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An Exploration of the Challenges Climate Change Has Brought to the Chinese Economy and the Corresponding Strategies

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Abstract

With the increasing use of fossil fuels, climate change in the 21st century is becoming the main development issue of our era. The increasing severity of climate change affects daily life and brings great challenges to the global economy. The purpose of the paper is to explore the impact of global climate change on China's economic development and analyze China's effective measures to deal with the challenges of climate change in the 21st century. Theoretical insights from East Asia Environment Monitor on Adapting to Climate Change (2007), which is the first regional report in the "Environment Monitor" series, and Rosa (2003), who made a clear explanation of the relationship between world energy and climate change are synthesized in the context of global climate change. Both form a conceptual framework. In addition, we also review the research of Hugh Compston and Ian Bailey with their study focusing on climate policies and anti-climate policies, and other professional experts in this field, such as B. Saranya and Mo Hong'e, who explore the risk of climate change in the economy and discuss specific policies in China. It can be found that due to climate change, various phenomena, including the rapid rise in global temperature, then changes in precipitation patterns and frequent extreme weather, have occurred, affecting food and water supplies in developing countries and leading to significant losses to the production of China's agriculture and animal husbandry. The study also finds that adaptation to climate change is a complicated process that must integrate different measures, including efficient energy conversion and utilization, carbon sequestration, and alternative energy carrier like synthetic fuels. Overall, this study provides effective measures for China's response to the impact of global climate change on economic development.

Keywords: extreme weather, energy conversion, carbon sequestration, energy carrier

1 Introduction

A new progress article published by Springer Nature's professional academic journal Nature: Climate Change claims that the conflict between humans and wildlife may be magnified by climate change. This research shows that future climate change's impact on human and wildlife welfare needs to be identified and mitigated. Climate change has always been a heated topic around the globe, with most researchers focusing on its impacts.

Concerning climate change, studies have focused on the impact of physical climate risks on firms and facilities globally. Physical climate risks, referring to the risks that arise from the physical effects of climate change, increasingly affect facilities worldwide across industries (Carleton & Hsiang, 2016; Hong, Li, & Xu, 2019; Mckinsey Global Institute, 2020; Byers et al., 2020), including foreign assets, or foreign direct investment (Pachauri & Meyer, 2014). For instance, increased rainfall and flooding interrupted business at Toyota's manufacturing facilities in Southeast Asia (Nikkei Asian Review, 2020). Water shortage shut down a Coca-Cola plant in India (CNBC, 2020). Rising sea-level risks affect some of the Chinese infrastructure investments in Pakistan (South China Morning Post, 2021).

To dispose of the puzzles, governments have proposed new climate policies abound, and there is a general trend toward stronger climate policies across a large range of countries. The number of climate change laws passed by governments worldwide has increased steadily at the beginning of the 21st century (Townshend et al., 2013). By 2013 renewable energy support policies, for example, were in place in 127 countries (REN21, 2013). Compston and Bailey furthered that the six largest emitters of carbon dioxide, including China, the U.S., the E.U., Japan, and India, have strengthened climate policies, except Russia, with no real progress.

To the best of our knowledge, although many of these studies have attendant expert literature discussing the impact and adaptations of climate change, they have seldom been brought together to be analyzed as a group. Therefore, this article explores the current challenges of climate change in China and how to live with climate change through innovative policies and methods. To do this, I look at some basic yet significant questions concerning climate change:

a) What is climate change?

b) What is the relationship between climate change and economic growth?

c) How to adapt to climate change?

The contributions of this work include a detailed description of climate change around the globe, integration of human research and practices on climate change, and thus providing effective measures for China's response to the impact of global climate change on economic development.

The structure of this essay is as follows: first, I look at the basic concept and development of climate change in history. After that, I focus on discussing the adaptation methods for countries and then put forward three useful and effective ways to achieve non-emitting energy sources and zero carbon emission, and finally, conclude.

2 Literature Review

2.1 Study of Climate Change

Climate change refers to variations in our climate that directly or subliminally result from human activity, mainly the concentration of greenhouse gases (GHG) in the atmosphere globally. In 1988, the World Meteorological Organization and the United Nations Environment Program established the Intergovernmental Panel on Climate Change (IPCC) to understand the risk of human-induced climate change, its potential impacts, and measures for adaptation and mitigation from scientific and socioeconomic perspectives. In 1992, the United Nations Conference on Environment and Development adopted several landmark treaties, including the United Nations Framework Convention on Climate Change (UNFCCC), which aims to prevent human activities from interrupting the climate system and to control GHG concentrations in the atmosphere at sufficiently low levels. Later, the Kyoto Protocol to the UNFCCC was signed in 1997, with compulsory targets to reduce the emission of GHG in each signatory nation, which entered into force on February 16, 2005. Under the Protocol, countries are classified into two types: developed countries, as Annex 1 countries, and developing countries, as Non-Annex 1 countries. The former nations must reduce the emission of GHGs since developed countries have been the main contributors to the increasing amount of GHGs in the atmosphere since the 1850s. At the same time, despite no such obligations, the latter must submit an annual GHG inventory. But the trend that developing countries contributed little to the stock of total GHG emissions in the past is expected to change over the coming decades (World Resources Institute, 2007). The institute projected that China, a Non-Annex 1 country, is responsible for a growing and significant share of the annual flow of current global emissions, with 118% of projected emissions in 2025, far exceeding other Annex 1 countries like America (39% of projection) and E.U. (19%) (World Bank, 2007).

According to the Kyoto Protocol in 1997, six gases demonstrate the properties of greenhouse: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbon (PFCs), and sulfur hexafluoride (SF6). Some of these gases occur naturally, while both human activity and natural conditions trigger some, and others are entirely from human activities. The latest Report from IPCC shows that human activity in the past century has led to the increase of GHGs in the atmosphere and an average temperature increase of 0.74 degree Celsius and is predicted to rise further by 1.1 to 6.4 degree Celsius by the end of the 21st century (World Bank, 2007). It is also indicated that the rise of global average temperatures since the mid-20th century is caused by GHG, which stems from human activities like fossil fuel burning and land use changes. The statistics from Stern Review in 2000 depict that GHG emissions are primarily from energy use, including the burning of fossil fuel in power generation, transport, industry, and buildings, accounting for 65% in total, while agriculture, deforestation, and other land use have significant proportions as well (World Bank, 2007).

2.1.1 History Development of Climate Change

Due to the improvement in the ability and speed of computing methods, people can model weather evolution, climate variability, and change. In 1988 the Intergovernmental Panel on Climate Change (Climate Change Panel) was established. Its responsibility is to evaluate and formulate various scenarios and understand climate change and its impacts and mitigation means. The results predicted by the Intergovernmental Panel on Climate Change are based on energy consumption and greenhouse gas emission forecasts made by the International Energy Agency, the Organization for Economic Cooperation and Development, the U.S. Energy Intelligence Agency and the Environmental Protection Agency, the Director of the Energy Bureau and the Director of the Environment of the European Union. However, the climate model personnel is imperfect and incomplete. It is affected by the huge uncertainty of increasing time, so such predictions are not predicted in any way. People prefer to regard them as issues of thinking and concern to continue to improve existing data and models. It should also be taken into account that although the general report of the Intergovernmental Panel on Climate Change and the supportive reports produced by the Working Group has recognized relevance, the complexity of the climate system and understanding of its work does not allow Chengdu to draw clear conclusions about actual trends and potential causes.

The international community adopted the United Nations Framework Convention on Climate Change in 1992 and the Kyoto Protocol in 1977. Therefore, the binding goal accepted by developed countries is to limit or reduce greenhouse gas emissions from 2008 to 2012. The Kyoto

Protocol will help curb the overall fossil energy demand and control energy prices. Based on experience, the Kyoto Protocol aims to control greenhouse gases globally.

Because the negative energy balance of the E.U. is worrying, the European Climate Change Plan was launched in 2000 to identify and develop the implementation of the Kyoto Protocol strategy. The clean development mechanism and the joint implementation of these policies will be based on appropriate fiscal measures, such as carbon energy taxes or reducing the tax burden of energy efficiency activities.

2.1.2 Expected Change in Global Climate

Due to climate change, various phenomena have occurred, and one of the conspicuous changes is the rapid rise in global temperature, then changes in precipitation patterns. For example, the runoff projected in 2050 shows that some areas will change. It will be drier, some areas will become drier, and extreme weather will appear more frequently. In 2001, IPCC published that sea levels are expected to rise by 18 to 59 centimeters by 2100 (World Bank, 2007). the Fourth Assessment Report announced that extreme weather events such as severe storms, floods, droughts, and heat waves have become longer and more intense, with more frequency of heavy precipitation and arctic sea ice shrinking by 2.7% per decade (World Bank, 2007).

Except for these obvious impacts of global climate change, there are also expected effects on food and water supplies and the ecosystem, with developing countries and the poor suffering the most. The Stern Review (2000) shows that the possible increase of 5-6 degrees Celsius warming would lead to an average 5-10 percent decline in global GDP, while poor countries are afflicted with more than 10% GDP loss (World Bank, 2007). Also, since the poor rely on natural resources and have limited capital to tackle and adapt to climate change and extremes, they are vulnerable to climate change which threatens livelihoods and negatively affects natural resources. Therefore, climate change is a severe risk to poverty mitigation, and developing countries should make corresponding policies to deal with it.

2.2 Economic Impacts of Climate Change

Climate change is the unintended consequence of world industrialization. The massive use of fossil fuels and human activities have emitted a large amount of carbon dioxide into the earth's atmosphere, resulting in a rise in global temperatures. Climate change negatively impacts the economy globally, especially in the East Asia and Pacific (EAP) region, since governments in these areas have to distribute limited budgets for climate change adaptation instead of investments for economic growth and poverty alleviation. Some essential impacts on assets and livelihoods related to climate change in EAP include threats to water security, impacts on agriculture and fisheries, disruption of tourism, and reduced energy security and GDP.

2.2.1 Impact on Agriculture

Climate change can lead to a series of phenomena, such as high temperatures, droughts, floods, coastal submersion, and land degradation, all of which negatively impact agricultural productivity.

Hoah et al. and Snidvonds et al. 2003 surveyed agriculture along the Mekong River, and the result of their studies is shown in the World Wildlife Fund (2005). The Mekong River is the longest in Southeast Asia. It raises a population of about 60,000,000, and the rice produced in the basin is enough to feed 300,000,000 people yearly (World Bank, 2007). However, impacted by the increased frequency of floods due to climate changes, rainfall in these areas will increase significantly during the flood season in September from 12 billion cubic meters (BCM) per month to 26 (BCM) per month (World Bank, 2007). It is recorded that overall rainfall on Korat Plateau will increase from 124 to 137 cm per year (World Bank, 2007). Increased floods in wet seasons result in land submerging in some areas, which may significantly damage the productivity and sustainable development of the Delta region. Heavy rainfall will increase the washing force of rainwater on the land, resulting in a large loss of nutrients in the soil. Suppose nutrients are difficult to meet the needs of crops. In that case, the output of the whole farmland will decline due to malnutrition, affecting the normal growth of crops and leading to a significant decline in yields and damage to product quality. Meanwhile, in the dry season, drought can affect crop rhizomes' growth and development, leading to slow crop growth and eventually reducing production. Due to higher temperatures, there will be a shortage of water resources and a deterioration of water quality, which may adversely affect sensitive and economically productive wetlands.

Another example is the Yangtze River, which is more than 3,600 kilometers long, accounting for about one-fifth of China's land area. The Yangtze River basin has more than 500,000,000 people. It is one of the most densely populated basins in the world and has created more than 40% of China's GDP (World Bank, 2007). In recent years, due to global warming, the average temperature in the Sanjiangyuan area has increased by about 0.88°C (World Bank, 2007). Glacier melting will increase water in the short term, but the flow of water will decrease over time, thus reducing the supply of river water. As the temperature rises, there will be more evaporation. Therefore, the impact of precipitation is also uncertain. Climate change not only affects the land productivity of crops but also affects the area of land cultivation (Worldwatch Briefing, 1998; Worldwatch Institute, 2006; Ya et al., 2000; Ye &

Glantz, 1998).

2.2.2 Impact on Fishery

Climate change also has a significant impact on fisheries. Both organisms and antibiotics, as climate factors, affect the number and distribution of marine fish. According to a recent study of changes in ocean currents, it will harm marine fisheries. Loukos et al. (2003) investigated that the expected warming leads to a dramatic decline in the scale of skipjack tuna habitat in the equatorial Pacific by using a modeling study. Also, in China, the primary marine fishery species, such as ribbon fish and yellow croakers with seasonal feeding and spawning migration patterns, are affected greatly by climate change. Global warming may lead to sea level rise, a coastline retreat, land salinization, and reduced oxygen content in seawater. For instance, some fish may die because they cannot adapt to the environment, which will cause a series of chain reactions. The rupture of the food chain will have a huge impact on other fish, and the diversity of marine life will be destroyed. Secondly, with global warming and the increase of carbon dioxide in the air, the photosynthesis of plants may be more frequent and prolong the growth cycle of plants. Thus the growth of algae in the ocean will be more vigorous, which may absorb seawater's nutrients, resulting in fish suffocation due to lack of oxygen. Under the influence of global warming, El Nino will occur more frequently, which may lead to a decline in the number of fish in the coastal waters of Southeast Asia. The high temperature caused by the El Nino phenomenon threatens aquaculture. Some areas will face the threat of water salinization caused by the decline in water level and seawater inversion, which negatively impacts aquaculture. Global warming will lead to frequent extreme weather. Severe weather, such as storm surges and typhoons, will affect the migration and survival of fish and threaten the fishing industry's safety. Due to the increase in sea temperature, fish migrate to high latitudes, and no other fish will supplement the equatorial region, which may cause a sharp decline in the number of tropical fish in the equatorial region. And people will go fishing to high latitudes, greatly increasing the original cost. Additionally, lower oxygen availability in higher elevations may affect fisheries due to a rise in surface air temperatures. It is reported that the timing and amount of precipitation in the plains may affect the migration from rivers to floodplains for spawning, dispersal, and growth (Food and Agriculture Organization of the United Nations [FAO], 2003).

2.2.3 Negative Impact on GDP

Global climate change has induced the El Nino phenomenon in terms of economic impact. The last century's most serious El Nino event occurred from 1997 to 1998 in Malaysia and Indonesia in Southeast Asia, exacerbating forest fires and causing forest fires, which seriously affected economic growth. The report from ADB and the National Planning Development Agency of Indonesia (BAPPENAS) shows the estimated loss due to such fires is 10 billion U.S. dollars in Indonesia. The resulting air pollution has caused about 500 deaths and nearly 3 million lost work days, costing more than $17 million in 1999 (World Bank, 2007). In recent studies, the El Nino cycle has been associated with disease outbreaks such as malaria, dengue, and Rift Valley Fever (WHO, 2000), leading to great financial loss.

A rise in sea level would generally affect the regions' GDP, and Vietnam and China suffered the most from impacts from Indonesia, Thailand, and Cambodia (Dasgupta et al. 2007). If there is no adaptation, a high island such as Viti Levu could withstand annual economic losses of 2% of Fiji's GDP on average. In comparison, a low group of islands, such as Tarawa Atoll in Kiribati, could encounter damages of about 16% of its GDP per year by 2050 (World Bank, 2007). These costs could be substantially higher in years of extreme weather events such as cyclones, droughts, and large storm surges. In an article in Nature, researchers from Stanford University and the University of California, Berkeley found that at a golden temperature of about 13 degrees Celsius, per capita GDP grew the fastest, and below or above this temperature may harm economic growth (citation). Climate warming and economic prosperity are opposites. The long-standing concern is that climate change is a disaster for people in poor countries, and we have confirmed this. Marshall Burke, an associate professor in the Department of Earth Systems Science at Stanford University, said, "Our important finding is that even rich countries can't stay out of it, and big countries will be affected as well" (citation, p.). Therefore, it is necessary to take certain measures to deal with the impact of climate change. (分页)

3 Methods to Combat Climate Change

Researchers have investigated diverse practices in dealing with global climate change. Rui Rosa, in 2003 studied that energy exploration, especially the reliance on oil in the current world, is associated with global climate change and put forwards three effective approaches to improve energy utilization and achieve low carbon emissions. Except this, in the East Asian Environmental Monitor 2007, it is supposed that EPA regions take immediate methods to adapt to climate change, and addressing climate risks and taking adaptive action will require both individual and collective action involving firms, communities, and government agencies. Hugh Compston and Ian Bailey (2013) furthered this idea by proposing climate and anti-climate policies, and they concluded that anti-climate policies could best be tackled by targeting approvals of new fossil fuel power stations and proposals to introduce new fossil fuel subsidies.

3.1 Methods to Lower Carbon Emission

Efficient energy conversion and utilization are crucial to human development. It is necessary to analyze the energy reservoirs and flows to optimize the outputs from the energy resources and the impacts on the environment. To reduce emissions and pollution in power plants, refineries, and other large industrial plants, experts have improved combustion technology to increase thermal efficiency. In recent years, direct energy conversion has attracted more and more attention because it can bypass the Carnot efficiency limit, which limits the performance of the widely used heat engine and can directly convert the chemical energy of liquid or gaseous fuels into electric fuel cells.

The Second is Carbon sequestration. Long-term fossil energy selection requires effective carbon dioxide storage. Carbon management can be achieved by using primary fossil energy sources with sequestration technologies. Since electrical power plants constitute about one-third of the total carbon dioxide emission to the atmosphere, these plants are the manifest objects to implement carbon sequestration technologies (Herzog et al., 2000). This process involves recovery, concentration, liquefaction, and disposal. The two largest natural storage layers to deal with carbon dioxide are the rock layer and the deep sea. On the one hand, carbon dioxide can be stored in the deep ocean either as a carbonate solution or as pressurized gas or liquefied. On the other hand, deposing of CO2 can be injected into impermeable geological reservoirs like depleted gas and oil fields or mined salt domes.

Finally, alternative energy carrier, like synthetic fuels, is encouraged by most scientists. Human beings are also looking for new energy sources. Synthetic carbon fuel has been proposed as an alternative to today's fossil-derived fuels, which may play an important role in the future energy economy. Coal and natural gas can be converted into oxygenated or hydrocarbon fuels and chemical feedstocks. For example, it has been pursued to convert coal into synthesis gas by partial combustion in the presence of water steam. Coal hydrogenation offers a broad range of end products similar to petrochemical products. In addition, natural gas can also be reformed into synthesis gas and therefore transformed into more complex organic products. Although coal gasification in a thermochemical metal redox cycle is still under development, it has great potential. Since the basic raw materials required for a full-scale energy economy based on synthetic fuels are coal and fresh water, synthetic fuels obtained are free from pollutants such as sulfur, metals, and aromatic compounds.

Combining the above methods can achieve a non-emitting energy source and zero carbon emission. The choice of atmospheric CO2 for the fuel synthesis is considered best since when burning that fuel, the net balance of CO2 emissions would be zero; this choice for Synthetic carbon fuel economy contributes to a renewable source of carbon and a zero net balance of Synthetic carbon fuel emissions (Steinberg & Baron, 1976). Later, in 1997, Canon proposed hydrogen as an ideal energy carrier and final-end fuel since the endpoint of this process is zero CO2 emission, and it has three times higher heat of combustion than gasoline. Therefore, once hydrogen production becomes energetically and economically interesting, it might be used as a feedstock to the SCF economy. Thus the current transportation, distribution, storage, and end-use systems can be utilized.

3.2 Methods of Adaptation

Adaptation to climate change is imperative for countries because it is nearly impossible to avoid climate change in the next two or three decades with the continuous growth and accumulation of GHGs (IPCC, 2007). Adaptation to climate change is a complicated process that must integrate different measures, including awareness raising, technological innovation, poverty reduction, economic reform, coordination, improving disaster preparedness, and establishing financial safety nets and insurance systems. Though debates concerning the most effective approaches for developing and implementing adaptation strategies, it is recognized that these actions make sense and have greater value in anticipation of future climate change.

In recent years, the number of extreme weather climates in China has increased under the background of global climate change. Heavy rains, floods, high temperatures, droughts, low temperatures, etc., are extremely extreme and regionally obvious. Abnormal situations are frequent and frequent, and the scope of impact and the losses caused are further increased. The content of carbon dioxide is also increasing year by year. In the past hundred years, the global temperature has fluctuated due to the large-scale burning of fossil fuels and large-scale deforestation. For nearly half a century, the increase in anthropogenic greenhouse gas emissions has increased the greenhouse effect. Climate warming is expected to continue by the middle of this century. This puts forward higher requirements to enhance our ability to adapt to climate change.

Adaptation is to take adjustment measures and fully implement effective means to mitigate the adverse effects and potential risks caused by climate change by strengthening the risk monitoring and management of natural ecosystems and economic and social systems. Mitigation is to reduce greenhouse gas emissions and increase carbon sinks through the long-term adjustment of energy, industrial, and other economic systems and natural

ecosystems to stabilize and reduce the concentration of greenhouse gases in the atmosphere and slow down the rate of climate change. Mitigation is a fundamental strategy to mitigate climate change, but adaptation is essential to solve immediate problems.

There are significant regional differences in the impact and risks of climate change. We need to improve the assessment technology level and basic capabilities, promote the construction of China's climate change data center system, establish a big data sharing platform that includes multi-circles and human activities, and realize the interconnection and interoperability of climate change and its socioeconomic impact data; carry out climate change impact and risk causes, quantitative analysis, establish climate change and its impact and risk, climate carrying capacity assessment indicator system and technical system; promote quantitative and dynamic climate change impact and risk assessment for key regions and sensitive areas.

Adapting to climate change still faces many challenges. Adapting to climate change is closely related to everyone. All departments, industries, and regions must improve their political positions, strengthen work responsibilities, strengthen organizational leadership, strengthen support and guarantees through policy means and market mechanisms, and improve capabilities through scientific and technological research and development, popular science training, and talent construction. The keys to the success of the climate change adaptation strategy include: taking the government as the leader in climate change adaptation governance, improving the efficiency of all regions and departments while ensuring a certain degree of public participation; the formulation of relevant policies is scientific, and requires continuous supervision and adjustment; and finally, the implementation of policies should be Only through specific analysis of regional characteristics can we effectively build a climate-adaptive society with local characteristics.

3.3 Climate Policies and Anti-Climate Policies

Implementing effective climate and anti-climate policies is important to achieving ecological and environmental progress and high-quality development. The community with a shared future for mankind proposed by China has also contributed its solutions to global climate governance. It is necessary to adhere to the new development concept of innovation, coordination, green, openness, and sharing, among which green development is necessary for sustainable development. Adhering to the new development concept represents the people's yearning for a better life and is an important guide for China's climate action. Xi Jinping once said, "Lucid waters and lush mountains are invaluable assets. Clear waters and green mountains are as good as mountains of gold and silver." Protecting the ecological environment can promote economic development and mitigate climate change's impact on China. This statement has demonstrated that social development cannot be at the cost of unrestrained consumption of natural resources and bottomless sacrifice of the natural environment. As Porter and Linde (1999) said, "Win-win opportunities for the environment and economy can be captured through improvements which reduce pollution in production processes" (p. 1). Although industrial production has created unprecedented material wealth for human society, it has also caused irreparable ecological trauma to the human living environment. Adhering to the concept of "green water and green mountains are golden mountains and silver mountains" not only helps to create a good production and living environment but also breaks through the environmental protection bottleneck that restricts economic and social development and people's living standards with green production and lifestyle, and helps the transformation and upgrading of economic and social structure. This concept provides an endless internal impetus for building a beautiful China and achieving a strong modern socialist country. Also, it creates a new situation for developing the cause of socialism with Chinese characteristics.

Reducing pollution and carbon emissions is one way to deal with climate change's impact. Carbon dioxide and other common pollutants usually come from the same source, mainly from the combustion and utilization of fossil fuels, so we need to control the use of fossil fuels and thus reduce carbon emissions, which has a lasting impact on economic development and lifestyle. Promote the green transformation of the economy and promote high-quality development; this will help mitigate climate change and the damage it causes to the economy.

4. Conclusion

This study aims to explain how global climate change has affected China's economic development and how China should respond to these challenges. It was found in the study that climate change in agriculture not only affects the land productivity of crops but also affects the land planting area. Therefore, under future climate change, it is advised to raise crop diversification and create new crop varieties by genetic engineering and gene mapping as strategies for adaptation. Besides, due to the more frequent occurrence of El Niño, the fishing industry has suffered substantially in the number of fish along the coastal waters of Southeast Asia. Also, we found that rising sea levels would affect the regions' GDP generally, especially in China and Vietnam. Thus, we should take practical management measures to strengthen cooperation with neighboring countries and reduce destructive fishing. Overall, this work contributes to existing knowledge of climate change by providing a more detailed development

of climate conditions and discussing its economic impacts. However, due to the limitation of the research scope data and the incompleteness of the methods, the proposed measures may not be specific enough, so I will continue to learn relevant knowledge and expand my horizons through practice. In the future, I plan to study the impact of soil corrosion on agriculture and put forward my views and suggestions after learning.

5 Evaluation

This project allows me to independently write an academic paper on a subject I am interested in. It makes me know more about climate change. Besides, I have enhanced my abilities in searching materials, critically analyzing the contents, and improving my writing skills. However, there are still some limitations to my project.

Firstly, climate change is a big topic, and through this study, I found many directions to be detailed, such as the effects of soil erosion on agriculture. In addition, since school courses and EPQ courses are conducted simultaneously, time is very tight, which is a challenge for me to manage practice and accomplish tasks. Thus, if I could finish this paper again, I would read more relevant materials and spend more time researching and analyzing articles.

Overall, I have learned about climate change, its impacts on the economy, and different methods to adapt to climate change, broadening my horizon. Also, I can be more organized with my time and improve my management skills. This can lay a good foundation for my college studies.

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