Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 4 Issue 3 (2024)

Climate Stress and Migration in India: An Exploratory Study of Environmental Changes on Population Movement

Dr. Trishna Sarkar[1*], Ms Aarushi Joshi[2], Dr. Yamini[3]

[1*]Assistant Professor, Department of Economics, Dr Bhim Rao Ambedkar College, University of Delhi
[2]Assistant Professor, Department of Economics, Dr Bhim Rao Ambedkar College, University of Delhi
[3]Assistant Professor, Department of Management, Indira Gandhi Delhi Technical University for Women

Abstract
This article delves into the intricate relationship between climate change and human migration in India, highlighting the severe impacts on marginalized communities. Climate change is causing rapid environmental shifts, particularly in regions like Kerala, Odisha, West Bengal, Uttarakhand, Bihar, and Maharashtra. These regions are experiencing a range of climate-induced phenomena, such as rising sea levels, desertification, increased frequency of cyclones, floods, and prolonged droughts. The consequent economic and social disruption has forced millions to migrate, often to urban centers where they face further challenges. The article also explores the plight of migrant laborers, especially women, who suffer from precarious working conditions, social discrimination, and exploitation, including trafficking and forced labor. In Kerala, coastal erosion and flooding have displaced entire communities, while Odisha's frequent cyclones and West Bengal's Sundarbans face rising salinity and loss of livelihood, pushing people into distress migration. The study highlights the urgent need for comprehensive policies to address the vulnerabilities of climate migrants, ensuring their rights, livelihoods, and social integration. This paper serves as a crucial resource for understanding the complex dynamics of climate migration in India and the profound socio-economic challenges it entails.

Keywords:- climate change, migration, economy, women,

JEL Codes: Q54, O15, Q56, J61

1. Introduction

Throughout history there has been a strong linkage between environmental influences and human migration. The adverse impact of climatic changes are progressively propelling not only domestic but international migration as well. According to 2018 estimates by the World Bank, climate change could result in an additional 143 million climate migrants by 2050 across three regions: Southeast Asia, sub-Saharan Africa, and Latin America. In 2017, a record 68.5 million people were forcibly displaced. Among these, approximately one-third, or between 22.5 million and 24 million individuals, were compelled to relocate due to sudden onset weather events such as floods, forest fires following droughts, and more intense storms. Furthermore, an increasing body of evidence suggests that gradual onset phenomena such as desertification, rising sea levels, ocean acidification, air pollution, shifts in precipitation patterns, and the decline in biodiversity are being further exacerbated by the impacts of climate change.

Heavy rains in May 2024 caused significant flooding in southern Brazil, forcing roughly 150,000 people to relocate. (Stallard, 2024) During a severe heat wave that swept the Sahel region of Africa in April 2024, temperatures in Mali reached 48.5C, which was connected to a rise in hospital admissions and fatalities.(Stallard, 2024) Between 2020 and 2022, portions of East Africa saw five unsuccessful rainy seasons in a succession as the continent saw its worst drought in forty years. 1.2 million people were displaced as a result, only in Somalia. (Stallard, 2024) The current patterns of internal and international migration in South Asia are being exacerbated by rising sea levels, temperature increases, increased frequency of cyclones, flooding of river systems fed by melting glaciers, and other extreme weather events. Additionally, rapid economic growth and urbanization are accelerating and magnifying the impact and drivers of climate change—the demand for energy is expected to grow 66 percent by 2040. (Prakash, 2018) Compounding this, many of the expanding urban areas are located in low-lying coastal areas, already threatened by sea level rise. (Nansen Initiative Secretariat, 2015) The confluence of these factors leads the World Bank to predict that the collective South Asian economy (Bangladesh, Bhutan, India, the Maldives, Nepal, and Sri Lanka) will lose 1.8 percent of its annual GDP due to climate change by 2050. (UNFCCC, 2014)

India's economy has grown significantly since the mid-1990s, and the agriculture sector has contributed significantly to GVA and jobs in the nation. According to the PLFS report conducted by NSSO 2022-23, the agricultural sector continues to account for approximately 45.6% of national employment and contributes 18.3% to the country's GDP[1].

The agriculture sector has been completely decimated over the last 20 years by repeated droughts, extreme weather events like heat waves, floods, cyclones, and rising sea levels. This has resulted in a massive movement of people from India's rural area affected by climate change to its urban centers. This paper analyses the various facets of climate migration in India and how it affects the most marginalized sections of society.

[1] Retrieved from: https://www.niti.gov.in/sites/default/files/2022-04/Discussion_Paper_on_Workforce_05042022

2. Climate Change and Human Migration in India

The consequences of climate change have been increasingly apparent over the last few decades on our dietary patterns, economy, flora and fauna, and health. Sadly, these effects have not been favorable. Most notably, the highlands and coastal regions bear the brunt.

Of the approximately 455 million migrants in India, 64% came from rural areas, according to the 2011 Census. South Asia's most intensively cropped Indo-Gangetic (IG) region includes the low-income states of Uttar Pradesh and Bihar, which account for 36% of all out-of-state migration. (Lopez-Ridaura et al., 2018) These states make up the majority of migrants. There is a systemic instability, or "risk," in the agricultural sector, as seen by this out-migration, which is both seasonal and permanent in character and is mostly carried out by the marginalized population that rely on it. Approximately 640 million people live in poverty in the IG region, which is also the largest populous area of India. (Lopez-Ridaura et al., 2018) During the past ten years, the rate of migration from these areas has increased, and this trend is expected to continue in coming years.

According to the "State of India's Environment-2022" report, India is the fourth worst-hit country in the world when it comes to climate change-induced migration, with more than three million people forced to leave their homes in 2020-2021. The UNHCR's Global Trends Report estimates that approximately 5 million Indians were internally displaced in 2021 as a result of natural disasters and climate change. These climate migrants fight for survival and frequently do not have official refugee status. (Benny & Social Policy Research Foundation, 2023) Climate change can cause two different kinds of migration: swift-onset events, such as hurricanes and floods, and gradual-onset events, such as desertification and sea level rise. Distress migration is the result of slow-onset events, when people relocate in expectation of approaching environmental hardship. In metropolitan settings, this kind of movement can cause distress, prejudice, and a loss of cultural identity. (Benny & Social Policy Research Foundation, 2023). The following section maps the variety of reasons which are the primary cause of climate-migration in several states.

2.1 Kerala

Over 590 kilometers along the Arabian Sea, Kerala's coastline region is home to a large population High-impact events that cause widespread erosion, land loss, and population displacement include storm surges, tsunamis, and rogue waves. Numerous natural disasters have affected Kerala, including Cyclone Ockhi in 2017 and devastating floods in 2018 and 2019. Roughly 500 hectares of Kerala's coastline land were lost to erosion between 2002 and 2012, impacting over 79,000 people. (Benny & Social Policy Research Foundation, 2023) Forecasts suggest that by 2050, large portions of four districts: Kottayam, Ernakulam, and Alappuzha may fall below sea level, which would increase the amount of migration brought on by climate change. (UNDP, 2018) Nearly 14.5% of Kerala's land area is vulnerable to flooding, and certain districts are at even higher risk (UNDP, 2018) The state is therefore quite vulnerable to flooding.

Thiruvananthapuram district has the greatest rates of erosion, with a large portion of Kerala's coastline 63 percent being affected, according to the National Centre for Sustainable Coastal Management (NCSCM). The beaches of Valiyathura, Poonthura, and Panathura seem to be eroding gradually, with Cyclone Ockhi in 2017 making matters worse. Families of fishermen who lost their homes in Valiyathura due to intense erosion and Cyclone Okhi in previous years are now either living in camps or rented houses. The displaced villagers feel that the government's compensation of Rs 10 lakh per family for buying land and building dwellings is insufficient, and they want safe housing to be built in their neighborhood. Due to restricted access to the sea, the relocated villagers have lost their employment and means of subsistence, and they now reside in unhealthy conditions. (Bhavapriya, 2021)

Homes in the Munroe Islands are flooded at high tide periods as a result of rising sea levels; in contrast to previous times, the water stays in the area for several months. Currently, water covers over 39% of the island's land area. Here, more than 800 families have already abandoned their underwater homes; all over the area, abandoned homes appear like drowned bones. They are the first migrants affected by climate change from Kerala. The remaining inhabitants of Munroe Island are currently battling a number of survival issues brought on by climate change, such as persistent ground subsidence, tidal floods, and decreased agricultural production. Ashtamudi Lake allows rising sea levels from the Arabian Sea to inundate facilities (Shaji, 2023) . Climate change and poorly planned construction are also contributing to the flight from Kerala's Kuttanad, which is well-known for its backwaters and paddy paddies. In 2018, the area experienced an increase in the frequency and intensity of flooding. An estimated 6,000 families have left their residences over the past two years due to dread of yearly floods and sea level rise. While residents also point the finger at shoddy planning and hasty development, particularly the construction of tourist resorts and infrastructure on delicate reclaimed ground, for this catastrophe, climate change is a major contributing cause (Shaji & Mazumder, 2021) People may purposefully diminish their links to their homes and make new ones elsewhere as a result of climate change awareness, which can cause a separation from a location (Agyeman et al., 2009). Due to their experiences, many migrants in Kerala have claimed to have suffered from trauma and a sense of isolation (Jennath & Paul, 2022)

2.2 Odisha

A World Bank-funded Integrated Coastal Zone Management (ICZM) project has discovered that 10% of Odisha's coastline, primarily in the districts of Puri, Kendrapara, and Ganjam, is extremely vulnerable to sea erosion. The study demonstrates that in certain locations, erosion has become more frequent and more significant in recent years. (Patnaik

et al., 2018) In coastal Odisha, Kendrapara and Jagatsinghpur are two of the districts most at risk from cyclones and climate change. Three extremely destructive major storms have struck the shores of Odisha in the past few decades. The lives of communities in the region have been severely disturbed by Super Cyclone, Cyclone Phailin, and Cyclone Hudhud. (Chatterjee, 2016) A series of cyclones, including one in 1971, a super cyclone of 1999, Phailin in 2013, Hudhud in 2014, Fani and Bulbul in 2019, have struck the area consistently and regularly to break the agriculture and fishing dependent livelihood pattern of the inhabitants.

A July 2018 research by the National Centre for Coastal Research in Chennai found that between 1999 and 2016, seawater ingression caused Odisha to lose 153.8 km, or 28%, of its 485 km of coastline. The study also discovered that large tidal waves and the inundation of livable areas are being caused by rising sea levels and shifting wind patterns. Odisha's coastal agriculture is currently dealing with a serious climatic emergency. Climate change could make the poor even more vulnerable by negatively impacting their health and means of subsistence and hindering state development. It is clear that Odisha's climate change has the potential to severely worsen the state's water scarcity, food security, and public health.

47 percent of people in Odisha, one of the poorest states in India, are living below the poverty line. However, the Tendulkar Committee estimates that 57.2 percent of Odisha's population lives below the poverty line. The N.C. Saxena Committee, however, suggests that it is 84.5 percent. With 9,37,148 interstate migrants, Odisha is a major state that sends migrants, according to the 2001 Census. However, 2.5 million people leave Odisha each year, according to an unofficial estimate. Forty-five percent of this migration is from the coastline region[2]. In the 64th iteration of the National Sample Survey Office (NSSO) survey conducted in 2007–2008, the percentage of migrants in Odisha's population was 18.2%, compared to 29% nationwide.

2.3 West Bengal

The Sundarbans region of West Bengal was designated as a World Heritage Site in 1987 and a Biosphere Reserve in 2001 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). With an abundance of natural resources, the Sundarbans region is home to a diverse range of plant and animal species. The Sundarban region is well-known for its Sundari trees (Heritiera fomes) and Royal Bengal Tigers (Panthera tigris tigris). The resources that the environment provides are essential to the local population's way of life. This area is low-lying, subject to severe rainfall, and is cyclone prone. Climate change has led to a rise in the severity of natural disasters in recent years. Increasing sea levels pose a serious threat to the area. One of the largest risks to the region is sea level rise. This is because numerous islands have already drowned or are about to do so. An additional risk to the area is the yearly cyclones. Examples of cyclones so powerful that they wreaked enormous devastation and suffering include the Amphan cyclone in 2020 and past cyclones like Aila in 2009 and Sidr in 2007. A further significant risk to the area is rising salinity. For those who reside in the Sundarbans region, migration is not an unusual phenomena. Since the region's people depend on natural resources for a living, any effects on those resources will have an influence on their way of life. Migration has long been a crucial means of subsistence. Families with at least one male member would relocate to another area in search of employment. From the Indian Sundarbans, a large number of people moved to Kerala, Mumbai, Gujarat, and Orissa. A small number of them even moved overseas, such as to the Gulf nations (Saha & Goswami, 2020).

2.4 Uttarakhand

Eighteen hill districts, three of which are urban, make up Uttarakhand. Mountains to urban plains movement has been sparked by the majority of the state's expansion in industry, jobs, higher education, and health services. 70% of the state's population relies on subsistence farming, despite the fact that only 6% of the state's land is arable due to its mountainous terrain. Farmers mostly depend on rainfall due to the poor quality of the soils. Key crops in the hills, aside from essential grains, are stone fruit (apples, pears), spices, flowers, and off-season vegetables.

Uttarakhand is under "extremely high risk" of the effects of climate change, according to a 2019 assessment on future risk and vulnerability by the Indian Council of Agricultural Research (ICAR). The bulk of Uttarakhand's population resides in rural areas, and 71% of them rely on terrace farming on hill slopes for rainfed agriculture. (CANSA, 2021)

In India's northern state of Uttarakhand, climate change is having an impact on agricultural livelihoods and causing an increase in internal migration. A large number of migrants are relocating to the plains districts from the hilly areas. (Blocher and others, 2021).

The number of abandoned villages in Uttarakhand is rising due to migration. A 2018 survey found that since 2011, 734 communities in the state have lost their residents. These communities, which are dispersed among all 13 districts, are frequently called "ghost villages".

[2] Uma Daniel, Analytical Review of Market, State and Civil Society Response to Seasonal Migration from Odisha

2.5 Bihar

Bihar's climate is changing, bringing with it variations in temperature and precipitation patterns. Bihar is seeing an increase in monsoon unpredictability, resulting in both drought and floods occurring in the same year, occasionally even in the same district. Poverty and widespread crop losses are caused by these risks.

Bihar is among the states in India most severely hit by floods. Of its 94.16 lakh hectares of total land area, over 68.8 lakh hectares are vulnerable to flooding. Furthermore, around 9.41 lakh hectares (8.32 lakh ha in north Bihar and 1.09 lakh ha (in south Bihar), or 10% of the state's overall geographic area, is submerged in water. 28 of Bihar's 38 districts—including Saharsa district—are prone to flooding and were badly impacted by the significant floods that occurred in 2004, 2007, 2008, and 2011. A previous flood in 2002 killed almost 400 individuals, uprooted 16.5 million people, and destroyed about 400,000 dwellings (ReliefWeb, 2002).The inhabitants in the Saharsa district have observed that the reduced monsoon period and the fast rising temperatures have a direct impact on agriculture and are the most obvious effects of climate change in the area. Because of the lengthening of summer and winter, seepage is becoming more burdensome and frequently results in flood scenarios.

95% of males who are able to work migrate to cities, including 14-year-old children. The majority of them relocate to nearby urban areas like Saharsa, Patna, Madhepur, and Bhagalpur. In addition to Haryana, Punjab, Uttarakhand (Dehradun, Haridwar, Mus- soorie), Surat (Gujarat), Delhi, Haryana, West Bengal (Kolkata), and Maharashtra (Mumbai) are among the states where people have relocated.

2.6 Maharashtra

About 34% of the state of Maharashtra was afflicted by drought in 2015, when the government of that state declared a "drought-like condition" in 14,708 villages. (Pardhi et al., 2020) The majority of Maharashtra's 8,522 villages were reported to be afflicted by drought, with the Marathwada region being the most hit. (Pardhi et al., 2020) The situation has gotten worse in the three years that

have passed since the area has not had enough rain. Millions of people were compelled to flee their homes due to the ongoing drought and relocate to larger cities like Pune and Mumbai in quest of employment and water. Pregnant ladies, young mothers, and elderly persons made up the majority of the households that moved. Many of these migrants live in improvised shelters on building sites, sidewalks, and beneath bridges in NaviMumbai because they lack housing in the city. (Pardhi et al., 2020)

3. Conditions of Migrant labour with focus on women's plight

In addition to experiencing an economic upheaval, those who relocate also have to deal with issues related to social security, education, the workplace, housing, language hurdles, and cultural differences. Language barrier, customs, and social security are all eased to an extent if the move is from a rural to an urban area within the same state. The relocation to a different state with entirely different language, climate, and social customs exacerbates problems. It has an impact on gender roles and causes families to break up. Areas that receive migrants are frequently ill-equipped to provide them with rudimentary housing and gender-neutral sanitary facilities. Migrants are at risk of illness due to unsanitary environments. Laws pertaining to labor and occupational safety are largely ignored. In addition to being paid less than non-migrants, migrant workers are frequently pushed to work excessive hours in dirty environments. Additionally, they lack job security (Bharadwaj et al., 2022).

40.3 million people are considered to be enslaved worldwide (ILO, 2017). The most marginalized groups in society, including women, minorities, and children, are disproportionately affected by modern slavery (Dahir, 2018). 71% of people who are allegedly victims of modern slavery are women. Almost three out of every four women and girls in this group were trafficked for the purpose of sexual exploitation. 2016 saw 10 million victims of contemporary slavery, of which one in four were under the age of 18. Additionally, 21% of forced sexual exploitation victims and 18% of forced labor exploitation victims are in this age bracket. (Bhardwaj et al., 2022) Odisha had 876 and 741 trafficking victims in 2019 and 2020, respectively, according to data from the National Crime Records Bureau. This is the state with the second-highest number of victims in the nation, after Assam. The four coastal districts of Balasore, Kendrapara, Ganjam, and Puri were among the 26 areas in the state where there were occurrences of human trafficking (Patro, 2021)

The people in the villages inside the Sundarban police district subdivision are pushed into a vicious cycle of poverty each time a cyclone strikes. Breaking free from this pattern is terrifying because the females from these villages travel to the metro areas in quest of domestic assistance jobs but end up becoming prostitutes. (Taran Deol & Taran Deol, 2022) Unimaginable pain befalls even those who join the League of Domestic Help. Issues that are noticed in the sector include low earnings, unjust working conditions, such as irregular paid weekly off days or absence of leave, denial of rest and food, introduction of more responsibilities, and increased workload without further remuneration. (Neetha, 2013)

Nestled in the Marathwada area, which shares borders with Telangana and Karnataka, is Beed, an administrative district of Maharashtra's Aurangabad division. Based on metrics including a decrease in groundwater index, poor soil quality, and a shortfall in rainfall, the Maharashtra government deemed Beed to be among the most severely affected districts by

the national drought on October 31, 2018[3].Due to these circumstances, laborers and farmers are compelled to relocate from a number of Marathwada districts, mostly Beed, to the sugar belt regions of Western Maharashtra and Karnataka in order to work on sugarcane farms from October to May during harvest season. Each migrant couple is paid an *uchal*, or an advance of Rs 50,000 and Rs 1,00,000 (Rs 250-300 for a day), with a fine, or *khada*, ranging from Rs 500 to Rs 1000 for each day of missed work (Jadhav 2019). Females undergo hysterectomy in order to avoid paying fines for missing work due to menstruation. According to a study commissioned by the Maharashtra State Commission for Women in 2018, 36% of female sugarcane labourers in the State had undergone a hysterectomy (Shukla and Kulkarni 2019)https://sprf.in/wp-content/uploads/2021/01/Constructing-the-Female-Labouring-Body.pdf. This claim is further substantiated with the figures presented by the National Family Health Survey 4. Following an increase in migration from the hill regions to the plains or beyond, the women who remain behind carry on the tasks of the male members who have departed. In addition to their other domestic obligations and household activities, this adds to their workload.
Women begin working on farms or under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which offers government-funded employment for up to 100 days in registered, locally based jobs.(Mamgain et al., 2017) Generally speaking, migrant workers make far less money than non-migrant labor. Workers from elsewhere frequently endure hazardous and unhygienic working conditions. They might be subjected to dust, noise, and dangerous substances. They might put in a lot of overtime without receiving much compensation. Employers frequently take advantage of migrant workers. They can be denied basic rights like sick pay and leave, be paid less than the minimum wage, or be made to work long hours.
Caste, religion, or linguistic discrimination may be experienced by migrant workers. They might not be given housing or employment, or they might receive discriminatory treatment at work. Access to essential services including housing, healthcare, and education is frequently limited for migrant laborers. Additionally, they may find it difficult to get Social Security benefits.

4. Conclusion

Greenhouse effect, primarily caused by the non-release of certain atmospheric gases from earth's surface, is the root-cause of climatic change. What is currently happening in the world is primarily the result of human action, the term "anthropogenic" is occasionally used to describe this kind of climate change, which simply means "caused by human beings". Over the past 150 years, the unrestrained use of fossil fuels has significantly increased the amount of greenhouse gases, primarily carbon dioxide, in the atmosphere. Forests, wetlands, and other carbon sinks—natural resources that store carbon dioxide and stop it from being released into the atmosphere—are being extensively destroyed as a result of logging and industrialization. The main causes of climate change include human activities such as the production of energy for transportation, heating, and electricity, the industrialization of our environment, human interactions with the land, and human consumption patterns.
For centuries the minute adjustments in earth's orbit, volcanic eruptions, solar radiation, tectonic movements have all shaped the environment we live in today. Though natural occurrences also play a part in the deteriorating climate change, their impact is slow to observe. According to NASA, *"these natural causes are still in play today, but their influence is too small or they occur too slowly to explain the rapid warming seen in recent decades*".
Climate change is pertinently caused by a variety of developmental activities, which consequently leads to the emergence of climate refugees. Since development projects are typically found in isolated villages, hills, and woods, the displaced are typically the indigenous people who have historically served as conservationists. People have been relocated in India as a result of unplanned growth endeavors including the building of railroads, bridges, and dams without taking the effects on the environment and science into account. In this case, being displaced has meant losing one's means of subsistence, one's home and belongings, social unrest and disorder, and one's connection to the ecosystem that had supported them. The poor and vulnerable are most at risk from these displacements since they could become even more impoverished. Human beings' role as a profit-driven producer and as an unsatisfied consumer has caused the ecosystem to be destroyed to the point where it is mirrored in unpredictable weather and climate patterns. And the person most at risk is the one who had contributed the least to this chaos. Regardless of the title we provide them, The predicament of climate migrants, climate refugees, and environmental refugees is unparalleled.
This is where the government's involvement comes into play. A measure has been taken and a bill has been drafted (THE CLIMATE MIGRANTS (PROTECTION AND REHABILITATION BILL, 2022) by Shri Pradyoot Barodoloi, Min Of Parliament, in recognition of the anguish experienced by climate refugees. The Government aims to provide a complete relief and rehabilitaion package through this Bill. These programs will undoubtedly empower climate

[3] Retrieved from: https://weather.com/en-IN/india/news/news/2018-11-01-maharashtra-government-declares-drought

migrants, but only if they are implemented under tight oversight by authorities and strong political power. In this scenario the authority will oversee risk reduction to climate migrants by providing state sponsored crop and cattle insurance along with ensuring investment in sustainable infrastructure. This will be complemented by comprehensive policies that aim to equip urban areas for the significant increase in migrant populations. The designated authority's functions further include investing in temporary shelters through MNREGS for climate migrants, developing contingency plans for unadaptable areas, and ensuring resettlement areas are not located in migration hotspots that do not disrupt ecological balance. They also provide relief and compensation, such as shelter, nutrition, healthcare, safety for women and children, mental health support to address psychological stress following a climatic event. It further advices authorities to ensure effective monitoring to prevent exploitation in terms of forced labor, debt bondage and child labor in displaced migrants. Suggestions also include access to employment under Mahatma Gandhi National Rural Employment Guarantee Act for income generation. Investment in affected or resettlement areas is promoted. School enrollment for migrant children is facilitated, including access to remedial classes. Rehabilitation of children who lose parents due to climate migration is supported. Coordination with local authorities is done to ensure civil and political rights for resettled migrants.

The bill also ensures facilitating the return of climate migrants to the sustainable affected areas for their long term rehabilitation. In case the area is unsuitable for settlement, a resettlement plan should be created after consulting the displaced community, without disrupting the ecological balance or social harmony. Providing alternatives for climate migrants who relied on natural resources, such as land, forests, and water, through methods like land grants and livestock aid. Offering re-skilling and livelihood support to climate migrants, connecting them with government policies for employment and skill development.

The design and structure of the bill seeks to holistically mitigate the adverse effects weathered by climate migrants while also keeping in view the needs of the migration hotspots. Providing the poor and vulnerable economic opportunities including the option of resettlement in their native places is an extremely crucial step in avoiding impoverishment of the displaced. That said, the implementation of the bill requires co-ordination among several government agencies and any failure in terms of lack of coordination and communication can lead to a compromise in successful implementation of this bill.

References:

1. Agyeman, J., Devine-Wright, P., & Prange, J. (2009). Close to the Edge, down by the River? Joining up Managed Retreat and Place Attachment in a Climate Changed World. *Environment and Planning a Economy and Space*, *41*(3), 509–513. https://doi.org/10.1068/a41301
2. Benny, N. M. & Social Policy Research Foundation. (2023). Navigating Climate-Induced Migration in Kerala: Challenges, responses, and adaptation strategies. In *Discussion Paper* (pp. 11–23) [Discussion Paper]. https://sprf.in/wp-content/uploads/2023/11/keralaaa.pdf
3. Bharadwaj, R, Chakravarti, D, Karthikeyan, N, Hazra, S, Daniel, U, Topno J and Abhilashi, R (2022) Climate change, migration and vulnerability to trafficking. IIED Working Paper, IIED, London. http://pubs.iied.org/20936IIED
4. Bhavapriya, J. (2021). *Why 'climate refugees' in this Kerala village don't want schools to reopen*. Down to Earth. https://www.downtoearth.org.in/climate-change/why-climate-refugees-in-this-kerala-village-don-t-want-schools-to-reopen-79127
5. Blocher, J. M., Bergmann, J., Upadhyay, H., Vinke, K., & Potsdam Institute for Climate Impact Research (PIK). (2021). Hot, wet, and deserted: Climate Change and Internal Displacement in India, Peru, and Tanzania. In *Insights From the EPICC Project*. https://www.internal-displacement.org/global-report/grid2021/downloads/background_papers/background_paper-climatechange.pdf
6. Climate Action Network South Asia (CANSA). (2021). *Migration and Climate Change in India*. Retrieved from https://cansouthasia.net/wp-content/uploads/ 2021/02/ Migration_ India_20_02_2021.pdf
7. Chatterjee, J. (2016). *Mangrove nurseries protect coasts and livelihoods*.India Water Portal. https://www.indiawaterportal.org/articles/mangrove-nurseries-protect-coasts-and-livelihoods
8. Jennath, A., & Paul, S. (2022). Migration as a Response to Climate Disasters in Coastal Areas: Insights from Kerala, India. Oceans Conference Record (IEEE). https://doi.org/10.1109/ OCEANSChennai45887.2022.9775396
9. ILO. (2017). Global estimates of modern slavery: forced labour and forced marriage. International Labour Organization. https://www.ilo.org/publications/global-estimates-modern-slavery-forced-labour-and-forced-marriage
10. Lopez-Ridaura, S., Frelat, R., Van Wijk, M. T., Valbuena, D., Krupnik, T. J., & Jat,
11. M. (2018). Climate smart agriculture, farm household typologies and food security.
12. *Agricultural Systems*, *159*, 57–68. https://doi.org/10.1016/j.agsy.2017.09.007
13. Mamgain, R.P., and Reddy, D.N. (2017), Outmigration from Hill Region of Uttarakhand: Magnitude, Challenges and Policy Options, National Institute of Rural Development and Panchayati Raj, Hyderabad, p. 15.
14. Nansen Initiative Secretariat. (2015). Climate Change, Disasters, and Human Mobility is South Asia and Indian

Ocean: Background Paper. Retrieved from: https:// www. brookings. edu/ articles/the-climate-crisis-migration-and-refugees/

15. NASA Earth Observatory. (n.d.). *Global warming*. Retrieved from: https:// earthobservatory. nasa.gov/features/GlobalWarming/page4.php
16. Neetha, N. 2013. 'Minimum Wages for Domestic Work: Mirroring Devalued Housework', (Table 4, p. 80) *Economic and Political Weekly*, October 26, Vol. 48, No. 43, pp.77-84.
17. Pardhi, A., Jungari, S., Kale, P., & Bomble, P. (2020). Migrant motherhood: Maternal and child health care utilization of forced migrants in Mumbai, Maharashtra, India. *Children and Youth Services Review*, *110*, 104823. https://doi.org/10.1016/j.childyouth.2020.104823
18. Patnaik, N., Odisha State, Routray, B., Forest & Environment, Odisha, Padhi, A. P., Mohapatra, S. C., & Murugesan, K. (2018). *Odisha State Action Plan on Climate Change (Phase-II)*. https://climatechangecellodisha.org/pdf/State%20Action%20Plan%20on%20Climate%20Change%202018-23.pdf
19. Prakash, A. (2018). Boiling point. Finance and Development, 55(3). International Monetary Fund.https://www.imf.org/external/pubs/ft/fandd/2018/09/southeast-asia-climate-change-and-greenhouse-gas-emissions-prakash.htm
20. ReliefWeb.(2022). *India - Floods OCHA Situation Report No. 4 - India*. Retrieved from: https://reliefweb.int/report/india/india-floods-ocha-situation-report-no-4-0
21. Saha, S & Goswami, R. (2020). Destinations of male out migration and their drivers in Indian Sundarbans. *Space and Culture India*, 8(1).
22. Shaji, K., & Mazumder, B. (2021). Kerala's backwater exodus. Village Square. Retrieved from https://www.villagesquare.in/keralas-backwater- exodus/
23. Shaji, K. (2023). That sinking feeling: As Munroe island slowly goes under, it is creating Kerala's first climate refugees. The South First. Retrieved from
24. https://thesouthfirst.com/kerala/a-sinking-scenic-cluster-of-islets-in-kollam-district-throws-up-the-first-climate-refugees-of-kerala/
25. Stallard, M. P. a. E. (2024, June 17). *How climate change worsens heatwaves, droughts,* wildfires and floods. https://www.bbc.com/news/science-environment-58073295
26. Taran Deol, & Taran Deol. (2022, June 21). Ground report: How cyclones Amphan & Yaas pushed girls from the Sundarbans into trafficking. Down to Earth. https://www.downtoearth.org.in/governance/ground-report-how-cyclones-amphan-yaas-pushed-girls-from-the-sundarbans-into-trafficking-83375
27. *UNDP. (2018). Post-Disaster Needs Assessment - Kerala*. https:// www.undp .org/publications /post-disaster-needs-assessment-kerala
28. UNFCCC. (2014). *Climate Change Danger to South Asia's Economy.* United Nations Framework Convention on Climate Change. Available at https://unfccc.int/news/climate-change-danger-to-south-asias-economy