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A Study of Carbon Colonialism and Inequality in the Global South Based on Ecocritical Theory

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Abstract:

In response to the accelerating impacts of global climate change and the realities of the Anthropocene, nation-states have implemented international agreements such as the Kyoto Protocol and the Paris Agreement to mitigate climate change and curb environmental degradation stemming from excessive carbon emissions. Through carbon market operations, these nation-states aim to achieve carbon neutrality and uphold the integrity of the Earth's ecological system. Nevertheless, the nations of the Global South are enduring some of the harshest effects of environmental degradation, despite their limited historical responsibility for greenhouse gas emissions. This inequality is further exacerbated within climate change response strategies, where developed nations displace the costs of emissions reduction and ecological crises onto developing countries via policy mechanisms, industrial transfers, and technological restrictions, thus maintaining inequality. Based on a literature review and case studies, this paper employs an ecocritical framework to investigate how carbon colonialism shapes the use and management of environmental resources in the Global South through political-economic structures. Besides, it further explores the underpinning power dynamics and the logic of capital accumulation. The results reveal that carbon colonialism shapes the dynamics of traditional colonialism and North-South inequalities through climate politics, carbon markets, and green technology. In addition, a political-economic approach examines global environment and guides systemic change for justice and sustainability.

Keywords: Ecocritical Theory, Carbon Colonialism, Global South, Inequality

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1. Introduction

Industrial civilization has left clear marks in the geological record and shaped the uneven spatial and social distribution of global environmental and societal risks. In this context, climate change affects regions and populations differently, hence making some areas disproportionately vulnerable. Though climate governance discourse emphasises "common but differentiated responsibilities," this normative framework continues to face major practical implementation challenges. While some nations exploit institutional advantages in global governance to create economic opportunities from climate challenges, many regions in the Global South face higher climate risks and heavier emission reduction obligations. Thus, this paper adopts an ecocritical theoretical framework, combining case study analysis with a systematic literature review to investigate the unequal impact of the Global North on the Global South within climate governance mechanisms, and to analyze the underpinning political-economic logics that drive such disparities. It further explores pathways towards climate justice through the lenses of structural inequality and decolonial perspectives. Furthermore, this paper examines approaches to climate justice that integrate democratic ecological compensation and sustainable development, aiming to provide more balanced strategies for global climate governance. By drawing on grassroots experiences from the Global South, it seeks to explore climate responses that move beyond technocratic approaches and emphasize social equity.

2. Overview of Ecocritical Theory and Carbon Colonialism

2.1 The Core Proposition of Ecocritical Theory

Ecocritical theory, which emerged in the mid-to-late 20th century from environmentalist thought and critical theory, examines modernity, power structures, and resource production while addressing ecological crises associated with modernization [1]. The theory posits an inherent conflict between modern development and environmental sustainability, viewing ecological crises as stemming from structural contradictions within the political-economic system rather than managerial or technical failures. In addition, it examines how the logic of nature and capital, together with power relations, shape society and the environment, while also highlighting cultural and institutional influences on environmental outcomes. For instance, Rob Nixon's concept of "slow violence" illustrates how environmental degradation often unfolds gradually across time and space, yet cumulatively imposes significant and lasting harms on vulnerable populations [2]. This perspective explains the Global South's inequalities in the climate crisis.

2.2 Carbon Colonialism and North-South Inequality

Through climate policies and mechanisms, Global North nations apportion emissions reduction responsibilities and environmental impacts to Global South nations, a process referred to as carbon colonialism [3]. Its core lies in sustaining and reshaping unequal patterns of global power and resource allocation under the formal framework of climate governance. This phenomenon is closely linked to postcolonialism [4]. In terms of its formation mechanism, carbon colonialism continues the colonial logic of externalizing the environmental costs of resource exploitation while retaining the associated profits. Leveraging the international climate regime, carbon markets, and advantages in green technology, it establishes a new form of green colonialism. Northern nations continuously appropriate the ecological spaces of Southern nations by setting rules, controlling discourse, and systematically avoiding historical responsibilities. Historical data indicate that between 1850 and 2019, developed nations accounted for approximately 70% of cumulative carbon dioxide emissions, while Africa's contribution remained below 4% [5]. Yet the Global South disproportionately bears the impacts of the climate crisis. Although the United Nations Framework Convention on Climate Change established the principle of "common but differentiated responsibilities," developed nations have demonstrably fallen short in providing financial and technological support. Their pledge of $100 billion annually in climate finance had not been fulfilled by 2020 [6]. These developments indicate that carbon colonialism reflects both environmental challenges and the perpetuation of systemic and structural inequalities. Through climate governance frameworks, historical emissions advantages are converted into new economic and policy leverage, further intensifying ecological disparities between the Global North and South.

3. The Operational Mechanisms and Economic Structure of Carbon Colo-

nialism

3.1 The Unequal Distribution of Carbon Markets

The carbon credit mechanism intensifies the global North-South divide through uneven distribution and trading, exemplifying carbon colonialism within climate governance. From the Kyoto Protocol to the Paris Agreement, the carbon credit trading system has served as the core mechanism of international climate negotiations. Its core principle involves commodifying carbon emission rights and reducing emissions via market-based approaches [7,8]. However, this system displays marked power asymmetries in both design and implementation. In light of Northern developed nations' disproportionate control over carbon market rules and initial quota allocations, Southern nations remain in a relatively passive role. For instance, when the Kyoto Protocol established a global carbon emission cap of 800 billion tonnes, developed nations garnered dominant allocation shares. Twenty-seven developed countries, representing 14% of the worldwide population, obtained 44% of the emission allowances, while the remaining 86% of the population were allocated merely share 56% of the emission rights [8]. This initial imbalance further constrained the development pathways of Southern nations in practice. Even with identical carbon emission targets, developed nations can still gain surpluses due to their service- and high-end manufacturing-based industries. By contrast, developing countries, which rely on traditional energy sources and are undergoing industrialisation, are more susceptible to exceeding quotas. This forces them to purchase carbon credits, increasing abatement costs and constraining development potential. As a result, carbon colonialism transcends environmental concerns, reflecting profound imbalances in global justice. By reinforcing historical power disparities through ostensibly neutral market mechanisms, developing nations are positioned in a relatively passive position within global climate governance. This requires a critical review of fairness and representation at institutional and governance levels.

3.2 The Relocation and Externalization of Polluting Industries

The transnational transfer of high-carbon industries acts as another key mechanism through which carbon colonialism shifts environmental burdens and emission liabilities to Global South nations. Driven by pressures from stringent environmental regulations and exorbitant decarbonization costs, developed nations have progressively relocated high-carbon industries such as steel, chemicals, and textiles to Southern countries with relatively lax environmental oversight. This process gives rise to the distinct phenomenon of carbon leakage: while Northern nations ostensibly meet their emission reduction targets, yet global carbon emissions remain stagnant. Meanwhile, environmental risks and health burdens are shifted onto the South. For instance, since the acceleration of globalization in the 1990s, massive volumes of electronic waste have been diverted to Africa and South Asia. According to the Secretariat of the Basel Convention, roughly 70% of global e-waste ultimately ends up in developing countries [9]. Lacking advanced treatment facilities, these regions primarily depend on rudimentary manual dismantling and informal recycling methods, leading to heavy metal leaching and contamination of soil and water by persistent toxic substances. This threatens residents' health and the ecological environment and intensifies the unequal distribution of social and environmental burdens. At the same time, this relocation of polluting industries strengthens the concentration and dominance of green technologies, thus further amplifying structural dependencies and inequalities between the Global North and South.

3.3 Concentration and Control of Green Technologies

The concentration and monopolistic control of green technologies have intensified the dependence of Global South nations on the Global North in the course of their low-carbon transitions, thereby generating new structural inequalities. Despite their pivotal role in enabling energy transformation, green technologies remain highly concentrated in research, development, patenting, and industrial application within a few developed nations and multinational corporations. According to data from the World Intellectual Property Organization (WIPO), more than 80% of global renewable energy technology patent applications between 2010 and 2019 came from OECD member states [10]. As a result, such technological concentration exposes Southern nations to exorbitant patent licensing fees and technical barriers in the process of their green transitions, further deepening their dependence on the Global North. For instance, in the solar photovoltaic sector, though some developing nations possess production capabilities, core materials and critical equipment remain under the control of a handful of technology suppliers. Furthermore, India

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has consistently emphasized in the Doha Round negotiations that strict intellectual property rules in climate governance block the fair transfer of technologies [11]. And this technological monopoly raises the cost of green transition for Southern nations and maintains their subordinate role in the international division of labor. The concentration of green technologies reflects the capital logic of carbon colonialism, sustaining global inequalities in resources and power through intellectual property and patents.

3.4 Capital Accumulation and Power Relations

The core logic of carbon colonialism lies in the systemic reproduction of capital accumulation and global power relations. Moreover, the global carbon governance system addresses climate change while extending the reach of the capitalist world order into the ecological domain. More specifically, developed nations and their multinational corporations dominate capital flows, rule-making, and standard-setting through carbon markets, green finance instruments, and technology patent systems, reinforcing the structural subordination of Global South nations. For example, the data from United Nations Conference on Trade and Development (UNCTAD) show that between 2016 and 2020, the global flow of climate finance to developing countries was only half of the required amount. Over 70% of this funding went to middle- and high-income countries, while the least developed countries and small island developing states received less than 10% [12]. Besides, carbon market mechanisms convert historical emissions advantages into new economic benefits through initial quota allocations and trading rules, while Southern nations incur additional costs in purchasing carbon credits and complying with regulations. At the same time, green finance and technological patents regulate capital flows and limit the autonomous R&D and industrial upgrading of Southern nations, further entrenching their subordinate position in the global economic and technological systems. Therefore, carbon colonialism gives rise to mutually reinforcing mechanisms through unequal carbon market distribution, transnational transfer of polluting industries, concentration of green technologies, and the operation of capital and power. This deepens developed countries' structural control over the Global South in ecological, economic, and technological spheres, exposing the political-economic paradoxes and colonial continuity inherent in contemporary climate governance.

4. Real Challenges and Constraints Faced by the Global South

4.1 Constraints of the Institutional Environment

Both international and domestic institutional limits restrict the Global South's ability to respond to climate change. In particular, the design design and negotiation of global institutions are primarily influenced by developed nations and transnational organizations. For instance, the agenda-setting and implementation of international agreements, from the Kyoto Protocol to the Paris Agreement, are shaped by the Global North. However, despite the incorporation of the principle of "common but differentiated responsibilities" into international legal documents, its implementation varies considerably across countries and regions [13]. Concurrently, climate governance systems in some developing nations remain under development, exhibiting limitations in cross-sectoral coordination, environmental legislation and enforcement, and the integrity of policy implementation. For instance, in certain African countries, collaboration among the energy, environmental, and fiscal departments remains inadequate, impeding the effective implementation of low-carbon development strategies [14]. Thus, these institutional factors limit climate policy implementation and strategic planning in Southern nations at international and domestic levels, and are closely linked to financial resources, technological support, and opportunities for international cooperation.

4.2 Shortage of Financial Resources and Technology

Financial resources and technology are vital assets for global climate governance, as they enable developing nations to achieve emissions reductions and pursue low-carbon development. Based on data from the United Nations Framework Convention on Climate Change (UNFCCC), developing countries require more than US$600 billion in annual climate finance up to 2030. However, the actual support provided by developed nations falls significantly short of the pledged US$100 billion, thus constraining the capacity of Southern nations to advance their emissions reduction and climate adaptation strategies to some extent. In the technological domain, patent protection, limited R&D capacity, and weak implementation of technology transfer have made Southern countries dependent on external support for energy transition and industrial upgrad-

ing. For instance, while some nations have solar photovoltaic or wind energy production capabilities, key materials and equipment are controlled by a few suppliers, thereby raising acquisition costs and complicating implementation. Thus, shortages in finance and technology constrain policy implementation and project delivery in Southern nations, heightening their dependence on international resources. This reflects imbalances in resource allocation within the global climate governance system and further exacerbates the challenges that Southern nations face in engaging in international cooperation.

4.3 Barriers to International Cooperation

Within global climate governance, Southern nations' capacity is further constrained by obstacles to international cooperation, which represent a critical element of these multiple limitations. Although climate change is a global issue, practical cooperation between North and South remains hampered by a trust deficit and conflicting interests. Accordingly, insufficient external support in funding, technology transfer, and responsibility-sharing prevents governments in the Global South from fully implementing their nationally determined contributions (NDCs), despite pressure from developed nations to accelerate emissions reductions [16]. At the same time, Southern nations face institutional marginalisation in international cooperation, exemplified by climate finance allocation favouring middle-income developing countries while least developed countries and small island states receive limited support. Furthermore, emerging trade and policy barriers, such as carbon border adjustment mechanisms, further complicate North-South cooperation by introducing elements of competition or even confrontation. Therefore, these barriers weaken Southern nations' role and ability in climate governance, and link with institutional limits, money shortages, and tech support gaps.

5. Response Strategies and Development Pathways in the Global South

5.1 Social Participation and Environmental Governance

Within the framework of carbon colonialism, the response of the Global South depends not only on national-level policies but on broad societal engagement, with social organizations, communities, and the general public serving as crucial actors in advancing environmental governance. In Latin America, local farmers and indigenous movements that resist polluting projects by transnational corporations have both protected ecosystems and catalyzed the emergence of environmental justice discourse [17]. This grassroots action challenges government and international control over climate discourse. Concurrently, non-governmental organizations and academic institutions play key roles in raising public awareness, scrutinizing governmental policies, and further advancing international initiatives. India's 'Solar Villages' program illustrates this, as community engagement has catalyzed the adoption of clean energy and strengthened the role of rural women in energy governance. As a result, social participation enhances policy transparency and sustainability while providing Southern nations with diversified governance tools.

5.2 Public Policy and Sustainable Practices

For Southern nations, public policy provides the institutional foundation for advancing sustainable development. In key sectors such as energy, agriculture, and transportation, several countries have implemented localized low-carbon policies. For instance, China's renewable energy law and green finance policies have directed capital toward clean energy, positioning the country as a global leader in photovoltaic and wind power technologies [18]. Brazil has achieved high substitution rates in transportation energy through biofuel policies, while Climate-Smart Agriculture (CSA) programme in Kenya strengthens smallholder resilience to climate risks by promoting drought-tolerant crops, water-efficient irrigation, and agricultural insurance [19]. This indicates that public policies serve to meet emissions reduction targets and promote social equity and sustainable development. However, policy effectiveness is often constrained by fiscal capacity and institutional environments. As such, for Southern nations, effective policy coherence and implementation capacity depend on strong cross-sectoral coordination. For example, energy transition policies can be linked with employment training and social security programs to reduce the social impacts of industrial transformation. In addition, green bonds or climate funds can also attract private capital to supplement limited public funding. Thus, public policy plays a central role in aligning emissions reduction, social equity, and development, although its effectiveness depends on institutional frameworks and resource support.

5.3 Innovative Models and Future Directions

Innovative models provide Southern nations with a key

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pathway to overcome institutional, financial, and technological constraints. Regional cooperation and multilateral financing mechanisms can help alleviate the resource limitations faced by individual countries. For example, the African Union's African Renewable Energy Initiative targets the addition of 300 GW of clean energy capacity by 2030. Through regional resource integration and multilateral financing, this initiative strengthens the collective bargaining power of Southern nations in global climate governance. At the same time, digitalization and indigenous innovations provide low-cost, high-efficiency solutions. For example, mobile payments, micro-lending, blockchain, and big data technologies are already employed in energy management and climate finance. In East Africa, the M-Pesa platform facilitates microloans for renewable energy projects, hence enhancing rural access to clean energy. Thus, the combination of regional cooperation and innovative technologies enables Southern nations to investigate diverse pathways under multiple constraints, boost their global climate governance capacity, and promote sustainable development.

6. Conclusion

This study examines the manifestations of carbon colonialism within global climate governance and the structural inequalities it imposes on Southern nations, drawing on ecocritical theory. The results indicate that carbon colonialism embeds capitalist logic within the environmental domain. Through mechanisms like carbon market manipulation, relocation of polluting industries, monopolization of green technologies, and inequitable financial distribution, it reproduces colonial logic, thus strongly affecting Southern nations' environmental sovereignty, development rights, and ecological health. However, due to data limitations and the scope of this paper, it lacks a detailed comparative analysis of differences among Southern nations. In addition, it explores macro-level policies and institutions, which do not fully capture the complexity of grassroots ecological resistance and local adaptation strategies. Accordingly, future studies should explore cultural, knowledge, and climate perspectives from a decolonial viewpoint. The comparison of different regions using mixed methods may reveal how developing countries respond to carbon colonialism, while the examination of governance, knowledge, and ecological approaches could highlight pathways toward climate justice.

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