Issues in Economics and Business
ISSN 2377-2301
2024, Vol. 10, No. 1

The Impact of Climate Change on Global Economic Stability: Developing Economic Policies to Manage Climate Risks

Ejuchegahi Anthony Angwaomaodoko

Independent Researcher

ORCID iD: 0009-0001-6300-2017

E-mail: ejuchegahi.angwaomaodoko@gmail.com

Received: July 30, 2024 Accepted: September 22, 2024 Published: September 24, 2024

doi:10.5296/ieb.v10i1.22277 URL: https://doi.org/10.5296/ieb.v10i1.22277

Abstract

The paper explores the impact of climate change on global economic stability while also placing consideration on the role of economic policy towards the management of climate change risk. Climate change represents one of the pressing environmental challenges of the 21st century with profound repercussion on the economic stability while also affecting several sectors such as agriculture, energy, tourism and health. The increased rate of change in the climatic condition has led to a wide spread of severe weather conditions such as hurricanes, flooding, drought, tsunamis, wild fire etc. This has necessitated the need for a robust economic policy that would aid in the mitigation effort against the release of greenhouse gases into the atmosphere, as well as providing adaptation against the harmful impact of climate change. The role of the agreement of 2015 Paris frame work was examined as it provides an important foundation for global cooperation in the fight against climate change. It is expected that proper integration of financial institution and the private sector would provide the necessary funding and technical support that would aid in the implementation of green technology as well as promote sustainable development.

Keywords: climate change, economic stability, economic policies, natural disasters, green technology

1. Introduction

Climate change is one of the most pressing environmental challenges of global significance in the 21st century. The impact of climate change extends beyond its environmental consequence, but also its implication on global economic stability. The change in climatic

condition is caused by the emission of greenhouse gases (GHG) into the atmosphere which has resulted in the rising temperature of the earth. The challenge of climate change has significantly increased since the dawn of the industrial age (IPCC, 2022; Massey, 2023) which showcases the role of industrialization on the emission of carbon dioxide into the atmosphere, hence, leading to climate change.

The threat posed by Climate change on global economic stability is significant considering that the world is continuously experiencing rise in temperature, as well as adverse weather conditions. This consequently has negative impact on natural resources as well as disrupts agricultural activities thus resulting in food insecurity (Fabris, 2020). More so, the negative consequence of climate change has massively affected infrastructural development in some countries with the constant exposure to natural disasters. These impacts result in economic losses, increased costs for disaster recovery, and shifts in global trade patterns with those in developing nation more affected by the negative consequence of climatic change. IMF (2018) provided an estimate of damage caused by hurricanes and typhoons between 2000 and 2014 on a global scale which stood at USD 548 billion.

The number of weather events has tripled since the 1980s (Munich Reinsurance Company, 2018), while the number of natural disasters has also increase from 249 in 1980 to 820 in 2019 (European Central Bank, 2020). This reflects the trend of climatic change over the years, for instance, within the last 20 years, the earth has been hit with major natural disasters which include; the 2004 and 2011 Tsunami earth quake that caused massive destruction of lives and properties in some Asian countries, Hurricane Katrina in New Orleans of United State in 2005, Haiti Earthquake in 2010, Tohoku Earth quake 2011, Typhoon Haiyan in 2013 which represented one of the strongest cyclones ever recorded, Nepal Earthquake in 2015, Australian Bushfires between 2019 and 2020, Hurricane Maria in 2017 in Puerto Rico while there has been several cases of flood in most countries. These disasters have had massive impact on the economic stability with effects reaching key economic sectors such as tourism, energy and transportation (Fawzy et al., 2020).

The reality of the danger posed by climate change has propelled the international panel on climate change (IPCC) to warn on the consequence of allowing the planet warm beyond 1.5°C which would result into natural disasters such as drought, heat waves, floods, rise in sea level among many other disasters, despite the previously agreed target was 2°C (Malhi et al., 2020). The panel further warned that even with a maximum emission of 1.5°C that the world has about 12 years to reduce its carbon emission by at least half in a bid to avoid major impact (Malhi et al., 2020). Therefore, the development of a sustainable policy on the cut of carbon emission could prove vital in achieving the targeted reduction of carbon within the duration of time as speculated.

The current study delves into the effects of climate change on global economic stability while placing emphasis on the development of economic policy necessary for the mitigation of the risk associated with climate change, as we are currently in an era that has witnessed continuous increase in the warming of the earth surface.

2. Economic Impact of Climate Change

Climatic change has been directly linked with the increase in natural disaster with its effects on both economic activities and infrastructural destruction being quite immense. The impact of natural disaster on the economy can either be direct or indirect (Penwar & Sen, 2019; Hochrainer, 2009; Okuyama, 2003). The direct impact of natural disaster showcased itself in the form of loss of labour (loss of human capital either through disabilities, injuries and in worse case- death) and loss of capitals which is through the direct damages to infrastructure and physical assets The direct impact of climate change events often lead to the indirect impact due to the ripple effect of the disaster having a negative consequence on economic activities. This impact often manifest its self through the decrease in expected labour hours and outputs from both industrial and agricultural activities (Penwar & Sen, 2019). Both the direct and indirect consequences of natural disaster could either have positive or negative impacts on a country's GDP, trade and employment but in most occasion, the consequence are negative (Botzen et al., 2019). The economic impact of climate change is measured using integrated assessment models (IAMs), econometric analyses, and sectoral studies. IAMs like DICE and PAGE assess long-term costs of climate policies, while econometric studies quantify GDP impacts from temperature fluctuations. Sectoral studies focus on specific industries like agriculture or energy (Nordhaus, 2017; Stern, 2015).

Raihan (2023) noted that natural disasters have been directly involved in the loss of 0.2% the global Gross Domestic Product (GDP) annually and when added up, the 0.2% of GDP amounts to $1.3 trillion loss to natural disaster as a result of climate change within the last decade. The impact of the damages caused by natural disaster on GDP of individual nation is immense for instance, the 2011 floods in Thailand (one of the largest producers of rice) was estimated at around 10% of their total GDP while this percentage does not even account for the indirect cost through loss in economic activities. More so, the Thai flood had a massive effect on the stock market with 30% drop which lasted a duration of 40 days. In 2018, the total cost of wild fire in California was estimated at about $350 billion with this figure accounting for 1.7% of the United State GDP (IMF, 2020). The Tropical cyclone in Malawi caused a record destruction in properties to a tune of $4 billion. IMF (2020) noted that natural disasters such as flood, drought and storm can cause destruction that could amount to 50% of a country's GDP. "Decreased agricultural production, system rehabilitation, and technology rebuilding were just some of the global losses attributed to natural and environmental disasters" (Yu et al., 2021 cited in Raihan 2023 p. 40).

The economic implication of climate change also includes the number of human causalities considering the significance of human capital on economic growth. An increase in human capital could have a significant effect on science, education and productivity. Wiranata and Simbolon (2021) cited by Raihan (2023) noted that an average of 60,000 annual death can be associated with natural disaster on a global scale. The developing nations are more vulnerable to the negative consequence of extreme weather condition due to the lack of adaptive strategy to cushion the harmful impact of climate change.

Developed nations are more resilient to the economic shock associated with the damages

from natural disasters but are also responsible for higher CO2 emission due to their industrial activities (Panwar & Sen, 2018; Raihan, 2023). Despite the role of the developed nations in the increase emission of greenhouse gases that enhance climate change, the developing nation are mostly at the receiving end of the impact considering that majority of the developed nations have higher capital income and disaster risk management systems, as such, they could easily cope with the economic consequence of these events (Raihan, 2023; Fomby et al., 2013; Loayza et al., 2012; Noy, 2009). The frequency of natural disaster would continue to increase when mitigating approaches towards cubing the emission of CO2 are ignored.

Table 1. Economic loss due to climate change

Country	Estimated economic losses due to climate change	Major impact as a consequence of Climate Change
United States	By the end of the century, without any mitigation, there could be an annual loss of between $360 billion and $1.2 trillion	Disruption of agriculture and damages to infrastructure would ensue as a due to rising sea level, extreme weather events would occur more frequently with increased intensity.
China	China may loss 0.5%–3% of GDP by the beginning of the next century	Severe cases of extreme weather events which will cause damage to infrastructure and agriculture process while also leading to water scarcity
European Union	The Countries under the European union may be pose to loss as much as 1.8% of GDP annually by the end of the century	Impact on the tourism sector, damages on infrastructure as result of extreme weather, the distribution of natural resources would be affected
India	India may loss as much as 2.8% of GDP annually from event of climate change by the end of the century	Extreme weather event would have consequence on infrastructure, the availability of natural resources (water scarcity), increase in Heat waves, and agriculture
Brazil	Brazil may incur loss of around 2% of her GDP annually from climate change by the end of the century	Tourism sector will be impacted, forest degradation, Deforestation, and other extreme weather condition causing damages to infrastructure

2.1 Climate Change and Food Security

Climate change has exacerbated the problem of food insecurity. This challenge is induced by the warming of the earth surface which affects the average rate of precipitation which has led to the increased cases of flood, drought and heat waves. More so, pests and diseases are easily spread in warmer climatic conditions, ground ozone concentration has also increased with all these factors affecting both the quantity and quality of food production (Zhao et al.,

2020; Kumar et al., 2022; Janni et al., 2024). Temperature is an important parameter that should be considered for the optimal growth and development of plants. Plants flowering and fruiting process can be altered as a result of exposure to temperature that is beyond the level necessary for their optimal development (Janni et al., 2024).

Currently, there is a high dependence on four major crops namely; rice, maize, wheat and soybeans for 66% of energy intake (Smýkal et al., 2018 cited in Janni et al., 2024). Tigchelaar et al. (2018) noted that with a global warming of 2°C, the total yield of four major exporter of maize is expected to decline by almost 53 millions tons which would translate to 43% of the volume of maize that is exported globally. The decline in yield of maize is in consideration of the fact that cereal are particularly sensitive to temperature (heat) with this parameter also affecting the quality of its produce (Maestri et al., 2002).

While in the case of wheat, exposure to a mean temperature of over 35°C leads to the damage of the plant and an exposure to a temperature that is greater than 24°C for a duration of 2-5 days during their reproductive phase results to an estimate loss of 6.0 ± 2.9% loss in global yield with each increase in temperature by 1°C (Janni et al., 2024). Parthasarathi et al. (2022) provided a statistics of the impact that an increase of 1°C would have on the yield of crops. They estimated that the global maize production would shrink by 7.4%, rice by 6.2%, and Soybeans by 3.1%. Brás et al. (2021) cited by Janni et al. (2024) buttressed the impact that both heatwave and drought could have on agricultural produce. Brás et al. (2021) statistics showed that the aforementioned factors would result in losses as follows; wheat (−11.3%), barley (−12.1%) and maize (−12.5%), and for non-cereals: oil crops (−8.4%), olives (−6.2%), vegetables (−3.5%), roots and tubers (−4.5%), sugar beet (−8.8%), among others" (p.3).

The economic loss as a consequence of long duration of exposure to heat reduces output of FAO crops by 3%. A loss of range of $0.8–3.1 billion is estimated per heat-wave (Miller et al., 2021). They further gave an average projection per country in terms of losses by the year 2091-2100 if no mitigation approaches is carried out to cub carbon emission into the atmosphere. The losses in output of agricultural produce at that duration could reach 10.3% of individual country (Miller et al., 2021).

3. Climate Change, Global Financial Stability and Stock Exchange

Climate change is increasingly having an effect on both the economic system as well as the financial market which could account for the increase of studies in the area of climate finance (Pagnottoni et al., 2022). Financial market provides the liquidity and capital that are necessary to ensure economic growth, stability and thriving. Therefore, an impact on the financial market carries a significant impact on the economy depending on its extent and duration.

The economic consequence of climate change has accentuated the changes that financial institutions and governments are making to the financial asset that they hold or issue (Neuhoff et al., 2009). Chen et al. (2020) noted that the consequence of climate change has serious ramification on the obligation of insurance companies as well as the defaulting of loans. While considering that both the impact of climate change and its mitigation through

the transition into a renewable form of energy is connected with fund as such the financial ramification of climate risk should be considered (Kim et al., 2020). Climate change affects economic stability both at a national and international level (Sholdaroy & Mullaboey, 2019). This risk manifest themselves as a results of losses incurred from change in climatic conditions and the natural disasters that follow suit.

Natural disasters can be viewed as external, non-financial shocks to the economy with the impact not restricted to the economy of the country but also having a ripple effect on the financial market of neighbouring countries and beyond (Pagnottoni et al., 2022). For instance, the Tohuku and tsunami earth quake had a massive impact on the Japanese stock market with the market experiencing a quick decline. The Nikkei 225 index dropped by over 10% in the days following the disaster. This event also led to disruptions in global supply chains, affecting stock prices in various industries worldwide, including automotive and electronics (Wang & Kutan, 2013). The impact of the tsunamis translated beyond the boundary of Japan considering that the Japanese Yen and United State dollars are most used currency in international trade and stock market. Studies have shown that Hurricane Katrina had a significant negative impact on stock prices, especially in industries directly affected by the disaster, such as insurance, oil, and tourism (Schuh & Jaeckle, 2023). “The study of 10 P&L insurers with coverage in the affected areas shows a semi-strong market efficiency as the stock prices react fast to public information around the event. Statistically significant negative risk-adjusted returns of −0.02% prevail in the [−30;+30] day period around the event” (Howerton & Bacon, 2017, p. 14, p. 16, Schuh & Jaeckle, 2023). The broader market also experienced volatility, with increased uncertainty and risk perceptions among investors, thus, highlighting the impact that natural disaster has on an economic giant country.

Pagnottoni et al. (2022) in their study, found that the reaction of stock prices to natural disaster is dependent the type of disasters under consideration and the location of the event. Their study indicates that stock indices are more responsive to event within European countries with the shock from these events affecting the stock market negatively. The reason for the impact is not far fetch from the fact that the market volatility and risk premium are increased as a consequence of the disaster with investors seeking for higher returns for holding stocks down during the period that precede a natural disaster. The reason for investors seeking higher returns can be traced to the fact that the aftermath of these disasters is often marked with high level of uncertainty as such the risks are higher. Therefore, the role of international cooperation and policy coordination is critical in creating a stable and sustainable global financial environment.

4. Impacts on Different Economic Sectors

The economic damage that is inflicted on the different sectors of the economy varies and depends on the extent to which these sectors depend on weather conditions. Over the years, some of the sectors that has been heavily impacted by climate change and the impact that climate change has had on each of the sectors are summarized below:

4.1 Tourism

Tourism is one of the sectors that is threatened by climate change which could be attributed to the dependence of this sector on weather as one of the factor that set a geographical location apart as a tourist attraction from others, and also allows for the free flow of individuals into a tourist destination. Rosselló et al. (2020) study on the effect of natural disaster on tourism is a pointer to the impact that different catastrophe as a result of climate change would have on tourism sectors. In their study, they found that Tsunami, flood and volcanoes have a massive impact on tourist visitation which could be attributed to the substantive destruction of the facilities within these sites and also the loss of natural assets. They added that for every increase in the number of death (for every 1000 people), affected (in millions of people) cost of damages (in millions of dollars), there will be a decrease of 1.07% and 1.32%, 2.13%–1.78% and 4.51%–3.44%, visitation respectively to the tourist location (Rosselló et al., 2020). While wildfires and earthquakes have a mixed reaction on the arrival of tourists, when considering the economic cost of the disaster on facility, earthquakes have more massive impact on tourist visitation when compared to Tsunami. Wild fire also has a massive influence on the influx of tourist due to the loss of natural sites.

Some of the reasons that the massive impact on tourism sector in the aftermath of disaster could be attributed to the damages to the facilities of the tourist site such as accommodation facility and other infrastructure within the city such transportation, telecommunication network, and electricity. Raihan (2023) noted that wild fire reduces the quality of air in tourist sites and also lead to loss of key sites. Furthermore, people's perception of these regions to be unsafe reduces the likelihood of them visiting, as they may not take the risk of visiting such locations (Rosselló et al., 2020). More so, Global warming is currently having a massive impact on the loss of key tourist sites and also the loss of biodiversity. For instance, IPCC (2022) has reported the loss of some skiing regions as a result of the increase in temperature of these regions while also taking into consideration the impact of variation in seasonality on tourism sector.

4.2 Health Sector

Global warming pose threat to the health of human with the spread of vector –borne infection, diseases that are associated with food and water, reduction in the quality of air which could be attributed to the increase in ozone pollutants which is increasing the prevalence of asthma and other respiratory infection (Domingo et al., 2024). The increase in heat waves has a direct impact on mortality (Yadav et al., 2023). In a recent pilgrimage to Mecca in Saudi Arabia, over 1300 pilgrims died due to heat wave (Agence France-Presse, 2024). The consequence of the increase of these disease would have an indirect impact on the economy by reducing the human capital due to time out to visit hospitals.

4.3 Agriculture

The impact of climate change on agricultural sector cannot be over emphasised as it has been mentioned in the earlier part of this paper. The impact of climate change has resulted in the reduction in agricultural yield and the quality of agricultural produce as a result of the

increased incident of pest and diseases which thrives in warmer conditions (Zhao et al., 2020; Kumar et al., 2022). In addition, adverse weather condition and the disasters related to climate change has also led to the loss of agricultural produce. The cumulative effect of climate change in agriculture could result to a dent in the exportation of agricultural produce and also lead to food insecurity. Rawat et al. (2023) noted that through the use of crop model, scientist have been able note the impact that drought would have on the agricultural sector. They noted that global crop production would reduce by 20% at the end of the century (Rawat et al., 2023). The reduction in crop production would have great consequence on an increasing population and also impact the contribution of agriculture to global GDP. (Table 2 below present a summary of impact of climate change on some of the sectors of the economy).

Table 2. Impact of climate change on some of the sectors of the economy

Sector	Impact	Cost
Energy	Transition to cleaner, renewable energy sources	Expensive and could have a significant impact on the economy
Agriculture	Lower crop yields	Food insecurity and price inflation
Tourism	Decline in tourism revenue	Negative impact on the economies of many countries
Financial sector	Increased risk of financial instability	Higher costs of capital
Water resources	More frequent and severe droughts; flooding	Difficulty accessing and managing water resources
Health sector	Increased risk of heat-related illness and death	Higher healthcare costs
Insurance industry	Increased claims for weather-related damage	Higher insurance premiums

Source: The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report

5. Climate Change Framework

The United Nations Frame work convention on climate change (UNFCCC) was established

in 1992 with the aim of reaching an agreement on reduction in global emission. The Kyoto treaty represents the first comprehensive international agreement which was adopted in 1997 (Harris et al., 2017). The treaty specified the agreement of industrialized countries to reduced emission between 2008 and 2012 through comparison with the baseline emission that was set in 1990. For instance, the United State agreed to a reduction by 7%, while France and Japan agreed to 8% and 7% respective reduction with the cumulative average reduction estimated at about 5%. The major setback to the Kyoto treaty was the fact that developing countries were not bounded by the targeted reduction with the then American President, President George Bush taken offence on the fact that China and India that are highly industrial but still grouped under the developing countries were not bounded by the agreement as such they withdrew from the treaty when it was enforced in 2005. The prior mentioned fact limited the success of the Kyoto protocol as global emission continued to increase during that duration (Clark, 2012). Despite the struggles of the Kyoto protocol, it represents the first important step taken towards climate change militation.

The Paris Agreement of 2015 marked a significant milestone, with countries committing to limit global temperature rise to well below 2 degrees Celsius above pre-industrial levels with a more ambitious target of 1.5 degrees Celsius. The Paris agreement was built on the foundation that individual country would set up her own voluntary goals that is within their own attainment for the reduction in emission. In the preceding month after the agreement was put in place, 186 countries submitted their proposed National determined contributions (NDCs), hence, indicating their inclination towards the reduction of CO_2 (Harris et al., 2017). Since the number of countries that were part of the agreement (195 countries) was inadequate to secure a global goal, the agreement would include a five years circle for countries to review their goals. The design of the agreement was done in a manner that enabled pressure to be placed on countries to comply with their pledges with further increment over a duration. The Paris agreement stipulates the continued provision of support in terms of finance and technology to aid developing countries in their transition towards sustainable renewable energy sources, as well as help them combat the adverse consequence of climate change (Harris et al., 2017).

Table 3. Major event in climate change negotiation

Year	Location	Outcome
1992.	Rio Earth Summit	The United Nations Framework Convention on Climate Change (UNFCCC) was open for signatory at the summit in Rio. The framework seek cooperation among members with the aim of reducing emission of greenhouse gases.
1995.	Berlin	The First Conference of the Parties (COP). This conference was significant as it was the beginning of a formal process for the reduction of greenhouse gases among developed nations.
1997.	Kyoto	A target reduction of 5% of greenhouse emission among developed countries between 2008 and 2012 from the baseline emission that was set in 1990.
2001.	Bonn	The significance of the Bonn 2001 protocol was to review the failures of the Kyoto agreement as a general consensus was not agreed with the US government rejecting the Kyoto agreement.
2009.	Copenhagen	The aim was to establish a binding global framework for reducing greenhouse gas emissions. The COP-15 was significant as developed countries made financial commitment of $100 billion to support the developing countries.
2011.	Dubai	COP-17 set up the foundation for negotiation aimed at developing a legally binding global agreement on climate change by 2015, which will then be implemented by 2020.
2015.	Paris	COP-21, commitment of 195 countries becoming signatory and providing a voluntary NDC's as a commitment to limit global temperature rise to well below 2 degrees Celsius above pre-industrial levels.

Source: (Harris et al., 2017)

6. Economic Policies for Climate Change Mitigation

6.1 Carbon Taxes

Carbon taxes is viewed as economic tool for the mitigation of climate change (Harris et al., 2017). This approach utilizes setting a price on carbon by levying a fee on the carbon content of fossil fuels. It provides a clear economic signal, encouraging businesses and consumers to reduce their carbon footprint. Revenue generated from carbon taxes can be reinvested in renewable energy projects, energy efficiency measures, or returned to citizens through dividends, thereby addressing both environmental and social objectives. Carbon taxes have been introduce in some countries and yielded considerable success in the reduction of greenhouse gases as well as in the generation of revenue for instance the success story of British Columbia province of Canada (Harris et al., 2017). It is expected that efforts should be placed on the acceptability of these measure to ensure its successful implementation globally.

6.2 Cap-and-Trade Systems

This approach of emission reduction was proposed over 50 years ago by Thomas D. Crocker (1966) and J. H. Dales (1968) which involves the process of designing an emission permits that could be transferable which serve to limit emission beyond the level known as the cap. The breakdown of this process involves setting the total level of emission that is permissible which is known as the cap with government usually playing the role of setting up the acceptable pollution in form of a permit; with these permits allocated to individual firms or industries within the boundaries that does not exceed the amount of permissible CO level within the country. The advantage of this approach to individual firms is that any of the firms reserve the right to sell the surplus of their right to another firm when they have been able to achieve reduction in their emission level or even make use of the excess in another of their operation. One of the downside of the cap and trade system is the issue of price volatility that can be an obstacle to capital investment (Metcalf, 2019) which could in turn affect political support for climate change policy as well as discourage investment in research and development alongside new technology. Therefore, emission cap can be done in such a way to vary from year to year depending on the economic situation during the period.

6.3 Subsidies and Incentives

The placement of subsidies on fossil fuel by government has become a measure used to stimulate economic growth as well as remove the barrier of inequality income. Government's subsidies on fossil fuel is either through the reduction in the amount payable by consumers or increase the amount that energy producers are receiving (Hayer, 2017 cited in Qadir et al., 2021). These measures have over the years increase the usage of fossil fuel as well as hampered the growth of the use of renewable energy in these countries having serious environmental impact. Therefore, subsidies on fossil fuel needs to be removed and reallocated to the development of cleaner form of energy (Qadir et al., 2021) to ensure the reduction in the emission of CO_2. While incentive can be issued by government to promote the adoption of clean energy bearing in mind that the importation of technology that are

necessary for renewable energy could prove to be expensive, most especially, in countries that has limited expertise in manufacturing (Zhao et al., 2016). The process of incentive can be achieved through either the provision of incentive for research and development to aid on the production of solar panel, wind turbines, e.t.c or through the process of tax waiver for the importation of renewable energy equipment (Qadir et al., 2021).

7. Barriers to Implementing Effective Climate Policies

Barriers to implementing effective climate policies include political resistance, economic concerns, and vested interests in fossil fuels. Political polarization hinders international cooperation, while economic fears of job losses slow policy action. Additionally, fossil fuel industries exert significant lobbying power.

One of the primary barriers to effective climate policy is political resistance, often due to ideological divides. Climate change has become a polarizing issue in many countries, with debates often split along party lines. In countries like the U.S., conservative groups frequently oppose climate policies due to concerns over government overreach, economic consequences, or skepticism of climate science. This resistance hampers the ability to pass comprehensive policies or international agreements aimed at reducing emissions (Lockwood, 2018). Additionally, short-term political cycles discourage long-term climate action, as elected officials prioritize policies with immediate benefits over those addressing long-term climate risks.

The fossil fuel industry wields significant political and economic power, further complicating climate policy implementation. These industries have historically lobbied against climate regulations, spending billions on campaigns and research that sow doubt about climate science or the necessity of mitigation efforts (Brulle, 2018). This lobbying leads to policy delays, weaker regulations, and the continued subsidization of fossil fuels in many countries. Overcoming this influence requires transparency in political lobbying, reducing subsidies for fossil fuels, and offering subsidies or incentives for renewable energy and cleaner technologies.

Climate change is a global issue that requires collective international action. However, securing global cooperation has proven difficult. Countries often prioritize their national interests over global climate objectives, especially when their contributions to climate change vary. For example, developing countries argue that historically industrialized nations should bear more responsibility for reducing emissions, while wealthier nations expect all countries to contribute equally. This disconnect complicates negotiations under frameworks like the Paris Agreement. Without a shared sense of responsibility and equitable distribution of climate costs, achieving global cooperation remains a significant challenge (Falkner, 2016).

8. Strategies for Overcoming Barriers

Overcoming these barriers requires political will, economic incentives for green technologies, and public pressure (Markard et al., 2020; Roberts, 2017). Among these strategies, building political will is essential to overcoming resistance. Engaging the public through awareness campaigns, grassroots movements, and activism can generate the political pressure needed to

push governments to act on climate (Fisher, 2019; Pettifor, 2020). Elected officials are more likely to implement climate-friendly policies when their constituents demand action.

In addition, the provision of economic incentives for renewable energy, energy efficiency, and low-carbon technologies can counter fears of job losses. Policies such as carbon pricing, green subsidies, and investment in green infrastructure create opportunities for economic growth, job creation, and industrial innovation (Nordhaus, 2019; IRENA, 2020).

Furthermore, strengthening international agreements like the Paris Agreement and creating mechanisms for accountability can help ensure that countries adhere to their climate commitments (Falkner, 2016). Support for climate adaptation and mitigation in developing countries through financing and technology transfers is essential for fostering global cooperation.

9. Conclusion

The study highlights the threat posed by climate change on global economic stability with its impact felt across different sectors including Agriculture, Energy, Insurance and Tourism. The disruption caused due to extreme weather events, global warming and rise in sea levels has stirred up the need for comprehensive and effective economic policies to manage climate change. Some of the economic policies as reviewed includes Carbon-tax, regulatory standards, subsidies and incentives for adoption of renewable energy which represents policies that must be incorporated globally to serve as a mitigation tool against the emission of CO2 while also putting in place adaptive measures to support and cope with the harmful impact of climate change. However, the success rate of these measures have been hampered by lack of global compliance.

To successfully combat the issue of climate change, the role of international cooperation cannot be overemphasised, with global agreement such as the Paris agreement taking centre stage in providing a framework that would ensure global cooperation among countries (ESCAP, 2020). However, the success of these agreement depends on the complete commitment and implementation by individual countries. More so, the role of financial institution and the private sector investment could also serve as a critical tools towards the driving of the agenda of renewable energy sources.

In conclusion, combating climate change requires the sincere efforts of all the actors involved while also taking the role of economic policies, international cooperation and the private sectors into consideration. By developing and implementing robust policies that address both mitigation and adaptation, we can enhance global resilience, promote sustainable development, and ensure a more stable economic future in the face of climate change.

Acknowledgments

Not applicable.

Authors contributions

Not applicable.

Funding

Not applicable.

Competing interests

Not applicable.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Macrothink Institute.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

References

Agence France-Presse (2024, June 23). *At least 1,300 hajj pilgrims died during extreme heat, Saudi Arabia says*. The Guardian. https://www.theguardian.com/world/article/2024/jun/23/hajj-pilgrimage-death-toll-extreme-heat-mecca-saudi-arabia

Botzen, W. J. W., Deschenes, O., & Sanders, M. (2019). The Economic Impacts of Natural Disasters: A review of Models and Empirical studies. *Review of Environmental Economics and Policy*, *13*(2), 167-188. https://doi.org/10.1093/reep/rez004

Brás, T. A., Seixas, J., Carvalhais, N., & Jägermeyr, J. (2021). Severity of drought and heatwave crop losses tripled over the last five decades in Europe. *Environmental Research*

Letters, *16*(6), 065012. https://doi.org/10.1088/1748-9326/abf004

Clark, D. (2012). "Has the Kyoto Protocol made any difference to carbon emissions?" *The Guardian*, November 26. https://www.theguardian.com/environment/blog/2012/nov/26/kyoto-protocolcarbon-emissions

Domingo, N. G., Fiore, A. M., Lamarque, J., Kinney, P. L., Jiang, L., Gasparrini, A., ... & Chen, K. (2024). Ozone-related acute excess mortality projected to increase in the absence of climate and air quality controls consistent with the Paris Agreement. *One Earth*, *7*(2), 325-335. https://doi.org/10.1016/j.oneear.2024.01.001

ESCAP. (2020). Accelerating implementation of the Paris agreement in Asia-Pacific: a guide for policymakers.

European Central Bank. (2020, February 27). *Climate change and the financial sector*. https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200227_1~5eac0ce39a.en.html

Fabris, N. (2020). Financial stability and climate change. *Journal of Central Banking Theory and Practice*, *9*(3), 27-43. https://doi.org/10.2478/jcbtp-2020-0034.

Falkner, R. (2016). The Paris Agreement and the New Logic of International Climate Politics. *International Affairs, 92*(5), 1107-1125.

Fawzy, S., Osman, A. I., Doran, J., & Rooney, D. W. (2020). Strategies for mitigation of climate change: a review. *Environmental Chemistry Letters*, *18*(6), 2069-2094. https://doi.org/10.1007/s10311-020-01059-w

Fisher, D. R. (2019). The broader importance of Fridays for Future: Moral and political legacies for climate change. *WIREs Climate Change, 10*(3), e608.

Harris, J.M., Roach, B., & Codur, A. (2017). The Economics of Global Climate Change. Global Development and Environment Institute Tufts University. http://ase.tufts.edu/gdae

Hayer, S. (2017). Fossil fuel subsidies.

Howerton, A., & Bacon, F. W. (2017). Hurricane Katrina's effect on property and casualty insurance companies'stock prices Proceedings of the Academy of Accounting and Financial Studies, *22*(1), 12-16. ttps://www.abacademies.org/Public/Proceedings/Proceedings38/aafs_proceedings_new_orleans_2017.pdf

International Monetary Fund (IMF) (2018). *World Economic Outlook*. Washington: IMF.

International Monetary Fund (IMF) (2020). *Equity Investors Must Pay More Attention to Climate Change Physical Risk.* Equity Investors Must Pay More Attention to Climate Change Physical Risk (imf.org)

IPCC. (2022). Climate Change 2022: Mitigation of Climate Change, the Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Cambridge University Press, New York, USA

IRENA. (2020). *Renewable Energy and Jobs: Annual Review 2020.* International Renewable Energy Agency.

Janni, M., Maestri, E., Gullì, M., Marmiroli, M., & Marmiroli, N. (2024). Plant responses to climate change, how global warming may impact on food security: a critical review. *Frontiers in Plant Science, 14*. https://doi.org/10.3389/fpls.2023.1297569

Kumar, L., Chhogyel, N., Gopalakrishnan, T., Hasan, M. K., Jayasinghe, S. L., Kariyawasam, C. S., Kogo, B. K., & Ratnayake, S. (2022). Climate change and future of agri-food production. In *Elsevier eBooks* (pp. 49-79). https://doi.org/10.1016/b978-0-323-91001-9.00009-8

Lockwood, M. (2018). Right-wing populism and the climate change agenda: exploring the linkages. *Environmental Politics, 27*(4), 712-732. https://doi.org/10.1080/09644016.2018.1458411

Maestri, E., Klueva, N., Perrotta, C., Gulli, M., Nguyen, H. T., & Marmiroli, N. (2002). Molecular genetics of heat tolerance and heat shock proteins in cereals. *Plant Molecular Biology, 48*(5/6), 667-681. https://doi.org/10.1023/a:1014826730024

Malhi, Y., Franklin, J., Seddon, N., Solan, M., Turner, M. G., Field, C. B., & Knowlton, N. (2020). Climate change and ecosystems: threats, opportunities and solutions. *Philosophical Transactions - Royal Society. Biological Sciences, 375*(1794), 20190104. https://doi.org/10.1098/rstb.2019.0104

Massey, D. S. (2023). The shape of things to come: International migration in the Twenty-First Century. In *Springer eBooks* (pp. 29-81). https://doi.org/10.1007/978-3-031-19153-4_2

Metcalf, G. E. (2019). Paying for Pollution: Why a Carbon Tax is Good for America. New

Munich Reinsurance Company (2018). *A Stormy Year: Natural Catastrophe 2017*. Geo Risks Research. Munich: Munich Reinsurance Company.

Nordhaus, W. (2017). Revisiting the social cost of carbon. *Proceedings of the National Academy of Sciences, 114*(7), 1518-1523.

Nordhaus, W. D. (2019). Climate Change: The Ultimate Challenge for Economics. *American Economic Review, 109*(6), 1991-2014.

Pagnottoni, P., Spelta, A., Flori, A., & Pammolli, F. (2022). Climate change and financial stability: Natural disaster impacts on global stock markets. *Physica. A, 599,* 127514. https://doi.org/10.1016/j.physa.2022.127514

Panwar, V., & Sen, S. (2018). Economic Impact of Natural Disasters: An Empirical re-examination. *Margin the Journal of Applied Economic Research, 13*(1), 109-139. https://doi.org/10.1177/0973801018800087

Parthasarathi, T., Firdous, S., David, E. M., Lesharadevi, K., & Djanaguiraman, M. (2022). Effects of high temperature on crops. In *IntechOpen eBooks*.

https://doi.org/10.5772/intechopen.105945

Pettifor, A. (2020). The Case for the Green New Deal. Verso Books.

Qadir, S. A., Al-Motairi, H., Tahir, F., & Al-Fagih, L. (2021). Incentives and strategies for financing the renewable energy transition: A review. *Energy Reports*, *7*, 3590-3606. https://doi.org/10.1016/j.egyr.2021.06.041

Raihan, A. (2023). A review of the global climate change impacts, adaptation strategies, and mitigation options in the socio-economic and environmental sectors. *Journal of Environmental Science and Economics*, *2*(3), 36-58. https://doi.org/10.56556/jescae.v2i3.587

Rawat, A., Kumar, D., & Khati, B. S. (2023a). A review on climate change impacts, models, and its consequences on different sectors: a systematic approach. *Journal of Water and Climate Change*, *15*(1), 104-126. https://doi.org/10.2166/wcc.2023.536

Rosselló, J., Becken, S., & Santana-Gallego, M. (2020). The effects of natural disasters on international tourism: A global analysis. *Tourism Management*, *79*, 104080. https://doi.org/10.1016/j.tourman.2020.104080

Schuh, F., & Jaeckle, T. (2023). Impact of hurricanes on US insurance stocks. *Risk Management and Insurance Review, 26*, 5-34.https://doi.org/10.1111/rmir.1223024.

Smýkal, P., Nelson, M. N., Berger, J. D., & Von Wettberg, E. J. (2018). The Impact of Genetic Changes during Crop Domestication. *Agronomy*, *8*(7), 119. https://doi.org/10.3390/agronomy8070119

Stern, N. (2015). Why are we waiting? The logic, urgency, and promise of tackling climate change. MIT Press.

Tigchelaar, M., Battisti, D. S., Naylor, R. L., & Ray, D. K. (2018). Future warming increases probability of globally synchronized maize production shocks. *Proceedings of the National Academy of Sciences of the United States of America*, *115*(26), 6644-6649. https://doi.org/10.1073/pnas.1718031115

Wang, L., & Kutan, A. M. (2013). The Impact of Natural Disasters on Stock Markets: Evidence from Japan and the US. *Comparative Economic Studies*, *55*(4), 672-686. https://doi.org/10.1057/ces.2013.16

Wiranata, I. J., & Simbolon, K. (2021). Increasing awareness capacity of disaster potential as a support to achieve sustainable development goal (sdg) 13 in Lampung province. *Jurnal PIR/Jurnal PIR : Power in International Relation*, *5*(2), 129. https://doi.org/10.22303/pir.5.2.2021.129-146

Yadav, N., Rajendra, K., Awasthi, A., Singh, C., & Bhushan, B. (2023). Systematic exploration of heat wave impact on mortality and urban heat island: A review from 2000 to 2022. *Urban Climate*, *51*, 101622. https://doi.org/10.1016/j.uclim.2023.101622

York: Oxford University Press, 2019.

Yu, Z., Razzaq, A., Rehman, A., Shah, A., Jameel, K., & Mor, R. S. (2021). Disruption in global supply chain and socio-economic shocks: a lesson from COVID-19 for sustainable production and consumption. *Operations Management Research*, 15, 233-248.

Zhao, J., Lu, Z., Wang, L., & Jin, B. (2020). Plant responses to heat stress: physiology, transcription, noncoding RNAs, and epigenetics. *International Journal of Molecular Sciences*, *22*(1), 117. https://doi.org/10.3390/ijms22010117

Zhao, Z. Y., Chen, Y. L., & Chang, R. D. (2016). How to stimulate renewable energy power generation effectively?–China's incentive approaches and lessons. *Renewable energy, 92*, 147-156.