1 COMPOUND IMPACTS OF EXTREME WEATHER EVENTS AND COVID-19 ON CLIMATE MOBILITIES

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**Abstract:** Weather and climate-related human mobility (climate mobilities) including displacement are often viewed as security concerns. The recent coronavirus (COVID-19) pandemic adds yet another layer of complexity which calls for unpacking these connections. This paper explores how existing patterns of migration and displacement that are driven by climate change impacts compound with the ongoing COVID-19 pandemic. First, the paper outlines the links between extreme weather events and human mobility to then explore how the impacts from COVID-19 interact, cascade and compound pre-existing vulnerabilities of people on the move. Examining the ways in which climate change is potentially driving or shifting patterns of climate mobility allows to gain a shared understanding of this complex issue. This paper contextualises the compounding impacts with a geographical focus on Bangladesh, a well-known climate hotspot. The paper contributes to the debates on impacts and human responses to climate change and concludes with a set of policy recommendations.

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2 INTRODUCTION

The recent coronavirus (COVID-19) pandemic emerged into an already-complex world with disasters such as extreme weather events, conflict and humanitarian crises regularly causing national and regional disruption (Raju & Ayeb-Karlsson, 2020; United Nations Office for Disaster Risk Reduction, 2015, 2022). Recent extreme weather events, such as the wildfires, flooding and drought in California demonstrate how dangerous simultaneous or compounding disasters can be for the human-environment-system globally (Abatzoglou et al., 2020; Silva et al., 2018). Populations already vulnerable to the impacts of climate change—poorer parts of the world, poorer communities in industrialised countries, and those who depend on migration for their livelihoods, are also likely to stay the most vulnerable to impacts from COVID-19. This paper seeks to disentangle how COVID-19 compounds pre-existing vulnerabilities of climate mobilities, including migration and displacement. First, it conceptualises how weather and climate-related events like droughts, hurricanes, typhoons, and flash floods affect and potentially alter patterns of human mobility. The next section sheds light on the connections between climate mobilities and COVID-19 in three spotlight areas and concludes with a set of policy recommendations.

3 MULTICAUSAL FACTORS OF HUMAN MOBILITY IN A CHANGING CLIMATE

Human mobility comprises a variety of human movements and is influenced by factors ranging from weather and climate-related events to socio-economic factors, poverty, and conflict (Hoffmann et al., 2020). The IPCC (Pörtner et al., 2022) highlights three broad types of human mobility: migration, displacement and refugees. Situations of voluntary immobility (unwillingness) or forced immobility can also occur (Black et al., 2013); however, the latter
exceed the focus of this paper. Migration is a form of voluntary mobility in which individuals or groups of individuals have some agency and degree of freedom over when and where to go (Black et al., 2011). Displacement refers to situations where people who have been forced to move with little to no meaningful choice about when or where to move to (International Organization for Migration, 2011). The term ‘climate mobilities’ has emerged from a recognition of the impacts from weather and climate-related events as an important driver in the decision to move (Boas et al., 2019; Herbeck, 2015). Increasingly, climate mobilities are recognized as the ‘human face’ of climate change, beyond abstract or quantitative-focused assessments (Parsons, 2019).

Figure 1: Conceptual framework illustrating the multi-causality of human mobility decisions, adapted from Black et al. 2011.

There is also a key distinction in climate change impacts, between slow onset and rapid onset events (IPCC, 2018). Rapid onset events refer to short, impactful extreme events such as typhoon and hurricane strikes. Slow onset events by sea level rise and drought create certain distinctive patterns of human mobility, whereas rapid onset events like flash floods, typhoons and hurricanes create different patterns of mobility outcomes (McLeman et al., 2021). The question arises: What are the key patterns of migration and displacement that are connected to weather and climate-related events?

Disaster displacement links to rapidly unfolding extreme weather events. Displaced people tend to move short distances in response to the immediate crisis or extreme weather event (Zickgraf, 2021). Another pattern of mobility is internal migration, which refers to people moving with more agency and freedom about where and when they move. This mobility pattern unfolds in response to more slowly unfolding extreme weather events like droughts. People
may move to find work after a drought has eroded their ability to make a livelihood or has destroyed their ability to work in agriculture (Hermans & McLeman, 2021). Affected populations may move from rural areas into cities to find alternative employment opportunities (Cattaneo et al., 2019). In a warming world, displacement is likely to increase in areas where populations are already vulnerable to the impacts of climate change, poverty and environmental degradation (Thalheimer et al., 2021).

4 UNPACKING THE CONNECTIONS BETWEEN CLIMATE MOBILITIES AND COVID-19

In 2021, 38 million people have been newly displaced by weather and climate-related events (Internal Displacement Monitoring Centre, 2022), facing displacement in the wider context of a global COVID-19. Bangladesh is a well-known climate change hotspot where extreme rainfall and flood events have been attributed to anthropogenic climate change (Philip et al., 2019; Rimi et al., 2019). The country’s trajectory toward sustainable development is pathed with multiple risks and pre-existing vulnerabilities, exacerbated by COVID-19 (Sakamoto et al., 2020). Climate change has wide-ranging implications for the geographies of labour and climate mobilities that are rooted in historical socio-economic landscapes (Parsons & Natarajan, 2021). While labour migration is a dominant form of migration across Bangladesh, the country is also a hotspot of sea level rise-related migration (Bell et al., 2021). This section asks: How has the situation of displacement during COVID-19 differed from previous disaster displacement? How have city authorities, governments and aid agencies coped differently and addressed displacement situations differently in the context of COVID-19?

4.1 Spotlight 1: Contrasting the need to move and lockdown situations

The connections between climate mobilities and COVID-19 exacerbate pre-existing vulnerabilities of people on the move and those displaced (Horton et al., 2021). Populations inevitably attempt to flee the extreme event and authorities need to decide on a disaster response which potentially leads to conflict or protest outcomes, though this has not been the case for Bangladesh (Petrova, 2021). COVID-19 has created a tension between people who need to remove themselves from harm’s way and the need to maintain various forms of lockdown, physical distancing and various measures that are designed to contain the spread of the virus (Ullah et al., 2021). The Cox’s Bazar refugee camp contains high population densities,
making already vulnerable population groups even more vulnerable to the spread and impact of COVID-19 (Islam & Yunus, 2020).

Further, evacuation becomes much more difficult in lockdown situations. In the aftermath of typhoon Haiyan (Yolanda) in 2013, over 16 million people in the Philippines were affected (Guha-Sapir et al., 2016), many of them in need for evacuation through various forms of public transport and mass transit. With COVID-19, physical distancing measures to contain a disease or virus are difficult to follow in crowded evacuation centres.

Here, another part of disaster displacement comes to the surface in which mobility that is needed to get people out of harm's way is in tension with various forms of lockdown or physical distancing. In densely populated countries such as Bangladesh (Khan et al., 2021) lockdown measures were needed to contain the virus, adding another layer of complexity to the difficult situations for the public but also to the complicated decisions for emergency planners, city authorities and governments as they attempt to balance the need of removing people for a disaster zone and containing the spread of the virus.

Another issue concerning the pattern of disaster displacement is around temporary shelters and camps that create situations ideal for the spread of diseases (Chakraborty & Maity, 2020). Many people could be infected with COVID-19 because they have been forced into cramped living courses as a result of an extreme weather event (Vonen et al., 2021). Municipal authorities and governments are face with the question regarding whether to attempt to enforce lockdown even when people are trying to remove themselves from a disaster zone.

4.2 Spotlight 2: Urban economies in lockdown

Across geographies, many people depend on rural-urban migration for their livelihoods (Ayeb-Karlsson, 2020a; Cai et al., 2016). With the COVID-19 associated economic turndown, urban migration as adaptation is hampered, creating additional vulnerabilities, especially for labour migrants who may have to migrate back to climate vulnerable geographies. Bangladesh is one of the geographies where this phenomenon occurs (Adams & Kay, 2019). Many poor people leave the low-lying region Delta region that vulnerable to rainfall-induced flooding and sea level rise to move to cities (Bell et al., 2021). The region experiences recurring cyclone events and is considered to be one of the most climate change vulnerable locations (Philip et al., 2019; Rimi et al., 2019). It is also an area that is agriculture dependent (Hossain, 2021). Impacts from farming such as salinization of farmable land in combination with climate change impacts on the
frequency and intensity of extreme weather events mean that farming in the Delta region is becoming increasingly difficult (Chen & Mueller, 2018). These dynamics prompt migrants to move further in land, often to Dhaka’s informal settlements. Migrants moving from the Delta region tend to pursue work in the garment industry, working in factories making clothes primarily for exports to wealthier countries (Ayeb-Karlsson, 2020b). As factories were faced with situations of lockdown in order to prevent the spread of coronavirus, many of the migrant workers have been laid off from their jobs adding to COVID-19 challenges in Bangladesh (Hossain, 2021; Médecins Sans Frontières, 2020). At the same time, the high streets of wealthier countries went into lockdown and people stop going out and buying clothes. Orders ceased to be placed for the manufacture of those clothes and people working in the garment industry in Dhaka and in other places across the world were faced with unemployment or an increased risk of such (Sen et al., 2020). Migrant workers then face a difficult decision of remaining in the urban Dhaka area and try to find another way to survive or return to the rural, climate-vulnerable regions (Sakamoto et al., 2020).

Post-COVID-19, climate mobilities seeking work in Bangladesh’s capital Dhaka could be pushed to live in slum dwellers long-term (Amjad, 2021). The consequences are that the people who worked in those sectors are then permanently out of work, exacerbating socio-economic vulnerabilities and poverty. In turn, people who have migrated into cities from rural areas perhaps driven by drought or floods then may face the additional burden of having to decide either to try and find another way to survive in the city to try and find another form of employment. Climate mobile populations may be faced to move back to vulnerable areas, such as an area that has already been affected by floods, sea level rise or that is vulnerable to other climate change impacts which they were attempting to move away from in the first place (Bell et al., 2021; Khan et al., 2021). However, retreat is barely an option in Bangladesh (Hayward & Ayeb-Karlsson, 2021).

4.3 Spotlight 3: Global economic connections

There is also a global economic connection to the topic of climate mobilities (Chakraborty & Maity, 2020). Lockdowns have brought consumption to halt, globally (Sheth, 2020). As demand for goods such as clothes and in part electronics sharply dropped as a result from shops in many cities across the world being closed. Instead of people stop spending money consumers have attempted to save money creating a buffer from potential job losses and other COVID-19 related economic hurdles (Cruz-Cárdenas et al., 2021). For industries dominated by migrant
workers, spending and buying less means that orders are not being placed, such as in Bangladesh, the world’s largest garment industry (Anner, 2020). Consequently, large numbers of people who work in the garment and export industry were being laid off with coping mechanism being limited (M. S. Alam et al., 2020).

In Bangladesh, remittances play an important role for the economy and migrant workers (Siddique et al., 2012). COVID-19 acts as a risk multiplier, removing the individual financial security of a migrant. People who have moved to escape a drought or sea level rise, seeking work in a city now finds themselves without the security of employment. Without an income source, migrants are also no longer sending remittances back to the household that they have left (Chowdhury & Chakraborty, 2021). The household migrant workers departed from is deprived of security that was provided by previously obtained remittances (Karim et al., 2020; Sutradhar, 2020). Remittance receiving households become increasingly vulnerable as they are no longer insulated from the impacts of extreme weather events (Ayeb-Karlsson, 2020b; Black et al., 2013). The absence of remittances also mean that any ad-hoc community level adaptation has stopped, as well the investment of associated remittances in long-term adaptation measures or a diversification out of farming (van der Geest et al., 2019). Hence, rural households are left more vulnerable to climate change impacts in the future (G. M. M. Alam, 2017).

5 POLICY RECOMMENDATIONS

This paper highlights that the addition of COVID-19 into an already complicated mix of migration, displacement and climate change impacts presents a hidden burden on populations vulnerable to weather and climate-related events. Given the increasing relevance of considering post-pandemic options, this section explores potential policy pathways.

5.1 Anticipatory humanitarian funding options

An element of debt relief is crucial. It becomes evident that the episodes of disaster displacement during the pandemic have been inevitably more expensive to mitigate. Humanitarian aid and disaster risk response place an additional burden on the already stretched finances of many of the poorest countries (Thalheimer, Jjemba, et al., 2022).

During the onset of COVID-19, money and scarce resources have been deployed to prevent disasters and crisis from cascading and compounding (Herrero & Thornton, 2020). Aid and development money addressing the disaster displacement during the on-going pandemic is
more costly and may imperil investment in climate action (Andrijevic et al., 2020). Organising evacuations in a way to avoid the spread of coronavirus and other diseases involves additional capital due to additional equipment such as masks and space for physical distancing measures involved. Again, the bulk of the burden falls on the poorest countries. Debt relief in addition to increased aid and development support from the rich countries is therefore essential in helping in assisting world's poorest countries deal with COVID-19 and beyond (Hepburn et al., 2020).

When considering how aid and development money is deployed, it is crucial that the distribution should be remittance aware. Firstly, the dynamics of monetary flows from urban economies from urban centres into rural areas need to be taken into consideration. Helping protect and insulate people protect the welfare of people who have a migrant household member is crucial. It also raises the question about how climate change adaptation funding is deployed. Many vulnerable populations are already using rural-to-urban migration as a way of adapting to and coping with climate change. Secondly, the flow of remittances from urban economies into the rural areas that has been used to finance ad-hoc community level climate change adaptation measures has vanished with the impacts from COVID-19. With complex emergencies such as COVID-19, disaster risk reduction and preparedness funding need to be more flexible and anticipatory. Already, there is increasing interest in anticipatory humanitarian action in the context of disaster displacement (Thalheimer, Simperingham, et al., 2022). The United Nations Framework Convention on Climate Change Task Force on Displacement called on States to: “develop innovative approaches, such as forecast-based financing, to avert, minimize and address displacement related to the adverse impacts of climate change” (Task Force on Displacement, 2018). Forecast-based financing as one mechanism offers a set of options to incorporate weather forecasts to prepare vulnerable populations, such as migrants with funds before a natural hazard materialises and turns into a disaster (Coughlan de Perez et al., 2015, 2019). In Bangladesh, anticipatory measures have been taken jointly between the government and the International Federation of Red Cross and Red Crescent Societies to prepare affected populations and minimize flood impacts (Kruczkiewicz et al., 2021). Existing frameworks could be expanded to include climate mobilities and complex disasters beyond single-hazard types such as heatwaves. This would support different stages of mobility while accounting for compounding risks.
5.2 Strengthening protection and human rights of people on the move

Secondly, it is key to strengthen the protection of human rights and remind governments of their obligations under international law to protect the rights and welfare of internally displaced people and internal migrants. Existing international frameworks include several pieces of international soft law which are designed to protect the rights and welfare of people who have been displaced within their own country (Intergovernmental Authority on Development, 2020; International Organization for Migration, 2019; United Nations Office for Disaster Risk Reduction, 2015). The aim is to create a ‘refugee’-like form of legal protection for people who are moving in their own country, rather than crossing an international border (Oelgemöller, 2020). In the context of COVID-19 and ongoing disaster displacement it is key to emphasis on the guiding principles on displacement, reminding states of their obligations under those principles. For a post-COVID-19 world, migrants and displaced populations should be included in national and regional recovery plans and strategies. Emphasis should be placed on protecting the health and safety of displaced people living in camps and climate mobilities already living in populous areas.

6 CONCLUSION

This paper assessed compounding impacts of weather and climate-related events and COVID-19 by unpacking compounding vulnerabilities of climate mobilities. To expand and deepen the understanding of patterns of human mobility under COVID-19 and extreme weather events, more research on how climate mobilities unfold post-pandemic is needed. Collaboration across disciplines can help in the collection of empirical data on impacts and effective ways forward. Forecast-based financing already presents such an opportunity to bring together existing efforts of applied researchers, humanitarian aid stakeholders and policymakers to minimise adverse impacts from weather and climate-related events on vulnerable populations.

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