

Strategic Solutions: Game Theory Perspectives on Climate Change in South Asian Cli-Fi

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Received: August 28, 2024

Accepted: October 29, 2024

Online Published: December 20, 2024

doi:10.5430/wjel.v15n3p79

URL: <https://doi.org/10.5430/wjel.v15n3p79>

Abstract

Climate change is a significant concern to South Asia, requiring innovative policy development and public participation approaches. This study explores the application of game theory to analyze climate strategies depicted in two significant South Asian climate fiction (cli-fi) novels: The works of Amitav Ghosh's *"The Hungry Tide"* and Indra Sinha's *"Animal's People."* To examine how game theoretic analysis of cli-fi narratives can enable their contribution to climate policy and activism for South Asia. The approach adopted in this study involves the combined textual analysis of the selected novels, game theoretic modelling of climate scenarios described within, and comparative analysis of fictional approaches to climate problem solving with real-world climate policies. The analysis focuses on three key game theoretic concepts: common pool resource problems, negotiation games, and behavioural games. Both novels relegate intricate game theoretic environments for environmental decision-making and climate activism. Both *"The Hungry Tide"* and *"Animal's People"* explore the problem of common pool resources (CPR) within the Sundarbans ecosystem and the negotiation dynamics between victims of disaster and corporation's post-disaster. Both narratives stress the need for local knowledge and community-based tools to deal with climate vulnerabilities. Through a game theoretic analysis, the critical insights from the game theoretic analysis provide essential guidance for formulating climate policy, including the importance of transparency, adaptive management strategies and robust legal frameworks to hold corporations accountable

Keywords: Climate Change, Game Theory, Climate Fiction, South Asia, Environmental Policy, Literary Analysis

1. Introduction

Global warming is one of the most significant concerns in The South Asian region because of geographical, socioeconomic and demographic vulnerability factors. More works have pointed to worse conditions lately, with estimates pointing to more significant incremental temperatures and precipitation shifts in the area (Rana et al., 2020; Hussain et al., 2019). According to "The Intergovernmental Panel on Climate Change" (IPCC), Janes et al. (2019), extreme weather patterns such as heat waves, famines, and floods will more frequently affect South Asia. It is acknowledged that these changes will usher numerous impacts that may affect agriculture, water resources, human health, and biological diversity, with adverse effects on the range of socioeconomic inequalities and political dilemmas in the area (Kundu & Debnath, 2019; Swapna et al., 2018).

Considering these challenges, policymakers and researchers have sought to be more attuned to game theory as a valuable application instrument to combat climate issues. For the skeptical theory, climate change is a global problem that requires strategic behaviour by players in mega games; game theory analyses of climate negotiations and policy implementation suggest that players' choices are interdependent (Hussain et al., 2018; Mall et al., 2018; Lekshmy, 2023). Governmental and corporate interests, on the one hand, and local communities, on the other hand, can be represented in the games theoretically, and their behaviour in/from the overall structure can help to reveal forces of incentives, trade-offs and potential outcomes in terms of climate strategies (Rasheed et al., 2023; Wang et al., 2023). Some studies in the last few years have used game theory to model global climate cooperation, carbon pricing, and adaptation initiatives for South Asian countries (Kisku, 2023; Kumara et al., 2020; Jha, 2023).

It is not superfluous to stress that in addition to the scientific and policy-type discourses addressing climate change, it is equally essential to consider literature as a discursive practice in forming people's imagination (Oh, 2018; Mishra et al., 2020; Ullah et al., 2020). Climate change narrative, or the often-known cli-fi, is now considered a powerful discourse type that illustrates the impact of climate change on people. It was also said that two well-known South Asian cli-fi novels are *"The Hungry Tide"* by Amitav Ghosh (2005) and *"Animal's People"* by Indra Sinha (2007). These novels – the first still rooted in the Third World desolation of the Sundarbans, the latter in the Second World toxicity of Bhopal – provide complex representations of societies living with environmental collapse and industrial

disasters.

This article sets out the approaches the novel *"The Hungry Tide"* has followed to intertwine conservation, displacement, and locality in the context of the Sundarbans, a region at a critical point relative to climate change. That is precisely why the novel tries to explain the conflict between environmentalism and human rights and the multiplicity of parties involved in the story with their claims (Kluwick, 2020; Huo & Peltier, 2020; Basu, 2020). *"Animal's People,"* on the flip side, is a novel of social injustice and environmental receptors protesting corporate carelessness motivated by the 1984 Bhopal Gas Tragedy (Sree, 2018). With a focus on a representative community's fight for justice and their fundamental right of survival, issues of accountability, endurance and the continued aftermath of calamities such as environmental neglect (Williams, 2018; Bell & Keys, 2023; Godinho et al., 2020).

Hence, the analysis of climate strategies portrayed in these novels should be game theoretic, and its applications can help global policymakers and activists. From the game theory perspective, the cross-sectional analysis of strategic behaviour, decision-making, and power relations depicted by the narratives present helps to understand South Asia's climate change scenario and prospects. The importance of this approach is not only in adding to the understanding of the literary sources but in the correlation between fiction and practical policy-making.

The theme of this study is based on game theoretic thinking as a creative approach to exploring aspects of climate strategies in the fiction *"The Hungry Tide"* and *"Animal's People,"* which relate to decision-making of resources and negotiations among stakeholders about climate change. In this way, this study strives to join the ongoing conversation in climate science and policy and literary criticism, providing fresh insights into how novelists both reinterpret climate science and envision the potential for the transformative actions of individuals and societies in modern South Asia and beyond.

2. Theoretical Framework

Analyzing climate change through game theory enriches our understanding of the activity and facilitates modelling its essential aspects. In this section, the authors review game theory concepts for climate change essential to policy-making and innovative connections between game theory, climate change, and climate fiction (cli-fi).

2.1. Game Theory Concepts Relevant to Climate Change

Games for behavioural change and risk-takers uncertain choices help advance knowledge about people's and organizations' reactions to climatic risks. In addition, Chander (2018) states that because much of the impacts of climate change are unpredictable, decisions may be challenging to make. Behavioural game theory enables actors' choices to be simulated in such contexts by considering cognitive biases, risk perception, and social influences. For example, the likelihood of a high-impact, low-probability climate event may cause organizations to act irrationally, as they can overestimate short-term gains by earning more than they lose in the long run (Wu & Thill, 2018; Abeysekara et al., 2023).

Climate change involves common pool resource issues and the tragedy of the commons. The atmosphere, oceans and other common property resources are good examples of open-access resources that will likely be over-exploited. Shu and Fu (2023) explain how the conflict of interest between self and others can be analyzed with game theoretic models in the context of these resources. The phenomenon of rational self-interest resulting in the erosion of a shared resource that supports it is represented by greenhouse gas emissions and deforestation in South Asia (Aryal et al., 2019; Alvi et al., 2021).

Negotiation games are helpful when considering cross-country climate policy and agreements. The Paris Agreement and other global climate accords can be considered multi-player games with many different payoffs. Li and Rus (2019) use game theory to analyze how heterogeneously developing countries bargain and cooperate in the framework of climate change policies that involve climate mitigation. By identifying and explaining various theoretical patterns in climate change negotiations, their work shows aspects like asymmetric information, credible commitments, and forming a coalition that affects the consequential results of international climate change negotiations.

2.2 Application of Game Theory to Climate Policy and Decision-Making

In the climate policy context, game theoretic methods provide relevant information for policy-making and policy execution. Chen and Shi (2022) show how dynamic game models can capture the cooperation and competition of actors over time in the context of climate policies of different regions. More analysis is needed on how different long-term strategic interactions look in policy, especially as illustrated by the "Regional Integrated Climate-Economy" (RICE) model.

In South Asia, game theory has been used to understand climate adaptation interventions among smallholder farmers. Aryal et al. (2019) apply game theory to analyze how farmers choose crops, water supply and technologies amidst climate risks. Their recommendations call for policies connecting personal self-interest to efforts and goals to create climate resilience.

Market-based climate policy instruments are also designed based on game theory. Emissions trading schemes and carbon pricing mechanisms can be elaborated as games with players pursuing self-interest. Buck et al. (2021) demonstrate how game-theoretic frameworks can guide policymakers to recognize such strategic action patterns and develop less inefficient and fairer climate policies.

2.3 Intersection of Game Theory, Climate Change, and Literary Analysis In Cli-Fi

Climate change and game theory are potential research areas for characterizing novel literary works that await classification and analysis.

The novels such as *"The Hungry Tide"* by Amitav Ghosh and *"Animal's People"* by Indra Sinha depict events that can be put into a game theory standpoint to examine the actions of human beings to problems about environmental disasters.

Estok (2023) points out that many cli-fi stories feature what he describes as game theoretic aspects of existence: interactions between characters, distribution of resources, and bargaining over climate policies. Thus, using game theory elements, we can find more meanings and a critical attitude in these literary works.

For example, the land use and conservation episodes in *"The Hungry Tide"* can be best explained in terms of the standard pool resource game where different players vie to control the Share of the Sundarbans ecosystem. Likewise, negotiating over the distribution of benefits between corporate entities and local dwellers in *"Animal's People"* is evidence of negotiation games and 'asymmetric knowledge.

Kaur (2023) discusses how different cli-fi novels analyze emerging forms of belongingness in the context of climate change, which is understood through different cooperative game theories. Notably, many of these literary works undermine their protagonists' self-serving tendencies or expose models of collective action which may usefully underpin climate strategies.

Thus, it is possible to create more diversified approaches to interpreting human behaviour that relates to climate change, applying game theory models, climate science data, and literary works analysis. While bringing multiple new insights into approaches to analyzing cli-fi narratives, this interdisciplinary initiative also contributes to developing innovative views on policy-making and the public perception of the climate crisis.

3. Methodology

This article uses a multidimensional methodological approach, undertaking a game theory analysis of climate change strategies in Amitav Ghosh's *"The Hungry Tide"* and Indra Sinha's *"Animal's People"*. Thus, the proposed research is methodologically based on textual analysis, game-theoretic modelling, and comparative analysis, which are the most efficient approaches to offer a complex view of the representation of climate issues and possible consequences in the novels.

3.1 Textual Analysis Approach to the Selected Novels

The primary mode of inquiry is a literary analysis directed at *"The Hungry Tide"* and *"Animal's People."* It requires the analyst to undertake close or hermeneutic analysis of the novels with particular reference to the passages that characterize the environmental decision-making, resource mobilization and climate change negotiation. This analysis looks at the key themes, characters' incentives and plot structures to depict game theoretic situations embedded in the fiction. Language, symbolism, and characterization are the focus of interest throughout the works studied, as, in Ganguly's words, these aspects help authors create a 'multi-layered representation of the environment and the society that is on the brink of collapse' (Ganguly, 2020). The study incorporates non-cooperative game theory approach. This research approach enables the analysis of the chosen novels to depict various climate change problems and people's actions from the South Asian perspective.

3.2 Game Theoretic Modeling of Climate Scenarios

Based on the textual analysis, this study uses game theoretic ideas to analyze the climate scenarios depicted in the novels. They are employed to study decision-making choices among characters within uncertainty about risk environments and adaptations (Chander, 2018). Common pool resource dilemmas are used to analyze rivals of the natural resources, the Sundarbans environment in *"The Hungry Tide"* and the toxicity atmosphere in *"Animal's People."* Incompetence analysis and negotiation games study power relationships and cooperation between actors, residents, government agencies, and companies (Chen & Shi, 2022; Ahmed et al., 2018). These models assist in explaining the key aspects of strategy Regarding climate-related conflicts and cooperation illustrated in the novels.

3.3 Comparative Analysis of Fictional Strategies and Real-World Climate Policies

As the last step of the methodology, comparative analysis between the imagined stories and real-world climate policies within South Asia are drawn. This approach analyses the extent to which the climate strategies narrated in the novels reflect or depart from the policy orientations of the region. The research uses the novels to recreate current climate change mitigation and adaptation discourses in South Asia (Aryal et al. 2019; Almazroui et al., 2020; Alvi & Khayyam, 2020). Applied to cli-fi narratives involving fictional strategies, this method aims to discover potential gains and novel solutions that still unread or unseen stories may provide to policymakers and activists.

4. Analysis of *"The Hungry Tide"* through Game Theory

4.1 Overview of Climate Themes and Environmental Conflicts in the Novel

In *"The Hungry Tide,"* the protagonist unveils a complex table of conflicts of an environmental nature that take place in the territory of the Indian Sundarbans islands in the Bay of Bengal. Describing the relationship between people and nature, the novel brings to our understanding the frailty of existence in the area, defined by threatening tides and storms.

In one of the core clashes regarding the environment, the protection and sustainable use of the Sundarbans, home to an affluent population of the Bengal tiger, is pitted against the primacy of human interests of the population of this region. This tension is particularly illustrated when Describing the Sundarbans as

a universe unto itself...there is no prettiness here to invite the stranger in: yet to the world at large this archipelago is known as the Sunderbans, which means "the beautiful forest." There are some who believe the word to be derived from

the name of a common species of mangrove – the sundari tree, *Heriteria minor* (Ghosh, 2005, p. 7).

Being a very realistic work, the description of the life experiences in this region becomes much more severe with Kanai recalling the failure of Sir Daniel Hamilton's dream to create a perfect world. The people's lives can be changed for the better for the price of some bricks and discussing how easily and nonchalantly “how quickly and casually those lives can be destroyed by a storm, a flood, or a Bengal tiger” (Ghosh, 2005).

4.2 Characters' Environmental Decision-Making

Characters in the novel *"The Hungry Tide"* often make decisions within their interactions with other characters that are consistent with behavioural game theory, especially in environments of decision uncertainty (Pilia, 2020). This is particularly felt in the American cetologist who abandons her official tour guides to accompany the fisherman, Fokir, in his boat. Here, she is highly uncertain and makes decisions based on partial information; for example, she "wonders what they might do to her in this state" if she should return with the guards (Ghosh, 2005).

Fokir's perception and choice also have implications for behavioural game theory. His willingness to take Piya to dolphin places and to fish in restricted places despite the losses one is likely to incur shows strong consideration of the benefit (helping Piya and getting paid) against the cost (being caught by authorities). This is evident and illustrative when Piya says of Fokir, "steers away from the mass of boats, careful not to be seen" (Ghosh, 2005).

4.3 Conflicts over the Sundarbans Ecosystem

The Sundarbans ecosystem is a common pool resource depicted in *"The Hungry Tide,"* whose use is dominated and controlled by several individuals or groups (Raja, 2018). This is well illustrated in the conservation clashes with the welfare of those living in such areas. It is done through the story of Morichjhapi, in which tens of thousands of Bangladeshi refugees occupied an island considered a nature reserve. Nilima explains that "the authorities tried to force the settlers out repeatedly before massacring them" (Ghosh, 2005).

In fishing, the upcoming issues also identified the common pool resource problem in the Sundarbans. When Piya first meets Fokir, she notices how he is "fishing in an out of bounds area" for conservation laws, but he is doing so because the poor fishermen need the fish for survival and profit (Ghosh, 2005).

4.4 Power dynamics between Locals, Government, and Outsiders

It is possible to examine some of the episodes in the context of the negotiation game, especially at the level of power relations between representatives of the indigenous people, the state, and other individuals. The Morichjhapi incident is a glaring example of broken attempts at dialogue and gross asymmetry of energy between the two parties. Kusum Nilima says she and her son were one of the settlers here. Nilima reveals that "Kusum, Nilima reveals, was one of the settlers, along with her son. She died in the massacre" (Ghosh, 2005).

On a smaller scale, the relations between Piya and the local authorities are good examples of the negotiation games at work. When Piya finally gets her research permit, it is recorded that it was issued due to the "thanks to her uncle's position" but with the requirement that "she be accompanied by a forest guard" (Ghosh, 2005). This can be understood as a series of negotiations for research conducted in protected territories.

4.5 Author's Persona as Climate Activist-Novelist and Narrative Choices

Understanding that Ghosh is a climate activist-novelist, the analyzed narrative choices in *"The Hungry Tide"* cohere to form a comprehensive whole. The complicated interconnection between people and the environment is established through the presentation of sophisticated scientific theories, the incorporation of fables and legends attributed to the inhabitants of the studied area, and the author's experiences. This can be observed by how he describes the attitudes of the people of the Sundarbans as "conditions are dangerous and ever changing, and the place is 'a universe unto itself'" (Ghosh, 2005).

The author's activist position can be traced in the description of the Morichjhapi incident. In this case, Nirmal writes about this historical injustice in his journal, meaning that Ghosh does not want us to forget it. Kanai finally learns that the journal is "a record of what happened on Morichjhapi" which indicates the author's intent to expose other such environmental and social issues (Ghosh, 2005).

Ghosh also works with Piya's character to explain science's function in studying ecological environments. When Piya realizes the actual behaviour of the dolphins, which is "like Archimedes and his bathtub, Newton and his apple", it becomes clear that rather than finding new facts, science can serve to preserve the species (Ghosh, 2005).

Therefore, *"The Hungry Tide"* provides comprehensive grounds for introducing the game theory concepts for studying environmental disputes and decisions. Reading Ghosh's prose, the fantastic characters he creates, and the plot, we get a great story with an important message and the set of questions and concerns that a reader has thought about the occupation of delicate natural zones and connections between humanity and surroundings.

5. Analysis of "Animal's People" through Game Theory

5.1 Overview of Environmental Justice Themes and Corporate Responsibility

The novel *"Animal's People,"* by Indra Sinha, known as throws a raw light on corporate ruthlessness and environmental exploitation through the futuristic story construction of Khaufpur, which is, in fact, the accurate picture of Bhopal Mike's difficulty. The work

considers the repercussions of industrial disasters for vulnerable populations and the issue of corporate and state responsibility in the context of social injustice (Pruszinski, 2021).

The central environmental justice theme is encapsulated in Animal's description of the disaster: "On that night it was like a wedding in the factory, lights blazing, pipes gushing, the noise of sirens and shouting" (Sinha, 2007). This is in stark contrast to the vivid presentation of the effects of the event the audience receives, which emphasizes the complete unceremonious treatment of life in the race for money.

Lack of or exercise of corporate responsibility is a common theme. Animal calls the responsible company "the Kampani," which translates as "the company," but which suggests the latter's anonymous character. He growls,

For eighteen years, the people have fruitlessly tried to force the Kampani to pay proper compensation to those whose loved ones it killed, whose health it ruined, plus it should clean the factory and compensate the people who had been drinking its poisons (Sinha, 2007, p. 33).

5.2 Corporate vs Community Interests in Disaster Aftermath

This article describes the situation after the disaster as the play of behaviours between the company and the community as presented in the novel. The Kampani avoided confrontation, and thus, the company never faced court for the continued pollution of the environment. It also looks like the game theory in which the corporation historically tries to reduce costs and avoid legal consequences, disregarding the community's interests.

The community response initiated by the activists, including Zafar, entails the following strategies in the fight against the Kampani's evasion. Zafar's approach is described as follows: "Zafar tells the people they will win" (Sinha, 2007). This can be viewed as a coordination game. Coordination games are games where players' payoffs are common knowledge, and the success of the joint strategy is conditional on everyone believing in the possibility of a victory.

5.3 Shared Burden of Environmental Degradation

Therefore, chronic environmental degradation in Khaufpur poses a typical shared pool resource dilemma. Thus, a contaminated environment is a common property or, in this case, a nuisance for all the community members. Animal describes the pervasive nature of the contamination: "Animal imagines poison flowing through the pipes and out into the city, killing thousands" (Sinha, 2007).

This situation leads to a tragedy of the commons whereby actions detrimental to the larger group are chosen because of the benefit to the individual. This is how the problem is discussed in the novel and Spotlight for analyzing how the burden is being shared among the community, focusing on the vulnerable citizens in the society.

5.4 Legal Battles, Activism, and Power Imbalances

Legal and activist campaigns against the Kampani can be seen in the same terms as a game. The power imbalance between the corporation and the community is stark, as Animal's observation illustrates: "The company lawyers arrive, and Zafar fears they will try to make a deal" (Sinha, 2007).

Several strategies in the course of negotiations, as used by different characters in the novel, have been portrayed. There is a similar relationship between the hunger strike of Zafar and an example of an ultimatum strategy in game theory, in which one tries to obtain concessions from the rating party, demonstrating a deep commitment to a certain position. Animal describes this tactic: "Zafar and Farouq go on hunger strike, foregoing even water; Elli tries to dissuade them" (Sinha, 2007).

Not to mention that it contributes to negotiated understandings that are endemic to the government. Promises made by the Chief Minister to "not to approve a deal without him [Zafar]" are clear indicators of how political players can shape these negotiations, which might be problematic in several ways (Sinha, 2007).

5.5 Author's Persona as Advocate for the Marginalized and Narrative Strategies

There is no doubt what kind of authorial voice Indra Sinha takes on when he tells the story through the protagonist, Animal, who is physically impaired by the catastrophe. This narrative strategy provides a voice for the most vulnerable people in society, who are literally and metaphorically broken by corporate carelessness.

Animal's unique perspective is reflected in his self-description: "I don't remember a time when I was human, though I'm told I once walked on two feet just like a human being" (Sinha, 2007). Even with the room still shaking from the disaster and corporations heartlessly ignoring the victims, this statement holds much powerful meaning.

Another proof of Sinha's advocacy work is his openness to the community's issues. The Animal uses sexually explicit and profanities in his talks to wake up readers from their slumber. For example, when talking about journalists, Animal says they "come to suck our stories from us" and are "drawn by the smell of blood" (Sinha, 2007).

The author's commitment to giving voice to the voiceless is also reflected in Animal's insistence that his story be told in his own words: The first statement was, "The book 'must be his words only'" (Sinha, 2007). This narrative preference points to the need for genuine, untold stories and voices for the victims of environmental injustices.

Hence, "*Animal's People*" can be seen as a book that provides a colourful picture of issues related to environmental justice that would create the perfect backdrop for game theoretic analysis. The novel presents and exposes the strategic behaviour involved in forming

interactions by illustrating the propensity for corporation-community-state geopolitics in responses to disasters and the resistance to justice in post-Rena environmental disasters.

6. Comparative Analysis and Synthesis

6.1 Similarities and Differences in Game Theoretic Scenarios across the Novels

It is about game theoretic concepts and difficulties of environmental politics and climate protest in South Asia as far as the characters of both novels, *"The Hungry Tide"* and *"Animal's People."* Yet, each author's novels are dissimilar in terms of the themes and scope of the tensions depicted.

In *"The Hungry Tide,"* one of the vital game theoretic situations is founded on how the combined ecosystem of Sundarbans must be dealt with. This is the common pool resource dilemma. It paints a picture of local fishermen, conservationists, government officials, outsiders and every other player in this game where everybody scrambles for what is left of our resources. At the same time, the ravaging forces of nature await nobody. For example, they are protecting the tiger at the cost of human lives versus cases such as deciding where an endangered animal like the tiger is to be protected and from whom, which cases again relate to the conflict arising from striving to conserve the natural environment while trying to cater to human needs. This case represents the tragedy of the commons in which individual decisions could damage or destroy an asset that is open to everyone (Tsai, 2018).

On the other hand, *"Animal's People"* deals with another catastrophe, that happens to be a local one and the events that follow it, where game theoretic approaches different from those of the tsunami apply. Therefore, the novel's primary focus is the negotiation games involving the respective community and the organization that caused the disaster (Pai, 2023). The extending court cases to fight the "Kampani" and numerous campaigns also describe the information asymmetry manoeuvres in which the corporation has the upper hand and abundant information over the local people (Williams, 2018). Related community issues, such as protests, boycotts, and actions, can be considered using coordination games.

Both novels involve contractual framings concerning behavioural games, including the decision-making of the single agent under risk conditions. People in both books act in the unknown environment and society, making decisions which may substantially influence the outcome.

6.2 Effectiveness of Climate Strategies Portrayed in Relation to Real-World Policies

The climate strategies represented in both novels are helpful in understanding the actual difficulties involved in implementing climate policies in South Asia and the possible effectiveness of such action. One of the messages in *"The Hungry Tide"* is the value of local expertise and the need for management flexibility in climate change vulnerable natural environment. From Fokir, Sundarbans' tides and animalistic instincts indicate that climate adaptation should also engage traditional ecological knowledge (Vincent, 2018; Bhushan, 2021). This concurs with the current literature supporting indigenous knowledge assimilation into climate policies in South Asian nations (Cerutti et al., 2021).

Compared to *"Animal's People,"* this novel does seem to offer a somewhat more purely critical perspective of corporate-inspired environmental governance and the inability of the law to protect affected populations sufficiently. This is learning the wheel of justice in the novel, which resembles true-life stories of pursuing justice in cases of corporate crimes, including flesh-shattering calamities such as oil spillage. This narrative reflects similar work on developing nations' challenges and barriers to establishing workable climate liability policies (Li & Rus, 2019).

The two novels stress the relevance of community-centred change adaptation. However, they do not escape the reflection that attempts by the people directly involved in the enterprise from below fail when it comes to powerful forces outside of society, be it cataclysms or specific business initiatives. This tension echoes the concerns being voiced in climate policy concerning the relative emphasis on centralized and decentralized strategies to address climate change (Alvi & Khayyam, 2020).

6.3 Authors' Approaches to Climate Activism Through Fiction: Strengths and Limitations

Ghosh and Sinha, both writers, address climate activism in their novels in different ways, agents utilizing different methods for different successes and failures. In *"The Hungry Tide,"* Ghosh's approach is not as overt as Bulawayo's in the sense that he does not rigidly conform to the social justice nature of post-colonialism while, at the same time, he does not shy from the theme throughout his novel (G & M, 2023). Hansen's strength is depicting complex sides of environmental conflicts and no clear-right wrongs categorizations. According to Ganguly (2020), this aligns with what Ghosh has brought to the literary world, referred to as 'planetary realism,' as it places the local environmental concerns in perspective with the global forms of struggle, however, this approach may reduce the extent to which the novel can spark an urgent call to action on climate issues immediately.

In *"Animal's People,"* Sinha immediately directs the readers to the scene of injustice through more straightforward and confrontational storytelling with uncompromising narrative and imagery. The story can engender empathy and anger, which may stimulate people to participate in measures for environmental protection. However, according to Donig (2018), it adds to the distorted representation of complex environmental issues, and readers might turn off if they are on the opposite end of the opinion.

Thus, both authors are good at fictionalizing the effects of environmental pollution and climate shifts, thus presenting universally global problems in Avery's narration. This is in line with research estimating that story-based strategies may be beneficial for promoting

understanding of the impacts of climate change and catalyzing behaviour change (Estok, 2023).

6.4 Critique of Game Theory's Applicability and Limitations for Analyzing Literary Climate Narratives

In applying game theory to analyzing the strategies illustrated in these climate narratives, one faces certain drawbacks. Game theory's focus on materially calculated decisions and outcomes can perhaps provide an insufficient account of the passion and cultural aspect of environmental conflict presented in the novels.

To illustrate this, in *"The Hungry Tide,"* nature's value to the people of Sundarbans cannot be expressed in forms that would fit game theoretic models. Likewise, in *"Animal's People,"* it is more than mere calculation as one seeks to pursue his/her life with reasonable certainty of risk and gain: the traumatic aftermath and detailed fabric of the social milieu are more than this sole and scarcely viable account.

Furthermore, the novels describe situations when information is frequently limited or unbalanced, which differs from true in numerous game-theoretical models. It becomes challenging to apply conventional game theory approaches to such stories due to the openness of natural systems and the delayed, often concealed consequences of abuse of the existing environment.

However, the specified prospering of behavioural and evolutionary game theory can partly excite some of these limitations. These approaches can be more suitable for recognizing and dealing with phenomena like bounded rationality, cultural influence, and the constantly changing character of an environment for decision-making (Shu & Fu, 2023).

7. Implications for Climate Policy and Activism

7.1 Insights from Game Theoretic Analysis of cli-fi for Policy Formulation

The game theoretic strategic analysis of these texts can be examined to provide some guidance into the future of climate policy in South Asia. These novels help to unpack the sophisticated motivations and behaviours that characterize interactions between the different players involved in environmental decision-making and offer a rich appreciation of the obstacles to good climate policy.

Among these insights, one noteworthy is the problem of inequality in the distribution of information between various players. In *"Animal's People,"* the power imbalance between the corporation and the affected community is exacerbated by unequal access to information. This means that climate policies should develop measures to motivate the provision of information and knowledge to enhance competition during bargaining and decision-making (Li & Rus, 2019).

This paper article presented the common pool resources problems in *"The Hungry Tide"* and the relations between conservation and the local people's livelihood that call for appropriate policies. This parallels the current literature advocating for mainstreaming traditional ecological knowledge into climate change adaptation practices in South Asia (Aryal et al., 2019).

7.2 Potential Real-World Applications and Policy Recommendations

Based on the game theoretic analysis of these novels, several policy recommendations can be made:

- Develop inclusive decision-making processes: Its policies should institutionalize opportunities for the engagement of all stakeholders, including the vulnerable, in climate-related matters. This may be helpful to overcome the numerous dominances illustrated in both the novels.
- Implement adaptive management strategies: In the case of *"The Hungry Tide,"* due to unpredictable climatic impacts in the Sundarbans region, context-specific and responsive policies are the need of the hour (Chandio et al., 2022).
- Strengthen legal frameworks for corporate accountability: In the novel *"Animal's People,"* justice issues are shown to exist in dealing with corporations that have caused environmental deformity (Alvi & Khayyam, 2020).
- Promote community-based climate resilience initiatives: Two of the points we see in both novels are the asset that comes with local knowledge and the role of the individual in the community. Political policies must help enhance and enable climate change initiatives by the communities (Dhyani et al., 2021).

7.3 Role of Literature in Shaping Climate Discourse, Public Opinion, and Action

In climate fiction, there are essential roles to play: to shape public discourse and opinion on climate change. By humanizing environmental degradation and showing real-world ethical dilemmas, these novels can turn readers into both emotional and intellectual players in climate drama in a way that scientific reports often do not.

According to Estok (2023), cli-fi narratives can fill the gap between science and public knowledge of climate change. *"The Hungry Tide"* and *"Animal's People"*, for example, will assist in bringing these global problems to the reader's attention by utilizing relatable characters experiencing environmental difficulties.

These literary works could organize climate activism by providing examples of counter resistance and collective acts. A favourite example from my list of favourites would be Zafar in *"Animal's People"* and Piya in *"The Hungry Tide,"* where people make a difference when the aim seems 'impossible.'

8. Conclusion

Results obtained from this study show how the application of game theoretic concepts can offer essential insights when such analysis is

brought to bear on South Asian cli-fi novels and the strategies they portray in the context of climate change. By studying Amitav Ghosh's *"The Hungry Tide"* and Indra Sinha's *"Animal's People,"* we have made visible the intricate interplays of strategy, power relations, and decision-making process through which responses to environmental challenges in the region unfold. The behavioural games, common pool resource problems, and negotiation scenarios from these novels represent a robust setting for applying game theory. Modelling conflicts over the joint use of things like the Sundarbans ecosystem and the aftermath of industrial disasters and struggles for environmental justice also exposes the strategic foundations of climate-related conflicts and cooperation. An interdisciplinary approach, this approach combines game theory, literary analysis, and climate science and is highly relevant to climate change research and policy. In addition, it shows that fictional narratives can contribute valuable lessons for real-world environmental choices and policy formulation. This study argues that cli-fi has the potential to be an effective medium for the communication of environmental issues, both emotionally and intellectually engaging readers.

Future research could expand this approach to other cli-fi novels from different cultural contexts to see if cross-cultural patterns of climate change perceptions and responses can be found. In addition, combining more sophisticated game theoretic models, such as evolutionary game theory, may yield more nuanced studies of climate change adaptation and mitigation strategies.

Concisely, this study demonstrates that climatic problems are matters of a comprehensive nature that require interdisciplinary approaches to their solutions. Augmented with game theory, the literature analysis enables us to understand people's responses to environmental crises better and more equitably effective and equitable climate policies.

Acknowledgments

Not Applicable

Authors' contributions

Ms. Rahamath Nisha S drafted the manuscript and Dr. S. Horizan Prasanna Kumar revised it and proofread the final version. All authors read and approved the final manuscript.

Funding

Not Applicable

Competing interests

The authors declare that they have no known competing interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Sciedu Press.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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