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Voices of change in the Global South: Understanding the dynamics of environmental protest

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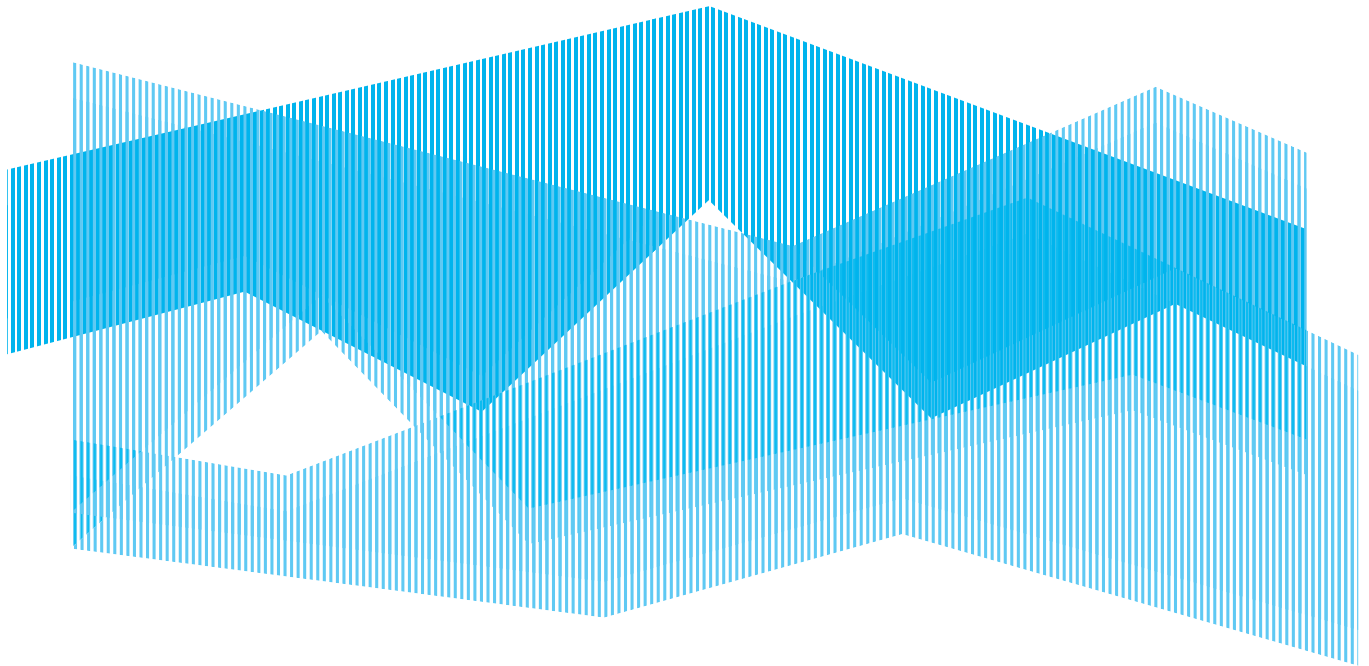
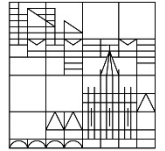
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Voices of Change in the Global South: Understanding the Dynamics of Environmental Protest

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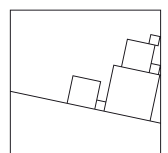
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Voices of change in the Global South: Understanding the dynamics of environmental protest

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Abstract

Environmental degradation, ranging from air and water pollution to land degradation and climate change, often generates discontent and grievances among affected populations. Such dissatisfaction with living conditions can foster political unrest, as individuals may protest publicly to voice their concerns and demand action from authorities. In light of increasing climate change and its widespread impacts, scholars have questioned whether environmental changes could become a destabilizing factor, promoting overall levels of unrest. To address this issue, several related questions concerning the nature of environmental mobilization must be explored: Have environmental issues become more prominent in protests? If so, which specific issues are mentioned and in which regions are they most vocalized? Additionally, are environmental protests systematically different from other forms of political protest, perhaps by attracting more participants or more frequently involving violent tactics? To better understand the origins and dynamics of environmental mobilization, we present a new dataset covering environmental protests in the Global South. This region, despite its low historical emissions, is particularly affected by environmental issues linked to climate change. Our dataset geo-codes environmental dissent at both national and local levels, identifies actors and political demands, and collects information on violence and repression. This new data enhances the scope of existing research and provides a robust foundation to address the research questions introduced.

Keywords: Environmental degradation, climate change, protest, mobilization

Human existence is inextricably linked to the environment. Much of human well-being depends on a stable and healthy environment and the sufficient availability of resources such as land, water, food, and raw materials. This reliance becomes particularly evident amidst natural disasters, where the destruction of essential assets and shortages of food or water supplies quickly endanger the lives and livelihoods of affected populations (Poggione et al., 2012; Tierney, 2019; Strömberg, 2007). Conversely, nearly every form of human activity leaves an imprint on the environment, which in turn impacts the quality of life for those exposed to these changes. Economic activities such as resource extraction can lead to forms of environmental degradation, including pollution, which adversely affects the well-being of communities (Cheon, Kang and Ramachandran, 2021; Denly et al., 2022; Eisenstadt and Jones West, 2017).

Political protests often arise in response to these environmental issues. For instance, disaster victims may demand more support in the aftermath of a catastrophe (Ide, Kristensen and Bartusevičius, 2021; Plänitz, 2020), or citizens may protest against industrial pollution and call for stricter environmental protection measures (Irrarrazaval, 2022). These events highlight how environmental conditions can spur people into action, particularly against the backdrop of climate change, which has made environmental issues more prevalent than ever before. Climate change significantly increases the likelihood of severe weather events and associated resource shortages (Allan et al., 2021). Additionally, the extraction of certain metals and rare earth elements, necessary for the green transition of the global economy, often has adverse effects on local communities (Denly et al., 2022; González and Snyder, 2023; Haslam and Tanimoune, 2016; Sexton, 2020). Climate policies and environmental protection measures also affect people differently, frequently sparking discontent about which activities should be implemented.

Given the increasing relevance of environmental degradation and the strong emphasis on these issues, there is growing concern about whether this will lead to a higher frequency of societal unrest (Homer-Dixon, 1991; Koubi, 2019; Von Uexkull and Buhaug, 2021). Numerous experts have labeled climate change an unprecedented challenge for humanity, raising questions about whether the dynamics of unrest associated with it differ systematically from protests about other issues, such as in terms of size and escalation potential. To fully grasp the complexity of environmental mobilization, it is essential to understand which types of problems lead to unrest, where such events occur, which societal groups participate, and what responses they demand from authorities.

Despite a burgeoning body of literature exploring the circumstances under which extreme weather events, resource extraction, pollution, and associated challenges lead to contentious activities, many questions remain largely unanswered. Previous studies have often focused on more violent events, such as those investigating the relationship between extreme weather conditions and conflict (Bagozzi, Koren and Mukherjee, 2017; Buhaug et al., 2021; Linke and Ruether, 2021), mining and armed clashes (Christensen, 2019; Denly et al.,

2022), or food shortages and uprisings (Holt-Gimenez and Patel, 2012; Newman, 2020). More recently, scholars have begun to pay greater attention to less violent, smaller-scale forms of contentious activities, such as riots and protests (Bush and Martiniello, 2017; Hendrix and Haggard, 2015; Gizelis, Pickering and Urdal, 2021; Jansesberger, 2024; Koubi et al., 2021). However, many of these studies focus on single countries or small geographical regions, limiting the ability to make broader inferences about the dynamics of environmental mobilization. Importantly, the focus and research design of these studies is not only driven by the interests of the individual researchers. There also exists a lack of data allowing answering such questions: comparable protest event datasets covering a wide universe of different environmental protests aside non-environmental protests.

In this paper, we introduce a dataset that enables the examination of environmental mobilization in unprecedented detail. We collect data on 774 environmental protests across 119 countries in the Global South over an eight-year span (2014-2022) as part of a general protest data collection project. This dataset provides in-depth information on the location, addressed issue, and size of each event, as well as detailed mappings of the actors and the peaceful or violent strategies involved in each incident. We begin by explaining the motivation for collecting new data and how this enables scholars to address pressing research questions in the literature on environmental events and societal unrest. We then outline our methodology and data collection strategy. Finally, we provide an overview of the dataset and conduct preliminary descriptive analyses to better understand the nature of environmental mobilization, including its temporal trends and spatial dynamics.

Motivation for a new dataset

Starting from the premise that all forms of political unrest are rooted in grievances, scholars have investigated whether environmental degradation and its adverse impacts could lead to increased contentious activities, ultimately culminating in societal conflict (Homer-Dixon, 1991; Koubi, 2019). Adverse environmental changes have severe implications for affected societies. For instance, anomalies in precipitation, water or soil pollution, and disastrous storms and floods impact agricultural production, economic growth, and migration patterns can stir up political conflict. In recent years, the consequences of global warming have become increasingly visible. Given the accelerating and multifaceted changes in the human environment due to climate change, a growing body of work has sought to determine whether these processes pose a security threat to the stability of regimes (Buhaug and von Uexkull, 2021; Linke and Tollefsen, 2021).

Political actors in the Global South

While some changes in environmental studies, such as environmental protection policies or the lack thereof, are directly linked to the decisions of political actors, the immediate effect of other environmental events, such as disastrous weather events or environmental pollution by companies, is less visible in the political dimension. Although it might not be immediately obvious why these seemingly exogenous events should be studied within the realm of political unrest, a closer examination reveals the significant role of political actors in such dynamics. Politicians can prepare for environmental disasters, mitigate hardships, and support individuals in dealing with the consequences (Plümper, Flores and Neumayer, 2017; Tennant and Gilmore, 2020). Additionally, laws, ultimately rooted in political decision-making, delineate the scope within which companies can operate, such as resource extraction regulations (Bezzola et al., 2022; Cheon, Kang and Ramachandran, 2021; Denly et al., 2022). Hence, the environment is not merely a backdrop but is shaped by political decisions. Consequently, scholars have been examining whether discontent associated with the adverse consequences of environmental challenges increases the likelihood of political unrest, as this might be a way for citizens to express their dissatisfaction.

For various reasons, the Global South is at the forefront of this context. In terms of grievances stemming from environmental degradation, a particularly pronounced injustice is evident. These societies have very low historical emission levels and, compared to states in the Global North, have contributed very little to climate change. Nonetheless, extreme weather events inflict their most adverse consequences on vulnerable, less resilient populations, particularly in the Global South (Allan et al., 2021; Bracking and Leffel, 2021; Kuhl et al., 2023). While these societies already suffer disproportionately from the most destructive and immediate effects of climate change, they are also often expected to provide resources, such as rare earth elements, for the green transition, which is often accompanied by adverse environmental side effects. Hence, these regions are of particular interest in studying contentious activities associated with environmental degradation.

Destabilization through environmental changes?

Initially, a majority of scholarly works focused on environmental problems and their potential association with more conflictual forms of unrest (Bagozzi, Koren and Mukherjee, 2017; Buhaug et al., 2021; Christensen, 2019; Denly et al., 2022; Holt-Gimenez and Patel, 2012; Linke and Ruether, 2021; Newman, 2020). However, researchers have become increasingly aware that destabilization due to environmental issues could begin in much earlier stages. As a result, more studies have been published on lower-scale types of societal disruptions, such as riots and protests (Bush and Martiniello, 2017; Gizelis, Pickering and Urdal, 2021; Hendrix and Haggard, 2015; Jansesberger, 2024; Koubi et al., 2021). Given that political protest has been widely studied in political science and sociology, several datasets on contentious mass mobilization already

exist and have been used to answer this research question. Studies utilizing datasets like ACLED (Raleigh et al., 2010), SCAD (Salehyan et al., 2012) or similar data projects, as for instance the Mass Mobilization Protest Project (Clark and Regan, 2016), can indicate whether the probability of protest increases during disastrous weather events or in the presence of mining activities. However, they do not allow for conclusions about whether environmental issues represent an overall destabilization threat. The main obstacles to identifying a potentially general destabilizing trend initiated by environmental changes and climate change using these datasets are: 1) they do not offer a nuanced classification of whether and which environmental issues are associated with each event, and 2) they are limited in their geographical and temporal coverage of the Global South. SCAD, for example, is generally restricted to Africa, Latin America, and the Caribbean, while ACLED is more comprehensive but has only become so in recent years. Many relevant sub-regions of the Global South, such as Southeast Asia, have only been covered lately, making the observation of general time trends in environmental mobilization difficult.

In addition to insights derived from these studies, there exist scholarly works drawing on datasets associated with specific types of environmental protests, such as water-related protests (Bernauer et al., 2012; Ide et al., 2021), flood-disaster unrests (Ide, Kristensen and Bartusevičius, 2021), or unrest associated with mining activities (Bornschiefer and Vogt, 2024; Haslam and Tanimoune, 2016; Walter and Wagner, 2021). Although analyses based on such datasets can provide some impression on protest dynamics associated with certain types of environmental challenges, inferences drawn from the overall destabilizing potential of environmental changes remain limited. On top of mostly covering certain geographical sub-regions in the Global South, they can only convey information about unrest dynamics for a specific sub-type of environmental issues, revealing nothing about the overall magnitude of environmental mobilization.

To determine which environmental issues have been increasingly addressed over time and where these issues are most frequently voiced, a dataset that covers and classifies protests on a wide range of environmental issues across the entire Global South over a comparable period is required. Our dataset provides exactly that, laying the foundation for understanding which environmental issues are most often raised in protests in different geographical regions. This is important since the literature on protest indicates that not all dissatisfaction translates directly into protest so that suitable opportunity structures are needed (Della Porta, 2008; Earl, 2011; Rød and Weidmann, 2023). By differentiating precisely into individual classifications, one can gain better insights into whether specific environmental issues are more frequently taken to the streets in certain regions and whether some of these problems are more likely to result in collective protest mobilization, even in highly repressive systems.

Understanding the nature of environmental mobilization

Additionally, to properly contextualize environmental protests, one needs to compare data on general protests. The absolute number of environmental protests is only meaningful to a limited extent if one wants to determine whether environmental issues are a significant topic in protests. It is possible that a country has many environmental protests; however, if there are many more protests on other topics, environmental protests might constitute only a small share in relative terms. This distinction between the general protest volume and the proportion attributable to individual issues is crucial for calculating whether environmental issues represent a large proportion of the mobilization potential in a country or remain a minor issue. Many data collections, such as the aforementioned collections or GECCO (Duit et al., 2023), cover contentious activities related to environmental topics but lack “normal” protests as counterparts. In contrast, our dataset on diverse environmental protests is part of a larger data collection on the whole universe of political protests in the Global South. Thus, one can always contextualize the frequency of environmental protests to the overall protest volume in the respective region. This enables us to determine whether a significant share of the mobilization potential in a country is dedicated to environmental issues or if they constitute only a small part of it.

Furthermore, reflecting on how to gauge whether environmental degradation could spur societal disruptions and low-scale destabilization, it becomes clear that protest frequency — both in absolute and relative numbers — is just one parameter. Not all protest events are the same, and some are significantly larger than others (Butcher and Pinckney, 2022; Hager et al., 2022). Therefore, simply looking at frequencies could be misleading. The same number of environmental protests might have a completely different impact depending on whether these are minor disruptions involving a few dozen protesters or large-scale mass mobilizations with thousands of participants. To fully understand the impact of environmental degradation on unrest, one must also examine whether environmental protests differ systematically from other protests in terms of their size. Additionally, the extent to which violent strategies are employed during events provides important insights into the potentially destabilizing nature of environmental issues. Even a few small environmental protests can have a substantial impact if they escalate into severe violence, either from the protesters or through repressive tactics by the authorities (Arce and Nieto-Matiz, 2024; Klein and Regan, 2018; Le Billon and Lujala, 2020). Having specific information on violence and repression enables the determination of whether the strategies used by protesters and the government differ systematically for environmental issues. One can then assess whether certain environmental issues are more likely to involve violent tactics and whether some environmental grievances are more likely to be met with government repression. The detailed documentation of our protest data in this regard is a comparative advantage over other datasets on environmental issues that lack this in-depth information. Therefore, our data lays the foundation to significantly expand our

understanding of the disruptive influence of climatic and environmental change.

Finally, many existing arguments for why environmental issues should lead to protest are based on the reasoning that certain actors, when experiencing environmental stress, will mobilize to put forward specific demands to actors from whom they expect relief (Ide, Kristensen and Bartusevičius, 2021; Koubi et al., 2021). While it is undeniable that some groups are hit harder by environmental change than others, this does not explain who is likely to protest and where environmental protests are most likely to occur. From the general literature on protest, we know that it is not always the worst-off and most deprived groups that protest, but that it also depends on which groups have sufficient resources and mobilization potential (Brady, Verba and Schlozman, 1995; Chenoweth and Ulfelder, 2017; Dalton, van Sickle and Weldon, 2010; Olson, 2012). While studies based on existing protest data can show that protest likelihood increases in regions affected by environmental events or in their neighboring areas, they cannot definitively say whether this effect is driven by the affected actors protesting or by someone else entirely. Teasing out the precise dynamics of environmental mobilization is important to fully understand the mechanisms at play.

Individuals suffering from environmental changes, such as pollution, water or food scarcity, or disastrous extreme weather, might want to draw attention to their suffering and voice their discontent directly at the place where the environmental changes occur. Alternatively, they might take their demands to more visible regions, such as capital cities, depending on which societal actors they want to address—local authorities or more central actors, such as state or national authorities, which are mostly headquartered in capitals. The observation units used in recent literature to study a possible relationship between environmental changes and unrest range from small artificial grid cells (Christensen, 2019; Gizelis, Pickering and Urdal, 2021) to medium-sized administrative units (Irrarazaval, 2022; Jansesberger, 2024) to entire countries (Cheon, Kang and Ramachandran, 2021; Koubi et al., 2012). This underscores the uncertainty and lack of knowledge we currently have regarding the extent to which spatial lags should be expected between the origin of specific environmental grievances and the location of the protests addressing them. This is strongly linked to another relationship we still struggle to understand: which actors will environmental protesters address with their demands? This gap in existing datasets strongly motivates our data collection project.

Our novel dataset includes information on an unprecedented number of environmental protest features, including the precise geo-location of each event, enabling the tracing of the geographical associations between environmental events and associated protests. Moreover, it is highly comprehensive, encompassing protests related to all types of environmental issues in one unified dataset. It goes beyond existing data by including information on size, diffusion, and whether violent or non-violent strategies are applied during protests. Thus, our data allows for insights into whether demonstrations and riots related to environmental issues remain relatively small and localized or have the potential to develop into major protest events, including

the possibility of turning violent. Therefore, our data facilitates future quantitative studies aiming to address more detailed questions. Furthermore, it provides an ideal starting point for selecting appropriate cases for comparative case studies or studies applying Qualitative Comparative Analysis (QCA). Additionally, our data could be useful for policymakers as it allows them to identify which environmental issues spark public outrage and what protesters want politicians or the international community to do about them. This underscores not only the scientific but also the societal relevance of our data collection.

Identifying environmental protest events

To obtain data on protest, we rely on the framework and infrastructure of the “Mass Mobilization in Autocracies Database” (MMAD, Strauch, Keremoğlu and Weidmann, 2022; Weidmann and Rød, 2019, Ch. 4). Geo-located information on political protest is processed in a novel combination of *automatic* and *human* coding and data is retrieved from media reports published by the Associated Press, the Agence France Presse and BBC Monitoring. Using English-language sources from LexisNexis, articles with the following keywords were extracted: *protest, demonstration, rally, campaign, riot, picket*. While the articles were primarily retrieved in English, BBC Monitoring also covers articles in the local languages and translates them automatically, so that information in marginalized languages is likewise included. After retrieving the articles from the database, a supervised machine learning approach filtering relevant news is applied. In this step, 250,000 articles were coded by hand and a computer learned to detect relevant articles based on the coding. This trained classifier is then used to sort relevant articles. By implementing this step, only suitable articles are forwarded to the coders to reduce unnecessary workload. Coders are trained to identify protest which pass the following criteria: the event must have been an actual and observable gathering (1), at least 25 people have to be involved (2), the mobilization must have a political component (3), and the protest must support or oppose the national, regional or local government (4). Coders then also retrieve information on the number of participants, involved actors, protest issues and the level of violence exerted by protest participants and government forces. Data on protest is then aggregated to the event-level as one article can record numerous protest events and events can be documented across multiple articles. For this, we aggregate reports across location, date and addressee to generate the event-level dataset.¹ If needed, report-level data can be aggregated differently given the researcher’s interest in the project.

Based on this existing dataset we enlarge the coverage and scope of political protests. First of all, deviating from the original coverage of countries, we also code protest outside autocratic countries. More specifically, we expand the dataset to all countries of the Global South with at least one million inhabitants, including Sub-Saharan Africa, Latin America and Southeast Asia. We thus expand the original dataset with some additional 46 countries. A full list can be found in the appendix (Table 1). From this existing dataset

which covers protest on various topics, we extract observations that are associated with environmental mobilization. Based on wording, detailed in section B in the appendix, we retrieve all observations that are related to environmental mobilization (further details on the specific categories are provided in the following section.)

Mapping the occurrences and dynamics of environmental protests

In our dataset, we identify 744 protest events in 71 out of 119 countries between the years 2014 and 2022 that are associated with any sort of environmental issue. Figure 1 shows the geographical distribution across our sample. As we primarily include countries in the Global South, we do not record mass mobilization in industrialized nations. This explains why some countries on the map do not show any record of protest events. A majority of environmental protests takes place are Iran, Russia and Venezuela whereas countries like Ethiopia or Cambodia only register one event during the covered time period. For countries like Vietnam or Rwanda, we do not find any record for environmental protest at all. This variation allows us to elaborate further under which conditions — in terms of political institutions and other structural factors that facilitate mobilization — environmental protest can evolve and endure. Given the variety of regimes present in the dataset, we can also draw the conclusion that environmental protest is able to form in highly repressive states. Taking Iran as an example, voicing dissent about ongoing water shortages in the country, is still possible and highly visible. This speaks to the strength of individual mobilization even in the absence of governmental institutions promoting political participation.

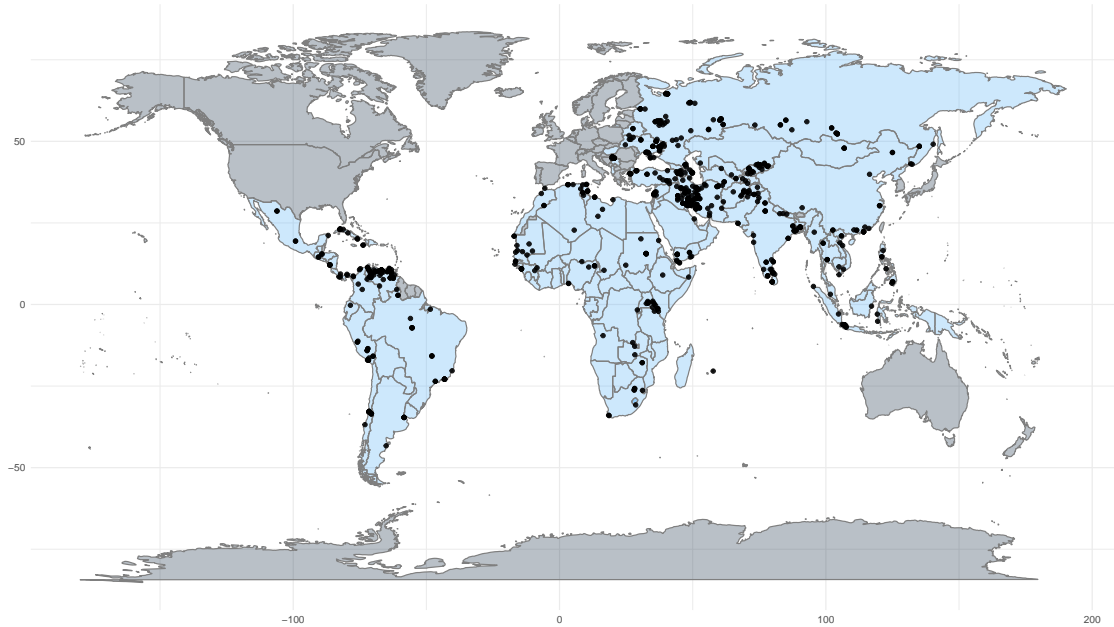


Figure 1: Mapping environmental protest events in 119 countries between 2014 and 2022. Countries covered in the dataset are highlighted in blue and protest events are marked with points.

As environmental protest can encompass various political demands, we classify the events into five different categories: *disaster*, *environment*, *energy and resource extraction*, *water scarcity and pollution* and *food shortage*. While the category *disaster* encapsulates extreme weather events like floods, storms, earthquakes, droughts or wildfires, *environment* encompasses anything related to the protection of the environment, like demonstrating against deforestation, toxic waste, pollution or climate change. In *energy and resource extraction*, we depict issues related to energy supply, such as the construction and continuation of nuclear power plants or oil rig projects, but also in relation to mining. In cases where food supplies are neglected or price hikes in staple food are addressed, we associate the protest with *food shortage*. Finally, *water scarcity and pollution* is related to water supply and pollution. In Figure 2 we show the overall distribution of categories across cases. While a notable portion is associated to energy supplies, the pollution and protection of the environment and food shortages, it becomes apparent that protests are little related to disaster outcomes but show increased frequency issuing water shortages. This visualization is an indicator for the mobilization of recurring and persistent patterns of grievances much more than organizing mass gathering in the aftermath of quick and sudden events. Individuals are able to mobilize in pressing and long-lasting scenarios of grievance and abundance but not as quickly in situations with abrupt negative consequences. Even though the issues presented here might be intertwined, for example natural disasters causing food and water shortages, we capture the precise concern in the dataset that is expressed during the given event.

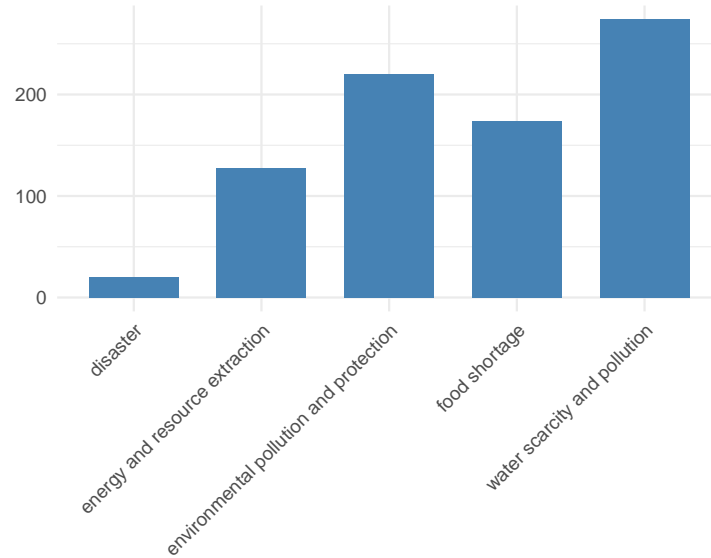


Figure 2: Distribution of environmental protest events across categories between 2014 and 2022.

In Figure 3, we disaggregate each category by country to identify major pressing issues in the respective regions. This allows us, for example, to differentiate to which external factors citizens are more likely to mobilize. While in Russia, for example, much dissent is expressed towards general environmental issues, Iran’s major protest cases evolve around water issues and food supply. With this information at hand we can further differentiate which political claims and demands are to be voiced in political protest. It can also help us understand why, for example, citizens in neighboring countries with similar environmental predispositions, are able to mobilize or not. Grievances and desperation might be similar, but collective action potential in given countries might differ substantially.²

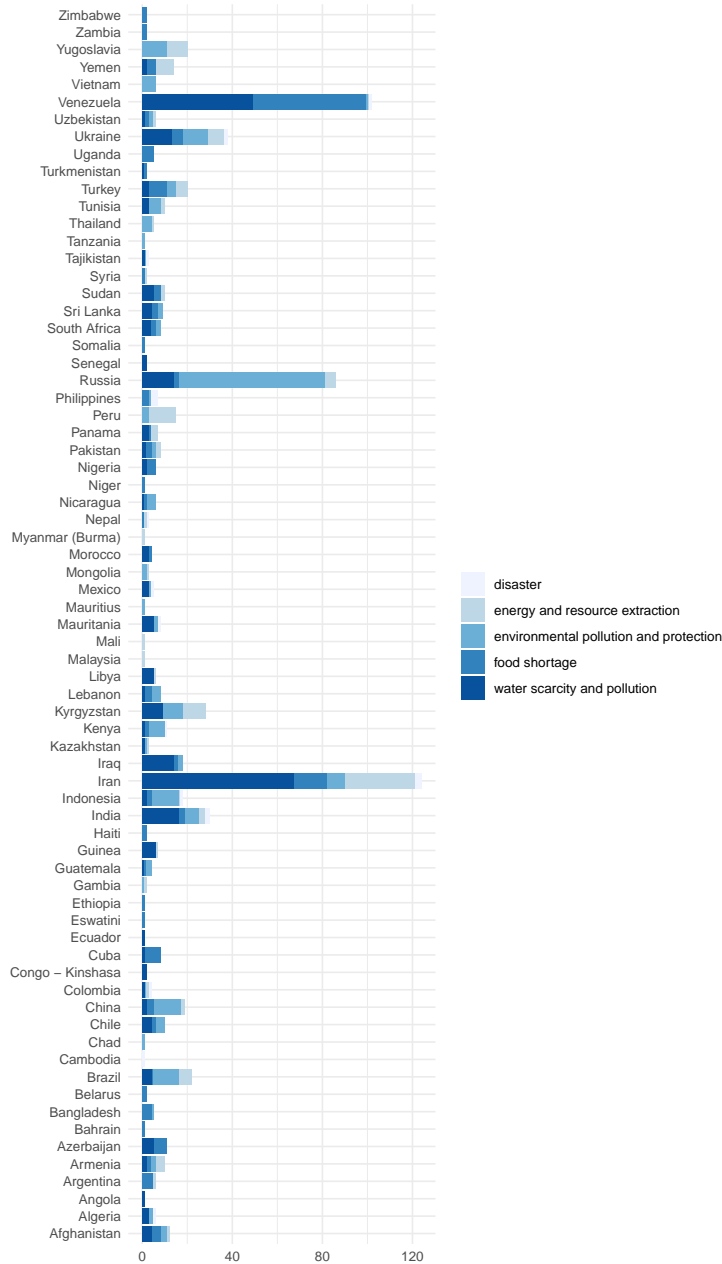


Figure 3: Distribution of environmental protest events across categories and countries between 2014 and 2022.

Is environmental protest any different?

Besides capturing protest on environmental issues, the datasets also holds information on political mobilization on other topics, such as protest before and after elections, the imprisonment of public figures or reactions to the enactment of new laws, just to name a few. With this additional information at hand, we can draw some conclusions comparing environmental with non-environmental protest. About 3.2% of all the protests

that we capture are related to environmental issues. This is a marginal but not to be dismissed number and it allows us to understand the frequency in which environmental issues are expressed contrasted to other driving issues. Figure 4 shows the distribution of environmental related protest and all other issues over time. We see a small but consistent increase in environmental protest peaking in 2019 along with all other types protest before descending in numbers again in 2020. This trend might be explained by the increased attention to environmental issues due to prominent climate change campaigns and a general rising awareness to environmental degradation. The share of environmental protest appears to be proportionally related to overall protest occurrence. This could indicate that environmental mobilization is just as dependent on opportunity structures to mobilize as other types of protests.

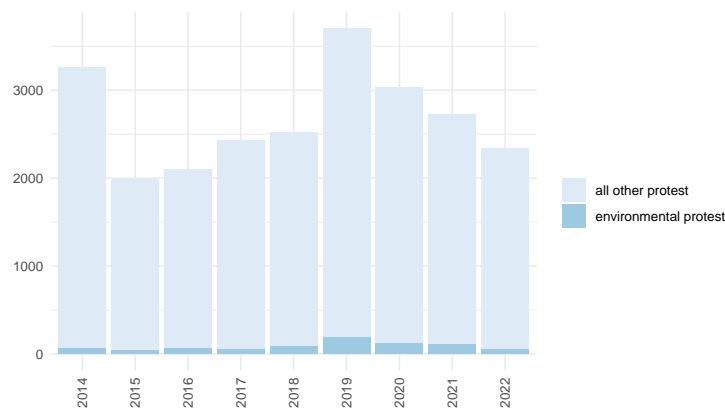


Figure 4: Number of environmental protest events in comparison to all other protest events over time.

To better understand the significance of environmental protests, one can compare environmental protests to the overall volume of protest occurrence within one country. Venezuela, for example, shows 97 protest events to be related to environmental issues in comparison to 778 protests in total. However, the share of environmental protest in other places like Sudan or Jordan is higher (over 80%) because the overall volume of protests is in general lower (see Figure 5). So while mobilization potential is linked to the occurrence and expansion of environmental protest over time, it does not reflect proportionally on a spatial level.

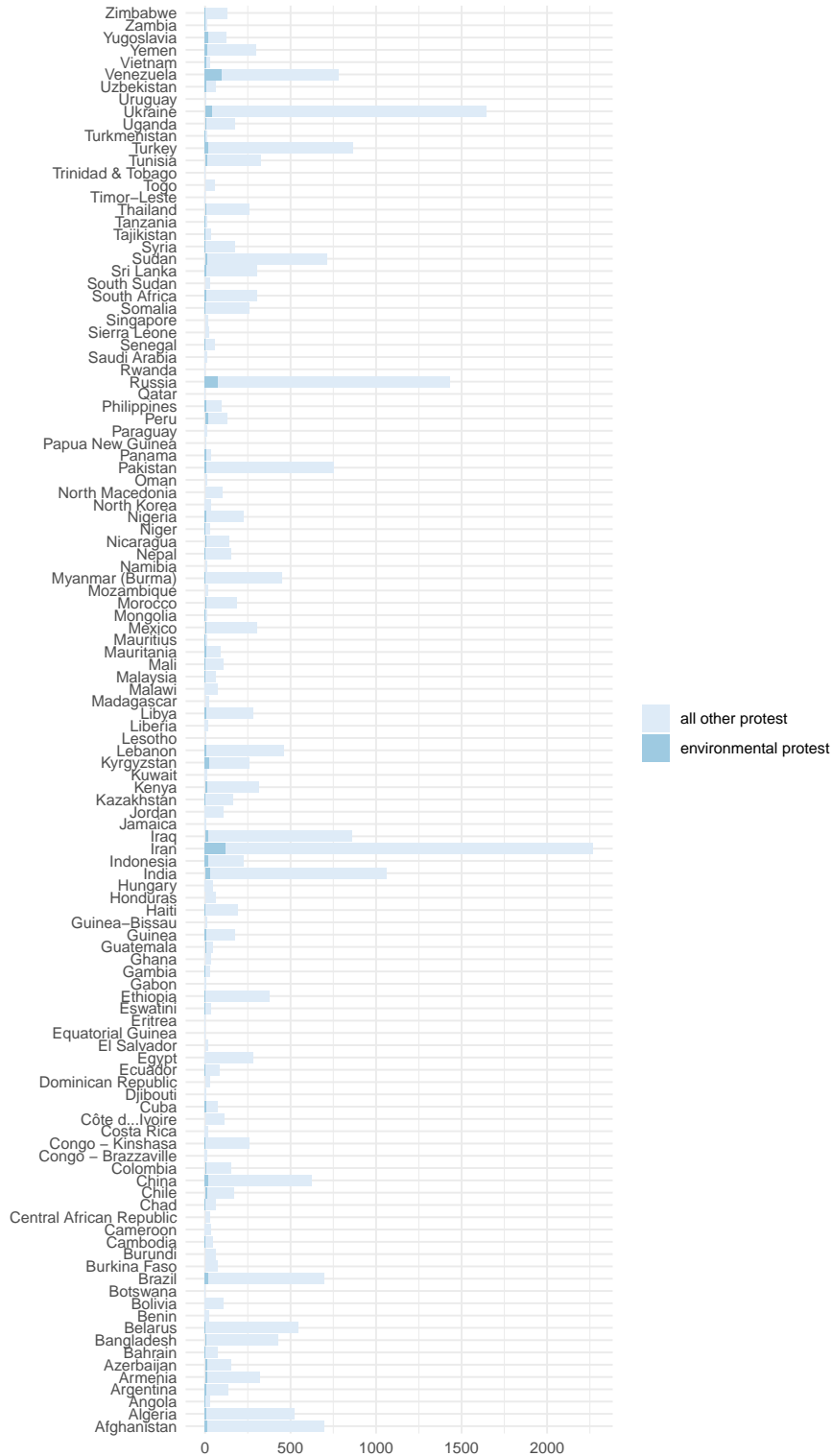


Figure 5: Number of environmental protest events in comparison to all other protest events across countries between 2014 and 2022.

Size, violence and repression

In the following section, we discuss some further detailed information on the nature of environmental protest which we believe to be of importance to answer current research questions in the field of environmental studies.³

When referring to the scope of protests, one can also compare the size of environmental protest in terms of participants. While we record, for example, several occurrences of small groups with only 25 to 50 participants, the largest event by far took place in Venezuela in 2016 when around 400.000 participants took to the streets to demonstrate against food shortages. Generally speaking, the lack of food and limiting prospects on improvement will mostly lead to large protest events. In contrast to that, water pollution and scarcity only attracts supporters on a smaller or medium scale. This diversity in reception of both such elementary issues highlights the complexity of political demands and the ability to mobilize in large numbers. In general, we document that on average 3368 participants are taking part in environmental protest events. This considerable size underscores the large mobilization potential environmental issues inhibit. Even though this relatively large number of protest participants gives power to the green wave movement, all other protest events are double in size. So eventually, environmental mobilization is able to gather numerous followers but is on average less likely to attract mass support than other political queries.

With regard to violent components, we are able to answer questions about how violent environmental protest is and which issues cause the most interrogation. In our dataset we find that in about 16% of cases environmental protest has remained peaceful and no sort of violence has been documented. In nearly 50% of incidences, property damages or clashes with civilians were reported. In 48 cases people were seriously harmed or injured and during 52 events participants were actually killed. These very lethal events were, for example, documented in Iran where protesters were unveiling their discontent about water shortages. However, these values are somewhat less relevant if we do not put them into perspective with non-environmental protest events. When comparing these observations to protest in general, we record less peaceful protest and more lethal interactions with environmental framing. In terms of what issues are most likely to result in lethal clashes, the lack of water and food supplies appear to be the leading reason. Non surprisingly, scarcity of elementary supplies and the lack of substitutes is most likely to stir up violence in environment-related protest. While we do not only record the level of violence that is exerted by the crowd, we can also take a closer look at government responsiveness to such events. When looking at repressive action taken by the government, we see for instance that in over half of the cases, physical interference ranging from crowd dispersal over arrests to beatings were applied. Lethal interventions were again mostly registered with protests concerning the lack of water and food supplies. In relation to other protests, repressive measures were more likely to be lethal and the simple presence of security forces without any physical interaction is also less

frequent. This can again give an indication about the fight over scarce resources and that the government will put down an uprising rather with brutal forces than with considerable measures.

Who blames whom? Political actors and addressees

While there is much research on political actors in protest events, little is known about the role or mobilization potential of different groups for environmental issues. For more than half of the events that we record, we are able to identify political actors which are involved in the protest movement. In most of the cases, local residents aside from students and opposition supporters participate in the event. Apart from these rather broad definitions, we also find professional groups, like farmers, miners or drivers, to be expressing their dissent on the streets. This demonstrates the overall bandwidth of environmental protest including various groups of civil society. From this information, we can, for example, infer which groups hold the necessary resources to mobilize.

When speaking of political actors in protest scenarios, we do not only look at protest participants but also at addresses at which they voice their dissent and who they hold responsible for strenuous circumstances or a lack of action. Our dataset also allows us to differentiate between the addressee of protest. In the majority of cases (736) protest is directed against the national government. As the dataset captures pro- and anti-government rallies, it allows to distinguish between political demands in favor of the government or against political authorities. Non surprisingly, in the majority of cases environmental protest is expressed against governmental action rather than voicing any support for the government when it comes to environmental issues. Also, most environmental protest is expressed opposing the government on the *national* level. However, also 23% of cases take place on the regional and local level. In comparison to protests in general (only 9.5%), we notice a higher level of diffusion to the rural areas. This highlights that mass gatherings with a focus on environmental issues do not need to travel to the country's capital to attract participants. Rather, citizens are able to gather in smaller and more rural areas to express their concern and discontent regarding environmental issues. As the dataset holds precise geo-located information of protest, researchers can use this fine-grained information for research on the sub-national level.

Conclusion

The goal of this paper was to introduce a new data set that allows researchers to answer various questions regarding the dynamics around environmental protest. Previous research and data collection efforts were unable to provide encompassing and detailed data on environmental mobilization in the Global South. With an increasing demand for understanding protest patterns better, we expand current knowledge on mass mobilization to particular drivers and circumstances surrounding environmental protest. Our dataset

contains fine-grained and yet unprecedented information on the location of protests, involved civil society and political actors, the diffusion of protest and on violence and repression. Furthermore, it allows for considerable comparisons to other political demands and unveil the unique nature of environmental dissent. This detailed data should allow researchers to investigate environmental protests in great detail using both quantitative and more qualitative methods.

Notes

¹For more information, please see <https://mmadatabase.org/use/code-examples/report-level/>.

²In Figure 2 and 3, one event can hold multiple issues simultaneously. The number of issues is thus higher than the overall number of protest events.

³While we provide detailed information on actors, political violence and the size of environmental mobilization, we can offer data on these issues in 521 of cases. For the remaining observations, no such information was recorded in the articles.

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A List of Country-periods

Country	Start	End
Afghanistan	2009-08-20	2022-12-31
Algeria	2003-01-01	2022-12-31
Albania	2021-01-01	2022-12-31
Angola	2003-01-01	2022-12-31
Argentina	2014-01-01	2022-12-31
Armenia	2003-01-01	2020-12-31
Azerbaijan	2003-01-01	2022-12-31
Bahrain	2003-01-01	2022-12-31
Bangladesh	2007-01-11	2008-12-29
Bangladesh	2013-01-01	2022-12-31
Belarus	2003-01-01	2022-12-31
Benin	2014-01-01	2022-12-31
Bolivia	2014-01-01	2022-12-31
Botswana	2003-01-01	2022-12-31
Brazil	2014-01-01	2022-12-31
Burkina Faso	2003-01-01	2022-12-31
Burundi	2003-01-01	2003-04-30
Burundi	2013-01-01	2022-12-31
Cambodia	2003-01-01	2022-12-31
Cameroon	2003-01-01	2022-12-31
Central African Republic	2003-03-15	2022-12-31
Chad	2003-01-01	2022-12-31
Chile	2014-01-01	2022-12-31
China	2003-01-01	2022-12-31
Colombia	2014-01-01	2022-12-31
Congo	2003-01-01	2022-12-31
Costa Rica	2014-01-01	2022-12-31
Cuba	2003-01-01	2022-12-31
Democratic Republic of the Congo	2003-01-01	2022-12-31
Dominican Republic	2014-01-01	2022-12-31
Ecuador	2014-01-01	2022-12-31
Egypt	2003-01-01	2012-06-30
Egypt	2013-01-01	2022-12-31
El Salvador	2014-01-01	2022-12-31
Equatorial Guinea	2013-01-01	2022-12-31
Eritrea	2003-01-01	2022-12-31
Eswatini	2003-01-01	2022-12-31
Ethiopia	2003-01-01	2022-12-31
Gabon	2003-01-01	2022-12-31
Gambia	2003-01-01	2022-12-31
Ghana	2014-01-01	2022-12-31
Georgia	2003-01-01	2003-11-23
Guatemala	2014-01-01	2022-12-31
Guinea	2003-01-01	2010-01-16
Guinea	2013-01-01	2022-12-31
Guinea-Bissau	2003-01-01	2003-09-14
Guinea-Bissau	2013-01-01	2022-12-31
Haiti	2003-01-01	2004-02-29
Haiti	2013-01-01	2022-12-31
Honduras	2014-01-01	2022-12-31

Hungary	2019-01-01	2022-12-31
India	2014-01-01	2022-12-31
Indonesia	2014-01-01	2022-12-31
Iran	2003-01-01	2022-12-31
Iraq	2009-01-01	2011-12-31
Iraq	2017-01-01	2022-12-31
Ivory Coast	2003-01-01	2022-12-31
Jamaica	2014-01-01	2022-12-31
Jordan	2003-01-01	2022-12-31
Kazakhstan	2003-01-01	2022-12-31
Kenya	2003-01-01	2003-12-31
Kenya	2013-01-01	2022-12-31
Kuwait	2003-01-01	2022-12-31
Kyrgyzstan	2003-01-01	2022-12-31
Laos	2003-01-01	2022-12-31
Lebanon	2009-01-01	2011-12-31
Lebanon	2014-01-01	2022-12-31
Lesotho	2014-01-01	2022-12-31
Liberia	2003-01-01	2003-08-11
Liberia	2014-01-01	2022-12-31
Libya	2003-01-01	2012-12-31
Libya	2014-01-01	2022-12-31
Macedonia	2013-01-01	2016-12-31
Madagascar	2009-03-17	2022-12-31
Malawi	2019-01-19	2022-12-31
Malaysia	2003-01-01	2022-12-31
Mali	2013-01-19	2022-12-31
Mauritania	2003-01-01	2022-12-31
Mauritius	2014-01-01	2022-12-31
Mexico	2014-01-01	2022-12-31
Mongolia	2014-01-01	2022-12-31
Morocco	2003-01-01	2022-12-31
Mozambique	2003-01-01	2022-12-31
Myanmar	2003-01-01	2022-12-31
Namibia	2003-01-01	2022-12-31
Nepal	2003-01-01	2006-04-24
Nepal	2014-01-01	2022-12-31
Nicaragua	2013-01-01	2022-12-31
Niger	2009-06-26	2011-03-12
Niger	2014-01-01	2022-12-31
Nigeria	2014-01-01	2022-12-31
North Korea	2003-01-01	2022-12-31
Oman	2003-01-01	2022-12-31
Pakistan	2003-01-01	2008-08-18
Pakistan	2013-01-01	2022-12-31
Panama	2014-01-01	2022-12-31
Papua New Guinea	2014-01-01	2022-12-31
Paraguay	2014-01-01	2022-12-31
Peru	2014-01-01	2022-12-31
Philippines	2014-01-01	2022-12-31
Qatar	2016-01-01	2022-12-31
Russia	2003-01-01	2022-12-31
Rwanda	2003-01-01	2022-12-31
Saudi Arabia	2003-01-01	2022-12-31

Senegal	2014-01-01	2022-12-31
Serbia	2016-01-01	2022-12-31
Sierra Leone	2014-01-01	2022-12-31
Singapore	2003-01-01	2022-12-31
Somalia	2012-01-01	2022-12-31
South Africa	2014-01-01	2022-12-31
South Sudan	2011-07-09	2022-12-31
Sri Lanka	2013-01-01	2022-12-31
Sudan	2003-01-01	2022-12-31
Syria	2003-01-01	2022-12-31
Tajikistan	2003-01-01	2022-12-31
Tanzania	2003-01-01	2022-12-31
Thailand	2006-09-19	2007-12-23
Thailand	2013-01-01	2022-12-31
Timor-Leste	2014-01-01	2022-12-31
Togo	2003-01-01	2022-12-31
Trinidad and Tobago	2014-01-01	2022-12-31
Tunisia	2003-01-01	2012-12-31
Tunisia	2014-01-01	2022-12-31
Turkey	2013-01-01	2022-12-31
Turkmenistan	2003-01-01	2022-12-31
Uganda	2003-01-01	2022-12-31
Ukraine	2012-01-01	2022-12-31
United Arab Emirates	2003-01-01	2022-12-31
Uruguay	2014-01-01	2022-12-31
Uzbekistan	2003-01-01	2022-12-31
Venezuela	2005-12-04	2022-12-31
Vietnam	2003-01-01	2022-12-31
Yemen	2003-01-01	2022-12-31
Zambia	2003-01-01	2022-12-31
Zimbabwe	2003-01-01	2022-12-31

Table 1: Country-periods in the MMAD

B Key words for environmental protest categorisation

Disasters

flood, flooding, storm, landslide victims, mudslide, typhoon, hurricane, cyclone, tornado, tsunami, tidal wave, earthquake, quake, hail, rain, rainfall, drought, heat wave, extreme temperature, extreme heat, extreme cold, wildfire

Energy and resource extraction

dam, construction of a mine, construction of mining firm, illegal mine, mine, mining, nuclear power plant, power plant, nuclear power station, chemical plant, chemical factory, chemical company, pipeline, petrol petrol station, oil spill, oil rig, oil project, hydro power, hydroelectric, construction of dam, dam construction, building of dam, resource extraction

Environmental pollution and protection

environmental, climate strike, climate protest, protection of environment, environmental protection, protest nature, environmental degradation, environmental damage, damage to environment, environmental destruction, environmental impact, healthy environment, pollution, toxic gas, toxic waste, green, forest, destruction of park, takeover of park, demolition of park, destruction of park, construction in a park, protection of park, cutting trees in park, sale of public parks, deforestation, soil contamination, soil salinization, haze, smog, fog, nature reserve, climate change, climate crisis, global warming, wildlife”, greenhouse, greenhouse gas, Fridays For Future, Fridays for Future, climate change, action against climate change, climate strike, tree cutting, ecological

Food shortage

food, right to food, food rations, provision of food, distribution of food, shortages of food, food shortage, lack of food, food supplies, food aid, food benefit, food allowance, food from government, hunger, distribution of ham, bread prices

Water scarcity and pollution

water, water cuts, water cut off, costs of water, water prices, lack of water, water shortage, water service, water rationing, water outage, clean water, hot water, water supply, water supplies, tap water, drinking water, water crisis, running water, water pollution, toxic water, water management, marine environment, marine pollution