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Linking Policy and Politics in Climate Action: An Overview

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ABSTRACT

The existential threat posed by climate change necessitates comprehensive responses that span the political and scientific domains. Political science and environmental policy approaches to mitigating climate change are critically studied. Analysis of environmental policy looks at certain policy instruments such as international agreements, carbon pricing, and subsidies for renewable energy. The study evaluates their efficiency in reducing emissions and points up any drawbacks, such as their narrow reach or reliance on foreign assistance. There are frameworks available from political science perspectives to help comprehend the political dynamics of climate action. It explores ideas like as power dynamics and rational choice to explain what influences social movements, domestic policy decisions, and international negotiations. The examination examines how different frameworks shed light on issues like public opinion and the impact of special interests. The review's main body then evaluates and contrasts various strategies. It investigates how political science theories and environmental policy interact or conflict with one another. This article points up possible opportunities for collaboration between different disciplines to provide better solutions. Lastly, the evaluation addresses how both areas will proceed in the future with climate change. It outlines new directions in theory and policy, points out areas in need of more research, and makes recommendations for possible study topics. Through a critical analysis of various strategies, the review hopes to advance a more thorough knowledge of mitigating climate change.

Keywords: Climate Change Approaches: Environmental, Political – Comparison, Road Map

INTRODUCTION

The urgency of addressing climate change requires comprehensive strategies that integrate both technical solutions and the political dynamics that influence their implementation. While environmental policy provides practical tools and frameworks—such as carbon pricing, renewable energy subsidies, and energy efficiency regulations—it often overlooks the complex political landscape that shapes the feasibility and success of these measures. Conversely, political science offers critical insights into the power dynamics, public opinion, and institutional barriers that drive or hinder climate action but may lack actionable solutions for directly reducing emissions. Bridging these two disciplines is essential for crafting holistic and effective climate strategies. Environmental policies can

benefit from political science's understanding of public sentiment, lobbying influences, and negotiation dynamics to ensure policies are not only technically sound but also politically viable and widely accepted. Similarly, political science can leverage environmental policy expertise to propose solutions that align with political realities while addressing emissions reductions and sustainability goals.

This interdisciplinary collaboration is crucial for overcoming barriers such as inadequate funding, policy enforcement challenges, and resistance from vested interests. It also enhances the ability to design equitable policies that address the needs of vulnerable populations while maintaining global cooperation. By uniting the strengths of environmental policy and political science, we can advance climate action that is both ambitious and achievable, fostering a sustainable future for all. Climate change, driven by human activities that release greenhouse gases into the atmosphere, is arguably the most pressing challenge facing humanity today. Scientists universally agree that the rapid rise in global temperatures poses significant risks, with profound impacts on ecosystems, weather patterns, sea levels, and human societies [1]. These effects, including more frequent and severe heatwaves, droughts, floods, storms,

rising sea levels, and disruptions to food production, threaten public health, security, and economic stability. Addressing this crisis requires a comprehensive approach that bridges the gap between scientific knowledge and actionable solutions. This is where political science and environmental policy intersect [2]. Environmental policy analysis provides a framework for developing and implementing strategies to reduce greenhouse gas emissions and promote sustainable development. By assessing the strengths and weaknesses of various programs, environmental policy ensures that mitigation efforts are equitable, efficient, and well-targeted [3]. Meanwhile, political science offers valuable insights into the political dynamics that shape climate action. Through frameworks that examine global power structures and domestic politics, political science helps explain how international agreements and national policies are influenced by political institutions, public opinion, and interest groups. By exploring these processes, political science reveals the political challenges and opportunities that affect the adoption of effective climate policies. Although their focus may differ, both political science and environmental policy play essential roles in addressing climate change [4]. This review highlights the synergies between these fields, critically evaluating their respective strengths and weaknesses in combating the climate crisis. Given the urgency of the situation, a coordinated approach that leverages the strengths of both political science and environmental policy is crucial. Political science offers insights into the complex political landscape shaping climate action, while environmental policy provides practical tools for reducing emissions and fostering sustainability [5]. By fostering interdisciplinary dialogue, this review seeks to identify opportunities for collaboration, aiming to develop more effective and holistic climate action strategies capable of tackling the global challenge of climate change [6]. Addressing the existential threat of climate change requires a comprehensive approach that integrates the strengths of environmental policy and political science. Environmental policy offers practical tools such as carbon pricing, renewable energy subsidies, and energy efficiency regulations, which have demonstrated their effectiveness in reducing emissions. However, these measures often face limitations due to inadequate design, insufficient funding, or weak enforcement. Political science complements environmental policy by providing a nuanced understanding of the political landscape that shapes climate action. Insights into power dynamics, the role of public opinion, special interest influences, and international

negotiations are crucial for navigating the challenges of implementing effective climate strategies. However, political science alone may lack the technical specificity needed to design actionable solutions.

1.Environmental Policy Approaches: Environmental policy provides a broad range of tools to address climate change, with various key policy areas, strengths, and challenges are discussed here.

1.1 Renewable Energy Policies:

These policies aim to promote the development and use of renewable energy sources, such as wind, solar, geothermal, and hydropower. Common policy instruments include renewable energy portfolio standards, which mandate utilities to generate a certain percentage of electricity from renewable sources; feed-in tariffs, which offer fixed prices for renewable energy generation; and subsidies that reduce the initial costs of renewable energy technologies [7]. Evidence suggests that these policies have played a significant role in accelerating the growth of the renewable energy sector, contributing to a notable reduction in greenhouse gas emissions. However, their effectiveness can vary, and the costs, particularly associated with subsidies, can be high depending on how they are designed and implemented [8]. Lu et al. (2020) examined the importance of government laws and policies in supporting renewable energy alongside conservation efforts and technological 90 advancements. Their study analyses the evolution of energy policy in five countries and evaluates the effectiveness of different policy instruments in fostering renewable energy adoption.

1.2 Carbon Pricing Mechanisms:

Carbon pricing aims to reduce emissions by placing a financial cost on carbon output, thereby encouraging polluters to decrease their emissions. The two primary mechanisms for carbon pricing are carbon taxes and cap-and-trade systems. A carbon tax directly charges emitters a fee for each unit of carbon dioxide they release. This creates an economic incentive for polluters to reduce emissions or invest in cleaner technologies to avoid higher tax payments [9]. In contrast, cap-and-trade programs establish a gradually decreasing emissions cap, after which emitters must obtain permits to emit carbon. These permits can be bought and sold on the market, and as the cap lowers over time, the cost of permits increases, creating a market-driven incentive for emission reductions. While carbon pricing mechanisms have the potential to be highly effective in curbing emissions, their political feasibility can be challenging. [10] Ji et al. (2018) explored the market dynamics governing carbon pricing and examined the factors that influence the cost of carbon in these systems.

1.3 Energy Efficiency Regulations:

The purpose of these laws is to enhance the energy performance of industrial processes, appliances, and buildings. These laws typically set minimum efficiency standards for industrial equipment and require mandatory energy performance criteria for buildings and appliances. When effectively implemented, efficiency regulations can lead to significant reductions in both greenhouse gas emissions and energy consumption. However, enforcing these standards can be challenging, and overly stringent regulations may stifle innovation in energy-efficient technologies [11]. Lee and Yik (2004) conducted a comprehensive review of policy tools designed to improve energy efficiency in buildings, exploring various approaches to enhancing energy performance in the sector.

1.4 International Environmental Agreements:

International environmental agreements aim to foster global cooperation in addressing climate change. A prime example is the Paris Agreement, which sets a long-term goal of limiting global warming to well below2°C above pre-industrial levels, with an aspirational target of 1.5°C. Under this agreement, countries are encouraged to submit increasingly ambitious national climate action plans and update them regularly. While international agreements

provide a vital framework for collective global action on climate change, they often depend on voluntary commitments from participating nations, which can be challenging to enforce since they are not legally binding [12]. The effectiveness of these agreements is influenced by several factors, with the level of ambition being crucial—more aggressive targets typically lead to greater reductions in emissions.

2. Political Science Approaches:

Political science provides essential frameworks for analysing the complex political dynamics that influence climate action. Below are key perspectives that shed light on responses to climate change:

2.1 Rational Choice Theory and Game Theory in Climate Negotiations: These frameworks suggest that nations and other stakeholders in international climate negotiations make rational decisions aimed at maximizing their benefits. Game theory, in particular, models the strategic interactions between participants, analysing potential negotiation strategies and outcomes. These perspectives enhance our understanding of how countries weigh the costs and benefits of climate action and how they may choose to collaborate or compete in shaping international agreements [13].

2.2 Power Dynamics and International Co-operation: This perspective examines how disparities in power among nations influence international collaboration on climate change. Dominant nations may exert disproportionate influence in negotiations, potentially hindering bold climate action. This approach highlights the importance of power-sharing arrangements and equity considerations in fostering international cooperation and explains why negotiating and implementing global agreements can be so challenging [14].

2.3 Domestic Politics and the Role of Special Interests:

Domestic political actors and institutions play a pivotal role in shaping climate policy. Public opinion, interest groups, and political parties significantly impact policy decisions. For instance, powerful special interests, such as fossil fuel industries, can lobby against climate initiatives, stalling progress. This perspective underscores the importance of navigating domestic political contexts and building public support to pass effective climate legislation [15].

2.4 The Role of Social Movements and Public Opinion: Social movements are critical in raising public awareness, pressuring governments to act, and advocating for ambitious climate policies. Strong public support makes ambitious climate action more politically viable. This approach emphasizes the transformative power of public participation and grassroots activism in driving political change on climate issues. Effective climate action requires robust environmental policies grounded in an understanding of the political systems in which they are developed and implemented [16].

3.Critical Comparison:

Political science and environmental policy offer distinct yet complementary perspectives on climate change mitigation. Environmental policy focuses on practical tools and strategies, such as carbon pricing and renewable energy subsidies, to reduce emissions. These tools have been shown to drive emission reductions, including during the COVID-19 era [17]. However, inadequate funding, poor design, and weak enforcement can limit their effectiveness. Additionally, environmental policy may not fully account for political challenges that complicate implementation. Conversely, political science provides valuable insights into the political landscape of climate policy. It helps identify barriers to progress, such as power dynamics, special interests, and public opinion. While these frameworks clarify political challenges, they may not always offer concrete solutions for policy design [18]. Furthermore, an overemphasis on political constraints can sometimes lead to less ambitious climate action than what is necessary to address the crisis effectively. Despite these differences, the two

approaches are highly complementary. Incorporating political science insights into the design and implementation of environmental policies can enhance their public acceptance and political feasibility. Similarly, a thorough understanding of political dynamics can help refine environmental policy tools to achieve more effective and sustainable outcomes [19].

4.Roadmap Ahead:

Addressing climate change requires continuous innovation and exploration of novel strategies by political science and environmental policy researchers. Emerging areas of focus include advanced technologies like carbon capture and storage, negative emissions strategies such as afforestation, and green financing systems that incentivize private sector investment in sustainable development [20]. Political science is increasingly studying the role of non-state actors—such as corporations, cities, and grassroots movements—in driving bottom-up climate action. Additionally, there is growing interest in how the rise of populism influences climate policy decisions. Future research should emphasize equitable climate legislation, leveraging behavioural science to promote sustainable practices, and designing communication strategies tailored to diverse audiences. Enhancing global cooperation, investing in clean technologies, and building public support remain critical. By integrating insights from political science and environmental policy, more robust and effective climate action plans can be developed to secure a sustainable future [21].

5.CONCLUSION

Climate change poses an existential threat that demands a multifaceted approach to bridge the gap between scientific knowledge and actionable solutions. This review highlighted the essential roles of political science and environmental policy in mitigating climate change. Environmental policy provides practical tools, such as carbon pricing and renewable energy subsidies, proven to lower emissions [22]. However, challenges such as limited funding, flawed policy design, and weak enforcement can undermine their effectiveness. Political science, on the other hand, offers crucial insights into the political complexities of climate action, including the impact of public opinion, special interests, and power dynamics. Although distinct, these approaches are deeply complementary. A clear understanding of political contexts during policy design can enhance the success of environmental regulations, while political science can help adapt policies to be more publicly appealing and politically feasible. Collaboration between these disciplines is vital to formulating comprehensive and effective climate action strategies. Tackling the monumental challenge of climate change and ensuring a sustainable future requires an interdisciplinary approach that combines innovation, collaboration, and actionable solutions [23]. By bridging these two disciplines, we can develop climate strategies that are both technically robust and politically viable. Interdisciplinary collaboration enables the design of policies that address emissions while accounting for political realities, ensuring they gain broader acceptance and support. This synergy is vital for overcoming barriers to action, promoting equitable and sustainable development, and fostering global cooperation. In conclusion, the critical review highlights that neither environmental policy nor political science alone can fully address the complexities of climate change. Instead, a multidisciplinary approach that leverages the strengths of both fields is essential for creating comprehensive and effective solutions. Such collaboration is crucial to mitigate the impacts of climate change and secure a sustainable future for generations to come.

Declaration by Authors

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