

The Primacy of National Policies in Navigating the Local-Global Nexus: A Case Study of the Plastic Crisis

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Abstract: Against the backdrop of the escalating plastic crisis, exacerbated by human activities and posing a significant public concern, this study seeks to evaluate the role of various policy-making levels in environmental intervention. The core subject of investigation is the integral function of national lawmakers in spearheading effective environmental policy strategies while contextualizing the coordination of local and international policymakers. Using practical policy examples as primary tools for analysis, the study delves into the dynamics between the three tiers of policy-making and gleans evidence underlining the centrality of national players. Results indicate that while local and international policies offer solutions, they are often impeded by inherent policy limitations. National policies, powered by vast resources and political clout, emerge as pivotal, capable of overhauling plastic production, consumption, and disposal mechanisms. The research concludes that to holistically address the plastic crisis spawned by market failures, a blend of governmental intervention, primarily driven by national policymakers, and complemented by local and international cooperation, is imperative. Additionally, the future necessitates not only a reduction in plastic use but also the pursuit of viable plastic alternatives to combat pollution comprehensively.

Keywords: environment policy, plastic crisis, national policymakers, market failure, government intervention

1. Introduction

The plastic crisis, currently a significant public issue stems from human activities. Ever since plastic came into existence, its extensive application is used in daily life. However, the mismanaged waste and the enduring nature of plastic have resulted in profound environmental contamination. Addressing the plastic crisis urgently calls for human intervention in the form of regulated environmental policies. This paper suggests that national policymakers play a pivotal role in shaping effective environmental policies. While it acknowledges the importance of local and international regulators, emphasizing the primacy of the nation's policy formulation. However, the prevailing view is that effective environmental policy implementation necessitates collaboration between local, national, and international policymakers, and the critical role of national governments often goes underappreciated. Despite the emphasis on multi-level coordination for executing environmental policies, the substantial contributions of national lawmakers in driving successful policies frequently remain under-acknowledged. This study is likely pivotal in shedding light on environmental policy

and delineating the distinct roles of policymakers at each level. Firstly, the severity of environmental problems will be elucidated, exemplified by the plastic crisis, and the necessity for government intervention will be established. Secondly, the relationship between local, national, and international policymakers will be discussed, with differences in policy formulation and implementation across these levels being highlighted. Finally, practical cases where national-level policymakers have solved the plastic crisis will be referred to, with further analysis of the efficacy of their policies being conducted.

2. The Global Problem of the Plastics Crisis

The environmental impact of everyday plastic is often ignored. An estimated 12.7 million metric tons of plastic waste enter the oceans annually, which is equivalent to a truckload of plastic every minute [1]. As illustrated in Table 1, there are several categories of pollution arising from plastics, with marine ecosystem degradation being the most critical. It's estimated that a staggering 269,000 tons of plastic floats in our oceans, posing a significant threat to marine biodiversity when creatures consume and subsequently perish from this debris. Moreover, the harmful compounds found in plastics could find their way into human diets via the marine food web [2]. But where does this abundant plastic originate? Figure 1 highlights that the primary sources of plastic pollution are the packaging and construction sectors. For instance, beverage giants like Coca-Cola and PepsiCo are responsible for producing in excess of 500 billion single-use plastic bottles annually [3]. There's no denying that the pollution from plastic waste has a profound detrimental impact on our planet, and the primary culprits are humans.

Table 1: Type of Pollution caused by plastic [2].

Type of pollution	Description of the hazard
Marine ecosystem damage	Plastic pollution leads to marine life ingesting plastic, harming the balance of marine ecosystems.
Land pollution	Plastic is difficult to decompose, accumulating in soil and affecting soil fertility
Release of harmful chemicals	Toxic chemicals are released during the plastic decomposition process, contaminating water sources and soil
Bioaccumulation	Plastic particles enter the food chain, ultimately impacting human health
Energy waste	A large amount of plastic waste is not recycled, resulting in resource wastage

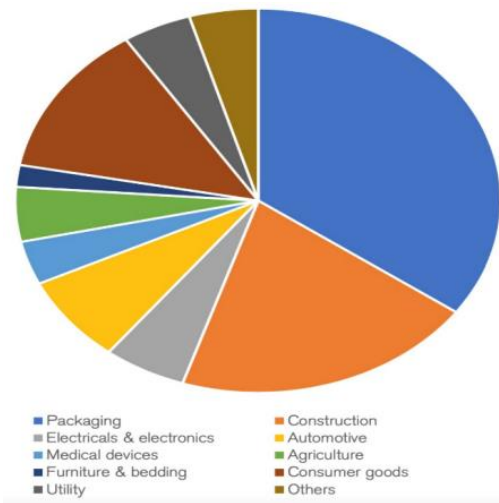


Figure 1: Global Plastic waste share [3].

The reason for the plastic crisis is: Conceptually, the rapid increase in disposable plastic production outstrips our capacity to manage it. From 1950 to 2015, 6,300 million metric tons of plastic waste is generated, only 9% was recycled while a staggering 79% was left in the open environment [4]. From the perspective of market failure: Market failure arises when the market’s inability to effectively distribute resources results in wasted resources or adverse environmental consequences [5]. In the context of the plastic crisis, market failure occurs when the market fails to effectively manage the resources of plastic production, processing, and disposal. Consequently, plastic waste isn’t addressed promptly, leading to pollution, greenhouse gas emissions, and ecological harm. This situation is an “externality” in market failure, referring to unintended economic effects on others without direct market dealings [6]. Plastic problems reflect a negative externality by exacerbating environmental problems, these damages are not factored into the cost of plastic products. Table 3 forecasts that plastic pollution will double to 12,000 million metric tons by 2050, endangering all forms of life without intervention. Undeniably, the issue of externalities has had a significant impact on the plastic crisis, and formulating environmental policies to address market failures is essential.

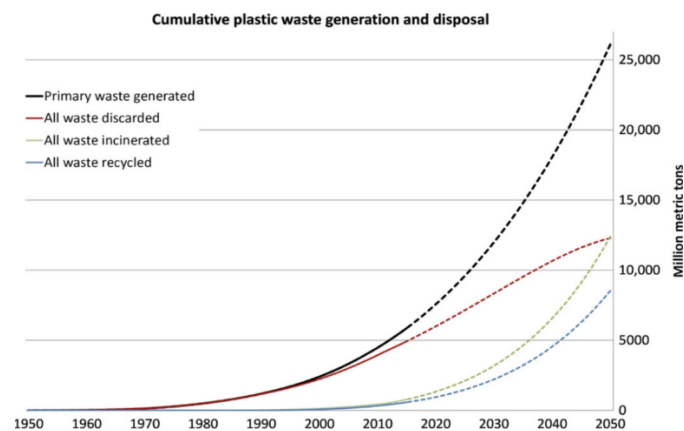


Figure 2: The prediction of plastic pollution [4].

3. The Relationship among Local, National, and International Policymakers

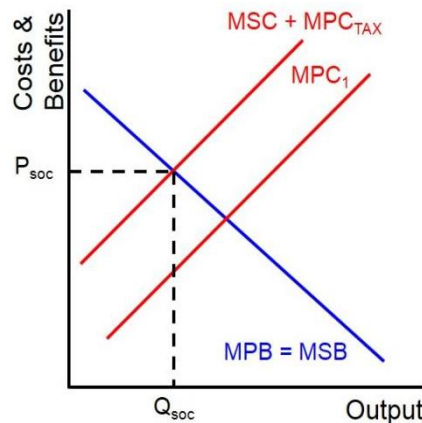


Figure 3: Social optima outcome [7].

It is essential that government intervention should address this crisis, so which level of government or policymakers should interfere. It is believed that the nation is the best option. The theory of social optimal outcomes posits that rational resource distribution enhances societal welfare, evidenced by Figure 3 where the equilibrium is at point P_{soc} [7]. Essentially, policymakers who can better regulate plastic production, consumption, and disposal are in a stronger position to address the market failure surrounding the plastic crisis. National policymakers act as a bridge between the three levels, which are positioned in the middle of the hierarchy level. It can not only push the agreement at the international level but conduct the implementation at the lower level locally. Following the U.S. government's 2014 plastic regulations, California promptly enacted its "Plastic Bag Bans" [8]. Similarly, nations like the U.S. and China play pivotal roles in international policy forums. Their influence was evident at the 21st United Nations Climate Change Conference, leading to the Paris Climate Agreement [9]. This indicates that national policymakers can support the execution of local policies and spearhead the creation of international policies.

Environmental policymakers at various levels have distinct characteristics in addressing the plastic crisis. National policymakers benefit from comprehensive information, uniform legal frameworks, and integrated resources. Local authorities offer flexibility, specificity, and practical solutions. Meanwhile, international strategies emphasize global cooperation, technology transfer, and overarching strategies. Effective government intervention should be determined based on the characteristics of the policymakers. An incorrect choice might increase the cost of policy implementation. The Coase Theory suggest that once the property rights are settled, parties can negotiate to the optimal level if transaction costs are low. However, when transaction costs are high or property rights are ambiguous, the market may fail to allocate resources efficiently [10]. The plastic pollution issue stems from a lack of clear property rights over environmental damages caused by it. This indicates that national policymakers can streamline policy creation and enforcement, reducing transaction costs of inter-regional or international coordination. This is because national laws possess uniformity and comprehensiveness. Local authorities may face more constraints, while international cooperation involves complex negotiations among multiple nations, raising transaction costs. Direct collaboration between local governments and international entities may result in misalignment and imbalance issues. In 2013, the African Union introduced a policy targeting plastic waste reduction via new disposal systems. However, over 72% of local administrations in member nations struggled with its implementation, mainly due to resource constraints and insufficient expertise [11]. This is because the national-level has the authority to establish clear property rights structures across the country. This clarity can reduce the externalities of plastic pollution, as businesses and consumers are

explicitly aware of their responsibilities and obligations. This does not indicate that local and international policy interventions are essential, they serve distinct roles in government intervention. With the national level taking the lead, and local and international levels acting as supportive pillars, it's plausible to effectively allocate resources in the plastic crisis.

4. The Solution of National Policy Makers in the Plastic Crisis

From a national perspective, which environmental policies are effective in solving the challenges of the plastic crisis. The Coase Theory also indicate that transaction costs often hinder the efficient exchange of property rights, preventing the market from achieving its optimum in real life. He proposed solving externality problems by reducing transaction costs, especially by clarifying and strengthening property rights [10]. Inspired by Coase's theorem, I believe that national policy can address the plastic crisis by (1) establishing property rights (2) facilitating transactions (3) overseeing implementation, and (4) incentive cooperation. Here are some detailed examples:

Tradable Permits involve governments establishing a ceiling for specific pollutant emissions, subsequently dividing this cap among different emitters [12]. With regard to the plastic dilemma, the overarching quota for plastic production and pollution is set by the national authority. This centralized decision-making is rooted in the need for comprehensive data and substantial jurisdiction, capabilities that a central government possesses in contrast to local administrations. Taking cues from the Tradable Permits mechanism, South Korea introduced the Resource Circulation Support System in 2003. Under this system, corporations are given specific plastic consumption allowances; surpassing these thresholds invokes additional charges [13]. Consequently, a majority of Korean enterprises curtail their plastic utilization to adhere to these thresholds and optimize operational expenses. Merging economic and environmental objectives, this strategy facilitated a reduction of plastic pollution by an approximately 42% in 2003 [13]. These policies exhibit a mandatory nature, whereas local and international policies tend to be less binding due to their limited scope and respective sovereignty.

Beyond the previously mentioned strategies, employing taxes and subsidies stands out as a potent remedy for market failures, especially in the plastic crisis context. Establishing plastic taxes at the national level ensures policy consistency across the nation, whereas discrepancies in local and international regulations might introduce market disparities. The Pigouvian Taxation approach levies taxes on commodities or services producing negative externalities to attenuate their detrimental repercussions [14]. In a move mirroring this principle, Ireland initiated a 0.50-euro tax on each plastic item in 2002. By imposing this tax, the intention was to rectify market inefficiencies to mirror the true expense of plastic production. Such fiscal measures make consumers hesitant about paying a premium for plastic goods, thus diminishing their demand [15]. This strategy cohesively merges environmental concerns with economic policy-making, tackling plastic pollution while fortifying the nation's fiscal health.

Private rights pertain to the exclusive ownership of a resource. Once granted, the owner has the incentive and authority to manage that resource. Public rights concern resources that are shared and accessible to all [16]. Overexploitation or degradation of these can lead to a "tragedy of the commons," where individual actions deplete or degrade a resource, harming everyone involved. In 2018, the European Union unveiled the "European Plastic Strategy," mandating that 75% of plastic packaging in the European market should be recyclable by 2025 [17]. Plastic bottle recycling exemplifies this distinction. A "deposit system" encourages bottle returns by charging consumers an extra fee when purchasing a drink. When returned to specified points, they get a refund. This motivates recycling. For non-recycled bottles, governments may establish public collection centers to prevent littering and environmental harm. While these innovative pursuits remain ongoing, they signify a promising inception in the effort to clear the division of plastic property rights.

Integrating environmental and innovation policies is a prevalent strategy among national policymakers. Michael Porter, a renowned American economist postulates “The Porter Hypothesis,” which posits that stringent environmental standards compel businesses to explore eco-friendlier production methods, catalyzing the pace of innovation [18]. Innovations typically demand significant financial and technical backing, and national entities often possess the requisite resources to bolster such initiatives. Under the aegis of innovation policies, companies and institutions are incentivized to pioneer alternatives to plastic, mitigating the environmental ramifications of plastic waste. Group performance Theory believes that the success of group-based strategies will hinge on the manner in which the policy is designed, specifically the external rewards and penalties, as well as the operational design of the group itself [19]. In Canada’s British Columbia province, the government has established a green plastic industrial park, bringing together recycling, processing, and production entities [20]. This initiative aims to offer communal recycling amenities, thereby reducing the expenses associated with plastic waste disposal. This suggests potential complementarities between “top-down” regulatory interventions based on group performance and “bottom-up” intra-group incentives for self-governance.

5. Conclusion

This study has examined the rationale behind national policymakers taking the forefront in governmental interventions and has analyzed the outcomes of policies at various levels during such interventions. When evaluating national strategies, they can be formulated from political, innovative, and fiscal viewpoints. The abundant resources and authority of the nation empower policymakers to efficiently manage and reallocate plastic production, consumption, and disposal. In summary, the plastic dilemma arises from a market failure that has led to the imbalanced distribution of plastic resources. Addressing this requires structured environmental policy underpinned by governmental action. While policymakers at local, national, and international levels all play a role in tackling the crisis, those at the national level can exert the most significant influence. That said, further investigations are essential to unearth a broader range of impactful environmental strategies. Presently, most plastic management initiatives lean towards reducing usage; however, mere recycling or disposal won’t suffice to navigate this challenge. A pragmatic solution lies in discovering a suitable plastic alternative, necessitating the leadership of national policymakers and the collaborative efforts of both local and international stakeholders. The hope remains that the impending future will be free from the concerns of plastic-induced pollution.

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