The Impact of Climate Change on Economic Growth in South Asian Countries: The Role of Financial Development, Trade Openness and Renewable Energy Consumption

Muhit Anwar Chowdhury[1]

Lecturer, School of Business, Canadian University of Bangladesh

DOI: https://dx.doi.org/10.47772/IJRISS.2024.801034

Received: 14 December 2023; Accepted: 25 December 2023; Published: 28 January 2024

ABSTRACT

This study examines the complex correlation between climate change and economic growth in South Asian nations, focusing specifically on the significant influences of financial development, trade openness, and renewable energy usage. This research endeavors to address the existing information gaps pertaining to the impact of climate change on economic development, with a specific focus on the susceptibility of South Asian nations. This study employs quantitative research approach. Economic indicators, climate data, and relevant financial and trade metrics are scrutinized to discern patterns and relationships. The methodology incorporates a multi-faceted approach to capture the complexity of the interactions between climate change variables and economic parameters. The study's results provide significant insights into the intricate relationship among climate change, financial growth, trade openness, and renewable energy use in the South Asian region. The research elucidates how climate-induced disruptions impact economic sectors crucial to the region's development. Moreover, it dissects the specific mechanisms through which financial structures, trade policies, and renewable energy initiatives influence economic resilience in the effect of climate challenges. Based on the findings, the study offers a set of targeted recommendations for policymakers, emphasizing the need for integrated approaches to climate change alleviation and adjustment. These recommendations encompass strategies for enhancing financial mechanisms, optimizing trade policies, and promoting sustainable practices in renewable energy consumption. By aligning economic policies with environmental sustainability goals, the recommendations aim to guide South Asian countries toward resilient and sustainable development pathways amidst the evolving landscape of climate change challenges.

Key Words: Climate Change, Economic Growth, South Asian Countries, Financial Development, Trade Openness, Renewable Energy Consumption, Labor Forces.

INTRODUCTION

Climate change, propelled by anthropogenic activities and global environmental shifts, has emerged as a paramount challenge confronting nations worldwide. Among the region's most susceptible to the far-reaching consequences of climate change is South Asia, a diverse and densely populated subcontinent marked by unique geographical and socio-economic characteristics. As climate change increasingly impacts ecosystems and weather patterns, its influence on the economic trajectory of South Asian countries becomes a critical area of study. This research seeks to discover the intricate associations between climate change and economic growth in South Asia, focusing specifically on the roles of financial development, trade openness, and the consumption of renewable power.

The issue of climate change has become a worldwide concern, presenting substantial obstacles to the achievement of sustainable economic progress and advancement. The South Asian area, which encompasses countries like India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan, and the Maldives, confronts a diverse range of difficulties that are influenced by climate change. The escalation in temperatures, alterations in

precipitation patterns, and occurrences of severe weather events are causing disruptions to conventional agricultural methods, posing threats to water supplies, and destabilizing vulnerable ecosystems. According to the Intergovernmental Panel on Climate Change (IPCC, 2018). The economic repercussions of these environmental changes are palpable, affecting sectors crucial to the region's development (Hallegatte et al., 2016). Against this backdrop, understanding the nuanced connections between climate change and economic growth is vital for formulating policies that promote both environmental sustainability and economic resilience. Agricultural output, infrastructure, and human health are all being negatively impacted by the enlarging frequency and severity of severe weather events in the area (ADB, 2022). The region's development goals, economic growth, and poverty levels might all take a hit due to these climate-related disturbances.

In this context, understanding the complex interplay between climate change, economic development, and financial growth in South Asia is crucial for formulating effective mitigation and adaptation strategies. Financial development is broadly documented as a key driver of financial intensification, enabling efficient allocation of resources, risk management, and innovation (Beck et al., 2000). Trade openness, on the other hand, facilitates access to technology, knowledge, and markets, fostering economic growth and resilience (Sachs & Warner, 1997). Renewable energy, as a clean and sustainable alternative to fossil fuels, can contribute to climate change mitigation while also promoting energy security and economic growth (REN21, 2022). Financial development stands as a critical determinant of economic growth (Levine, 1997), and its significance is heightened in the circumstance of environment change revision and mitigation. Simultaneously, trade openness acts as a catalyst for economic growth by facilitating the movement of goods and activities crossways boundaries. In the context of climate change, examining how trade policies influence the adaptive capacity and economic outcomes of South Asian countries is crucial (Dinda, 2004).

Trade openness is often associated with increased market access, allowing countries to tap into a broader consumer base. Romer (1993) argues that openness to trade fosters economic growth by facilitating the dissemination of technological advancements and spurring innovation (Romer, 1993). Trade openness facilitates participation in global value chains (GVCs), enabling countries to engage in different stages of production. This interconnectedness fosters technology transfer and knowledge spillovers (Gereffi et al., 2005).

Furthermore, one of the most important ways to combat climate change's negative impacts is to switch to renewable energy. South Asian governments are gradually realizing the importance of renewable energy sources in reducing emissions of greenhouse gases and ensuring long-term energy security (IEA, 2019). The development of policy frameworks that are in line with global sustainability goals requires an understanding of the complex interplay between renewable energy use, economic growth, and resilience to climate change. From 26% in 2019 to 29% in 2020, the share of renewable energy in global power output increased. A primary objective of this study is to add to the existing body of knowledge about the relationship between climate change and economic growth in South Asian countries. Our research aims to shed light on the interconnected nature of climate change, financial development, trade openness, and renewable energy consumption, and we hope that academics, stakeholders, and policymakers will find it valuable and instructive.

LITERATURE REVIEW

The objective of this literature review is to examine the complex connections between climate change and economic growth in South Asia, specifically focusing on the influence of financial development, trade openness, and renewable energy usage.

Climate Change and Economic Growth

The complex relationship between climate change and rising economies encompasses several aspects.

Several studies indicate that climate change might potentially impede economic development (Dell, Jones, & Olken, 2012; Burke, Hsiang, & Miguel, 2015). But other studies have shown that the relationship is more complex and could differ from one country to another based on variables like their degree of development and susceptibility to climate change (Parry, 2009). Climate change affects economic development in complex ways, which have been the subject of many research. The need of taking preemptive steps to reduce risks is highlighted by Stern's (2007) emphasis on the long-term economic effects of climate change. According to the IPCC reports (2014), agricultural production and infrastructure might be negatively impacted by severe weather events, altering precipitation patterns, and rising sea levels. As a result, economic output could be negatively impacted.

Many scholarly investigations have focused on the question of how climate change and economic growth are becoming more intertwined. The economic consequences of climate change were heavily highlighted in the seminal work of Stern (2007), which highlighted the possibility of long-term damage to infrastructure, agricultural production, and human welfare. Following investigations conducted by Tol (2009) and Dell et al. (2012), other research endeavors have attempted to quantify the financial ramifications of climate change. These studies have highlighted the varying effects on different industries and areas. Dasgupta et al. (2014) argue that nations in South Asia have a notable susceptibility to the effects of climate change, which include occurrences of severe weather events, alterations in precipitation patterns, and the increase in sea levels.

Climate change has the potential to alter precipitation patterns, average temperatures, and the frequency and severity of severe weather events, all of which may have far-reaching consequences on agricultural output. The World Bank predicts that this would slow economic development due to food shortages, unstable prices, and lower farmer incomes (2020). Disasters like floods, cyclones, and droughts have the potential to wreak havoc on vital infrastructure like electrical grids, highways, and bridges. The whole economy might be hit hard if this mess with power, communication, and transportation (ADB, 2022). Heatstroke, infectious infections, and respiratory disorders are just a few of the many health concerns that climate change may cause. This has the potential to raise healthcare expenses and decrease worker productivity, both of which are known to impede economic development (World Health Organization, 2021).

Financial Development and Climate Change Adaptation

Financial development know how to do a vital function in helping countries adapt to climate revolutionize by enabling the investment in climate-resilient infrastructure, technologies, and practices (World Bank, 2016). A well-developed financial system can provide the necessary financing for climate-resilient infrastructure projects, such as flood control systems, drought-resistant crops, and renewable energy projects. It can also facilitate the development and dissemination of climate-resilient technologies, such as early warning systems and weather forecasting tools.

The detrimental effects of climate change on economic growth may be lessened by financial development, according to empirical research. One research indicated that after a natural catastrophe, there is a correlation between a one-standard deviation gain in financial development and a 0.2 percentage point boost in economic growth (World Bank, 2014).

Trade Openness and Climate Change Mitigation

With open trade and access to knowledge, markets, and technology, countries can adapt to climate change and lower their emissions of greenhouse gases, according to the International Panel on Climate Change (2018). Renewable energy technology and energy-efficient goods are examples of cutting-edge climate-friendly practices that nations may acquire via international commerce. Accelerating the development and implementation of climate-friendly technology is another potential outcome of trade openness, which may

promote innovation and information exchange. Countries may lower their emissions of greenhouse gases if they are more open to trade, according to empirical research. For instance, according to Sachs and Warner (1997), there is a correlation between a one-standard-deviation rise in trade openness and a 0.4% decrease in carbon dioxide emissions.

Renewable Energy Consumption and Climate Change Mitigation

Potentially lowering emissions of greenhouse gases, increasing energy independence, and stimulating economic growth are clean and sustainable renewable energy sources (REN21, 2022). In the long term, renewable energy has the potential to help countries transition away from fossil fuels—the primary source of climate change—and establish an economy that is more environmentally friendly. The use of renewable energy sources may have a positive impact on public health by decreasing air pollution. Using renewable energy sources may help nations lower their emissions of greenhouse gases, according to empirical research. For instance, according to one research (UNEP, 2020), carbon dioxide emissions may be reduced by 0.6% for every one standard deviation rise in the usage of renewable energy.

Labor Force and Economic Growth

Climate change has many impacts on the workforce. The occurrence of severe weather events such as heat waves, floods, and droughts may lead to a decline in income and employment due to the disruption of agricultural production, infrastructure, and human health (World Bank, 2019). Individuals may find it more challenging to adjust to changing climatic conditions and discover new work prospects if they are already vulnerable due to factors including poverty and inadequate access to healthcare, education, and other basic necessities (ILO, 2020).

The expansion of every economy depends on a healthy job market. Productivity, creativity, and entrepreneurial spirit may all benefit from a workforce that is both trained and flexible. Since women are more likely to be affected by climate change and to encounter extra obstacles while looking for work, this phenomenon has the potential to worsen preexisting gender disparities in the workplace (WEDO, 2021).Climate change will have a detrimental effect on both the labor force participation and productivity, according to empirical research. Labor productivity drops 2.2% for every 1 sigma rise in temperature, according to one research (Dhingra et al., 2018). Workers in outdoor and agricultural occupations are more vulnerable to production losses during heat waves, according to research by Hsiang et al. (2017).

Capital and Economic Growth

Climate change can hinder capital accumulation through various channels. Tremendous climate actions, such as drought, floods, and storms, can damage physical capital, including infrastructure, buildings, and machinery, reducing productivity and investment potential (World Bank, 2018). Climate change can also increase risks for businesses and investors, making it more difficult to access finance and discouraging investment in climate-sensitive sectors (Furukawa et al., 2020). Moreover, climate change can exacerbate existing vulnerabilities, such as poverty and income inequality, limiting individuals and communities' ability to save and invest in their future (IPCC, 2018).

A major factor propelling economic expansion is the accumulation of capital, whether it be human or physical. Businesses are able to increase the efficiency of their production processes with the use of physical capital, which includes machinery, equipment, and infrastructure. Education, training, and experience all constitute human capital, which boosts efficiency and creativity in the workplace (Solow, 1956; Lucas, 1988). When companies have enough money to grow, they may hire more people, open more locations, and boost the economy as a whole. Capital production and economic growth are positively correlated, according to empirical research. For example, according to one research, economic growth increases by 0.35% for

every 1% increase in physical capital stock (Barro, 2004). Economic development is positively affected by human capital, which is defined as educational attainment, according to another research (Hanushek & Woessmann, 2010).

Financial Development and Economic Growth

There is widespread agreement that progress in the financial sector is a primary factor in rising incomes. Businesses may access cash for investment, innovation, and development via a well-functioning financial system, which allows for the effective deployment of resources. Because of this, production goes up, new jobs are created, and the economy grows as a whole (Beck et al., 2009). Research in the South Asian region has shown that improved financial infrastructure contributes to faster economic expansion. Regional economic growth rates are positively correlated with financial development, according to studies (Ghosh & Abedin, 2015; Islam & Chowdhury, 2019). This development is assessed by measures such as financial depth, efficiency, and accessibility. Research has shown that South Asian economic development might be negatively affected by climate change. To provide just one example, Mittal et al. (2018) found that by the century's end, climate change would cut India's GDP by as much as 10%. Climate change, according to another research (Ahmed et al., 2020), might cut agricultural output in Bangladesh by as much as 20% by century's end.

Trade Openness and Economic Growth

Trade openness is a key factor in helping people adapt to climate change. According to Frankel (2009), economies that are open to new ideas and resources are better able to weather climate change and other economic storms. Economic development in South Asia is positively influenced by trade openness. Regional economic growth rates are positively correlated with trade openness, according to studies (Islam & Chowdhury, 2019; Narayan & Narayan, 2008). Reason being, when trade is liberalized, nations may focus on making their strengths shine, which boosts efficiency, productivity, and innovation. The correlation between trade openness and global warming has been the subject of contradictory empirical findings. Because they rely more on imports of climate-sensitive items, nations that are more open to trade may be more susceptible to the effects of climate change, according to some research (Furukawa et al., 2020). Trade liberalization, according to some research (Sachs & Warner, 1997), may aid nations in their climate change adaptation efforts by increasing their access to information, capital, and technological know-how. Trade openness and economic growth are positively correlated, according to empirical research. For example, according to Sachs and Warner (1997), economic growth is 0.7% higher for every one standard deviation rise in trade openness. A different research indicated that emerging nations are the ones most affected by trade openness in terms of economic development (Frankel &Romer, 1999).

Renewable Energy Consumption and Economic Growth

Increasingly, individuals are recognizing that transitioning to renewable energy sources may contribute to the sustainable prosperity of the economy. Baldwin et al. (2019) argue that transitioning to renewable energy sources may have dual benefits for the environment and the economy. This shift can stimulate innovation, provide employment opportunities, and enhance energy security. The use of renewable energy sources might potentially bolster resilience in the face of climate change. According to Sovacool (2016), renewable energy sources help maintain economic growth since they are diversified and decentralized, which increases energy security and decreases susceptibility to climate change. Consumption of renewable energy sources is positively associated with economic growth, according to empirical research. An example of this is the correlation between increasing the proportion of renewable energy sources used and a 0.2 percentage point boost to GDP growth, according to one research (Apergis & Payne, 2010). Another research indicated that developing nations are more affected by the effects of renewable energy consumption on economic development than industrialized ones (Shahbaz et al., 2017). Greenhouse gas

emissions may be significantly reduced, according to studies, by expanding the usage of renewable energy sources. For example, according to IPCC (2018), if the world switched to renewable energy sources entirely by 2050, it could cut carbon dioxide emissions by more than 70%.

Research Gap

More study is needed to fill up the gaps in our understanding of the complex relationships between climate change, economic growth, financial development, trade openness, and renewable energy usage in South Asian nations. First, in order to have a full picture of how various aspects are interdependent, there has to be integrated frameworks that take all of them into account at once. Second, more detailed, country-specific assessments are needed since the literature often considers South Asian nations as a homogeneous group, ignoring their various settings. Additionally, the impact of technical advancement on the adoption of renewable energy sources remains little studied. There is a lack of research on the social and distributional effects of climate adaptation strategies, especially when it comes to renewable energy uptake and financial development. Additionally, the efficacy of climate change-related policy interventions in the area has to be assessed. Filling these gaps would help us understand climate change in South Asia better and make better policies to promote sustainable development.

PROBLEM STATEMENT

The connection of climate change and economic expansion poses a significant challenge to the South Asian area. We know that South Asian countries are vulnerable to climate change (IPCC, 2018), but we don't know how climate change affects economic growth. This is especially true when it comes to the roles played by financial development, trade openness, and renewable energy consumption. Both the complex interplay between climate change, trade openness, and economic development (Dinda, 2004) and the unique roles played by financial systems in these endeavors have received little attention (Beck et al., 2000). Furthermore, there has been little research into how much sustainable economic growth in South Asian contexts is aided by the incorporation of renewable energy resources (IEA, 2019).

RESEARCH QUESTIONS

Research questions are as follows:

1. How does climate change impact economic growth in South Asian countries?
2. What role does financial development play in climate change and alleviation initiatives in South Asian economies?
3. How does climate change influence trade patterns and trade openness in South Asian countries, and how do trade policies contribute to sustainable development?
4. To what extent have South Asian countries integrated renewable energy into their portfolios, and how does this impact economic growth and environmental sustainability?

OBJECTIVES OF THE STUDY

The objectives for the research are as follows:

Main Objective

The primary objective of this research is to determine how South Asian countries' economies will be affected by climate change.

Specific Objectives: The detailed objectives of this study are as follows:

1. To identify the role of financial development in climate change adaptation and mitigation efforts in South Asian economies.
2. To examine the contribution of trade openness in the association between climate change and economic development.
3. To find out the contribution of renewable energy consumption in the relationship between climate change and economic growth.

CONCEPTUAL FRAMEWORK

Using the responsibilities of financial development, trade openness, and renewable energy use as a lens, this conceptual framework seeks to provide a systematic way to studying the effects of climate change on economic development in South Asian nations. Drawing on prior research as well as recognized knowledge gaps, the framework combines essential parts and how they relate to one another.

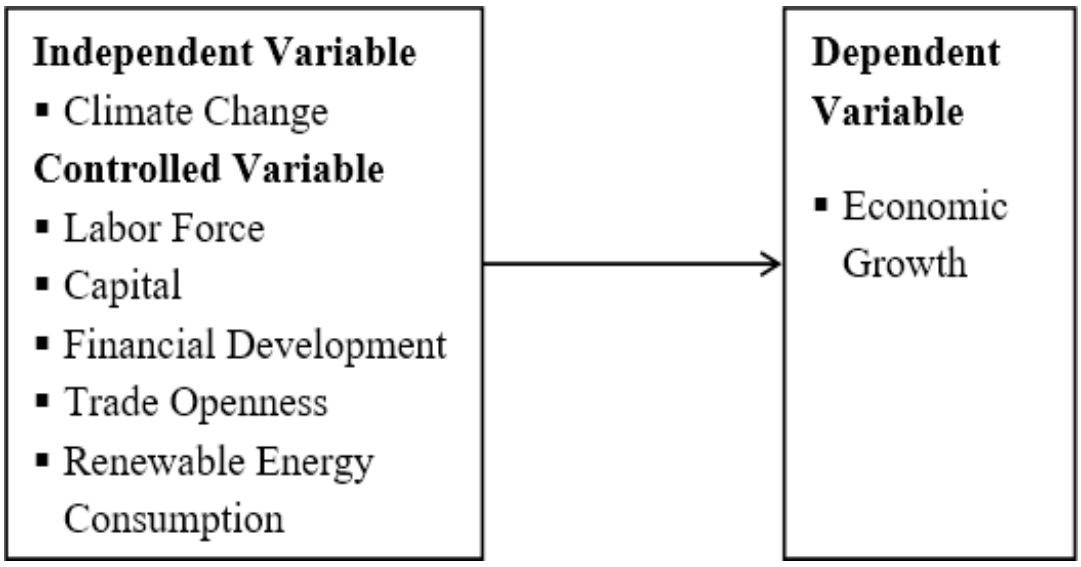

Figure 1: Conceptual Framework

DATA AND RESEARCH METHODOLOGY

Data

The empirical research is based on the South Asian countries of Bangladesh, Bhutan, India, Pakistan, and Sri Lanka. The research covers the period from 1990 to 2021, although we only picked five South Asian economies since data for other economies is not accessible. Economic growth (EG) is considered as a proxy of Real GDP at constant 2017 national prices (in mil. 2017US$). Climate change (CC) is used as a proxy for temperature change with respect to a baseline climatology, corresponding to the period 1951-1980. Labor (L) and Capital (K) are used as a proxy of number of persons engaged (in millions) and capital stock at current PPPs (in mil. 2017US$), respectively. Financial development is consider financial development index. RE is used renewable and other (quad Btu) and Trade openness (TO) be considered as a proxy of Trade (% of GDP). EG, L and K data are retrieved from the Penn World Table (PWT) 10.01[2]. CC data is collected form FAOSTAT(2022). FD data is obtained from the FD index[3] from the website of the International Monetary Fund (IMF).RE data is retrieved from the "US Energy Information Administration[4] (EIA)" website. TO data is collected form from the World Bank (WB)[5] website

Table 1: Numerical analyses of data

Var.	Narration	Obs.	Mean($\bar{X}$)	Std. dev	Min.	Max.
EG	Real GDP at constant 2017 national prices (in mil. 2017US$)	160	12.272	2.352	7.298	16.143
CC	"Temperature change with respect to a baseline climatology, corresponding to the period 1951-1980"		6.676	0.468	-0.413	1.720
L	Number of persons engaged (in millions)		2843	2.513	-1.630	6.221
K	Capital stock at current PPPs (in mil. 2017US$)		13.126	2.183	8.675	17.433
FD	Financial Development (FD) index		-1.465	0.398	-2.116	-0.628
RE	Renewables and other (quad Btu)		-2.470	1.772	-5.386	1.102
TO	Trade (% of GDP)		3.803	0.501	2.741	4.758

Source: World Bank (2022), PWT 10.01 (2022), EIA (2022). FAOSTAT(2022)

Therefore, all of the data comes from freely available, web-based data sources. In order to prevent outliers in the series, the magnitudes of all variables, with the exception of CC, are transformed into their natural logarithm equivalents. The study's descriptive data is shown in Table 1.

Model Construction

The long-term and short-term connections between the variables are tested using an autoregressive distributive lag (ARDL) model. To analyze the effect of climate change on economic growth, we develop the following model. Equations (1)) provide the model specifications.

LnEG = f(CC, LnK, LnL, LnFD LnRE, LnTO)… .....(1)

To its cross-sections, the PMG model applies the error variance, long-run and short-run constants. Because of this, the model can measure relationships in the short and long run. Here we see the dynamic form of a PMG approach in Equation (2).

$$\Delta LnEG_{it} = \sum_{j=1}^{p-1} \vartheta_{ij} \Delta LnEG_{it-j} + \sum_{j=0}^{q-1} \theta_{ij} \Delta X_{it-j} + \delta_i [LnEG_{it-1} - \beta_i X_{it-1}] + \mu_i + \varepsilon_{it} \quad (2)$$

Where i = 1, 2,……N (Quantity of cross-sections), presumptuous t = 1, 2, 3,……, T, represents time, j indicates lag, X_i is the vector of independent variables, δ_i is the "error correction term (ECT)" constant or the correction rate of EG release to preserve its constancy over time consequential from any modify in the explanatory factors. A stable association lasts for a long term only when δi < 0. μ_i refers to the fixed effect.

Lastly, in order to ascertain if there is a causative relationship between the variables, we use the Dumitrescu-Hurlin (2012) causality analysis. Its model is defined in equation (3) and it permits cross-sectional coefficients to vary.

$$Y_{it} = \beta_i + \sum_{i=1}^{k} \alpha_i Y_{i,t-k} + \sum_{i=1}^{k} \varphi_i X_{i,t-k} + \epsilon_{i,t} \quad \ldots\ldots(3)$$

β_1 is the constant, α_i, is the lag parameter, and δ_i is the constant slope. The equations of the null and alternatehypotheses are given below.

$$H_0: \delta_i = 0, H_1: \begin{cases} \varphi_i = 0, \theta_i = 1,2, \ldots\ldots\ldots\ldots\ldots\ldots N \\ \varphi_i \neq 0, \theta_i = N_1 + 1, N_1 + 2, \ldots\ldots N \end{cases}$$

Although non-homogeneous Granger causation is shown by cross-sections throughout the board, the alternative hypothesis suggests that panel data may be used to uncover at least one cause.

RESULTS AND DISCUSSION

Panel unit-root and CD test results

Table 2 provides a summary of the findings of the unit root test (UTR). Some of the three variables are level-stationary and the other two don't have a unit root at first difference, but all three are stationary at various integrating orders.

Table 2: URT results

Variable	CADF		CIPS	
	Level	1st diff	Level	1st diff
LnEG	-1.535	-3.070***	-1.567	-4.005***
CC	-3.099***	-5.983***	-4.886***	-6.190***
LnL	-2.715***	-3.774***	-2.741***	-4.725***
LnK	-2.289	-2.459**	-0.584	-2.085
LnFD	-1.615	-4.177***	-1.642	-5.244***
LnRE	-2.105	-3.725***	-2.893***	-5.676***
LnTO	-2.152	-3.997***	-2.166	-5.710***

Note: *** p<0.01, ** p<0.05.

The CD test findings, as shown in Table 3, indicate that the variables are not independent but rather associated due to a panel dependence.

Table 3: CD test result

Test	d.f.	LnEG	CC	LnL	LnK	LnFD	LnRE	LnTO
BP- LM	15	317.141***	153.979***	303.332***	311.370***	121.737***	178.988***	96.373***
Pesaran-LM	15	68.678***	32.194***	65.591***	67.388***	24.985***	37.786***	19.313***
Bias-corrected scaled LM	15	68.598***	32.114***	65.510***	67.307***	24.904***	37.706***	19.233***
Pesaran CD	15	17.808***	12.118***	17.414***	17.645***	10.278***	13.111***	1.997**

Residual Cross-Section Dependence Test			
Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	49.483	10	0.0000
Pesaran scaled LM	8.828		0.0000
Pesaran CD	2.882		0.0039

Note: *** p<0.01, ** p<0.05, * p<0.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue I January 2024

PMG Estimation Results

According to the findings of the unit root test, the PMG-ARDL model that adheres to the AIC criterion is defined as ARDL (1, 2, 2, 2, 2, 2, 2).The results of the model are exhibited in Table 4.

Table 4: PMG-ARDL Outcomes Lag 1

Dependent Variable: D(LNEG)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
CC	0.141	0.032	4.424	0.000
LNK	0.369	0.017	21.460	0.000
LNL	0.347	0.101	3.423	0.001
LNFD	0.435	0.079	5.476	0.000
LNRE	0.240	0.019	12.100	0.000
LNTO	0.112	0.021	5.226	0.000
	Short Run Equation			
COINTEQ01	-0.227	0.079	-2.858	0.005
D(CC)	-0.020	0.010	-1.950	0.054
D(CC(-1))	-0.007	0.011	-0.638	0.524
D(LNK)	0.170	0.052	3.274	0.001
D(LNK(-1))	-0.152	0.209	-0.731	0.466
D(LNL)	-0.048	0.049	-0.988	0.325
D(LNL(-1))	-0.141	0.097	-1.454	0.149
D(LNFD)	-0.017	0.024	-0.715	0.476
D(LNFD(-1))	-0.000	0.008	-0.014	0.988
D(LNRE)	-0.032	0.017	-1.860	0.066
D(LNRE(-1))	0.024	0.024	0.988	0.325
D(LNTO)	-0.030	0.018	-1.622	0.108
D(LNTO(-1))	0.008	0.017	0.499	0.618
C	1.633	0.564	2.891	0.004

The coefficient of climate change has a significant impact on economic growth in South Asian countries that could be realized with appropriate adaptation and mitigation strategies.

In certain parts of South Asia, higher agricultural output may be possible as a result of climate change. South Asia offers extensive renewable energy resources, including sun, wind, and hydropower. Increased wind speeds and more constant rainfall patterns are two examples of how climate change may make these resources more accessible, leading to more generation of renewable energy and less need for fossil fuels. The effects of climate change may result in an increase in tourism to some locations of South Asia, especially those that have lower temperatures and ecosystems that are distinctive. For instance, the Himalayan area may see a rise in tourism as a result of the lengthening of snow seasons and the creation of new attractions brought about by glacier meltwater. The difficulties brought on by climate change may serve as a catalyst for innovation and adaptation in the economies of South Asia, resulting in the creation of new

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue I January 2024

methods, technologies, and practices that improve the region's capacity to withstand shocks and save resources.

Labor and capital are two of the most important factors of production, and they play a noteworthy optimistic role in economic growth in South Asian countries. The huge and expanding population of workers in South Asia is one of the region's most valuable assets for further economic development. It is anticipated that the population of the area would reach 2.4 billion by the year 2050, which will offer a sizable pool of labour to support the rise of the economy. The nations of South Asia are making substantial expenditures in education and the cultivation of skills, which is contributing to an improvement in the overall quality of the labour force. Because of this, workers are becoming more productive and competitive, which ultimately contributes to increased economic development. The percentage of people in South Asia who are actively participating in the labour force is growing, especially among women. This results in a larger pool of potential workers, which in turn contributes to the expansion of the economy.

South Asian nations are drawing increasing local and international investment. This finances new enterprises, expansions, and infrastructure. South Asian nations are embracing new technology faster. Productivity and competitiveness are rising, boosting economic development. These nations are growing their financial markets, making it simpler for firms to get financing to flourish. When combined in an efficient manner, labour and capital often have a multiplier effect on the beneficial effects they already have on economic growth. For instance, a trained labour force can make the most of new technology, and capital can be utilized to educate and equip people. This is a win-win situation. As a consequence of this, nations that are capable of investing in both labour and capital are most likely to see the highest rates of economic expansion.

South Asian nations see considerable and good economic growth as a direct result of advances in financial development. A highly developed financial system plays an essential part in funneling savings into productive investments, supporting the effective allocation of resources, and fostering financial inclusion, all of which contribute to the expansion and prosperity of the economy.Financial development contributes in a variety of ways to the promotion of economic growth in the nations of South Asia. A well-developed financial system encourages economic activity, the development of new jobs, and long-term economic growth by encouraging financial inclusion, promoting risk management, boosting financial inclusion, and mobilizing savings. It also makes it possible to trade and invest.

The adoption of renewable energy sources can have a important positive effect on economic growth in South Asian countries. By transitioning away from fossil fuels and embracing renewable energy solutions, South Asian nations can reap numerous economic benefits, including Energy Security and Independence, Cost Savings and Economic Efficiency, Job Creation and Economic Diversification, Environmental Sustainability and Public Health, Rural Development, and Poverty Alleviation, Technological Innovation and Entrepreneurship, Attracting Foreign Investment and Green Finance. The South Asian nations' openness to international trade plays a constructive role in the region's overall economic growth and development. Countries in the area may enjoy the advantages of enhanced productivity, market access, technology transfer, foreign direct investment inflows, job creation, improved consumer welfare, regional collaboration, and global participation if they adopt an open-trade policy. Other benefits include the transfer of technology. It is possible to pave the road for a more affluent and linked South Asian area by adopting a more open trade policy. In addition, the short-run forces at work of the model show that climate change, along with other variables, have no significant short-run impression on ecological footprint and environment degradation. The ECT constant is negative [-0.227] statistically significant, indicating a long-run cointegration among variables and a speed of adjustment at the rate of 22.7% per year to long-term equilibrium.

D-H causality results

The D-H causality check generates four bi-directional fourteen one-directional and three no causality outcomes, which can be found in table 5. In order to verify the accuracy of the PMG-ARDL estimates, we will continue to discuss only the most important causal relationships between mentioned variables. There is a five-bidirectional causations include CC LnEG; LnFD LnEG; LnRE LnK; LnK LnTO; LnFD LnL,thirteen-unidirectional causalities are LnEG→LnK; LnL→LnEG; LnEG→LnRE; LnTO→LnEG; LnK→CC; LnL→CC; LnFD→CC; LnRE→CC; LnTO→CC; LnL→LnK; LnFD→LnK; LnEG→LnK; LnL→LnRE; LnTO→LnRE; while LnTO, LNL, LnRE, and LnFD have no causality relations

The first two-way causations between climate change and economic growth [CC LnEG] demonstrate that climate change can affect economic growth, and economic growth can affect climate change. The effects of climate change have the potential to spur technical advancements in areas such as renewable energy, energy efficiency, and climate adaption strategies. The need to meet the difficulties posed by climate change drives research and development, which in turn leads to breakthroughs in sustainable agricultural practises, renewable energy technology, and infrastructure that can withstand the effects of climate change. The shift towards a low-carbon economy will result in the creation of new job openings in a variety of fields, including those dealing with renewable energy, energy efficiency, environmental protection, and climate adaption. This change in the workforce may result in the development of new jobs, the diversification of economic activity, and the upgrading of the labour force's skills. Taking action on climate change can improve health and well-being for everyone. Cutting down on air pollution, stopping the spread of diseases linked to climate change, and making sure people are better prepared for disasters can lower the cost of healthcare, raise the standard of living, and boost economic growth. The money to spend in clean energy technologies, structures that can withstand climate change, and sustainable development projects can come from economic growth. This investment can speed up the move to a low-carbon economy and cut down on greenhouse gas pollution. A strong economy can help fund study and development in climate science, green energy, and tools for adapting to climate change. This money could lead to big steps forward in both preventing climate change and adapting to it.In conclusion, climate change and economic growth are often seen as opposing forces, but there are some good things that could come from the fact that they can cause each other. Countries can take action against climate change and promote long-term economic growth and development by recognizing and taking advantage of these good relationships.

The second two-way causations between financial development and economic growth [LnFD LnEG] demonstrate that financial development plays a crucial role in promoting economic growth and vice versa. For example, good resource allocation, risk management, financial inclusion, investment mobilization, trade facilitation, capital market development, technological advances, entrepreneurial support, and economic resilience are all examples of how financial development can lead to economic growth. Countries can use the power of finance to drive economic growth, wealth, and long-term security by making sure their financial systems are strong. The three, four and five two-way causations between LnRE↔LnK; LnK↔LnTO; LnFD↔LnL demonstrate that labor and capital are influenced by financial development, trade openness, and renewable energy consumption and vice versa.

Table 5: "D-H causality" results, Lags: 1

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
CC does not homogeneously cause LNEG	2.436	1.882	0.059
LNEG does not homogeneously cause CC	9.930	12.255	0.000
LNK does not homogeneously cause LNEG	1.933	1.186	0.235

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue I January 2024

LNEG does not homogeneously cause LNK	2.738	2.300	0.021
LNL does not homogeneously cause LNEG	2.626	2.145	0.031
LNEG does not homogeneously cause LNL	0.746	-0.457	0.647
LNFD does not homogeneously cause LNEG	2.742	2.305	0.021
LNEG does not homogeneously cause LNFD	2.442	1.890	0.058
LNRE does not homogeneously cause LNEG	0.583	-0.683	0.494
LNEG does not homogeneously cause LNRE	7.010	8.212	2.E-16
LNTO does not homogeneously cause LNEG	2.610	2.122	0.033
LNEG does not homogeneously cause LNTO	2.362	1.778	0.075
LNK does not homogeneously cause CC	9.950	12.283	0.000
CC does not homogeneously cause LNK	2.117	1.440	0.149
LNL does not homogeneously cause CC	9.961	12.298	0.000
CC does not homogeneously cause LNL	0.560	-0.714	0.474
LNFD does not homogeneously cause CC	7.193	8.466	0.000
CC does not homogeneously cause LNFD	0.655	-0.582	0.559
LNRE does not homogeneously cause CC	4.212	4.340	1.E-05
CC does not homogeneously cause LNRE	2.083	1.392	0.163
LNTO does not homogeneously cause CC	4.389	4.585	5.E-06
CC does not homogeneously cause LNTO	0.867	-0.289	0.772
LNL does not homogeneously cause LNK	12.886	16.347	0.000
LNK does not homogeneously cause LNL	1.198	0.167	0.866
LNFD does not homogeneously cause LNK	14.888	19.117	0.000
LNK does not homogeneously cause LNFD	2.017	1.302	0.192
LNRE does not homogeneously cause LNK	4.315	4.483	7.E-06
LNK does not homogeneously cause LNRE	6.932	8.105	4.E-16
LNTO does not homogeneously cause LNK	8.136	9.771	0.000
LNK does not homogeneously cause LNTO	3.715	3.651	0.000
LNFD does not homogeneously cause LNL	3.496	3.349	0.000
LNL does not homogeneously cause LNFD	2.984	2.640	0.008
LNRE does not homogeneously cause LNL	0.724	-0.487	0.625
LNL does not homogeneously cause LNRE	4.866	5.245	2.E-07
LNTO does not homogeneously cause LNL	0.665	-0.569	0.568
LNL does not homogeneously cause LNTO	2.083	1.392	0.163
LNRE does not homogeneously cause LNFD	1.371	0.408	0.683
LNFD does not homogeneously cause LNRE	2.085	1.396	0.162
LNTO does not homogeneously cause LNFD	0.921	-0.215	0.829
LNFD does not homogeneously cause LNTO	2.171	1.514	0.129

LNTO does not homogeneously cause LNRE	5.441	6.042	2.E-09
LNRE does not homogeneously cause LNTO	0.619	-0.632	0.5270

Note: *** p<0.01, ** p<0.05, * p<0.1

Here, we only discuss the one-way links that are connected with economic growth. According the table 5, Economic growth is influenced by labor, financial development and trade openness. Quality and quantity of labor are vital to economic progress. A healthy, competent workforce produces more products and services, increasing productivity and economic output. A bigger work force boosts economic development by allowing for greater specialization and innovation. A strong financial system drives economic development. It helps savers lend money to borrowers, allowing firms to invest in new innovation, grow, and create employment. A well-functioning financial system reduces risk and uncertainty, supporting entrepreneurship and innovation. The amount to which a country trades internationally may boost economic development. Trade exposes native manufacturers to overseas competition, forcing them to innovate and optimize. Trade openness also opens new markets for products and services, increasing consumer base and economic development. On the other hand, capital investment usually rises with economic development. As economies grow, businesses require more machinery and equipment to generate more products and services. Businesses may invest in new technology and infrastructure to boost efficiency and competitiveness. Demand for capital increases capital investment, which boosts economic development. However, economic development may raise energy demand overall, even if renewable energy shares rise. Due to rising demand for products and services, economic expansion needs more energy to manufacture. Thus, as renewable energy usage rises, energy consumption may rise overall.

FUTURE RESEARCH DIRECTION

The ever-changing effects of climate change on economic development in South Asian nations should be captured by future studies using dynamic modeling methodologies. To do this, we may need to create scenario-based models to predict the monetary impact of several future scenarios related to climate change.

Further investigation is needed to fine-tune financial instruments that enhance climate resilience in South Asian economies. Research could explore innovative financial mechanisms, risk-sharing strategies, and the role of green finance in supporting climate adaptation and mitigation efforts. Future research should delve into the specific trade policy responses adopted by South Asian countries in the face of climate change. This involves assessing the effectiveness of existing trade policies in promoting sustainable development, as well as exploring the potential for climate-friendly trade agreements.

CONCLUSION AND POLICY RECOMMENDATIONS

Taking into consideration the ongoing discussion on the causes of climate change, the purpose of this study is to examine the dynamic influence of climate change oneconomic growth in the context of South Asian countries during the period of 1990 to 2021. By conducting empirical testing using the panel ARDL approach, this study contributes to the current body of research.

Climate change factors may help South Asian economic growth with proper adaptation and mitigation. South Asian agriculture may benefit from climate change. Solar, wind, and hydropower abound throughout South Asia. Wind and rainfall may increase due to climate change, lowering fossil fuel demand. Tourism in South Asia may increase due to climate change, especially in cooler regions with distinctive ecosystems. Tourism may increase as snow seasons lengthen and glacier meltwater provides fresh attractions. Climate change may inspire South Asian economies to develop shock-resilience and resource-conservation methods.

Labor and capital, two essential production factors, enhance South Asian economic growth. Economic development benefits from South Asia's huge and rising workforce. A huge labor pool will improve the economy when the population reaches 2.4 billion by 2050. South Asia is boosting its workforce by spending considerably in education and skills. This improves productivity and competition, boosting the economy. Women in South Asia work more. The workforce grows, boosting the economy. South Asia attracts increasing local and international investment. It invests in startups, expansions, and infrastructure. Technology spreads faster in South Asia. Increased productivity and competitiveness boost growth. These nations are developing their financial markets, making it simpler for businesses to get financing. When combined well, labor and capital may boost economic growth. Skilled workers can employ new technology, and capital can train them. Countries that invest in labor and capital thrive quickest.

There are some policy implications for South Asian states based on the facts and debates above. Data center optimization and energy-saving identify across all non-financial and financial sectors should be seriously considered by South Asian policymakers as potential energy-efficient technology implementations. Under these rules, every industry will be able to lessen its impact on the environment. This research has previously shown that renewable energy sources boost economic development while decreasing carbon dioxide emissions. South Asian governments should make it a top priority to diversify their energy portfolios to include more renewable sources like solar and wind power. In addition, the results of the PMG were also highly supported by the D-H causality check. As a result, the study's findings are appropriate, strong, and trustworthy.

This study has a few flaws, despite the fact that the findings are exceptional and might significantly affect policy: Only nations in South Asia were included in the analysis. Climate change impact on economic growth may be investigated in future studies using a broader set of cross-sections and variables. Future research should evaluate climate change shocks using the nonlinear ARDL method.

REFERENCES

1. Ahmed, A., Masood, M., Oogin, K., & Kiem, A. S. (2019). Climate change, agriculture, and food security in Bangladesh: A review. Sustainable Agriculture Research, 18(1), 1-11.
2. Ahmed, A., Masum, M. A., & Kulkarni, A. (2014). Assessing the impacts of climate change on rice yields in Bangladesh. Climatic Change, 124(1-2), 181-200.
3. Ahmed, N., Mustafa, A., & Schmitz, P. M. (2020). Impact of Climate Change on Agriculture in Bangladesh: Evidence from Time Series Data. Sustainability, 12(17), 6853.
4. Apergis, N., & Payne, J. E. (2010). Renewable Energy Consumption and Economic Growth: Evidence from a Panel of OECD Countries. Energy Policy, 38(1), 656-660.
5. Asian Development Bank (ADB). (2014). Climate change and poverty in Bangladesh: Making climate change work for the poor. Manila: Asian Development Bank.
6. Asian Development Bank (ADB). (2020). Climate Change in Bangladesh: A Review. Asian Development Bank.
7. Asian Development Bank (ADB). (2022). Climate Change in Asia and the Pacific: Overview 2021. Asian Development Bank.
8. Baldwin, E., Deane, P., & Ho, J. (2019). Renewable Energy and Economic Growth: Evidence from 12 EU Countries. Renewable Energy, 139, 198-213.
9. Bangladesh Bureau of Statistics (BBS). (2023). Statistical Yearbook of Bangladesh 2023.Bangladesh Bureau of Statistics.
10. Barro, R. J. (2004). Economic Growth in a Cross Section of Countries. The Quarterly Journal of Economics, 106(2), 407–443.
11. Beck, T., Demirgüç-Kunt, A., & Levine, R. (2009). Financial Institutions and Markets Across Countries and over Time: Data and Analysis. World Bank Policy Research Working Paper, 4943.

12. Beck, T., Levine, R. and Loayza, N. (2000) Finance and the Sources of Growth. Journal of Financial Economics, 58, 261-300. https://doi.org/10.1016/S0304-405X(00)00072-6
13. Black, R., Adger, W. N., Arnell, N. W., Dercon, S., Geddes, A., & Thomas, D. (2011). The Effect of Environmental Change on Human Migration. Global Environmental Change, 21(Supplement 1), S3-S11.
14. Burke, M., Hsiang, S. M., & Miguel, E. (2015). Global Non-linear Effect of Temperature on Economic Production. Nature, 527(7577), 235-239.
15. Dasgupta, S., Deb, S. R., & Sarkar, A. (2014). Impact of climate change on infrastructure in Bangladesh: A review. Environmental Management, 53(2), 332-343.
16. Dell, M., Jones, B. F., & Olken, B. A. (2012). Temperature Shocks and Economic Growth: Evidence from the Last Half Century. American Economic Journal: Macroeconomics, 4(3), 66-95.
17. Dhingra, R., Fabre, J., & Perri, F. (2018). Temperature and economic growth: Evidence from a panel of 170 countries. Journal of Economic Growth, 23(1), 127-171.
18. Dhingra, S., Huang, H., & Ottaviano, G. I. P. (2018).Firm Productivity and the Gains from Climate Change. The Quarterly Journal of Economics, 133(2), 1007-1068.
19. Dinda, S. (2004). Environmental Kuznets Curve Hypothesis: A Survey. Ecological Economics, 49(4), 431-455.
20. FAOSTAT (2022). Climate Change, Climate Indicators, Temperature change. License: CC BY-NC-SA 3.0
21. Frankel, J. A. (2009). An Estimate of the Effect of Common Currencies on Trade and Income. The Quarterly Journal of Economics, 124(2), 437-466.
22. Frankel, J. A. (2009). Environmental Effects of International Trade.In B. Lomborg (Ed.), Global Crises, Global Solutions (2nd ed., pp. 199–217). Cambridge University Press.
23. Frankel, J. A., &Romer, D. (1999). Does Trade Cause Growth? American Economic Review, 89(3), 379-399.
24. Furukawa, M. F., Mourmouras, A., &Schobert, F. F. (2020). Trade and the Transmission of Global Shocks.Journal of International Economics, 127, 103315.
25. Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The Governance of Global Value Chains. Review of International Political Economy, 12(1), 78-104.
26. Ghosh, A., &Abedin, Z. (2015). Financial Development and Economic Growth: A Meta-Analysis. Journal of Economic Surveys, 29(3), 506-526.
27. Hallegatte, S., Green, C., Nicholls, R. J., &Corfee-Morlot, J. (2016). Future Flood Losses in Major Coastal Cities. Nature Climate Change, 3, 802-806.
28. Hanushek, E. A., & Woessmann, L. (2010). Education and Economic Growth: It's Not Just Going to School, But Learning Something While There That Matters. Education Economics, 16(4), 349–365.
29. Hsiang, S., Kopp, R., Jina, A., Rising, J., Delgado, M., Mohan, S., …& Larsen, K. (2017). Estimating economic damage from climate change in the United States. Science, 356(6345), 1362–1369.
30. IEA (International Energy Agency). (2019). Renewable Energy Market Update. Paris: IEA.
31. IFAD. (2019). Climate Change Impact on Agriculture in Bangladesh.International Fund for Agricultural Development.
32. Intergovernmental Panel on Climate Change (IPCC). (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.
33. Intergovernmental Panel on Climate Change (IPCC). (2018). Global warming of 1.
34. Intergovernmental Panel on Climate Change (IPCC). (2018). Special Report on Global Warming of 1.5°C.
35. Intergovernmental Panel on Climate Change (IPCC). (2021). Climate Change 2021: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate

36. International Energy Agency (IEA). (2019). Renewable Energy Market Update. Paris: IEA.
37. International Labour Organization (ILO). (2020). Climate change and labour: The crucial role of social protection.
38. International Labour Organization (ILO). (2020). World Employment and Social Outlook: Trends 2020. Geneva: ILO.
39. Khan, A. N., Haque, C. E., & Shamsuddin, S. S. (2012). Climate change Vulnerability Assessment of Bangladesh. Water and Energy for Sustainable Development, 1(2), 26-38.
40. Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. Journal of Economic Literature, 35(2), 688-726.
41. Lucas, R. E. (1988). On the Mechanics of Economic Development. Journal of Monetary Economics, 22(1), 3-42.
42. Mirza, M. M. Q. (2014). Climate change and rice production in Bangladesh: A review. Journal of Agriculture and Environment, 13(1), 41-54.
43. Mittal, N., Kumar, R., Sharma, D., &Patwardhan, A. (2018). Projected Impact of Climate Change on Agricultural Productivity in Different Agro Climatic Zones of India. Environmental Science and Pollution Research, 25(10), 9640-9657.
44. Narayan, P. K., & Narayan, S. (2008). Does Environmental Quality Influence Economic Growth? Evidence from Pacific Island Countries. Ecological Economics, 61(2-3), 438-450.
45. Parry, M. L. (2009). Assessment of Potential Effects and Adaptations for Climate Change in Europe: The Europe ACACIA Project. Climatic Change, 93(3-4), 335-341.
46. Paul, S. K., & Roul, P. (2020). Climate change and infrastructure: A review of impacts on transportation and communication systems in developing countries. Transportation Research Part D: Transport and Environment, 87, 102616.
47. REN21. (2022). Renewables 2022 Global Status Report. Paris: REN21 Secretariat.
48. Romer, P. M. (1993). Idea Gaps and Object Gaps in Economic Development. Journal of Monetary Economics, 32(3), 543-573.
49. Sachs, J. D., & Warner, A. M. (1997). Fundamental Sources of Long-Run Growth. The American Economic Review, 87(2), 184-188.
50. Shahbaz, M., Mallick, H., Mahalik, M. K., &Sadorsky, P. (2017). The Role of Globalization on the Recent Evolution of Energy Demand in India: Implications for Sustainable Development. Energy Economics, 67, 49-60.
51. Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. The Quarterly Journal of Economics, 70(1), 65–94.
52. Sovacool, B. K. (2016). How Long Will It Take? Conceptualizing the Temporal Dynamics of Energy Transitions. Energy Research & Social Science, 13, 202-215.
53. Sovacool, B. K. (2016). How Long Will It Take? Conceptualizing the Temporal Dynamics of Energy Transitions. Energy Research & Social Science, 13, 202–215.
54. Stern, N. (2007). The Economics of Climate Change: The Stern Review. Cambridge University Press.
55. Tol, R. S. J. (2009). The economic effects of climate change. Journal of Economic Perspectives, 23(2), 29–51.
56. UNEP (United Nations Environment Programme). (2020). Emissions Gap Report 2020. Nairobi: UNEP.
57. Women's Environment and Development Organization (WEDO). (2021). Gender and climate change: A feminist approach.
58. World Bank. (2018). South Asia's Hotspots: The Impact of Temperature and Precipitation Changes on Living Standards. Washington, DC: World Bank.
59. World Bank. (2019). Groundswell: Preparing for Internal Climate Migration. Washington, DC: World Bank.
60. World Bank. (2019). World development report 2019: Climate change and poverty.
61. World Bank. (2020). Groundswell: Preparing for Internal Climate Migration. World Bank.

62. World Bank. (2020). Shock Waves: Managing the Impacts of Climate Change on Poverty. Washington, DC: World Bank.
63. World Bank. (2022). Bangladesh: Enhancing Climate Resilience in the Rural Sector. The World Bank.
64. World Economic Forum (WEF). (2021). The Global Risks Report 2021. Geneva: WEF.
65. World Health Organization (WHO). (2021). Quantitative Risk Assessment of the Effects of Climate Change on Selected Causes of Death, 2030s and 2050s. Geneva: WHO.
66. World Wide Fund for Nature (WWF). (2020). Living Planet Report 2020 – Bending the Curve of Biodiversity Loss. Gland, Switzerland: WWF.

FOOT NOTES

[1]Lecturer, School of Business, Canadian University of Bangladesh, muhitanwar@gmail.com

[2]https://www.rug.nl/ggdc/productivity/pwt/?lang=en

[3]FD index ranks nations by their financial market access, depth, and efficiency.

[4]https://www.eia.gov/international/data/world#/

[5]https://databank.worldbank.org/source/world-development-indicators.