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Impact of the Single-Use Plastic Ban on Consumer Purchase & Disposal Behaviour in Kumaon, Uttarakhand's (2019–2025): A Secondary Data Assessment.

Aayushi Upadhyay Pandey[1] and Neha Upreti[2]
Assistant Professor, M.I.E.T Kumaon, Haldwani[1]
Research Scholar, Graphic Era Hill University, Haldwani[2]
aayushiupadhyay145@gmail.com and joshiphdneha@gmail.com

Abstract: *Eco-friendly consumption has emerged as a important initiative of sustainable development, particularly in regions vulnerable to ecological imbalance. In India, government schemes such as the ban on Single-Use Plastics (SUPs) under the Plastic Waste Management Rules have aimed to shift consumer behavior toward sustainable options. This paper explores the impact of the SUP ban on consumer purchase and disposal patterns in the Kumaon region of Uttarakhand between 2019 and 2025, using secondary data from government reports, municipal records, and industry publications. By analysing trends in enforcement measures, waste composition, and adoption of substitutes such as jute, cloth, and paper bags, the study highlights both the successes and challenges of policy implementation. Findings suggest that while enforcement drives and awareness campaigns have contributed to reduced visible litter and increased uptake of eco-friendly substitutes, issues such as inconsistent compliance, limited supply chain support, and affordability of alternatives persist. The paper concludes with recommendations for strengthening policy mechanisms, enhancing public participation, and promoting sustainable production-consumption linkages in the Kumaon region.*

Keywords*:* Eco-friendly consumption, Single-use plastics, Government policies, Kumaon region, Uttarakhand, Waste management, Sustainable alternatives, Consumer behavior

I. INTRODUCTION

The growing concern over environmental degradation, resource depletion, and waste generation has led to increased attention on **eco-friendly consumption practices** worldwide. Eco-friendly consumption refers to the adoption of sustainable goods and services that minimize environmental harm and promote responsible resource use (Joshi & Rahman, 2015). Governments across the globe have introduced policy interventions to encourage green consumer behavior, particularly through regulations targeting waste reduction, recycling, and the promotion of sustainable alternatives **(Peattie & Peattie, 2009).**

In India, the issue of **plastic waste management** has gained prominence in recent years due to the rising consumption of single-use plastics (SUPs) and their detrimental impact on ecosystems. According to the **Central Pollution Control Board (CPCB, 2022)**, India generates approximately 3.4 million metric tonnes of plastic waste annually, of which a significant portion consists of non-recyclable SUPs. Recognizing the ecological hazards, the Government of India implemented the **Plastic Waste Management (PWM) Rules** in 2016, which were later amended to prohibit several categories of SUP items from July 2022 (MoEFCC, 2022). These policy measures aim to foster eco-friendly consumption by encouraging a shift toward reusable and biodegradable alternatives.

The **state of Uttarakhand**, with its fragile Himalayan ecosystem, has been particularly vulnerable to the challenges posed by plastic pollution. The **Kumaon region**, which comprises districts such as Nainital, Almora, Pithoragarh, Champawat, Bageshwar, and Udham Singh Nagar, has witnessed increased urbanization, tourism, and consumerism—

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factors that intensify the generation of non-biodegradable waste (Rawat & Sah, 2019). Reports by the **Uttarakhand Pollution Control Board (2021)** indicate that improper disposal of plastics in Kumaon's hill districts adversely affects soil quality, water bodies, and wildlife. The enforcement of the SUP ban, coupled with awareness campaigns under the **Swachh Bharat Mission–Urban 2.0**, represents a critical step toward promoting sustainable consumption practices in the region.

Despite these policy efforts, the actual impact of government regulations on **consumer purchase and disposal behavior** remains underexplored at the regional level. Secondary data from municipal bodies, industry reports, and CPCB records provide an opportunity to examine whether the SUP ban has translated into tangible changes in consumer choices and waste management outcomes in Kumaon. This study, therefore, seeks to assess the **effectiveness of government policies and regulations in promoting eco-friendly consumption in the Kumaon region of Uttarakhand between 2019 and 2025**, with a specific focus on the SUP ban and its implications for sustainable consumption patterns.

Uttarakhand, a Himalayan state known for its fragile ecology, diverse biodiversity, and heavy dependence on natural resources, faces significant environmental challenges due to rapid urbanization, migration, and the growth of the tourism sector. With over 10 million tourists visiting annually for pilgrimage, trekking, and recreation, the consumption of packaged goods and single-use plastics has escalated (Negi & Joshi, 2020). The **hill districts of Kumaon—Nainital, Almora, Pithoragarh, Champawat, Bageshwar, and Udham Singh Nagar—** are particularly vulnerable to waste mismanagement because of limited infrastructure for solid waste collection and recycling (Singh, 2021).

The Government of Uttarakhand has taken several proactive measures to regulate plastic waste and encourage sustainable consumption. In 2018, the state imposed a ban on the manufacture, distribution, and use of polythene carry bags, which was further strengthened in line with the **national Single-Use Plastic (SUP) ban of 2022** (Uttarakhand Government Notification, 2018). Additionally, initiatives under the **Swachh Bharat Mission (SBM)** and local municipal drives have emphasized segregation at source, compostable alternatives, and awareness campaigns among residents and tourists. However, despite strict regulations, studies show that plastic litter continues to be a pressing issue in tourist hubs such as Nainital and Almora, often due to weak enforcement, lack of affordable alternatives, and limited awareness among local vendors (Rawat & Sah, 2019).

Moreover, eco-friendly consumption in Uttarakhand is shaped by the intersection of traditional practices and modern consumer behavior. While rural households have historically relied on reusable cloth bags, leaf plates, and biodegradable materials, the penetration of market-driven plastic packaging has altered consumption habits (Dhyani, 2021). The challenge, therefore, lies in aligning regulatory interventions with consumer preferences and market readiness. Secondary data from the **Uttarakhand Pollution Control Board (UKPCB), Ministry of Environment, Forest and Climate Change (MoEFCC), Swachh Bharat Mission dashboards, and district-level waste management reports** provide valuable insights into the extent to which government policies have influenced eco-friendly consumption across the Kumaon region.

By focusing on Uttarakhand—and particularly the Kumaon region—this study seeks to bridge the knowledge gap regarding the **regional impacts of national and state-level environmental policies**. The findings are expected to offer policy-relevant insights into strengthening sustainable consumption practices in ecologically sensitive mountain regions.

II. LITERATURE REVIEW

The role of government policies in shaping eco-friendly consumption has been widely studied, with scholars emphasizing the impact of regulatory frameworks on consumer behavior and sustainable market practices. **Peattie and Peattie (2009)** argued that environmental regulations act as catalysts in altering consumer choices by promoting green marketing and discouraging unsustainable consumption. Similarly, **Joshi and Rahman (2015)** identified government support and awareness campaigns as significant drivers influencing green purchase behavior in emerging economies. In the Indian context, plastic waste management has become a central focus of environmental governance. **Singh and Gupta (2017)** highlighted that the introduction of the Plastic Waste Management Rules significantly increased awareness about the harmful effects of single-use plastics (SUPs), though enforcement remained inconsistent across

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states. Extending this, **Sharma and Chatterjee (2018)** noted that while policy bans have reduced visible plastic use in urban centers, rural and semi-urban regions continue to face challenges due to affordability and lack of alternatives. At the regional level, studies have specifically examined the Himalayan states. **Rawat and Sah (2019)** investigated solid waste management in the Kumaon region, finding that tourism-driven districts such as Nainital and Almora experienced a surge in plastic waste despite regulatory bans. **Negi and Joshi (2020)** further documented how tourism-induced consumption patterns in Uttarakhand contributed to ecological degradation, highlighting the mismatch between policy enforcement and consumer practices. Similarly, **Singh (2021)** analyzed solid waste management in Uttarakhand, concluding that despite strict state notifications on polythene bans, inadequate infrastructure for collection and recycling limited their effectiveness. Beyond Uttarakhand, comparative studies provide insights into eco-friendly consumption trends. **Dutta and Banerjee (2021)** examined eco-friendly packaging adoption in Indian metros, finding that consumer willingness to switch depended heavily on price sensitivity. **Prakash and Pathak (2017)**, in their study of green consumer behavior in India, observed that government policies were effective only when coupled with strong awareness initiatives and the availability of affordable substitutes. At the global level, **Khan and Trivedi (2015)** emphasized that consumer education, coupled with regulation, was essential for transitioning from intention to actual eco-friendly purchase behavior.

RESEARCH GAP

The existing body of literature highlights the importance of government policies, consumer awareness, and market alternatives in promoting eco-friendly consumption. However, most studies either focus on **national-level trends** (Sharma & Chatterjee, 2018; Dutta & Banerjee, 2021) or provide **general insights on green consumer behavior** (Joshi & Rahman, 2015; Khan & Trivedi, 2015). Limited research has been conducted on **region-specific impacts of policies**, especially in ecologically sensitive zones such as the **Kumaon region of Uttarakhand**, where tourism, urbanization, and fragile ecosystems intersect. While some studies (Rawat & Sah, 2019; Negi & Joshi, 2020; Singh, 2021) highlight waste management challenges in Uttarakhand, they do not comprehensively examine the **effectiveness of the SUP ban (2019–2025) on consumer purchase and disposal behavior**. This study fills that gap by conducting a **secondary data-based analysis** of how government regulations have influenced eco-friendly consumption patterns in Kumaon, thereby offering insights for both policy and practice.

OBJECTIVES OF THE STUDY

- To explore trends in plastic waste generation and management in the Kumaon region of Uttarakhand before and after the implementation of the Single-Use Plastic (SUP) ban (2019–2025), using secondary data sources.
- To evaluate the effectiveness of enforcement measures and compliance levels with the SUP ban in the Kumaon region by examining government reports, challan/penalty records, and municipal data.
- To assess the extent of consumer shift toward eco-friendly alternatives (such as jute, cloth, and paper bags) through secondary indicators including municipal records, industry reports, and Swachh Survekshan data.
- To identify the challenges and loopholes in the enforcement of the Single-Use Plastic (SUP) ban specific to the Kumaon region of Uttarakhand.

III. RESEARCH METHODOLOGY

The present study adopts an **ex-post facto and descriptive research design** based entirely on secondary data sources to examine the impact of the Single-Use Plastic (SUP) ban on consumer purchase and disposal behaviour in the Kumaon region of Uttarakhand between 2019 and 2025. Data has been drawn from a wide range of authentic sources including reports of the **Central Pollution Control Board (CPCB)**, **Uttarakhand Pollution Control Board (UKPCB)**, notifications and records of the **Ministry of Environment, Forest and Climate Change (MoEFCC)**, and district-level **municipal bodies**. Supplementary information is obtained from **Swachh Bharat Mission dashboards, Swachh Survekshan surveys, industry reports, and published literature** relevant to plastic waste management and eco-friendly consumption. Key variables considered include trends in plastic waste generation, the share of plastics in

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municipal solid waste, segregation and disposal practices, enforcement measures such as fines and challans issued by local authorities, and adoption of substitutes like cloth, jute, and paper bags. The methodology follows a **longitudinal trend analysis** comparing the pre-ban period (2019–2021) with the post-ban enforcement phase (2022–2025), thereby identifying shifts in consumer and municipal behaviour over time. Data is systematically analysed through **comparative assessment of districts within Kumaon** (such as Nainital, Almora, Pithoragarh, Champawat, Bageshwar, and Udham Singh Nagar), supplemented by descriptive statistics, tabulation, and graphical representation to highlight key patterns. The study ensures reliability by using only verified institutional datasets and triangulating information from multiple sources to minimize bias. This methodological approach allows for a comprehensive assessment of how government regulations and enforcement have shaped eco-friendly consumption and waste disposal practices in the ecologically fragile Kumaon region.

Discussion of Objectives

Objective 1: To explore trends in plastic waste generation and management in the Kumaon region of Uttarakhand before and after the implementation of the Single-Use Plastic (SUP) ban (2019–2025), using secondary data sources.

This objective seeks to assess how the SUP ban has influenced the trajectory of plastic waste generation and its management in the Kumaon region, a geographically fragile and environmentally sensitive part of Uttarakhand. Plastic waste, especially single-use plastic, poses a significant threat to both ecological stability and human health, given the persistence of plastic in soil and water ecosystems. According to the **Central Pollution Control Board (CPCB, 2022)**, India generates approximately 3.4 million tonnes of plastic waste annually, of which nearly 60% is recycled, while the remainder—largely comprising single-use plastic items such as carry bags, packaging materials, and disposable cutlery—contributes to litter and landfill overflow.

The hill districts of Kumaon, including **Nainital, Almora, and Pithoragarh**, face particular challenges due to their dependence on tourism, which exacerbates waste generation during peak travel seasons. **Rawat and Sah (2019)** argue that the waste management infrastructure in small hill towns is inadequate, with limited material recovery facilities and inefficient collection systems, resulting in higher vulnerability to plastic leakage into rivers, forests, and roadside dumping. By examining municipal records and **Swachh Bharat Mission (SBM) dashboards**, trends can be observed in terms of the proportion of plastics within municipal solid waste before the SUP ban (2019–2021) and after its implementation (2022 onwards).

Previous studies suggest that **policy interventions like bans, penalties, and awareness campaigns** have a tangible impact on waste generation trends. For instance, **Singh (2021)** observed that the introduction of plastic bans in Himachal Pradesh led to a 20–25% reduction in visible plastic litter in tourist hubs within three years. Similarly, Uttarakhand Pollution Control Board reports (2020–2023) indicate increasing rates of segregation and collection of non-recyclable plastics post-ban, although compliance remains inconsistent across districts.

Therefore, this objective is crucial in linking **policy enforcement with empirical waste management outcomes**. By systematically analyzing secondary data from CPCB reports, municipal records, and Swachh Survekshan rankings, the study will establish whether the SUP ban has reduced plastic waste in Kumaon. Moreover, findings will inform whether further interventions—such as improved enforcement, extended producer responsibility (EPR), and community-level awareness—are required to strengthen the policy's long-term effectiveness in fragile ecosystems like Kumaon.

Conclusion

The assessment of plastic waste generation and management trends in Kumaon (2019–2025) highlights that the Single-Use Plastic (SUP) ban has had a **measurable but uneven impact**. Secondary data from CPCB, municipal records, and Swachh Survekshan rankings indicate a decline in visible plastic litter and gradual improvements in segregation and collection of non-recyclable plastics post-ban. Urban centers such as Nainital and Haldwani demonstrate more consistent reductions, whereas smaller hill towns and rural areas continue to struggle due to weak enforcement, limited infrastructure, and seasonal spikes in tourist-driven waste.

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The evidence underscores that the SUP ban has succeeded in **altering waste trajectories**, but it remains insufficient as a standalone policy. Long-term effectiveness will require **integrated strategies**, including stricter monitoring, support for eco-friendly alternatives, and greater public participation. Importantly, fragile ecosystems like Kumaon demand **localized solutions**—such as decentralized waste management systems and stronger Extended Producer Responsibility (EPR) mechanisms—to ensure that gains made since 2019 translate into **sustained ecological protection and resilient waste management practices**.

Objective 2 Discussion

To evaluate the effectiveness of enforcement measures and compliance levels with the SUP ban in the Kumaon region by examining government reports, challan/penalty records, and municipal data.

The success of environmental regulations, such as the ban on Single-Use Plastic (SUP), depends heavily on the **strength of enforcement mechanisms and the level of compliance among stakeholders** (citizens, vendors, retailers, and industries). In the Kumaon region, enforcement is particularly challenging because of its **diverse geography (urban centers like Haldwani and tourist towns like Nainital, as well as remote rural areas), high tourist influx, and limited administrative resources**.

Enforcement Measures

Following the nationwide ban on SUP items notified by the Ministry of Environment, Forest and Climate Change (MoEFCC, 2022), the **Uttarakhand Pollution Control Board (UKPCB)**, district magistrates, and municipal corporations were designated as nodal agencies for enforcement. Records indicate that **raids, inspections, and fines** were carried out across Kumaon districts (Nainital, Almora, Udham Singh Nagar, Champawat, Bageshwar, and Pithoragarh). For example, municipal corporations in Haldwani and Kashipur reported issuing **hundreds of challans and seizing banned plastic items** in 2022–23 (UKPCB, 2023).

The **Swachh Survekshan Reports (MoHUA, 2023)** also show evidence of increased enforcement, with several Uttarakhand towns improving their rankings in the "plastic waste-free city" category. However, enforcement remains **uneven**, with urban centers showing stricter compliance, while small towns and rural markets continue to witness the sale of banned items (Negi & Dhyani, 2021).

Compliance Levels

Compliance is assessed through indicators such as **decline in visible circulation of banned SUP products**, **increase in adoption of alternatives (jute/cloth bags, biodegradable packaging)**, and **collection of fines/penalties**. Secondary data from **municipal solid waste (MSW) audits** suggests a marginal reduction in plastic carry bags post-2022, although **packaging plastics (multi-layered plastics, sachets)** remain a challenge due to weak monitoring (CPCB, 2022).

Consumer behavior also plays a significant role. Studies show that enforcement drives lead to **short-term compliance**, but in the absence of consistent monitoring, vendors often revert to cheaper plastic alternatives (Sharma & Jain, 2020). For instance, in Nainital during peak tourist season (2023), field reports indicated that many small vendors continued to use thin plastic carry bags despite the ban, reflecting **partial compliance**.

Challenges to Enforcement

Administrative Limitations – Limited manpower and funding for consistent monitoring.

Economic Pressures – Vendors and small businesses face higher costs for eco-friendly alternatives, which discourages compliance.

Tourism Pressure – Heavy seasonal demand leads to increased SUP consumption in tourist hubs like Bhimtal and Mukteshwar.

Informal Sector – Street vendors and small-scale shops often bypass regulations, making enforcement difficult.

Conclusion The available evidence suggests that while enforcement efforts in Kumaon have increased since the SUP ban (2019–2025), **compliance levels remain moderate** and vary across regions. Urban centers show more structured

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enforcement and better outcomes, while rural and semi-urban areas face challenges in consistent monitoring. Evaluating challan/penalty records, Swachh Survekshan rankings, and municipal reports provides a reliable secondary data-based method to measure the effectiveness of enforcement.

Objective 3 Discussion

To assess the shift in consumer and vendor behavior towards eco-friendly alternatives in the Kumaon region after the SUP ban, based on secondary data sources.

The ban on Single-Use Plastic (SUP) not only requires strong enforcement but also depends on the **willingness of consumers and vendors to adopt eco-friendly alternatives**. Behavior change is a gradual process, influenced by **awareness levels, affordability, availability of alternatives, and social norms** (Gupta & Sinha, 2019).

Consumer Behavior

Studies on Indian states implementing plastic bans suggest a **mixed trend in consumer adoption**. In Kumaon, secondary reports and media coverage (2022–23) highlight an **increase in the use of cloth and jute bags**, particularly in urban areas like Haldwani, Rudrapur, and Nainital. Large retail outlets and supermarkets have actively promoted paper and biodegradable carry bags, aligning with government regulations (CPCB, 2022).

However, **habitual reliance on plastics** persists among local consumers, especially in weekly markets and rural areas. Tourists also contribute significantly to SUP demand, as many prefer the convenience of plastic packaging (Negi & Dhyani, 2021). While awareness campaigns conducted under the **Swachh Bharat Mission** and by municipal bodies have improved knowledge about SUP hazards, **actual behavioral change remains partial**.

Vendor Behavior

Vendor response varies across segments:

Large Vendors/Retail Chains: More compliant, using paper bags, cardboard packaging, and charging extra for cloth bags.

Small Vendors/Street Sellers: Struggle with higher costs of eco-friendly alternatives; many discreetly continue using banned plastics.

Tourism-Based Vendors: In places like Nainital Mall Road, Bhimtal, and Almora markets, adoption of alternatives (jute/paper bags) has increased due to stricter tourist-area monitoring.

A study by Sharma & Jain (2020) found that **compliance is often price-driven**; where alternatives are subsidized or provided free, adoption is high, but where costs are borne by vendors, resistance remains.

Eco-Friendly Alternatives Adopted

Cloth and Jute Bags – Widely adopted in urban centers, often promoted by NGOs and women's self-help groups.

Paper Bags – Increasingly common but less durable in monsoon-prone hilly regions.

Biodegradable Plastic (PLA-based) – Still limited due to higher costs and lack of local supply chains.

Traditional Packaging – In rural areas, banana leaves, areca leaf plates, and old newspapers continue to be used informally.

Challenges in Shifting Behavior

Affordability: Alternatives cost 2–3 times more than plastic.

Availability: In remote Kumaon districts like Pithoragarh and Bageshwar, alternatives are not easily accessible.

Tourism Pressure: Tourists expect convenience packaging, which pushes vendors back toward SUP use.

Awareness vs. Practice: While awareness has improved, habitual convenience often overrides eco-friendly choices.

Conclusion

The SUP ban in Kumaon has **initiated a noticeable behavioral shift**, particularly in urban and tourism-centered markets where monitoring and awareness are high. Yet, **full transition to eco-friendly alternatives remains incomplete** due to economic and logistical constraints. The role of local governments, NGOs, and women's self-help groups in promoting cost-effective alternatives is critical for sustaining long-term change.

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Objective 4 Discussion

To identify the challenges and loopholes in the enforcement of the Single-Use Plastic (SUP) ban specific to the Kumaon region of Uttarakhand.

Effective environmental regulation requires not just well-written laws but functioning enforcement ecosystems: institutional capacity, supply-side alternatives, public buy-in, and coordinated governance. In Kumaon, the SUP ban has encountered a range of structural, economic, and behavioural impediments that reduce its on-ground impact. These challenges fall into six interrelated categories:

1. Institutional & Administrative Capacity

Municipalities and ULBs in many hill districts face **staffing shortages, limited technical expertise, and constrained budgets**, which undermine routine inspection and follow-up actions (Singh, 2021). Remote terrain and dispersed settlements raise operational costs for monitoring, making sustained enforcement difficult outside major towns (Rawat & Sah, 2019). Limited capacity also affects data collection quality for MSW audits, leading to weak evidence for policy adjustments.

2. Informal Markets & Vendor Resistance

A large share of retail trade in Kumaon occurs in the **informal sector** (weekly haats, street vendors, small kirana shops). These vendors often operate on thin margins and face **higher unit costs** for eco-friendly alternatives (cloth/jute/paper bags). As studies show, when alternatives are costlier or intermittently available, small vendors revert to banned SUPs despite awareness of regulations (Sharma & Jain, 2020; Dutta & Banerjee, 2021). The informality of transactions also makes detection and penalization harder.

3. Seasonal Tourism Pressure

Kumaon's tourist inflows (pilgrimage and leisure) create **sharp seasonal spikes in consumption and waste**, especially plastic packaging and disposables. Enforcement that is effective in off-season months often becomes porous during peak tourism periods, when demand-supply mismatches and the sheer volume of transient consumers reduce deterrence (Negi & Joshi, 2020). The seasonal nature of the problem also strains temporary waste management arrangements.

4. Supply-chain & Availability of Alternatives

While jute and cloth alternatives are available in urban centres, **consistent local supply chains** for affordable alternatives are weaker in remote blocks and rural markets. Biodegradable plastics or compostable packaging are also either unavailable or expensive, creating an economic disincentive for vendors and consumers (Prakash & Pathak, 2017). Without market interventions (subsidies, producer engagement, localized manufacture), bans alone cannot create alternatives at scale.

5. Regulatory Loopholes & Scope Limitations

The SUP ban's implementation occasionally suffers from **ambiguities in item definitions**, exemptions, and staggered phase-ins. Multi-layered plastics (MLPs), sachet packaging, and certain thin films often escape easy enforcement because identifying and tracing their sources is technically challenging, and their recycling/integration into value chains is limited (CPCB, 2022). Additionally, incomplete implementation of Extended Producer Responsibility (EPR) rules reduces upstream pressure on manufacturers to redesign or reduce SUPs.

6. Public Awareness, Behavioural Persistence & Incentive Gaps

Awareness campaigns have increased knowledge, yet **behavioural inertia** — convenience, low cost, and habit — persist. Research indicates that awareness without affordable, convenient alternatives and positive incentives (e.g., buy-back, discounts for reusable bags) yields only partial compliance (Peattie & Peattie, 2009; Gupta & Sinha, 2019). Furthermore, inconsistent messaging and uneven community engagement reduce social norms supporting eco-friendly choices.

Evidence & Local Illustrations

Municipal and UKPCB reports (2019–2023) document **improvements in segregation and targeted enforcement** in towns like Haldwani and Rudrapur, but also note **continued prevalence of banned items in rural market surveys** (UKPCB, 2023). Comparable case studies from Indian hill states show that short-term enforcement spikes reduce

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visible litter but long-term reductions require supply-side alignment and continuous monitoring (Sharma & Chatterjee, 2018; Singh, 2021).

Policy Implications & Mitigation Strategies

To close these loopholes and improve enforcement efficacy in Kumaon, the evidence suggests a portfolio approach:

- **Strengthen ULB capacity** — dedicated anti-plastic squads during peak seasons, digital tracking of inspections/challans, and training programs for enforcement staff (MoHUA, 2023).
- **Support local alternative production** — incentivize small jute/cloth bag enterprises and social enterprises (SHGs) through micro-credit, procurement preferences, and market linkages to reduce alternative costs (Prakash & Pathak, 2017).
- **Tourism-specific interventions** — temporary kiosks selling reusable options at entry points, mandatory "zero-plastics" guidelines for hotels/guesthouses during festivals, and tourist-facing awareness drives.
- **EPR & upstream engagement** — rigorous implementation of EPR obligations to make producers pay for collection/recycling and incentivize redesign of packaging (CPCB, 2022).
- **Behavioral nudges & incentives** — deposit-refund schemes for reusable containers, discounts for customers bringing their own bags, and visible social recognition for compliant vendors (Peattie & Peattie, 2009).
- **Data & monitoring improvements** — standardized MSW composition audits across Kumaon ULBs and public dashboards to increase transparency and accountability.

Conclusion

The SUP ban in Kumaon is a necessary policy step, but current evidence suggests that enforcement faces structural hurdles across capacity, economics, seasonality, and supply chains. Addressing these gaps requires coordinated interventions that combine regulatory rigor with market facilitation and community-level incentives. Without such complementary measures, bans risk producing short-term visible gains but fall short of sustained behavioural and environmental outcomes.

IV. FINDINGS, SUGGESTIONS, AND CONCLUSION

Findings

Decline in Single-Use Plastic (SUP) Waste : Secondary data from Swachh Bharat Mission dashboards and municipal records indicate a **gradual reduction in the proportion of single-use plastic items** (carry bags, straws, cups) in the overall municipal solid waste composition of Kumaon districts after the 2022 ban (CPCB, 2022; Singh, 2021). However, **seasonal tourist influxes** in districts like Nainital and Almora still cause temporary surges in SUP waste (Rawat & Sah, 2019).

Infrastructural and Management Gaps : Despite improvements, many municipal bodies in hilly regions continue to **struggle with waste segregation and recycling infrastructure**. Smaller districts like Champawat and Bageshwar show higher rates of **open dumping and mismanaged plastic waste** due to logistical constraints (MoEFCC, 2023).

Compliance Patterns : Enforcement records reveal that **urban centres (Haldwani, Rudrapur)** demonstrate stronger compliance with SUP bans compared to remote and rural areas. **Penalty collection and monitoring data** suggest that enforcement remains **inconsistent** across districts.

Consumer Behavioural Changes : Market reports and trade associations indicate a **visible increase in consumer adoption of alternatives** such as jute, cloth, and paper bags. Nevertheless, **affordability and accessibility issues** continue to limit widespread adoption, particularly among rural populations (Shukla & Kumar, 2020).

Suggestions

Strengthening Policy Enforcement

Establish **district-level monitoring committees** to oversee SUP ban compliance.

Introduce **digital reporting and tracking systems** for violators and waste audits.

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Enhancing Waste Management Infrastructure

Develop **small-scale recycling and plastic collection centres** in remote districts.

Ensure **special waste collection drives during peak tourism seasons** in eco-sensitive areas.

Promotion of Sustainable Alternatives

Provide **government subsidies and tax benefits** to local manufacturers of eco-friendly bags.

Empower **Self-Help Groups (SHGs) and women entrepreneurs** under NRLM and DIC schemes to produce alternatives, thereby linking waste management with livelihood creation.

Awareness and Behavioural Interventions

Conduct **awareness campaigns in schools, markets, and tourist hubs** to promote the environmental benefits of the SUP ban.

Use **mass media and digital campaigns** to influence consumer behaviour.

Integrate plastic waste management practices into **Swachh Survekshan evaluation criteria** for local bodies.

Conclusion

The study concludes that the **Single-Use Plastic Ban (2019–2025)** in the Kumaon region has shown **partial effectiveness**. While secondary data reveals a **notable decline in SUP waste generation and an increasing consumer shift towards alternatives**, challenges remain in the form of **inconsistent enforcement, inadequate infrastructure, and behavioural resistance**. Urban districts reflect better outcomes compared to remote hill regions.

To ensure long-term success, the SUP ban must be supported by **strong enforcement mechanisms, adequate waste management infrastructure, and sustained consumer awareness programs**. Moreover, by linking the ban with **local entrepreneurship and livelihood generation**, the Kumaon region can position itself as a **model eco-sensitive zone for sustainable waste management practices** in India.

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