



Tropical Cyclones and Climate Justice: Unveiling the Interconnectedness

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Articles

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Introduction

Tropical cyclones are powerful and destructive weather phenomena that regularly impact coastal regions across the globe. These intense storms, known as hurricanes in the Atlantic and northeastern Pacific, typhoons in the northwestern Pacific, and cyclones in the Indian Ocean, have long been a subject of scientific research and public concern due to their devastating consequences (“Hurricanes, Cyclones, and Typhoons Explained”). In recent years, an emerging field of study has shed light on the intricate relationship between tropical cyclones and climate justice, highlighting the disproportionate impacts experienced by vulnerable communities (Santer et al.). This article explores the interconnectedness of tropical cyclones and climate justice, emphasizing the need for equitable and inclusive approaches to address the challenges posed by these natural disasters.

Understanding Tropical Cyclones

Tropical cyclones are formed over warm ocean waters, fueled by evaporation and condensation processes. As the warm, moist air rises, it creates a low-pressure system that draws in surrounding air, resulting in powerful winds and heavy rainfall (“Tropical Cyclones”). The intensity of these storms varies, ranging from Category 1 (weakest) to Category 5 (strongest) (“The Saffir-Simpson Hurricane Wind Scale”).

Climate Change and Tropical Cyclones

Climate change plays a significant role in the frequency and intensity of tropical cyclones. While it is challenging to attribute individual storms to climate change, scientific evidence suggests a link between rising sea surface temperatures and the increased intensity of cyclones (Knutson et al.). Warmer ocean waters provide more energy for storm development, potentially leading to more powerful hurricanes, typhoons, and cyclones (“Impacts of Super Typhoons and Climate Change”). Additionally, climate change influences atmospheric conditions, such as wind patterns and moisture content, which can impact cyclone formation and tracks (Knutson et al.).

Disproportionate Impacts on Vulnerable Communities

Climate justice emphasizes the fair distribution of the burdens and benefits of climate change, acknowledging that vulnerable communities are often disproportionately affected by its impacts (Lam). This principle applies to tropical cyclones, where marginalized populations face increased vulnerability due to various factors.

1. Geographic Location: Low-income communities and developing countries are often situated in hazard-prone coastal regions, where cyclone impacts are more likely. Limited resources and infrastructure make these areas more susceptible to the devastation caused by storms, resulting in higher death tolls, economic losses, and displacement (Lee).

2. Limited Preparedness and Resilience: Lack of access to early warning systems, evacuation routes, and resilient infrastructure further exacerbates the vulnerability of marginalized communities. Unequal access to resources hampers their ability to prepare for, respond to, and recover from tropical cyclones, leaving them disproportionately burdened (Dunlap and Brulle).

3. Social Inequities: Pre-existing social disparities, such as poverty, inequality, and inadequate healthcare, intensify the impacts of tropical cyclones. These storms can exacerbate food and water scarcity, increase the risk of disease outbreaks, and disrupt essential services, disproportionately affecting marginalized communities that lack the necessary resources to cope with such crises (Dunlap and Brulle).

Case Studies

In order to draw attention towards the disproportionate impacts of cyclones and typhoons on different nations, here are some case studies that highlight how some countries are more severely affected compared to others.

Bangladesh

Bangladesh, located in a cyclone-prone region, experiences the devastating impacts of cyclones frequently. Its low-lying coastal areas are highly vulnerable to storm surges, intense rainfall, and strong winds (Bernard et al.). For instance, Cyclone Sidr in 2007 caused extensive damage and claimed the lives of over 15,000 people (Howes). Bangladesh's high population density, limited infrastructure, and socio-economic challenges exacerbate the impacts of cyclones, resulting in widespread destruction and significant human suffering (Bernard et al.).



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The Philippines

The Philippines is one of the most typhoon-affected countries in the world due to its geographical location in the western Pacific Ocean. The archipelago nation experiences an average of 20 typhoons annually, with varying intensities (“Recent Typhoons in the Philippines”). Super Typhoon Haiyan in 2013 stands as a tragic example, causing catastrophic damage and claiming thousands of lives (“Super Typhoon Haiyan – 10 Years On.”). The country’s vulnerable coastal communities, poor infrastructure, and socio-economic disparities contribute to the disproportionate impacts, particularly affecting marginalized populations (Warren).



Image Credit: Pixibay

Small Island Developing States (SIDS)

Small Island Developing States, such as those in the Caribbean and the Pacific, face unique vulnerabilities to cyclones and typhoons (Bloemendaal and Koks). These nations have limited land area, fragile ecosystems, and high dependence on key sectors like tourism and agriculture. The intensity and frequency of tropical cyclones pose significant threats to their economies and livelihoods. For instance, Hurricane Maria in 2017 severely impacted Dominica, causing widespread devastation and estimated damages exceeding 200% of the country’s GDP (World Bank Group). SIDS face challenges in terms of limited resources, remote locations, and limited access to financial and technical assistance, making recovery efforts more challenging.



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Mozambique

Mozambique, located along the southeast coast of Africa, is vulnerable to tropical cyclones originating in the Indian Ocean. In recent years, the country has experienced severe cyclones, such as Cyclone Idai in 2019 and Cyclone Kenneth in the same year (“Mozambique: Tropical Cyclones Idai and Kenneth - Emergency Appeal N° MDRMZ014, Final Report - Mozambique”). These storms caused extensive damage, including loss of life, infrastructure destruction, and disruption of vital services. Mozambique’s limited resources, inadequate infrastructure, and socio-economic challenges make it particularly susceptible to the disproportionate impacts of cyclones.

India

India is surrounded by Arabian Sea in the west and notorious Bay of Bengal in the east. While latter has been a hot-bed of cyclones in the past, there has been a significant change in the Arabian Sea which is witnessing cyclones like never before. In 1999, India experienced the Super Cyclone which caused extreme devastation in the province of Odisha (OB Bureau). It was followed by cyclones like Amphan, Hud Hud and Phailin all of which happened in the Bay of Bengal (PTI). In the western coast, apart from severe cyclones, this time India is witnessing extremely severe cyclone, Biparjoy which is one of the most severe cyclone to ever hit the western coast (Team TOI).

These case studies illustrate how the impacts of cyclones and typhoons are not evenly distributed among nations. Factors such as geographical location, socio-economic conditions, infrastructure, and adaptive capacity play a crucial role in determining the severity of the impacts and the ability to recover. Addressing these disparities requires international cooperation, support for vulnerable countries, and the implementation of climate justice principles to ensure a more equitable and resilient future for all.



Image Credit: Pixibay

Promoting Climate Justice in Cyclone-Affected Areas

Addressing the interconnected challenges of tropical cyclones and climate justice requires multifaceted and inclusive approaches.

1. Mitigation: Reducing greenhouse gas emissions is crucial to mitigate the long-term impacts of climate change and subsequently limit the intensity of tropical cyclones (“Study: Climate Change Has Been Influencing Where Tropical Cyclones Rage”). International cooperation and efforts to transition to renewable energy sources can help vulnerable communities become more resilient to future storms.



2. Adaptation: Enhancing the resilience of coastal communities through adaptive measures is essential. This includes improving early warning systems, strengthening infrastructure, and implementing sustainable land-use practices. Ensuring the participation of marginalized communities in decision-making processes is vital to promote equitable adaptation strategies.

3. Disaster Risk Reduction: Investing in disaster risk reduction measures can save lives and protect vulnerable populations. This involves improved urban planning, the establishment of safe shelters, and community-based initiatives that empower local communities to better withstand and recover from cyclones (Taylor).

Conclusion

Tropical cyclones and climate justice are intricately intertwined, with vulnerable communities bearing the brunt of the disproportionate impacts. Recognizing the interconnectedness of these issues is crucial for fostering climate resilience and promoting equitable responses to cyclone-related challenges. By prioritizing climate justice principles, such as equitable adaptation and disaster risk reduction measures, we can work towards a future where the impacts of tropical cyclones are more justly shared, protecting the most vulnerable among us.

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About the Authors



Siddharth is an entrepreneur who happens to be a lawyer. He loves exploring his interests that very often have nothing to do with one another. His interest in mental health issues and climate change drove him to find some time from his busy Law Firm schedule and get associated with The Dialogue Box. Since then, there has been no looking back. He often manages to squeeze some time for his interest in painting and loves to play with graphite sticks and paintbrush when not working on his Law Firm projects.



Sukrati is a dedicated advocate for addressing climate change and water sanitation issues. Working tirelessly in a non-profit organization, she channels her passion for sustainability and social justice into meaningful action. Through education, awareness programs, and partnerships, she strives to foster resilience and sustainable practices. Sukrati's unwavering interest in her work and commitment to inclusivity ensures that marginalized voices are heard and their rights protected. Her work exemplifies the power of individual action in creating a more equitable and sustainable future for all.