Bihar and ECI helped.

Odisha state assembly election 2019

In this example, the possibility of infrastructure damage in a constituency due for election led to postponement of the said election. On 3 May 2019, Cyclone Fani wreaked havoc on the coastal areas of Odisha and West Bengal. In the eastern state of Odisha, where the cyclone's effects were felt the most, 64 people died while 1.2 million were evacuated to cyclone shelters (World Bank 2019). Despite a category four hurricane with windspeed of 180 kmph, about 1.5 million people were shifted within 24 hours to 9,177 safety shelters before landfall (Jena and Kishor 2021).

National elections in India were taking place at the same time; while the simultaneous election (for national and state assembly) had already taken place in four phases on 11, 18, 23 and 29 April 2019 for most of the constituencies in Odisha state, election to one state assembly constituency of Patkura was left (ECI 2019b). Voting in Patkura had been scheduled for 29 April 2019, four days before the landfall of Cyclone Fani (ECI 2019d). Due to the risks of destruction of electoral materials, the ECI instructed the CEO office to move electronic voting machines (EVMs) from the districts of Jagatsinghpur and Gajapati. To uphold the principles of transparency, the entire process was conducted in the presence of all candidates and under video surveillance. A joint team of central and state police forces accompanied the vehicles transporting EVMs and voter verifiable paper audit trails (VVPATs),, as did the presiding officer of each centre (India Today 2019).

The Chief Minister of Odisha urged the ECI to postpone the election in Patkura due to the Cyclone Fani alert (Bisoyi 2019). The Bharatiya Janata Party (BJP), the opposition party in the state and the ruling party in the federal government, opposed the proposal of the Chief Minister. Yet the ECI decided to postpone the election (Bisoyi 2019; ECI 2020a), first to 19 May 2019 due to the death of a contesting candidate and then to 20 July 2019 due to Cyclone Fani (ECI 2019d).

Measures on prevention and adaptation applied at the national level

In response to natural hazards, the ECI has also adopted risk management and resilience-building measures at the national level. This includes specific references to natural hazards in the risk management manual (ECI 2023f), the election disaster management plan (CEO Himachal 2022), contingency plans and assured minimum facilities (AMF) at all polling stations (ECI 2023d). All of the aforementioned measures are described below.

Manual on Electoral Risk Management and Disaster Management Plan

Elections to some state assemblies or by-elections to some constituencies are held throughout the year during any season, as per the expiry of the five-year term (ECI 2023a). Hence, contingency planning has been adopted by the ECI to ensure smooth conduct of elections during events like storms and floods to ensure voting rights of citizens.

The ECI at the national level has prescribed proactively designing a mitigation strategy in case of natural disasters in its Manual on Electoral

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Risk Management, updated on 28 July 2023 along with an Election Disaster Management Plan. First published in 2018, the second edition of the manual now states that damage from risks that are 'uncontrollable such as a natural disaster (cloudburst/ floods, cyclone), outbreak and escalation of local/ communal conflict, Covid pandemic etc. can be prevented by proactively designing a mitigation strategy which shall entail clearly defined roles for everyone involved in the process' (ECI 2023f: 5). The manual identifies multiple risk categories along with mitigation measures to be undertaken and by which authority. While a range of risks are covered, from training of staff to communication during disasters and inundation of polling materials, the document focuses mostly on contingency measures for disaster prone areas only. Table 1 is an extract from the manual on disaster risk and its mitigation.

From the Table 1, it is evident that most of the contingency planning is to be conducted at the district or constituency level. Some states which are disaster prone should consider developing a disaster management plan in coordination with state disaster management authorities. Also, states where only a few districts or constituencies are affected could look at preparing a specific plan for these districts in association with relevant district disaster management authorities.

At an ECI meeting for sharing of experiences from states having gone to the polls in 2016, one of the lessons was the need for contingency planning for unexpected weather conditions on polling day like severe storms, widespread rain and power failures. The Union Territory of Puducherry had faced a crisis on election day owing to a storm-induced blackout and 'panic' arrangements for lamps had to made at polling stations (ECI 2018a).

The Handbook for Returning Officers is a key document with standard operating procedures (SOPs) for the lead officer responsible for the conduct of elections in a constituency (ECI 2019a). It mentions various measures for contingency planning, stating:

> Under section 57(1) of the Representation of the People Act, 1951, the Presiding Officer of a polling station is empowered to adjourn the poll on account of:
>
> i). a natural calamity like flood, heavy snowfall, a severe storm and the like, or
>
> ii). non-receipt or loss or damage to essential polling materials like EVMs, ballot boxes, ballot papers, authentic copy of electoral roll and the like, or
>
> iii). disturbance of peace at the polling station making it impossible to take the poll; or
>
> iv). non-arrival of the polling party at the polling station due to obstruction on the way or any other serious difficulty, or
>
> v). any other sufficient cause.
> —The ECI, Handbook for Returning Officers (2019: S.13.60.1)

Table 1. **Risks and mitigation measures identified—ECI Manual on Electoral Risk Management**

Work area	Risk identified	Mitigation measures/action points	Level at which action to be taken*
1. Election Disaster Management Plan	Not covering all facets of various types of disasters.	Advance planning required for ensuring this. Frequent, timely meeting of SDMA and District Disaster Management Authority.	SDMA/CEO/DDMA
2. Training	Untrained personnel do not know how to face disaster and panic.	Training of election officials on particular disaster handling in disaster prone areas should be provided.	CEO/DEO/RO
3. Awareness of disaster	The election personnel are unaware of the updates/ happening of disaster.	Live weather updates to be integrated with communication plan, provision for putting alert and mechanism of SOS generation should be there.	DEO/RO/PO
4. Poll materials	The election materials getting damaged/drenched due to water.	Procurement/use of polythene bags in rain prone areas for covering election materials.	DEO/RO
5. Communication	Normal communication fails due to load shedding, mobile connection non-functional.	Back up communication plan to be kept ready in case mobile phones becomes non- functional. Sufficient power banks to be provided to polling parties. Allow mobile phones to all polling personnel, not only to Presiding Officer.	DEO/RO
6. DCRC (Distribution Centres/ Receiving Centres)	DCRC temporary structure being blown away due to cyclone/natural disaster.	Avoid temporary structures of DCRC in cyclone prone areas.	DEO/RO
7. Polling station	Polling stations of low-lying areas get submerged under water due to flood.	Pre-identification of alternative building on highland for shifting of polling station in case of sudden flood.	CEO/RO
	Load-shedding at polling station after evening, the poll materials may be misplaced lost.	Arrangement of alternate/rechargeable light or other source of light.	DEO/RO
8. Polling parties [voters]	The polling parties are frightened and unaware of alternate routes.	Civil defence volunteer/local volunteer with polling party in disaster prone areas.	DEO/RO
	No electricity, no light endangers all the personnel.	Torch or flash lights to be provided with polling parties.	DEO/RO
	The polling personnel are drenched and infected with cold.	Raincoats may be stored at sector for special requirements in such disaster-prone areas, if any.	DEO/RO

Key: *SDMA: State Disaster Management Authority; DDMA: District Disaster Management Authority; CEO: Chief Electoral Officer of a state; DEO: District Election Officer; RO: Returning Officer of a Constituency.
Source: ECI, Electoral Risk Management Manual (2nd edition) (2023f: 72-77).

The Handbook for Returning Officer also deals with instructions to avoid setting up temporary structures for polling stations and counting centres in case of fire, rain and dust storms (ECI 2019a: sections 2.2 and 15.4) and to protect election materials from hazards such a fire, rain etc. The ECI favours use of permanent structures like school buildings as polling stations, which exist in every corner of the country. Only in very remote places where a school does not exist, a temporary structure may be permitted to create a polling station. In a recent instruction, the ECI has also instructed districts to create permanent, wheelchair friendly ramps (with a 1:12 gradient) at all schools which will act as polling stations (ECI 2023e).

Improving voter experience during extreme heat
Extreme heat can discourage voters from standing in queues, especially afternoon hours when temperatures and voter numbers both peak (*Times of India* 2016). Hence, over the past several years, the ECI has introduced assured minimum facilities (AMF) at all polling booths. These facilities provide voters with shade from the sun, drinking water, seating arrangements and toilet facilities, as well as medical kits in case of emergencies. The AMF is a framework to enable polling personnel to discharge their duties in an efficient manner (ECI 2023d). Election officials can manage complaints and identify which facilities are not available in which polling stations, making corrective arrangements as required.

Recent updates on AMF instructions include sufficient numbers of environmentally friendly disposable glasses for drinking water, canopies for waiting areas (minimum 15 square feet in area and sufficient seating with preference for 'ladies/senior citizens/nursing mothers/differently abled voters and children accompanying them' (ECI 2023d)). Figure 3 shows a voter getting checked for hypertension at a polling station equipped with drinking water and first aid kits during 2014's national election.

The AMF is of vital importance also because apart from cases of EVMs malfunctioning due to heat (Dua 2018), some deaths of people standing in queues were also reported during the last national election (Singh 2019).

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3. MITIGATION MEASURES TO REDUCE CARBON EMISSIONS DURING ELECTIONS

Focus on reducing pollutants during elections is an integral part of the ECI strategy to reduce carbon emissions (ECI 1999). During elections in India, the ECI issues a large number of instructions and circulars along with SOPs for smooth conduct of elections. Over time, ECI has moved from paper ballots to electronic voting to save paper, introduced a ban on single-use plastics during elections and undertaken 'green election' initiatives (ECI 2022a).

Electronic voting

India introduced the use of EVMs to record votes cast in 1982, on a pilot basis (ECI n.d.; ECI 2022b, n.d.). After judicial review and positive responses from political parties and other stakeholders, the reach of EVMs was expanded and they were finally used across India from the national elections of 2004 onward. Judicial pronouncements on the need for EVMs during their pilot-testing phase mostly refer to ease of counting and being a safeguard against ballot stuffing (ECI 2022b). However, multiple news articles discuss the importance of introducing EVMs for environmental reasons, while a scientific paper refers to EVMs as an 'eco-friendly' option that 'saved the cost spent on transportation of large number of ballot boxes, cost spends on papers, cost spends on stamps etc' (Verma et al. 2015). Media reports also talk about EVMs saving trees, given that 'in the 1996 national election 8,000 tonnes of paper were used for printing ballot papers and in 1998 national polls the paper use was marginally lower at 7,700 tonnes' (PTI/Rediff.com 2004). This would need upwards of 150,000 trees to be felled. Another media report pointed out that if EVMs had not been used in the 2009 national elections, 10,000 tonnes of paper would have been consumed due to the increase in registered voters (Hindustan Times 2009).

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Figure 3. **AMF facilities in action**

Source: Election Commission of India. Narrative and Statistical Report Ls Election 2014, 13 September 2018, <http://tinyurl.com/42bfvk6j>, accessed 16 January 2024.

In comparing EVMs with paper ballots, the ECI itself says, 'EVM voting saves time, energy and money, not to speak of the millions of trees it saves in the process'.

In comparing EVMs with paper ballots, the ECI itself says, 'EVM voting saves time, energy and money, not to speak of the millions of trees it saves in the process' (ECI n.d.). Amid the demand for a return to physical ballot papers, a former Chief Election Commissioner commented that this would lead to wastage of paper (Hindu 2018). While the ECI has completely switched to using EVMs during national, state and presidential/vice-presidential elections, some State Election Commissions—which are responsible for the conduct of municipal, village and local polls—still use paper ballots. In 2019, the electoral management body (EMB) of the most populous state, Uttar Pradesh State Election Commission (UPSEC), was inviting bids to dispose of around 286 metric tonnes of used ballot paper waste. UPSEC was planning to use 'EVMs in all the cities beyond municipal corporations where they are already used' (*Hindustan Times* 2019).

India's EVM is a stand-alone, non-networked, one time-programmable (OTP) machine. Not being computer controlled nor connected to the Internet or any network (ECI n.d.) and battery operated, it does not require further electricity to function.

Set against this, EVMs do need to be securely moved around the country during election periods. EVMs are transferred to polling stations from dispatch centres and from polling stations to designated strong rooms by GPS-fitted container trucks and escorted by both central and state police vehicles, depending upon the logistics plan devised by the District Election Officer (DEO) (ECI n.d.). While the exact number of vehicles used during elections is not available, in the last national election in 2019, the ECI commissioned 2.23 million ballot units, 1.63 million control units and 1.73 million VVPATs (Paliwal 2019). Transportation of such a large number of EVMs and polling personnel to polling stations, especially in hilly and remote areas, represents significant carbon emissions.

Ban on single-use plastics during elections

According to reports for year 2017–2018, the Central Pollution Control Board (CPCB) estimated that India generates approximately 9.4 million tonnes per annum of plastic waste (26,000 tonnes per day). Out of this approximately 5.6 million tonnes are recycled (15,600 tonnes per day) and 3.8 million tonnes is left uncollected or littered (9,400 tonnes per day). The per capita consumption, however, has been low at 11 kg per annum, compared to the global average of 28 kg. Among developed nations, the United States has a per capita consumption of 139 kg per annum, while the European Union's is 65 kg (CSE 2019). Data on how much of this plastic waste can be attributed to electoral activities is not available (MoHUA 2019).
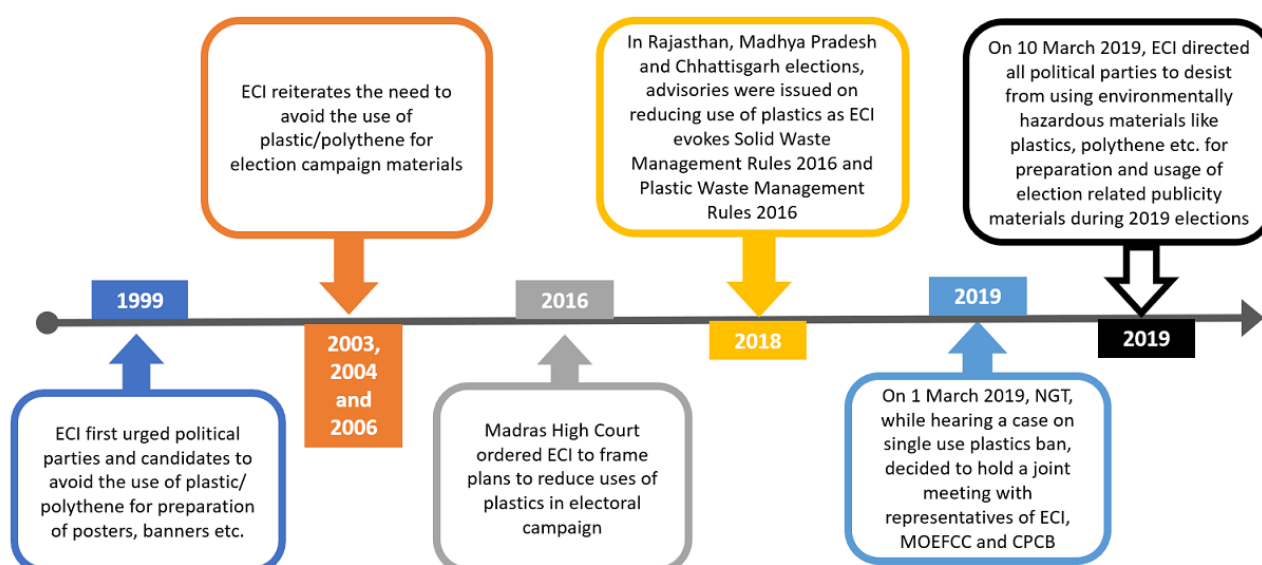
Given the extent of the problem, efforts to reduce the use of single-use plastics have been ongoing for some years (Sailaja Bhattacharya et al. 2018) as India had committed to do away with single-use plastics by 2022. At the 4th United

Nations Environment Assembly held in 2019, India piloted a resolution on the issue. The Plastic Waste Management Amendment Rules first issued in 2016 and amended in 2021 by the Ministry of Environment, Forest and Climate Change (MOEFCC) put a ban on 'manufacture, import, stocking, distribution, sale and use of identified single use plastic items, which have low utility and high littering potential, all across the country from July 1, 2022' (Government of India 2022b). Covering 19 items, including disposable plastic cutlery and straws, the ban triggered the development and manufacturing of innovative eco-alternatives and their uptake, including by state governments and local authorities (Yadav 2023).

The ECI started the campaign against single-use plastics (Figure 4) early, with support from High Courts and the National Green Tribunal (NGT)—a specialized judicial body equipped with expertise solely for the purpose of adjudicating environmental cases in India, established in 2010 (NGT n.d.). As early as July 1999, the ECI first urged political parties and candidates to avoid the use of plastic/polythene for preparation of posters and banners, based on an appeal by World Wide Fund for Nature–India. The ECI issued similar letters in 2003, 2004 and 2006 (ECI 1999). In January 2016, before the Tamil Nadu state elections in May, the Madras High Court ordered the ECI to frame plans to reduce the use of plastics in electoral campaigns. In the state elections in December 2018 in Rajasthan, Madhya Pradesh and Chhattisgarh, advisories were issued on reducing use of plastics. The ECI evoked the Solid Waste Management Rules (CPCB 2016) and Plastic Waste Management Rules 2016 for parties and authorities to adhere to (Mahapatra 2019).

As early as July 1999, the ECI first urged political parties and candidates to avoid the use of plastic/polythene for preparation of posters and banners, based on an appeal by World Wide Fund for Nature–India.

Figure 4. **Timeline of events to ban single-use plastics during elections**

Source: Author.

Kerala was the first State where election-related plastic was banned by the High Court.

However, the implementation of these instructions by the ECI is a work in progress (Mahapatra 2019). Kerala was the first state where election-related plastic was banned by the High Court. The directive may not have been followed effectively, but it was a step in the right direction and almost all political party workers reported being aware of green protocols (Anand 2019). Other states like Karnataka, Maharashtra, Himachal Pradesh, Telangana and

> Box 2. **Green elections**
>
> The ECI has initiated new activities like green polling stations in areas with forest covers given that Kerala's High Court, for example, banned the use of flex and nonbiodegradable campaign materials such as plastic hoardings for the 2019 national election. An advisory/recommendation was issued by the CEO immediately afterward asking all political parties to refrain from using single-use plastic materials in poll campaigning, and instead use eco-friendly options (such as wall graffiti and paper or cloth posters). A primary focus was reusable alternatives to plastic cutlery and bottles, such as glass/stainless steel/porcelain (ECI 2019c).

Sikkim already had some form of single-use plastic ban in place, but not all of them extended to campaigning (Verchot 2019). Finally, effective enforcement and analysis of these regulations' effects is not possible without data gathering efforts.

A booklet was published explaining all the ways in which the green protocol could be adhered to and enforced in the state. Not just that, all activities conducted by the Commission at the state level and even at the district level were entirely 'green' events and promoted the plastic-free message. Special events were organized by the district election officials to promote the green message including cycle rallies, processions by students and green protocol volunteers in different districts, a signature campaign on cloth banners, street plays on green elections, flash mobs, a beach run, sand art, quizzes, local celebrity endorsements and other activities. All of this was under the aegis of the ECI's SVEEP (Systematic Voters' Education and Electoral Participation Programme) in the state (ECI 2019c).

Model eco-friendly polling stations have been set up in Goa, Gujarat and Puducherry using coconut shells, and palm and banana leaves.

Various CEOs have undertaken similar innovative initiatives. Model eco-friendly polling stations have been set up in Goa (Figure 5), Gujarat and Puducherry using coconut shells, and palm and banana leaves; eco-friendly seed pens have been adopted by polling personnel in Meghalaya. A 'Grow with Democracy' plantation drive took place in Assam's Kakoijana Reserve Forest, with 32,000 saplings planted in a record time of 32 minutes. A major push has been given for eco-friendly infrastructure, with many CEOs adopting LED lighting, rainwater harvesting systems and solar panels in their office premises and EVM warehouses (ECI 2022a).

Figure 5. **Green polling station, Goa**

Source: ECI, 2022.

Celebrating the World Environment Day on 5 June 2022, Election Commissioner Shri Anup Chandra Pandey said, 'Reduce, Reuse and Recycle is an integral motto of ECI's approach for environmentally sound election management practices'. He added that ECI initiatives like online assistance with voter registration/candidate nominations and an extensive suite of mobile apps for citizens are all part of ensuring environmentally friendly elections (ECI 2022a).

Biomedical waste management during Covid-19

The ECI has held 16 state assembly elections since the Covid-19 pandemic began (ECI 2023b). Of these, 11 state assembly elections were held during peaks of infection which by mid-2022 meant the voting rights of over 444 million voters were upheld (ECI 2023b). In order to ensure safety of polling staff, they were all provided one packet of personal protective equipment (PPE) containing hand sanitizer, six 3-ply face masks, one face shield and gloves (Business Insider 2020). Disposal of these materials post-election was a massive task. Elaborate guidelines were issued for custody, handling, use and disposal of Covid-19 safety equipment (ECI 2020b). According to a report by the MOEFCC, India produced over 962 tonnes per day of biomedical waste (BMW) between May 2020 and March 2022 (Government of India 2022a). Tagging of polling booths along with other places where BMW was being generated, sanitization, collection and disposal were closely supervised by district administrations, with waste management teams themselves equipped with PPE (Bhardwaj 2020). For example, during the 2022 Punjab assembly election, waste materials were collected from all 24,740 polling booths of the state within two hours of the end of polling and 603 collection centres were set up for this purpose. The ECI insisted on tracking the vehicles to ensure all waste was disposed of efficiently (Bhardwaj 2020). The Bihar state election team had developed a mobile application to track the movement of vehicles

so engaged (CEO Bihar n.d.), which was likewise adopted by other states in 2021—West Bengal (ECI 2021b) and Kerala.

4. **CONCLUSION AND LESSONS LEARNED**

This case study has described resilience-building measures adopted by the ECI at the national and state levels to protect elections against natural disasters. At the state level, this paper highlights inter-agency collaboration between the ECI and National Disaster Response Forces as well as the introduction of the first disaster management plan, specifically for Himachal Pradesh state assembly elections. The introduction of more than 33,000 auxiliary polling stations as a result of the twin hazards during the 2020 Bihar election is a notable example of adaptation and flexibility, while the ECI's postponement of elections in one constituency of Odisha due to Cyclone Fani demonstrated the flexibility in the legal framework to respond to humanitarian and operational concerns.

The next national election will be conducted in April– May 2024, which is peak summer in India. Within this timescale it may be feasible for the ECI to develop a comprehensive plan on ensuring voting rights are preserved during floods, droughts and extreme heat.

A potential advantage of a more decentralized approach to disaster management is that some states plan innovative solutions that others can then adopt. A potential disadvantage is that other states might face natural disasters with no measures in place at all. Only a minimal requirement for contingency planning at national level is proposed in the Manual on Electoral Risk Management (ECI 2023f), and it still focuses on disaster prone areas. There are at present no specific contingency planning measures proposed at a national level for all states and Union Territories that look at all manner of natural disasters. The next national election will be conducted in April–May 2024, which is peak summer in India. Within this timescale it may be feasible for the ECI to develop a comprehensive plan on ensuring voting rights are preserved during floods, droughts and extreme heat.

Efforts made by the ECI, various state high courts and the NGT have enabled a partial ban on plastics during election campaigning. However, more needs to be done by various agencies to enforce existing regulations and widen them to ensure all aspects of elections are more environmentally friendly. Many innovative ideas on reducing use of plastics and taking up eco-friendly measures to reduce carbon emissions have been discussed in this study. Use of eco-friendly materials for ballot papers, voting booths and other election materials can significantly reduce the environmental impact of elections (Prasher 2019) but, as pointed out earlier, while most political parties are aware of the ECI's instructions, data gathering is not in place and there is no information to suggest that they adhere to ECI guidelines strictly. The ECI needs to analyse the effects of its ban and to respond accordingly. Sustainable and progressive contributions to climate change mitigation could involve conducting carbon costing of electoral activities of ECI offices, political parties and other key stakeholders.

During emergencies, EMBs may need to transport hazardous biomedical waste and therefore they need to have plans in place for it. Therefore, any attempt to

decrease the overall carbon emissions of an election needs to also take into account extra materials that are needed to hold elections during emergency periods. Strict norms by the MOEFCC for the implementation of biomedical waste management for elections held during Covid-19 have enabled environmentally friendly elections. Similar strict implementation of plastics bans can lead to pollution-free elections.

Political will—along with express action by constitutional bodies such as the ECI, Supreme Court of India and other High Courts—can make a difference to ensure a green election and reduce carbon emissions. Electronic voting systems can significantly reduce the amount of paper required for elections, as well as reduce transportation and storage requirements. However, it is important to ensure that these systems are secure, robust, reliable and accepted by all stakeholders.

During times of emergencies and crisis like Covid-19, there may be a need for the EMB to make use of more materials (that need transportation and disposal) after election day compared to elections in normal times. All the indications are that these burdens and their associated carbon emissions will become more frequent. The carbon footprint of elections is ultimately bound up with India's infrastructure and wider economy. Using renewable energy sources such as solar and wind power can help reduce the environmental impact, as can encouraging voters to use public transport to reach their polling stations. Free public transport on election day can also make a big difference in ensuring higher voter turnout. Educating voters about the importance of environmentally friendly practices, such as reducing waste and using renewable energy, can help raise awareness and promote more sustainable practices on polling day and beyond.

Political will—along with express action by constitutional bodies such as the ECI, Supreme Court of India and other High Courts—can make a difference to ensure a green election and reduce carbon emissions.

REFERENCES

Election Commission of India (ECI)

Chief Electoral Officer Bihar (CEO Bihar), 'Bihar Assembly Election 2020' (presentation slides), 4 September 2021, <https://indiaawebcentre.org/files/file/47-bihar-assembly-election-2020> accessed 17 December 2023

—, 'ELE Traces: Election Tracking Enabled System', [n.d.], <https://eletraces.bih.nic.in/bihar>, accessed 17 December 2023

Chief Electoral Officer Himachal (CEO Himachal), *Disaster Management Plan during Himachal Pradesh Vidhan Sabha [Assembly] Election 2022* (New Delhi: ECI, 2022), <https://ceohimachal.nic.in/CommonControls/ViewCMSFile?qs=KI3gZ53zz1wW9H2IggWkQt6AMp4fx4pdDgcoJeKb%2BByf16%2B%2F5WxmaWssdU%2F77%2BZaBTfPBajMw6CFxxJ9e5rsEgljS3rhwGrHaaWk1%2BB4uAtt6kr9zzbiL59HBrmZp%2BlS>, accessed 18 January 2024

MG and Ambarkhane, 'Narrative and Statistical Report General Election to Lok Sabha, 2014', Election Commission of India, 13 September 2018, <https://www.eci.gov.in/eci-backend/public/api/download?url=LMAhAK6sOPBp%2FNFF0iRfXbEB1EVSLT41

NNLRjYNJJP1KivrUxbfqkDatmHy12e%2FzVx8fLfn2ReU7TfrqYobgIiWsKNw80sVQQ
TurmfLsaRPntO5zzMHfx%2B2yGWjALHfdIqvEPy9J%2BR2k0iP4MKyGy
VCXWS6O7ZEzFZqGg8EquKQfaoY5iFf%2BNhdkotT9UprguJHvF4JqpCLHnJYOf
%2FcvfvXoJE9GzXzfieGjq4BSBSw%3D>, accessed 16 January 2024

Electoral Commission of India (ECI), 'Pollution of environment on account of use of plastic sheets for making use of posters/banners during the election campaign', 16 July 1999, <https://old.eci.gov.in/files/file/1115-pollution-of-environment-on -account-of-use-of-plastic-sheets-for-making-use-of-postersbanners-during-the -election-campaign>, accessed 17 December 2023

—, *Experiences & Lessons Learnt from the Poll Gone States 2016* (New Delhi: ECI, 2018a), <https://old.eci.gov.in/files/file/5666-experiences-lessons-learnt-from-the-poll-gone -states-2016>, accessed 17 December 2023

—, *Electoral Statistics Pocket Book 2017* (New Delhi: ECI, 2018b), <https://old.eci.gov .in/files/file/5668-electoral-statisitics-pocket-book-2017>, accessed 17 December 2023

—, *Handbook for Returning Officer February 2019* (Document 23, Edition1) (New Delhi: ECI, 2019a), <https://old.eci.gov.in/files/file/9400-hand-book-for-returning-officer -february-2019>, accessed 17 December 2023

—, 'Announcement of schedule for general elections to Lok Sabha and Legislative Assemblies in Andhra Pradesh, Arunachal Pradesh, Odisha and Sikkim, 2019' (press release), 10 March 2019b, <https://old.eci.gov.in/files/file/9396-announcement-of -schedule-for-general-elections-to-lok-sabha-and-legislative-assemblies-in-andhra -pradesh-arunachal-pradesh-odisha-sikkim-2019>, accessed 17 December 2023

—, 'Conducting a green election in Kerala', 25 June 2019c, <https://ecisveep.nic.in/ articles.html/new-initiative/conducting-a-green-election-in-kerala-r104>, accessed 17 December 2023

—, 'Schedule for general elections to fill vacancy from 96-Patkura assembly constituency in the State Legislative Assembly of Odisha where poll was adjourned' (press release), 4 July 2019d, <https://old.eci.gov.in/files/file/10321-schedule-for -general-elections-to-fill-vacancy-from-96-patkura-assembly-constituency-in-the -state-legislative-assembly-of-odisha-where-poll-was-adjourned>, accessed 17 December 2023

—, 'ECI defers Rajya Sabha Poll in view of Covid-19; fresh date to be announced later' (press release), 24 March 2020a, <https://old.eci.gov.in/files/file/11983-eci-defers -rajya-sabha-poll-in-view-of-covid-19-fresh-date-to-be-announced-later>, accessed 17 December 2023

—, 'Broad Guidelines for Conduct of General Elections/By-elections during Covid-19' (Document No. 324.6.EPS.OT.001.2020), 21 August 2020b, <https://old.eci.gov.in/ files/file/12167-broad-guidelines-for-conduct-of-general-electionbye-election-during -covid-19>, accessed 17 December 2023

—, 'Bihar Legislative Election 2020' (results), 13 January 2021a, <https://old.eci.gov.in/ files/file/12787-bihar-legislative-election-2020>, accessed 17 December 2023

—, 'CEC holds a review meeting with CS West Bengal' (press release), 24 April 2021b, <https://old.eci.gov.in/files/file/13347-cec-holds-a-review-meeting-with-cs-west -bengal>, accessed 17 December 2023

—, 'Electoral Statistics Pocket Book 2021 (as on 31st December)', 31 December 2021c, <https://old.eci.gov.in/files/file/14181-electoral-statistics-pocket-book-2021-as-on-31st-december>, accessed 17 December 2023

—, 'ECI celebrates World Environment Day' (press release), 5 June 2022a, <https://old.eci.gov.in/files/file/14201-eci-celebrates-world-environment-day>, accessed 17 December 2023

—, *Legal History of EVMs and VVPATs* (New Delhi: ECI, 2022b), <https://old.eci.gov.in/files/file/14525-legal-history-of-evms-and-vvpats>, accessed 17 December 2023

—, 'General Election to Legislative Assembly of Himachal Pradesh, 2022 -reg' (press release), 14 October 2022c, <https://old.eci.gov.in/files/file/14491-general-election-to-legislative-assembly-of-himachal-pradesh-2022-reg>, accessed 17 December 2023

—, 'Term of the Houses', 2023a, <https://old.eci.gov.in/elections/term-of-houses>, accessed 17 December 2023

—, 'Election Results – Full Statistical Reports', 2023b, <https://old.eci.gov.in/statistical-report/statistical-reports>, accessed 17 December 2023

—, 'Assured Minimum Facilities and Other Facilities at Polling Stations-reg', 10 June 2023d, <https://ceodelhi.gov.in/PDFFolder/planning/Assured_Minimum_Facilities_(AMF)_issued_by_ECI.pdf>, accessed 18 January 2024

—, 'Inclusive and Participative Elections – Setting up of All Women/PwD/Youth managed Polling Station', letter to Chief Electoral Officers of All States/UTs, 30 August 2023e, <https://www.eci.gov.in/eci-backend/public/api/download?url=LMAhAK6sOPBp%2FNFF0iRfXbEB1EVSLT41NNLRjYNJJP1KivrUxbfqkDatmHy12e%2FzVx8fLfn2ReU7TfrqYobgIm3oWfm8hZDWv6FfRd42QeY1couyYw%2FoSLRDdDGZ%2BA%2BTIr3gLHm6lpiChmkU8hcSVXcJMvOlCl%2BNHmEVjVSQhj9UpyGVFqMTjZoK%2FJnG4EEj>, accessed 16 January 2024

—, *Manual on Electoral Risk Management 2023*, Edition 2 (Document No. 324.6.EPS:MA:005: 2023), 28 June 2023f, <https://ceomadhyapradesh.nic.in/Links/Manual/Manual%20on%20Electoral%20Risk%20Management%20FINAL.pdf>, accessed 18 January 2024

—, *Status Paper on Electronic Voting Machine (EVM)*, [n.d.], <https://ceo.karnataka.gov.in/uploads/media_to_upload1637061008.pdf>, accessed 17 December 2023

Other

Ambarkhane, S., 'Covid-19 and elections: The case of Bihar Legislative Assembly, India', 5 December 2021, <https://www.idea.int/sites/default/files/covid-19-and-elections-to-the-bihar-legislative-assembly-india-en.pdf>, accessed 17 December 2023

Anand, N., 'For the first time, an Indian state has kept the elections clean and green', Quartz, 23 April 2019, <https://qz.com/india/1602042/kerala-election-update-first-indian-state-with-green-polls>, accessed 17 December 2023

Bhardwaj, D., 'Bihar polls amid Covid-19: An election of many firsts', *Hindustan Times*, 3 November 2020, <https://www.hindustantimes.com/bihar-election/bihar-polls-amid-covid-19-an-election-of-many-firsts/story-bXkEjZJyJ7rxbx4iMrtCnI.html>, accessed 17 December 2023

Bisoyi, S. K., 'Odisha: ECI postpones Patkura assembly election in the aftermath of cyclone Fani', *Times of India*, 6 May 2019, <https://timesofindia.indiatimes

.com/elections/assembly-elections/odisha/news/odisha-eci-postpones-patkura -assembly-election-in-the-aftermath-of-cyclone-fani/articleshow/69204693.cms>, accessed 17 December 2023

Business Insider, 'Bihar Assembly Election 2020 – Here's how Covid-19 has changed the election preparations', 25 September 2020, <https://www.businessinsider.in/ india/news/heres-how-covid-19-has-changed-the-bihar-election-2020-preparations/ articleshow/78313687.cms>, accessed 17 December 2023

Central Pollution Control Board (CPCB), 'National Action Plan for Municipal Solid Waste Management', 2016, <https://cpcb.nic.in/uploads/MSW/Action_plan.pdf>, accessed 17 December 2023

Centre for Science and Environment (CSE), 'The Problem of Plastics', 2019, <https://cdn .cseindia.org/attachments/0.57139300_1570431848_Factsheet1.pdf>, accessed 16 January 2024

Disaster Management Department, Bihar, *Reflections on 2020 Floods in Bihar* [Hindi] (Patna: Government of Bihar, 2020), <https://state.bihar.gov.in/cache/7/Media%20 Gallery/Publications/17.pdf>, accessed 18 December 2023

Dua, R., 'UP bypolls: EC blames hot weather for EVM snags', *Times of India*, 29 May 2018, <https://timesofindia.indiatimes.com/city/lucknow/up-bypolls-ec-blames-hot -weather-for-evm-snags/articleshow/64362776.cms>, accessed 16 January 2024

Ghoshal, D. (2019, April 10), 'Factbox: Key issues in India's massive general election', Reuters, 10 April 2019, <https://www.reuters.com/article/us-india-election-issues -factbox-idUSKCN1RM05P>, accessed 3 January 2024

Government of India, Press Information Bureau/Ministry of Environment, Forest and Climate Change, 'Disposal of Bio-Medical Wastes', 7 April 2022a, <https://pib.gov .in/PressReleaseIframePage.aspx?PRID=1814553>, accessed 3 January 2024

—, 'Ban on identified single use plastic items from 1st July 2022', 28 June 2022b, <https://pib.gov.in/PressReleasePage.aspx?PRID=1837518>, accessed 3 January 2024

Hindustan Times, 'Things you did not know about EVMs', 17 March 2009, <https:// www.hindustantimes.com/delhi/things-you-did-not-know-about-evms/story-gb 9tZ4PhHixJVCM8geJjlM.html>, accessed 17 December 2023

—, 'Amid call for ballot system, SEC to dispose of 286 MT ballot paper', 1 February 2019, <https://www.hindustantimes.com/lucknow/amid-call-for-ballot-system-sec-to -dispose-of-286-mt-ballot-paper/story-9kLSJMrR0KH8nT8LWIzhaJ.html>, accessed 3 January 2024

India, Republic of, Constitution of 1950, <https://www.refworld.org/docid/3ae6b5e20 .html>, accessed 17 December 2023

—, Republic of, Representation of the People Act 1951, <https://www.indiacode.nic.in/ bitstream/123456789/2096/5/a1951-43.pdf>, accessed 18 January 2024

India Today, 'EC nod for shifting EVMs in Odisha over Cyclone Fani fears', 1 May 2019, <https://www.indiatoday.in/india/story/evm-odisha-fani-1514371-2019-05-01>, accessed 17 December 2023

Institute for Economics and Peace (IEP), *Ecological Threat Register 2020: Understanding Ecological Threats, Resilience and Peace* (Sydney: IEP, 2020), <https://www .visionofhumanity.org/wp-content/uploads/2020/10/ETR_2020_web-1.pdf>, accessed 17 December 2023

—, *Ecological Threat Report 2022: Analysing Ecological Threats, Resilience and Peace,* (Sydney: IEP, 2022), <https://www.economicsandpeace.org/wp-content/uploads/2023/10/ETR-2022-web.pdf>, accessed 17 December 2023

Intergovernmental Panel on Climate Change (IPCC), 'Chapter 11: Weather and climate extreme events in a changing climate', in *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva: IPCC, 2023), <https://doi.org/10.1017/9781009157896.013>

International IDEA, 'The Impact of Natural Hazards on Elections', updated 10 January 2023, <https://www.idea.int/news-media/multimedia-reports/impact-natural-hazards-elections>, accessed 17 December 2023

Jaiswal, U., 'Elections come and go, but Assam's flood problems linger', The Telegraph Online, 5 April 2021, <https://www.telegraphindia.com/north-east/assam-assembly-elections-2021-polls-come-and-go-but-states-flood-problems-linger/cid/1811534>, accessed 18 December 2023

Jena, P. and Kishor, P. K., 'The Fani: A case study Of Odisha disaster management', in A. N. Gupta et al. (eds), *Health Adaptation and Resilience to Climate Change and Related Disasters* (New Delhi: National Institute of Disaster Management, 2021), <https://www.researchgate.net/publication/358009339_THE_FANI_A_CASE_STUDY_OF_ODISHA_DISASTER_MANAGEMENT>, accessed 18 December 2023

Koerth, M., 'Can focusing on climate change help win elections?', Five Thirty Eight, 17 October 2022, <https://fivethirtyeight.com/features/can-focusing-on-climate-change-help-win-elections>, accessed 17 December 2023

Krishnan, M., 'Climate change in India: A growing environmental crisis', DW, 7 November 2023, <https://www.dw.com/en/climate-change-in-india-a-growing-environmental-crisis/a-66190451>, accessed 12 January 2024

Kumar, A., 'Bihar assembly election 2020: State faces flood challenge in run-up to polls', *Hindustan Times*, 30 September 2020, <https://www.hindustantimes.com/bihar-election/bihar-assembly-election-2020-state-faces-flood-challenge-in-run-up-to-polls/story-Z64wZAOJUSFSmZXjSKSyxH.html>, accessed 17 December 2023

Mahapatra, R., 'Election Commission, NGT, environment ministry say no to plastics in 2019 poll campaigning', Down To Earth, 12 March 2019, <https://www.downtoearth.org.in/news/pollution/election-commission-ngt-environment-ministry-say-no-to-plastics-in-2019-poll-campaigning-63546>, accessed 17 December 2023

Masiero, G. and Santarossa, M., 'Natural disasters and electoral outcomes', *European Journal of Political Economy*, 67/2 (2021), <https://doi.org/10.1016/j.ejpoleco.2020.101983>

Ministry of Housing and Urban Affairs (MoHUA), *Swachh Bharat Mission (Urban) Plastic Waste Management: Issues, Solutions and Case Studies* (New Delhi: Government of India, 2019), <http://swachhbharaturban.gov.in/writereaddata/SBM%20Plastic%20Waste%20Book.pdf>, accessed 18 December 2023

National Green Tribunal (NGT), 'FAQs', [n.d.], <https://www.greentribunal.gov.in/faqs>, accessed 18 December 2023

Paliwal, A., 'Election Commission data shows EVM-VVPAT tally was completely correct', India Today, 25 May 2019, <https://www.indiatoday.in/elections/lok-sabha-2019/story/election-commission-data-shows-evm-vvpat-tally-was-completely-correct-1534194-2019-05-24>, accessed 16 January 2024

Panwar, T. S., 'Explained | Himachal floods: a man-made disaster?', *The Hindu*, 30 July 2023, <https://www.thehindu.com/news/national/other-states/explained-himachal-floods-a-man-made-disaster/article67121119.ece>, accessed 18 December 2023

Prasher, K., 'NGT Demands Action on Plastic Pollution During Election. What Can Parties Do?', The Weather Channel, 6 March 2019, <https://weather.com/en-IN/india/news/news/2019-03-05-ngt-demands-action-on-plastic-pollution-during-election-what-parties-can>, accessed 18 December 2023

PTI/The Hindu, 'Reverting to paper ballots will be a retrograde step, says ex-CEC Krishnamurthy', 19 March 2018, <https://www.thehindu.com/news/national/reverting-to-paper-ballots-will-be-a-retrograde-step-says-ex-cec-krishnamurthy/article23294291.ece>, accessed 3 January 2024

PTI/*Economic Times*, 'After 2018 floods, Keralites want climate change to drive poll narrative', 26 March 2019, <https://economictimes.indiatimes.com/news/elections/lok-sabha/india/after-2018-floods-keralites-want-climate-change-to-drive-poll-narrative/articleshow/68576091.cms?from=mdr>, accessed 3 January 2024

Sailaja Bhattacharya, R. R. N. et. al., 'Discussion paper: Challenges and opportunities—plastic waste management in India', Energy and Resources Institute, 2018, <https://www.teriin.org/research-paper/discussion-paper-challenges-and-opportunities-plastic-waste-management-india?url=https://www.teriin.org/research-paper/discussion-paper-challenges-and-opportunities-plastic-waste-management-india&?campaign=1433443194&>, accessed 18 December 2023

Singh, K., 'Over 10 voters have died amid history's biggest election—and it's not even halfway done', Quartz, 26 April 2019, <https://qz.com/india/1604603/india-election-voters-die-in-kerala-west-bengal-chhattisgarh>, accessed 16 January 2024

Times of India/Times News Network, 'Noida: E-services to make assembly elections smooth and more transparent', 29 December 2016, <https://timesofindia.indiatimes.com/city/noida/noida-e-services-to-make-assembly-elections-smooth-and-more-transparent/articleshow/56227462.cms>, accessed 18 December 2023

Tripathi, P., '10 north Bihar districts affected by flood, 7.6 lakh people affected', *Times of India*, 24 July 2020, <https://timesofindia.indiatimes.com/city/patna/10-north-bihar-dists-hit-by-flood-7-6l-people-affected/articleshow/77134359.cms>, accessed 18 December 2023

Verchot, M., 'How "green" are India's elections?', 22 April 2019, <https://www.cnbctv18.com/economy/how-green-are-indias-elections-3034091.htm>, accessed 16 January 2024

Verma, G. et al., 'Hardware implementation of an eco-friendly electronic voting machine', *Indian Journal of Science and Technology*, 8/17 (2015) pp. 1–4, <https://doi.org/10.17485/ijst/2015/v8i17/79496>

Verma, S., 'Will India have its green moment in politics?', Down To Earth, 10 June 2019, <https://www.downtoearth.org.in/blog/climate-change/will-india-have-its-green-moment-in-politics--65009>, accessed 18 December 2023

World Bank, 'What states can learn from Odisha in disaster preparedness and mitigation' (interview with Deepak Singh, Lead Disaster Risk Management Specialist, World Bank), 14 June 2019, <https://www.worldbank.org/en/news/speech/2019/06/14/odisha-fani-disaster-preparedness>, accessed 18 December 2023

Yadav, B., 'India is moving away from single-use plastics', *Hindustan Times*, 30 June 2023, <https://www.hindustantimes.com/opinion/indias-successful-journey

-towards-beating-plastic-pollution-a-year-of-bans-alternatives-and-ecoinnovation
-101688136783729.html>, accessed 18 December 2023

ABBREVIATIONS

AMF   Assured minimum facilities

BMW   Biomedical waste

CEO   Chief Electoral Officer

DEO   District Election Officer

ECI   Electoral Commission of India

EMB   Electoral management body

EVM   Electronic voting machine

MOEFCC Ministry of Environment, Forest and Climate Change

NDRF   National Disaster Response Force

NGT   National Green Tribunal

PPE   Personal protective equipment

SOP   Standard operating procedure

VVPAT   Voter verifiable paper audit trail

ABOUT THE AUTHOR

Saket Ambarkhane has worked as a consultant with Election Commission of India (ECI) and as a Programme Manager at IIDEM (India International Institute of Democracy and Election Management) for over seven years. He has also worked as Programme Officer for Electoral Support at International IDEA's office in Nay Pyi Taw, Myanmar. Ambarkhane has 12 years' experience in the private, development and public sectors in total, including work on democratic governance and electoral management, research and documentation, capacity building, development consulting and media.

Contributors
Erik Asplund, Senior Programme Officer, Electoral Processes Programme, International IDEA.

Sarah Birch, Professor of Political Science and Director of Research (Department of Political Economy), Kings College London.

Ferran Martinez i Coma, PhD, Senior Lecturer, School of Government and International Relations at Griffith University, Queensland.

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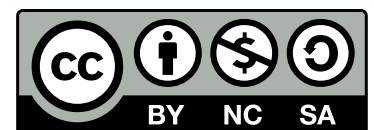
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