

A Critical Review of Environmental Policy and Political Science Approaches to Climate Change

D. T. Dhage

Department of Political Science, M. V. P. Samaj's K. K. Wagh Arts, Science, And Commerce College, Pimpalgaon (B.), Nashik, 422209, Maharashtra, India.

DOI: <https://doi.org/10.52403/ijrr.20240815>

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 research 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 Mitigation; Environmental Policy Analysis; Political Science Approaches; Interdisciplinary Collaboration; Climate Action Strategies

1. INTRODUCTION

Arguably the most urgent issue confronting humanity today is climate change, which is caused by human activities that emit greenhouse gases into the atmosphere. There is broad agreement among scientists that the rate at which global temperatures are rising is concerning, with far-reaching implications for ecosystems, weather patterns, sea levels, and human cultures [1]. The health, security, and wealth of people are all at risk due to these effects, which also include increased frequency and intensity of heat waves, droughts, floods, and storms, increasing sea levels submerging coastal areas, and disruptions to food production systems. A diversified strategy that closes the gap between practical action and scientific understanding is needed to

address climate change. This is where political science and environmental policy come into play [2]. A framework for creating and executing policies to lower greenhouse gas emissions and advance sustainable development is provided by environmental policy analysis. This covers a broad variety of policy instruments, including encouraging international collaboration on climate action, enforcing energy efficiency regulations, establishing carbon price systems, and supporting renewable energy sources. Environmental policy ensures mitigation measures are equitable, efficient, and well-targeted by evaluating the pros and cons of these programs [3]. On the other hand, political science provides insightful information on the political processes that influence climate action. Frameworks from political science aid in our understanding of how global power relations affect international climate accords and talks. These frameworks also clarify how domestic politics including the impact of political institutions, public opinion, and special interests affect national policy decisions. Political science assists us in determining the political obstacles and potential for passing successful climate policy by examining these processes. Political science and environmental policy methods, albeit having different foci, are equally important in combating climate change [4]. The objective of this critical evaluation is to establish a connection between these domains by analyzing the advantages and disadvantages of each strategy for mitigating climate change. The review will specifically: Examine the main instruments used in environmental policy for mitigating climate change, considering their possible disadvantages as well as their efficacy. Examine how political science theories provide light on the political processes that influence climate action at the national and

international levels. Examine how political science and environmental policy approaches complement or contradict one another by critically comparing and contrasting them. Determine possible areas for these disciplines to work together more successfully to create thorough and effective climate action plans [5-6].

This review attempts to contribute to a more thorough knowledge of the obstacles and potential for climate change mitigation by critically analyzing various strategies. A coordinated strategy that capitalizes on the advantages of political science and environmental policy is necessary given the urgency of climate change. Political science gives insights into the complicated political context that drives climate action, while environmental policy offers a useful tool set for cutting emissions and fostering sustainable development [7]. These two fields of study will be examined critically, with an emphasis on their merits and demerits in mitigating climate change. The assessment will examine the practical applications of environmental policy instruments, such as carbon pricing systems and incentives for renewable energy while considering their possible drawbacks. After that, it will examine how political science frameworks such as power dynamics and rational choice theory shed light on the obstacles and chances that political leaders face in implementing successful climate policy. The goal of the review is to find places where political science and environmental policy might work together by critically analyzing these methods. Encouraging this multidisciplinary conversation is essential to creating effective and all-encompassing climate action plans that can address the enormous problem of climate change [8-9].

2. Environmental Policy Approaches:

Environmental policy offers a vast toolbox for mitigating climate change. Here, we

provide some key policy areas (Fig. 1) and their strengths and limitations:

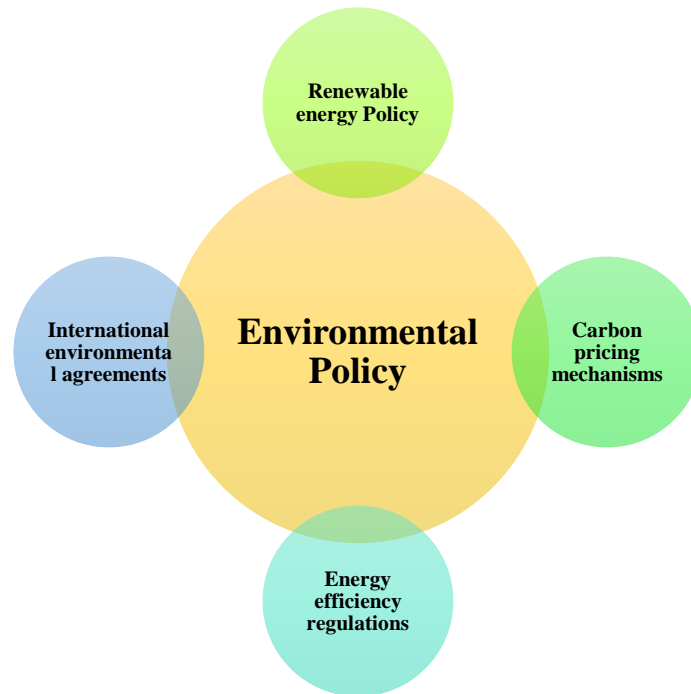


Figure 1. Environmental Policy Approaches

2.1. Renewable energy policies:

The development and application of renewable energy sources, such as hydropower, geothermal, wind, and solar power, are intended to be encouraged by these laws. Renewable energy portfolio standards, which require utilities to produce a certain percentage of their electricity from renewable sources, feed-in tariffs, which guarantee a fixed price for electricity produced from renewable sources, and subsidies that directly lower the upfront costs of renewable energy technologies are examples of common tools [11]. There is proof that these regulations have accelerated the development of the renewable energy industry, which has resulted in a considerable decrease in greenhouse gas emissions. However, depending on how they are designed and put into practice, they can be costly, especially subsidies [12]. Lu *et. al.*, (2020),

studied the necessity of laws and policies from the government to support renewable energy sources in addition to conservation efforts and technical developments. They look at the evolution of energy policy over the course of five nations as well as the potency of different policy instruments. According to the assessment, feed-in tariffs and energy-efficiency regulations have been effective in boosting renewable energy. It also suggests that building energy performance certification programs could be improved for more sustainable growth in the future [13]. Abdmouleh *et. al.*, (2015) examined many methods for creating a supportive regulatory environment. To determine what influences the adoption of renewable energy laws, they looked at case studies and experiences from many nations, including both triumphs and failures. The assessment recognizes the impact of variables other than national experiences,

such as the particular renewable energy source and technology being used. In the end, the authors hope to give decision-makers a thorough perspective that will encourage information exchange and guide the creation of successful renewable energy policies that can meet challenging goals [14].

2.2. Carbon pricing mechanisms:

By placing a cost on carbon emissions, these regulations hope to incentivize polluters to lower their emissions. Carbon taxes and cap-and-trade programs are the two primary strategies. Emitters are directly charged a price by a carbon tax for each unit of carbon dioxide emitted. To avoid paying more in taxes, this encourages polluters to cut back on emissions or spend money on greener technology. Cap-and-trade programs set a decreasing limit on the overall amount of emissions [15]. After that, to emit, an emitter must get a permit, which they can purchase and resell on the market. The cost of permits increases as the cap decreases over time, providing a market-driven incentive for reducing emissions. Although carbon pricing schemes have the potential to be very effective in reducing emissions, their political viability may present difficulties [16-17]. Ji *et. al.*, (2018) studied the mechanisms governing the price of carbon on the market and the variables that affect them. Their analysis emphasizes how carbon emissions trading systems are becoming a more popular instrument for combating global warming. They note that China's carbon market is still in its infancy and concentrate their study on the factors that determine prices in carbon markets. The authors analyze the theoretical underpinnings of carbon pricing and the variables influencing price formation by utilizing price theory. They consider viewpoints such as resident demand,

enterprise emissions, government regulations, and the energy and financial markets [18].

2.3. Energy efficiency regulations:

The purpose of these laws is to increase the energy efficiency of industrial operations, appliances, and buildings. This can be done by establishing minimum efficiency criteria for industrial equipment or by making energy performance standards for buildings and appliances mandatory. Efficiency laws have the power to drastically cut greenhouse gas emissions and energy use. However, enforcing and implementing them may be difficult, and if rules become too rigid, innovation in efficient technology may be hindered [19]. A survey of the literature on policy tools for improving building energy efficiency was done by Lee and Yik (2004). Although they admit that buildings account for a large portion of the energy used in cities, they also point out that big reductions in energy use are possible via increased efficiency. Although increased efficiency can result in cost savings, the authors acknowledge that this alone might not be enough to spur broad adoption. They studied the drawbacks of depending just on raising public knowledge of environmental issues and the necessity of more potent policies to encourage or mandate action, especially for parties to international treaties like the Kyoto Protocol [20].

2.4. International environmental agreements:

The purpose of these accords is to promote global collaboration in the fight against climate change. The most notable example is the Paris Agreement, which establishes a long-term target of keeping global warming relative to pre-industrial levels to much below 2 degrees Celsius, ideally to 1.5 degrees Celsius [21]. Countries are encouraged under the accord to submit

ambitious national climate action plans and to update them regularly. International accords offer a useful foundation for concerted global climate change action. They frequently rely on voluntary promises from member countries, which might be difficult to implement and are thus not legally enforceable [22].

Several criteria determine how effective these approaches to environmental policy will be. The degree of ambition is one important consideration since more aggressive programs result in larger reductions in emissions. The formulation and application of policies are another element. Well-thought-out policies with definite objectives, effective workings, and

strong enforcement systems have a higher chance of producing the desired results. Lastly, given the worldwide scope of climate change, international collaboration is essential. The most complete strategy for addressing this difficult problem combines robust national policy with successful international accords [23-24].

3. Political Science Approaches:

Political science offers valuable frameworks for understanding the complex political dynamics that shape climate action. Here, we studied some perspectives and how they illuminate responses to climate change:



3.1. Rational choice theory and game theory in climate negotiations:

According to these frameworks, nations and other players in international talks make logical decisions to maximize their advantages. Specifically, game theory analyzes possible negotiating tactics and outcomes in climate negotiations by modeling the strategic interactions between

various players. These frameworks can aid in our comprehension of how nations assess the advantages and disadvantages of taking climate action as well as how they may collaborate or compete in international accords. They may, however, occasionally oversimplify complicated political situations and fail to sufficiently take into consideration elements other than self-

interest, such as cultural forces or ideological convictions [25-26].

3.2. Power dynamics and international cooperation:

This viewpoint focuses on how power imbalances among nations affect international collaboration on climate change. Stronger nations could have more clout in discussions, which might impede the advancement of bold climate action. This paradigm emphasizes the significance of power-sharing arrangements and fairness concerns in promoting international cooperation and helps us understand why international accords can be difficult to negotiate and implement [27-28].

3.3. Domestic politics and the influence of special interests:

The players and institutions of domestic politics are vital in determining the direction of climate policy. Public opinion, interest groups, and political parties all have an impact on policy choices. Progress may be hampered by strong special interests lobbying against climate action, such as fossil fuel industries. This paradigm emphasizes how crucial it is to navigate domestic political environments and garner public support for climate policy to pass meaningful legislation [29-30].

3.4. The role of social movements and public opinion:

To increase public awareness of climate change, put pressure on governments to act, and advance aggressive climate policies, social movements are essential. Strong public support for climate action increases the political feasibility of ambitious programs, and public opinion also plays a vital impact. This approach emphasizes how crucial social movements and public participation are to advancing political change on climate-related concerns.

Through the use of various analytical frameworks, political science offers significant contributions towards the creation of more efficacious tactics for climate action. These frameworks can aid in the identification of possible roadblocks, the comprehension of the objectives of various players, and the development of strategies for resolving political obstacles to the implementation of successful climate policy. Strong environmental laws and a thorough grasp of the political framework in which they are created and carried out are essential for effectively combating climate change [31-32].

4. Critical Comparison:

Political science and environmental policy provide different but complementary viewpoints on addressing climate change mitigation. Political science clarifies the intricate political factors that influence climate action, whereas environmental policy concentrates on the doable instruments and approaches for cutting emissions. This analysis of the two techniques will look at how they might complement one another to provide better results. Environmental policy offers a practical set of tools for cutting emissions. Emission reductions have been proven to be driven by tools such as carbon pricing and subsidies for renewable energy during the COVID era [33-34]. However, little financing, shoddy design, and lax enforcement may make them less effective. Furthermore, political issues that may make implementation difficult may not be completely considered in environmental policy. On the other hand, political science offers important insights into the political nuances surrounding climate policy. Political science frameworks aid in our understanding of the barriers to advancement, ranging from power dynamics and special interests to public

opinion. These frameworks might not, however, necessarily provide specific answers to problems with policy [35-36]. A more conservative strategy that falls short of the degree of ambition required to successfully address climate change might occasionally result from an understanding of political realities. These methods are quite complimentary despite their variances. If the political environment is clearly understood during the planning and implementation process, environmental policy instruments may be more successful. Political science knowledge may be used to modify environmental policies so that they are more popular with the public and politically viable [36-37].

5. Future Directions:

To combat climate change, political science, and environmental policy scholars must remain committed to investigating novel approaches and maintain a constant state of innovation. Here, we examine a few new developments and prospective research topics: Innovative techniques such as carbon capture and storage technology, negative emissions tactics like planting trees, and green financing systems that encourage private sector investment in sustainable development are becoming more and more important in environmental policy [39-40]. Research in political science is increasingly examining how non-state actors (such as corporations and cities) and international climate movements may propel bottom-up climate action. Furthermore, research on populism's emergence and how it affects decisions made on climate policy is becoming more popular. Political science and environmental policy both need to be continuously innovative in the battle against climate change. Innovative instruments including carbon capture technology, negative emissions plans, and green

financing methods are becoming more prevalent in environmental policy. The influence of populism on climate policy decisions as well as the participation of new players such as companies and cities are being investigated by political scientists [42-43]. To advance, research should concentrate on developing fair climate legislation, using behavioral science to encourage sustainable behavior, and creating communication plans that work for a range of audiences. To combat climate change, it is also essential to promote global collaboration, make investments in clean technology, and rally public support. Political science and environmental policy may collaborate to create comprehensive and effective climate action plans for a sustainable future [44-45].

6. CONCLUSION

The existential threat posed by climate change necessitates a multimodal strategy that closes the knowledge gap between science and practical action. This analysis examined the crucial roles that political science and environmental policy play in addressing climate change mitigation. With instruments like carbon pricing and subsidies for renewable energy that can be shown to reduce emissions, environmental policy provides a useful toolset [46]. However, little financing, shoddy design, and lax enforcement may make them less effective. However, political science offers important insights into the political nuances surrounding climate action, such as the significance of public opinion, special interests, and power dynamics [47]. Comprehending these intricacies is crucial in formulating efficacious strategies and maneuvering through the political terrain. These strategies are quite complimentary even if they are different. When the political context is clearly understood during the design process, environmental regulations

can be more successful. On the other hand, political science knowledge may be used to modify policies so that they are more popular with the public and politically viable. Collaboration between political science and environmental policy can help us create more thorough and effective climate action plans. To address the enormous issue of climate change and guarantee a sustainable future for everybody, a multidisciplinary approach is essential [48-49].

Declaration by Author

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The author declares no conflict of interest.

7. REFERENCES

1. Drake, B. G. (2014). Rising sea level, temperature, and precipitation impact plant and ecosystem responses to elevated CO₂ on a Chesapeake Bay wetland: Review of a 28-year study. *Global change biology*, 20(11), 3329-3343.
2. Lemos, M. C., & Agrawal, A. (2009). Environmental governance and political science. *Governance for the environment: New perspectives*, 69-97.
3. Oates, W. E., & Portney, P. R. (2003). The political economy of environmental policy. In *Handbook of environmental economics* (Vol. 1, pp. 325-354). Elsevier.
4. Fiorino, D. J. (2023). *Making environmental policy*. Univ of California Press.
5. Wan, C., Shen, G. Q., & Choi, S. (2017). A review on political factors influencing public support for urban environmental policy. *Environmental Science & Policy*, 75, 70-80.
6. Forsyth, T. (2004). *Critical political ecology: the politics of environmental science*. Routledge.
7. Kraft, M. E., & Kamieniecki, S. (Eds.). (2007). *Business and environmental policy: Corporate interests in the American political system*. MIT Press.
8. Bäckstrand, K. (2003). Civic science for sustainability: reframing the role of experts, policy-makers and citizens in environmental governance. *Global environmental politics*, 3(4), 24-41.
9. Graham, E. R., Shipan, C. R., & Volden, C. (2013). The diffusion of policy diffusion research in political science. *British journal of political science*, 43(3), 673-701.
10. Rosen, R. A., & Guenther, E. (2015). The economics of mitigating climate change: What can we know?. *Technological Forecasting and Social Change*, 91, 93-106.
11. Lund, P. D. (2009). Effects of energy policies on industry expansion in renewable energy. *Renewable energy*, 34(1), 53-64.
12. Cullen, R. (2017). Evaluating renewable energy policies. *Australian Journal of Agricultural and Resource Economics*, 61(1), 1-18.
13. Lu, Y., Khan, Z. A., Alvarez-Alvarado, M. S., Zhang, Y., Huang, Z., & Imran, M. (2020). A critical review of sustainable energy policies for the promotion of renewable energy sources. *Sustainability*, 12(12), 5078.
14. Abdmouleh, Z., Alammari, R. A., & Gastli, A. (2015). Review of policies encouraging renewable energy integration & best practices. *Renewable and Sustainable Energy Reviews*, 45, 249-262.
15. Ji, C. J., Hu, Y. J., & Tang, B. J. (2018). Research on carbon market price mechanism and influencing factors: a literature review. *Natural Hazards*, 92, 761-782.
16. Narassimhan, E., Gallagher, K. S., Koester, S., & Alejo, J. R. (2018). Carbon pricing in practice: A review of existing emissions trading systems. *Climate Policy*, 18(8), 967-991.
17. Baranzini, A., Van den Bergh, J. C., Carattini, S., Howarth, R. B., Padilla, E., & Roca, J. (2017). Carbon pricing in climate policy: seven reasons, complementary instruments, and political economy considerations. *Wiley Interdisciplinary Reviews: Climate Change*, 8(4), e462.
18. Ji, C. J., Hu, Y. J., & Tang, B. J. (2018). Research on carbon market price

- mechanism and influencing factors: a literature review. *Natural Hazards*, 92, 761-782.
19. Crawford, R. H., Bartak, E. L., Stephan, A., & Jensen, C. A. (2016). Evaluating the life cycle energy benefits of energy efficiency regulations for buildings. *Renewable and sustainable energy reviews*, 63, 435-451.
 20. Lee, W. L., & Yik, F. W. H. (2004). Regulatory and voluntary approaches for enhancing building energy efficiency. *Progress in energy and combustion science*, 30(5), 477-499.
 21. Mitchell, R. B. (2003). International environmental agreements: a survey of their features, formation, and effects. *Annual review of environment and resources*, 28(1), 429-461.
 22. Mitchell, R. B., Andonova, L. B., Axelrod, M., Balsiger, J., Bernauer, T., Green, J. F., ... & Morin, J. F. (2020). What we know (and could know) about international environmental agreements. *Global Environmental Politics*, 20(1), 103-121.
 23. Barrett, S. (1994). Self-enforcing international environmental agreements. *Oxford economic papers*, 46(Supplement_1), 878-894.
 24. Breton, M., Sbragia, L., & Zaccour, G. (2010). A dynamic model for international environmental agreements. *Environmental and Resource economics*, 45, 25-48.
 25. DeCanio, S. J., & Fremstad, A. (2013). Game theory and climate diplomacy. *Ecological Economics*, 85, 177-187.
 26. Wood, P. J. (2011). Climate change and game theory. *Annals of the New York Academy of Sciences*, 1219(1), 153-170.
 27. Golooba-Mutebi, F., & Booth, D. (2013). *Bilateral cooperation and local power dynamics*. London: Overseas Development Institute.
 28. Kinne, B. J. (2013). Network dynamics and the evolution of international cooperation. *American Political Science Review*, 107(4), 766-785.
 29. Milner, H. V. (2020). *Interests, institutions, and information: Domestic politics and international relations*. Princeton University Press.
 30. Grossman, G. M., & Helpman, E. (2001). *Special interest politics*. MIT press.
 31. Rohrschneider, R. (1990). The roots of public opinion toward new social movements: An empirical test of competing explanations. *American Journal of Political Science*, 1-30.
 32. Huff, C., & Kruszewska, D. (2016). Banners, barricades, and bombs: The tactical choices of social movements and public opinion. *Comparative Political Studies*, 49(13), 1774-1808.
 33. Jadhav, V. R., Bagul, T. D., & Aswale, S. R. (2020). COVID-19 era: students' role to look at problems in education system during lockdown issues in Maharashtra, India. *International Journal of research and Review*.
 34. Forsyth, T. (2004). *Critical political ecology: the politics of environmental science*. Routledge.
 35. Wan, C., Shen, G. Q., & Choi, S. (2017). A review on political factors influencing public support for urban environmental policy. *Environmental Science & Policy*, 75, 70-80.
 36. Jadhav, V. R., Bagul, T. D., Aswale, S. R., & Bairagi, B. (2021, November). Coronavirus Pandemic's Lockdown Impact on Indian Environmental Air Pollution: A Brief Analysis. In *Galaxy link, Conference Proceedings, An International multidisciplinary research journal* (Vol. 1, No. 10, pp. 87-95).
 37. Jadhav, V. R., Tagad, C. K., & Palake, A. (2024). Economic and commercial aspects related to nanotechnology-based sensors. In *Nanotechnology-Based Sensors for Detection of Environmental Pollution* (pp. 541-552). Elsevier.
 38. Jadhav, V. R., Aher, J. S., Bhagare, A. M., & Dhaygude, A. C. (2020). COVID-19 era: What's impact of the lockdown on India's environment?. *Journal of Chemistry, Environmental Sciences and its Applications*, 7(1), 1-6.
 39. Keohane, N. O., Revesz, R. L., & Stavins, R. N. (1997). The positive political economy of instrument choice in environmental policy.

40. Fiorino, D. J. (2023). *Making environmental policy*. Univ of California Press.
41. O'Riordan, T. (1985). Research policy and review 6. Future directions for environmental policy. *Environment and Planning A*, 17(11), 1431-1446.
42. Vig, N. J., & Kraft, M. E. (Eds.). (2012). *Environmental Policy: New Directions for the Twenty-First Century 8th Edition*. Sage.
43. Kraft, M. E. (2021). *Environmental policy and politics*. Routledge.
44. Jörgens, H., Knill, C., & Steinebach, Y. (2023). Conclusions: Past Achievements and Future Directions for Environmental Policy Research. In *Routledge Handbook of Environmental Policy* (pp. 427-450). Routledge.
45. Green, J. F. (2021). Does carbon pricing reduce emissions? A review of ex-post analyses. *Environmental Research Letters*, 16(4), 043004.
46. Gugler, K., Haxhimusa, A., & Liebensteiner, M. (2021). Effectiveness of climate policies: Carbon pricing vs. subsidizing renewables. *Journal of Environmental Economics and Management*, 106, 102405.
47. Jadhav, V. R., & Bagul, T. D. (2021, February). Education towards skill development for rural women. In *Chronicle of Humanities and Cultural Studies, UGC Sponsored National Conference, Mahatma Gandhi, Education and welfare Society* (Vol. 7, No. 01, pp. 122-126).
48. Baranzini, A., Van den Bergh, J. C., Carattini, S., Howarth, R. B., Padilla, E., & Roca, J. (2017). Carbon pricing in climate policy: seven reasons, complementary instruments, and political economy considerations. *Wiley Interdisciplinary Reviews: Climate Change*, 8(4), e462.
49. Baranzini, A., Van den Bergh, J., Carattini, S., Howarth, R., Padilla, E., & Roca, J. (2015). Seven reasons to use carbon pricing in climate policy.

How to cite this article: D. T. Dhage. A critical review of environmental policy and political science approaches to climate change. *International Journal of Research and Review*. 2024; 11(8): 129-138. DOI: <https://doi.org/10.52403/ijrr.20240815>
