# Exploring the intersections between climate, governance & conflict

**How do governance and conflict dynamics interact with climate change? What interventions can we invest in beyond mitigation to help manage the impacts of the climate crisis on governance and conflict?**

**Authors:** Aprille Knox, Anna Mysliwiec, and Aimee Barnes on behalf of the Governance, Crime, and Conflict Initiative

---

*This document was prepared by Aprille Knox (Policy Lead), Anna Mysliwiec (Senior Policy Manager), and Aimee Barnes (Policy Manager) in affiliation with the Abdul Latif Jameel Poverty Action Lab (J-PAL) and in collaboration with Innovations for Poverty Action (IPA) for the Foreign, Commonwealth, and Development Office (FCDO). It was published in April 2025.*

*It is not an exhaustive review of all rigorous evidence on this topic but is limited in scope to emerging insights from impact evaluation studies that employ experimental or quasi-experimental designs and should be considered alongside other sources of evidence. The views expressed here do not necessarily reflect those of any of the publication's funders or those who provided input. J-PAL and IPA bear sole responsibility for the content of this report.*

Governance, Crime, and Conflict Initiative

J-PAL ABDUL LATIF JAMEEL POVERTY ACTION LAB

ipa Innovations for Poverty Action

UK International Development Partnership | Progress | Prosperity

# Overview: Exploring the intersections between climate, governance & conflict

## Context

Climate change disproportionately affects lower-income households and threatens to reverse decades of progress in global poverty alleviation. The World Bank estimates that it could push as many as another 132 million people into poverty by 2030 (Jafino et al. 2020).

While the technology needed to address climate change is rapidly advancing, political commitment to enact and implement vital climate change policies lags behind. At the heart of the issue lies a core political economy challenge—climate change policies often create both winners and losers, pitting promises of fossil-fuel-led growth against commitments to emissions reductions.

Moreover, the effects of climate change transcend country borders. Many of the places and populations disproportionately affected by climate change are not the largest emitters. Chancel, Bothe, and Voituriez (2023) describe this phenomenon as the "triple climate inequality crisis," whereby the bottom 50 percent of wealth holders are responsible for just 12 percent of global emissions but experience roughly 75 percent of the relative income losses triggered by climate change. This includes many fragile and conflict-affected contexts, where government capacity is often already weak, intergroup tensions are high, socioeconomic progress is slow, and stability is tenuous. In these contexts, climate change is often described as a "threat multiplier" to conflict (United Nations 2021).

In this brief, we provide a high-level overview of the theoretical frameworks and (quasi-) experimental literature on the intersections between climate, governance, and conflict, pulling out key recommendations and open questions for continued exploration.[1,2,3] We present key recommendations for policy and research before dividing the brief into two distinct sections: the first examining the links between climate and governance, where the experimental evidence base is better established and growing, and the second on the links between climate and conflict, where evidence from randomized evaluations remains limited but is beginning to emerge.

---

1 In addition to studies focused on reducing carbon emissions, we include studies focused on other pollutants and environmental harm, as oftentimes the same activities that generate carbon emissions generate co-pollutants and environmental damage that contribute to public health crises. In some instances, we include reference to studies exploring environmental regulations and practices that may not have direct links to climate change but where results may help inform effective climate change mitigation and adaptation strategies.

2 This review is meant to complement and be considered alongside other sources of evidence, including other sector-specific and/or largely nonexperimental studies and reviews. For example, Annual Reviews has compiled a detailed overview of interdisciplinary literature exploring the links between climate change and governance, including perspectives on conflict.

3 This review draws on research beyond that funded through the Governance, Crime, and Conflict Initiative (GCCI). Studies notated with an asterisk (*) throughout indicate those supported by GCCI.

## Key recommendations for policy and research

1. **Enhance environmental regulatory capacity:** Doing so can can have high returns on reducing environmental harms and degradation, particularly by investing in interventions or technologies that improve monitoring or reduce opportunities for corruption. Effective environmental regulation and regulatory capacity has been critical in solving major environmental challenges across contexts and is key for confronting climate change. Governments must both build the technological and bureaucratic capacity and establish the right incentives to effectively enforce environmental regulations, whether they pertain to polluting firms or illegal mining and logging activities. This entails deploying technology to enable accurate, credible monitoring—leveraging advances in remote sensing data, satellite imagery, and machine learning—and then using this data as a tool for enforcement. Incentives are key: experimental evidence has shown that audit mechanisms are more effective when they ensure that firms being audited have no financial ties to auditors, and enforcement must account for the fact that targeted firms can learn to circumvent it over time. Moreover, transparency initiatives and information campaigns may also help reduce pollution and mitigate environmental degradation.

2. **Invest in market-based mechanisms for curbing emissions:** Market-based mechanisms, such as pollution taxes and emissions trading schemes (ETS), can complement traditional government enforcement of climate policies. Proof-of-concept evaluations from India and Uganda highlight the potential of ETS and payments for ecosystem services in cutting emissions and curbing forest degradation, respectively. These market-based approaches suggest potential alternatives to traditional government regulations, such as command-and-control policies that set strict limits on emissions for individual firms or mandate the use of specific technologies, which can be more difficult to enforce.

3. **Invest in social protection to strengthen the resilience of low-income households, and mitigate the impacts of climate shocks on conflict:** Emerging quasi-experimental research from Ethiopia, India, and Kenya suggests that social protection programs can equip households to be more resilient to climate-related shocks, thereby mitigating the risk of future conflict and violence.[4] Policymakers should also be mindful of the distributional impacts of climate change policies, potentially combining those that may harm poor households, such as fossil fuel subsidy reform, with cash transfers or other policies that may benefit them. Further research is needed to uncover the optimal design of such policies.

[4] These findings mirror a broader literature on the benefits of social assistance programs in bolstering farmers' resilience to climate shocks. For a more detailed review of this literature, see J-PAL's Policy Insight on "Leveraging index insurance to protect farmers from weather-based risk" (J-PAL 2024).

4. **Evaluate the impacts of pairing peacebuilding and conflict prevention programs with climate mitigation, adaptation, and resilience efforts:** A growing literature shows the promising impacts of various interventions—including community-level reconciliation, intergroup contact and dialogue, and perspective taking—on strengthening social cohesion, particularly in fragile and conflict-affected contexts. However, few studies examine the impact of interventions implemented in locations at high risk of climate volatility or that are revisited following a climate shock to observe long-run impacts, presenting an area ripe for additional research.
5. **Unpack the mechanisms linking extreme climate and conflict:** While there is growing consensus on the indirect links between climate shocks and conflict—with climate change slowing socioeconomic development, triggering land disputes and conflicts over resources, exacerbating intergroup tensions, and forcing migration and displacement—identifying the main mechanisms linking extreme climate and conflict remain a key research and policy question. Investing in research in these areas is critical to understanding causal pathways and in turn designing effective policies and programs that may help communities become more resilient to climate-related shocks and conflicts.

# State of the evidence: Climate & governance

Governments have a vital role to play in addressing the climate crisis, including by designing regulations domestically, negotiating a just climate transition at the international level, and implementing policies to mitigate the effects of both climate change and climate change policy on vulnerable households. Governance research offers insights on how to create consensus around climate policies and how to implement them effectively, including in settings where state capacity is low. Experimental research on these topics is nascent, but early insights are emerging that can contribute to a broader evidence base on the political economy of climate action.[5]

**Building consensus around climate policies presents a political challenge** as these policies will often create winners and losers. Despite the clear long-run benefits of investing heavily in cleaner technologies and regulation now, the more immediate benefits of investing in fossil-fuel-led growth in terms of income growth and poverty reduction can trump these, which can be an especially challenging hurdle to overcome in low-capacity states (Pande 2024). Therefore, policymakers must consider ways to make climate policies more politically palatable. This may include groups negatively impacted by climate reform, such as through replacing energy subsidies with cash transfers; providing assistance for groups hit hardest by climate change; and clearly communicating the benefits, costs, and distributional

[5] See, for example, Annual Reviews' Political Science Perspectives on Climate Change, Oates and Portney (2003), and Besley and Persson (2023).

consequences of climate policies.[6] At the same time, there is a need for effective interventions to strengthen popular demand for climate action and to ensure that demand is translated into policy.

In some contexts, popular demand for climate action may be ahead of government action.[7] Citizens must thus be able to freely voice their climate and energy policy preferences and hold their leaders to account for acting on them. A large body of experimental evidence has identified effective strategies for enabling citizens to do so, including giving them access to information on politicians' performance in office and conducting audits of government programs (J-PAL 2019; J-PAL 2020). Researchers should build on this broader literature with research focused on holding leaders accountable for action on climate policy specifically and on building political coalitions, including those that transcend national borders, to back and adhere to climate policies.

When the public supports environmental policies, states can employ several evidence-based strategies to **monitor and enforce environmental regulations accurately and unbiasedly.**

- Research has shown that audits and monitoring are most effective when truly independent—that is, when auditors have no financial links to those being audited. To illustrate this, in Gujarat, India, Duflo et al. (2013) evaluated the impact of a pollution audit system reform, which made auditors more independent, on the truthfulness of auditors' reporting and audited firms' behavior. Increasing auditors' independence made them more likely to report the truth about industrial plants' pollution levels, and in response, the plants polluted less.
- In the long run, the targets of enforcement may learn how to circumvent regulations. In Chile, Gonzalez-Lira and Mobarak (2022) experimentally varied the frequency and predictability with which government agents made monitoring visits to vendors that illegally sold endangered hake fish. They found that visits were not effective when the schedule was predictable—as vendors could hide or freeze fish—and higher-frequency monitoring simply increased the speed with which vendors learned to circumvent it. By contrast, unpredictable and less-frequent monitoring reduced illegal fish sales substantially. Lessons from this research could be applied to the monitoring of other industries and practices with more direct links to climate change.
- Evidence suggests that citizen participation can support the enforcement of environmental standards by shifting regulators' enforcement interests. In a nationwide experimental evaluation in China, Buntaine et al. (2024) found that when volunteers publicly complained about pollution violations on a popular social media app and tagged the appropriate environmental authority, firms reduced their subsequent violations by over 60 percent and reduced their emissions. Private

[6] On this last point, see Drews and van der Bergh (2015) for a review of empirical and experimental literature on the factors that drive public support for climate policies and Dechezleprêtre et al. (2025) for results from a more recent large-scale survey experiment exploring attitudes toward climate policies.

[7] Dechezleprêtre et al. (2025) suggest that globally, there is widespread belief in the urgency of the climate crisis and support for clean energy policies.

complaints made directly to the regulator or firm led to smaller reductions in violations and emissions. Researchers suggest that public appeals were effective because they shifted regulators' interest away from facilitating economic growth toward avoiding public unrest over pollution.

In addition to monitoring programs, transparency initiatives and information campaigns may also help reduce pollution and mitigate environmental degradation. In the aforementioned study on reducing overfishing in Chile, researchers also found that a consumer information campaign—designed to educate consumers on the environmental impacts of consuming hake—was nearly as effective as the best enforcement design in reducing overfishing (Gonzalez-Lira and Mobarak 2022).

Additional research is also exploring the **effectiveness of market-based mechanisms, such as pollution taxes and ETS.**[8] For example:

- Greenstone et al. (2023) collaborated with the Gujarat Pollution Control Board to experimentally evaluate the impact of the first ever ETS for particulate air pollution on air quality and compliance costs for industrial plants. The evaluation of ETS leveraged an existing innovation of rolling out continuous emissions monitoring systems devices across the state, which send live readings of particulate emissions. Plants randomly assigned to participate in the scheme reduced their pollution emissions by 20–30 percent and reduced their average pollution abatement costs, suggesting that, relative to top-down command-and-control regulations, market-based mechanisms may be more enforceable and that emissions markets can work even in states with lower capacity.
- Jayachandran et al. (2017) tested the impacts of a "payments for ecosystem services" (PES) program, in which a local nonprofit paid Ugandan landowners to not cut trees on their property, compensating them for their foregone income. During the study period, landowners who were randomly offered contracts to conserve forest cleared 4 percent of forested land, compared to 9 percent in villages where the program was not offered. This equates to delaying 3,000 metric tons of carbon dioxide per village from being released into the atmosphere, at a cost of US$0.46 per metric ton. Even with relatively low participation rates, the PES program was an effective and cost-effective way of averting carbon dioxide release.[9]
- Six years after the PES intervention described above, Vorlaufer et al. (2023) and Vorlaufer, de Laat, and Engel (2023) found that the PES program did not result in long-run adverse effects on pro-environmental behaviors or conflicts between PES and non-PES recipients. Moreover, in villages that received the PES program,

[8] It is important to note that the success of market-based mechanisms depends on 1) accurate reporting and verification of emissions data, including the use of third-party monitoring, and 2) appropriate oversight and enforcement being in place to reduce the risk of potential corruption and greenwashing.

[9] While the original study found no evidence that the PES program improved economic well-being on average, follow-up analysis by Jayachandran (2022) found that economic outcomes improved for those who faced lower costs to implementing the program's requirements—e.g. households that did not face income losses from being unable to sell trees or cultivate land—and for lower-income eligible households, relative to higher-income households.

community members exhibited more egalitarian preferences over shared forest access.

- Jack et al. (2023) experimentally evaluated the impact of another PES program, where cash transfers were offered to a random subset of farmers in Punjab, India, on the condition that they not burn the crop residue in their paddy fields, a major contributor to air pollution. Farmers received different PES contract offers, in which the timing of payments and amounts varied. Researchers found that farmers offered a partial upfront, unconditional payment were more likely to comply with the contract conditions and reduce their crop burning than farmers offered a standard contract, where payment was only received after compliance had been verified, despite receiving a lower total transfer. This suggests that PES programs can be improved through thoughtful contract designs that address participants' credit constraints and distrust that payments will be made, which may hinder compliance under standard contracts.

It is also possible that **existing policy choices may exacerbate climate change and constrain adaptation**, presenting opportunities for reform and innovation. The free provision of power to farmers in various states in India is an example of such a policy. Farmers, given power for free, use too much and have rapidly drained the state's groundwater resources and disincentivized adaptation to more drought-tolerant crops. To address this, in a quasi-experimental study, Ryan and Sudarshan (forthcoming working paper) partnered with the state utility in Rajasthan to offer farmers a new contract in which they would receive a lump-sum transfer equal to the value of their subsidized power and, in turn, pay the full price for water. Overall, the intervention led to a 17 percent reduction in electricity use. Uptake varied based on farmers' productivity—very productive farmers preferred the status quo relative to "unproductive" farmers who were able to cut water use. This example illustrates how existing policy can limit adaptation in subsistence agriculture and how policies could be made more politically palatable through, for instance, replacing a subsidy—which incentivizes fossil fuel use—with a cash transfer of equivalent value.

Finally, it is crucial to identify strategies to help households adapt to climate change in the countries expected to experience its worst effects. **Governments thus have an important role to play in supporting resilience and adaptation.** Social protection programs, including cash transfers and livelihoods programs, and complementary policies, like weather insurance, may help prevent households from draining their savings to respond to shocks, including climate shocks like droughts or floods.[10] While a deeper dive is beyond the scope of this synthesis, J-PAL (2024), J-PAL (2023), J-PAL (2023), and Tenzing (2020) offer a more comprehensive overview of the social protection literature.

[10] See the J-PAL Policy Insight on "Leveraging index insurance to protect farmers from weather-based risk" for a more detailed discussion on when and how weather insurance can be designed well to help protect farmers from adverse weather effects (J-PAL 2024).

## Emerging experimental evidence

Several ongoing randomized evaluations are building on the early experimental insights described above to further test strategies to improve transparency, reduce leakages and inefficiencies based on existing policies, and introduce new market-based schemes for emissions reductions. For example:

- ***Direct benefit transfer of electricity subsidy in Punjab (Ryan and Sudarshan):** Building on the research in Rajasthan described above, in partnership with the government of Punjab, researchers are conducting a large field experiment to examine the impacts of offering lump-sum transfers in exchange for farmers' voluntarily agreeing to face a marginal price for power.
- **Fostering adaptation to climate change among the poor in Bangladesh (Caria, Bandiera, Bryan, and Burgess):** Researchers are testing the impacts of two versions of BRAC's Ultra-Poor Graduation Initiative on supporting climate change adaptation among the rural poor. The first version will provide households with assistance to adapt to climate change in their current locations (such as by planting climate-resilient crops), and the second version will provide assistance to build skills, financial support, and knowledge to migrate from rural, flood-prone areas to urban areas.
- **Digital innovation in Ghana—Interventions targeted at addressing leakage (Annan, Asuming, Carattini, Mensah):** Researchers are studying Ghana's Premix Fuel Program, a large conditional transfer program subsidizing premix fuel for fishermen in Ghana. Subsidized fuel is hoarded, creating artificial shortages and prices that defy the program's spirit. Researchers are partnering with the National Premix Fuel Secretariat as they roll out a nationwide program that will digitize access to subsidized fuel to reduce leakages.
- **Environmental inspections for pollution regulation enforcement in China (Almond and Zhang):** In collaboration with China's National Environmental Inspection Program, researchers are evaluating the impact of reporting firms' hourly emissions data to environmental inspectors on the likelihood of firms being inspected, local air pollution, local economic output, and health outcomes.
- **Market-based schemes for air pollutants (Greenstone, Pande, Ryan, and Sudarshan):** Building on the ETS work described above, researchers are collaborating with the Pollution Control Boards of Gujarat and Maharashtra to design and scale emissions markets for air pollutants. The goal of these markets is to reduce the cost of compliance with environmental regulations and reduce emissions of the targeted air pollutants to improve environmental quality.
- **Targeting subsidies for the poor—Electricity in Cape Town, South Africa (Jack and Jayachandran):** Researchers are working in partnership with the City of Cape Town to adapt evidence on social assistance to inform the design of utility subsidies, including the allocation of nationally mandated "free basic electricity," which represents an in-kind transfer via subsidized electricity. Better design of these transfers

could help the City of Cape Town achieve both its climate goal of net carbon neutrality by 2050 and its poverty alleviation goals.

- ***The power of agency—Evidence from a participatory agricultural transformation (Mahajan, Rao, Gine, and Malani):** In India, researchers are evaluating the impact of community participation in implementing climate-adaptive irrigation projects on the allocation of water, sustainable use of resources, agricultural outcomes, maintenance of irrigation channels, and incidence of intragroup conflicts.

The majority of the ongoing evaluations listed above are supported by J-PAL's King Climate Action Initiative (K-CAI), which is funding a broad portfolio of research and scaling projects on effective programs and policies to tackle four climate-related challenges facing the world: **climate change mitigation, pollution reduction, climate change adaptation, and energy access**. A full list of ongoing research can be found here. Expanding on K-CAI, J-PAL regional offices have recently launched Air and Water Labs, whose missions are to work closely with government partners to co-generate evidence-based solutions for the most pressing air and water challenges in Africa, the Middle East and North Africa, and South Asia.

## Open questions

Emerging rigorous research can offer insights on governance strategies for mitigation, adaptation, and resilience, but more evidence is needed. Open questions that experimental research may help to unpack include the following:

- **What new and reformed institutions—market, regulatory, governance—are needed to mitigate climate change?** Good governance and state capacity are needed to effectively implement climate change policies, from strengthening emissions audits to establishing carbon pricing schemes. Research on governance and institutional design can shed better light on the incentives faced by politicians, bureaucrats, and citizens and uncover which policies and institutions are feasible to implement in low-capacity settings.
- **What strategies work to create political coalitions that can implement policies to mitigate climate change while also reducing poverty?** Creating coalitions in favor of climate change policy requires recognizing that the benefits and drawbacks of policies may be unevenly distributed to different groups. Governments must be able to identify vulnerable groups who may lose out from new policies and compensate them. For instance, it may be politically unpopular to remove fossil fuel subsidies that poor households benefit from, so this policy may need to be combined with other forms of tax and transfer schemes in order to build a political alliance.
- **How can states and the international community optimally design and implement fiscal climate-change-related reforms, such as carbon taxes, to ensure that the burden of climate change policies does not fall disproportionately on low-income citizens?** Greater investment is needed to finance climate change adaptation in low- and middle-income countries. Some quasi-experimental research has shown there is support for progressive climate policies in many contexts, including a carbon tax with cash transfers to poor households (Dechezleprêtre et al. 2025) or a global

carbon price funding a global basic income (Fabre et al. 2024). However, further research is needed on how such policies might be implemented and on their impacts.

- **How can economists and climate scientists work together to understand the risks, costs, and benefits of different policies, enabling governments to make optimal investments in mitigation, adaptation, and resilience?** Governments have fixed resources to allocate across mitigation, adaptation, and resilience. Research across disciplines can shed light on how governments can optimally balance their spending across these areas. Encouragingly, rigorous research has already identified several low-cost technologies and policies, and emerging evidence is suggesting that these can be scaled quickly in cases where they address key policy priorities of government champions.[11] Developing a playbook of low-cost and high-impact interventions, and getting incentives right to promote adoption at scale, is necessary for both mitigating and adapting to climate change.

# State of the evidence: Climate & conflict

Fragile and conflict-affected states—which the World Bank estimates may be home to roughly 60 percent of the world's extreme poor by 2030—are often those at highest risk for climate insecurity (World Bank 2024; Black et al. 2022). In these contexts, where government capacity is often already weak, intergroup tensions are high, socioeconomic progress is slow, and stability is tenuous, climate change has been described as a "threat multiplier" to conflict (United Nations 2021).

A growing body of primarily quasi-experimental evidence suggests that climate shocks can increase the likelihood of conflict (Burke et al. 2024; Burke, Hsiang, and Miguel 2015; von Uexkull and Buhaug 2021). **These shocks can heighten the risk of conflict through numerous pathways, including by:**

- **Slowing socioeconomic development and reducing opportunity costs:** Climate shocks—such as extreme temperatures and increased incidence of natural disasters—may negatively impact economic livelihoods, for instance, by reducing income from agriculture due to drought. At the individual level, this may lower the opportunity costs of engaging in criminal or violent activities as a means of making ends meet, and at the local and national levels it may limit economic growth and deter investment. For recent examples, see Harari and La Ferrara (2018) and Fetzer (2020).

[11] For example, see Chakravorty, Dar, and Emerick (2023) on alternate wetting and drying, Aker and Jack (2023) on rainwater harvesting, and Miller, Luby and Brooks (ongoing) on brick manufacturing.

- **Triggering land disputes and conflicts over scarce resources:** Climate stress and related income shocks (e.g., from declining agricultural yields or pressure on rangelands) can lead to changing agricultural, grazing, and migratory patterns. This may result in groups competing to control or access the same land, leading to conflict, as seen in places like the Sahel. Moreover, as some resources like water become scarcer due to climate change, groups may increasingly compete for what is available. See, for example, McGuirk and Nunn (2024), Eberle, Rohner, and Thoenig (2023), and Gehring and Schaudt (2024).
- **Promoting rapacity:** Groups may compete for control over high-value commodities, and climate-induced changes may make conditions for attack either easier or more difficult. See, for example, Dube and Vargas (2013), Berman et al. (2017), and Vanden Eynde (2016).
- **Exacerbating intergroup tensions:** If the impacts of climate shocks (particularly if economic) are experienced unevenly across groups, this may exacerbate underlying tensions between them, particularly in locations where peace may already be tenuous or if it is perceived that the state is not responding adequately or consistently depending on the populations most severely affected. See, for example, Harari and La Ferrara (2018), McGuirk and Nunn (2024), and Burke et al. (2024).
- **Forcing migration and displacement:** As swaths of land become uninhabitable or unproductive due to climate shocks, communities may be forced to leave and integrate into new areas, which may create tensions between displaced and host communities due to competition over space, economic opportunities, and resources. See, for example, Abel et al. (2019) and McGuirk and Nunn (2024).
- **Influencing psychology and decision-making:** Particularly at the interpersonal level, fluctuations in weather may influence the ways in which people think and make decisions, as suggested by the literature linking higher temperatures to an increased incidence of violence. See, for example, Almås et al. (2020) and Baylis (2020).

In a recent review of eighty quasi-experimental studies that explore these links, Burke et al. (2024) suggest that **climate shocks can be a risk factor for triggering or exacerbating violent conflict at the interpersonal and intergroup levels.** At the interpersonal level, numerous natural experiments have found that crimes—particularly violent ones—between individuals tend to increase when ambient temperatures are higher. The authors observe similar trends at the intergroup level: numerous studies since 1960 have indicated that higher temperatures, adverse rainfall levels, and droughts have been associated with higher risks of political and collective violence in low- and middle-income countries. When analyzing these studies together, they conclude that higher-than-average temperatures are associated with increases in intergroup and interpersonal violence as well as self-harm. The researchers outline where evidence is accumulating on the potential channels connecting higher temperatures and climate shocks to conflict, identifying economic, demographic, and psychological factors, as well as migration and politics, as the leading mechanisms

underlying this relationship, while also observing that these mechanisms appear highly context specific. Specifically, they point to the potential of economic policies, such as cash transfers and other social safety nets, in mitigating the impacts of potential climate shocks.

Over the past decade, a relatively large quasi-experimental literature has also emerged examining the relationship between conflict and exogenous income shocks—such as those generated by dramatic changes in commodity prices resulting from climate-induced shifts in agricultural productivity, trade liberalization policies, and more. A 2021 meta-analysis synthesizing results from 46 natural experiments finds that shifts in the price of a bundle of various commodity types does not affect the likelihood of conflict on average (Blair, Christensen, and Rudkin 2021). However, when commodities are disaggregated by commodity type, the results support earlier theoretical frameworks (Dal Bó and Dal Bó 2011) on conflict. **Across studies that observed price increases to labor-intensive agricultural commodities (e.g., corn and coffee), conflict decreased**, likely due to increasing economic returns to licit employment opportunities, thereby raising the opportunity costs of engaging in fighting. **By contrast, in contexts that experienced increased prices for capital-intensive commodities (e.g., oil and gas) or easily lootable commodities (e.g., artisanal minerals), conflict increased**, likely due to an increase in the use of violence by groups aiming to capture the production and economic benefits of controlling these resources. For a more detailed discussion of this research, see Chapter 4 of the GCCI Evidence Wrap-Up.

**Emerging quasi-experimental evidence suggests that social protection programs can help smooth climate-related income shocks and mitigate the risk of conflict.** In line with findings from Burke et al. (2024), quasi-experimental evaluations of two index-based livestock insurance (IBLI) programs in Kenya and Ethiopia have found that IBLI decreased drought-related conflict by reducing migratory pressures and helping pastoralists manage negative income shocks (Gehring and Schaudt 2024; Sakketa, Maggio, and McPeak 2025). Similarly, in India, researchers found that a large public workfare program (the National Rural Employment Guarantee Act, or NREGA) insulated participants from shocks to their agricultural income from adverse monsoon rains; areas where demand for NREGA increased following low rainfall also saw a reduction in conflict (Fetzer 2020). Together, there is growing evidence that programs that help people smooth their incomes during climate events can reduce conflict by raising the opportunity costs of fighting.[12]

[12] Evidence also shows that social protection programs can disrupt the link between climate and conflict through alternative channels beyond income smoothing, namely by allowing investments in technologies that reduce vulnerability to climate extremes and by reducing psychological stress that could contribute to violent behavior. See Garg, McCord, and Montfort (2020) for more.

In addition to the evidence on climate impacting conflict, **a growing experimental and quasi-experimental literature examines the impacts of programs to monitor and curb illegal activities that negatively impact the environment**—such as illegal mining, logging, and fishing—which may reveal important lessons for tackling illicit practices that directly contribute to climate change.[13] For example:

- In Colombia, where about 15 percent of illegal gold mines are used to finance armed groups, a randomized evaluation by Saavedra (2024) found that disclosing information regarding a technology that can detect mining activity and sharing potential mine locations to local- and national-level authorities led to reductions in illegal gold mining in and around the target areas, driven by increased government enforcement. However, these reductions were partially offset by the spillover of illegal mining to areas not targeted by the information.
- In Liberia, Blattman and Annan (2016) experimentally evaluated the impact of an intensive agricultural training program—which provided both human and physical capital and integrated economic and psychosocial assistance to mostly former combatants of Liberia's civil wars—on employment activities, income, and sociopolitical integration. The program increased participants' employment in agriculture and average wealth, decreased the amount of time they spent in illicit activities (e.g., unlicensed mining, rubber tapping, or logging), and lowered their interest in mercenary recruitment activities related to a conflict in Côte d'Ivoire. However, while treated men spent fewer hours engaged in illicit activities, many did not exit these activities entirely, suggesting that in resource-scarce environments, individuals may choose to engage in "portfolios" of work to mitigate the risk of future economic shocks.

Finally, **despite the potential negative links between climate and conflict, climate change may also have some conflict-reducing potential**, and active conflict may deter some forms of environmental degradation. In some cases, resource scarcity may prompt collaboration and cooperation, for instance, to align on how best to distribute finite resources (Mach et al. 2019). However, evidence on such positive, peace-enhancing side effects is limited. Moreover, quasi-experimental research examining the links between conflict and deforestation, including in places like Colombia and Sierra Leone, has found greater forest cover during periods of conflict. This suggests that in the wake of conflict, peacebuilding efforts may need to be accompanied by complementary state interventions to prevent the risk of environmental degradation (Prem, Saavedra, and Vargas 2020; Burgess, Miguel, and Stanton 2015).

[13] Some of these illegal activities have been used to finance armed groups, such as illegal mining in Colombia (Saavedra 2024); interventions that can stem some illegal activities may have downstream impacts on violence and conflict in addition to environmental impacts. However, other papers focus on illegal activities unrelated to armed groups, for example, Gonzalez-Lira and Mobarak (2022) on illegal fishing or Assunção, Gandour, and Rocha (2022) on logging.

## Emerging experimental evidence

Although the experimental evidence base exploring the links between climate and conflict remains limited, several ongoing randomized evaluations are examining these topics. For example:

- ***Livestock insurance and its conflict-mitigating potential (Ericksen, Barrett, Bulte, Harrison, Jensen, Zaal, Gebrehiwot, and Morsink):** Researchers are designing a randomized evaluation of an IBLI scheme offered to pastoralists in Ethiopia and Kenya. They will test the IBLI's ability to mitigate the negative effects of weather shocks on conflict when delivered as either a stand-alone program or when combined with a conflict-mitigating intervention.
- ***Can contact reduce conflict between farmers and herders? (Dube and Robinson):** In Nigeria, researchers are investigating whether "contact" through intergroup dialogues can help resolve endemic farmer-herder conflict that has been exacerbated by climate impacts on access to grazing and agricultural land.
- **The power of agency: Evidence from a participatory agricultural transformation (Mahajan, Rao, Gine, and Malani):** In India, researchers are evaluating the impact of community participation in implementing climate-adaptive irrigation projects on the allocation of water, sustainable use of resources, agricultural outcomes, maintenance of irrigation channels, and incidence of intragroup conflicts.

## Open questions

While researchers and others increasingly acknowledge a relationship between climate change and increased risk of violence and conflict, identifying the main mechanisms linking extreme climate and conflict remains a key research and policy question. Understanding these key causal pathways is critical for designing effective policies and programs that may help communities become more resilient to climate-related shocks and successfully mediate conflicts that may have been triggered or exacerbated by climate change. Open questions that experimental research may help to unpack include the following:

- **What types of agricultural and environmental interventions may help build community resilience against negative climate shocks, which may in turn reduce risks of local conflict?** Evidence exists exploring the impacts of climate adaptation interventions like crop and weather insurance, improved storage systems, cash transfers, and training on livelihoods, health outcomes, and technology adoption. However, few studies examine the impacts of such interventions on peace-related outcomes, such as resilience, trust, and belonging, or explore how such adaptation efforts could inadvertently exacerbate conflict, for instance, by favoring some groups over others. Similarly, there is little evidence on how programs encouraging resource conservation (e.g., through more efficient irrigation systems, pricing schemes, or rainwater harvesting, as in Chakravorty, Dar, and Emerick (2023) or Aker, Jack, and Assane (ongoing)) could impact conflict dynamics, for example, by lessening competition over limited resources.

- **Can anticipatory programs delivered prior to the onset of climate shocks help minimize the risk of future conflict?** Humanitarian agencies and others are increasingly exploring the impact of delivering (1) anticipatory aid and cash transfers (e.g., Sulaiman et al. ongoing) or (2) early warnings on community resilience to future climate shocks (e.g., Jagnani et al. ongoing). However, few studies have examined whether these anticipatory programs may also have peace-enhancing or conflict-reducing effects, particularly when delivered in fragile contexts.
- **In countries at high risk of climate hazards, how can peacebuilding, conflict prevention, and dispute resolution programs be integrated to prevent or mitigate the potential negative effects of future climate shocks on conflict?** A growing literature is examining the impacts of various interventions—including community-level reconciliation (Cilliers, Dube, and Siddiqi 2016), intergroup contact and dialogue (J-PAL 2021), and perspective taking (Alan et al. 2021)—on strengthening social cohesion, particularly in fragile and conflict-affected contexts. However, few studies examine the impact of interventions when implemented in locations at high risk of climate volatility or that are revisited following a climate shock to observe long-run impacts.

# References


Abdul Latif Jameel Poverty Action Lab (J-PAL). 2019. "The Risks and Rewards of Voter Information Campaigns in Low- and Middle-Income Countries." J-PAL Policy Insights. Last modified March 2019. https://doi.org/10.31485/pi.2275.2019.

Abdul Latif Jameel Poverty Action Lab (J-PAL). 2020. "Increasing Accountability and Reducing Corruption Through Government Audits." J-PAL Policy Insights. Last modified August 2020. https://doi.org/10.31485/pi.2536.2020.

Abdul Latif Jameel Poverty Action Lab (J-PAL). 2021. "Governance, Crime, and Conflict Initiative Evidence Wrap-Up." Last modified June 2021. https://www.povertyactionlab.org/review-paper/governance-crime-and-conflict-initiative-evidence-wrap?lang=en.

Abdul Latif Jameel Poverty Action Lab (J-PAL). 2023. "Research Directions on Social Protection in Low- and Middle-Income Countries." Last modified March 2023. https://www.povertyactionlab.org/review-paper/research-directions-social-protection-low-and-middle-income-countries.

Abdul Latif Jameel Poverty Action Lab (J-PAL). 2024. "Leveraging index insurance to protect farmers from weather-based risk." J-PAL Policy Insights. Last modified October 2024. https://doi.org/10.31485/pi.2391.2018.

Abel, Guy J., Michael Brottrager, Jesus Crespo Cuaresma, and Raya Muttarak. 2019. "Climate, Conflict, and Forced Migration." *Global Environmental Change* 54 (January): 239–249. https://doi.org/10.1016/j.gloenvcha.2018.12.003.

Aker, Jenny, and Kelsey Jack. 2023. "Harvesting the Rain: The Adoption of Environmental Technologies in the Sahel." *Review of Economics and Statistics*, 1–52. https://doi.org/10.1162/rest_a_01404.

Alan, Sule, Ceren Baysan, Mert Gumren, and Elif Kubilay. 2021. "Building Social Cohesion in Ethnically Mixed Schools: An Intervention on Perspective Taking." *Quarterly Journal of Economics* 136, no. 4 (November): 2147–2194. https://doi.org/10.1093/qje/qjab009.

Allcott, Hunt, and Todd Rogers. 2014. "The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation." *American Economic Review* 104, no. 10 (October): 3003–3037. http://dx.doi.org/10.1257/aer.104.10.3003.

Almås, Ingvild, Maximilian Auffhammer, Tessa Bold, Ian Bolliger, Aluma Dembo, Solomon M. Hsiang, Shuhei Kitamura, Edward Miguel, and Robert Pickmans. "Destructive Behavior, Judgment, and Economic Decision-Making Under Thermal Stress." NBER Working Paper #25785, December 2020. https://www.nber.org/papers/w25785.

Assunção, Juliano, Clarissa Gandour, and Romero Rocha. 2023. "DETER-ing Deforestation in the Amazon: Environmental Monitoring and Law Enforcement." *American Economic Journal: Applied Economics* 15, no. 2 (April): 125–156. https://doi.org/10.1257/app.20200196.

Baylis, Patrick. 2020. "Temperature and Temperament: Evidence from Twitter." *Journal of Public Economics* 184, no. 104161 (April). https://doi.org/10.1016/j.jpubeco.2020.104161.

Berman, Nicolas, Mathieu Couttenier, Dominic Rohner, and Mathias Thoenig. 2017. "This Mine Is Mine! How Minerals Fuel Conflicts in Africa." *American Economic Review* 107, no. 6 (June): 1564–1610. https://doi.org/10.1257/aer.20150774.

Besley, Timothy, and Torsten Persson. 2023. "The Political Economics of Green Transitions." *The Quarterly Journal of Economics* 138, no. 3 (August): 1863–1906. https://doi.org/10.1093/qje/qjad006.

Black, Richard, Joshua Busby, Geoffrey D. Dabelko et al. *Environment of Peace: Security in a New Era of Risk*. SIPRI, 2022. https://doi.org/10.55163/LCLS7037.

Blair, Graeme, Darin Christensen, and Aaron Rudkin. 2021. "Do Commodity Price Shocks Cause Armed Conflict? A Meta-Analysis of Natural Experiments." *American Political Science Review* 115, no. 2 (May): 709–716. https://doi.org/10.1017/S0003055420000957.

Black, Richard, Joshua Busby, Geoffrey D. Dabelko, Cedric de Coning, Hafsa Maalim, Claire McAllister, Melvis Ndiloseh, Dan Smith, José Alvarado, Anniek Barnhoorn, Noah Bell, Daniel Bell-Moran, Emilie Broek, Alexis Aberlein, Karolina Eklöw, Jakob Faller, Andrea Gadnert, Farah Hegazi, Kyungmee Kim, Florian Krampe, David Michel, Corey Pattison, Caleb Ray, Elise Remling, Evelyn Salas Alfaro, Elizabeth Smith, and Jürg A. Staudenmann. *Environment of Peace: Security in a New Era of* Risk. Stockholm: Stockholm International Peace Research Institute, 2022. https://doi.org/10.55163/LCLS7037.

Blattman, Christopher, and Jeannie Annan. 2016. "Can Employment Reduce Lawlessness and Rebellion? A Field Experiment with High-Risk Men in a Fragile State." *American Political Science Review* 110, no. 1 (February): 1–17. https://doi.org/10.1017/S0003055415000520.

Buntaine, Mark T., Michael Greenstone, Guojun He, Mengdi Liu, Shaoda Wang, and Bing Zhang. 2024. "Does the Squeaky Wheel Get More Grease? The Direct and Indirect Effects of Citizen Participation on Environmental Governance in China." *American Economic Review* 114, no. 3 (March): 815–850. https://doi.org/10.1257/aer.20221215.

Burgess, Robin, Edward Miguel, and Charlotte Stanton. 2015. "War and Deforestation in Sierra Leone." *Environmental Research Letters* 10 (September): 1–10. https://doi.org/10.1088/1748-9326/10/9/095014.

Burke, Marshall, Joel Ferguson, Solomon Hsiang, and Edward Miguel. "New Evidence on the Economics of Climate and Conflict." NBER Working Paper #33040, October 2024. https://www.nber.org/papers/w33040.

Burke, Marshall, Solomon M. Hsiang, and Edward Miguel. 2015. "Climate and Conflict." *Annual Review of Economics* 7 (August): 577–617. https://doi.org/10.1146/annurev-economics-080614-115430.

Chakravorty, Ujjayant, Manzoor H. Dar, and Kyle Emerick. 2023. "Inefficient Water Pricing and Incentives for Conservation." *American Economic Journal: Applied Economics* 15, no. 1 (January): 319–350. https://doi.org/10.1257/app.20210011.

Chancel, Lucas, Philipp Bothe, and Tancrède Voituriez. 2023. "Climate Inequity Report 2023." World Inequality Lab Study 2023/1. https://wid.world/document/climate-inequality-report-2023/.

Cilliers, Jacobus, Oeindrila Dube, and Bilal Siddiqi. 2016. "Reconciling After Civil Conflict Increases Social Capital but Decreases Individual Well-Being." *Science* 352, no. 6287 (May): 787–794. https://doi.org/10.1126/science.aad9682.

Composto, Jordana, and Elke Weber. 2022. "Effectiveness of Behavioural Interventions to Reduce Household Energy Demand: A Scoping Review." *Environmental Research Letters* 17, no. 063005 (June). https://doi.org/10.1088/1748-9326/ac71b8.

Dal Bó, Ernesto and Pedro Dal Bó. 2011. "Workers, Warriors, and Criminals: Social Conflict in General Equilibrium." *Journal of the European Economic Association* 9, no. 4 (August): 646–677. https://doi.org/10.1111/j.1542-4774.2011.01025.x.

Dechezleprêtre, Antoine, Adrien Fabre, Tobias Kruse, Bluebery Planterose, Ana Sanchez Chico, and Stefanie Stantcheva. 2025 "Fighting Climate Change: International Attitudes Towards Climate Policies." *American Economic Review* 115, no. 4 (April): 1258-1300. https://doi.org/10.1257/aer.20230501.

Drews, Stefan, and Jeroen C.J.M. van den Bergh. 2016. "What Explains Public Support for Climate Policies? A Review of Empirical and Experimental Studies." *Climate Policy* 16, no. 7: 855–876. https://doi.org/10.1080/14693062.2015.1058240.

Dube, Oeindrila, and Juan Vargas. 2013. "Commodity Price Shocks and Civil Conflict: Evidence from Colombia." *Review of Economic Studies* 80, no. 4 (October): 1384–1421. https://doi.org/10.1093/restud/rdt009.

Duflo, Esther, Michael Greenstone, Rohini Pande, and Nicholas Ryan. 2013. "What Does Reputation Buy? Differentiation in a Market for Third-Party Auditors." *American Economic Review* 103, no. 3: 314–319. http://dx.doi.org/10.1257/aer.103.3.314.

Eberle, Ulrich J., Dominic Rohner, and Mathias Thoenig. "Heat and Hate: Climate Security and Farmer-Herder Conflicts in Africa." Working Paper, July 2023. https://people.unil.ch/mathiasthoenig/files/2023/09/ERT_17July2023.pdf.

Fabre, Adrien, Thomas Douenne, and Linus Mattauch. "International Attitudes Toward Global Policies." Working Paper, May 2024. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4448523.

Fetzer, Thiemo. 2020. "Can Workfare Programs Moderate Conflict? Evidence from India." *Journal of the European Economic Association* 18, no. 6 (December): 3337–3375. https://doi.org/10.1093/jeea/jvz062.

Garg, Teevrat, Gordon C. McCord, and Aleister Montfort. "Can Social Protection Reduce Environmental Damages?" IZA Discussion Paper #13247, May 2020. http://dx.doi.org/10.2139/ssrn.3602423.

Gehring, Kai, and Paul Schaudt. "Insuring Peace: Index-Based Livestock Insurance, Droughts, and Conflict." CESifo Working Paper #10423, February 2024. http://dx.doi.org/10.2139/ssrn.4702292.

Gonzalez-Lira, Andres, and Ahmed Mushfiq Mobarak. "Enforcing Regulation When Agents Learn and Adapt." Working Paper, July 2022. https://agonzal6.github.io/website/HakePaper.pdf.

Greenstone, Michael, Rohini Pande, Anant Sudarshan, and Nicholas Ryan. "Can Pollution Markets Work in Developing Countries? Experimental Evidence from India." Working Paper, January 2023. https://www.anantsudarshan.com/uploads/1/0/2/6/10267789/ets_paper.pdf.

Harari, Mariaflavia, and Eliana La Ferrara. 2018. "Conflict, Climate, and Cells: A Disaggregated Analysis." *Review of Economics and Statistics* 100, no. 4 (October): 594–608. https://doi.org/10.1162/rest_a_00730.

Hsiang, Solomon M., and Marhsall Burke. 2014. "Climate, Conflict, and Social Stability: What Does the Evidence Say?" *Climatic Change* 123: 39–55. https://doi.org/10.1007/s10584-013-0868-3.

Hsiang, Solomon M., Marshall Burke, and Edward Miguel. 2013. "Quantifying the Influence of Climate on Human Conflict." *Science* 341, no. 6151 (August). https://doi.org/10.1126/science.12353.

Jack, Kelsey, Seema Jayachandran, Namrata Kala, and Rohini Pande. "Money (Not) to Burn: Payments for Ecosystem Services to Reduce Crop Residue Burning." Working Paper, December 2023. https://seemajayachandran.com/money_not_to_burn.pdf.

Jafino, Bramka Agra, Brian Walsh, Julie Rozenberg, and Stephane Hallegatte. "Revised Estimates of the Impact of Climate Change on Extreme Poverty by 2030." World Bank Policy Research Working Paper #9417, September 2020. http://documents.worldbank.org/curated/en/706751601388457990/Revised-Estimates-of-the-Impact-of-Climate-Change-on-Extreme-Poverty-by-2030.

Jayachandran, Seema, Joost de Laat, Eric F. Lambin, Charlotte Y. Stanton, Robin Audy, and Nancy E. Thomas. 2017. "Cash for Carbon: A Randomized Trial of Payments for Ecosystem Services to Reduce Deforestation." *Science* 357, no. 6348 (July): 267–273. https://doi.org/10.1126/science.aan0568.

Jayachandran, Seema. "The Inherent Trade-Off Between the Environmental and Anti-Poverty Goals of Payments for Ecosystem Services." NBER Working Paper # 29954, April 2022. https://doi.org/10.3386/w29954.

Mach, Katharine J., Caroline M. Kraan, W. Neil Adger et al. 2019. "Climate as a Risk Factor for Armed Conflict." *Nature* 571 (July): 193–197. https://doi.org/10.1038/s41586-019-1300-6.

McGuirk, Eoin F., and Nathan Nunn. 2024. "Transhumant Pastoralism, Climate Change and Conflict in Africa." *Review of Economic Studies* 92, no. 1: 404–441. https://doi.org/10.1093/restud/rdae027.

Oates, Wallace E., and Paul R. Portney. "Chapter 8 – The Political Economy of Environment Policy." In *The Handbook of Environmental Economics: Volume 1*, edited by Karl-Göran Mäler and Jeffrey R. Vincent. Elsevier Science B.V., 2003. https://doi.org/10.1016/S1574-0099(03)01013-1.

Pande, Rohini. 2024. "Fixing Forest Carbon Credits." *Science* 383, no. 6679. https://doi.org/10.1126/science.adn4923.

Prem, Mounu, Santiago Saavedra, and Juan F. Vargas. 2020. "End-of-Conflict Deforestation: Evidence from Colombia's Peace Agreement." *World Development* 129 (May). https://doi.org/10.1016/j.worlddev.2019.104852.

Saavedra, Santiago. "Technology and State Capacity: Experimental Evidence from Illegal Mining in Colombia." Working Paper, October 2024. http://dx.doi.org/10.2139/ssrn.3933128.

Sakketa, Tekalign Gutu, Daniel Maggio, and John McPeak. 2025. "The Protective Role of Index Insurance in the Experience of Violent Conflict: Evidence from Ethiopia." *Journal of Development Economics* 174 (May). https://doi.org/10.1016/j.jdeveco.2024.103445.

Tenzing, Janna. 2020. "Integrating Social Protection and Climate Change Adaptation: A Review." *WIREs Climate Change* 11, no. 2: e626. https://doi.org/10.1002/wcc.626.

United Nations. 2021. "Secretary-General's Remarks to the General Assembly on COVID-19 Vaccination." United Nations, December 9, 2021. https://press.un.org/en/2021/sgsm21074.doc.htm.

Vanden Eynde, Oliver. 2017. "Targets of Violence: Evidence from India's Naxalite Conflict Get Access Arrow." *The Economic Journal* 128, no. 609 (March): 887–916. https://doi.org/10.1111/ecoj.12438.

von Uexkull, Nina, and Halvard Buhaug. 2021. "Security Implications of Climate Change: A Decade of Scientific Progress." *Journal of Peace Research* 58, no. 1 (January): 3–17. https://doi.org/10.1177/0022343320984210.

Vorlaufer, Tobias, Joost de Laat, and Stefanie Engel. 2023. "Do Payments for Environmental Services Affect Forest Access and Social Preferences in the Long Run? Experimental Evidence from Uganda." *Journal of the Association of Environmental and Resource Economists* 10, no. 2 (March). https://doi.org/10.1086/721440.

Vorlaufer, Tobias, Stefanie Engel, Joost de Laat, and Björn Vollan. 2023. "Payments for Ecosystem Services Did Not Crowd Out Pro-Environmental Behavior: Long-Term Experimental Evidence from Uganda." *Proceedings of the National Academy of Sciences* 120, no. 18 (April): 1–8. https://doi.org/10.1073/pnas.2215465120.

World Bank. 2024. "Fragility, Conflict, and Violence." World Bank, May 24, 2024. https://www.worldbank.org/en/topic/fragilityconflictviolence/overview.