

Economic Ramifications of Climate-Induced Migration: A Quantitative Study of Fisherfolk Communities in Coastal Odisha

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1. Abstract

This paper addresses the economic impact of climate migration among fisherfolk communities of coastal Odisha, which are seriously affected by cyclonic storms, rising sea levels, and coastal erosion. Using a quantitative approach, it examines the convergence of environmental displacement and economic restructuring in terms of changes in household income, participation in the labour market, and the role of remittances in economic resilience. Leveraging data from government reports and empirical case studies of major cyclones, including Phailin (2013), Fani (2019), and Amphan (2020), this study identifies the most critical economic vulnerabilities in such scenarios and adaptation strategies of displaced communities. Findings suggest that though migration is a necessary survival strategy, it compounds economic inequalities, complicates local labour markets, and encourages dependency on inflows of remittances—the latter, although stabilising in the near term, are insufficient for ultimately stabilising local economies. The study underscores the urgent need for policy interventions, including financial inclusion, climate-resilient employment strategies, and targeted social safety nets to mitigate the economic shocks of climate-induced displacement.

2. Keywords

Climate-induced migration, fisherfolk communities, coastal Odisha, remittances, economic resilience, adaptive strategies.

3. JEL Classification

Q54: Climate change and disaster impacts

R23: Regional migration and labour markets

O13: Natural resources and rural livelihoods

J61: Labor mobility and migration

F22: Migration and economic integration

4. Introduction

4.1 Background of the Study

Climate change is considered one of the biggest challenges of the 21st century, with the coastal regions experiencing a disproportionately greater share of its impacts. The vulnerable ecosystems of these areas and the socio-economic vulnerabilities of their inhabitants create a complex web of challenges that demand urgent attention. In developing nations like India, the impact of climate change is very severe, affecting millions of livelihoods dependent on natural resources.

Odisha, a coastal state of eastern India, is an exemplary case for such challenges. Frequent cyclonic storms, increasing sea levels, and coastal erosion are some of the recurrent issues Odisha has been facing. Devastating events, like *Cyclones Fani (2019)* and *Amphan (2020)*, have intensified the vulnerability of Odisha's coastal communities, especially the fisherfolk. These communities, deeply reliant on marine ecosystems, face dwindling fish stocks, saline intrusion, and habitat destruction, forcing many to migrate in search of alternative livelihoods.

For these fisherfolk, migration is seldom a matter of choice but rather an enforced response to environmental and economic pressures. This movement redefines the economic landscape of their origin and destination regions, introducing new dynamics in labour markets, income distribution, and household stability. The economic impact of this phenomenon, including the role of remittances and adaptive strategies, therefore calls for deeper exploration to understand how such communities cope with and adapt to such changes.

While migration has been extensively studied in terms of socio-cultural impacts, its microeconomic dimensions, particularly for climate-sensitive populations like Odisha's fisherfolk, remain underexplored. This study, therefore, focuses on bridging this gap, highlighting how climate-induced migration interacts with economic structures and adaptive resilience in vulnerable communities.

4.2 Research Question(s) and Objectives

The central question guiding this research is: *How does climate-induced migration reshape the economic landscape of fisherfolk communities in Odisha?* Addressing this query involves unpacking several subsidiary questions:

1. How do migration and displacement affect household income and labour market participation?
2. What role do remittance flows play in mitigating income disparities within these communities?
3. What are the economic costs of displacement, and how do these costs vary across demographic and geographic subgroups?

The study aims to add to the literature on climate economics by exploring economic changes brought about by migration, offering insights into both adaptive strategies adopted by fisherfolk and the persistent challenges they face. With a combination of descriptive analysis, regional case studies, and visualisation techniques, this research intends to fill the gaps in previous literature and provide recommendations for policymakers.

4.3 Significance of the Study

To this date, social and cultural facets dominate the literature on climate-related migration, neglecting the economic ramifications. The study by *Dasgupta et al. (2007)* provides risks to the global economy due to rising sea levels but does not explain household-level effects. *Panda's (2010)* study reports that climate shock is the push factor of internal migration across India but fails to elucidate the coastal livelihoods through their economic adaptations. This paper fills such gaps by embracing a quantitative approach, anchored within regional specificity, to assess economic dynamics in affected fisherfolk communities under climate-induced migration.

Beyond the scientific contribution, the study has practical relevance in developing sustainable adaptation strategies. The research highlights the economic resilience mechanisms—remittance dependence and livelihood diversification—and provides findings that could inform policies geared towards reducing vulnerability and creating long-term economic stability. More broadly, this study adds to the new field of climate economics, which puts forward the imperative for microeconomic analyses centred on the lived realities of at-risk populations.

5. Literature Review

5.1 Overview of Existing Literature

Through the lenses of global economic risks, internal migration trends within India, and socio-ecological specificities in the face of coastal communities in Odisha, the economic consequences of climate-related migration have been evaluated.

In this aspect, *Nicholas Stern's* seminal work, *The Economics of Climate Change: The Stern Review (2007)*, provides an overview of the economic impacts of climate change with a focus on disproportionate effects on developing nations. Stern argues that the costs of inaction far outweigh the costs of mitigation, underscoring the urgent need for global cooperation to address climate change. This foundational text thus underscores the broader economic context within which regions like coastal Odisha are situated.

In a similar study, *Dasgupta et al. (2009)*, in their study, *The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis*, examine the economic impacts of sea-level rise, especially on developing countries. According to them, rising sea levels pose significant threats to coastal economies in terms of land loss, reduced agricultural productivity, and increased migration pressure. This comparative analysis does provide insightful data on the vulnerabilities of the Indian coastal areas and Odisha region.

Internal migration due to climate shocks within India has been an important issue of consideration. In a paper, *Climate Change, Migration and Women: Analysing Construction Workers in Odisha*, *Patel and Giri (2019)* focused on gender-sensitive aspects of migration related to Odisha, concentrating more on construction workers. They show how climate change has worsened pre-existing vulnerabilities and, thus, increased migration among women and the associated economic problems they face in urban settings. The study offers an insight into the socio-economic dynamics of migration in Odisha.

In *Climate Change Induced Migration: A Case Study from Indian Sundarbans*, *Roy and Guha (2013)* analyse the migration trends in the Sundarbans (West Bengal), a region that has much in common with coastal Odisha. They highlight how environmental degradation and climate change force communities to migrate, causing substantial socio-economic changes. Their findings are very relevant to an understanding of broader patterns of climate-induced migration along India's coastlines.

With a particular focus on Odisha, there have been many studies that try to evaluate the state's vulnerability to climate change and its economic impacts. *Khristodas et al. (2022)*, in their research work titled *Assessment of Climate-Induced Sea-Level Rise Scenarios and Its Inundation in Coastal Odisha, India*, assessed the potential impact of sea-level rise on the

coastal districts of Odisha. According to them, massive inundation would likely occur with great threats to the livelihood of coastal communities, mainly fisherfolk, and substantial economic problems.

Hazra et al. (2022), in their work, *Assessing Coastal Vulnerability and Governance in Mahanadi Delta, Odisha, India*, evaluate the effectiveness of governance in coastal areas while managing the effects of climate-induced migration. There, they identified inadequacies of policy implementation while integrating different types of approaches into socio-ecological challenges through climate change. Such research calls upon the effective performance of governance systems in terms of the economic losses resulting from such migration.

Sahoo and Bhaskaran (2017), in their study *Coastal Vulnerability Index and Its Projection for Odisha Coast, East Coast of India*, develop a coastal vulnerability index to assess the susceptibility of Odisha's coastline to climate change impacts. Their findings indicate that large portions of the coastline are highly vulnerable, which has direct implications for the economic stability of coastal communities.

The *Central Marine Fisheries Research Institute (CMFRI)* has also actively engaged with issues concerning climate change within the marine fisheries sector. Initiatives undertaken were on preparing the marine fisheries sector to reduce impacts from climate change and to develop adaptive strategies for fisherfolk communities. This has been critical for the improvement of the resilience of coastal communities in Odisha.

5.2 Research Gap

Though valuable insights into broader economic risks from climate change and socio-ecological challenges of coastal regions have been provided in the existing literature, there is a glaring lacuna of quantitative studies focusing on household-level economic impacts of climate-induced migration among fisherfolk communities in coastal Odisha. Most research studies have focused on regional vulnerability assessments, governance frameworks, and environmental impacts while not giving enough emphasis to direct economic consequences to households. Such a gap has underlined the necessity for more targeted research, where it studies the economic effects that climate change-induced migration will bring about on fisherfolk families in terms of changes in income, employment opportunities, and access to resources. Addressing this gap becomes important to determine targeted policies and interventions for sustaining the resilience of these communities toward adaptation.

6. Methodology

This section summarises the data sources, the analytical framework, and the econometric techniques used in analysing the economic impacts of climate-induced migration in fisherfolk communities of Odisha. It derives its secondary data from various sources and bases its analysis on socio-economic indicators, demographic patterns, and environmental vulnerabilities.

6.1 Data Sources

To analyse the overall impact of climatic changes on various sectors in Odisha, primarily the fisherfolk communities, we will use the datasets of the Odisha Economic Survey from 2011 to 2023. From these reports, we can get data on GSDP (Gross State Domestic Product), NSDP (Net State Domestic Product), per capita GSDP, and per capita NSDP. For the changes in climatic conditions, we will use data on rainfall taken from the Census of India, NSSO, and IMD Odisha. To check the impact on fisherfolk communities, we will use Gross State Value Added (GSVA) from fishing and aquaculture. Then, to get information about migration and remittances, we will use reports from the Centre for Migration and Labour Solutions and the Ministry of Statistics & Programme Implementation.

6.2 Analytical Framework

To check the impact of climatic changes on the economic condition of fishermen, we will use the OLS (Ordinary Least Square) model of regression between two variables. Here the dependent variable is the growth rate of GSVA by fishing and aquaculture of Odisha and the independent variable is the average maximum annual rainfall in the coastal district of Odisha. The coastal districts of Odisha are Balasore, Bhadrak, Kendrapara, Jagatsinghpur, Puri, and Ganjam. Then we used the Odisha Economic Survey for the years 2009-10, 2012-13, 2013-2014, 2016-17, 2019-20, and 2021-2022 to compare the different economic variables of the fishing sector, like the growth rate of GSVA by fishing, the growth rate of fish production, export and import of fish, and employment in the organised sector.

6.3 Descriptive Framework

This research integrates several foundational economic theories to analyse the economic ramifications of climate-induced migration among fisherfolk communities in coastal Odisha. The Harris-Todaro Model (1970) is applied to explain the increase in rural-to-urban migration after cyclonic disasters when displaced workers migrate to urban centres in anticipation of better economic opportunities despite high risks of unemployment. The Dual Labour Market Theory by Doeringer & Piore in 1971 is applied to illustrate that the majority of migrant fisherfolk and agrarian workers enter the informal, low-wage sector with little

scope for upward mobility, enforcing economic precarity. In addition, the NELM theory of Stark and Bloom (1985) has been used to explain the risk diversification motive for remittances. These studies demonstrate that migrant earnings indeed act as a financial cushion in affected households. However, often the remittance flows are considered inadequate for household stability over long periods. The Permanent Income Hypothesis (Friedman, 1957) is used to analyse how remittance-dependent households attempt to smooth consumption amid income volatility, albeit with varying success depending on pre-existing financial linkages. Additionally, the Kuznets Curve (1955) is employed to demonstrate how climate-induced displacement initially exacerbates income inequality before any potential economic stabilisation, as households with better migration networks recover faster. Last but not least, Lewis's Theory of Structural Change (1954) accounts for labourers who are displaced from fishing and agriculture and later encounter difficulties in entering or remaining in non-traditional sectors due to incompatible skills, leading to downward occupational mobility. These theoretical frameworks collectively provide an analytical lens through which the economic impact of displacement is assessed across various case studies, reinforcing the study's findings on labour market disruptions, remittance dependency, and the widening of socio-economic disparities post-migration. To compare the economic condition of fisherfolk communities in the coastal region of Odisha, we will use five case studies, which are: Super Cyclone (1999), Phialin (2013), Fani (2019), Amphan (2020), and Dana (2024). For each case study, we have analysed the following metrics:

1. Household Income and Labour Market Participation (Trends in income changes and shifts in employment patterns post-migration.)
2. Role of Remittances (Contribution of remittances to income disparity reduction and economic stability.)
3. Economic Costs of Displacement (Identification and categorisation of costs across demographic and geographic subgroups.)

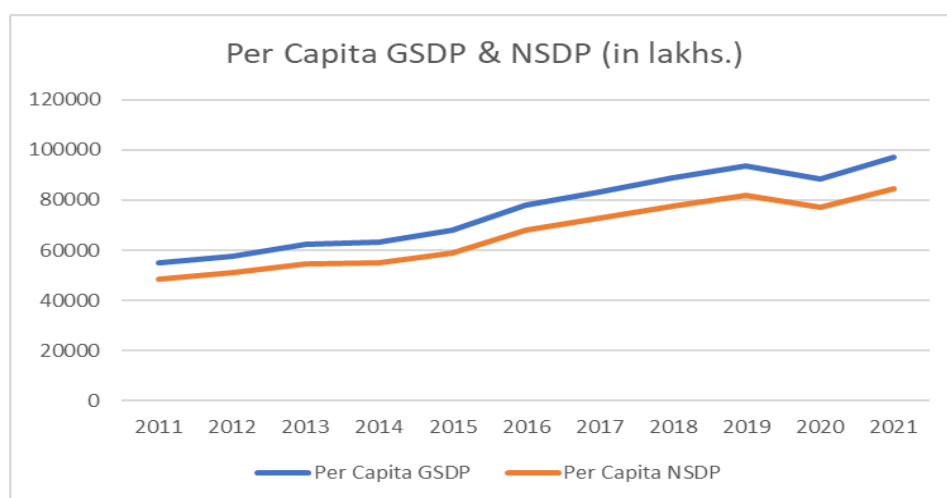
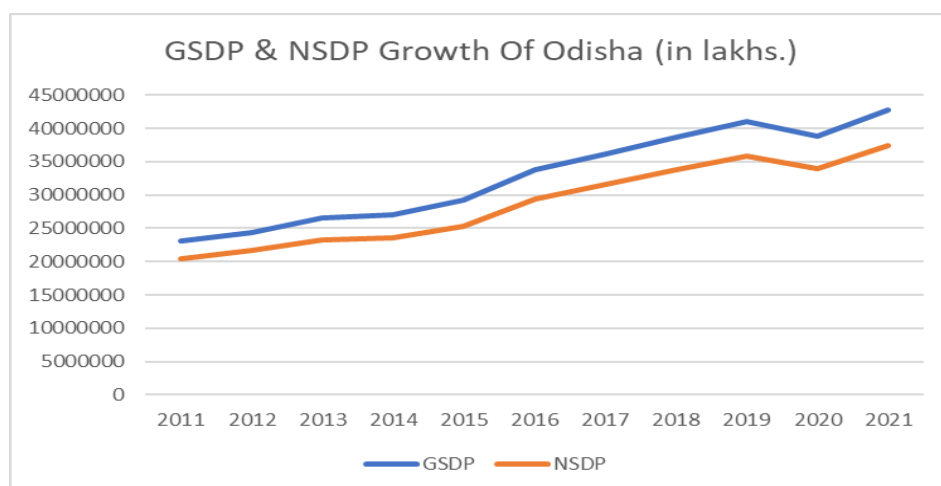
6.4 Assumptions

This study also draws its analytical framework from some underlying assumptions that form the backbone of the paper. The major assumption is that the primary factors for migration by fisherfolk communities in Odisha are based on economic distress, particularly decreased yields of fisheries, income uncertainty, and employment loss due to climate disasters. While environmental and social factors may dominate, the roots of the basic focus are invariably

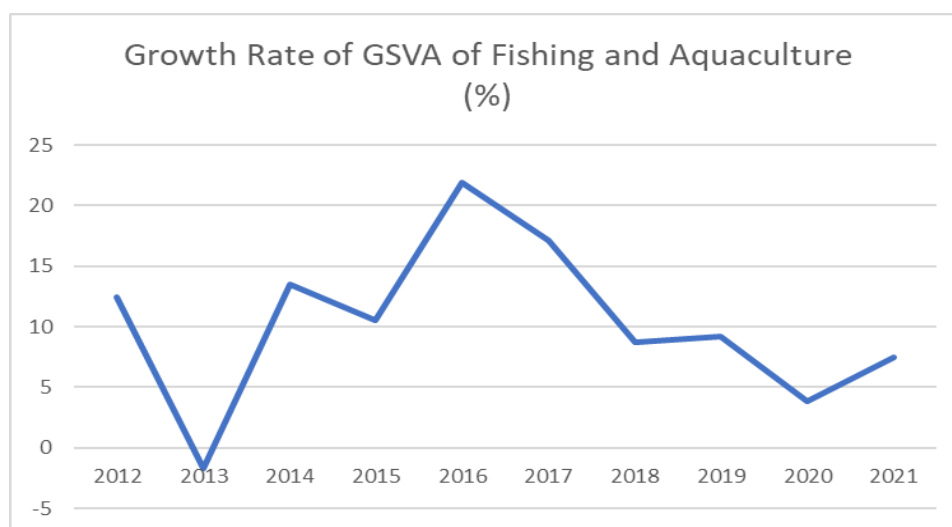
economic. Underlying this framework is also a relatively homogeneous influence on the involved communities' economic impact, allowing labour market shock, income disruption, and subsequent remittance losses to be projected similarly for virtually all displaced heads of household; in practice, differences in household coping strategies and financial literacy—and access to some alternative employment—income losses will result in diverging economic impacts instead. Another assumption is that the relation between climate shocks and economic downturns is linear in such a way that higher shocks lead to predictable income and labour participation disruption. However, post-disaster economies have more complex feedback mechanisms involving government intervention, foreign aid, and grassroots resilience initiatives, which may change the expected trends in the economy. The study hardly elaborates on long-term policy responses or infrastructural improvements that can have migration and recovery patterns in the future. Though relief programs by the government are presented, it is argued that their immediate impacts on economic stability are minimal; in fact, sustained policy measures could significantly lower long-term economic distress. Finally, the paper presumes that the data covering the available economics is enough to capture employment trends and income shifts; however, since informal labour is prominent in coastal communities, there could be a possibility of underestimating the scale of economic hardship or recovery. These sets of limitations and assumptions indicate the areas for further research that consider including household-level longitudinal studies, primary field surveys, and deeper analyses of socio-economic adaptation mechanisms.

7. Empirical Evidence

We will start our analysis with the impact of climatic changes on household income. For this, we have plotted the GSDP (Gross State Domestic Product) and NSDP (Net State Domestic Product), per capita GSDP, and per capita NSDP of Odisha to show the trend of these economic variables in time series data. From the following graph, we can see that all these variables had significant drops during adverse climates like Cyclone Phailin (2013), Cyclone Fani (2019), and Cyclone Amphan (2020).

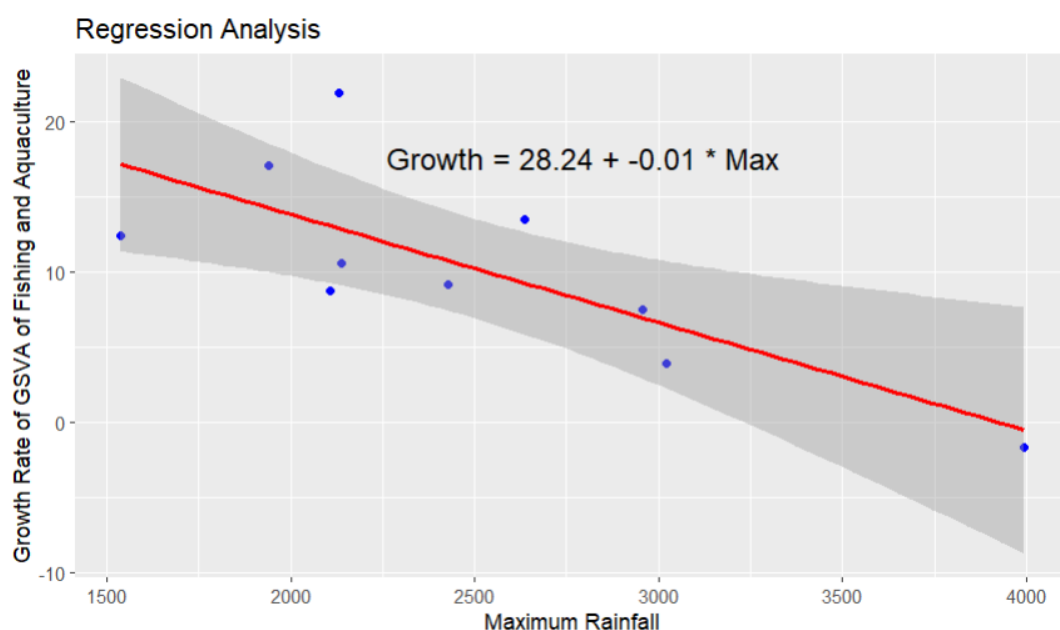


However, the worst affected communities during these faces are the fisherfolk communities. Following is a graph of the GSVA (Gross State Value Added) growth rate of fishing and aquaculture from 2012 to 2021. Here we are using fishing & aquaculture as a variable to study the impact on fishing communities. The data for all the variables has been taken from Odisha Economic Surveys. We can see the same pattern in the growth rate of GSVA of Fishing and Aquaculture—that extreme climatic conditions have adverse effects on them. The most obvious reason is that climatic change, especially natural disasters like cyclones, rises in sea levels, strong winds, heavy rainfall, floods, etc., stops the whole socio-economic activity of the fishing community. However, these are the immediate reasons for this drop in the growth rate. One consequence of these climatic changes is the migration of fisherfolk communities from the coastal region to other parts of the state and country.



These migrations have both positive and negative effects. On one hand, they bring remittances that improve the financial condition of the region, but on the other hand, they lead to economic loss in the region affected by the climate. For instance, according to the 2014 Odisha State Migration Report, migration accounts for 55–60% of the annual income of rural Odisha. In 2007-08, the rural region of Odisha received domestic remittances of 14.25 billion, making it the 6th highest in the country. The same report also states that there are a total of 4.17 lakh short-term migrants from rural Odisha; here, short-term migrants refer to those who had stayed away from the village for more than 1 month but less than 6 months. Out of these 4.17 lakh migrants, 82% were men, which shows that most of them migrated for job opportunities. 10 % of these migrants were from the coastal region of the state. Due to the unavailability of time series data on migration, it is not possible to show the relation between migration and household income for all the periods; therefore, we will use the method of case studies of some particular events to show the effect of climate-induced migration on fisherfolk communities.

However, before that, we will try to see the relation between climatic changes in the coastal region and the income of fisher communities in Odisha. For this, we will do a regression analysis and hypothesis testing between maximum rainfall in the coastal districts and the GSVA growth rate of the fishing and aquaculture sectors. The coastal districts of Odisha are Balasore, Bhadrak, Kendrapara, Jagatsinghpur, Puri, and Ganjam. The result of the analysis is as follows:



Term	Coefficients	Std_Error	T_Value	P_Value	Significance_Level
(Intercept)	28.2387	5.576393	5.0639	0.00097	0.05
Maximum Rainfall	-0.0072	0.002164	-3.3257	0.01045	0.05

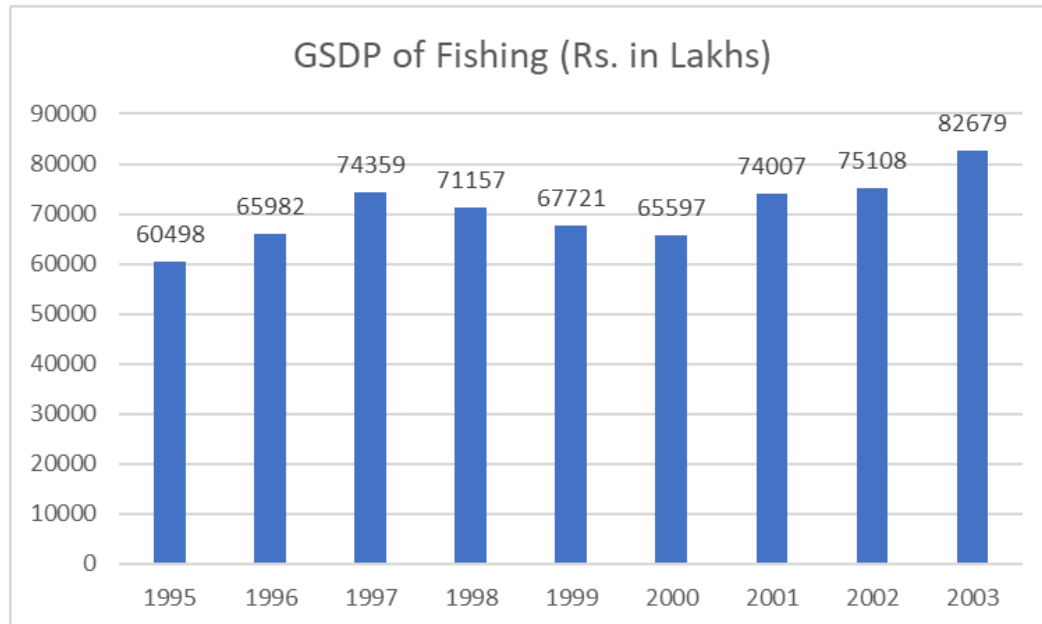
Hypothesis	P_Value	Significance_Level	Conclusion
When Maximum rainfall increases, the Growth Rate falls	0.01045	0.05	Reject Null Hypothesis: Rainfall has a significant effect on Growth Rate.

From the above results, we can see that the hypothesis testing has been successful in rejecting the null hypothesis at a significance level, which means that rainfall has a significant effect on the growth rate. Therefore, when maximum rainfall increases in coastal areas, it is very likely that the growth rate of the fishing and aquaculture sectors will fall. The P-value of the testing was 0.01, which shows a strong relation between the two variables. We can see that the coefficient of regression is negative; therefore, rainfall and growth rate have an inverse relation between them. The equation of regression is as follows:

Growth rate = $28.24 - 0.01 \times \text{Maximum rainfall}$

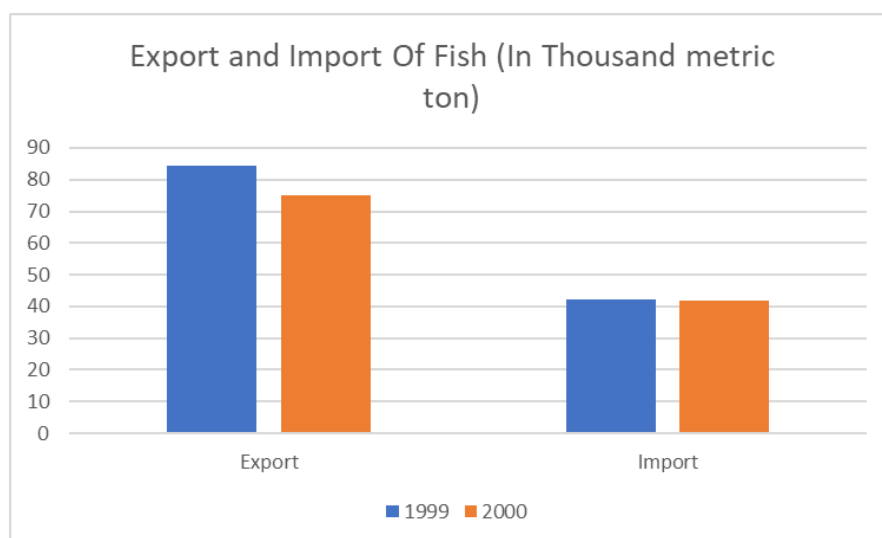
8. Case Studies

8.1 Super Cyclone (1999)

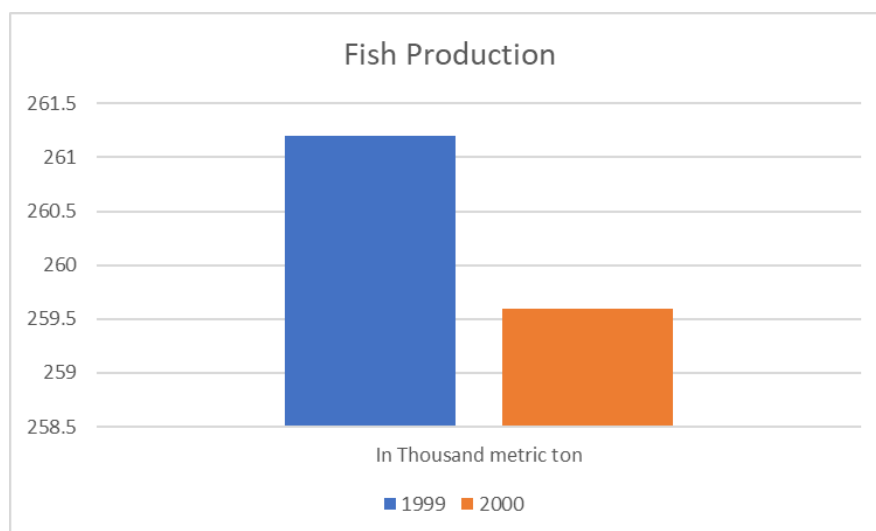


(at 1999-2000 prices)

To see the impact of climatic changes on the economic condition of fishing communities, we will first look at the Super Cyclone of 1999. For this, we use the Odisha Economic Survey of 2009-10 for our datasets. Due to this cyclone, the GSDP of fishing was reduced by 4.83% from 1998 to 1999, and this fall continued to 2000, as GSDP had fallen by 3.14% from 1999 to 2000, while the growth rate of GSDP in fishing had fallen by 0.52 percentage points. The production of fish dropped from 261.2 thousand metric tonnes in 1999 to 259.6 thousand metric tonnes in 2000. Similarly, the export of fish in Odisha dropped from 84.33 thousand metric tonnes to 75.08 thousand metric tonnes, while imports rose from 42.2 thousand metric tonnes to 41.99 thousand metric tonnes.



(at 1999-2000 prices)



8.1.1 Householder Income and Labour Market Participation

The Orissa supercyclone of 1999 had massive impacts on household incomes and labour markets, especially in coastal districts. The impact on the economic side was intense in sectors such as the agricultural sector, fishing, and small and micro industries; those are all basic sectors contributing to the development of the Odisha rural economy. Damage to crop stands, animal rearing stocks, and fishing gear immediately affected the household incomes of smaller farmers, labourers in agriculture, and fishermen.

A major trend that emerged post-disaster was labour displacement. Agricultural workers, who were largely wage earners, were left jobless due to massive crop failures. This resulted in a surge of migration towards urban centres, as the Harris-Todaro model predicts that rural distress often translates into an influx into the urban labour market. However, since

formal sector jobs were scarce, many of these workers were absorbed into low-paying, informal employment in construction and manual.

Women labourers, particularly those involved in informal agricultural work, were more economically vulnerable. The destruction of agricultural fields led to a significant reduction in wage labour opportunities, forcing women into unstable and often exploitative forms of employment. The collapse of small enterprises, including handloom and handicraft industries, led to large-scale unemployment among artisans and weavers, further aggravating income instability.

From the theoretical aspect, it could be interpreted from Keynesian economics: aggregate demand contracted due to sudden massive unemployment that may perpetuate long periods of economic stagnation without governmental public sector supplementation. In reality, although necessary relief measures, the efforts from the government could not promptly get back to the economic system being normal; rather, this would need some kind of structural recovery in terms of employment programs.

8.1.2 Role of Remittances in Economic Stability

Remittances have played a very limited but extremely important role in the post-cyclone economic revival. A large segment of the workforce of Odisha is already employed as migrant labourers, mostly in places like Kolkata, Mumbai, and Surat. After the cyclone, most of the affected families were dependent on monetary inflow from these external sources towards meeting their current consumption needs. However, remittances alone could not offset the scale of economic devastation, as the pre-existing migration pattern largely consisted of low-skilled labourers who earned meagre wages.

From an economic perspective, remittances are a counter-cyclical economic stabiliser, as suggested by the New Economics of Labour Migration (NELM) theory. In Odisha, remittance inflows, which temporarily cushioned the economic distress, were unable to play a major role in long-term recovery for two major reasons: (1) remittance-dependent households were primarily low-income, which meant the inflow of finances was inadequate to finance reconstruction, and (2) banking infrastructure disruptions after the cyclone made cash transfers inefficient and delayed.

There was little evidence of remittances being reinvested into productive assets or infrastructure, a requirement for long-term stabilisation of the economy. While in some areas remittance income is invested in entrepreneurship, the cyclone-induced crisis in Odisha saw most remittances used solely for survival, thereby limiting their impact on

regional economic revitalisation. This underscores the importance of having a more aggressive financial inclusion strategy in disaster-prone areas so that remittance flows are less interrupted during economic crises.

8.1.3 Economic Costs of Displacement

This came with severe economic implications of the displacement caused by the Orissa Super Cyclone, cutting across various demographic and geographic categories. More than 1.6 million houses were destroyed, making millions of people forcibly displaced. The costs included direct ones—loss of homes and livelihoods—and indirect costs, such as long-term losses in productivity and increased social vulnerabilities.

The most severe cost was borne by marginalised communities, such as Dalits and landless labourers. Because land titles existed for few of them, they were excluded from formal compensation programs. Economic displacement thus threw these groups deeper into poverty and widened the existing inequalities, in line with the Kuznets hypothesis regarding disaster-driven displacement increasing income disparities before any recovery efforts kick in.

A massive financial burden had to be borne by the state government since huge funds were required to be allocated for relief work, rehabilitation, and infrastructure rebuilding. The total estimated economic loss due to this cyclone was around INR 250 billion, or USD 5.7 billion. Housing, agriculture, and fishing are the main sectors that have been affected.

While government spending on reconstruction created some short-term employment, the absence of parallel private-sector investment meant that long-term economic recovery was slow. In addition, the cyclone disrupted human capital accumulation, especially among displaced children. With nearly 6,000 schools either damaged or destroyed, educational disruptions led to increased dropout rates, which in turn had long-term implications for labour market outcomes and economic mobility.

The human capital depreciation theory holds particularly well for this case—the theory states that protracted dislocation leads to lower skill retention and employability. Lastly, the ecological and infrastructural losses were part of the displacement cost. In this case, almost 2 million hectares of agricultural land had been inundated; hence, destabilising the long-term losses in productivity would be considerable for Odisha's agrarian economy. The destruction of fisheries infrastructure further destabilised the coastal economy, resulting in protracted unemployment and economic hardship for fishing communities.

8.2 Cyclone Phailin (2013)

8.2.1 Household Income and Labour Market Participation

Odisha's experience was severely and deeply affected, with household incomes and employment largely dislocated from normal patterns across Ganjam, Puri, and Khordha districts that were most battered by Cyclone Phailin. The prime sectors affected involved agriculture, fishing, small industries, and unorganised employment; all these have a strong grip on the local economy. This resulted in a drastic fall in the income of wage labourers, sharecroppers, and small businesspeople, mainly because productive assets such as fishing boats, agricultural land, and small industrial units suffered massive damage.

Labour market participation experienced notable shifts post-disaster. The destruction of cropland led to significant job losses among agricultural labourers, particularly those without land ownership. Sharecroppers and marginal farmers were disproportionately affected, as compensation schemes targeted landowners. Many displaced workers thus sought alternative employment in urban centres, further intensifying rural-to-urban migration.

This phenomenon is economically similar to the Harris-Todaro model, which predicts an increase in urban informal sector employment following rural distress. However, the shift does not guarantee stable livelihoods because many of the displaced workers entered precarious, low-wage jobs in construction and other urban informal sectors.

Additionally, Cyclone Phailin devastated Odisha's micro, small, and medium enterprises (MSMEs) that have high employment generation capacities. As a result, an estimated 1,039 units of MSME suffered damage while undergoing reconstruction, spreading unemployment among artisans, weavers, and small entrepreneurs. Given the capital and infrastructure-intensive nature of these industries, capital and infrastructure losses combined with long-term unemployment meant that income gaps in affected communities widened. Such a disruption illustrates the vulnerability of informal economies to natural disasters and the need for targeted financial and employment recovery programs.

8.2.2 Role of Remittances in Economic Stability

Remittances played an important but inadequate role in softening the economic shock of Cyclone Phailin. Several affected households had financial inflows from family members working in other states or abroad. However, the scale of these remittances was too small to make up for the loss of income and damage to property. Although remittances helped

households recover short-term income, they were not instrumental in stabilising the economy in the long term since the losses were too huge.

The theoretical framework of remittance dependency suggests that in disaster-affected regions, remittances can act as a countercyclical economic buffer, providing liquidity when local employment opportunities decline. However, in Odisha, the pre-existing low rate of highly skilled labour migration meant that remittance inflows were insufficient to generate substantial economic resilience. Most remittances came from low-wage workers employed in domestic labour markets rather than from high-income overseas employment, thereby limiting their overall economic impact.

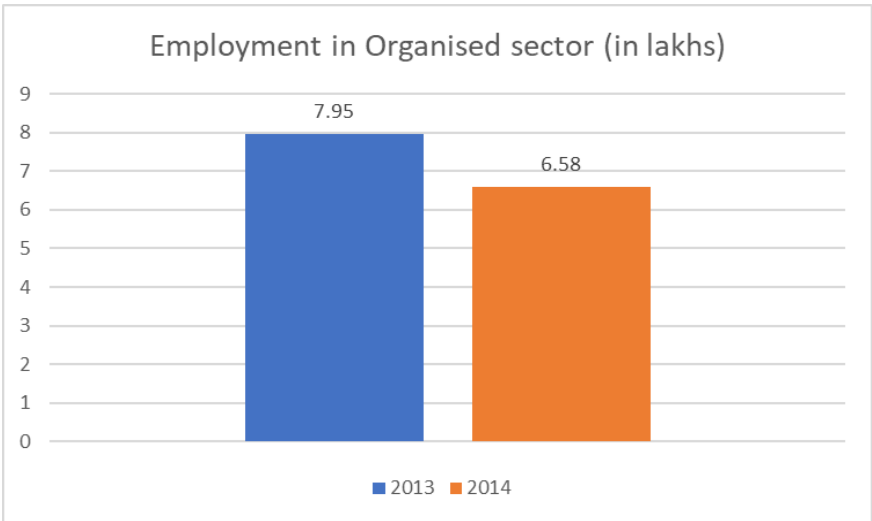
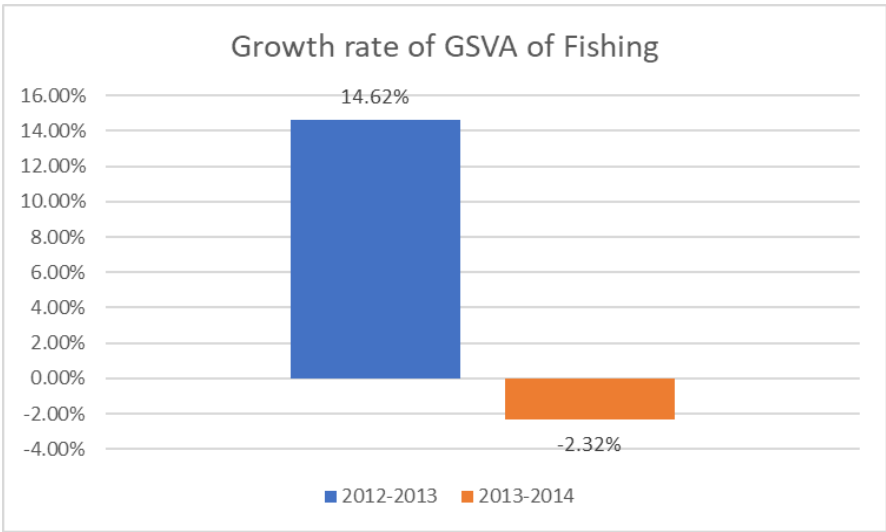
In addition to the physical destruction of monetary infrastructure, the available banking services coupled with digital means of payment inhibited the effective processing and use of remittances in the following days. This points to an even larger challenge in post-disaster economic rehabilitation: the very critical role financial inclusion and digital banking play in uninterrupted access to external financial aid. In the long term, strengthening banking networks in disaster-affected areas will improve the potency of remittances as a stabilisation tool.

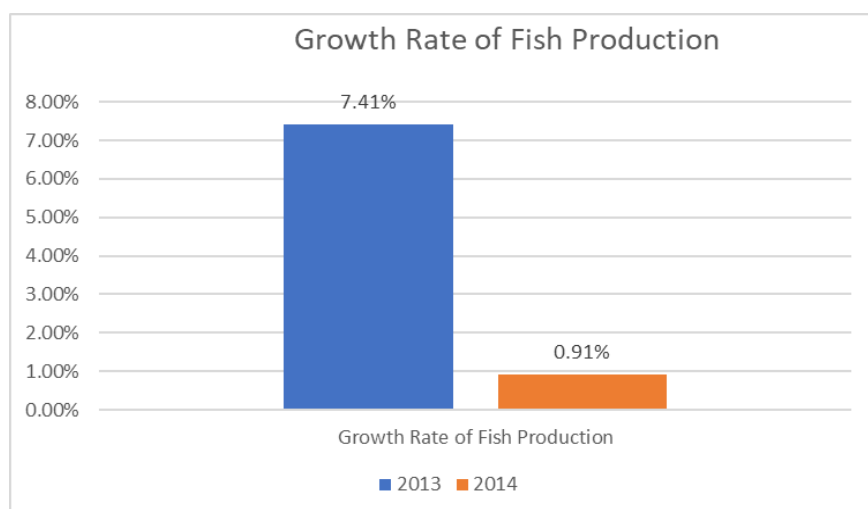
8.2.3 Economic Costs of Displacements

The economic loss due to displacement after Cyclone Phailin can be considered in two categories, that is, direct and indirect. The destruction of housing, public infrastructure, and livelihood assets represents direct losses, but long-term productivity loss, increased dependency on social welfare programs, and psychological impact on the displaced persons would fall in the category of indirect losses.

The highest costs of displacement were borne by households in marginalised communities. Dalit communities, landless labourers, and fisherfolk were disproportionately affected because their economic structures were fragile. Over 500,000 people were displaced, straining urban housing and basic services, thereby increasing the burden on state-sponsored relief programs. The economic theory of human capital depreciation is particularly relevant in this context. The displaced persons, especially the agricultural and skilled workers, lost their industry-specific skills because of long-term dislocation. The movement of labourers to new economic environments resulted in their employment in low-productivity sectors, causing overall economic inefficiencies. This is consistent with the Kuznets hypothesis, which postulates that disaster-induced displacement increases income inequality in the short run before any long-term recovery efforts can be initiated.

Besides, rebuilding all the infrastructures, which were very necessary and included roads, schools, and power supply networks, required a cost of INR 89,020 million (approximately USD 1.45 billion). Although the investments in this way prove necessary for long-term economic stability, they also create intense fiscal burdens on the government, potentially diverting funds from other developmental priorities. The Keynesian perspective on fiscal policy is that while disaster-related public spending can spur economic activity in the short term, dependence on government expenditure without parallel private sector investment for long periods will result in structural fiscal imbalances.





Due to Cyclone Phailin, the growth rate of GSVA by fish production in Odisha fell by 16.94 percentage points, from 14.62% in 2012-13 to -2.32% in 2013-14. Similarly, the growth rate of fish production fell from 7.41% in 2013 to 0.91% in 2014, while employment in the organised sector fell from 7.95 lakhs in 2013 to 6.58 lakhs in 2014.

8.3 Cyclone Fani (2019)

Cyclone Fani struck Puri, Odisha, on 3 May 2019, with wind speeds recorded at 205 km/h and classified as an Extremely Severe Cyclonic Storm (ESCS). There was massive displacement, infrastructure destruction, and economic shocks, especially among fisherfolk and agrarian communities. Beyond immediate losses, it resulted in changes to income structures, labour market dynamics, remittance dependency, and the long-term resilience of the economy. The following sections look in detail at how it was impacted.

8.3.1 Household Income and Labour Market Participation

The economic disruptions from Cyclone Fani had significant effects in terms of income volatility and employment restructuring in affected communities. Given the impact of the cyclone on 1.65 crore people in 14 districts, along with more than 5 lakh houses, several households directly suffered immediate losses of income. Damages to fishing boats, agricultural fields, and small-scale industries cut local incomes and made a sizeable chunk of the affected population temporarily unemployed. The economic shock was most acutely seen in fisheries. Agriculture and informal trade, for whom the loss of boats and nets meant an indefinite halt in fishing activities; likewise, the agrarian community witnessed crop losses of 1.81 lakh hectares, rendering seasonal employment in the agricultural sector unavailable.

Labour market participation underwent significant changes following the cyclone. Several migrated to the urban centres of Bhubaneswar, Cuttack, and Surat for low-skilled jobs from Puri, Kendrapara, and Ganjam. The pattern of movement is said to well comply with the Harris-Todaro Model (1970), which says the migration decisions are more based on anticipated income differentials than employment certainty. Despite this, many forced migrants ended up in insecure, informal sector work, including construction and daily wage labour, with lower wages than their pre-cyclone incomes. Another theory that helps explicate why most of the displaced populations, lacking in skills or education, ended up in jobs that were low-wage and high-risk with a threat of job insecurity and bad working conditions is the Dual Labour Market Theory propounded by Doeringer & Piore 1971.

The cyclone also had gendered implications for the labour market response. Because many male household members migrated in search of work, there was a feminisation of labour in the villages affected by cyclone disasters. Women had to take up more responsibilities, especially in agriculture, fish processing, and small-scale trading. However, women's economic agency continued to be constrained by factors such as limited access to credit, restricted mobility, and dominant socio-cultural norms, which escalated household income insecurities. The longer-term effects of such disruptions highlight the fragility of income sources in climate-vulnerable regions, reinforcing the necessity for climate-resilient employment policies and skill diversification programs.

8.3.2 Role of Remittances in Economic Stability

The cyclone accentuated the critical role of remittances in bringing economic stability to affected households. According to the New Economics of Labour Migration (NELM) theory of Stark & Bloom (1985), migration acts as a household risk diversification strategy, and remittances help act as a shock absorber for household incomes. For many families caught up by the Fani episode, remittances from close relatives working in urban centres cutting across Gujarat, Maharashtra, and West Bengal remain the first significant coping mechanism helping households to face basic consumption levels, repair households, and make debt service amortisations.

The Permanent Income Hypothesis, first advanced by Friedman (1957), asserts households use remittances for short-term consumption; however, "remittances also act like an investment scheme." While the government report on Fani does not provide explicit information about the volumes of remittance inflows, economic theory suggests that households that received support from external financial sources faced lower income volatility levels compared to those that relied solely on local livelihoods. Many households

were using remittance earnings for reconstituting assets, purchasing essential commodities in disturbed local markets, and for health and education-related expenses. The reliance on remittances in post-disaster contexts also brings out spatial economic disparities since only households with pre-existing migration linkages benefit from these financial flows.

Though they have stabilising effects, remittances were not an equalising mechanism for all the affected families. Economic inequality, as suggested by the Kuznets Curve of 1955, often worsens before stabilising in disaster-affected regions as wealthier households—already integrated into migration networks—receive larger remittance inflows. Thus, families that had no migration ties remained disproportionately reliant on government relief measures, with slower income recovery and protracted economic distress. The cyclone, therefore, simply scaled up pre-existing wealth disparities, with the need for targeted financial inclusion policies to bridge these economic gaps.

8.3.3 Economic Costs of Displacement

In terms of economic costs, the displacement due to Cyclone Fani can be categorised into direct financial losses, indirect long-term economic impacts, and macroeconomic consequences. The loss was huge in immediate financial terms—more than 5 lakh houses destroyed, 1.81 lakh hectares of crops destroyed, and severe disruptions to transport and energy infrastructure. The loss of fishing harbours, market spaces, and primary roads further delayed economic recovery, while the costs of rebuilding essential services placed an enormous fiscal strain on the state government, prompting Odisha to seek financial assistance from the Centre.

Beyond the direct costs, displacement led to long-term economic disruptions, particularly in the labour market. According to the Theory of Structural Change, Lewis (1954) indicates that it is common for displaced workers to have difficulties finding employment in new sectors, especially if there are mismatches in skills. Such was the case for displaced fisherfolk and agricultural labourers who did not possess the skills required to gain access to high-paying jobs in cities. Many of these individuals found themselves in informal or casual wage labour, where they experienced lower earnings, less job security, and lower productivity.

The economic impacts of displacement also reverberated at the regional level. Large-scale migration to cities created temporary labour shortages in the non-affected coastal regions and increased wages for certain industries in those areas but oversaturated labour markets in urban centres, further depressing wage rates for informal labourers. Also, the failure of community-based risk-sharing mechanisms increased household economic vulnerability as

it broke the usual support networks for forced migrants. Long-term dependency on government relief and rehabilitation programs further emphasises the economic fragility of disaster-prone communities, pointing towards climate-resilient employment strategies and financial safety nets.

The cyclone further highlighted substantial policy voids in addressing climate-induced displacement. There were no well-defined skill development programs, financial inclusion mechanisms, or credit schemes that depended on remittances to aid displaced households' recovery processes as an institution over the long run. The new frameworks of disaster responses need to integrate climate-resilient investments in infrastructure, livelihood diversification, and more inclusive access to financial services for minimising severe economic shocks triggered by such calamities.

8.4 Super Cyclone Amphan (2020)

Super Cyclone Amphan, which landed on May 20, 2020, was one of the strongest cyclones to hit the Bay of Bengal region in recent times, with wind speeds exceeding 185 km/h. Though West Bengal bore the brunt of the cyclone, Odisha suffered extensive collateral damage, particularly in its coastal districts, where thousands of households, livelihoods, and critical infrastructure were affected. Beyond direct destruction, the economic consequences of the cyclone spilt into long-run shocks in terms of income disturbances, labour market shocks, remittance dependence, and large dislocation-related expenditures. The impacts of these factors are analysed using the theories underlying the economics as described below.

8.4.1 Household Income and Labour Market Participation

The economic impact of Amphan was felt disproportionately across occupational groups, with daily wage earners, fisherfolk, and small-scale agricultural workers suffering the most severe income shocks. The destruction of houses, fishing boats, markets, and farmlands led to immediate unemployment and income losses, disrupting household financial stability. In Odisha, over 44 lakh people across 10 districts were affected, with 2.8 lakh houses damaged. It exposed the economic vulnerability of the coastal fisherfolk and agrarian workers whose livelihoods are precarious and normally aligned with environmental stability.

The cyclone also led to a form of forced migration, as most of the workers shifted to urban and peri-urban areas in search of employment. According to the Harris-Todaro Model of Migration, published in 1970, this phenomenon occurs because of expected income differentials rather than actual guaranteed employment. Many of the migrant workers migrated to Bhubaneswar, Cuttack, and Kolkata, taking up casual jobs, construction, and

miscellaneous services. However, in such a time of pandemic as COVID-19, the other challenges within urban agglomerations squeezed economic opportunities, making room for heavy underemployment and wage suppression within the informal economy as well.

Workforce participation trends adjusted, particularly among women who had to take on more domestic responsibilities and economic burdens. With male migration increasing after Amphan, women have been forced to accept informal secondary jobs in agriculture, home-based work, and petty trade, which have remained low-paid and even less regular forms of employment, reinforcing gendered vulnerabilities in economic terms. A proper understanding of these events can be rendered through the Dual Labour Market Theory by Doeringer & Piore (1971), where migrant labour tends to get absorbed mainly in the low-wage secondary, informal sectors with very little scope for upward mobility.

The employment shocks resulting from Amphan were not district-specific. Economies with diversified non-agricultural employment recovered faster, whereas economies that are heavily dependent on fishing and coastal trade took much longer to recover. Households that had other sources of income, such as remittances, government relief, or micro-enterprise opportunities, recovered faster than those solely dependent on primary-sector livelihoods.

8.4.2 Role of Remittances in Economic Stability

As in other climate-related disasters, remittances played a crucial role in cushioning the income shocks caused by Amphan. According to the New Economics of Labour Migration (NELM) (Stark & Bloom, 1985), migration serves as a household risk-diversification strategy, wherein remittance inflows act as an informal financial safety net during economic crises. After Amphan, the families with migrant members working in industrial and service hubs like Surat, Mumbai, and Hyderabad relied heavily on remittance income to cover all essential expenses, rebuild homes, and supplement lost earnings.

According to the Permanent Income Hypothesis by Friedman (1957), households that receive regular remittances are more likely to maintain stable consumption patterns even with income volatility. Indeed, however, the COVID-19 pandemic disturbed interstate migration flows and remittance channels, which would have softened the impact of income shocks. Remittances from Odisha's workers delaying return migration by temporarily shutting down industrial activities only increased the reliance on government aid and relief efforts coming from communities.

The distributional impact of remittances was highly uneven. Households that had pre-existing migration linkages received steady remittances, while those without the members who had sent remittances had more extended recovery times and greater burdens of debt. The Kuznets Hypothesis (1955) argued that economic inequality first increases and then stabilises as the post-crisis economies recover. That was seen with Amphan in the aftermath because well-off households, who were able to have members migrate abroad for work, benefitted the most, which accelerated wealth disparities among affected regions.

Though remittances could offer temporary financial relief, they were not a long-term means of reviving the economy. Households that invested remittance earnings in rebuilding productive assets—for example, buying fishing gear, restoring farmlands, or investing in small businesses—were able to recover financially much faster than those who spent most of their remittances on consumption. The role of state intervention in providing financial assistance and skill-development programs became critical in bridging these economic gaps.

8.4.3 Economic Costs of Displacement

The costs of dislocation by Amphan were multilateral: direct monetary losses, indirect long-term economic effects, and fiscal burden on the state. Housing, public infrastructure, and economic assets were severely damaged, and the government estimated that over ₹20,000 crore were lost due to the cyclone. The damage was the costliest in fisheries, agriculture, and housing. Displaced households lacked adequate monetary resources to recover.

The Structural Change Theory (Lewis, 1954) explains the difficulties of displacement, especially in the case of workers from primary sectors, such as fisheries and agriculture, who cannot easily enter secondary or tertiary employment because of a lack of skills. Most of the displaced fisherfolk and agrarian workers did not have the technical skills to integrate into urban job markets and, therefore, were relegated to long-term economic precarity and downward occupational mobility.

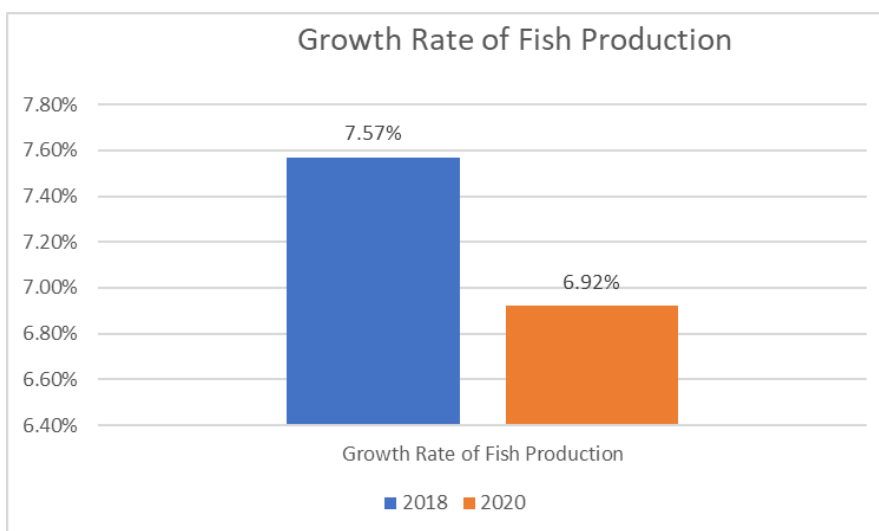
Regional labour market distortions were also an outcome of displacement. Outmigration of the working-age population from the coastal regions meant that non-affected rural regions experienced labour shortages and temporarily elevated rural wage rates. On the other hand, displaced individuals pouring into the urban labour market meant that wage compression occurred in informal construction and service sectors where the upsurge in labour supply depressed the daily wage.

Beyond household losses, the cyclone imposed a huge fiscal burden on the state government, requiring massive relief expenditures and rehabilitation programs. The period of recovery

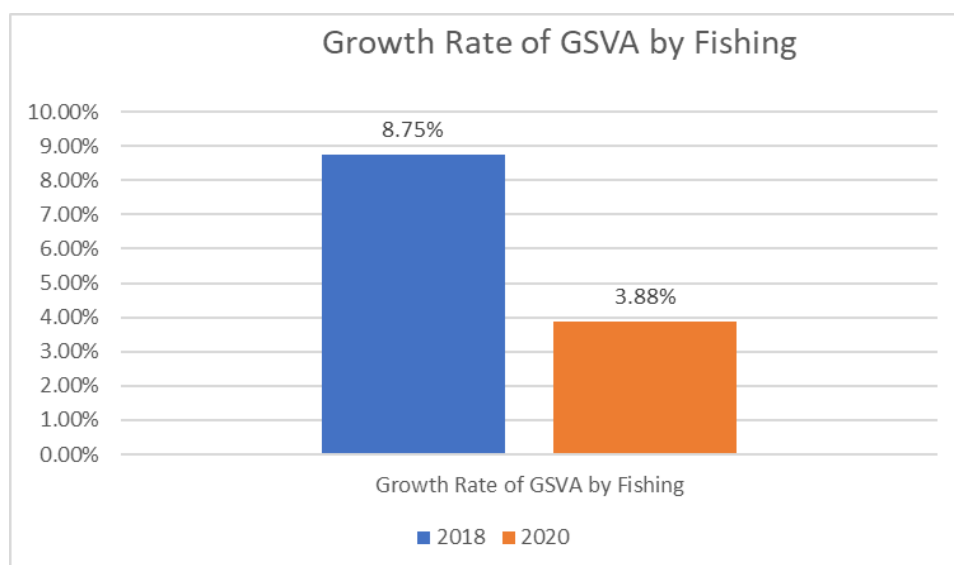
from the Amphan incident shows an increase in dependence on public welfare programs such as food security programs (PDS), cash transfers, and employment guarantee programs (MGNREGA). However, bureaucratic delays and inefficiency in relief delivery resulted in unequal distribution of relief, leading to extended periods of economic stress among affected households.

The long-term costs of displacement extended beyond monetary losses. As communities fragmented under forced migration, social capital erosion further weakened the informal risk-sharing mechanisms that are so crucial for traditional livelihoods. It thus became more difficult for households to rebuild their economic foundations. Displaced families faced permanent shifts in their economic trajectories because post-disaster migration often resulted in multi-generational shifts away from traditional livelihoods.

Cyclone Fani (2019) and Cyclone Amphan (2020)—combined statics



Due to the occurrence of two cyclones within a year, that is, Cyclone Fani (2019) and Cyclone Amphan (2020), the growth rate of fish production fell from 7.57% in 2018 to 6.92% in 2020, while the growth rate of GSVA by fishing fell from 7.57% in 2018 to 3.58% in 2020.



8.5 Severe Cyclonic Storm Dana (2024)

Cyclone Dana, which struck land near Bhitarkanika in Kendrapara district on 24–25 October 2024, was a severe cyclonic storm with high-speed winds, torrential rainfall, and significant coastal flooding. It was not the most extreme in terms of wind speed, but it was the most severe disruption to livelihoods, infrastructure, and economic stability, especially for fishing-dependent and agrarian communities. Damage will not be immediately visible, although the cyclone will lead to long-term reorganisation of local economies, transformations in labour-market participation, and further financial frailty for victimised populations.

8.5.1 Household Income and Labour Market Participation

Cyclone Dana threw the economy of various sectors out of kilter, more significantly impacting daily wage earners, fisherfolk, and small farmers. The first impact is invariably a blow to employment and earnings, following damage to physical capital and interruption to market relations as in past cyclonic catastrophes that occurred in Odisha. According to the memorandum, fisheries, agricultural fields, and small-scale trading establishments suffered very severe damage with a corresponding, sudden collapse of household incomes.

The destruction of boats, fishing nets, and coastal markets entirely stopped all fishing activities along the Kendrapara and Jagatsinghpur coasts. It agrees with the Theory of Labour Market Segmentation, which states that workers in primary sectors, such as fishing and agriculture, have relatively lower employment mobility than workers who are in secondary or tertiary sectors. Unlike workers in industry or services, fisherfolk cannot easily transition to alternative employment, leading to a prolonged period of income stagnation.

The destruction of inland fishing infrastructure further deepened the crisis, forcing many to seek alternative, often lower-paying, work in unorganised urban sectors.

For agrarian workers, the cyclone resulted in extensive crop damage, particularly in paddy fields, which form the backbone of Odisha's rural economy. Standing crops were destroyed. Thousands of small-scale farmers who had obtained seasonal loans to cultivate the crop remained indebted. The linkage between agriculture and fisheries was affected too: floodwater carried saline into arable lands, degrading their productivity for years ahead. The Environmental Kuznets Curve predicts that at an initial level of development, environmental degradation deteriorates before becoming stable. However, the very low adaptive capacity of rural Odisha means that these environmental shocks translate directly into economic distress without adequate buffering mechanisms.

In terms of these economic shocks, changes in the labour market were reported as people largely moved to the urban centre in large numbers. The Harris-Todaro Model of Rural-Urban Migration, 1970, explains this by saying that the workers move to anticipate higher wages despite uncertain employment immediately. The memorandum reveals an increased number of people migrating to Cuttack, Bhubaneswar, and Kolkata for work in construction, transportation, and domestic services, where the displaced workers sought jobs. These sectors, however, were informal and employed with uncertain prospects, low wages, and no social security.

The labour market effects of Cyclone Dana were also gendered. With male outmigration rising, women in affected households took on additional economic responsibilities, engaging in low-wage agricultural labour, petty trade, and home-based work. However, lack of financial resources and social constraints limited their access to stable employment, further deepening economic inequalities.

8.5.2 Role of Remittances in Economic Stability

Like the previous cyclones, remittances helped the households cope with the loss of income and dislocation. Pre-existing migration ties helped households raise funds from their relatives who are working in other states, such as Gujarat, Maharashtra, and Tamil Nadu, where most Odia workers work in industries and services. According to the New Economics of Labour Migration (NELM) (Stark & Bloom, 1985), remittances are a household risk-management strategy, providing an alternative income stream during economic downturns.

The Permanent Income Hypothesis, by Friedman (1957), postulates that households with stable inflows of remittances can sustain long-term consumption even during crises.

However, in the previous cyclones, the distribution of remittances was not uniform across households, which further widened income disparities. Households without migrant workers were more reliant on relief measures, which were often delayed and inadequate to meet full recovery needs.

The memorandum highlights the fact that most households were rebuilding homes, purchasing food supplies, and paying outstanding debts from remittance inflows. Conversely, other families invested the earnings from remittances into new economic activities such as microenterprises, poultry farming, and small-scale retail trade. According to Taylor, 1999, the multiplier effect of remittances means that income earned from remittances could contribute to spillover benefits to the local economies by enhancing the demand for goods and services. However, it was again constrained in the case of Dana-affected areas, where the overall economic downturn limited the purchasing power.

In some regions, the memorandum observes that remittances contributed to rising local inflation, particularly in essential commodities. This is exactly in line with the Dutch Disease Hypothesis, which reflects that large remittance inflows reduce local labour force participation as households depend less on primary sector employment. Even though this effect was not uniformly observed, it does raise some concern about economic dependencies on external income sources.

8.5.3 Economic Costs of Displacement

The economic costs of displacement following Cyclone Dana are multilayered, involving direct monetary losses, indirect economic dislocations, and increased fiscal burdens on the state. Housing, transport networks, and coastal infrastructure destruction have involved significant financial loss, and there is a pressing need for massive government relief measures. The estimated total economic damage runs into thousands of crores, with fisheries, agriculture, and small businesses being the worst affected sectors.

Structural Change Theory by Lewis (1954) can account for long-term displacement costs, especially when workers are struggling to shift from one sector to another. Many of the displaced fisherfolk and agrarian workers experienced a lack of congruence in skills, making it difficult for them to gain employment stability in urban economies. The memorandum further shows that the majority of the number of displaced individuals was absorbed in the informal sectors, whose jobs were low-paying and insecure.

Another indirect, or hidden, cost of displacement was the loss of social capital. Relocations severely disrupted community-based informal lending networks and labour-sharing

mechanisms, which historically have served as informal safety nets. By disturbing these community-based support structures, increased household financial vulnerability pushed more families toward high-interest loans to ensure their survival.

The state government's response was concentrated on emergency relief, financial support, and infrastructure rehabilitation. Yet, according to the memorandum, there were difficulties in the delivery of relief assistance, particularly to hard-to-reach coastal villages, whose access was delayed. The recovery of affected households is long-term, depending on continued policy interventions that include climate-resilient housing, financial inclusion measures, and skills training programs for displaced workers.

9. Limitations

Despite its thorough deliberation, this study has limitations that must be stated for this research to give proper consideration to its findings. Among them is reliance on secondary data sources—government economic surveys, migration reports, and disaster assessment records. These sources provide great macroeconomic insight but are likely to miss out on nuances such as the informal labour dynamics, localised economic fluctuations, and unrecorded financial transactions all contributing to the economies in post-disaster environments. This study also lacks longitudinal data, that is, monitoring the same household over time to understand the long-term economic recovery. The study bases its results on cross-sectional data points sampled from different occurrences of cyclones and is not possibly reflective of how evacuees cope with economic adversity over the long term. An added limitation of the study is that it looks strictly at economic effects, which are indispensable but do not include larger effects of migration affecting the social-psychological and cultural characteristics of displacement, including social dislocation, mental health-related stress, or community displacement-related distress. These non-economic aspects, though indirectly related to economic stability, are beyond the scope of this paper. In addition, the study assumes a degree of uniformity in economic responses in different coastal districts of Odisha and generalises its findings to the entire state. However, there are huge differences in local governance efficiency, access to financial relief, and community mechanisms for resilience across regions, and these might translate into differences in the degree of economic disruption and recovery in these different regions. The study does not consider spillover effects, for example, out-migration impacts on city labour markets, impacts of compression of wages in receiving cities, or strain on public services due to increased population inflows. Although these are important secondary effects, they would

also need empirical evidence to gauge the broader economic implications of climate-related migration.

10. Conclusion

The economic ramifications of climate-induced migration among fisherfolk communities in coastal Odisha underscore the complex interplay between environmental shocks, labour market dynamics, and household economic resilience. This study has demonstrated that climate disasters—such as Cyclones Phailin, Fani, Amphan, and Dana—disrupt traditional economic structures, leading to substantial shifts in income patterns, employment participation, and regional economic stability. The case studies analysed here thus suggest that these communities experience cyclical economic distress, characterised by direct loss of productive assets, prolonged instability in incomes, and forced migration into low-paying, insecure urban labour markets. A key finding of this research is that climate-induced migration has asymmetric impacts on household incomes and labour market participation.

Although some of the migrants succeed in finding a place within the urban economies, most enter precarious, informal employment with lower earnings and little possibility of upward mobility. The study confirms the Harris-Todaro model's claim that rural-to-urban migration does not necessarily ensure improvement in economic status; it instead tends to worsen vulnerability by pushing displaced workers into sectors with little job security. The feminisation of household economic burdens, as in the post-disaster scenario, highlights the gendered implications of climate-induced migration further. Women left behind to support households are driven into informal labour markets under the conditions of financial precarity that reinforce systemic inequalities. Remittances have turned out to be a critical yet insufficient mechanism for economic stabilisation. Although they temporarily cushion the blow of lost incomes, their long-term effectiveness is low because of the low wages of migrant labour markets and infrastructural constraints in disaster-affected areas.

The research supports the New Economics of Labour Migration (NELM) theory as it explains that while remittances are a counter-cyclical economic buffer, they do not bring about sustainable growth or economic resilience without productive reinvestment. Moreover, unequal access to remittance networks also widens economic disparities because households not connected to migrants are left significantly dependent on state welfare and emergency relief programs. The economic costs of displacement do not only amount to direct monetary losses but also structural disruptions in regional labour markets, increasing fiscal burdens for the state, and long-term depreciation of human capital. The available evidence seems to support climate-induced migration triggering the erosion of skills among

displaced fisherfolk and agricultural workers, thus being consistent with the theory of human capital depreciation. As this community is thrown into alien economic sectors, it will face huge barriers in skill adaptation and wage parity, and it will continue to stagnate economically for a long time.

Besides, the financial costs of periodic climatic catastrophes that come in the form of high public expenditures for rehabilitation and rebuilding of infrastructure severely hinder long-term developmental agendas. It speaks of the imperatives of much-needed policy actions towards making economically more resilient climates. Any medium-run to long-run adaptation framework is only going to succeed if skills development programs can be expanded to involve more numbers of people while strengthening financial inclusion. Remittance inflows have the potential to become a stabilisation mechanism in a post-disaster economy if channels to formal sectors through better banking infrastructure and more widespread digital services could be offered. Finally, climate-induced migration in coastal Odisha is not just an environmental issue but one that remains deeply economic in dimension, thus requiring the engagement of multilevel policy solutions. The results of this study suggest a need for proactive economic planning that builds livelihoods beyond disaster relief, regional economic integration that helps to break cycles of displacement and poverty, and addresses structural vulnerabilities. Such efforts to address the above challenges require coordinated action between government agencies, international organisations, and community stakeholders to ensure that migration becomes a strategy of empowerment rather than a last resort.

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