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Climate Change Perspectives of Bangladeshi Smallholder Farmers: Are There Knowledge Gaps to be Filled to Optimize Economic Development?

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I. Abstract

Bangladesh, situated in the deltaic plains of South Asia, stands at the forefront of the impacts of climate change. The country faces a multifaceted challenge as rising sea levels, intensified cyclones, and erratic weather patterns increasingly threaten its low-lying coastal regions. With a densely populated and agrarian society, Bangladesh is highly vulnerable to the adverse effects on agriculture, food security, and water resources. The frequency and intensity of natural disasters, such as droughts, heat waves, cyclones and flooding, have risen, displacing communities and amplifying economic hardships. Agriculture is a major sector of the economy in Bangladesh, employing around 50% of the labor force and contributing to about 15% of the country's GDP.[1] Smallholder farmers are the backbone of the agriculture sector, producing crops such as rice, jute, tea, and vegetables. Despite the importance of agriculture to the country's economy and food security, smallholder farmers in Bangladesh face the brunt of climate catastrophes, finding it difficult to cope and adapt. Many smallholder farmers lack access to credit, inputs, and technical expertise, which can limit their ability to adopt new technologies and practices to cope with climate change and other challenges. They also experience significant difficulties in accessing resources and decision-making forums. As one of the groups contributing least to climate change, their right to life, right to self-determination, right to development, right to food, right to water and sanitation, right to health, right to housing, right to meaningful and informed participation, the right of future generations, are all being infringed upon by the actions of the wealthiest, and by the inaction of governments and world leaders. However, how much do smallholder farmers in Bangladesh actually realize their rights? Is there

[1] Raihan, Selim, et al. "Bangladesh Country Paper: Employment Effects of Different Development Policy Instruments." *Swiss Programme for Research on Global Issues for Development*. 2015. https://www.wti.org/media/filer_public/09/9d/099d8467-853e-4803-9506-e7b584172967/wp_2015_05_bangladesh-country-paper.pdf

a knowledge gap among Bangladeshi farmers that hinders them from seeking their rights and improving their vulnerable conditions? How much do they truly understand climate change and its relation to justice? If we can identify where the knowledge gaps exist among smallholder farming communities in Bangladesh, then we can better address the impacts of climate change in those communities and what sort of economic development policy is required to alleviate their struggle.

This study seeks to analyze the perspective of Bangladeshi smallholder farmers on climate change and what they believe they need most to better adapt and improve their well-being. It does so by surveying 27 smallholder farmers in Pekua and Chakaria in the District of Cox's Bazaar. Interviews were conducted during the month of October 2023. Aside from being a smallholder farmer, there were no strict criteria to participate in this study, such as gender, age, education, religion, etc. Smallholder farmers were approached at their fields and small tea shops during their breaks. All participation was voluntary and the farmers were afforded anonymity. The smallholder farmers were asked questions pertaining to their perspectives on climate change to explore whether empowering farmers' knowledge could yield better results for climate resilience and economic development. The surveys help to identify where there are knowledge gaps among the farming community. Ultimately their perspective gleams light on the need for more climate education, training on adaptation and mitigation, as well as a need for a rights-based development approach to improve the well-being of smallholder farmers and address the current misaligned economic development policy.

II. Introduction

a. The Human Rights Impacts of Climate Change in Bangladesh

Bangladesh, a country smaller than the state of Illinois, situated in low elevation with approximately a fourth of its land positioned less than seven feet above sea level, is often referred to as "ground zero for climate change."[2] According to the Global Climate Risk Index 2021, Bangladesh was ranked as the seventh most affected country in the world by climate change between 2000 and 2019.[3] The report notes that the country has been hit by a series of weather extremes in recent decades with increased severity and frequency of powerful storms and cyclones, floods, droughts, and heat waves, leading to significant loss of life and damage to infrastructure. This coupled with high population density, inadequate infrastructure, and heavy reliance on agriculture economy makes the country acutely vulnerable. Land, farms, and homes are being washed away and much of what is left is becoming uninhabitable. Climate experts predict 17 percent of Bangladesh will submerge underwater due to sea levels rising by 2050, displacing about 20 million people.[4] The situation is already very critical with approximately 10,000 hectares of land, an area far larger than Manhattan, washing away each year due to riverbank erosions.[5] According to the Internal Displacement Monitoring Centre, on average nearly 700,000 Bangladeshis are displaced each year due to climate change related natural disasters, and the years that experience catastrophic cyclones like Cyclone Aila in 2009 and

[2] Sedlar, Frank, Marcin Szczepnski, and Jenny Shalant. "Bangladesh: A Country Underwater, a Culture on the Move." *Natural Resources Defense Council*. September 2018. https://www.nrdc.org/onearth/bangladesh-country-underwater-culture-move

[3] Eckstein, David, Vera Kunzel, and Laura Schafer. "Global Climate Risk Index 2021." *Germanwatch*. January 2021. https://germanwatch.org/sites/default/files/Global%20Climate%20Risk%20Index%202021_1.pdf

[4] Sedlar, Frank, Marcin Szczepnski, and Jenny Shalant. "Bangladesh: A Country Underwater, a Culture on the Move," *Natural Resources Defense Council*. September 2018. https://www.nrdc.org/onearth/bangladesh-country-underwater-culture-move

[5] "Climate Displacement in Bangladesh." *Environmental Justice Foundation*. https://ejfoundation.org/reports/climate-displacement-in-bangladesh

Cyclone Amphan in 2020, the number of displacements rises exponentially.[6] Just in 2016 alone the region was ravaged by four cyclones, Roanu, Kyant, Nada, and Vardah.[7]

Among the impacted communities in Bangladesh, smallholder farmers experience some of the most intense challenges due to climate. Climate change has had the most devastating damages to agriculture in Bangladesh. According to the Food and Agriculture Organization of the United Nations, 70 percent of the land in Bangladesh is devoted to agriculture, with almost 50 percent of the country's population work in the farming sector.[8] The water-stressed country faces even greater devastation as fresh water supplies for drinking and irrigation continue to be contaminated by salinity intrusion. With more frequent flood conditions and rising sea levels, salt water intrusion and risings salinity levels in coastal regions have led to significant crop damages and soil degradation, wiping out livelihoods for many farmers.[9] Overall, smallholder farmers in Bangladesh have been struggling with the impacts of climate change for a long time, and the situation is predicted to worsen in the coming years.

Climate change is very much intertwined with human rights issues. Bangladesh has ratified the International Covenant on Civil and Political Rights (ICCPR), the International Covenant on Economic, Social, and Cultural Rights (ICESCR), and the Paris Agreement, a legally binding international treaty on climate change. States like Bangladesh are responsible for safeguarding human rights by taking measures to anticipate and mitigate the adverse impacts of

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[6] Internal Displacement Monitoring Center. "Bangladesh." *Norwegian Refugee Council.* https://www.internal-displacement.org/countries/bangladesh

[7] "Climate Displacement in Bangladesh." *Environmental Justice Foundation*. https://ejfoundation.org/reports/climate-displacement-in-bangladesh

[8] "Bangladesh." *Food and Agriculture Organization of the United Nations*. https://www.fao.org/asiapacific/perspectives/agricultural-statistics/global-strategy/results-in-the-region/bangladesh/en/

[9] Sedlar, Frank, Marcin Szczepnski, and Jenny Shalant. "Bangladesh: A Country Underwater, a Culture on the Move." *Natural Resources Defense Council*. September 2018, https://www.nrdc.org/onearth/bangladesh-country-underwater-culture-move

climate change. They have an obligation to also ensure that individuals, particularly those in vulnerable circumstances, have access to effective remedies and resources to adapt and maintain their quality of life. Some of the international human rights affected by climate change include the right to life (Article 6, ICCPR), the right to self-determination (Article 1, ICCPR/ICESCR), the right to development (Article 55, UN Charter; ICCPR; ICESCR), the right to food (Article 11, ICESCR), the right to water and sanitation (General Comment No. 15, Committee on Economic, Social and Cultural Rights; Resolution 64/292, the General Assembly), the right to health (Article 12, ICESCR), the right to housing (Article 11, ICESCR), the right to education (Article 13, ICESCR), the right to meaningful and informed participation (Article 19, ICCPR), the right of future generations (General Assembly resolutions 43/53,44/207,45/212 and46/169), and the right of those most affected by climate change (Paris Agreement). Under these international conventions, ratifying states have an obligation "to take preventive measures to reduce the impacts of climate change on the enjoyment of these rights and to provide remedies if harms have occurred."[10]

It is clear that the main duty bearer of protecting the Bangladeshi population and mitigating the harms of climate change falls on the national and local government of Bangladesh as signatories of the above mentioned treaties. However, government corruption, a pervasive problem in the country, has been one of the main obstacles to economic development and social progress in Bangladesh. The appropriate actions and responsibilities of the Bangladeshi government most often fall short, and meaningful engagement with the government come with heavy limitations. For this reason, this research project will focus more on the critique and

[10] Gloppen, Siri and Catalina Vallejo. "The Climate crisis: litigation and economic, social and cultural rights." *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. Edited by Jackie Dugard, Bruce Porter, Daniela Ikawa, Lilian Chenwi. *Edward Elgar Publishing*. 2020.

suggestion of rights-based development approaches, which is often taken by international and local Non-Governmental Organizations (NGOs) in Bangladesh. This is not to say NGOs are therefore the duty bearers of upholding human rights pertaining to climate change in Bangladesh. However, as advocates of human rights who are directly engaging with impacted populations, they bear a certain level of responsibility to avoid causing further harm to the people they work with. Engaging in self-evaluations and critiques of their rights-based approach is an important part of continuous improvement. Organizations should regularly evaluate their programs and activities to ensure that they are effective, responsive to the needs of the communities they serve, and consistent with human rights principles. Organization should also be willing to acknowledge and address any shortcomings and negative impacts of their actions. By doing so, organizations can better promote the well-being and the rights of the people they serve, contribute to positive social change, and support a more bottom-up approach.

b. Significance of This Research

The effects of climate change in Bangladesh can be traced back to the 1960s and 1970s, when the country began experiencing more frequent and severe flooding and natural disasters. Since then, the situation has only worsened, with extreme weather events becoming more common and intense in recent years. The detrimental impacts of climate change are not recent occurrences, the people of Bangladesh have been suffering for several decades, yet efforts around adaptation and interventions from well-intentioned organizations have not yielded much improvement, particularly for poor farmers. Why is that the case? Could there be a disconnect between what organizations are proposing and the realities of those living through the crisis? How is the climate change phenomena translating to farmers on the ground directly impacted by

the adverse effects? How much do they understand climate change and where are the gaps in climate education in the community? What do farmers believe they need most to cope, and are development policies in Bangladesh taking into account the views of the farmers and responding to those needs? Can adaptation efforts be optimized and improved by shrinking the knowledge gap of farmers and addressing any misalignments with economic development approaches?

Given the acceleration of the impacts of climate change in Bangladesh, there needs to be adaptation, however, there are limits to how successful adaptation will be if it does not connect with the local understanding, knowledge, and context. According to the Bangladeshi government, some of the adaptation and mitigation efforts in the country include transitioning to solar energy, building deep-tube wells, planting trees and reviving forests, creating cyclone preparedness programs, distributing stress tolerant seeds, supporting the cultivation of floating vegetable beds, constructing climate resilient homes, implemented solar street lights, among others other adaptation, mitigation, and research projects. [11] The scale of many of these initiatives still remain relatively small. For example, for a population of nearly 173 million people[12], the government has distributed just 10,908 solar home systems, installed 4,184 deep tube wells, built three rubber dams and reconstructed two spars, among a number of other projects.[13] For a population so vast, scale and resources still remain significantly insufficient. When addressing climate change, it is crucial to also consider economic resources, implications

[11] "Climate Change Initiatives of Bangladesh." *Ministry of Environment, Forest and Climate Change* and *Government of People's Republic of Bangladesh*. October 2022. https://doe.portal.gov.bd/sites/default/files/files/doe.portal.gov.bd/npfblock/2022-11-02-08-08-ade27c3a48eeeedbf1394e5fa527edd2.pdf

[12] "World Population Dashboard Bangladesh. *United Nations Population Fund*. 2023. https://www.unfpa.org/data/world-population/BD

[13] "Climate Change Initiatives of Bangladesh." *Ministry of Environment, Forest and Climate Change* and *Government of People's Republic of Bangladesh*. October 2022. https://doe.portal.gov.bd/sites/default/files/files/doe.portal.gov.bd/npfblock/2022-11-02-08-08-ade27c3a48eeeedbf1394e5fa527edd2.pdf

and policies. Climate change and economic development are closely interconnected, and their relationship is complex. In the case of Bangladesh and other Least Developing Countries (LDCs), they face higher costs in adapting to the impacts of climate change, including building resilience, implementing new technologies, and transitioning to more sustainable practices. These costs can divert resources from other development priorities. Least Developing Countries often have limited resources to invest in robust infrastructure. Climate change increases the frequency and intensity of extreme weather events leading to damage to infrastructure such as roads, bridges, and energy facilities. Rebuilding and adapting infrastructure to withstand climate impacts can strain economic resources. Developing economies, like in Bangladesh, heavily rely on natural resources such as forests, fisheries, and water for economic activities, all of which are deeply disrupted leading to resource scarcity, increased competition which deepens inflation, and potential conflicts over access to these resources. In terms of agriculture specifically, which is a crucial sector for many developing economies, changes in temperature and precipitation patterns, as well as increased frequency of extreme weather events, lead to reduced crop yields, affecting food security and livelihoods. Overall, climate change poses challenges to economic development in multiple ways, impacting key sectors and requiring adaptation strategies. Addressing climate change and promoting sustainable development go hand in hand, emphasizing the need for integrated policies that consider both environmental and economic goals.

In Bangladesh, however, there seems to be a misalignment with economic development efforts with local needs and realities. The following examples illustrate how a number of well-intention initiatives have failed in Bangladesh due to the disconnect with the local context. Scientists have been pushing for high-yield crop varieties in Bangladesh as an agriculture

diversity and sustainability.[14] Although this method of farming is intended to increase food production and alleviate poverty, the introduction of high-yield crop varieties have led to unintended consequences for farmers. In addition to requiring more water than traditional crops leading to depletion of ground water resources, high yield crop varieties require large amounts of fertilizers and pesticides, which are expensive and not always available in rural areas. The farmers who cannot afford these inputs end up with low yields, creating a cycle of debt and poverty. Poverty and lack of access to affordable financing are the main reasons farmers are unable to explore crop variations for sustainable agriculture.[15] Farmers are often trapped in the vicious cycle of repaying high interest loans by selling crops immediately after harvest for low profit in order to repay loans. Delays in loan repayments mean higher interests, trapping farmers in a continuous vicious cycle of poverty.[16]

Another example of a development strategy in Bangladesh that led to detrimental consequences are the paddy to pond transitions for shrimp farming in the coastal regions of Bangladesh. Since the mid-1980s, shrimp farming has been highly promoted due to favorable agro-climatic conditions and adequate water resources.[17] However, this initiative has had unintended negative consequences for both the environment and the local communities. In order to create shrimp farms, mangrove forests were cleared, leading to the destruction of valuable ecosystems that provide a range of beneficial services, including storm protection, carbon

[14] Tisdell, Clement, et al. "Agriculture Diversity and Sustainability: General Features and Bangladeshi Illustration." *Sustainability*, 11(21), 6004. October 2019. https://www.mdpi.com/2071-1050/11/21/6004/htm

[15] Siddique Abu. "Lack of finance prevents Bangladesh farmers form diversifying their rice crop." *Mongabay*. August 2022. https://news.mongabay.com/2022/08/lack-of-finance-prevents-bangladesh-farmers-from-diversifying-their-rice-crops/

[16] Siddique Abu. "Lack of finance prevents Bangladesh farmers form diversifying their rice crop." *Mongabay*. August 2022. https://news.mongabay.com/2022/08/lack-of-finance-prevents-bangladesh-farmers-from-diversifying-their-rice-crops/

[17] Abdullah, Shahriar, Dhrubo Barua, and Md Sazzad Hossain. "Environmental Impacts of Commercial Shrimp Farming in Coastal Zone of Bangladesh and Approaches for Sustainable Management." *International Journal of Environmental Sciences & Natural Resources*. July 2019. https://juniperpublishers.com/ijesnr/IJESNR.MS.ID.556038.php

sequestration, and habitat for marine life.[18] The construction of shrimp farms has also led to the depletion of freshwater resources and increased soil and water salinity, making it difficult to grow other crops.[19] Moreover, the shrimp farming industry is tainted with corruption, exploiting the labor of poor and marginalized communities who work under exploitative and hazardous conditions for low wages.[20] The shrimp farming industry has also led to social conflicts as it often involves the appropriation of common lands and resources that local communities depend on for their livelihoods.[21] This adaptation strategy has made the farming communities even more vulnerable.

There are other examples of failed economic development initiatives in Bangladesh that are intertwined with climate change and agriculture. The failure of these initiatives highlight the need to consider the socio-economic and environmental impacts of interventions, and involve local communities in decision-making processes. A more sustainable and equitable approach would involve promoting alternative livelihoods that are compatible with local ecosystems and cultural values, and ensure that the benefits of economic development are shared fairly among all members of society, especially farmers who face the brunt of climate change impacts. Bangladesh is a very small country but the population is immense and representation is

[18] Paul, Brojo Gopal, and Christian Reinhard Vogl. "Impacts of shrimp farming in Bangladesh: challenges towards alternatives." *Elsevier Ocean & Coastal Management*, 54: 201-211. 2011. https://www.academia.edu/9482866/Impacts_of_shrimp_farming_in_Bangladesh_challenges_towards_alternatives#:~:text=Similarly%2C%20environmental%20impacts%20such%20as,development%20of%20sustainable%20shrimp%20farming

[19] Paul, Brojo Gopal, and Christian Reinhard Vogl. "Impacts of shrimp farming in Bangladesh: challenges towards alternatives." *Elsevier Ocean & Coastal Management*, 54: 201-211. 2011. https://www.academia.edu/9482866/Impacts_of_shrimp_farming_in_Bangladesh_challenges_towards_alternatives#:~:text=Similarly%2C%20environmental%20impacts%20such%20as,development%20of%20sustainable%20shrimp%20farming

[20] Miller, Stephan Robert. "'White gold': why shrimp aquaculture is a solution that caused a huge problem." *The Guardian*. June 2022. https://www.theguardian.com/environment/2022/jun/30/shrimp-aquaculture-bangladesh-solution-that-caused-huge-problem

[21] Miller, Stephan Robert. "'White gold': why shrimp aquaculture is a solution that caused a huge problem." *The Guardian*. June 2022. https://www.theguardian.com/environment/2022/jun/30/shrimp-aquaculture-bangladesh-solution-that-caused-huge-problem

important. This research seeks to explore whether a more participatory approach that considers the knowledge and needs of Bangladeshi farmers and integrated traditional knowledge with modern innovative practices would be more effective in promoting sustainable agriculture, effective economic development, and climate resilience.

III. Literature Review

Literature after literature it has been emphasized that climate change is undeniable and the negative consequences of climate change are accelerating rapidly, disproportionately impacting the most vulnerable communities. In their 2021 sixth assessment report, the Intergovernmental Panel on Climate Change (IPCC) confirms that climate change is unequivocally happening without a doubt, despite claims by global warming deniers. The IPCC is known for their transparency and neutrality and their research is conducted by conservative yet neutral scientists. According to their sixth assessment report, unless governments implement effective strategies to reduce greenhouse gas emissions and encourage changes in behavior, the world is heading towards a climate emergency characterized by elevated sea levels, increased temperatures, and more frequent and severe extreme whether events.[22] These findings are especially pertinent to the context of Bangladesh, where a combination of low-lying topography, high population density and insufficient infrastructure renders the country highly susceptible to the effects of climate change.

Scientists like Fulco Ludwig have differentiated between the top-down and bottom-up approaches when it comes to assessing the vulnerability of an adaptation system. The conventional top-down strategy involves one or more global climate situations and then linking

[22] Masson-Delmotte, Valerie, et al. "Climate Change 2021 The Physical Science Basis." *Intergovernmental Panel on Climate Chance (IPCC)*. 2021. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport_small.pdf

the potential consequences on a system by considering physical susceptibility. On the other hand, the bottom-up methodology starts by analyzing social-ecological susceptibility of a system and examines how climate change affects these vulnerabilities. It concludes by recognizing and assessing alternatives to decrease these vulnerabilities. Ludwig argues that the primary focus on the bottom-up adaptation approach is mainly on mitigating socio-economic vulnerability by enhancing adaptive capacity.[23] In Ludwig and his team's view, when it comes to Integrated Water Resource Management, both of these approaches are unsuitable and it's best to follow a risk based approach. They argue, "The bottom up approach focuses too much on socio-economic vulnerability and too little on developing (technical) solutions. The top-down approach often results in an 'explosion' of uncertainty and therefore complicates decision making."[24] In the context of Bangladeshi farmers, this research seeks to explore whether the bottom-up approach would be best suitable for adaptation systems in Bangladesh and does a better job taking into account the realities and vulnerabilities of farmers.

Unlike Ludwig's take, prominent international climate justice organizations, such as World Resource Institute and the Global Commission on Adaptation, push for Locally Led Adaptation (LLA), which is more closely aligned with the bottom-up approach. They emphasize five benefits to Locally Led Adaptation: effective, context specific program; higher social environmental, and economic returns; more equitable results; more holistic approaches; and

[23] Ludwig, Fulco Erik van Slobbe, and Wim Confino. "Climate change adaptation and Integrated Water Resource Management in the water sector." Journal of Hydrology, Vol 518, Part B, 235-242. October 2014. https://doi-org.ezproxy.cul.columbia.edu/10.1016/j.jhydrol.2013.08.010 https://www-sciencedirect-com.ezproxy.cul.columbia.edu/science/article/pii/S002216941300588X

[24] Ludwig, Fulco Erik van Slobbe, and Wim Confino. " Climate change adaptation and Integrated Water Resource Management in the water sector." Journal of Hydrology, Vol 518, Part B. October 2014. 235-242. https://doi-org.ezproxy.cul.columbia.edu/10.1016/j.jhydrol.2013.08.010 https://www-sciencedirect-com.ezproxy.cul.columbia.edu/science/article/pii/S002216941300588X

amplifies local knowledge.[25] They assert incorporating knowledge and expertise from the local community into adaptation measures can enhance their inclusivity, facilitate their acceptance, and increase their sustainability, all while strengthening the community's sense of ownership. They reiterate that empowering communities to take the lead in adaptation efforts through Locally Led Adaptation can enable them to tap into their immense potential an resourcefulness to create and implement effective solutions. In the 2020 report by Global Commission on Adaptation, *Scaling Local and Community-Based Adaptation*, the authors present several successful Locally Led Adaptation projects in various regions, including one in Bangladesh. The case study in Bangladesh entailed the Triple-F Model, or the Forest, Fish and Fruit Model, for enhancing the resilience of coastal communities. The Triple F Model basically introduced the elevated ditch-dike model, which entailed transforming "barren coastal lands [to] support mangrove forest (re)establishment as well as fruit and fish production in order to diversify community members' livelihoods and enable them to generate income."[26] This adaptation project is characterized as Community-Based Adaptation because of the active involvement of the local community as well as incorporating three main components: structural intervention, income generation measures, and community awareness raising.[27] The structural intervention included the mangrove green belt, the income generating measures was through the fruit and fish farming, and the awareness-raising entailed "raising adaptation practitioners awareness on how to empower communities by integrating traditional methods in order to achieve effective, locally

[25] Illick-Frank, Emma. "5 Benefits to Local Action on Climate Resilience." *World Resource Institute.* June 2020. https://www.wri.org/insights/5-benefits-local-action-climate-resilience

[26] Mfitumukiza, David, Arghya Sinha Roy, et, al. "Scaling Local and Community-Based Adaptation." Global Commission on Adaptation. June 2020. https://gca.org/wp-content/uploads/2020/12/Local_Adaptation_Paper_-_Global_Commission_on_Adaptation.pdf?_gl=1*wcab6q*_ga*MTYyNzM2NjA4LjE2ODA5NzUwODY.*_up*MQ..

[27] Mfitumukiza, David, Arghya Sinha Roy, et, al. "Scaling Local and Community-Based Adaptation." Global Commission on Adaptation. June 2020. https://gca.org/wp-content/uploads/2020/12/Local_Adaptation_Paper_-_Global_Commission_on_Adaptation.pdf?_gl=1*wcab6q*_ga*MTYyNzM2NjA4LjE2ODA5NzUwODY.*_up*MQ..

contextualized adaptation and by strengthening institutional capacity through training programs".[28] This research seeks to explore whether other farming communities in Bangladesh that are adapting to climate change are experiencing these sort of Community-Based and Locally-Led Adaptation. If yes, has it improved their quality of life? If no, then where is the disconnect? How much should organizations consider local engagement and local knowledge?

In recent year, indigenous knowledge has been a growing research arena, particularly around the environment and climate change. UNESCO defines local and indigenous knowledge as "the understandings, skills, and philosophies developed by societies with long histories of interactions with their natural surroundings. For rural and indigenous peoples, local knowledge informs decision-making about fundamental aspects of day-to-day life."[29] Yulia Nesterova who advocates for the inclusion of indigenous knowledge in formal education systems argues that it is essential to do so because "it can help us to close some gaps in our knowledge about the environment that will enable us to counter the threats to the natural environment."[30] She also underlines that the introduction of indigenous knowledge into education in settler societies like Australia, Canada, Taiwan, and others, can facilitate transitional and historical justice as a healing process for the harms inflicted on indigenous communities during the era of colonialism. She believes the incorporation of indigenous knowledge in education would promote

[28] Mfitumukiza, David, Arghya Sinha Roy, et, al. "Scaling Local and Community-Based Adaptation." Global Commission on Adaptation. June 2020. https://gca.org/wp-content/uploads/2020/12/Local_Adaptation_Paper_-_Global_Commission_on_Adaptation.pdf?_gl=1*wcab6q*_ga*MTYyNzM2NjA4LjE2ODA5NzUwODY.*_up*MQ..

[29] "Local and Indigenous Knowledge Systems (LINKS)." UNESCO. https://en.unesco.org/links

[30] Nesterova, Yulia. "Rethinking Environmental Education with the Help of Indigenous Ways of Knowing and Traditional Ecological Knowledge." *Journal of Philosophy of Education*, Vol. 54, No. 4. Aug 2020. https://onlinelibrary-wiley-com.ezproxy.cul.columbia.edu/doi/epdf/10.1111/1467-9752.12471

reconciliation and help to establish more equitable relationships between indigenous and non-indigenous groups.[31]

Researchers Elizabeth Sumida Huaman and Porter Swentzell, both Associate Professors at United States universities, and originally from Indigenous communities, stress the need for affirming spaces for Indigenous knowledge in sustainable development discussions.[32] They note that early on sustainability development has been defined in a human centric way centering around quality of life that requires perpetual access to economic, social, and environmental resources. The definition later expanded to encompass a number of other critical issues like fair governance and gender equity, and then linked sustainable development to the need of eradicating extreme poverty under the United Nations Sustainable Development Goals (SDGs). Huaman and Swentzell argue it is important to ask how Indigenous communities define wealth and poverty, and similarly ask "what else our communities and other marginalized peoples and places will be asked to sacrifice in order to preserve quality of life and create wealth envisaged and enjoyed by other."[33] They take a very critical stance on the definition and even express "skepticism of sustainable development as an English term that is synonymous with betterment within a Western construct."[34] Ultimately they emphasize the need to nurture Indigenous

[31] Nesterova, Yulia. "Rethinking Environmental Education with the Help of Indigenous Ways of Knowing and Traditional Ecological Knowledge." *Journal of Philosophy of Education,* Vol. 54, No. 4. Aug 2020. https://onlinelibrary-wiley-com.ezproxy.cul.columbia.edu/doi/epdf/10.1111/1467-9752.12471

[32] Huaman, Elizabeth Sumida, and Porter Swentzell. "Indigenous Education and Sustainable Development: Rethinking Environment Through Indigenous Knowledges and Generative Environmental Pedagogies." Journal of *American Indian Education*, Vol. 60, Issue 1-2. 2021. https://go-gale-com.ezproxy.cul.columbia.edu/ps/i.do?p=AONE&u=columbiau&id=GALE%7CA684967277&v=2.1&it=r&sid=summon

[33] Huaman, Elizabeth Sumida, and Porter Swentzell. "Indigenous Education and Sustainable Development: Rethinking Environment Through Indigenous Knowledges and Generative Environmental Pedagogies." Journal of *American Indian Education*, Vol. 60, Issue 1-2. 2021. https://go-gale-com.ezproxy.cul.columbia.edu/ps/i.do?p=AONE&u=columbiau&id=GALE%7CA684967277&v=2.1&it=r&sid=summon

[34] Huaman, Elizabeth Sumida, and Porter Swentzell. "Indigenous Education and Sustainable Development: Rethinking Environment Through Indigenous Knowledges and Generative Environmental Pedagogies." Journal of *American Indian Education*, Vol. 60, Issue 1-2. 2021. https://go-gale-com.ezproxy.cul.columbia.edu/ps/i.do?p=AONE&u=columbiau&id=GALE%7CA684967277&v=2.1&it=r&sid=summon

sustainability scholars and to create spaces for Indigenous voices in sustainable development research and policy development. They believe the best way to achieve this is by generating environmental pedagogies that centers around Indigenous knowledge and to do so with two goals in mind: "(1) to defend and care for Indigenous homelands while challenging the status quo of the global development project, and (2) manifesting the desire to utilize [their] knowledge acquisition processes for educational development."[35] To prepare further generations for the challenges ahead, they encourage engaging in researching, initiating conversations within Indigenous communities, collaborating with allies, and developing targeted educational strategies that promote resilience and creativity in the face of climate change and environmental degradation.

Similarly, researcher Ranjan Kumar Datta, who identifies as a settler scholar of color, stresses the need for land-based relational participatory action research that honors and respects traditional Indigenous knowledge. In a study he conducted with the Laitu Khyeng Indigenous community in Chittagong, Bangladesh, the participants of his research expressed feeling empowered and enabled by the participatory element of land-based research. Ultimately his research found that "adopting a land-based perspective represents a critical step towards employing Indigenous knowledge and practice to inform land and water policy and governance while potentially offering a significant bridge between Western and Indigenous approaches to environmental resource management and sustainability."[36]

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[35] Huaman, Elizabeth Sumida, and Porter Swentzell. "Indigenous Education and Sustainable Development: Rethinking Environment Through Indigenous Knowledges and Generative Environmental Pedagogies." Journal of *American Indian Education*, Vol. 60, Issue 1-2. 2021. https://go-gale-com.ezproxy.cul.columbia.edu/ps/i.do?p=AONE&u=columbiau&id=GALE%7CA684967277&v=2.1&it=r&sid=summon

[36] Datta, Ranjan. "Clarifying the process of land-based research, and the role of researcher(s) and participants." *Ethics in Science and Environmental Politics*, Vol. 19: 1-11. 2018. https://www.int-res.com/articles/esep2019/19/e019p001.pdf

Complementary to these researches conducted with Indigenous communities, this research project seeks to identify the benefits of incorporating local knowledge from farming communities when considering adaptation and sustainability projects. A perspective analysis of specifically Bangladeshi smallholder farmers in recent years has been lacking. This study seeks to analyze the perspective of Bangladeshi smallholder farmers on climate change and what they believe they need most to better adapt and improve their well-being. Similar to the empowerment of Indigenous knowledge, can empowering farmers knowledge yield better results for climate resilience in Bangladesh? How much do they truly understand climate change and its relation to justice? Is there a knowledge gap among Bangladeshi farmers that hinders them from seeking their rights and improving their vulnerable conditions? If we can identify where the knowledge gaps exist among smallholder farming communities in Bangladesh, then we can better address the impacts of climate change in those communities and improve the quality of adaptation and mitigation policies from NGOs and government through a more bottom-up approach.

IV. Research Findings

a. Research Methodology

Upon approval by the Institutional Review Board (IRB), protocol number AAAU7139, to ensure all ethical measures were in place, research for this study was conducted through qualitative data collection through oral interviews of 27 farmers. Interviews were conducted during the month of October 2023. Aside from being a smallholder farmer, there were no strict criteria to participate in this study, such as gender, age, education, religion, etc. Smallholder farmers were approached at their fields and small tea shops during their breaks. When interviews concluded, the participants were asked if they had recommendations of any other farmer in the

area who may be interested in participating in the study. This was the main method to seek additional participants. All participation was voluntary and the farmers were afforded anonymity. Aside from their age, all other personal data remains confidential. Participants were provided consent forms and information sheets translated to Bengali explaining the purpose of the research. Participants were aware taking part in this study would not yield any immediate benefit to them directly, but may help people who struggle with the detrimental impacts of climate change in farming communities in the future.

The smallholder farmers were asked questions pertaining to their perspectives on climate change. Each participant was asked the following questions: What is their age? How much formal education have they obtained? Do they believe in climate change? What do they know about climate change? Why is it happening? How are they experiencing and managing the increased natural disasters in their villages, and how are they processing their realities? How are they experiencing and managing the increased natural disasters in their villages, and how are they processing their realities? What are adaptation practices they are incorporating in their farming technique? Are these practices taught to them by external experts, were they taught by their forefathers, or did they develop the technique on their own? Do they understand their human rights are being violated as least contributors yet most impacted by climate change? Do they know there are legal apparatuses in place to seek reparations and push for loss and damage funding, to advocate for loss of cultural heritage, and other legal avenues to seek justice? What do these farmers believe they need most to improve their situations?

The primary research locations were in the District of Cox’s Bazaar. Cox's Bazar is mostly known for its tourism industry due to the world's longest natural sea beach. While tourism plays a significant role in the local economy, agriculture is also an important sector. The

region is characterized by a mix of agricultural activities, including rice cultivation, fishing, and other forms of subsistence farming. Cox's Bazar has also been a focal point for humanitarian efforts, especially with the presence of Rohingya refugee camps. This coastal location was selected for research because Cox's Bazar provides a unique opportunity to study the multifaceted impacts of climate change on ecosystems, communities, and economies, making it a valuable location for climate change research and the development of mitigation and adaptation strategies. It was also selected due to its accessibility and ease of transportation from major cities. The researcher is also proficient in the local Chittagonian dialect, which makes it easier to communicate with the rural farmers who may not all speak Bengali.

The interviews with smallholder farmers specifically took place in Pekua and Chakaria, which are two adjacent Upazilas (Sub-Districts) in Cox's Bazaar. They are located in the southeast coastal region of Bangladesh and are prone to cyclones and tidal surges. Chakaria was once home to the oldest mangrove forest in the subcontinent called the Chakaria Sundarban. The forest no longer exists due to human settlements, increased shrimp farms, and deforestation, resulting in increased vulnerabilities in the area particularly during extreme weather.[37] The farmers in Pekua and Chakaria have implemented various adaptation measures, such as changing their crop pattern and using saline-tolerant varieties, to cope with the impacts of climate change.

b. Research Limitations

Women farmers were not surveyed during this study given lack of voluntary responses to the call for participation. It is important to note women make up a large part of the agricultural

[37] Hossain, Shahadat. "Goodbye Chakaria Sunderban: The Oldest Mangrove Forest." *Wetland Science and Practice.* pp. 19-22. Sep 2001. https://www.researchgate.net/publication/232660648_Goodbye_Chakaria_Sunderban_The_Oldest_Mangrove_Forest

workforce in Bangladesh, but face various constraints around access and recognition, and much of this is due to gender-divisions and norms in the region. There are various gendered impacts of climate change and women often experience higher vulnerabilities to the impacts of climate change due to pre-existing social and economic inequalities. In many societies, women may have limited access to resources, education, and decision-making power, making it challenging for them to cope with and adapt to climate-related struggles.

Climate-related changes also interfered with this particular study. Severe flooding during the study period limited the sample size of farmers as well as the number of survey locations. The relative size of the county may be small, however, the landscape, terrain, climate impacts, and adaptation measures vary from one region to another within the country. While the Northwest suffers from extreme heat, aridity, and insufficient rainfall, the Northeast endures excessive rain and severe floods. The Southern coastal region, where this study takes place, has also been experiencing more frequent and intensified floods, along with cyclones, storm surges, salinity intrusion and sea-level rising. The increased extreme weather and climate change conditions continue to be detrimental to agriculture, impacting the very livelihood of farmers.

Another limitation of this study is that NGOs that work on adaptation and resilience in Bangladesh were not interviewed for their perspective. Interviews with NGO personnel could provide a deeper understanding of their engagements to pinpoint gaps and areas of improvement: What are their efforts around education and capacity building among Bangladeshi farmers? What sort of improvements and results have these efforts led to? How much do they involve farmers in their decision-making? How much do they take into consideration the views and suggestions of farmers when rolling out adaptation efforts and other projects? Would they consider having a farmer on their decision making board to provide a different perspective? Do they find it

worthwhile to bring Bangladeshi farmers to international forums, conferences, and COPs, as other countries have done, to help give them a voice in these decision-making spaces?

c. Interviews with Bangladeshi Farmers in Cox's Bazaar

A total of 27 smallholder farmers were interviewed for this study. Their age ranged from 26 years of age to 68 years of age. The average age for this sample group was 40 years of age. Some said they have been farming all their lives, "jormo thike kormo," as they said in Bangla, meaning since birth. Others began farming when they were out of school. In terms of education, 26% of the group said they did not obtain any formal education; 30% said they attended just primary school, which included individuals who completed just first or second grade; 37% attended secondary school between sixth and twelfths grade; and only two people completed two years of their bachelors degree, making them only 0.7% of the sample group.

Though across the globe there are climate change deniers and skeptics who do not believe in the phenomena, every single participant in this study said they believe in climate change because of the changes they themselves have been witnessing. When asked to elaborate on what they know about climate change and why it is happening, 74% said they did not know, while the remaining 26% expressed having some idea. The seven farmers who said they know about climate change and its causes, all received formal education until 6th grade or higher, including the two who completed two years of their bachelors. To them climate change is weather change that causes loss of crops, untimely rain, increased floods, and more rampant natural disasters. One farmer expressed a dichotomy: "climate change is human made, yet a natural thing." Their answers regarding the causes included deforestation, pollution from manufacturers, smoke from factories, and larger developed countries. One farmer argued climate change is taking place due

to the negligence of the government, while another felt everyone is responsible for climate change. Specific to Pekua, one farmer blamed factories near Matabari, a port in Pekua, for affecting farming and causing reduced water supply to their fields due to the marine port. He explained, “Developed countries use too much chemical, coal, and electric plants in Matarbari, which is causing a lot of pollution and that is causing less rain. Scientists are saying it will get worse in the future.”

Participants were then asked how they are experiencing climate change and managing the increased natural disasters in their villages? They all shared very similar grievances about their circumstances in recent years. As children, these farmers used to experience six seasons, Grisma (Summer), Barsa (Rainy), Sarat (Autumn), Hemanta (Late Autumn), Shitt (Winter), and Basant (Spring), and they say that is no longer the case. They are experiencing extended periods of hot Summers, as well as flood prone Rainy seasons. Farmers explained, there used to be seasons when they experienced sunny days and they were able to sow the seeds, and the rain would help to water the fertile land. Now they experience two extreme seasons. During the Summer months, heat has intensified drastically and the farmers have been faced with increased aridity and droughts. When they need rain, there is no rain for long stretches of time and water for irrigation becomes scarce. River flow has decreased impacting the fresh water source, which also has a lot to do with how India controls the dams. “The heat is unbearable but we don’t even have proper electricity for fans,” one farmer said. Load shedding is still a chronic issue in Bangladesh, particularly in rural areas. For those who farm fish, baby fish hatchlings in hatcheries are also dying due to extreme heat.

Rainy season has also intensified with extreme floods lasting days. In the past during the Rainy season, farmers would sow their seeds. Now that is not possible, canals have excessive

water when it rains so the fields cannot drain properly. Farmers must wait for floods to subside, causing harvest to be late, otherwise seeds and crops are completely destroyed by the floods. Farmers say they now experience three floods in just one year. This past year they said the floods ruined them twice already. The unanticipated sudden increase in water level does not leave them any time for any sort of reaction. Their homes are also severely damaged in the floods, sometimes due to landslides, and many homes still have not dried from the flood or repaired from damages. “We have to go through a lot of difficulties,” one farmer says, “we have to take loans from the bank every time. We have no income when we can't harvest, we just stay at home with no work.” Similar anecdotes have been shared by numerous farmers.

Salinity intrusion has also been a significant issue in recent years. Salt water enters the field and makes it infertile producing less harvest or spoiling harvest completely. There is no way to pump out water from the field, no drainage of excess water, therefore some farmers have switched to fishing fields to reduce risk of loss. Paddy farming is no longer possible in the low lands like it was before. However, even in some of these low land areas, fishing farms are negatively impacted and fishery are still dying. One farmer said he lost 3.5 million BDT (Bangladesh Taka) due to floods this year. He used to breed mixed species and the ponds had over three to four feet of flood water above the ground for days, so all the fish were gone when the floods subsided. One farmer notes, “We’re not a wealthy country, so we don’t get much help from the government, there aren’t much ways to adapt.”

Participants were then asked about the adaptation practices they are incorporating in their farming techniques. The majority of the farmers needed to change the seed variant of their crops or paddy to one that is more likely to survive. Farmers now have a very short window to sow the seeds before the floods begin. In the past, farmers harvested their crops and grain after six

months. The new seed variants they have switched to yield harvest within three months. These seed variants cost more, almost double, and yield less harvest according to the farmers. Some also switched to seed variants that are more tolerant to salt water. When and where possible, farmers are thinking about the elevation of the land before sowing their seeds and attempting to plant in elevated grounds.

For the most part, farmers say there is no way to reduce water intake in many of their fields. There are no dams or barriers for protection against floods. Therefore roughly 20% of the farmers took on their own initiative to switch to fish farming, while the remaining farmers do not have the financial ability and cannot afford to switch. They simply re-sow, replant, and repeat the process after every devastation. Farmers who switched to fish farming put nets around the fields when the water level is high to keep the fish from going away. Others raised the height of the pond boundaries to prepare for the next season. They say they do what they can to reduce the risks, but when the floods are too heavy, they still lose their fish and take on a lot of damage.

Twenty-two percent of the survey participants said these adaptation techniques were taught to them by their forefathers; 52% said they taught themselves, sometimes through trial and error; 15% said they were advised by government appointed field or agriculture officers; and 11% said they did not adapt and practiced the same farming methods.

The final segment of the interviews attempted to get an understanding of the legal consciousness among the community, do they understand their human rights are being violated as least contributors yet most impacted by climate change? Do they know if there are legal apparatuses in place to seek reparations and push for loss and damage funding, to advocate for loss of cultural heritage, and other legal avenues to seek justice? All the participants of this sample group sought further explanation as the question had left them confused. After

clarifications, 77% reaffirmed they did not know what their rights were, especially pertaining to climate change. They all shared sentiments of hopelessness when it came to rights, reparations, and loss and damage. Skepticism resonated throughout many of their responses: “Even if I have rights, will I ever get those rights fulfilled?” They overwhelmingly felt they did not have any resources to fight for their rights: “as someone who is poor, we do not have much hope for having our rights fulfilled.”

Many expressed frustration towards the government for not providing any support, nor do they have expectation of support in the future. Some blame the government for making their situation worse by leasing the dam switch gates to private companies who keep gates closed for commercial fishing. When farmers plead to open the switch gates to allow proper water drainage, companies refuse stating they will incur financial loss, resulting in floods inland. Farmers believe the government has the ability to help them in this situation, but they choose not to. “What will other countries do if my own country is not helping our farmers?” one farmer says, “We don't have any capacity to go appeal to foreign countries.”

The question of who kept resurfacing from many of the participants: “who would give us reparations, this is not something we ever expected or anticipate. We cannot even attempt because we don’t have the resources to seek reparations.” Another asked, “How is it possible to seek justice from someone I didn’t have a confrontation with (referring to wealthy countries and biggest contributors of climate change). Who do we go to? Who will help us?”

They strongly felt even if Loss and Damage funding was to be given, only powerful people would receive the funds due to corruption, it wouldn’t trickle down to the poor. One farmer complained, “I don't have time to look for reparations. It would cost me more time and money to look for the reparations. I do not have any of these thoughts in my head whether I will

get something by complaining to someone. If I go to law enforcers, I need to bribe them to listen and advocate for me, and even after giving a bribe, my attempt won't be successful, so it's better and easier for me to sit at home."

When the farmers were asked what do they believe they need most to improve their situations, every one of them indicated they needed resources. Resources to get by and support their families. Resources to recover from flood damage and other weather related devastation. Resources to adapt. Resources to fight for their rights. "We need alleviation from poverty and we need food on our tables," one farmer said. Participants complained about the challenge of making ends meet. It is increasingly difficult to provide a proper meal to their families. They complained of cost of living and the sky rocketing prices of food and basic necessities. One participant became overcome with tears as he expressed that his son loves to eat meat, but it has been many months since he was able to buy meat for the household. He wept as he conveyed his love for his son and regret for being unable to give him more in life, and praying the cycle of poverty does not continue with his future generations.

Another common answer by the majority was the need for the government to play a more active role to assist with disaster relief and protection from floods and salinity intrusion. They want the government to help keep the canal switch gates open to prevent floods from intensifying more and they are demanding from the government better ways of managing water flows. The current dams and canals are not strong enough to prevent water from overflowing inland. They also believe the government should help to facilitate education and training for farmers to better adapt. There is enthusiasm among the farmers to learn more about climate change and ways of adapting. One farmer believed more journalism exposure of their realities would help their situation. Another farmer had mixed feelings about who is actually responsible.

He said, “The Bangladeshi government needs to collect loss and damage on behalf of us, general people cannot claim loss and damage. The world cannot do anything if wealthy countries like the United States do not take responsibility. We can’t force them to pay us for the damage they are causing. General farmers need to be educated, we can’t be waiting for the government to come and save us. We need to learn by ourselves and move forward.” By the end of the interviews, many of the farmers described a desire to fight for their rights, they just do not know how and felt hopeless with their inadequate resources.

d. Analyzing Farmers Feedback – Knowledge is Power

The original inspiration for this research study stems from an encounter with a villager in Boalkhali, Chittagong which is right by Kharnaphuli River, the largest and one of the most important rivers in Bangladesh. The villager noted that each year the river keeps getting closer and closer. When I explained this was due to climate change, she was bewildered. She didn’t understand the concept of sea-level rising or global warming. She spoke as though the river had a life of its own, unphased by human activity, simply swallowing the village more and more with each passing year. This conversation with the villager sparked my interest in the knowledge gap and perspectives of rural farmers, many who are unfamiliar with climate change, the very phenomena imposed on them by wealthy nations.

The description of education laid out by the Committee on Economic, Social and Cultural Rights (CESCR) under General Comment No. 13 could not hold more true for these smallholder farmers. It states:

> “Education is both a human right in itself and an indispensable means of realizing other human rights. As an empowerment right, education is the primary vehicle by which

> economically and socially marginalized adults and children can lift themselves out of poverty and obtain the means to participate fully in their communities. Education has a vital role in empowering women, safeguarding children from exploitative and hazardous labour and sexual exploitation, promoting human rights and democracy, protecting the environment, and controlling population growth. Increasingly, education is recognized as one of the best financial investments States can make. But the importance of education is not just practical: a well-educated, enlightened and active mind, able to wander freely and widely, is one of the joys and rewards of human existence."[38]

Access to education still remains very limited in rural Bangladesh. Accessibility and affordability persists to be difficult as expressed by to the farmers. Many of the farmers in this study expressed needing to start working in the farms from a young age to support the family and not having the ability to pursue higher education. According to the surveys, there was a clear correlation between the amount of formal education the farmers had and how much they understood their rights and their level of understanding of climate change. In this study's data group, those who had any sort of knowledge regarding climate change, the causes, and rights had some exposure to formal education from 6th grade and up. Among the participant group, there was a hunger to learn more in order to improve their situation. Many felt left in the dark and it was the first time they ever heard about some of their rights. Many lacked knowledge of the concept of human rights that states have a duty to uphold, for the most basic things like the right to food and water, the right to health, the right to adequate housing, even the right to education.

[38] "General Comment No. 13: The right to education." *United Nations Committee on Economic, Social and Cultural Rights*. December 8. 1999. https://www.ohchr.org/en/resources/educators/human-rights-education-training/d-general-comment-no-13-right-education-article-13-1999

A hundred percent of the participants were not aware there is an avenue to seek reparations or that there is even a large movement for a push for Loss and Damage funding for the most vulnerable communities. These farmers had very limited access to information and resources. Lack of knowledge means they are not in the same playing field in the fight for global climate justice. How can they deploy advocacy efforts if they do not know how or even why?

There are many examples of successful farmers movements and collective action on issues around rural poverty, inequality, and social injustice, which the Bangladeshi smallholder farmers can learn from. There is the example of the United Farm Workers (UFW) movement in the United States, led by labor rights activists Cesar Chavez and Dolores Huerta. The UFW played a crucial role in advocating for the rights of farmworkers, particularly those involved in the production of table grapes in California during the 1960s and 1970s. [39] The movement focused on improving working conditions, wages, and labor rights for agricultural workers, who faced exploitation and harsh conditions.[40]

Farmers activism is quite common in Latin America, and another example of a successful farmers' movement is the Landless Workers' Movement (Movimento dos Trabalhadores Rurais Sem Terra or MST) in Brazil. The MST is a social movement that advocates for land reform and the rights of landless workers in rural areas. It emerged in the early 1980s and has since become one of the largest social movements in Latin America.[41]

Finally a more recent notable example of a successful farmers' movement comes from neighboring India. It is the Farmers' Protest in India, which gained international attention in 2020

[39] "A Latinx Resource Guide: Civil Rights Cases and Events in the United States." *Library of Congress*. https://guides.loc.gov/latinx-civil-rights/united-farm-workers-union
[40] "A Latinx Resource Guide: Civil Rights Cases and Events in the United States." *Library of Congress*. https://guides.loc.gov/latinx-civil-rights/united-farm-workers-union
[41] "What is the MST?" *Friends of the MST*. https://www.mstbrazil.org/content/what-mst

and 2021. The protest primarily revolved around three agricultural laws introduced by the Indian government: the Farmers' Produce Trade and Commerce Act, the Farmers Agreement on Price Assurance and Farm Services Act, and the Essential Commodities Act.[42] Farmers argued that these laws would lead to the dismantling of the traditional agricultural support system, leaving them vulnerable to exploitation by big corporations. The protests began in the state of Punjab and later spread to other parts of India, with farmers camping at various border points around Delhi. The movement gained widespread support from farmers across the country and drew attention from the international community. The farmers organized massive rallies, engaged in peaceful demonstrations, and maintained a persistent presence at protest sites for an extended period. Social media played a crucial role in spreading awareness and garnering support. The sustained and united efforts of the farmers eventually led to the repeal of the controversial agricultural laws. In November 2021, the Indian government announced the withdrawal of the laws, marking a significant victory for the farmers' movement. The success of the Farmers' Protest in India demonstrates the power of collective action and the ability of farmers to influence policy decisions through peaceful and persistent advocacy.[43]

Most of the study participants felt that taking any sort of legal action is not an option for them given their lack of knowledge and resources. However, in recent years, there has been a growing number of climate lawsuits demonstrating increased appetite for climate justice globally. In a landmark case decided in 2019, the Urgenda Foundation along with 900 Dutch citizens sued the Dutch government for their insufficient reduction of emission by only 17% percent as opposed to the committed minimum of 25% by 2020. The Court concluded the Dutch

[42] Narula, Smita. "Confronting State Violence: Lessons from India's Farmer Protests." *Columbia Human Rights Law Review*. Issue 54.1. 2022. https://hrlr.law.columbia.edu/files/2022/12/Narula_Finalized-12.08.22.pdf
[43] [43] Narula, Smita. "Confronting State Violence: Lessons from India's Farmer Protests." *Columbia Human Rights Law Review*. Issue 54.1. 2022. https://hrlr.law.columbia.edu/files/2022/12/Narula_Finalized-12.08.22.pdf

government was failing to uphold their treaty obligations, particularly under the Paris Agreement and the right to life under Article 2 of the European Convention on Human Rights, and right to private life, family life, home, and correspondence under Article 8.[44] In 2017, climate lawsuits were brought in 24 countries. That number rose to 38 countries in 2020.[45] This increase demonstrates there is a growing global desire to stand for climate justice.

There are also opportunities for peer learning within Bangladeshi farmers from different regions. In Pirojpur District located in the Southwestern low-lying delta region of Bangladesh, farmers are reviving a farming technique originating 200 years ago from their forefathers: floating farms or floating gardens. It is a region where flooding seasons lasted about five months in the past, but in recent years, flooding season elongated to ten months. For that reason, a growing number of smallholder farmers are cultivating crops on floating rafts in response to the escalating risks of rising seas and storm flooding that endanger an expanding portion of farmland.[46] Smallholder farmers in Cox's Bazaar can also benefit from this method of floating farms to cultivate their vegetables and fruits given their similar experience of prolonged flood conditions. These smallholder farmers would greatly benefit from knowledge sharing opportunities and workshops where farmers from various regions can share lessons learned and possible adaptation techniques, to push for and promote a bottom-up approach.

If smallholder farmers in Bangladesh are equipped with the right resources, they could also benefit from legal action to improve their situation. Having the right knowledge and

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[44] Urgenda Foundation v. State of the Netherlands, *Supreme Court of the Netherlands*, December 19, 2019, http://climatecasechart.com/climate-change-litigation/non-us-case/urgenda-foundation-v-kingdom-of-the-netherlands/

[45] Januta, Andrea, "Analysis: As countries wrangle over climate pledges, how enforceable are they," *Reuters*, November 13, 2021, https://www.reuters.com/business/cop/countries-wrangle-over-climate-pledges-how-enforceable-are-they-2021-11-12/

[46] Paul, Ruma. "As seas rise, Bangladesh farmers revive floating farms." *Reuters*. October 2022. https://www.reuters.com/world/asia-pacific/seas-rise-bangladesh-farmers-revive-floating-farms-2022-10-20/

exposure would also enable them to advocate and push for loss and damage funding to be trickled down to them and not just remain unfulfilled promises from the wealthiest states responsible for accelerating the negative impacts of climate change. This is also an area where NGOs can support smallholder farmers with their expertise and access to the international decision making arenas. With the decision to finally establish a dedicated fund for loss and damage at the 27th Conference of the Parties (COP27), efforts and advocacy by smallholder farmers and NGOs could not be more timely. For close to thirty years, nations facing vulnerability have been seeking financial assistance to mitigate the most severe effects of climate change, only to encounter repeated resistance from affluent countries. Now that there is consensus for the loss and damage fund, measures need to be in place to ensure the fund is reaching vulnerable communities like smallholder farmers to finance projects and improved conditions.

V. Towards a Contextually-Informed Rights-Based Economic Development Policy

When analyzing the responses of the farmers, it becomes clear overall they are pushing for a rights-based economy and a rights-based development approach to address their climate vulnerabilities. The suggestions based on the findings of this study very much align with the arguments and theories of the book, *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. The chapter "Economic Policy and Human Rights," hones in on the linkages between economic policies and human rights and the significance of intertwining the two. Scholars Radhika Balakrishnan and James Heintz argue neoclassical economic theories based on utility fail to take into account ethical or social concerns. When a human rights framework is incorporated into economic policies, it provides an avenue to implement basic

rights like right to education, right to adequate standard of living, right to food, as well as a mechanism to seek protection and to hold duty bearers, states, and perpetrators accountable for any violations.[47] The human rights approach "incorporates an understanding of the paradoxical character of governments, recognizing that states can both enable and deny social justice, and that individuals need protection against misuse of state power, as well as requiring the power of the state to be harnessed to realize their rights."[48] Under the Committee on Economic, Social, and Cultural Rights (CESCR) and the Maastricht Guidelines on Violations of Economic, Social, and Cultural Rights (Maastricht Guidelines), States have an obligation to respect, protect, and fulfill economic and social rights such as ensuring labor standards are in place and protecting against third party violations.

According to what the smallholder farmers in this study shared in the interviews, a number of their economic, social, and cultural rights (ESCR) have been impacted particularly due to climate change. One of the main grievances by the smallholder farmers in this study was rising costs of living and crippling inflation. While inflation itself may not directly violate human rights, its consequences, if severe and uncontrolled, can negatively impact various aspects of individuals' lives and undermine their enjoyment of economic, social, and cultural rights such as right to health, right to social security, right to food. Food inflation in Bangladesh surged to a record high of 12.56 percent in October 2023, hitting a ten-year peak and exacerbating financial hardships for the impoverished and those with low incomes like smallholder farmers.[49]

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[47] Balakrishnan, Radhika and James Heintz. "Economic Policy and Human Rights." *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. Edited by Jackie Dugard, Bruce Porter, Daniela Ikawa, Lilian Chenwi. Edward Elgar Publishing. 2020.

[48] Balakrishnan, Radhika and James Heintz. "Economic Policy and Human Rights." *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. Edited by Jackie Dugard, Bruce Porter, Daniela Ikawa, Lilian Chenwi. Edward Elgar Publishing. 2020.

[49] "Bangladesh Food Inflation." *Trade Economics*. 2023. https://tradingeconomics.com/bangladesh/food-inflation

Governments and policymakers play a crucial role in implementing measures to manage inflation and mitigate its adverse effects on human rights, but in Bangladesh, inflation remains a chronic problem.

There are a number of other economic, social, and cultural rights of the smallholder farmers that have been impacted particularly due to climate change. This includes the right of smallholder farmers to an adequate standard of living (Article 11 of ICESCR), which encompasses the right to adequate food, clothing, and housing. For the smallholder farmers, this right is closely tied to their ability to sustain themselves and their families through their agricultural activities. During the interviews, all the farmers grieved about their increasing difficulties and inadequate resources to live a decent life. The frequent floods and aggressive weather has also physically damaged their homes with limited ability for repair, which impacts their right to adequate housing (Article 11 of ICESCR). Their right to health (Article 12 of ICESCR) has also been impacted due to the unsanitary conditions post climate related natural disasters, heat waves, and lack of resources to address physical and mental health related illnesses. The right to water (Article 11 and 12 ICESCR) is one of the most critical, and all the smallholder farmers repeatedly grieved about lack of clean water and water for irrigation. For these smallholder farmers, preserving traditional farming practices, indigenous knowledge, and cultural heritage related to agriculture has become increasingly difficult which impacts their right to participate in cultural life (Article 15 of ICESCR). Smallholder farmers, like any other workers, have the right to social security (Article 9 of ICESCR), including social insurance. This is important for protecting farmers and their families against economic risks associated with agriculture, such as crop failures or market fluctuations, however the smallholder farmers expressed in many occasion this is not a right that has been given to them and when crops fail

and their livelihoods are lost, they have nothing to fall back on. Finally, as previously mentioned, farmers have a right to education (Article 13 of ICESCR), which the participants in this study did not have adequate access to. Access to education is crucial for improving agricultural practices, promoting sustainable farming methods, and empowering farmers with knowledge and skills. These economic social, and cultural rights are critical in order to ensure the well-being and dignity of smallholder farmers, and the best way to work towards a path to ensure these rights is to implement a rights-based development approach.

Rights-based development is an approach to development that places human rights at the center of the development process. It emphasizes the idea that all individuals have certain inherent rights, and these rights should be protected, respected, and fulfilled in the course of development efforts.[50] The rights-based development framework is rooted in international human rights principles and standards. By adopting a rights-based approach, development initiatives aim not only to achieve economic growth but also to enhance the well-being, dignity, and freedoms of individuals and communities. This approach is often advocated by international organizations, NGOs, and human rights activists as a means of ensuring that development efforts are sustainable, inclusive, and respectful of human dignity. NGOs working in the development space should take steps to ensure that their programs and activities are designed to promote the human rights of the people they work with.

How much of a right-based development approach is really implemented among impacted smallholder farming communities in Bangladesh? Many still lack basic human rights. From the smallholder farmers in this study's sample group, repeatedly there were mentions of

[50] "The Human Rights Based Approach to Development Cooperation Towards a Common Understanding Among UN Agencies." *United Nations Sustainable Development Group*. https://unsdg.un.org/sites/default/files/6959-The_Human_Rights_Based_Approach_to_Development_Cooperation_Towards_a_Common_Understanding_among_UN.pdf

lack of adequate access to clean water and water for irrigation, insufficient shelter during natural disasters, inability to access information and education, not having the means for meaningful and informed participation, scarce ability for recovery and development, all of which are rights guaranteed by international human rights frameworks.

Though the concept of rights-based economy is very similar, it is more specific to economic systems and activities. It refers to an economic system that is structured and governed by principles of justice, fairness, and respect for human rights. In a rights-based economy, economic policies, practices, and institutions are designed to uphold and advance the economic rights of individuals and communities.[51] This may include ensuring fair wages, preventing discrimination in employment, providing social protections, and addressing economic inequalities. The concept implies that economic activities should contribute to the realization of human rights and that economic growth should be inclusive and benefit all members of society.[52] For most of the smallholder farmers in Bangladesh, that is far from reality. In the study's sample group, numerous farmers expressed in their attempt to adapt to the changing climate, they wound up with less profit and more poverty since cost for short-yielding crop varieties and seeds are more expensive, yet they yield lower harvest and they make less profit. There has been many occasions when farmers in the study group lost their entire harvest to floods or their crop yields were completely spoiled by extreme heat, causing them to lose their entire livelihood. They expressed a feeling of helplessness having nowhere to turn to with lack of government support or resources. When asked about reparations, the farmers expressed skepticism and numerous

[51] Donald, Kate, et al. "A Rights-Based Economy Putting People and Planet First." Center for Economic and Social Rights and Christian Aid. October 2020. 2020. https://www.cesr.org/sites/default/files/Rights%20Based%20Economy%20briefing.pdf

[52] Donald, Kate, et al. "A Rights-Based Economy Putting People and Planet First." Center for Economic and Social Rights and Christian Aid. October 2020. 2020. https://www.cesr.org/sites/default/files/Rights%20Based%20Economy%20briefing.pdf

mentioned only the rich and powerful will benefit, not the poor. The situation of these farmers go against the concept of a right-based economy and its very definition: an economy "that would guarantee the material, social and environmental conditions necessary for all people to live with dignity on a flourishing planet."[53]

Unfortunately the climate crises illustrates how deep the inequalities are in our society and how extreme the disparities are between the rich and poor, not just in terms of wealth, but also responsibility. The *Climate Equality* report by Oxfam reveals that in 2019, the top 1% of the wealthiest individuals generated an amount of carbon pollution equivalent to that produced by the poorest two-thirds of the global population, encompassing 5 billion people.[54] The impacts of this is disproportionately felt by the poor. The report reveals, for example, over the last 50 years, more than 91 percent of fatalities resulting from climate-related disasters have occurred in developing nations. To address the dual crises of inequality and climate, they urge governments to reduce carbon emissions particularly by wealthiest nations, richest individuals, and affluent corporations, and they recommend doing so by taxing the wealthiest to generate the trillions of dollars required to support transition and fund loss and damage.

However, simply just raising the funds is not sufficient. Governments must ensure the funds are properly dispersed to those who need it most, the vulnerable and most impacted communities, like smallholder farmers. The International Institute for Environment and Development (IIED) reports, less than 10 percent of climate finance is dedicated to initiatives on

[53] Donald, Kate, et al. "A Rights-Based Economy Putting People and Planet First." Center for Economic and Social Rights and Christian Aid. October 2020. https://www.cesr.org/sites/default/files/Rights%20Based%20Economy%20briefing.pdf

[54] Khalfan, Ashfaq, et al. "Climate Equality: A Plnet for the 99%." Oxfam International, November 2023. https://policy-practice.oxfam.org/resources/climate-equality-a-planet-for-the-99-621551/

the local level.[55] According to their estimates, between 2003 and 2016, of the $17.4 billion that was approved for spending from the pledged international public finance for dedicated climate funds, only $1.5 billion was approved for projects focused on local level climate change initiatives.[56] This demonstrates how critically imbalanced the funding landscape is.

In the past eight years, the Bangladeshi government claims to have increased its allocation to climate related matters more than double, from TK. 12,163 crore (approximately US$ 1.44 billion) in the 2015-2016 fiscal year to TK. 30,531.98 crore (about US$ 3.08 billion) in the 2022-2023 fiscal year.[57] In terms of international funding from global funds, Bangladesh has received over $200 million in grants, $250 million in loans, and over $747 million in co-finance.[58] However, how much of that truly trickles down to the local level vulnerable communities such as those of smallholder farmers? Aside from having access to higher costing seed variations, the farmers from this particular study claim that they did not receive any other forms of support neither monetary nor technical from national nor local level governments.

Kate Donald, who leads Oxfam's Washington D.C. office and who has written extensively on rights-based economy, argues, "There is no healthy economy without a healthy population where everyone can enjoy their socio-economic rights – such as to housing, food, education and decent work. They also shine a spotlight on the fundamental injustice at the core

[55] Soanes, Marek, et al. "Delivering real change: Getting International climate finance to the local level." IIED, March 2017. https://www.iied.org/sites/default/files/pdfs/migrate/10178IIED.pdf
[56] Soanes, Marek, et al. "Delivering real change: Getting International climate finance to the local level." IIED, March 2017. https://www.iied.org/sites/default/files/pdfs/migrate/10178IIED.pdf
[57] "Climate Change Initiatives of Bangladesh." *Ministry of Environment, Forest and Climate Change* and *Government of People's Republic of Bangladesh*. October 2022. https://doe.portal.gov.bd/sites/default/files/files/doe.portal.gov.bd/npfblock/2022-11-02-08-08-ade27c3a48eeeedbf1394e5fa527edd2.pdf
[58] "Climate Change Initiatives of Bangladesh." *Ministry of Environment, Forest and Climate Change* and *Government of People's Republic of Bangladesh*. October 2022. https://doe.portal.gov.bd/sites/default/files/files/doe.portal.gov.bd/npfblock/2022-11-02-08-08-ade27c3a48eeeedbf1394e5fa527edd2.pdf

of our current economic model—a model that results in scarcity and precarity for the many, and unimaginable wealth and privilege for the few."[59] She notes, the combined wealth of the ten richest individuals in the United States amounts to $853 billion, a sum sufficient to eradicate extreme poverty multiple times. Overall she asserts that implementing global economic governance is essential in order to hold governments, corporations, and international financial institutions accountable. Similarly, Siri Gloppen and Catalina Vallejo stress in their final remarks in their piece on climate and litigation, "Civil society and the judiciary are key to preventing the green economy from reproducing the inequalities brought about by the carbon-intensive economy, where both the profits and benefits from fossil fuels are disproportionately enjoyed by a privileged minority while the externalities are shouldered by communities who also lack access to energy and welfare. The concentration of greenhouse gases in the atmosphere goes hand in hand with the accumulation of privilege and excess in consumption beyond socio-economic and cultural wellbeing."[60] I would take their argument a step further to say it is critical to involve impacted communities like smallholder farmers in the preventative actions along with civil society and the judiciary as they suggested so they are at the very least informed about the very measures taken that directly affect their well-being, livelihoods, and realities. Effective preventative action necessitates a bottom up approach as suggested by the literature review and the outcomes of this study.

There have been some attempts by international bodies to address the inequalities, primarily through the Sustainable Development Goals (SDGs) running from 2015 to 2030, but

[59] Donald, Kate. "A Rights-Based Economy: In Critical Times, A Roadmap for Action." Spotlight on Sustainable Development, 2021. https://www.2030spotlight.org/en/book/2495/chapter/chapter-31-rights-based-economy-critical-times-roadmap-action

[60] Gloppen, Siri and Catalina Vallejo. "The Climate crisis: litigation and economic, social and cultural rights." *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. Edited by Jackie Dugard, Bruce Porter, Daniela Ikawa, Lilian Chenwi. *Edward Elgar Publishing*. 2020.

again, when local and marginalized communities are overshadowed, effectiveness remain very limited and weak . Preceding the SDGs were the Millennium Development Goals (MDGs) running from 2000 to 2015. While the SGDs "looks to be impossible without also respecting, protecting, and fulfilling" economic, social, and cultural rights, the MDGs on the other hand "could in theory have been reached without also realizing human rights."[61] The following list displays the short titles for each of the objectives under the MDGs and SDGs to provide a quick comparison:

Millennium Development Goals (MDGs)[62]	**Sustainable Development Goals (SDGs)[63]**
MDG 1 Eradicate extreme poverty and hunger	**SDG 1** No poverty
MDG 2 Achieve universal primary education	**SDG 2** Zero hunger
MDG 3 Promote gender equality and empower women	**SDG 3** Good health and well-being
MDG 4 Reduce child mortality	**SDG 4** Quality education
MDG 5 Improve maternal health	**SDG 5** Gender equality
MDG 6 Combat HIV/AIDS, malaria, and other diseases	**SDG 6** Clean water and sanitation
MDG 7 Ensure environmental sustainability	**SDG 7** Affordable and clean energy
MDG 8 Develop a global partnership for development[	**SDG 8** Industry, innovation and infrastructure
	SDG 9 Decent work and economic growth
	SDG 10 Reduced inequalities
	SDG 11 Sustainable cities and communities
	SDG 12 Responsible consumption and production
	SDG 13 Climate action
	SDG 14 Life below water
	SDG 15 Life on land
	SDG 16 Peace, justice, and strong institutions
	SDG 17 Partnerships for the goals

[61] Donald, Kate. "The 2030 Agenda for Sustainable Development: opportunity or threat for economic, social and cultural rights?" *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. Edited by Jackie Dugard, Bruce Porter, Daniela Ikawa, Lilian Chenwi. *Edward Elgar Publishing*. 2020.
[62] "We Can End Poverty Millennium Development Goals and Beyond 2015." *United Nations*. https://www.un.org/millenniumgoals/bkgd.shtml
[63] "The 17 Goals." *United Nations*. https://sdgs.un.org/goals

The SDGs build upon the MDGs and aim to go further by addressing a broader set of interconnected issues and providing a shared framework and common language for countries and stakeholders to work together in addressing the world's most pressing challenges and building a more sustainable and equitable future.[64] These goals aim to stimulate policy changes and implementation incentives at the national level and global monitoring is employed to assess performance, serve as an accountability framework, and provide a foundation for advocacy in this context.[65] The SDGs put more emphasis on human rights and shrinking the inequality gaps, but despite its well intentions, these goals remain widely criticized by human rights advocates and scholars, particularly due to its weaknesses around implementation and accountability. One study focusing on persistent inequalities in the SDGs notes that even though the main mantra for the SDGs has been to "leave no one behind," marginalized communities failed to be included in monitoring and response which deprives the inclusion of local knowledge and expertise, making the SDG mantra more aspirational than reality. Furthermore, they emphasize that the inclusion of marginalized voices is even more imperative in the wake of rising nationalism, xenophobia, and racism.[66] Some of the main issues around SDG implementation include corporate capture, "SDG washing," and resistance by Global North countries, all of which exacerbate inequalities. Kate Donald stresses that the SDGs do not contain corporate accountability, which she describes as "one of the most worrying aspects of the Agenda's final outcome, given that the private sector is granted a privileged role in the Agenda as written."[67] She also highlights the issue of States

[64] "The 17 Goals." *United Nations*. https://sdgs.un.org/goals
[65] Winkler, Inga T. and Margaret L. Satterthwaite. "Leaving no on behind? Persistent inequalities in the SDGs." *The International Journal of Human Rights*. 2017. https://doi.org/10.1080/13642987.2017.1348702
[66] Winkler, Inga T. and Margaret L. Satterthwaite. "Leaving no on behind? Persistent inequalities in the SDGs." *The International Journal of Human Rights*. 2017. https://doi.org/10.1080/13642987.2017.1348702
[67] Donald, Kate. "The 2030 Agenda for Sustainable Development: opportunity or threat for economic, social and cultural rights?" *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. Edited by Jackie Dugard, Bruce Porter, Daniela Ikawa, Lilian Chenwi. *Edward Elgar Publishing*. 2020.

"cherry-picking" which goals to prioritize and "any real action to rebalance global economic governance (as demanded by target 10.6) is being fiercely resisted by Global North countries, aided in some cases by the international financial institutions."[68] If the elites and Global North countries continue to throw their weight in this way, inequalities will continue to spiral and the SDGs will remain weak and unaccomplished.

We cannot tackle the climate crisis without tackling economic and social inequalities, and the best way to do so is pushing to implement rights-based development and rights-based economy. If States on a local level and the United Nations on an international level implement detailed and improved legally binding laws that address global inequities as they relate to climate change, we have a better chance of achieving positive outcomes among the vulnerable communities in the Global South. Unfortunately corporate capture dominates the decision making space pushing back climate justice efforts. The very people with lived experience of the disasters of climate change, like the smallholder farmers in Bangladesh, experience restrictions and lack the opportunity to negotiate policies that directly impact their lives and well-being. Greater effort needs to be made to include those directly affected by climate change in the Global South at the negotiating table in order to more strongly support a bottom-up approach. Stronger language around equity obligations, stricter policies that do not give powerful nations a pass, concrete regulations to hold the elites accountable, and proper enforcement mechanisms for legally binding climate laws that provide an avenue to take violators to court will lead to more success in holding perpetrating states accountable and getting closer to achieving the obligations long overdue for the most vulnerable communities.

[68] Donald, Kate. "The 2030 Agenda for Sustainable Development: opportunity or threat for economic, social and cultural rights?" *Research Handbook on Economic, Social and Cultural Rights as Human Rights*. Edited by Jackie Dugard, Bruce Porter, Daniela Ikawa, Lilian Chenwi. *Edward Elgar Publishing*. 2020.

VI. Conclusion

Smallholder farmers in Bangladesh are impacted the most by climate change, yet they are kept in the dark about their rights with little to no resources. Despite the extreme challenges they face due to their socio-economic circumstances, smallholder farmers are innovative with the meager resources they have to survive and adapt. Additional funding, resources, and knowledge could unlock so much potential and innovation to thrive. There is a huge knowledge gap among the farming community, which has been a disservice to their potential. When people are unaware of social issues or systemic problems, they are less likely to take action or advocate for positive change. Being aware and informed enables individuals to make choices that are more sustainable and socially responsible. The farmers in this study were unaware of their rights and the ways in which climate advocates are seeking justice for impacted communities. They were unaware of the benefits of collective action and successful examples among the farming communities. Lacking knowledge can limit the ability to make informed decisions and seize valuable opportunities. A timely example of an opportunity is advocating for loss and damage funds that has finally been approved, and ensuring initiatives through these funds actually trickle down to the most vulnerable, like the smallholder farmers.

Adaptation to climate change is essential for safeguarding the well-being of communities, ecosystems, and economies, and it plays a crucial role in building a more resilient and sustainable future. However, if it is not coupled with a rights-based development approach, the conditions of climate vulnerable communities, like smallholder farmers, are unlikely to improve. Disparities between the wealthy and the poor are immense, and what the smallholder farmers from this study repeatedly expressed is their dire need for resources to survive. Policies

addressing equity are an integral part of achieving climate justice, and it is long overdue for the smallholder farmers in Bangladesh.

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