Proceedings of the 2nd International Conference on Social Psychology and Humanity Studies
DOI: 10.54254/2753-7048/37/20240510

Preventing Further "Tragedies of the Commons" in Warming: Insights from Global Climate Policy

Yixin Sun[1,a,*]

[1]*Management School, University of Liverpool, Liverpool, L69 3BX, the United Kingdom*
a. nysa.sun02@gmail.com
**corresponding author*

Abstract: Based on the theory of the tragedy of the commons and the background of global warming, this paper examines the emergence, development, and specific problems of current international climate policies at the political economy level. The aim is to provide the global community with sustainable policy recommendations to address the challenges of climate change effectively. The paper explores complex topics like resource distribution, carbon emissions, climate adaptation, and international cooperation using an interdisciplinary approach. The study underscores the crucial role of economic policies in guiding resource use to combat global warming. It also emphasizes the challenges posed by international cooperation, political will, and social acceptance. The paper further discusses measures like establishing standardized standards for resource extraction and highlights the importance of long-term planning among nations. In conclusion, even though the "tragedy of the commons" poses significant challenges in the context of climate change, these can be mitigated through specific economic measures.

Keywords: global warming, tragedy of commons, economic policies, sustainability

1. Introduction

The application of the tragedy of the commons problem in the context of global warming has been a topic of great social concern in recent years. This concept was first proposed in 1968 as an economic phenomenon, and it describes the problem of over-utilization of a common-pool resource; that is, when groups of people share a limited public resource, overexploitation and destruction of the resource can occur due to a lack of proper management and regulation [1]. This concept underscores the challenges to environmental sustainability posed by the drive for self-interest and competition for resources. It is beginning to be recognized that the phenomenon of the "tragedy of the commons" can be influenced by individual decision-making [2]. According to Van Vugt, individual decisions can be driven not only by economic self-interest but also by broader social, psychological, and ethical factors [3]. With the development of social sciences, scholars' discussions on the impacts of the tragedy of the commons have expanded to all aspects of the Earth's environmental resources such as biological systems [4] and pollution emission [5]. Among so many aspects, climate warming, as a typical global tragedy of the commons issue, involves complex issues such as the allocation of resources, carbon emissions, climate adaptation, and international collaboration. Therefore, the formulation of economic policies has become a key tool for directing the use of resources to combat global warming. However, the development and implementation of climate policies still face challenges. Factors such

DOI: 10.54254/2753-7048/37/20240510

as international cooperation, political will, and social acceptance affect the effectiveness of policies. At the same time, the problem of the tragedy of the commons triggered by climate warming requires an interdisciplinary research approach to better understand its root causes and solutions [6]. At a deeper level, the study of climate warming has also triggered profound thinking about how to formulate effective economic policies to manage global resources and cope with environmental degradation.

By delving into the theory of the tragedy of the commons and the study of climate change, this paper aims to summarize the problems encountered in current climate policy, with a particular focus on economic aspects. The ultimate goal is to provide the global community with sustainable economic policy options that can help address the challenges of climate change, so as to achieve effective resource management and sustainable environmental protection, and to avoid further "tragedies of the commons".

2. Definition and Manifestations of the Tragedy of the Commons

2.1. Definition of the Tragedy of the Commons

The tragedy of the commons is an economic concept introduced in 1968, used to describe a resource overuse problem that occurs when resources are shared among multiple parties [1]. This problem occurs particularly in the areas of climate, forests, fisheries, and other resources. Because these resources are usually not privatized and each individual is free to use them, over-exploitation and overuse of resources can lead to a range of ecological and environmental degradation problems.

The tragedy of the commons is characterized by the following features. Firstly, it arises from competitive use. Because people will use these resources as much as possible to satisfy their own needs without considering the sustainability and development of the resources themselves, the commons are easily threatened by people's competitive use. The second reason for the tragedy of the commons is the lack of ownership of the resources. Because there is no way for the resources to be privatized and there is no clear organizational or individual ownership, there is no entity that can implement effective laws and regulations to protect and manage these resources, leading to their over-exploitation and over-use. The third point is that the tragedy of the commons can lead to sustainability problems of the resources as they are over-exploited and over-used. This can result in the depletion of the resources and the destruction of the environment in which they are located, threatening the sustainable development of the resources in the future.

2.2. Manifestations of the Tragedy of the Commons in Global Warming

The global tragedy of the commons is manifested in the use of many resources, and greenhouse gas emissions and global warming are currently one of the largest manifestations of the tragedy of the commons worldwide. Emissions of greenhouse gases are a by-product of economic development in various countries, but their cumulative effect has led to an increase in global temperatures, triggering a series of environmental and climate problems. In recent years, researchers have examined the relationship between the tragedy of the commons and climate warming through several lenses. Some studies explored how warming has intensified competition for resources, particularly in terms of water resources and land use [7]. Other studies focused on the formulation and implementation of climate policies, exploring the roles and responsibilities of governments, businesses, and individuals in mitigating warming [8].

First, different countries have different levels of restrictions on GHG emissions, leading to competition for resources and the tragedy of the commons. Some countries may not put enough effort into reducing emissions and rely on other countries to reduce global emissions, thereby mitigating their own economic costs. Such behaviour exacerbates greenhouse gas emissions globally, with

DOI: 10.54254/2753-7048/37/20240510

escalating negative impacts on climate change. In the field of economic policy, researchers have put forward a number of policy proposals aimed at addressing the problem of unregulated gas emissions. According to [9], one of the approaches is to implement a carbon pricing mechanism to incentivize emission reduction behaviors by taxing carbon emissions or setting emission quotas. In addition, the development of green technologies and renewable energy is also seen as an effective way to mitigate climate warming. Governments can promote sustainable economic development and reduce dependence on finite resources by incentivizing research and development and the adoption of these technologies [10].

Secondly, global warming has led to problems such as rising sea levels, an increase in extreme weather events, and the collapse of ecosystems. These effects not only threaten the environment and ecological balance, but also have a serious impact on global society and the economy. However, solving the problem of greenhouse gas emissions requires international collaboration and joint efforts, and there is a tendency towards self-interest among countries, making it difficult to reach a globally consistent agreement on emissions reductions. In addition, the tragedy of the commons has climate justice implications, as climate change affects developing countries and vulnerable communities more severely, despite their lower contribution to emissions. This has exacerbated inequalities in global society and has fueled controversy over responsibility and fair sharing of the burden of emission reduction.

3. Existing International Policies

In response to the environmental problems led by climate warming, the international community has held a series of environmental negotiations in recent decades and has reached a number of well-known climate agreements. Among them, the Kyoto Protocol and the Paris Agreement are the most well-known and legally binding.

3.1. Tokyo Protocol

The *Tokyo Protocol*, formally known as the Agreement Concerning the Long-Range Transport of Substances in the International Air and the Harmful Effects thereof, is an agreement on the protection of the Earth's ozone layer. It is a key legal document for the protection of the Earth's ozone layer and aims to restrict and reduce the production and use of chemical substances that are harmful to the ozone layer.

The *Tokyo Protocol* was signed on 14 November 1987 in Tokyo, Japan, and is another international environmental agreement following the *Montreal Protocol*. While the *Montreal Protocol* focuses mainly on the control of chemicals such as chlorofluorocarbons (CFCs), the *Tokyo Protocol* focuses more on hazardous substances that may remain in the atmosphere for long periods of time. On an economic level, the implementation of the *Tokyo Protocol* has been somewhat successful, and its creation and implementation have helped to reduce the emission of some hazardous substances, such as prompting the development and application of environmentally friendly technologies and solutions. Reducing and eliminating the use of chemicals that are harmful to the ozone layer requires the search for alternatives and more environmentally friendly technologies, which has led to the emergence of the cleantech industry.

3.2. Paris Agreement

The *Paris Agreement*, published in 2015, has a higher degree of legal independence than the *Tokyo Protocol*. It is the first global agreement that establishes the control of warming as a legal policy, signed and ratified by each country individually. It plays a very important role at the economic level, and many of its policies are relevant to the sustainable development of the global economy. For

DOI: 10.54254/2753-7048/37/20240510

example, one of the goals of the *Paris Agreement* is to promote a transition to renewable energy and reduce dependence on fossil fuels. This promotes the growth of clean energy markets, stimulates economic growth, and reduces the risk of energy instability. Secondly, the *Paris Agreement* establishes carbon pricing and market mechanisms, and the Agreement encourages the use of carbon markets and carbon trading mechanisms to encourage companies to reduce carbon emissions by setting a price on carbon. This helps to reduce the cost of carbon emissions, promote the development of green technologies, and provide new sources of income for the economy. In addition, the *Paris Agreement* encourages international cooperation, creating wider market opportunities for businesses. Participation in low-carbon and sustainable development projects can strengthen international competitiveness and benefit from the emerging green economy.

Overall, the *Paris Agreement* provides significant opportunities and incentives to combat climate change economically. Encouraging a range of policies, such as clean energy and carbon pricing, can reduce the likelihood of the tragedy of the commons brought about by global climate change and push the economy in a more sustainable and low-carbon direction. This will not only benefit the climate but also contribute to long-term economic prosperity and stability.

4. Problems and Challenges

Although most countries are actively responding to the tragedy of the commons arising from global warming, existing international agreements still face many problems and challenges, mainly the following two.

Firstly, there is the problem of cooperation between countries to reduce gas emissions. Because of the self-interested tendency of countries, there is still a lack of effective cooperation between countries, which often remains in the form of meetings and talks without measures and actions. At the same time, conflicts of interest between countries are also manifested at this time. For example, Russia, due to its geographical location in the north, has a severe cold climate most of the year, and for it, climate warming is favourable to the development of their fishery industry. On the contrary, some island countries in the Great Flat Ocean are troubled by the problem of rising sea levels brought about by climate warming, and they worry about the survival of their countries. Therefore, conflicts among countries need to be handled properly.

Secondly, the contradiction between short-term interests and long-term sustainability within countries is a limitation. Many economic policies emphasize short-term economic growth without fully considering the long-term economic and social impacts of climate change. Typically, a country that wants to reduce its own gas emissions will do so in two ways. The first is to impose certain restrictions on the amount of industrial production, reducing the country's ability to maintain industrial production, and thereby contributing to the reduction of gas emissions. The second is to transform and upgrade domestic industry, investing large amounts of money to reduce waste gas emissions while maintaining constant output from the industry. However, while in the long run, both methods are favourable to the growth of the country's GDP, both will have some negative impact on the country's economic development in the short term. A country needs to sacrifice economic development in the short term to meet the requirements of industrial upgrading.

Finally, at the global level, the scarcity of energy and resources is a challenge. As the global population and economy grow, the demand for energy and resources continues to rise, which leads to overexploitation and overutilization of resources and exacerbates climate problems. The situation of the tragedy of the commons may lead to competition for resources and short-term gains and losses rather than sustainable management of resources

DOI: 10.54254/2753-7048/37/20240510

5. Measures

First, to address the issue of cooperation between countries to reduce gas emissions, the international community could provide more incentives for countries to reduce their emissions. This could include the provision of international financial assistance and technical support, which could help developing countries in particular. At the same time, it can also establish a better international carbon market by regulating prices and other mandatory measures, so as to provide economic incentives for countries to encourage more emission reduction actions. In addition, a more transparent emissions monitoring mechanism should be established at the international level to ensure that the concerned countries will honor their emission reduction commitments. This will help build trust among countries to ensure the fairness and feasibility of international cooperation.

Secondly, countries should strive to reduce the negative impact on the economy of the transformation and upgrading brought about by the reduction of climate emissions. The first is that negative impacts can be reduced through long-term planning and gradual economic transition. The government and enterprises in the country should actively formulate some long-term climate action plans to ensure the transformation and upgrading of industries and reduce the short-term impact on the economy through gradual and progressive development. Meanwhile, this will give companies and investors more time to adapt to industrial development. Then, the country can drive steady economic development by increasing employment in related industries, offsetting the negative impact of capital investment.

Thirdly, at the international level, there is a need to establish more standardized standards for resource extraction to avoid over-exploitation and over-utilization of resources. When faced with the contradiction between long-term and short-term exploitation, the sustainable exploitation of resources can also be achieved through long-term planning and coordination among countries.

6. Conclusion

This paper critically analyzed economic policies concerning the tragedy of the commons in the climate change context. Findings revealed that individual decision-making, influenced by various socio-economic factors, plays a pivotal role in this tragedy. The challenges of resource allocation, carbon emissions, and international collaboration were highlighted. While the study proposes economic measures like carbon pricing and green technology promotion, it acknowledges their limitations, primarily being confined to the economic realm. Future research should delve deeper into these measures, integrating broader socio-political factors to enhance climate policy effectiveness.

References

[1] *Hardin, G. (1968). The tragedy of the commons. The population problem has no technical solution; it requires a fundamental extension in morality. Science (American Association for the Advancement of Science), 162(3859), 1243–1248. https://doi.org/10.1126/science.162.3859.1243*

[2] *Weitz, J. S., Eksin, C., Paarporn, K., Brown, S. P., & Ratcliff, W. C. (2016). An oscillating tragedy of the commons in replicator dynamics with game-environment feedback. Proceedings of the National Academy of Sciences - PNAS, 113(47), E7518–E7525. https://doi.org/10.1073/pnas.1604096113*

[3] *Van Vugt, M. (2009). Averting the Tragedy of the Commons: Using Social Psychological Science to Protect the Environment. Current Directions in Psychological Science : A Journal of the American Psychological Society, 18(3), 169–173. https://doi.org/10.1111/j.1467-8721.2009.01630.x*

[4] *Rankin, D. J., Bargum, K., & Kokko, H. (2007). The tragedy of the commons in evolutionary biology. Trends in Ecology & Evolution (Amsterdam), 22(12), 643–651. https://doi.org/10.1016/j.tree.2007.07.009*

[5] *Feichtinger, G., Lambertini, L., Leitmann, G., & Wrzaczek, S. (2022). Managing the tragedy of commons and polluting emissions: A unified view. European Journal of Operational Research, 303(1), 487–499. https://doi.org/10.1016/j.ejor.2022.02.034*

DOI: 10.54254/2753-7048/37/20240510

[6] *Paavola, J. (2011). Climate change: the ultimate tragedy of the commons. Property in Land and Other Resources, 417–434.*

[7] *Eriyagama, N., Smakhtin, V. U., Chandrapala, L., & Fernando, K. (2010). Impacts of climate change on water resources and agriculture in Sri Lanka: a review and preliminary vulnerability mapping (616th ed.). https://doi.org/10.22004/ag.econ.94787*

[8] *Rosen-Zvi, I. (2011). You are too soft! What can corporate social responsibility do for climate change? Minnesota Journal of Law, Science & Technology, 12(2), 527-.*

[9] *Levi, S., Flachsland, C., & Jakob, M. (2020). Political Economy Determinants of Carbon Pricing. Global Environmental Politics, 20(2), 128–156. https://doi.org/10.1162/glep_a_00549*

[10] *Good, A. G., & Beatty, P. H. (2011). Fertilizing nature: A tragedy of excess in the commons. PLoS Biology, 9(8), e1001124-. https://doi.org/10.1371/journal.pbio.1001124*