

# Assessing the Impact of Global Agreements on Combating Climate Change and Advancing Sustainable Development and Global Climate Change

**Adamaagashi Izuchukwu**

A graduate of Enugu state university of science and technology.

Corresponding author : [adamaizuchukwu@gmail.com](mailto:adamaizuchukwu@gmail.com)

**Joseph Kwesi Asomah**

A graduate of Ghana institute of Management and Public Administration

[asomahjoseph42@gmail.com](mailto:asomahjoseph42@gmail.com)

**Udochukwu C. Onoh.**

A graduate of Kogi State University, Anyigba.

[udochukwuonoh31@gmail.com](mailto:udochukwuonoh31@gmail.com)

D.O.I: 10.56201/ijgem.v10.no1.2024.pg1.18

---

## **Abstract**

*This research evaluates the impact of global agreements on combating climate change and advancing sustainable development. Focusing on the Paris Agreement and Sustainable Development Goals (SDGs), the study employs qualitative research methods to analyze information from various sources. The Paris Agreement, ratified by 190 countries, outlines a global action plan to limit global warming, emphasizing the need to stay below 2 degrees Celsius and pursue efforts to limit the increase to 1.5 degrees Celsius. The study explores the effectiveness of global agreements by examining their impact on biodiversity, economic ramifications, and mitigation and adaptation strategies. Climate change emerges as a significant driver of global biodiversity loss, affecting species dynamics. The economic sector, particularly agriculture, faces challenges due to climate change, necessitating the formulation of effective climate policy contracts. Mitigation strategies, such as reducing greenhouse gas emissions and sustainable land use practices, are discussed, along with adaptation strategies involving resilient infrastructure and policies to protect vulnerable communities. The role of international cooperation is highlighted, emphasizing the importance of collaboration, knowledge sharing, and financial support for developing countries. While global agreements have made progress in mobilizing global action, challenges persist in their implementation. Sustained political will, financial support, and enhanced international cooperation are deemed essential for achieving the goals of these agreements. The study concludes with recommendations to strengthen implementation mechanisms, promote innovation, increase financial support, empower local communities, foster public awareness, integrate climate and health policies, and enhance global*

*governance for effective climate action and sustainable development.*

---

**Keywords;** *Climate Change, Sustainable Development, Biodiversity, Paris Agreement, Global Agreements*

---

## **Introduction**

The Paris Agreement, adopted in 2015 and now ratified by 190 countries, sets out a global action plan to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with efforts to limit the temperature increase to 1.5 degrees Celsius. The agreement also aims to strengthen the ability of countries to deal with the impacts of climate change and support them in their efforts to adapt to those impacts. The Sustainable Development Goals (SDGs), on the other hand, were adopted by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. Goal 13 specifically addresses climate action and calls for urgent action to combat climate change and its impacts. Together, these international frameworks play a crucial role in guiding global efforts to address climate change and promote sustainable development. By aligning their efforts with the Paris Agreement and the SDGs, countries can work towards achieving a more sustainable and resilient future for all. Additionally, these agreements provide a framework for cooperation and collaboration on a global scale, recognizing that climate change is a shared challenge that requires collective action.

Over the past 65 years, there has been a noteworthy encounter with observed and anticipated climatic changes worldwide, accompanied by significant global warming. Climate change (CC) presents a multifaceted global challenge, exerting its influence across various facets of ecological, environmental, socio-political, and socio-economic domains (Adger et al. 2005; Leal Filho et al. 2021; Feliciano et al. 2022). Elevated temperatures are a key aspect of climate change, impacting multiple spheres globally (Battisti and Naylor 2009; Schuurmans 2021; Weisheimer and Palmer 2005; Yadav et al. 2015). The industrial revolution has substantially intensified the challenge of earth's climate (Leppänen et al. 2014). Addressing this issue promptly with appropriate measures may enhance the likelihood of mitigating its detrimental impacts. Understanding the precise consequences of climate change on a sectoral basis is challenging (Izaguirre et al. 2021; Jurgilevich et al. 2017), as evidenced by the increasing recognition and consideration of climatic uncertainties in policymaking at both local and national levels (Ayers et al. 2014).

Climate change poses a significant threat to human health, as it can lead to increased frequency and severity of extreme weather events, air and water pollution, and the spread of vector-borne diseases (Watts et al., 2018). Addressing climate change through sustainable development measures can mitigate these health risks and lead to improved public health outcomes. For example, transitioning to renewable energy sources can reduce air pollution and improve air

quality, leading to decreased rates of respiratory diseases and cardiovascular problems (Jaccard & Rivers, 2019). In addition to public health benefits, advancing sustainable development can also create new job opportunities and spur economic growth. The transition to a low-carbon economy, for instance, can lead to the creation of green jobs in sectors such as renewable energy, energy efficiency, and sustainable transportation (IEA, 2019). Furthermore, investing in sustainable infrastructure and technologies can drive innovation and stimulate economic development (Rosenzweig et al., 2018).

Climate change is defined by examining long-term temperature and precipitation trends, along with factors like pressure and humidity levels in the surrounding environment. Prominent global and domestic effects of climate change include irregular weather patterns, the retreat of global ice sheets, and a corresponding rise in sea levels (Lipczynska-Kochany 2018; Michel et al. 2021; Murshed and Dao 2020). Historically, before the industrial revolution, natural sources such as volcanoes, forest fires, and seismic activities were considered distinct contributors to greenhouse gases (GHGs) like CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and H<sub>2</sub>O in the atmosphere (Murshed et al. 2020; Hussain et al. 2020; Sovacool et al. 2021; Usman and Balsalobre-Lorente 2022; Murshed 2022). The United Nations Framework Convention on Climate Change (UNFCCC) made a significant stride in addressing climate change at the Conference of the Parties (COP-21) in Paris on December 12, 2015. The resulting Paris Agreement unites nations in a collective effort to take ambitious measures, prevent climate change, and adapt to its impacts. It emphasizes increased funding to support developing countries in these endeavors, marking a pivotal moment in the global fight against climate change. The core objective is to limit the global temperature rise to well below 2 °C over pre-industrial levels, with efforts to further restrict the increase to 1.5° C (Sharma et al. 2020; Sharif et al. 2020; Chien et al. 2021).

Promoting sustainable development can contribute to enhanced social equity by ensuring that all segments of society have access to clean air, water, and energy resources. This can help reduce disparities in health outcomes and economic opportunities among different socio-economic groups (UNDP, 2019). By working together towards the goals outlined in international frameworks such as the Paris Agreement and the Sustainable Development Goals, governments, businesses, civil society, and individuals can strive to achieve a more sustainable and resilient future for the planet and its inhabitants. The Paris Agreement is a significant international accord that was negotiated within the United Nations Framework Convention on Climate Change (UNFCCC). The agreement represents a collective effort by 196 nations to address the growing threat of climate change. By setting the goal of limiting global temperature rise to well below 2 degrees Celsius, with an aspiration to limit the increase to 1.5 degrees Celsius, the agreement seeks to avoid the most catastrophic impacts of climate change.

The Paris Agreement establishes a framework for countries to regularly review and strengthen their climate action plans, known as nationally determined contributions (NDCs), with the aim of progressively reducing greenhouse gas emissions. In addition to mitigation efforts, the agreement also emphasizes the importance of adaptation to the impacts of climate change, particularly for vulnerable communities and ecosystems. This includes providing financial and technological

support to developing countries in their efforts to adapt to climate change and transition to low-carbon, resilient economies. The Paris Agreement also emphasizes the importance of transparency and accountability in reporting on climate action and progress towards achieving targets. Parties are required to regularly report on their emissions and progress in implementing their NDCs, and to participate in a global stocktake every five years to assess collective progress towards the agreement's goals. The Sustainable Development Goals (SDGs) offer a comprehensive framework for addressing the interconnected challenges of poverty, inequality, and climate change. Goal 13, in particular, emphasizes the urgent need for global cooperation to mitigate the impacts of climate change and transition towards a low-carbon, sustainable future. This includes efforts to reduce greenhouse gas emissions, improve adaptive capacity, and mobilize financial resources to support climate-resilient development (United Nations, 2015).

The SDGs are designed to be universal, applying to all countries regardless of their level of development. This reflects the recognition that climate change is a global issue that requires coordinated action at the international level. By setting specific targets and indicators for monitoring progress, the SDGs provide a roadmap for governments, businesses, and civil society to align their efforts towards a common vision of a more sustainable and resilient future. In addition, the SDGs recognize the interlinkages between climate action and other development priorities, such as poverty reduction, gender equality, and access to clean energy. By addressing climate change in a holistic manner, countries can achieve multiple sustainable development objectives simultaneously, leading to more integrated and effective solutions.

### **Methodology**

This study uses qualitative research methods to gather and analyze information from secondary sources, including peer-reviewed journals, books, and reports. A thorough review of literature was conducted, using specific keywords related to climate change, global agreements, and sustainable development. The research systematically evaluated the literature based on the research objectives, which focus on evaluating the impact of global agreements on addressing climate change and promoting sustainable development.

### **Effectiveness of Global Agreements**

The Paris Agreement, adopted in 2015, is a milestone in international agreements aimed at limiting global warming to well below 2 degrees Celsius above pre-industrial levels (United Nations Framework Convention on Climate Change [UNFCCC], 2015). The agreement's inclusion of nationally determined contributions (NDCs), wherein countries commit to reducing their greenhouse gas emissions and enhancing climate resilience, further underscores its significance in combating climate change (UNFCCC, 2015). The Paris Agreement is considered a critical step in mobilizing global action on climate change, as evidenced by the 189 countries that had ratified the agreement as of 2021 (UNFCCC, 2021). Nevertheless, challenges persist in the implementation of NDCs, as well as the necessity for more ambitious climate action to effectively meet the agreement's objectives.

The Sustainable Development Goals (SDGs), adopted in 2015 by all United Nations Member States, serve as a comprehensive framework to guide global efforts towards sustainable and equitable development (United Nations, 2015). The 17 interconnected goals and 169 targets cover a wide range of social, economic, and environmental issues, including poverty eradication, health, education, gender equality, clean energy, sustainable cities, responsible consumption, and climate action (United Nations, 2015). The SDGs have played a crucial role in raising awareness of sustainable development challenges and catalyzing efforts to mobilize resources and partnerships for their implementation (United Nations, 2015).

Currently, anthropogenic activities are primarily held responsible for climate change (CC) (Murshed et al., 2022). Beyond the industrial revolution, these activities encompass excessive agricultural operations, marked by high fuel-based mechanization, burning of agricultural residues, fossil fuel combustion, deforestation, and activities in national and domestic transportation sectors (Huang et al., 2016). Consequently, these anthropogenic actions contribute to climatic catastrophes, causing damage to both local and global infrastructure, human health, and overall productivity. The escalating levels of greenhouse gases (GHGs) due to heightened energy consumption, predominantly from fossil fuels in developing countries, contribute to rising temperatures (Balsalobre-Lorente et al., 2022; Usman et al., 2022b; Abbass et al., 2021a; Ishikawa-Ishiwata and Furuya, 2022).

This review aims to shed light on the socio-scientific aspects of climate change by analyzing existing literature across various global sectors that influence the environment. While providing an in-depth examination of climate change and its severe impacts on agriculture, biodiversity, health, economy, forestry, and tourism, the review proposes practical prophylactic measures and mitigation strategies as viable alternatives to counter the effects of CC. Detailed discussions on the societal implications of irregular weather patterns and other effects of climate changes are included. The review delves into sustainable mitigation measures, adaptation practices, and techniques on a global scale, with a focused exploration of their economic, social, and environmental aspects. Supplementary information, including methods of data collection, is included in the review.

However, while the SDGs have garnered significant attention and support, progress towards their achievement has been uneven across regions and countries. In particular, the goals related to climate action and environmental sustainability, such as Goal 13 on climate action and Goal 15 on protecting terrestrial ecosystems, require urgent and accelerated action (United Nations, 2019). Climate change poses a significant threat to sustainable development, and addressing this challenge is essential to achieving the broader SDGs (United Nations, 2019). As such, concerted efforts are needed to ramp up action, enhance international cooperation, and mobilize additional resources to ensure that the world is on track to meet the 2030 targets set forth by the SDGs (United Nations, 2019).

## **Impact of Climate change on biodiversity**

Climate change (CC) stands as a significant driver of global biodiversity loss, emerging as the foremost cause of species decline at an alarming rate. Extensive research, including studies by Abraham and Chain (1988), Manes et al. (2021), and A. M. D. Ortiz et al. (2021), highlights the profound impact of diverse climatic events on species dynamics. The speed and scale of climate change are reshaping habitat ranges for marine, freshwater, and terrestrial organisms. Changes in climate regimes have multifaceted effects on ecosystems, influencing factors such as species abundance, range shifts, alterations in activity timing, and microhabitat use (Bates et al. 2014). Species' geographic distribution hinges on their capacity to endure environmental stresses, biological interactions, and dispersal constraints. Consequently, local species must either accept, adapt, migrate, or face extinction in response to climate change (Berg et al. 2010). Species with superior adaptive abilities have a higher likelihood of survival in new ecosystems or may face decreased resilience in their current habitats (Bates et al. 2014). The inadequate connectivity of habitats and access to microclimates play a pivotal role, amplifying exposure to climate warming and extreme heatwave episodes. Notably, climate-driven expansion in the range of global mangroves is impacting carbon sequestration rates (Cavanaugh et al. 2014). This underscores the intricate interplay between climate change, habitat connectivity, and the resilience of diverse species.

The decline of kelp-forest ecosystems in various regions, replaced by seaweed turfs, has led to increased herbivory due to the influx of tropical fish populations. Elevated water temperatures, surpassing the physiological tolerance level of kelp communities, further contribute to this ecological shift (Vergés et al. 2016; Wernberg et al. 2016). Additionally, the destruction of keystone species poses a significant threat, with far-reaching consequences for entire communities in the affected habitat (Zarnetske et al. 2012). It's crucial to note that climate change (CC) doesn't target specific populations or communities, making the devastation of keystone species particularly concerning. This redistribution of species induced by CC may adversely impact carbon storage and overall ecosystem productivity (Weed et al. 2013). Prominent disruptions include effects on marine and terrestrial productivity, alterations in marine community assembly, and the widespread invasion of toxic cyanobacteria blooms (Fossheim et al. 2015). These changes underscore the complex repercussions of climate change on diverse ecosystems and their interconnected components.

The CC-impacted species extinction is widely reported in the literature (Beesley et al. 2019; Urban 2015), and the predictions of demise until the twenty-first century are dreadful (Abbass et al. 2019; Pereira et al. 2013). In a few cases, northward shifting of species may not be formidable as it allows mountain-dwelling species to find optimum climates. However, the migrant species may be trapped in isolated and incompatible habitats due to losing topography and range (Dullinger et al. 2012). For example, a study indicated that the American pika has been extirpated or intensely diminished in some regions, primarily attributed to the CC-impacted extinction or at least local extirpation (Stewart et al. 2015). Besides, the anticipation of persistent responses to the impacts of CC often requires data records of several decades to rigorously

analyze the critical pre and post CC patterns at species and ecosystem levels (Manes et al. 2021; Testa et al. 2018). Nonetheless, the availability of such long-term data records is rare; hence, attempts are needed to focus on these profound aspects. Biodiversity is also vulnerable to the other associated impacts of CC, such as rising temperatures, droughts, and certain invasive pest species. For instance, a study revealed the changes in the composition of plankton communities attributed to rising temperatures. Henceforth, alterations in such aquatic producer communities, i.e., diatoms and calcareous plants, can ultimately lead to variation in the recycling of biological carbon. Moreover, such changes are characterized as a potential contributor to CO<sub>2</sub> differences between the Pleistocene glacial and interglacial periods (Kohfeld et al. 2005).

### **Advancing Sustainable Development**

In addition to the SDGs, the Paris Agreement, which was adopted in 2015 by nearly every country in the world, is a landmark global agreement that aims to limit global warming to well below 2 degrees Celsius and pursue efforts to limit the temperature increase to 1.5 degrees Celsius. This agreement has been a catalyst for international cooperation on climate action and has prompted countries to develop and implement ambitious national climate action plans.

Furthermore, global agreements have also encouraged the adoption of sustainable practices in key sectors such as energy, transportation, and agriculture. For example, the transition to renewable energy sources such as solar, wind, and hydroelectric power has been a key focus of many national and international efforts to reduce greenhouse gas emissions and mitigate the impacts of climate change. Similarly, the promotion of sustainable and resilient agriculture practices, as well as the development of low-carbon transportation systems, have been critical components of advancing sustainable development.

These global agreements have not only informed and influenced national policies and strategies, but they have also fostered collaboration among governments, businesses, and civil society organizations. This multi-stakeholder approach has been essential in driving innovation, sharing best practices, and mobilizing resources for climate action and sustainable development.

Overall, global agreements have played a crucial role in mainstreaming climate action and sustainable development into national and international agendas. By providing a common framework and setting ambitious targets, these agreements have helped to galvanize global efforts towards building a more sustainable and resilient future for all.

### **The economic ramifications of climate change and antimicrobial resistance.**

Antimicrobial resistance (AMR) poses a rising and intricate global health challenge (Garner et al., 2019; Lemery et al., 2021). Health professionals worldwide express profound concern over this phenomenon, recognizing its potential to undo much of the progress achieved in the field of health (Gosling and Arnell, 2016). The extensive production of antibiotics by pharmaceutical industries globally has led to the gradual development of resistance among pathogenic microorganisms. This resistance threatens to significantly impact national and global economies

(UNEP, 2017). Notably, AMR is not confined to a specific region or country; it is prevalent on every continent (WHO, 2018). This escalating challenge pushes humanity towards a post-antibiotic era, where currently susceptible pathogens may once again cause widespread endemics and pandemics after becoming resistant (WHO, 2018). Such a reality could pose risks to sophisticated interventions like chemotherapy, joint replacements, and organ transplants (Su et al., 2018). The increasing cases of drug resistance have rendered common illnesses such as pneumonia, post-surgical infections, HIV/AIDS, tuberculosis, and malaria more challenging and expensive to treat (WHO, 2018). The ease with which antibiotic-resistant strains can be transmitted between individuals and across borders is exemplified by this scenario (Berendonk et al., 2015).

Examining second- and third-generation classes of antibiotics, including well-known cephalosporins, reveals their higher cost, broader spectrum, increased toxicity, and prolonged prescription durations (Lemery et al., 2021; Pärnänen et al., 2019). Furthermore, the abundance of resistant pathogenic strains is notably higher in warmer southern regions, indicating how climate change-induced global warming may facilitate the spread of antibiotic-resistant strains globally, imposing additional economic burdens for developing new and costlier antibiotics (WHO, 2018).

The exchange of antibiotic resistance genes (ARG) to susceptible bacteria through mechanisms like transformation, transduction, and conjugation is facilitated, and selection pressure can be induced by antibiotics, metals, pesticides, etc. In the most undesirable and dire scenario, bacteria carrying antibiotic-resistant genes may find their way into the environment (Pruden et al., 2013). This includes irrigation water utilized for crops, public water supplies, and eventually becoming integrated into food chains and food webs (Ma et al., 2019; D. Wu et al., 2019). This issue is widely reported in numerous countries, especially those where wastewater is commonly used as a source of irrigated water (Hendriksen et al., 2019).

### **Climate change impacts on the economic sector**

Climate exerts a substantial influence on overall productivity and economic growth, making climate change (CC) a major concern for both local and international environmental policymakers (Ferreira et al., 2020; Gleditsch, 2021; Abbass et al., 2021b; Lamperti et al., 2021). The adverse impacts of CC on the productivity of the agricultural sector are crucial for formulating local adaptation policies and shaping effective climate policy contracts. Prior research on CC has already predicted its repercussions on the global agricultural sector, highlighting varying impacts across different regions of the world. Investigating the effects of CC on diverse agrarian activities in various demographic areas and formulating strategies to respond to these effects has become a central focus for researchers (Chandio et al., 2020; Gleditsch, 2021; Mosavi et al., 2020).

The accelerated rise of global warming since the 1980s has led to a worldwide increase in temperatures, bringing about significant changes in rainfall patterns and evaporation processes in



various countries. The agricultural progress in numerous nations has long been intricately linked, fragile, and vulnerable to climate change (CC). The influence of CC on the development of Agriculture Total Factor Productivity (ATFP) affects diverse crops and the yields of farmers (Alhassan, 2021; Wu, 2020). Global trends indicate a rapid increase in both food insecurity and the frequency of natural disasters.

Numerous significant climatic and natural events have adversely impacted local crop production in affected countries, and the consequences of these disasters often surpass the coping capacities of economies and populations, posing threats to human life. China, in particular, stands out as one of the most affected nations globally, vulnerable to natural disasters due to factors such as its large population, challenging environmental conditions, rapid climate change (CC), low environmental stability, and disaster susceptibility. A statistical survey from January 2016 revealed that China suffered an economic loss of 298.3 billion Yuan, with approximately 137 million Chinese individuals severely affected by a variety of natural disasters (Xie et al., 2018).

### **Mitigation and adaptation strategies of climate changes**

Mitigation strategies can include reducing greenhouse gas emissions through the promotion of renewable energy sources, improving energy efficiency, and implementing carbon pricing mechanisms. Additionally, reforestation efforts and sustainable land use practices can help sequester carbon and mitigate the impacts of climate change. Governments, businesses, and individuals must collaborate to reduce their carbon footprint and transition towards a low-carbon economy. On the other hand, adaptation strategies involve preparing for and responding to the impacts of climate change. This can include investing in resilient infrastructure, developing early warning systems for extreme weather events, and implementing policies to protect vulnerable communities.

It is also crucial to integrate climate change considerations into urban planning, agriculture, and water resource management to minimize the potential risks associated with changing climate patterns. Researchers express deep concern about the adaptation and mitigation methodologies within specific sectors and geographical contexts. Key sectors like agriculture, industry, forestry, transport, and land use are focal points for adapting and implementing mitigation policies (Kärkkäinen et al., 2020; Waheed et al., 2021). Adaptation and mitigation efforts demand specific attention at both national and international levels. In the past decades, the world has confronted a significant challenge with climate change, making adaptation to its effects imperative for economic and social development. Developing policies and strategies at the international level is essential for effective adaptation and mitigation against climate change (Hussain et al., 2020).

Furthermore, international cooperation and funding mechanisms are crucial for supporting developing countries in their efforts to mitigate and adapt to climate change. By sharing knowledge, technology, and resources, the global community can work towards a more sustainable and climate-resilient future for all. It is also important to engage in dialogue and

advocacy to raise awareness about the urgency of addressing climate change and to mobilize action at all levels of society. Addressing the response to climate change (CC) involves two crucial factors: adaptation and mitigation (Jahanzad et al., 2020). While mitigation focuses on reducing or moderating greenhouse gas emissions, adaptation directly tackles the impacts of climate changes, such as floods. Mitigation is considered a critical issue both economically and environmentally, as it aims to curb the adverse effects of climate change (Botzen et al., 2021; Jahanzad et al., 2020; Kongsager, 2018; Smit et al., 2000; Vale et al., 2021; Usman et al., 2021; Verheyen, 2005).

Adaptation strategies, on the other hand, revolve around preparing for and minimizing the impacts of climate change that are already underway. This can include measures such as building resilient infrastructure, developing early warning systems for extreme weather events, and implementing strategies to protect vulnerable communities from the effects of climate change. Both mitigation and adaptation efforts are essential in addressing the challenges of climate change, as they work together to reduce emissions and build resilience to the changing climate. In addition to these strategies, it is also important to address the social and economic dimensions of climate change. This includes understanding and addressing the disproportionate impacts of climate change on marginalized communities, as well as finding ways to promote equity and justice in climate action. Furthermore, it is crucial to engage with stakeholders at all levels, including governments, businesses, and individuals, to foster a collective and inclusive approach to addressing climate change.

Education and awareness also play a significant role in addressing climate change. By increasing public understanding of the issue and promoting sustainable behaviors, we can work towards a more environmentally conscious society. This can include initiatives such as environmental education programs, public outreach campaigns, and policies that incentivize sustainable practices. Ultimately, addressing climate change requires a holistic approach that encompasses a wide range of strategies and actions. By combining mitigation and adaptation efforts with a focus on social equity, education, and stakeholder engagement, we can work towards a more sustainable and resilient future for the planet and for future generations.

Adaptation strategies, on the other hand, aim to minimize the vulnerability and increase the resilience of communities and ecosystems to the impacts of climate change. These strategies may involve building climate-resilient infrastructure, developing early warning systems for extreme weather events, and implementing sustainable land use planning to protect natural resources (IPCC, 2014). It is worth noting that while mitigation efforts are crucial for addressing the root causes of climate change, adaptation strategies are equally important for coping with the current and future impacts of a changing climate. By combining mitigation and adaptation measures, societies can work towards a more sustainable and resilient future in the face of climate change.

### **Role of International Cooperation and Stakeholder Involvement**

International cooperation is essential for addressing climate change and advancing sustainable

development. Collaboration among nations is vital for sharing knowledge, technology transfer, and financial support to support developing countries in their climate and sustainable development efforts (Asef Bayat, 2021). Multilateral mechanisms, such as the Green Climate Fund and the Technology Mechanism under the UNFCCC, play a crucial role in facilitating cooperation and supporting climate action (Hönig, S., & Schneider, L., 2017).

The Green Climate Fund, established as part of the United Nations Framework Convention on Climate Change (UNFCCC), is a key mechanism for providing financial resources to developing countries to assist in both mitigation and adaptation efforts. The fund aims to support a paradigm shift towards low-emission and climate-resilient development pathways, with a focus on the needs of the most vulnerable countries (Hönig, S., & Schneider, L., 2017). This represents an important form of international cooperation to address the financial challenges faced by developing nations.

Similarly, the Technology Mechanism, which consists of the Technology Executive Committee and the Climate Technology Centre and Network, aims to facilitate the transfer of environmentally sound technologies to developing countries. This mechanism supports countries in accessing and implementing sustainable technologies, contributing to their efforts in combating climate change (Moldan, B., Janoušková, S., & Hak, T., 2012). These multilateral mechanisms not only provide financial resources but also facilitate knowledge sharing and technical assistance. They are critical for promoting international cooperation and ensuring that developing countries have access to the necessary resources and support to advance their climate and sustainable development goals (Hönig, S., & Schneider, L., 2017).

By involving diverse stakeholders in the implementation of global agreements, a more comprehensive and inclusive perspective can be obtained. This can lead to policies that address the specific needs and concerns of various groups. For example, engaging with local communities can ensure that their unique challenges and vulnerabilities are taken into account when designing and implementing climate and sustainable development policies. Furthermore, businesses can bring valuable expertise and resources to the table, offering innovative solutions and technologies to help achieve the goals set out in global agreements. Civil society organizations can act as advocates for marginalized communities and ensure that their voices are heard and considered in the decision-making process.

In addition, governments play a crucial role in shaping and enforcing policies that are in line with international agreements. By involving them in the process, it can help ensure that policies are effectively implemented at the national and local levels. Ultimately, stakeholder involvement can help build a stronger foundation for the successful implementation of global agreements, as it creates a more transparent, accountable, and participatory decision-making process. This can lead to more effective and sustainable policies that benefit all stakeholders involved. In addition to these multilateral mechanisms, bilateral and regional partnerships also play a significant role in supporting developing countries in their climate efforts. Through these collaborations, countries can share expertise, technology, and best practices, fostering a global environment of

cooperation and mutual support in addressing climate change (Asef Bayat, 2021). These collaborations can also result in innovative financing and investment opportunities, driving sustainable development initiatives in developing countries.

### **Discussion of Findings**

The study underscores the significance of the Paris Agreement and Sustainable Development Goals (SDGs) in combating climate change and promoting sustainable development. It employs qualitative research methods, evaluating secondary sources to gauge the effectiveness of global agreements.

The Paris Agreement, ratified by 190 countries, aims to limit global warming and strengthen countries' ability to cope with climate impacts. Extensive literature review demonstrates the severe impact of climate change on biodiversity, emphasizing the need for global cooperation in mitigating these effects.

Furthermore, the study acknowledges the economic repercussions of climate change, emphasizing its influence on productivity and economic growth. The economic sector, particularly agriculture, is identified as vulnerable, necessitating robust adaptation policies.

Mitigation strategies, including reducing greenhouse gas emissions and sustainable land use practices, are highlighted. Simultaneously, adaptation strategies involve resilient infrastructure and policies to protect vulnerable communities.

International cooperation is deemed crucial, with mechanisms like the Green Climate Fund playing a vital role. The study concludes that while global agreements have spurred action and awareness, challenges persist in implementation. Sustained political will, financial support, and inclusive stakeholder engagement are deemed essential for achieving the goals of these agreements, emphasizing the need for ongoing commitment to address climate change and promote sustainable development.

### **Conclusion**

Global agreements, such as the Paris Agreement and the Sustainable Development Goals, have been instrumental in addressing climate change and advancing sustainable development. While these agreements have made progress in mobilizing global action and raising awareness, challenges remain in their implementation. Sustained political will, financial support, and enhanced international cooperation are essential for achieving the goals of these global agreements. Additionally, inclusive stakeholder engagement and innovative solutions are critical for driving climate action and sustainable development at the local, national, and global levels. By assessing the impact of global agreements, identifying challenges, and leveraging opportunities, the international community can accelerate progress towards a sustainable and resilient future for all.

## Recommendation

Based on the findings of this research, several recommendations can be proposed to enhance the effectiveness of global agreements in addressing climate change and advancing sustainable development:

1. **Strengthen Implementation Mechanisms:** Efforts should be intensified to strengthen the implementation mechanisms of global agreements, with a focus on translating commitments into tangible actions. This includes enhancing monitoring and evaluation frameworks to track progress at national and international levels.
2. **Promote Innovation and Technology Transfer:** Encourage innovation and facilitate the transfer of sustainable technologies across borders. This can be achieved through international collaborations, partnerships, and initiatives that promote the sharing of knowledge and best practices.
3. **Increase Financial Support:** Recognize the critical role of financial support in realizing the objectives of global agreements. Advocate for increased funding, especially to assist developing countries in implementing climate action plans and sustainable development initiatives.
4. **Empower Local Communities:** Emphasize the importance of inclusive stakeholder engagement, particularly at the local level. Empower local communities to actively participate in decision-making processes, ensuring that their perspectives and needs are incorporated into climate and sustainable development policies.
5. **Foster Public Awareness and Education:** Promote public awareness and education campaigns to increase understanding of climate change impacts and the importance of sustainable practices. Informed and engaged citizens are more likely to support and advocate for necessary policy changes.
6. **Integrate Climate and Health Policies:** Recognize the interconnectedness of climate change and health, especially concerning antimicrobial resistance. Develop integrated policies that address both environmental and health challenges for a comprehensive and sustainable approach.
7. **Enhance Global Governance:** Advocate for strengthened global governance structures to facilitate collaboration among nations. Support the continuation and improvement of multilateral mechanisms, such as the Green Climate Fund, to ensure effective coordination and support for climate action.

The successful implementation of global agreements requires a multi-faceted approach that includes robust policy frameworks, financial commitments, technological innovation, and active engagement of diverse stakeholders. By addressing these recommendations, we can work towards a more sustainable and resilient future, mitigating the impacts of climate change and advancing global sustainable development goals.

## References

- Abbass K, Begum H, Alam ASA, Awang AH, Abdelsalam MK, Egdair IMM, Wahid R (2022) Fresh Insight through a Keynesian Theory Approach to Investigate the Economic Impact of the COVID-19 Pandemic in Pakistan. *Sustain* 14(3):1054
- Abbass K, Niazi AAK, Qazi TF, Basit A, Song H (2021a) The aftermath of COVID-19 pandemic period: barriers in implementation of social distancing at workplace. *Library Hi Tech*
- Abbass K, Song H, Khan F, Begum H, Asif M (2021b) Fresh insight through the VAR approach to investigate the effects of fiscal policy on environmental pollution in Pakistan. *Environ Scie Poll Res* 1–14
- Abbass K, Song H, Shah SM, Aziz B (2019) Determinants of Stock Return for Non-Financial Sector: Evidence from Energy Sector of Pakistan. *J Bus Fin Aff* 8(370):2167–0234
- Abbass K, Tanveer A, Huaming S, Khatiya AA (2021c) Impact of financial resources utilization on firm performance: a case of SMEs working in Pakistan
- Abraham E, Chain E (1988) An enzyme from bacteria able to destroy penicillin. 1940. *Rev Infect Dis* 10(4):677
- Alhassan H (2021) The effect of agricultural total factor productivity on environmental degradation in sub-Saharan Africa. *Sci Afr* 12:e00740
- Ali A, Erenstein O (2017) Assessing farmer use of climate change adaptation practices and impacts on food security and poverty in Pakistan. *Clim Risk Manag* 16:183–194
- Anwar A, Sinha A, Sharif A, Siddique M, Irshad S, Anwar W, Malik S (2021) The nexus between urbanization, renewable energy consumption, financial development, and CO2 emissions: evidence from selected Asian countries. *Environ Dev Sust*. <https://doi.org/10.1007/s10668-021-01716-2>
- Araus JL, Slafer GA, Royo C, Serret MD (2008) Breeding for yield potential and stress adaptation in cereals. *Crit Rev Plant Sci* 27(6):377–412
- Aron JL, Patz J (2001) *Ecosystem change and public health: a global perspective*: JHU Press
- Arshad MI, Iqbal MA, Shahbaz M (2018) Pakistan tourism industry and challenges: a review. *Asia Pacific Journal of Tourism Research* 23(2):121–132
- Asseng S, Cao W, Zhang W, Ludwig F (2009) Crop physiology, modelling and climate change: impact and adaptation strategies. *Crop Physiol* 511–543
- Asseng S, Ewert F, Rosenzweig C, Jones JW, Hatfield JL, Ruane AC, Cammarano D (2013)

- Uncertainty in simulating wheat yields under climate change. *Nat Clim Chang* 3(9):827–832
- Balsalobre-Lorente D, Driha OM, Bekun FV, Sinha A, Adedoyin FF (2020) Consequences of COVID-19 on the social isolation of the Chinese economy: accounting for the role of reduction in carbon emissions. *Air Qual Atmos Health* 13(12):1439–1451
- Balsalobre-Lorente D, Ibáñez-Luzón L, Usman M, Shahbaz M (2022) The environmental Kuznets curve, based on the economic complexity, and the pollution haven hypothesis in PIIGS countries. *Renew Energy* 185:1441–1455
- Bank W (2008) *Forests sourcebook: practical guidance for sustaining forests in development cooperation*: World Bank
- Barua S, Valenzuela E (2018) Climate change impacts on global agricultural trade patterns: evidence from the past 50 years. In *Proceedings of the Sixth International Conference on Sustainable Development* (pp. 26–28)
- Bates AE, Pecl GT, Frusher S, Hobday AJ, Wernberg T, Smale DA, Colwell RK (2014) Defining and observing stages of climate-mediated range shifts in marine systems. *Glob Environ Chang* 26:27–38
- Brown HCP, Smit B, Somorin OA, Sonwa DJ, Nkem JN (2014) Climate change and forest communities: prospects for building institutional adaptive capacity in the Congo Basin forests. *Ambio* 43(6):759–769
- Bujosa A, Riera A, Torres CM (2015) Valuing tourism demand attributes to guide climate change adaptation measures efficiently: the case of the Spanish domestic travel market. *Tour Manage* 47:233–239
- Calderini D, Abeledo L, Savin R, Slafer GA (1999) Effect of temperature and carpel size during pre-anthesis on potential grain weight in wheat. *J Agric Sci* 132(4):453–459
- Cammell M, Knight J (1992) Effects of climatic change on the population dynamics of crop pests. *Adv Ecol Res* 22:117–162
- Cavanaugh KC, Kellner JR, Forde AJ, Gruner DS, Parker JD, Rodriguez W, Feller IC (2014) Poleward expansion of mangroves is a threshold response to decreased frequency of extreme cold events. *Proc Natl Acad Sci* 111(2):723–727
- Cell CC (2009) Climate change and health impacts in Bangladesh. *Clima Chang Cell DoE MoEF*
- Chandio AA, Jiang Y, Rehman A, Rauf A (2020) Short and long-run impacts of climate change on agriculture: an empirical evidence from China. *Int J Clim Chang Strat Manag*
- Chaudhary P, Rai S, Wangdi S, Mao A, Rehman N, Chettri S, Bawa KS (2011) Consistency of

- local perceptions of climate change in the Kangchenjunga Himalaya landscape. *Curr Sci* 504–513
- Chien F, Anwar A, Hsu CC, Sharif A, Razzaq A, Sinha A (2021) The role of information and communication technology in encountering environmental degradation: proposing an SDG framework for the BRICS countries. *Technol Soc* 65:101587
- Cooper C, Booth A, Varley-Campbell J, Britten N, Garside R (2018) Defining the process to literature searching in systematic reviews: a literature review of guidance and supporting studies. *BMC Med Res Methodol* 18(1):1–14
- Elsayed ZM, Eldehna WM, Abdel-Aziz MM, El Hassab MA, Elkaeed EB, Al-Warhi T, Mohammed ER (2021) Development of novel isatin–nicotinohydrazide hybrids with potent activity against susceptible/resistant *Mycobacterium tuberculosis* and bronchitis causing–bacteria. *J Enzyme Inhib Med Chem* 36(1):384–393
- EM-DAT (2020) EMDAT: OFDA/CRED International Disaster Database, Université catholique de Louvain – Brussels – Belgium. from <http://www.emdat.be>
- EPA U (2018) United States Environmental Protection Agency, EPA Year in Review
- Erman A, De Vries Robbe SA, Thies SF, Kabir K, Maruo M (2021) Gender Dimensions of Disaster Risk and Resilience
- Fand BB, Kamble AL, Kumar M (2012) Will climate change pose serious threat to crop pest management: a critical review. *Int J Sci Res Publ* 2(11):1–14
- FAO (2018).The State of the World’s Forests 2018 - Forest Pathways to Sustainable Development.
- Fardous S Perception of climate change in Kaptai National Park. *Rural Livelihoods and Protected Landscape: Co-Management in the Wetlands and Forests of Bangladesh*, 186–204
- Farooq M, Bramley H, Palta JA, Siddique KH (2011) Heat stress in wheat during reproductive and grain-filling phases. *Crit Rev Plant Sci* 30(6):491–507
- Feliciano D, Recha J, Ambaw G, MacSween K, Solomon D, Wollenberg E (2022) Assessment of agricultural emissions, climate change mitigation and adaptation practices in Ethiopia. *Clim Policy* 1–18
- Ferreira JJ, Fernandes CI, Ferreira FA (2020) Technology transfer, climate change mitigation, and environmental patent impact on sustainability and economic growth: a comparison of European countries. *Technol Forecast Soc Change* 150:119770
- Fettig CJ, Reid ML, Bentz BJ, Sevanto S, Spittlehouse DL, Wang T (2013) Changing climates,



- changing forests: a western North American perspective. *J Forest* 111(3):214–228
- Gleditsch NP (2021) This time is different! Or is it? NeoMalthusians and environmental optimists in the age of climate change. *J Peace Res* 0022343320969785
- Godfray HCJ, Beddington JR, Crute IR, Haddad L, Lawrence D, Muir JF, Toulmin C (2010) Food security: the challenge of feeding 9 billion people. *Science* 327(5967):812–818
- Gunter BG, Rahman A, Rahman A (2008) How Vulnerable are Bangladesh's Indigenous People to Climate Change? Bangladesh Development Research Center (BDRC)
- Hall CM, Amelung B, Cohen S, Eijgelaar E, Gössling S, Higham J, Scott D (2015) On climate change skepticism and denial in tourism. *J Sustain Tour* 23(1):4–25
- Hartmann H, Moura CF, Anderegg WR, Ruehr NK, Salmon Y, Allen CD, Galbraith D (2018) Research frontiers for improving our understanding of drought-induced tree and forest mortality. *New Phytol* 218(1):15–28
- Huang S (2004) Global trade patterns in fruits and vegetables. USDA-ERS Agriculture and Trade Report No. WRS-04-06
- Huang W, Gao Q-X, Cao G-L, Ma Z-Y, Zhang W-D, Chao Q-C (2016) Effect of urban symbiosis development in China on GHG emissions reduction. *Adv Clim Chang Res* 7(4):247–252
- Karami E (2012) Climate change, resilience and poverty in the developing world. Paper presented at the Culture, Politics and Climate change conference
- Kärkkäinen L, Lehtonen H, Helin J, Lintunen J, Peltonen-Sainio P, Regina K, . . . Packalen T (2020) Evaluation of policy instruments for supporting greenhouse gas mitigation efforts in agricultural and urban land use. *Land Use Policy* 99:104991
- Karkman A, Do TT, Walsh F, Virta MP (2018) Antibiotic-resistance genes in waste water. *Trends Microbiol* 26(3):220–228
- Lamperti F, Bosetti V, Roventini A, Tavoni M, Treibich T (2021) Three green financial policies to address climate risks. *J Financial Stab* 54:100875
- Leal Filho W, Azeiteiro UM, Balogun AL, Setti AFF, Mucova SA, Ayal D, . . . Oguge NO (2021) The influence of ecosystems services depletion to climate change adaptation efforts in Africa. *Sci Total Environ* 146414
- Lehner F, Coats S, Stocker TF, Pendergrass AG, Sanderson BM, Raible CC, Smerdon JE (2017) Projected drought risk in 1.5 C and 2 C warmer climates. *Geophys Res Lett* 44(14):7419–7428

- Macchi M, Oviedo G, Gotheil S, Cross K, Boedhihartono A, Wolfangel C, Howell M (2008) Indigenous and traditional peoples and climate change. International Union for the Conservation of Nature, Gland, Suiza
- Mall RK, Gupta A, Sonkar G (2017) Effect of climate change on agricultural crops. In Current developments in biotechnology and bioengineering (pp. 23–46). Elsevier
- Manes S, Costello MJ, Beckett H, Debnath A, Devenish-Nelson E, Grey KA, . . . Krause C (2021) Endemism increases species' climate change risk in areas of global biodiversity importance. *Biol Conserv* 257:109070
- Mannig B, Pollinger F, Gafurov A, Vorogushyn S, Unger-Shayesteh K (2018) Impacts of climate change in Central Asia *Encyclopedia of the Anthropocene* (pp. 195–203): Elsevier
- Martínez-Alvarado O, Gray SL, Hart NC, Clark PA, Hodges K, Roberts MJ (2018) Increased wind risk from sting-jet windstorms with climate change. *Environ Res Lett* 13(4):044002
- Mishra A, Bruno E, Zilberman D (2021) Compound natural and human disasters: Managing drought and COVID-19 to sustain global agriculture and food sectors. *Sci Total Environ* 754:142210
- Mosavi SH, Soltani S, Khalilian S (2020) Coping with climate change in agriculture: Evidence from Hamadan-Bahar plain in Iran. *Agric Water Manag* 241:106332
- Murshed M (2020) An empirical analysis of the non-linear impacts of ICT-trade openness on renewable energy transition, energy efficiency, clean cooking fuel access and environmental sustainability in South Asia. *Environ Sci Pollut Res* 27(29):36254–36281. <https://doi.org/10.1007/s11356-020-09497-3>
- Murshed M (2022) Pathways to clean cooking fuel transition in low and middle income Sub-Saharan African countries: the relevance of improving energy use efficiency. *Sustainable Production and Consumption* 30:396–412. <https://doi.org/10.1016/j.spc.2021.12.016>