A Study on Transformation Process of Single Use Plastic of Green Alternative in Chennai City.

RESEARCH SCHOLAR

MS. V. AKSHAYA
Department of Economics,
Vels University
Pallavaram,
Chennai- 600117

RESEARCH SUPERVISOR

DR.S.CHANDRA CHUD
Professor ,Department of Economics,
Vels University
Pallavaram,
Chennai- 600117

Abstract:

The escalating environmental challenges posed by single-use plastics (SUPs) have intensified global efforts to shift towards sustainable alternatives. In Chennai City, the combination of rapid urban expansion, rising consumer demand, and insufficient waste management systems has amplified the plastic pollution crisis. Consequently, replacing SUPs with eco-friendly substitutes—such as biodegradable bags, cloth carriers, compostable packaging, and other sustainable options—has emerged as both an ecological imperative and a socio-economic hurdle. This research investigates the transition process from SUP dependency to the adoption of greener materials. Employing a mixed-method research design, the study integrates primary data from surveys and interviews with consumers, retailers, waste management officials, and eco-product manufacturers, along with secondary data drawn from government publications, industry analyses, and environmental NGO reports. The study explores the extent of public awareness, market accessibility, and cost feasibility of green alternatives in Chennai, as well as the influence of policy frameworks like the Tamil Nadu Plastic Ban (2019) on consumer and business practices. Findings reveal that although awareness regarding the harmful effects of SUPs is considerable, consistent uptake of alternatives remains limited due to higher costs, inadequate distribution networks, and weak enforcement of regulatory provisions. Furthermore, behavioral reluctance among users and insufficient vendor incentives slow the pace of change. The research underscores the necessity for an integrated approach that blends mass awareness campaigns, financial incentives for green product manufacturing, and stricter enforcement of plastic regulations. It also advocates for collaborative efforts between government agencies, private businesses, and community groups to enhance both the affordability and scalability of sustainable alternatives. By identifying the challenges and motivators within this shift, the study offers practical recommendations to accelerate Chennai's movement toward a cleaner, plastic-free urban future.

Keywords: Single-use plastics, Sustainable alternatives, Environmental transition, Plastic ban policy, Chennai City, Eco-friendly initiatives.

Introduction:

Single-use plastics (SUPs) have become deeply embedded in modern consumption patterns, valued for their convenience, low cost, and widespread accessibility. Despite these advantages, their environmental impact is profound, as they are non-biodegradable, remain in natural habitats for centuries, and significantly contribute to land and marine pollution, as well as greenhouse gas emissions. In urban hubs like Chennai City—where dense populations and rapid economic development drive high consumption rates—SUP waste has placed immense pressure on waste management systems and has emerged as a critical environmental concern. In response to these challenges, the Government of Tamil Nadu enforced a comprehensive ban on selected SUP items in January 2019, targeting products such as plastic carry bags, disposable cups, and drinking straws. While the legislation marked a significant milestone in promoting environmental responsibility, its on-ground implementation has faced numerous hurdles. These include limited public awareness, the scarcity of affordable and accessible eco-friendly substitutes, and inconsistent enforcement within retail and wholesale markets. Transitioning Chennai from SUP reliance to sustainable alternatives—such as cloth and jute bags, biodegradable

packaging materials, and compostable containers—requires more than policy enforcement alone. It calls for a coordinated effort encompassing behavioral change, infrastructural support, and economic incentives to enable large-scale adoption. Manufacturers, traders, government agencies, environmental advocates, and citizens must work collectively, as their roles are interconnected in this transformation. This research aims to investigate the underlying factors influencing Chennai's movement toward green substitutes, evaluate the effectiveness of existing policy measures, highlight supply chain limitations, and gauge consumer readiness for sustainable practices. By identifying both barriers and opportunities, the study seeks to offer practical, evidence-based recommendations that can help accelerate the city's transition to a plastic-free environment. The insights gained will be instrumental for policymakers, entrepreneurs, and civil society groups striving to harmonize environmental protection with economic viability and public acceptance. Although single-use plastics (SUPs) offer convenience, they pose significant environmental risks in Chennai City, exacerbating pollution and straining waste management systems. Despite the Tamil Nadu plastic ban, the shift to eco-friendly alternatives remains slow, hindered by high costs, limited supply, and low public awareness. This study investigates the city's transition toward sustainable substitutes and the factors shaping this process. Single-use plastics (SUPs), while valued for their practicality, present serious environmental concerns in Chennai City, adding to pollution and waste management burdens. The Tamil Nadu government's 2019 prohibition on select SUP products was a key step toward sustainability; however, the move toward eco-friendly alternatives has progressed slowly, constrained by higher prices, restricted market access, and limited consumer uptake. This research investigates the drivers and barriers shaping Chennai's shift to sustainable substitutes and outlines strategies for more effective implementation.

Review of Literature:

Sharma, A. & Jain, M (2018). " Highlighted the responsibility of educational institutions in supporting a plastic-free environment and developing environmentally aware individuals". **Singh, R.P. & Rani, M (2019).** "Carried out field research in Chennai revealing limited compliance with plastic bans, primarily due to the absence of practical substitute options." **George, S. & Thomas, A. (2020).** "Emphasized the impact of environmental education on shaping the attitudes and behaviors towards sustainable consumption." **Nair, P.R., & Ramesh, K. (2016).** "Offered perspectives on marketing approaches for biodegradable products and the challenges faced in consumer adoption." **Rao, S.K., & Singh, P. (2020).** "Evaluated the economic impact of the single-use plastic ban on small-scale plastic producers in Tamil Nadu." **Kumar, A. & Sharma, S (2020).** "Highlighted the crucial role of startups and innovation in creating biodegradable plastic substitutes in India." **Sivakumar, R.(2020).** Examined the involvement of Chennai's municipal corporation in implementing plastic ban regulations and conducting public awareness initiatives." **Rajendran, S. & Krishnaswamy, R. (2020).** "Analyzed trends in plastic waste generation in Chennai and the socio-economic drivers behind plastic consumption." **Chandran, p., & Subramanian, K(2020)** "Investigated the execution of the plastic ban in Tamil Nadu, highlighted enforcement difficulties and public reactions in urban region such as Chennai." **Narayanan sawmy , R.(2020).** "Explored the effects of the Tamil Nadu plastic ban on retail businesses, focusing on operational challenges and adaption strategies." – south Asian journal of business and management. **Parihar, S.(2018).** " Investigate that green alternatives led by community initiatives tend to be more effective than those driven solely by policies measures." **Muthu , S.S. (2014)** "Conducted a comparative life cycle analysis of different alternatives packaging materials, concluding that compostable options are more effective in lowering carbon emissions." **Kumar, R. & Agrawal, S. (2021).** "Investigate consumer awareness of eco friendly alternatives and highlighted education and community involvement as crucial factors for driving the sustainable change." **Veramani. D, & Selvan, R. (2023)** "Examined the alignment waste segregation efforts in Chennai with sustainable development goal (SDG – 12) on responsible consumption and production." **Choudhary, R, & Srivastava, S (2021).** "Assessed the preparedness of India supply chains to transition towards sustainable packaging solutions." **Palaniswamy, M. & Valli, M. (2021)** "Studied the effects of plastic ban regulation on street food vendors and small - scale traders in Chennai." **Kumaraswamy, P, & Deepa, G (2023)** "Assessed compliance to policies and role of innovation within Chennai's green product manufacturing industry." **Gupta . K & Subramanian, S. (2022).** "Explored the shift from plastic to eco friendly packaging in urban Indian , emphasizing policy frame works, industry adaptations and consumer behaviour." – Journal of environmental policy and planning. **Shankar, A, & Devi, S.(2021) .** "Investigate the levels of public awarness and the effectiveness of plastic ban enforcement, highlighted gaps

between policy and practice." – International Journal of Research in Economics and social sciences. **Rao, S.K. & Singh, P (2020)** "Analyzed the financial impact of the single use plastic (SUP) ban on small – scale plastic manufacturing units in Tamil Nadu."

Objectives:

- To examine the prevalence of single-use plastic consumption in Chennai across various sectors, including household, commercial, and industrial domains.
- To study the availability, cost effectiveness, and easy access to eco-friendly alternatives in the Chennai marketplace.
- To investigate the difficulties encountered by the vendors, manufacturers, and consumers during the shift from plastic to environmentally friendly alternatives.
- To analyze the cooperation between the public and private sectors in advancing the shift from plastic to sustainable materials.
- To study the role of local entrepreneurs and startups in creating and distributing sustainable packaging solutions.
- To identify the obstacles encountered by consumers and vendors in embracing eco-friendly alternatives.

Research problem:

Single-use plastics (SUPs) have emerged as a major environmental threat in urban India due to their non-biodegradable composition, brief utility, and improper disposal methods. In Chennai, a prominent metropolitan hub, daily waste generation is leading to environmental issues such as water contamination, blocked drainage networks, and ecological damage. Although the government bans and has awareness initiatives, the widespread reliance on single-use plastic is driven by affordability, limited alternative options, and weak enforcement. Despite increasing efforts to promote eco-friendly alternatives, such as cloth bags, compostable packaging, and paper-based products, the shift towards these solutions has been inconsistent and remains insufficiently understood. Multiple actors – including government agencies, consumers, small businesses, NGOs, and manufacturers – are involved in this shift, but they vary significantly in terms of coordination, awareness, and capability. It is essential to examine how efficiently Chennai navigates this transition, the specific challenges encountered across sectors, the effectiveness of current policies, and both market and consumer reactions to sustainable alternatives without a comprehensive understanding of these dimensions. Attempts to phase out SUPs and adopt greener options may lack impact and sustainability. From a supply chain standpoint, the accessibility and scalability of eco-friendly options—such as cloth bags, jute-based products, compostable packaging, and other biodegradable materials—remain constrained. Producers of these alternatives often grapple with high manufacturing expenses, limited availability of raw inputs, and a lack of adequate government subsidies or incentives, making it challenging to compete with the low prices of conventional plastics. This situation creates a clear gap between policy and practice: although regulations exist, the socio-economic, infrastructural, and behavioral conditions necessary for their success are only partially developed. Unless these obstacles are addressed, Chennai's shift from SUPs to sustainable substitutes risks losing momentum, resulting in ongoing environmental degradation and missed opportunities for sustainable growth. Accordingly, the central research problem involves identifying the root causes behind the slow pace of transformation. This requires analyzing how consumer awareness does—or does not—translate into actual behavioral change, assessing the affordability and market reach of alternative products, evaluating the influence of enforcement and incentive mechanisms, and understanding how diverse stakeholders—government agencies, businesses, and community organizations—can work together to expedite the transition. Such an investigation is essential to formulating practical solutions that bridge the gap between legislative intent and ground-level outcomes, ensuring that Chennai's pursuit of a plastic-free future is both environmentally responsible and economically viable.

Hypothesis:

- There is a strong correlation between public awareness and the use of eco-friendly alternatives in Chennai.
- Environmentally conscious consumers are more inclined to adopt sustainability packaging alternatives.
- Lack of standardization guidelines and certifications for green alternatives causes uncertainty and reluctance among vendors in the market.
- The plastic ban has no significant impact on the income or operations of small vendors and manufacturers.
- The shift from single-use plastic to eco-friendly alternatives plays a crucial role in advancing Sustainable Development Goal (SDG 12) in Chennai.

Need for study:

The growing reliance on single-use plastic (SUPs) poses a Significant threat to environmental sustainability, particularly in urban areas like Chennai. These plastics- commonly used for packaging, carry bags, and disposable items are discarded after a single use but remain in the environment for centuries. In Chennai, plastic waste is a leading cause of water pollution, drainage blockages, and urban flooding, all of which adversely affect public health and the natural ecosystem. While the Tamil Nadu government has implemented a ban on various types of SUPs and encouraged the adoption of biodegradable and reusable substitutes, the real-world execution and community engagement have produced mixed outcomes. Many small-scale vendors and business still rely on plastic due to affordability and limited access to eco friendly alternatives, and a sustainable choices. This involves examining the hurdle encountered by key stakeholders including producers, sellers, consumers, and policy makers. Although several policy measures have been introduced, there is a noticed gap in scholarly research specifically addressing Chennai's transition to green alternatives. Moreover, with sustainability gaining the global attention, it is essential that local initiatives with international goals such as sustainable development goal 12, which emphasizes responsible consumption and production.

Types of Green Alternatives:

Types	Description
Biodegradable plastic	Made from renewable resources such as corn starch and sugarcane. Breaks down quicker than standard plastics. PLA and PHA are common types.
Natural fiber bags (cloth/jute)	Strong, long-lasting bags crafted from materials like cotton or jute. Serve as sustainable alternatives to plastic carry bags.
Packaging made from paper products	Includes materials like kraft paper, cardboard cartons, and paper sacks. Environmentally safe, recyclable, and suitable for various industries.
Edible utensils and sustainable tableware	Created from food-grade ingredients like rice, wheat, or milletsafe for consumption and naturally biodegradable, including items like areca leaf plates.
Reusable and compostable alternatives	Products such as stainless steel straws, reusable jars, and compost-friendly packaging, intended for repeated use or eco-friendly disposal.

Barriers to Transformation:

1. **Cost Alternatives:**

Sustainable alternatives like compostable or biodegradable items are often priced higher than regular plastic products, making them less accessible to consumers and businesses.

2. **Insufficient market access:**

Environmentally friendly goods are not always stocked in nearby stores, particularly in semi-urban and rural regions, limiting their reach.

3. **Inadequate public knowledge:**

A significant portion of the population lacks information about the negative effects of single-use plastic and the advantages of eco-friendly replacement.

4. **Consumer habits:**

Habitual use of plastics, driven by ease and routine, hinders the transition to sustainable option.

5. **Weak implementation of policies:**

Despite existing laws, ineffective oversight and lack of strict penalties often result in poor compliance with plastic restrictions or green regulations.

6. **Limited Availability :**

Eco-friendly alternatives are unevenly distributed across markets, with particularly limited access in suburban localities and low-income communities.

7. **Insufficient Public Awareness Campaigns**:

While public awareness of SUP impacts exists, it is not reinforced through ongoing, targeted educational initiatives, leading to declining engagement over time.

8. **Inconsistent Quality:**

The durability of some biodegradable products is poor, undermining consumer confidence and discouraging repeat usage.

Research Methodology:

1. **Introduction:**

This research methodology has been structured to methodically explore the shift from single-use plastic (SUPs) to eco-friendly alternatives in Chennai city. It details the strategies employed for collecting, analyzing both qualitative and quantitative data. The study focuses on aspects such as public awareness, consumer behaviour, policy enforcement efficiency, and the accessibility of green alternatives in an urban environment. A mixed-methods approach has been adopted to provide a comprehensive prespective, combining viewpoints from citizens. Vendors, government agencies, and environmental specialists.

2. **Research Design:**

A combined descriptive and exploratory research design was employed. The descriptive component examines current awareness levels, usage trends, and the market availability of green alternatives, whereas the exploratory component investigates the underlying challenges, driving factors, and potential strategies to expedite the transition. Participants were categorized according to their societal role, such as everyday consumers, shopkeepers, sanitation workers, and government officials. This method of stratification enables the collection of diverse viewpoints across the entire lifecycle of plastic usage and disposal.

3. **Data Collection Methods:**

Secondary Data:

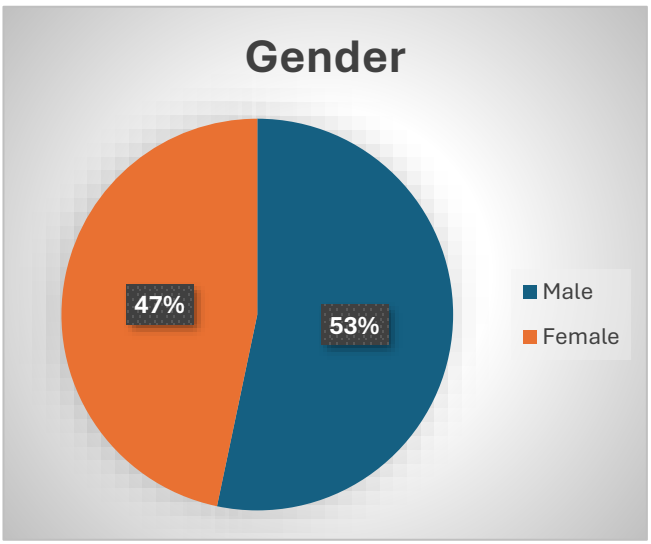
Secondary data was obtained from government reports (TNPCB, GCC, CPCB), academic journals, market research publications, and reports by environmental NGOs such as WWF-India and UNEP. These sources provided statistical data on plastic usage, waste management, and market trends for green alternatives.

Demographic Profile of Respondents:

The demographic profile of the respondents provides essential insights into the socio-economic and occupational background of individuals engaged in or affected by the usage and management of single-use plastics (SUPs) in Chennai City. The study considered a diverse sample population comprising **general consumers, street vendors, waste workers, and government officials**, selected from various administrative zones across Chennai.

Table: Demographic Profile of Respondents (N = 120)

S. No.	Demographic Variable	Category	Frequency (N)	Percentage (%)
1	Gender	Male	64	53.3%
		Female	56	46.7%
2	Age Group	Below 25 years	18	15.0%
		26–35 years	32	26.7%
		36–45 years	34	28.3%
		46–60 years	26	21.7%
		Above 60 years	10	8.3%



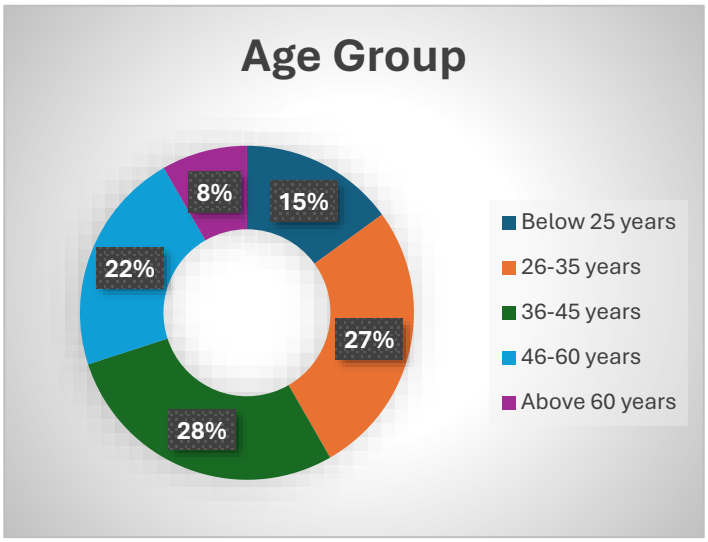
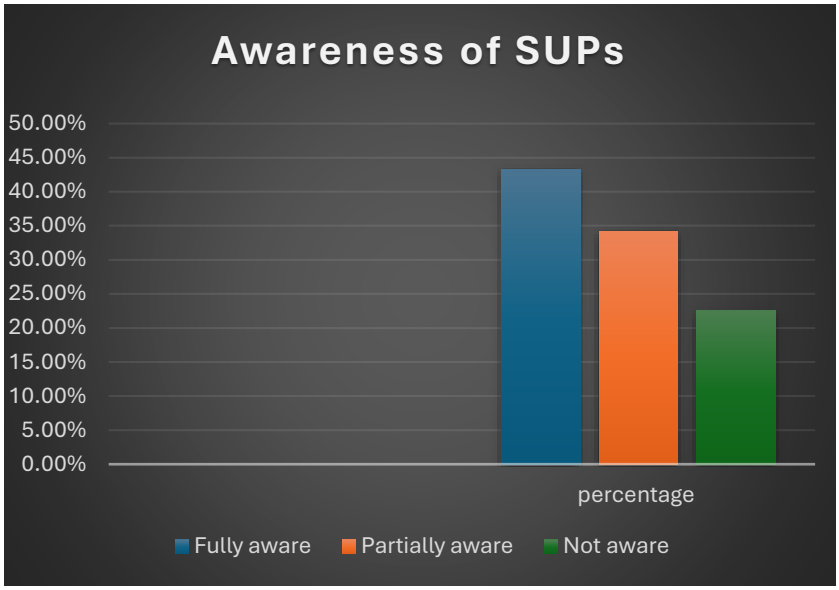


Table: Awareness and Usage of Single-Use Plastics (N = 120)

Awareness Level	Frequency (N)	Percentage (%)
Fully aware	52	43.3
Partially aware	41	34.2
Not aware	27	22.5

Awareness Level	Frequency (N)	Percentage (%)
Total	**120**	**100.0**



Usage of SUPs	Frequency	Percentage (%)
Daily	40	33.4
weekly	35	29.1
Occasionally	28	23.4
Never	17	14.1
Total		**120**

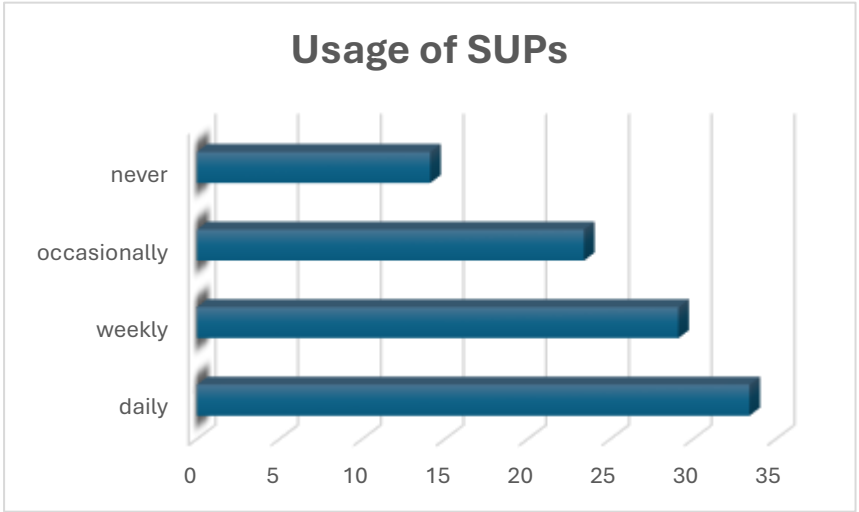
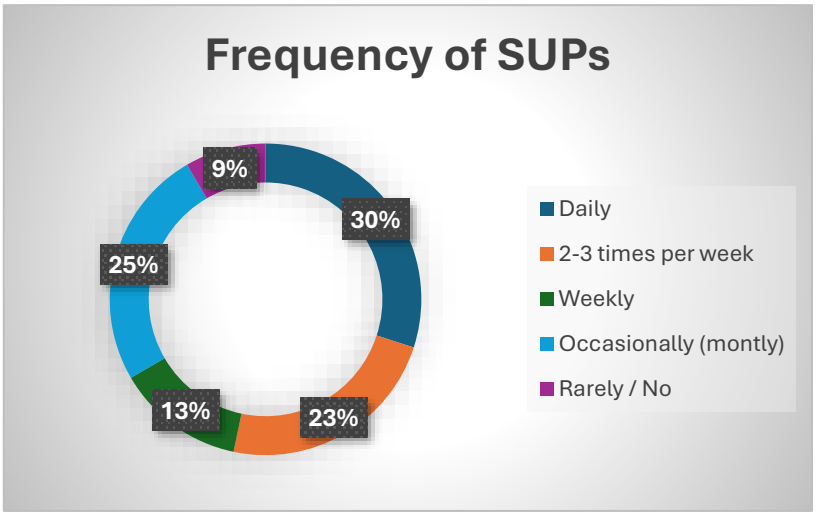


Table: Frequency of Single-Use Plastic Usage (N = 120)

S. No.	Usage Frequency	Number of Respondents (N)	Percentage (%)
1	Daily	36	30.0%
2	2–3 times per week	28	23.3%
3	Weekly	16	13.3%
4	Occasionally (monthly)	30	25.0%
5	Rarely/Never	10	8.4%
Total		**120**	**100%**



Factors Influenced by Plastics

1. Environmental Factors

- **Soil Degradation** – Plastic debris and microplastics impair soil health, lowering agricultural yield potential.
- **Water Contamination** – Chemical leachates and microplastics pollute surface water, groundwater, and aquatic habitats.
- **Marine Life Disruption** – Causes entanglement, ingestion hazards, and destruction of marine habitats.
- **Air Quality Decline** – Incineration or open burning of plastics releases harmful toxins such as dioxins and furans.
- **Strain on Waste Management** – Non-biodegradable plastics overwhelm collection, segregation, and disposal systems.

2. Human Health Factors

- **Toxic Chemical Leaching** – Compounds like BPA, phthalates, and styrene migrate from plastics into food and drinks.
- **Microplastic Consumption** – Detected in seafood, drinking water, table salt, and even in human tissues and organs.

- **Respiratory Hazards** – Exposure to airborne plastic particles and fumes during manufacturing or burning.
- **Hormonal Disruption** – Certain plastic additives interfere with the endocrine system, impacting health over time.

3. Economic Factors

- **Rising Municipal Expenditure** – Greater costs for plastic waste handling, segregation, and safe disposal.
- **Livelihood Displacement** – Informal waste collectors face income loss due to plastic bans without proper reskilling programs.
- **Tourism Decline** – Plastic litter in public areas and coastal zones discourages visitors.
- **Reduced Material Value** – Contamination of recyclable plastics lowers their market demand and profitability.

4. Social & Cultural Factors

- **Consumer Dependency** – Widespread reliance on single-use plastics for ease and convenience.
- **Low Awareness Levels** – Limited public understanding of plastic's ecological and health impacts.
- **Community Health Risks** – Marginalized groups, particularly waste handlers, face greater exposure to hazardous materials.

5. Climatic Factors

- **Greenhouse Gas Contribution** – Both production and disposal stages emit significant amounts of CO_2 and methane.
- **Flood Risk Amplification** – Plastic waste obstructs drainage systems, increasing vulnerability to flooding during heavy rains.

Conclusion

The rising use of single-use plastics (SUPs) has become one of the most critical environmental issues of our time. Although they offer convenience, low cost, and versatility across sectors like packaging, food services, and everyday use, the long-term consequences of SUPs are severe. These plastics, which take centuries to decompose, accumulate in landfills, oceans, and even the food chain due to ineffective waste management, leading to widespread pollution and contamination. In Tamil Nadu, the state government has taken significant steps to address this issue by implementing the Plastic Waste Management Rules (2016, with updates in 2020 and 2022) and banning specific plastic products. These efforts reflect strong political will, but their success largely depends on public engagement, education, and the availability of affordable, sustainable alternatives. Though the shift toward reusable and biodegradable options has started, adoption remains limited due to financial hurdles, lack of infrastructure, and inconsistent enforcement. SUPs have far-reaching effects across various sectors. Environmentally, they reduce soil and water quality, endanger wildlife, and contribute to greenhouse gas emissions from both production and disposal. Health-wise, exposure to plastic-related toxins and ingestion of microplastics have been linked to hormonal imbalances, respiratory problems, and chronic illnesses. On the economic front, local governments face high cleanup costs, while polluted environments negatively impact industries like tourism. Socially, habitual consumer behavior and limited public knowledge sustain the ongoing reliance on these harmful materials. Addressing the problem requires a comprehensive and coordinated approach. Strengthening enforcement mechanisms and launching extensive public education initiatives can drive shifts in behavior. Supporting innovation and ensuring access to cost-effective, eco-friendly alternatives are vital for broad adoption. Collaboration among government bodies, non-profit organizations, industries, and communities is crucial for achieving meaningful outcomes. In essence, tackling the issue of single-use plastics goes beyond laws and technology—it calls for a shift in societal values and

everyday practices. Tamil Nadu's proactive stance can inspire other regions. Still, long-lasting progress will only be achieved when all stakeholders take collective ownership of preserving the environment, protecting human health, and ensuring a resilient, sustainable future. The consequences of SUP pollution extend across environmental, health, economic, and social dimensions. Environmentally, plastics degrade ecosystems, harm wildlife, and contribute to emissions. From a health perspective, prolonged exposure to plastic chemicals and ingestion of microplastics can lead to serious issues such as hormonal imbalances and respiratory illnesses. Economically, cities face rising costs for waste management, and tourism suffers from plastic-littered environments. Socially, deep-rooted consumer habits and insufficient public education maintain the reliance on disposable plastics. To combat this growing issue, a multi-dimensional strategy is essential. This includes stronger enforcement, greater public education, support for innovation in sustainable alternatives, and collaboration across government, industries, NGOs, and communities. Ultimately, reducing SUPs is not just a regulatory or technological task—it requires a shift in public mindset and collective responsibility for a cleaner, healthier, and more sustainable future.

Reference:

1. "Lack of alternatives to single use plastics dampens efforts in Tamil Nadu" – New Indian Express, Jul 18, 2022; includes daily plastic waste generation (1,178 t/day for 2020-21), bans, raids, and seizures. The New Indian Express
2. "116 tonnes of single-use plastics seized in special drives … says TNPCB" – The Hindu, Jun 29, 2024; TNPCB enforcement data: 116 t seized (Oct 2022–Mar 2024), 691 t since Jan 2022, ₹ 8.75 crore in fines, manjappai-vending machines installed. The Hindu
3. National Plastic Waste Management Rules (2016), amendments 2020 & 2022 – implied in multiple reports.
4. "A year into plastic ban, Tamil Nadu still struggles to kick the habit" – The Hindu, Jan 2, 2020; seizures, enforcement challenges, banned plastics circulation, vendor dependence, disposal options. The Hindu
5. "Single-use Plastics in Chennai Markets: Pre- and Post-ban" – CAG report (Jan–Mar 2019) on market vendors before/after 1 Jan 2019 ban. cag.org.in
6. "Why Nilgiris can't shake off its mountain of plastic" – Times of India, Jun 11, 2025; historic ban in Nilgiris (2001), ongoing challenges, tourism impacts, Manjapai campaign, fishnet recycling. The Times of India
7. "Tonnes of waste cleared daily, but GCC merely dumps it at shut sites?" – Times of India, Jun 2, 2025; Chennai C&D waste—though not SUPs—is emblematic of waste-management infrastructure failure
8. Danasekaran, R., Kumar, M. B., Raja, T. K., Nirupama, A. Y., & Sharath, U. (2020). Perception Regarding Hazards of Plastics Usage and Effectiveness of Plastic Ban in Rural Tamil Nadu. National Journal of Community Medicine, 11(06), 254-257.
9. Pandirajan, S., Raja, V. P., Maruthupandiyan, J., & Annadurai, K. (2020). Assessment of awareness about plastic pollution and attitude regarding plastic bags usage among rural population of Kanchipuram, Tamil Nadu, India. International Journal of Community Medicine and Public Health, 7(6), 2146-2149.
10. Sujitha, P., Swetha, N. B., & Gopalakrishnan, S. (2019). Awareness, acceptance and practice of plastic ban legislation among residents of an urban area in Kanchipuram district, Tamil Nadu: a cross sectional study. International Journal of Community Medicine and Public Health, 7(1), 256-263.
11. "High concentration of microplastics entering human food chain in Tamil Nadu." (2024, March 2). The New Indian Express.
12. "Plastic sneaks into TN food chain, sets off alarm." (2024, March 3). The New Indian Express.
13. "Meendum Manjapai fails to stop plastic bag use in Tamil Nadu: Study." (2024, August 2). The New Indian Express.
14. "Why Nilgiris can't shake off its mountain of plastic." (2025, June 11). The Times of India.
15. "Tonnes of waste cleared daily, but GCC merely dumps it at shut sites?" (2025, June 2). The Times of India.
16. "Greens approach NGT regarding waste dumped on NH, railway lines." (2025, May 7). The Times of India.
17. "TNPCB flags need for CCTV, sewage fixes at Putheri Lake." (2025, May 7). The Times of India.
18. "Plastic bans spread in India, from Tamil Nadu to Maharashtra, with surprising winners and losers." National Geographic.