



Original Research Paper

Self-Control as a Common Mechanism in Sustainability Pathways: A Comparative Analysis of Veganism and Vehicular Emission Certification

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Abstract

The management of environmental pollution is increasingly centred on the integration of individual behaviours and governmental mandates, supported by robust enforcement mechanisms. This analysis explores two distinct yet interconnected strategies for advancing sustainability: veganism, representing a voluntary personal decision, and vehicle emissions testing, a regulatory measure implemented by authorities to mitigate pollution. The concept of self-regulation is employed as a framework to comprehend the operational dynamics of these two methodologies. The research synthesizes findings from diverse disciplines, including environmental stewardship, sustainable practices, behavioural studies, and quality assurance.

This analysis demonstrates how adherence to internal regulations, such as personal self-control or established institutional frameworks, can significantly impact pollution reduction outcomes. The research indicates that adopting a vegan lifestyle necessitates persistent self-discipline to minimize resource consumption and decrease the environmental footprint of food production. In contrast, assessing vehicle emissions relies on structured governance, implemented through stringent protocols, thorough quality assurance, and vigilant observation. Nevertheless, both approaches encounter obstacles, including non-compliance, inadequate internal review mechanisms, ambiguous accountability, and deficient feedback channels. These deficiencies undermine the efficacy of the policies, even when formal rules are established. The study proposes an innovative strategy that integrates individual decisions with legislative mandates by employing continuous surveillance, rigorous quality management, and adaptable governmental structures. Such an integration could enhance the effectiveness of pollution mitigation efforts by aligning personal conduct with official directives.

This research holds significance as it demonstrates the increasing necessity of internal accountability and adherence to regulations in addressing environmental sustainability challenges within nations experiencing rapid urbanization and a growing dependence on automobiles. The paper's distinct contribution lies in its comparative analysis of veganism and vehicle emission certification, examined through a unified framework of self-regulation and quality assurance. This approach elucidates the synergistic relationship between individual conduct and governmental policies in enhancing pollution reduction initiatives.

Keywords: Self-control; Environmental sustainability; Veganism; Vehicular emissions; Pollution Under Control (PUC); Environmental governance; Behavioural pathways; Quality management

Section 1. Introduction

1.1 Background and Context

Addressing global environmental sustainability is now a paramount concern, driven by the escalating

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impacts of climate change, deteriorating air quality, and the growing strain on Earth's finite resources. Despite advancements in eco-friendly technologies and the implementation of environmental protection regulations, pollution continues to pose a significant challenge across numerous sectors, with particular emphasis on food production and the transport industry. These sectors are substantial contributors to the release of greenhouse gases, are significant consumers of natural resources, and play a considerable role in local air pollution, especially in rapidly urbanizing nations experiencing a surge in vehicle usage.

Developing nations, particularly India, are experiencing amplified environmental challenges due to a combination of surging populations, the expansion of urban areas, and a rise in vehicle ownership. With a population exceeding 1.5 billion and a continuously increasing vehicle count, concerns regarding air quality and the strain on natural assets are escalating. Addressing these challenges necessitates the implementation of enduring strategies that prioritize pollution reduction through modifications in conduct and regulatory measures. For instance, adopting a diet centered on plant-based foods can mitigate the ecological footprint associated with animal agriculture and resource consumption. Concurrently, frameworks designed to verify vehicle adherence to emissions benchmarks endeavour to manage exhaust fumes via stringent mandates. The efficacy of these environmental initiatives is substantially contingent upon the degree of influence wielded by both individuals and corporate entities, which subsequently bolsters the impact and credibility of governmental interventions.

Conventional policy strategies have predominantly concentrated on technological solutions and external regulations. While these elements hold significance, a growing body of evidence suggests their insufficiency when considered in isolation. The enhancement of the environmental landscape is also contingent upon individual conduct, the efficacy of institutional operations, and the degree of adherence to internal system guidelines. Consequently, there is an increasing emphasis on methodologies that integrate behavioural considerations with regulatory frameworks, aiming for a more comprehensive grasp of pollution reduction and the advancement of sustainable practices.

1.2 Rationale for Integrating Behavioural and Regulatory Pathways

The food we consume and the emissions generated by our travel are distinct yet interconnected factors influencing the environments. The patterns of human consumption, particularly the prevalence of animal products in diets, significantly contribute to the release of greenhouse gases, the strain on land and water resources, and the decline of biodiversity.

Adopting a plant-based diet, known as veganism, is frequently regarded as an individual decision that can simultaneously yield positive ecological outcomes.

Conversely, vehicular exhaust significantly contributes to urban air contamination and poses a substantial risk to public well-being. To mitigate this issue, regulatory frameworks and inspection protocols are in place to ensure that automobiles adhere to specified emission benchmarks. These mechanisms facilitate the management of emissions through governmental oversight. Within numerous nations, such as India, the Pollution Under Control (PUC) certification serves as a crucial instrument for the enforcement of these mandates.

The principles of veganism and the requirements for vehicle emission certification are distinct domains; the former pertains to individual lifestyle decisions and conduct, whereas the latter concerns regulatory mandates and established benchmarks. Nevertheless, both necessitate a strong reliance on individuals or entities adhering to established guidelines independently, exercising sound oversight, and demonstrating sustained dedication. The parallel between these two enables us to examine them through the lens of self-regulation, defined as the capacity of individuals or collectives to govern their behaviours and internal operations, rather than depending solely on external mandates for compliance.

1.3 Problem Statement

Despite increased public consciousness, governmental attention, and established regulations, significant challenges persist regarding the environmental contamination stemming from food production and logistics. Individual shifts towards more ecologically sound dietary choices are not occurring with sufficient widespread adoption. Concurrently, the mechanisms designed to mitigate emissions frequently encounter obstacles such as inadequate execution, lax oversight, and non-adherence to prescribed protocols. A fundamental deficiency common to both domains is the absence of robust internal self-control and governance.

Initiatives promoting sustainability through behavioural changes frequently rely on ethical justifications but are not adequately backed by institutional frameworks. Concurrently, regulatory mechanisms might prioritize strict adherence to established guidelines without verifying the integrity and accountability of underlying operational procedures. The absence of an integrated strategy that considers both behavioural and regulatory avenues for sustainability has hindered comprehension of how internal self-control and or governance can contribute to external initiatives aimed at achieving ecological objectives.

1.4 Objectives of the Review

In light of these issues, this review paper endeavours to:

1. Examine the body of research concerning the environmental sustainability of veganism and dietary transitions, with a specific emphasis on mitigating emissions and optimizing resource utilization.
2. Investigate scholarly works pertaining to vehicular emissions and the methodologies employed for their certification as mechanisms for pollution control via regulatory frameworks.
3. Draw a contrast between veganism and vehicle emission certification, presenting them as distinct avenues toward sustainability—the former rooted in individual conduct and the latter in established regulations.
4. Delve into the concept of self-governance as a unifying principle for comprehending both individual decision-making and institutional approaches to managing sustainability.
5. Identify deficiencies in oversight, standards, and the effectiveness of implementation within these systems, which impact the extent of pollution reduction achieved.
6. Propose an integrated self-control model that harmonizes individual actions with regulatory strategies to enhance environmental stewardship.

1.5 Review Methodology

This study employs a narrative review methodology drawing from various disciplines to investigate behavioural and regulatory strategies for achieving sustainability, with a particular emphasis on the notion of self-control.

To gather pertinent information, our research involved an extensive review of literature, including books, scholarly journal publications, institutional reports, and studies concerning environmental governance, sustainable practices, quality assurance, veganism, and the regulation of vehicle exhaust. Our primary search avenues were academic databases such as Scopus, Google Scholar, and Web of Science, employing keywords like "self-regulation," "environmental stewardship," "sustainability and vegan lifestyles," "automotive emissions," "PUC certification," and "quality assurance systems." The scope of this review is dedicated to synthesizing concepts, examining management methodologies, and contrasting various methodologies, rather than conducting a quantitative statistical examination of findings.

Figure 1. Review Methodology and Analytical Structure of the Study



Source: Author

1.6 Organization of the Paper

This paper is organized as follows:

Section 2 introduces foundational concepts of self-control and its relationship with environmental management, drawing upon principles from quality management and behavioural science

Section 3 examines existing research on veganism as a sustainable lifestyle choice.

Section 4 investigates the role of vehicle emissions testing in pollution mitigation through regulatory frameworks.

Section 5 provides a comparative analysis of these two distinct approaches.

Section 6 addresses challenges encountered in the management and quality of these strategies. Section 7 proposes an innovative model for fostering sustainability by leveraging self-control. Lastly, Section 8 concludes the paper by summarizing its core contributions, identifying areas for further inquiry, and outlining potential avenues for future research.

Section 2. Conceptual Foundations: Self-Control and Environmental Governance

2.1 Self-Control as a Cross-Disciplinary Concept

The concept of self-control has been a subject of inquiry across disciplines such as psychology, the administration of organizations, public sector management, and the governance of environmental resources.

It is conceptualized as a method for regulating one's conduct and choices, obviating the necessity for continuous oversight. Scholars, including Baumeister and Vohs (2007) and Duckworth and

Gross (2014), have investigated the connections between self-regulation and attributes like behavioural consistency, the capacity to delay gratification, and sustained attention toward objectives with a long-term horizon.

Within the realm of environmental oversight, these attributes hold particular significance, as the mitigation of pollution extends beyond mere regulatory mandates to encompass the sustained voluntary adherence of individuals to ecological objectives. Investigations into behavioural patterns and their environmental implications demonstrate that endeavours to combat climate change and advance toward sustainable practices necessitate enduring self-discipline, characterized by individuals making choices that align with broader ecological aspirations.

Consequently, effective environmental stewardship transcends mere adherence to regulations or the rigor of their application; it hinges on individuals embracing personal accountability for the environment.

2.2 Self-Control in Quality Management and Organizational Governance

Within the realm of quality management, self-control is regarded as a crucial mechanism for guaranteeing process dependability, fostering individual accountability, and ensuring operational uniformity. Juran's perspective was that quality frameworks achieve optimal effectiveness when the obligation to adhere to specifications is integrated into routine activities, as opposed to solely depending on post-completion inspections (Juran, 1988; Juran & Godfrey, 1999).

This concept shifts the emphasis in oversight from external scrutiny to the cultivation of robust internal control mechanisms for operational processes. Consequently, for any organization to achieve optimal performance, it must possess not only established regulations but also the capacity to reinforce these protocols via evaluative mechanisms, periodic assessments, and the implementation of accountability measures. Although these principles originated in the industrial sector, their application has become widespread within public administration and regulatory frameworks alike (Oakland, 2014).

When it comes to managing environmental affairs, the effectiveness of regulatory frameworks hinges not primarily on the sheer existence of rules, but rather on the degree to which they are adhered to, the level of responsibility held by the entities involved, and the robustness of the prevailing compliance ethos.

2.3 Self-Control in Environmental Governance Frameworks

When it comes to managing environmental affairs, the effectiveness of regulatory frameworks hinges not primarily on the sheer existence of rules, but rather on the degree to which they are adhered to,

the level of responsibility held by the entities involved, and the robustness of the prevailing compliance ethos.

The effectiveness of environmental objectives within these frameworks is frequently contingent upon the readiness and capacity of various stakeholders to adhere to established regulations and sustainability benchmarks.

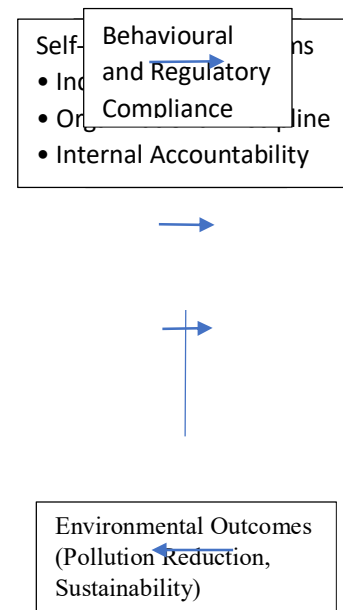
Studies concerning the oversight of environmental matters and the administration of jointly held assets indicate that enhanced governance effectiveness is significantly influenced by the presence of self-governance mechanisms, intrinsic responsibility, and mutual confidence among organizational members (Dietz, Ostrom, & Stern, 2003; Cashore, 2002).

From an analytical standpoint, self-regulation operates on several planes of oversight:

- individual moderation of actions,
- fostering a compliant ethos within corporate structures, and
- establishing organizational confidence via open practices and mechanisms for responsibility.

Consequently, self-control does not supplant established regulations. Rather, it complements them by contributing to the mitigation of inequitable conduct, superficial adherence, and difficulties encountered during the implementation of directives.

Figure 2. Environmental Governance Framework Linking Regulation and Self-Control



Environmental Governance Framework. Source: Author

2.4 Linkage of Self-Control to Sustainability Pathways

Self-control & discipline's significance is highlighted when examining various sustainability strategies that, despite their differing frameworks, encounter comparable obstacles during implementation. For instance, personal choices like adopting a vegan diet predominantly require individual self-restraint, encompassing the sustained effort of limiting consumption and maintaining dedication to ecological objectives in the long run (Poore & Nemecek, 2018; Springmann et al., 2016). In contrast, systemic methods, such as the certification of vehicle emissions, lean more heavily on organizational self-governance, evidenced by rigorous protocols, precise data collection, and dependable adherence to regulations (Baldwin et al., 2012).

Despite their distinct methodologies, both these strategies encounter a comparable challenge in their management: environmental outcomes are compromised when internal accountability is inadequately enforced.

Insufficient self-control can result in superficial adherence, the subversion of established procedures, or erratic conduct, thereby hindering genuine advancements in pollution mitigation (Gunningham, Kagan, & Thornton, 2004). Conversely, robust self-control fosters greater confidence in governing bodies, guarantees uniform application of rules, and enhances the efficacy of sustainability initiatives across both behavioural and regulatory frameworks.

2.5 Analytical Relevance for the Present Review

This examination employs self-regulation as a framework to comprehend how veganism and vehicle emission certification represent parallel avenues leading to environmental sustainability.

This work suggests that instead of viewing conduct and regulations as distinct entities, their interdependence hinges on individuals and collectives adhering to established guidelines from within. By integrating concepts drawn from behavioural science, environmental management frameworks, and quality control methodologies, the paper establishes a link between personal accountability in actions and the rigorous procedures implemented by organizations.

This method facilitates an evaluation of the effectiveness of various sustainability frameworks, their practical implementation, and their potential weaknesses. It lays the groundwork for subsequent sections of the analysis, which will focus on the comparative examination of the governance structures of these systems.

Section 3. Veganism as a Behavioural Sustainability Pathway

3.1 Environmental Impacts of Dietary Patterns

The way we produce and consume food significantly contributes to the release of greenhouse gases, alterations in land utilization patterns, depletion of freshwater resources, and a decline in biodiversity.

The livestock sector stands out as a primary consumer of resources within worldwide agricultural practices (FAO, 2013; Gerber et al., 2013). Research that contrasts the ecological impacts of various food categories indicates that products derived from animals generate considerably higher emissions and require more land compared to their plant-based counterparts (Poore & Nemecek, 2018). Such findings have significantly influenced discussions surrounding sustainability.

Current attention is shifting from solely technological solutions for environmental damage to a greater emphasis on individual dietary choices. Consequently, adopting predominantly plant-based eating patterns is increasingly recognized as a significant contributor to sustainability efforts, extending beyond its consideration as a mere personal preference.

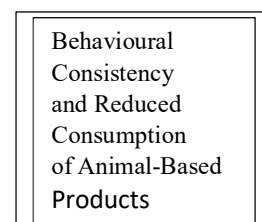
3.2 Veganism and Emissions Reduction Potential

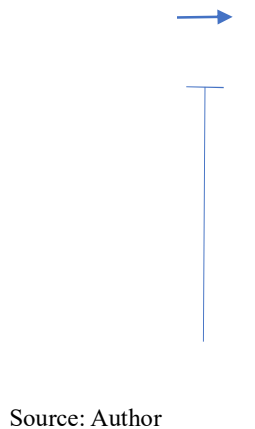
Of all the dietary patterns that exclude animal products, veganism represents the most significant reduction in dependence on animal-derived resources.

Studies indicate that a widespread adoption of vegan eating patterns could lead to substantial decreases in food-related emissions, a diminished need for land, and alleviated water scarcity, alongside enhancements in general well-being (Springmann et al., 2016; Springmann et al., 2018). However, these same investigations also conclude that dietary shifts alone are insufficient for achieving broader sustainability objectives.

Beyond this, modifications such as altered policies and the implementation of novel technologies are also necessary (IPCC, 2019). Consequently, veganism proves most effective when integrated into a broader initiative aimed at mitigating climate change, rather than being pursued as an isolated solution.

Figure 3. Veganism as a Behavioural Sustainability Pathway





Environmental Outcomes
(Emission Reduction,
Resource Efficiency,
Sustainability)

3.3 Veganism as a Voluntary Behavioural Pathway

Environmental shifts prompted by regulations and legislation differ from veganism, which predominantly stems from individuals voluntarily altering their lifestyles.

Individuals opt for a vegan diet due to concerns for the planet, convictions regarding humane animal treatment, a desire for improved well-being, financial feasibility, or the influence of their social circles (Sabaté & Soret, 2014; Willett et al., 2019).

The fact that this is a voluntary undertaking presents both benefits and drawbacks. On the advantageous side, it allows for organic dissemination without requiring extensive governmental regulations or organizational frameworks. Conversely, reliance on individual drive can result in inconsistent levels of assistance and obstacles to expansion. Research into human conduct indicates that factors such as ingrained routines, prevalent cultural customs, and the simplicity of adopting alterations significantly influence an individual's capacity to sustain novel dietary practices in the long term (Gifford, 2011).

Looking at the bigger picture, veganism illustrates a shift in environmental stewardship, moving beyond mere regulatory mandates to encompass individual consumer choices.

3.4 Role of Self-Control in Dietary Transitions

Adopting a vegan lifestyle demands persistent self-discipline, as immediate dietary inclinations frequently conflict with broader environmental aspirations.

Research indicates that self-control or self-regulation plays a crucial role in maintaining adherence to environmentally conscious practices, especially in the absence of external mandates

(Baumeister & Vohs, 2007; Duckworth & Gross, 2014).

Adopting a vegan lifestyle represents an individual method for enhancing sustainability, wherein adherence to ecological principles is internally regulated by disciplined actions and deeply held moral convictions. Nevertheless, exclusive reliance on personal willpower may prove precarious. In the absence of robust institutional backing, insufficient availability of suitable dietary choices, and societal pressures that do not encourage such a transition, maintaining this commitment over an extended period can become challenging, potentially resulting in abandonment or only partial observance of the diet (Verplanken & Wood, 2006).

This illustrates that even when individuals opt for

eco-friendly choices of their own accord, their success is contingent upon the robustness of the supporting infrastructure and administrative oversight.

3.5 Limitations and Governance Implications

Research indicates that while veganism offers significant environmental benefits, its widespread adoption faces considerable challenges. The degree to which individuals embrace veganism is largely influenced by factors such as affordability, accessibility of vegan food options, the current state of the food system, and its cultural acceptance across diverse societies (Garnett et al., 2019).

From a governance perspective, this highlights a significant constraint in conceptualizing sustainability based on individual actions: the environmental advantages cannot be solely dependent on people's private decisions and their capacity for self-control or self-regulation.

When expectations placed upon individuals are excessively high, the result may be limited or tokenistic actions that fail to produce substantial environmental improvements. Consequently, strategies aimed at modifying personal conduct require reinforcement from institutional frameworks, governmental regulations, and societal conditions that facilitate long-term sustainable practices for the populace.

When contrasting this particular governance difficulty with more formalized sustainability strategies, such as those for vehicle emissions, it becomes clear that the latter rely more heavily on stringent organizational mandates and adherence to established regulations to achieve environmental outcomes.

Section 4. Vehicular Emission Certification as a Regulatory Sustainability Pathway

4.1 Vehicular Emissions and Urban Air Pollution

The transportation industry significantly contributes to the air quality issues and the release of greenhouse gases in urban areas, particularly in nations experiencing a rapid increase in private vehicle ownership.

Automobiles emit detrimental substances including fine particles (PM), nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (hydrocarbons), and carbon dioxide (CO₂). These emissions negatively affect the environment and present substantial dangers to the well-being of populations (WHO, 2016; IPCC, 2022). In emerging economies such as India, the escalating volume of vehicles, the prevalence of aging automobile models, and a lack of consistent regulatory oversight exacerbate the consequences of emissions from transportation. Research indicates a correlation between pollution from vehicles and respiratory ailments, cardiac conditions, reduced life expectancy, and increased medical costs (HEI, 2020).

Consequently, the regulation of exhaust from operational vehicles has emerged as a crucial element in addressing environmental challenges within urban settings. This is particularly true for densely populated metropolises and rapidly expanding transportation corridors, such as the Chandigarh tri-city area.

4.2 Vehicular Emission Testing and Certification Systems

Systems for assessing and approving vehicle emissions are established protocols and directives designed to confirm that vehicles currently in operation adhere to predefined environmental discharge limits.

These frameworks typically operate via routine inspection and upkeep (I/M) initiatives, which involve assessing exhaust pollutants, confirming vehicle compliance with regulations, and granting official approvals (UNECE, 2017; World Bank, 2020). Within India, the Pollution Under Control (PUC) certification functions as a domestic regulatory mechanism for monitoring vehicle emissions.

The objective of these frameworks is to foster a feeling of ecological accountability by linking the operation of vehicles with routine inspections designed to confirm adherence. Nevertheless, their effectiveness hinges more on the quality of their implementation rather than solely on the existence of established regulations.

Figure 4. Vehicular Emission Certification as a Regulatory Sustainability Pathway



Source: Author

4.3 Regulatory Design and Implementation Challenges

Despite the implementation of numerous regulations, emission certification frameworks frequently encounter challenges in their practical application, thereby diminishing their capacity to safeguard the environment.

Numerous studies indicate that persistent problems within regulatory frameworks, including a lack of adequate testing infrastructure, inappropriate calibration techniques, departures from established protocols, lenient enforcement measures, and irregular oversight, are prevalent (Bishnoi et al., 2018; Guttikunda & Jawahar, 2014). Consequently, regulatory efforts frequently prioritize adherence to regulations over the tangible reduction of emissions. Consequently, certification frameworks may indicate corporate adherence on documentation, yet tangible environmental improvements might be absent. This points to a more significant challenge in oversight, characterized by robust regulatory blueprints that falter during their practical application or enforcement. From an analytical standpoint, the concern lies not merely in the absence of rules, but in the deficiency of robust

mechanisms and responsibility within the structures tasked with upholding them.

4.4 Institutional Self-Control in Emission Certification Systems

The effectiveness of systems designed to certify emissions hinges significantly on the internal discipline of the institutions participating. This internal discipline entails the capacity of these organizations to uphold precise operational methods, accept responsibility for their actions, and adhere to regulations without requiring continuous external supervision.

Ensuring accurate equipment calibration, adhering strictly to established testing protocols, rejecting any inclinations to exploit the system for personal advantage, and maintaining transparency in operational methods are all crucial aspects (Baldwin, Cave, & Lodge, 2012). From the perspective of quality management, the process of emission testing functions similarly to a system designed to control and monitor processes. Its effectiveness in safeguarding the environment is contingent upon the robustness of its internal regulations and organizational frameworks, rather than solely depending on sporadic oversight.

When an institution's capacity for self-control or self-governance is diminished, the likelihood of errors, the circumvention of established processes, and the fraudulent creation of official documents increases. Such failures erode confidence in regulatory frameworks and diminish their efficacy in protecting the environment (Gunningham, Kagan, & Thornton, 2004). Consequently, the successful implementation of environmental regulations hinges not solely on the existence of statutes and ordinances, but crucially on the development of a robust internal commitment to accountability and self-discipline within the entities tasked with their enforcement.

4.5 Regulatory Self-Control and Sustainability Outcomes

The certification of vehicle emissions diverges from strategies focused on behavioural sustainability due to its mandatory nature, unlike the voluntary participation in the latter.

Nevertheless, the mere existence of regulations does not invariably translate into tangible environmental progress. Frequently, adherence devolves into a superficial fulfilment of requirements rather than a genuine effort to mitigate pollution. Research examining governmental management practices indicates that emission control mechanisms achieve superior efficacy when underpinned by robust internal governance, well-defined procedures, clear lines of responsibility, and continuous oversight (OECD, 2016; World Bank, 2020).

Self-control by regulatory bodies serves as a valuable mechanism to ensure compliance with established rules and to prevent individuals or entities from exploiting the system. Regarding

sustainability, the effectiveness of vehicle emission certification is contingent not solely on the stringency of enforcement but also on the extent to which environmental objectives are integrated into the daily operational practices of the relevant organizations.

Section 5. Comparative Analysis of Sustainability Pathways

5.1 Behavioural and Regulatory Pathways to Pollution Reduction

Adopting a vegan lifestyle and obtaining certification for vehicle emissions represent two distinct yet interconnected methods for mitigating environmental contamination. Veganism is a personal decision individuals undertake, driven by their ethical convictions or an awareness of ecological issues. In contrast, vehicular emission certification is a mandatory standard established through legislation and overseen by governmental bodies.

Despite their distinct operational methodologies, both these strategies are directed towards mitigating environmental challenges such as the release of greenhouse gases, the depletion of natural resources, and localized contamination.

Sustained commitment and consistent practice are essential for both approaches, rather than isolated interventions. Scholarly findings indicate that the efficacy of these strategies is influenced by factors beyond mere knowledge or rigid regulations; a significant determinant is the genuine dedication of individuals within the system to achieving environmental objectives (Stern, 2000; Dietz, Ostrom, & Stern, 2003).

5.2 Comparative Dimensions of Self-Control

Across both approaches, self-discipline manifests distinctly, yet it remains a crucial element for their effectiveness.

Within veganism, self-control centres on individual resolve, involving continuous resistance to desires, modification of established routines, and ensuring dietary choices align with enduring ecological objectives. Conversely, in the realm of vehicle emission certification, self-control pertains to institutional discipline, encompassing adherence to stringent protocols, the maintenance of impartial testing procedures, and the prevention of fraudulent conduct within regulatory frameworks.

A comparison is shown in Table 1.

Table 1. Comparison of Behavioural and Regulatory Sustainability Pathways

Dimension	Veganism	Vehicular Emission Certification
Nature of pathway	Voluntary	Mandatory
Primary actor	Individual consumer	Institution / regulator
Type of self-control	Personal / behavioural	Organizational / procedural

Enforcement mechanism	Social norms, ethics	Legal and regulatory
Main vulnerability	Low adoption, habit persistence	Procedural non-compliance
Environmental outcome	Reduced food-system emissions	Reduced transport emissions

The analysis reveals that despite potential variations in the origin of self-control, its absence exerts comparable detrimental effects on both avenues. This deficiency manifests as diminished persistence, superficial compliance, and reduced efficacy within the surrounding context.

5.3 Strengths and Limitations of Each Pathway

Approaches centered on individual conduct, such as adopting a vegan diet, offer adaptability, incur minimal operational expenses, and can concurrently enhance personal well-being and the welfare of animals.

Nevertheless, these strategies necessitate a significant degree of personal self-control, posing challenges for widespread adoption and sustained adherence, particularly in the absence of supportive food infrastructure and governmental directives (Gifford, 2011; Garnett et al., 2019). In contrast, regulatory frameworks, exemplified by the certification of vehicle emissions, engage a broader populace and incorporate structured mechanisms for oversight. The effectiveness of such measures, however, is frequently contingent upon the quality of their execution, robust internal control mechanisms, and the presence of compelling disincentives for non-compliance. Moreover, even when these regulations are ostensibly observed, inherent limitations in their design or enforcement can impede the achievement of substantial positive environmental outcomes (Baldwin, Cave, & Lodge, 2012; OECD, 2016).

In rapidly expanding, motor-driven developing nations such as India, these concerns are amplified by an increasing volume of vehicles, escalating urban air contamination, and less robust administrative frameworks.

Similarly, the Chandigarh Tri-City region confronts comparable difficulties, as expanding demands for transportation and environmental considerations necessitate enhanced oversight and adherence to regulations.

5.4 Common Governance Challenges Across Pathways

A significant outcome of the comparative analysis reveals that despite their distinct organizational frameworks; both approaches grapple with comparable governance difficulties. These obstacles manifest as:

- * Adherence that is merely on the surface or performed for appearances,
- * Inadequate mechanisms for internal responsibility, and

* A divergence between intended ecological objectives and the practical execution of activities. Studies concerning the oversight of environmental matters indicate that such issues arise when self-governance mechanisms are inadequately incorporated into the framework. This results in an excessive dependence on either ethical persuasion, within behavioural approaches, or rigorous compliance measures, in regulatory frameworks (Gunningham, Kagan, & Thornton, 2004).

When internal controls are insufficient in either scenario, the confidence in and efficacy of initiatives aimed at sustainability are diminished, regardless of the presence of explicit policy directives.

5.5 Implications for Integrated Sustainability Strategies

The analysis reveals that neither exclusive reliance on individual actions nor exclusive dependence on regulatory measures is sufficient for sustained pollution reduction.

In isolation, individual conduct, lacking institutional backing, may fail to engage a broad audience. Conversely, regulations implemented without inherent adherence may not garner public confidence. This underscores the necessity of integrated sustainability approaches that acknowledge the significance of both personal responsibility and institutional governance. Currently, both avenues for fostering environmental responsibility encounter substantial obstacles, despite increasing public consciousness and focus on ecological concerns.

For instance, choices such as adopting a vegan diet are not universally embraced due to variations in culture, financial means, and daily routines. Conversely, regulatory approaches, like the inspection of car exhaust, frequently encounter obstacles such as ambiguous processes, inadequate oversight, and superficial implementation. These challenges highlight that environmental concerns stem not from a lack of policies, but rather from non-adherence to them, a lack of institutional accountability, and a deficit in the perceived legitimacy of regulations. Consequently, fostering greater self-discipline across both individual actions and institutional practices is paramount for enhancing the efficacy of environmental management and achieving tangible outcomes. By examining veganism and vehicle emission testing in tandem, this analysis demonstrates that self-regulation serves as a unifying element, bridging the gap between individual behavioural shifts and compliance with established rules.

This comprehension lays the groundwork for the subsequent discussion on governance and quality concerns, as well as for the development of a sustainability strategy that embeds self-regulation as a fundamental element.

Section 6. Governance and Quality Gaps

6.1 Governance Challenges in Sustainability Pathways

Contemporary approaches to environmental governance are increasingly recognizing that the mere existence of sound policies does not guarantee their effective implementation.

Within both behavioural and regulatory strategies for achieving sustainability, challenges frequently emerge due to inadequate communication channels among diverse stakeholders, ambiguous responsibilities within organizational structures, and a disconnect between policy objectives and their practical application (Jordan et al., 2010; OECD, 2016). These difficulties are particularly pronounced in systems that demand continuous adherence and periodic oversight, rather than one-off interventions. Within behavioural frameworks such as veganism, challenges related to management and oversight emerge in the form of inadequate policy backing, conflicting public sentiment, and an overemphasis on personal accountability without sufficient systemic assistance.

When examining regulatory frameworks, such as those for testing vehicle emissions, deficiencies emerge in the form of procedural flaws, insufficient oversight capacity, sluggish monitoring mechanisms, and inadequate accountability measures. Particularly in rapidly developing locales like India's urban centres and the Chandigarh Tri-City area, the escalating volume of vehicles underscores the critical need for prompt surveillance, periodic evaluations, and enhanced inter-institutional collaboration. Across both these scenarios, compromised governance structures lead to diminished consistency and efficacy in environmental initiatives.

6.2 Quality Gaps and Implementation Deficits

A frequent challenge encountered in sustainability initiatives is the divergence between adhering to official mandates and achieving tangible environmental benefits.

Studies concerning quality management indicate that systems frequently falter not due to an absence of established criteria, but rather because internal procedures are disorganized, lack adequate feedback mechanisms, and do not foster ongoing enhancement (Juran & Godfrey, 1999; Oakland, 2014). This principle holds significant relevance for the management of ecological concerns.

In instances where individuals endeavour to adopt eco-conscious behaviours, a disparity emerges between their commendable aspirations and the sustained implementation of those aspirations. This disconnect can manifest as incomplete transformations, a reversion to former practices, or even unintended adverse consequences (Verplanken & Wood, 2006). When regulatory frameworks are in place, such discrepancies arise if certification procedures are conducted without verifying the precision of measurements, ensuring equipment is

correctly calibrated, or confirming the authenticity of environmental gains.

The absence of consistent quality assessments and performance evaluations can diminish the dependability of systems over an extended period.

For instance, when the certification of emissions is hampered by delayed calibration assessments, infrequent audits, or a lack of diligent performance monitoring, the reliability of such a system can gradually erode. Similarly, initiatives designed to foster environmentally sound practices struggle to maintain participant adherence without continuous reinforcement and communication. Such shortcomings diminish public assurance and undermine the credibility of environmental regulations (Gunningham, Kagan, & Thornton, 2004).

6.3 Self-Control Deficits and Symbolic Compliance

When self-discipline is insufficient, be it for an individual or an organization, it frequently results in superficial adherence.

This phenomenon occurs when individuals or entities outwardly conform to regulations but fail to realize the intended objectives. Such symbolic compliance is particularly prevalent in the context of environmental governance, especially in situations where oversight is infrequent and deterrents to non-compliance are minimal (Baldwin, Cave, & Lodge, 2012).

In realms such as veganism, superficial adherence might manifest as individuals adopting sporadic or incomplete dietary adjustments, offering negligible environmental benefits. Regarding automobile exhaust examinations, this could translate to undergoing the procedure solely for the sake of completion, rather than ensuring accurate emission measurement or reduction. In the absence of continuous oversight or subsequent evaluation, this form of disingenuous conformity can evolve into the standard operational practice within control mechanisms.

These scenarios demonstrate that effective environmental stewardship extends beyond the mere establishment of regulations. It necessitates consistent oversight, genuine adherence, and a sustained commitment to complying with those established guidelines.

These scenarios demonstrate that effective environmental stewardship extends beyond merely establishing regulations. It necessitates consistent oversight, genuine adherence, and a sustained commitment to upholding those regulations over time.

6.4 Institutional Integrity and Process Discipline

Upholding institutional soundness and strict adherence to established procedures are crucial for narrowing discrepancies in oversight and quality, particularly within the regulatory frameworks governing sustainability.

Robust governance structures are characterized by well-defined protocols, internal mechanisms for holding individuals responsible, periodic evaluations, and a firm stance against enabling self-serving actions (OECD, 2016; World Bank, 2020). When these attributes are absent, regulatory frameworks might seem compliant in documentation but prove ineffective in achieving tangible environmental outcomes.

From a perspective focused on quality management, emission certification frameworks function most effectively when they are guided by established processes, with results being more dependent on internal oversight rather than solely on external inspections.

Integrating self-control into routine activities via consistent equipment evaluations, internal quality assessments, establishing technician responsibility, and employing continuous feedback mechanisms contributes to making operations more dependable and successful in safeguarding the environment (Oakland, 2014). Conversely, a lack of stringent process adherence results in certification errors, procedural violations, and a decline in public confidence.

In the long run, these problems undermine the trustworthiness of regulatory measures and diminish the efficacy of environmental oversight.

6.5 Cross-System Lessons and Governance Implications

A primary conclusion drawn from the examination is that challenges related to governance and quality are not confined to either behavioural or regulatory strategies.

Rather, these issues reveal more fundamental shortcomings in organizational self-control and the management of adherence to rules. Behavioural frameworks demonstrate that mere appeals to ethical conduct are insufficient without adequate backing and sustained reinforcement. Conversely, regulatory frameworks underscore the risks associated with prioritizing stringent oversight exclusively, neglecting consistent internal accountability.

The observations derived from various systems indicate that robust sustainability governance necessitates enhanced incorporation of self-regulation, rigorous quality assurance, and monitoring that relies on performance evaluation. Sustained trust in adherence, over the long haul, depends on consistent assessments, ongoing feedback mechanisms, and solid internal quality management, moving beyond mere superficial or temporary adherence.

Consequently, the enhancement of environmental stewardship transcends mere enforcement of stricter regulations or increased public consciousness. It necessitates the implementation of robust mechanisms for tracking progress, ensuring responsibility, and facilitating continuous refinement. Such frameworks contribute to fostering

self-regulation in both practical actions and policy frameworks, laying the groundwork for the comprehensive sustainability model that will be explored subsequently.

Section 7. Integrated Self-Control Framework for Sustainability

7.1 Rationale for an Integrated Framework

The preceding analysis demonstrates that while sustainability strategies focusing on behaviour and regulation differ in their design, they are linked by common obstacles in their management and execution.

Both the practice of veganism and the certification of vehicle emissions are intended to reduce ecological damage. However, their effectiveness hinges not solely on established policies or public consciousness, but equally on the degree of personal and corporate self-restraint. This underscores the necessity for a unified approach that incorporates both behavioural and regulatory self-governance into broader sustainability frameworks.

Current investigations into environmental governance are increasingly favouring hybrid approaches, combining voluntary initiatives, formal regulations, and internal mechanisms for accountability (Dietz, Ostrom, & Stern, 2003; Jordan et al., 2010). This trend holds particular significance in rapidly urbanizing regions such as India, where accelerated development, a growing vehicle population, and escalating demands on resources heighten the imperative for coordinated sustainability endeavours. The proposed framework identifies self-governance as a crucial element of governance, instrumental in fostering more predictable behaviours, enhancing the credibility of regulatory frameworks, and improving compliance with environmental legislation.

Integrated Conceptual Framework: Self-Control in Sustainability Governance

Linking Behavioural (Veganism) and Regulatory (PUC Certification) Pathways

Regulatory Pathway Vehicular Emission Certification / PUC -Institutional Self- Control -Adherence to Protocols -Accurate testing & Calibration -Process transparency

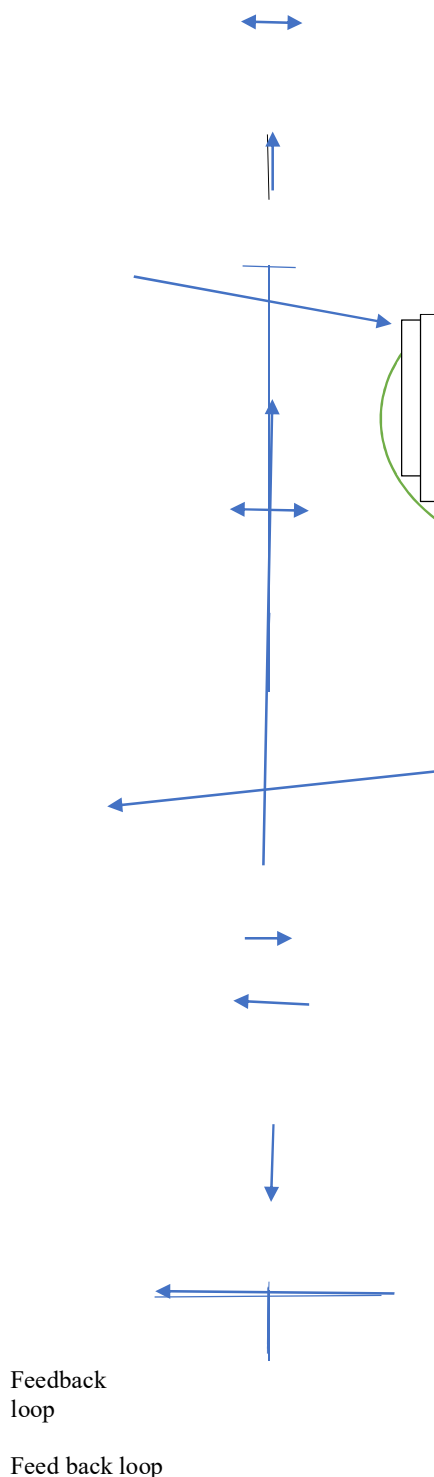


Figure 5: Integrated Conceptual Framework
Source: Author

Integrated Environmental Outcomes				
Reduced Emissions	Better Air Quality	Resource Conservation	Improved Public Health	Sustainable Future

Figure 5 illustrates a foundational conceptual model that can guide subsequent investigations into the multifaceted influence of self-control on governance efficacy and environmental outcomes. This framework explores how self-control impacts the promotion of sustainability, encompassing both behavioural shifts and regulatory measures.

7.2 Components of the Integrated Self-Control Framework

This conceptual model conceptualizes sustainability as an intricate system where self-control operates within three interdependent domains:

1. **Individual Self-control** This component examines an individual's capacity to manage their behaviour in pursuit of enduring environmental objectives. Regarding veganism, this involves maintaining dedication to a diet free of animal products, adhering to moral principles, and counteracting societal or cultural influences. Evidence indicates that a supportive setting, well-defined social expectations, and access to quality information contribute to enhanced self-regulatory abilities (Gifford, 2011; Verplanken & Wood, 2006).
2. **Self-control at the Organizational Scale** This concept pertains to an organization's capacity to govern its own conduct in adherence to external regulations. Within frameworks designed for vehicular emission assessments, this encompasses the diligent application of testing protocols, the utilization of equipment that meets established specifications, maintaining openness regarding operational methodologies, and implementing rigorous quality assurance mechanisms. The integration of quality management principles implies that when self-control is embedded within routine operational activities, it diminishes the reliance on external oversight and enhances the dependability and uniformity of the

processes involved (Juran & Godfrey, 1999; Oakland, 2014).

3. **Governance-Level Self-Control** At this stratum, self-control manifests through administrative frameworks designed to foster accountability, oversight, response mechanisms, and continuous enhancement of both conduct and governance. This entails the establishment of explicit directives, promotion of educational initiatives within entities, periodic evaluation of methodologies, and the implementation of adaptive procedures. Governance-level self-regulation contributes to verifying that individual conduct and institutional operations align with overarching sustainability objectives (OECD, 2016).

7.3 Policy and Governance Implications

The comprehensive framework for self-control offers significant insights into our approaches to environmental management.

Primarily, initiatives designed to modify conduct, such as campaigns encouraging dietary shifts, necessitate accompanying structural adjustments that enhance the accessibility, affordability, and informational backing of these alternative choices. Furthermore, oversight mechanisms, like those governing automotive exhaust levels, ought to extend beyond mere adherence to established regulations, incorporating more robust internal monitoring, periodic evaluations, and a system of accountability focused on the efficacy of operational procedures.

It is crucial to recognize that this conceptual model does not advocate for substituting regulatory measures with self-imposed initiatives, nor vice-versa. Rather, it emphasizes that the efficacy of both strategies is maximized when stakeholders possess a genuine comprehension of and commitment to environmental objectives. This perspective aligns with governance paradigms that prioritize confidence, equity, rigorous adherence to rules, and actual accountability, as elucidated by Baldwin, Cave, and Lodge (2012).

7.4 Practical Relevance for Sustainability Transitions

From a functional perspective, the unified self-control model provides a basis for developing sustainability initiatives that are capable of expansion, adaptation, and successful implementation.

By enhancing self-control across various tiers, the need for expensive oversight mechanisms can be reduced. This, consequently, can foster improved enduring environmental outcomes and more dependable adherence. Furthermore, this model serves as a tool for identifying deficiencies in the administration and performance of sustainability frameworks.

Continuous monitoring and feedback facilitate the implementation of improvements. The interconnectedness of environmental concerns arising from food and transportation networks is growing, as both sectors contribute to greenhouse gas emissions, resource depletion, and difficulties in achieving urban sustainability.

Postponing behavioural shifts and policy adjustments may exacerbate long-term environmental and health hazards. Consequently, the establishment of comprehensive self-control mechanisms, incorporating periodic assessments, quality assurance, and adaptive governance strategies, is crucial for accelerating interventions and enhancing sustainability outcomes in interdependent domains.

For nations experiencing economic growth, where financial and operational constraints frequently hinder robust oversight, cultivating enhanced self control and internal discipline within existing frameworks presents a feasible strategy for refining environmental stewardship without necessitating substantial alterations to the fundamental organizational blueprint.

Section 8. Findings, Implications for Governance and Sustainability, Research Gaps and Conclusions

8.1 Summary of Key Findings

This examination explored veganism and the certification of vehicle emissions as distinct approaches to attaining environmental sustainability, employing the concept of self-control as an analytical framework.

The analysis indicates that despite their disparities—with veganism pertaining to dietary choices and vehicle emission certification concerning automotive standards—both methodologies are contingent upon individuals' internal adherence to principles rather than solely external mandates. The adoption of veganism is a personal decision, and its positive environmental impact is predicated on sustained commitment. Conversely, vehicle emission certification operates as a regulatory framework, and its efficacy hinges on the diligent execution of established procedures by the governing bodies responsible for its oversight.

The review further indicates that the environmental outcomes in both scenarios are frequently constrained due to deficiencies in their management and the efficacy of their implementation.

Regarding individual decisions such as adopting a vegan lifestyle, insufficient adoption rates and a tendency for adherents to abandon the practice diminish the collective effect. For regulatory measures, any deviation from proper procedural adherence or inadequate internal oversight compromises the credibility and operational effectiveness of the certification framework. A shared challenge in both instances is the superficial

compliance with directives, failing to achieve genuine reductions in pollution levels.

8.2 Implications for Environmental Governance and Sustainability

The research suggests that methods for managing the environment should not solely depend on personal accountability or rigid legal frameworks. Achieving better sustainability outcomes is more likely when self-control is integrated across multiple tiers, encompassing individuals, organizations, and the broader system.

When it comes to behavioural shifts such as veganism, this necessitates the establishment of encouraging surroundings, unambiguous policy direction, and networks of social encouragement that extend beyond individual resolve.

Concerning regulatory strategies like the examination of automotive emissions, this underscores the importance of robust institutional confidence, effective internal controls, consistent supervision, and continuous evaluation mechanisms.

By viewing self-control as a crucial element of oversight, this examination illuminates how approaches centered on behaviour and those based on regulations can achieve greater synergy.

Furthermore, it demonstrates that the stewardship of environmental matters is no longer solely reliant on legislative frameworks, but also hinges on confidence in adherence, individual accountability, and dependable operational procedures.

8.3 Policy and Practice Recommendations

Following a review of the existing research, several overarching themes have emerged:

1. **Strengthening Internal Regulatory Processes:** Environmental oversight frameworks ought to incorporate more robust internal accountability through the implementation of quality management protocols, internal reviews, consistent oversight, and continuous performance evaluation. This is particularly crucial for entities dedicated to managing emissions.
2. **Facilitating Behavioural Change via Systemic Adjustments:** Initiatives designed to modify dietary patterns require support from improved availability, reduced pricing, and increased societal endorsement of food systems centered on plants. These structural enhancements will aid individuals in achieving lasting behavioural shifts.
3. **Moving Beyond Superficial Adherence:** Both behavioral and regulatory frameworks ought to prioritize tangible environmental outcomes over mere procedural observance. This can be achieved through enhanced monitoring mechanisms and establishing clear lines of responsibility.

4. **Harmonizing Behavioural and Regulatory Strategies:** Effective sustainability governance requires recognizing the complementary nature of individual behavioral shifts and established institutional rules. Consequently, both these elements should be incorporated into broader environmental policy initiatives.

The aforementioned points are intended to offer direction for forthcoming governance improvements and the formulation of sustainability policies, rather than serving as rigid directives.

8.4 Research Gaps and Future Directions

This paper emphasizes several significant domains requiring further scholarly investigation.

First, the current body of research offering direct insights into self-control as a quantifiable element impacting environmental outcomes across various sustainability sectors is limited. Subsequent investigations might explore self-control from the perspectives of both individuals and organizations to gain a deeper comprehension of its role in mitigating pollution and enhancing regulatory compliance. Secondly, the current body of research offering direct insights into self-control as a quantifiable element impacting environmental outcomes across various sustainability sectors is limited. Subsequent investigations might explore self-control from the perspectives of both individuals and organizations to gain a deeper comprehension of its role in mitigating pollution and enhancing regulatory compliance. Third the current body of research offering direct insights into self-control as a quantifiable element impacting environmental outcomes across various sustainability sectors is limited. Subsequent investigations might explore self-control from the perspectives of both individuals and organizations to gain a deeper comprehension of its role in mitigating pollution and enhancing regulatory compliance. Integrating insights from behavioural science, quality management, and sustainability governance holds the potential to enhance both the theoretical underpinnings and the practical implementation of these disciplines.

Presently, the majority of sustainability studies tend to consider behavioral and regulatory interventions as distinct domains. There is a limited emphasis on the role of self-regulation as a mechanism for linking and overseeing individual and corporate sustainability initiatives.

8.5 Concluding Remarks

This examination posits that self-control, while crucial, is an underappreciated element in our pursuit of sustainable practices.

Individually, neither the adoption of veganism nor the implementation of vehicle emission certifications offers a complete solution to environmental degradation. However, both illustrate the potential of regulated conduct and stringent guidelines to mitigate pollution, particularly when supported by effective oversight.

Enhancing self-control in both individual conduct and regulatory oversight can foster greater adherence to environmental legislation, cultivate increased confidence in governance, ensure procedural integrity, and ultimately yield superior outcomes for enduring environmental viability.

This analysis, by examining both individual actions and established regulations, contributes to a more profound comprehension of sustainability management and underscores the critical need for frameworks that instil environmental accountability.

The significance of this integrated strategy is amplified in the current context, characterized by escalating air contamination, a rise in vehicular traffic, escalating consumption of resources, and the mounting environmental pressures confronting rapidly developing nations.

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