



Transition From Free Bags to Eco-Friendly Alternatives: Economics, Greenwashing and Consumer Behavior in Veracruz, Mexico

Génesis' Yamilet Romero Durán L.A.¹, Catalino Jorge López Collado PhD², Salvador Partida Sedas PhD², Ángel Capetillo Burela M.Sc^{2*}, Iliana Santiago Hernández PhD², Rigoberto Zetina Lezama PhD³

¹ National Technological Institute of Mexico/Technological Institute of Boca del Río. Km12, Veracruz-Cordoba Highway s/n, Boca del Río, Veracruz, Mexico. CP 91810. ORCID: <https://orcid.org/0009-0003-2617-6194>

² Postgraduate College, Veracruz Campus. Address: Km. 88.5 Xalapa-Veracruz Highway, Tepetates Estate, Municipality of Manlio F. Altamirano; Veracruz, Ver. CP 91700. Mexico. ORCID: <https://orcid.org/0000-0002-7128-0439>; <https://orcid.org/0000-0003-3182-6027>. ORCID: <https://orcid.org/0000-0001-7638-132X>;

ORCID: <https://orcid.org/0000-0003-0329-9901>

³ National Institute of Forestry, Agricultural and Livestock Research (INIFAP)/Cotaxtla Experimental Field. Address: Km 34.5 Federal Highway Veracruz-Córdoba, Medellín de Bravo, Veracruz, Mexico. ORCID: <https://orcid.org/0000-0002-3469-0068>

ABSTRACT: The replacement of free plastic bags with alternatives marketed as eco-friendly has transformed the economic and environmental relationships between businesses and consumers; however, charging for bags does not necessarily imply an effective reduction in their consumption and can encourage greenwashing strategies when environmental claims lack verifiable support. The objective of this research was to analyze the economic and environmental implications of changing from free bags to paid bags with an eco-label in businesses in Veracruz–Boca del Río. A descriptive-exploratory study was conducted through direct observation in 16 businesses in the Veracruz–Boca del Río metropolitan area, Veracruz, Mexico, during January and February 2024. The type of material, price, dimensions, delivery conditions, and observed consumer behavior were recorded. The information was systematized through a qualitative-interpretive analysis. Significant differences were identified in prices and marketing methods, noting that conventional bags ranged in price from \$1.00 to \$17.50 MXN, while those labeled as eco-friendly or reusable ranged from \$3.00 to \$25.00 MXN. Replacing free bags with paid alternatives eliminated an operating cost and generated a new potential revenue stream. Furthermore, commercial practices based on environmental attributes were observed without sufficient information on reuse or environmental performance. It is concluded that the analyzed transition presents a relevant economic dimension and characteristics consistent with greenwashing; therefore, the environmental effectiveness of these policies should be evaluated using verifiable indicators of reduced consumption and increased bag reuse.

KEYWORDS: Pollution, price, reuse, merchandise, convenience stores.

INTRODUCTION

In Mexico and various countries around the world, there are commercial practices whose apparent ordinariness masks remarkably complex economic and environmental processes, such as the free distribution of plastic bags at the end of purchases. This practice, deeply ingrained in consumption habits for decades, went largely unnoticed due to its economic and environmental significance. Because it was so deeply ingrained in these habits, the plastic bag went unseen as an operating cost for businesses and as a potential source of pollution in terrestrial, coastal, and marine ecosystems, given its persistence and accumulation in different natural environments (Napper & Thompson, 2019). This problem is gaining even greater relevance due to the continued flow of significant plastic waste from land-based sources into the oceans (Jambeck). *et al.* (2015), as well as the environmental effects associated with the production, consumption, and disposal of single-use plastic products (Xanthos & Walker, 2017). In response to this problem, various countries and jurisdictions have implemented restrictions, prohibitions, or economic instruments aimed at reducing the consumption of plastic bags (Xanthos & Walker, 2017; Martinho *et al.*, 2017).

In Mexico, this trend has been accompanied by state regulatory changes aimed at restricting single-use plastics, including environmental legislation in the state of Veracruz. In this context, commercial establishments have progressively reoriented their



packaging policies, generating new methods for delivering and selling bags. The literature demonstrates that economic instruments can modify consumer behavior and reduce bag use when the additional cost constitutes a sufficiently perceptible incentive (Martinho *et al.*, 2017; Thomas *et al.*, 2019). However, replacing a conventional bag with an alternative labeled ecological, biodegradable, or reusable does not necessarily imply a lower environmental impact, as this depends on the material, production process, transportation, final disposal, and, particularly, the actual frequency of reuse (Muthu *et al.*, 2011; Gallego-Schmid *et al.*, 2019; Civancik-Uslu *et al.*, 2019).

Three responses predominate in the commercial landscape of the Veracruz–Boca del Río metropolitan area, where this research is focused: some establishments have completely eliminated the use of bags without offering any alternative; others maintain the plastic bag but charge a price for it that was previously nonexistent; and a third group has replaced the free conventional bag with bags presented as "ecological," "biodegradable," or "reusable," offered at prices higher than those of the original plastic bag. These responses reconfigure the relationship between establishment, consumer, and the environment, and demonstrate that the transition to lower-impact alternatives requires considering not only the material used, but also consumption and reuse patterns (Civancik-Uslu *et al.*, 2019; Gallego-Schmid *et al.*, 2019).

In this context, the concept of *greenwashing becomes relevant*, understood as the communication or presentation of environmental attributes that can lead consumers to perceive a higher environmental performance than is actually demonstrated (Delmas & Burbano, 2011). This problem intensifies when companies use environmental arguments without providing sufficient information to verify their benefits or compare them using objective criteria. In this regard, recent literature indicates that the lack of verifiable environmental evidence is one of the elements that makes it difficult to distinguish between genuine sustainability strategies and deceptive environmental marketing practices (Badhwar *et al.*, 2024). Therefore, the use of terms such as "ecological," "biodegradable," or "reusable" should not be considered, in itself, evidence of a lower environmental impact; its evaluation requires considering the product's entire life cycle and the actual conditions of use (Gallego-Schmid *et al.*, 2019).

The question posed by this research is seemingly simple: who truly benefits from the change? The central hypothesis argues that replacing free plastic bags with paid bags that offer eco-friendly attributes can represent an economic advantage for companies by eliminating an operating cost and generating a new revenue stream. However, this strategy can exhibit characteristics of *greenwashing* when environmental claims are not supported by verifiable metrics. This issue is also related to the so-called consumer intention-behavior gap, since environmental concern does not always translate into consistent sustainable consumption behaviors (Nguyen *et al.*, 2019). In particular, the availability of products considered environmentally preferable does not, in itself, guarantee sustainable behavior, as factors such as convenience, availability, and perceived effectiveness can influence consumer behavior (Nguyen *et al.*, 2019).

Sustainable Development Goal 12 (SDG 12) of the 2030 Agenda promotes sustainable consumption and production patterns, which has prompted companies to incorporate actions aimed at reducing waste and using alternatives to single-use plastics. Among these measures, the substitution or elimination of plastic bags is one of the most visible strategies for communicating environmental commitments. However, the adoption of business practices or attributes associated with sustainability does not, in itself, guarantee an effective reduction in environmental impacts. Badhwar *et al.* (2024) point out that environmental claims can have limitations in terms of evidence and verifiability, creating favorable conditions for *greenwashing practices*. Likewise, Romero Valenzuela and Camarena Gómez (2023) emphasize that sustainable consumption involves not only reducing the impacts associated with production, but also promoting active consumer participation during the acquisition, use, and disposal stages. In this context, it is necessary to analyze whether business strategies aimed at replacing or charging for plastic bags effectively contribute to changing consumption patterns or whether, on the contrary, they simply pass on their cost to the consumer without reducing their use.

Greenwashing refers to the communication of environmental attributes or benefits of products, services, or business practices that are ambiguous, exaggerated, or insufficiently supported by verifiable evidence. Its main mechanisms include the use of imprecise environmental labels, the exaggeration of secondary benefits, the omission of negative impacts, and the presentation of partial improvements as substantial environmental transformations (Badhwar *et al.*, 2024). In the case of shopping bags, this practice can manifest itself when products made with materials such as non-woven polypropylene, bioplastics, paper, or textile fibers are marketed as "eco-friendly" alternatives without providing sufficient information about their durability, frequency of reuse, life cycle, or disposal conditions. This lack of information limits the consumer's ability to objectively assess their environmental performance.



Similarly, Muposhi *et al.* (2022) point out that policies to reduce or prohibit bags can favor the proliferation of alternatives marketed with unverifiable environmental attributes when there are no clear certification criteria or life cycle assessments. Therefore, the replacement of conventional bags with so-called “eco-friendly” alternatives should not be evaluated solely based on the material used, but rather through verifiable indicators of reduced consumption, reuse, and environmental impact throughout their life cycle. Accordingly, the objective of this research was to analyze the economic and environmental implications of switching from free bags to paid bags with an eco-label in commercial establishments in Veracruz–Boca del Río, Mexico.

MATERIALS AND METHODS

Design and Study Area. The research was conducted using a descriptive-exploratory design, through direct and systematic observation in commercial establishments in the Veracruz–Boca del Río metropolitan area, Veracruz, Mexico. Fieldwork was carried out during January and February 2024, with the purpose of characterizing the methods of marketing and distribution of bags used by the establishments, as well as identifying elements associated with consumer behavior regarding different packaging alternatives. The study was based on a non-participant observation approach, suitable for recording commercial practices and consumer behaviors under real-world conditions. The use of direct observation allows for documenting behaviors as they occur at the point of sale, avoiding reliance solely on consumer statements. Research on policies related to plastic bags has shown that changes in purchasing conditions can modify consumer behavior, particularly in relation to the use of personal bags and the demand for bags provided by establishments (Jakovcevic *et al.*, 2014; Thomas *et al.*, 2019).

Selection of establishments and sampling. Sixteen commercial establishments and one reference residential area were intentionally selected to represent different types of businesses, sizes, and sales models existing in the study area. The sample included national chain convenience stores (OXXO); medium and large-format supermarkets (Walmart, Aurrera, Chedraui, Soriana, and La Montañesa); department stores (Liverpool and Sears); neighborhood self-service stores (Geo Villas del Puerto and Abarrotes Greis); as well as fashion, cosmetics, and jewelry stores located in shopping malls (Urban Store, Maja, Forever 21, Shasa, Sally Beauty, and Pandora). The Las Vegas residential development was used as the reference residential area.

The selection method was non-probabilistic and purposive, as the purpose was not to estimate population parameters, but rather to obtain a qualitative representation of the different commercial strategies related to the availability, price, and characteristics of the bags. Therefore, the results should be interpreted within the studied geographic and commercial context and not as generalizable estimates for the entire population of Veracruz or the state.

Variables and observation criteria. A structured observation was conducted at each establishment, and the characteristics of the bags available to consumers were recorded. The variables considered were:

1. **Bag type:** conventional plastic, non-woven polypropylene or pella, fabric, paper and bioplastic or material identified by the establishment as compostable.
2. **Delivery condition:** free, paid, free subject to purchase amount, or unavailable.
3. **Unit price:** cost expressed in Mexican pesos (MXN).
4. **Dimensions:** available measurements of each type of bag when provided or could be determined.
5. **Declared material:** material indicated by the establishment or visible on the product.
6. **Commercial name:** terms used to present the bags, particularly expressions such as “ecological”, “biodegradable”, “compostable” or “reusable”.
7. **Purchase conditions:** requirements set to obtain the bag free of charge or access certain types of packaging.
8. **Observable consumer behavior:** request for a bag, acceptance of the offered bag, purchase of paid bags, and presence or use of previously purchased bags.

The record was kept on-site, using a pre-designed structured observation sheet to standardize data collection across establishments. When permitted, the information was supplemented with photographs of products, prices, labels, and delivery conditions, which served as documentary evidence.

Data collection procedure. Visits were conducted directly at the selected establishments. At each location, the available bag options were initially identified, and their prices, materials, dimensions, and delivery conditions were subsequently recorded. Interactions



related to the delivery or acquisition of bags at the checkout areas were also observed. Consumer behavior was observed without direct intervention and without requesting personal information from shoppers. Particular attention was paid to situations in which consumers arrived with reusable bags and yet purchased or accepted a new bag provided by the establishment. This allowed for the analysis to consider the potential gap between practices declared or promoted as environmentally responsible and actual behavior at the point of purchase.

The inclusion of this dimension is relevant because studies conducted in different contexts have found that charging for bags can significantly alter purchasing behavior and the use of personal bags. In Buenos Aires, for example, the introduction of a charge was associated with an increase in consumers' use of personal bags (Jakovcevic et al., 2014). Similarly, in England, charging for plastic bags was observed to modify certain behaviors and increase consumer support for other measures aimed at reducing plastic waste (Thomas et al., 2019).

Systematization and analysis of information. The information obtained through observation sheets and photographic records was organized into a data matrix. For each establishment, records were compiled for the type of bag, material, price, dimensions, delivery conditions, and commercial name. The analysis was developed using a descriptive-comparative and qualitative-interpretive approach. In the first stage, prices and delivery conditions were systematized to identify differences between establishments and types of bags. Subsequently, comparisons were made between conventional bags and those marketed under environmental labels, considering particularly the price differences and the conditions under which they were delivered or sold. To facilitate interpretation, the establishments were grouped into three business strategies: a) charging for conventional bags; b) substituting conventional bags with an alternative marketed as ecological, reusable, or biodegradable; and c) eliminating the availability of bags at the point of sale. This classification allowed for the analysis of the differences between the strategies from economic, environmental, and behavioral perspectives.

Analysis of the environmental dimension and greenwashing. The identification of potential *greenwashing* practices was not based solely on the use of terms such as “eco-friendly” or “reusable,” but rather on the relationship between environmental claims, observable product characteristics, and the presence or absence of verifiable information on its environmental performance. Three main criteria were considered: i) the presence of environmental claims or labels; ii) the availability of verifiable information to support these claims; and iii) the existence of mechanisms that would effectively reduce consumption or promote the reuse of bags. This approach is consistent with recent literature, which indicates that *greenwashing* can occur when companies use environmental communication strategies that emphasize green attributes without providing sufficient evidence of their actual benefits or impacts (Badhwar et al., 2024).

Furthermore, the assumption that a bag labeled as “eco-friendly,” “biodegradable,” or “compostable” necessarily has a lower environmental impact was avoided. Life cycle assessment literature shows that the environmental performance of alternatives depends on the material used, the production process, final disposal, and, particularly, the number of times a reusable bag is actually used. Goodrum et al. (2024), for example, found significant differences between plastic, paper, and cotton bags and noted that non-plastic alternatives do not necessarily have lower environmental impacts across all categories. Therefore, in this research, the concept of *greenwashing* was used as an analytical category, and not as a legal assertion or a definitive determination of fraudulent conduct on the part of businesses.

Analysis of the economic dimension. The economic dimension was evaluated by comparing the prices recorded for the different categories of bags. Minimum and maximum prices were identified, as well as the differences between conventional bags and those marketed as eco-friendly or reusable. The transition from the bag as an operating cost for the establishment to the bag as a product capable of generating income was also conceptually analyzed, considering the observed payment and delivery conditions. However, because accounting information from the companies and data on the total number of bags sold were unavailable, the economic analysis was limited to comparing observed prices and interpreting marketing strategies, without estimating profits, profit margins, or total revenue.

Methodological considerations and limitations. Among the main limitations is the lack of longitudinal data that would allow for a comparison of the total number of bags distributed before and after the implementation of the commercial or environmental



policies. Furthermore, direct observation of consumer behavior allowed for the identification of visible patterns at the point of sale, but did not allow for the determination of the individual reasons behind each purchase decision.

Similarly, the sample size and purposive nature of the sample limit the possibility of generalizing the results to all commercial establishments in Veracruz–Boca del Río or to other regions of the country. Therefore, the results should be understood as an exploratory diagnosis of the bag market in the studied area, useful for identifying patterns, commercial strategies, and potential avenues for further research. Finally, because the study did not conduct its own life cycle analysis or quantify the total volume of bags sold by each establishment, the environmental conclusions are limited to the information observed in the field and the scientific literature used as a framework for interpretation. Subsequent studies could incorporate longitudinal consumption measurements, consumer surveys, sales data provided by the establishments, and life cycle analyses of the main types of bags sold in the region.

RESULTS AND DISCUSSION

Table 1 presents the consolidated data obtained through direct observation in 16 establishments in the Veracruz–Boca del Río metropolitan area during January and February 2024, considering the type of bag available, its price, and delivery conditions. The results show significant heterogeneity in both the supply and the commercial strategies associated with the use of bags for transporting goods. Generally speaking, conventional plastic bags were found with prices ranging from \$1.00 to \$17.50 MXN, while the alternatives identified as eco-friendly, reusable, or compostable had prices between \$3.00 and \$24.00 MXN. This price range represents a difference of up to 17.5 times between the minimum and maximum prices observed for conventional bags, and eight times for the eco-friendly alternatives.

The lowest-priced conventional bags (MXN \$1.00) were found at La Montañesa and Geo Villas del Puerto, while OXXO and Chedraui "Portal" charged MXN \$1.50. In contrast, Soriana Mercado had the highest price for a conventional bag, at MXN \$17.50. This shows that the price is not necessarily determined solely by the material used or the size of the bag, but also by the specific business policies of each establishment. Similarly, reusable or eco-friendly bags showed considerable variation: prices ranged from MXN \$3.00 for a white compostable bag from Chedraui to MXN \$24.00 for an eco-friendly non-woven bag sold by OXXO and a large eco-friendly bag from Walmart/Aurrera.

Another relevant aspect was the coexistence of different delivery methods within the same establishment. For example, the Chedraui shopping center is the most evident case, where conventional bags were observed at \$1.50 MXN, non-woven bags at \$13.00 MXN, and eco-friendly alternatives at \$3.00, \$10.00, and \$15.50 MXN. Furthermore, differences were detected between branches of the same chain, demonstrating that policies related to the availability, price, and replacement of bags were not entirely uniform during the observation period. In one branch, the advertised non-woven bag was not even available at the time of the visit. This situation could represent a barrier for consumers seeking to replace conventional bags with reusable alternatives, since the purchase decision depends not only on price but also on the actual availability of the product.

A contrasting strategy was identified in neighborhood self-service stores. While La Montañesa and Geo Villas del Puerto sold large, conventional bags for 1.00 MXN, Abarrotes Greis provided both small and large conventional bags free of charge. Geo Villas del Puerto also offered a large non-woven bag for 11.00 MXN. These results indicate that, particularly in smaller establishments, free distribution schemes for disposable bags still coexisted with more expensive reusable alternatives.

In department stores and establishments located in shopping malls, the free distribution of bags as part of the service associated with purchases was predominant. Liverpool offered the widest variety of options, providing a non-woven bag for MXN \$12.99, paid bags for MXN \$5.00, \$15.00, and \$25.00 depending on their size, as well as a free paper bag and a cloth alternative for MXN \$15.50. Forever 21, Shasa, Pandora, Sally, and Maja provided bags at no additional cost under certain purchase conditions. Urban Store adopted a different strategy, offering a white compostable bag for MXN \$3.00, although it could be obtained free of charge with the purchase of two or more pairs of shoes; additionally, they offered eco-friendly bags for MXN \$10.00 and \$15.00.

A particularly relevant case was that of the Las Vegas residential area, where the establishments visited did not provide bags and consumers had to bring their own packaging. Unlike establishments that replace conventional bags with a payment alternative, this practice represents a strategy of directly eliminating the distribution of bags at the point of sale. From a waste reduction perspective, this scheme can encourage the reuse of bags already available in homes; however, its effectiveness depends on consumers having

reusable alternatives and permanently adopting this practice. Overall, the results show that during the study period there was no uniform strategy to reduce or replace plastic bags in the establishments analyzed. Four main approaches were identified: i) free distribution of conventional bags or bags made of other materials; ii) sale of conventional bags; iii) sale of reusable or compostable alternatives ; and iv) elimination of bag distribution, shifting the responsibility for providing their own packaging to the consumer. Therefore, the coexistence of these modalities reflects a heterogeneous transition towards schemes with lower consumption of disposable bags.

Table 1. Prices and delivery conditions of bags by establishment, Veracruz-Boca del Río conurbation (January-February 2024)

Establishment	Sector	Bag type	Price (MXN)	Measurements / condition
OXXO	Chain convenience	conventional plastic	\$1.50	25.4 × 27.9 cm
OXXO	Chain convenience	Ecological (pelton)	\$24.00	400 × 500 mm
Walmart / Aurrera	Supermarket	Eco-friendly reusable	\$18.50	27 × 29.5 cm
Walmart / Aurrera	Supermarket	Large Ecological	\$24.00	400 × 500 mm
Chedraui "Portal"	Supermarket	conventional plastic	\$1.50	Median
Chedraui "Portal"	Supermarket	Organic pellón	\$13.00	Large (currently out of stock)
Chedraui (another branch)	Supermarket	Eco-friendly white compostable	\$3.00	—
Chedraui (another branch)	Supermarket	Ecological girl	\$10.00	10 × 28 cm wide × 26 cm h. × 18cm bellows
Chedraui (another branch)	Supermarket	Large Ecological	\$15.50	50 × 40 × 18 cm bellows
Chedraui (another branch)	Supermarket	Other bags	Free purchase	with —
Soriana Market	Supermarket	conventional plastic	\$17.50	Big
Soriana Market	Supermarket	Eco-friendly reusable	Free	Delivered with every purchase
The Mountain Woman	Supermarket	conventional plastic	\$1.00	Big
Geo Villas del Puerto	Neighborhood Self-Service	conventional plastic	\$1.00	Big
Geo Villas del Puerto	Neighborhood Self-Service	Pellon	\$11.00	Big
Greis Groceries	Neighborhood Self-Service	conventional plastic	Free	Small and large
Liverpool	Department store	Ecological (pelton)	\$12.99	45 × 40 × 10 cm
Liverpool	Department store	Small payment bag	\$5.00	—
Liverpool	Department store	Medium-sized payment bag	\$15.00	—
Liverpool	Department store	Large payment bag	\$25.00	—
Liverpool	Department store	Paper bag	Free purchase	with —
Liverpool	Department store	Ecological (fabric)	\$15.50	27 × 30 cm
Sears	Department store	Payment bag	Free purchase	with —

Urban Store	Fashion / Shopping mall	White compostable	\$3.00 (free if you buy ≥ 2 pairs of shoes)	—
Urban Store	Fashion / Shopping mall	Black Ecological	\$10.00	—
Urban Store	Fashion / Shopping mall	Ecological print	\$15.00	—
Maja	Fashion / Shopping mall	conventional plastic	Free with purchase	—
Maja	Fashion / Shopping mall	Cardboard bag	\$20.00 (discontinued)	No longer available for sale
Forever 21	Fashion / Shopping mall	Bags (2 sizes)	Free with purchase	—
Shasa	Fashion / Shopping mall	Paper bag (2 sizes)	Free with purchase	—
Pandora	Jewelry store / shopping center	Designer bag	Free with purchase	—
Sally	Cosmetics / plaza	Cardboard bag	Free with purchase	—
Sally	Cosmetics / plaza	Ecological (pelton)	\$20.00	—
Las Vegas subdivision (shops)	Residential area	No bag available	Without bag	The customer must bring their own

Note: Data obtained through direct field observation, January–February 2024, Veracruz–Boca del Río metropolitan area. The Chedraui "compostable" bag is made of corn starch; the interfacing is non-woven polypropylene. Price variations between branches of the same store were observed at Chedraui.

The results shown in the table above also suggest that price is an important factor in consumer decisions. The price difference between a conventional bag costing \$1.00–\$1.50 MXN and a reusable alternative costing \$11.00–\$24.00 MXN can represent an initial economic barrier to switching, particularly when the conventional bag remains available or is given away for free. However, the literature indicates that policies charging for bags can modify consumer behavior and encourage reuse. Specifically, Poortinga *et al.* (2013) found that introducing a charge for plastic bags can significantly increase the likelihood that consumers will use reusables bags, indicating that economic incentives can be an effective mechanism for reducing the consumption of disposable bags.

This relationship between price and behavior has also been observed in recent research. Antinyan and Corazzini (2025), through a field experiment conducted in a supermarket chain, found that both an environmental intervention and a financial incentive were able to reduce the demand for single-use plastic bags, although the financial incentive had a greater effect. The authors also observed that the use of reusable bags was not uniform among consumers and was related to the frequency of purchases, demonstrating that the existence of a reusable alternative does not, in itself, guarantee its repeated use.

Additionally, Li & Wang (2022) point out that policies aimed at reducing plastic bag consumption should consider not only material substitution but also consumer behavior and reuse frequency. In this regard, the identification of bags labeled "eco-friendly," "compostable," or "reusable" in the establishments studied does not necessarily imply an equivalent reduction in environmental impact, as their benefit depends on the material's characteristics, lifespan, reuse frequency, and final disposal. Therefore, the transition to alternatives to conventional bags should be accompanied by consumer information strategies, economic incentives, and the consistent availability of reusable options. In general, the results in Table 1 show that the transition to alternatives to conventional plastic bags in the Veracruz-Boca del Río metropolitan area was heterogeneous and heavily dependent on the type of establishment and its business policies. While some businesses continued to provide bags free of charge, others applied differentiated charges, offered reusable or compostable alternatives, and some had completely eliminated their distribution. This diversity is a relevant



element for understanding existing trade conditions and the possible barriers and opportunities to move towards consumption models with less plastic waste generation.

To this consideration must be added the behavioral dimension of reuse. Trant *et al.* (2024), analyzing the intention to use reusable bags in an emerging economy, found that this intention is related to various factors associated with attitudes, norms, and perceived behavioral control. This indicates that the physical availability of an alternative is not a sufficient condition to guarantee its effective adoption. Consequently, the results of this study must distinguish between the supply of reusable alternatives identified during fieldwork and their actual and repeated use, an aspect that was not directly quantified in this research.

Regarding greenwashing or genuine environmental responsibility, the information obtained during fieldwork revealed a widespread use of the term "*eco-friendly*" to identify bags made with different materials and characteristics, including nonwoven polypropylene, compostable materials, kraft paper, and cotton or blended textile fibers. However, none of the establishments visited provided quantitative information on the lifespan, minimum number of reuses, or final disposal conditions necessary for these alternatives to represent an environmental advantage over conventional plastic bags. This lack of information is significant because the environmental performance of an alternative bag depends not only on the material it is made of but also on its durability, frequency of reuse, production process, and final disposal (Goodrum *et al.*, 2024).

From this perspective, the results raise questions about the role of the "*eco-friendly*" label in the observed marketing strategies; specifically, whether it primarily serves as a mechanism for providing environmental information to consumers or also functions as a product differentiation and promotional tool. The analyzed establishments exhibited elements that could support the latter interpretation. For example, the non-woven fabric bag sold by OXXO for \$24.00 MXN was available at the checkout and visually associated with a more environmentally friendly alternative. Meanwhile, at Chedraui, the compostable bag was linked to a minimum purchase requirement, meaning its free distribution depended on reaching a certain spending threshold. Similarly, at Urban Store, the cost of the compostable bag was tied to the quantity of products purchased, as it could be obtained free of charge with the purchase of two or more pairs of shoes. These practices demonstrate that incorporating environmental attributes can coexist with marketing strategies aimed at encouraging higher consumption levels.

The difficulty in evaluating environmental claims becomes especially significant when consumers receive only general signals such as "eco-friendly," "green," "compostable," or "reusable," without additional information to assess their scope. Fella and Bausa (2024), through two experimental studies conducted in Germany, found that consumers may have difficulty distinguishing between environmentally friendly products and products associated with *greenwashing practices when the evaluation is based solely on purchase intention. However, the ability to identify differences between these categories increased when the possibility of greenwashing was explicitly mentioned.*

The above does not, in itself, allow us to conclude that the establishments are engaging in *greenwashing*, since establishing such a practice would require systematically evaluating the truthfulness, verifiability, and scope of the environmental claims used by each establishment. However, the absence of verifiable environmental indicators, information on product performance, and transparent criteria to support the environmental superiority of the observed alternatives is a factor that must be considered. In this regard, Badhwar *et al.* (2024) point out that ambiguous or difficult-to-verify environmental claims can lead to misleading interpretations when consumers lack sufficient information to assess the actual environmental benefit of a product.

Another relevant aspect identified in the study was the lack of mechanisms to limit the number of alternative bags a consumer can purchase. In most establishments selling reusable or compostable bags, the substitution was presented primarily as a change of material, without necessarily implying a reduction in the number of bags used. This is important because replacing a conventional bag with one labeled "*eco-friendly*" does not, in itself, guarantee a proportional decrease in environmental impact. In other words, the effectiveness of the substitution depends, among other factors, on the frequency of reuse and the bag's final disposal.

In contrast, the establishments located in the Las Vegas subdivision represented a different approach, not providing bags to consumers and requiring them to bring their own means of transporting their purchases. Although this strategy may be less convenient from the consumer's perspective, it directly restricts the use of disposable bags and shifts the responsibility for having a



reusable container onto the shopper. This type of measure is particularly relevant within a waste prevention strategy, as it addresses bag consumption and not just the material used to manufacture them.

Taken together, the results suggest that the strategies observed in the Veracruz-Boca del Río metropolitan area correspond to different levels of transition toward models that reduce bag consumption. While some establishments continue to provide bags free of charge, others promote alternatives by selling them or offering incentives based on the purchase amount, and a small group has completely eliminated their distribution. Therefore, the presence of a bag labeled “eco-friendly” should not be considered, in isolation, as evidence of genuine environmental responsibility. From a waste management perspective, it would be necessary to jointly assess the effective reduction in consumption, reuse, material composition, durability, final disposal conditions, and the transparency of information provided to the consumer.

In this regard, the results support the need to shift from strategies focused solely on material substitution to measures that prioritize preventing and reducing the consumption of single-use bags, accompanied by verifiable environmental information. The environmental responsibility of establishments should therefore be assessed not only by the availability of products commercially identified as “eco-friendly,” but also by their capacity to effectively reduce waste generation and promote more sustainable consumption and reuse patterns.

On the other hand, regarding the local culture of plastic bag consumption, direct observation at checkout points revealed a recurring pattern in consumer behavior: the purchase of a new bag during the shopping process, regardless of whether it was provided free of charge or involved an additional cost. During field visits, consumers were observed arriving at establishments with cloth or non-woven bags obtained from previous purchases; however, in some cases, these remained stored away or attached to their arm while the consumer accepted or purchased a new bag at the establishment. Although this observation was qualitative and a systematic count of consumers was not conducted, the recurrence of this behavior at different points of sale suggests that the prior availability of reusable bags does not necessarily translate into their effective use.

This behavior is relevant because it highlights a possible discrepancy between the availability of reusable alternatives and their effective use; that is, from the perspective of sustainable consumption, replacing a conventional bag with a more durable bag only represents an environmental advantage when the latter is used a sufficient number of times to offset the impacts associated with its manufacture, distribution, and final disposal; therefore, simply acquiring a bag marketed as “ecological” or “reusable” does not, in itself, guarantee a reduction in material consumption or waste generation.

The observed results are consistent with the so-called attitude *-behavior gap*, a phenomenon widely documented in sustainable consumption studies. In this regard, Chong *et al.* (2010) analyzed the effect of informational interventions related to the use of plastic bags in Mexican supermarkets and found that providing environmental information did not necessarily translate into significant changes in purchasing behavior. This background is relevant for interpreting the observations made in Veracruz-Boca del Río, as it suggests that knowledge about the environmental impacts of plastic bags may be insufficient to modify consumption practices that are ingrained in daily shopping routines.

The recurrence of this practice also calls into question the effectiveness of strategies based solely on charging for or selling reusable bags. In other words, when the price of the bag represents a small proportion of the total purchase cost, charging for it may not be a strong enough incentive to change consumer behavior. Furthermore, when the bag incorporates design elements, branding, or a perceived quality, its purchase can acquire value beyond its purely functional purpose. Therefore, in these circumstances, a measure designed to reduce the consumption of single-use bags can become a commercial opportunity to increase bag sales without necessarily decreasing the total number of bags purchased.

A hypothetical example helps to illustrate this phenomenon: if a consumer buys a reusable non-woven bag for \$18.50 MXN on each of their three monthly supermarket visits, they would have purchased 36 bags by the end of the year, with a cumulative cost of \$666 MXN. If each bag were used only once, the material change would not effectively reduce the number of bags consumed. However, if the same bag were systematically reused during several shopping trips, the number of bags required would decrease considerably. Therefore, the relevant indicator should not be solely the number of alternative bags sold, but rather the relationship between bags purchased, frequency of reuse, and the number of trips taken.



From this perspective, the findings of this research suggest that a strategy aimed at reducing the impact associated with plastic bags should consider mechanisms that promote their effective reuse, not just their replacement with alternative materials. These mechanisms could include financial incentives for bringing your own bag, discounts on subsequent purchases, return or reuse programs, campaigns specifically designed to modify behavior at the checkout, and progressive restrictions on the distribution of new bags. Consequently, the observations made in the establishments studied suggest that the main challenge for the transition to more sustainable consumption lies not necessarily in the availability of reusable bags, but in ensuring that they are effectively reused. Furthermore, the presence of multiple bags accumulated in homes can represent an apparent substitution of the material without an equivalent reduction in consumption. Therefore, commercial policies and strategies aimed at reducing waste associated with plastic bags should shift the emphasis from "buying an eco-friendly bag" to reducing the number of new bags purchased and increasing their lifespan through reuse.

Finally, as can be seen, the results allow us to identify three distinct strategies among the establishments analyzed: a) charging for conventional bags; b) substitution with alternatives marketed as environmentally friendly; and c) elimination of bag distribution. These approaches have different environmental and economic implications. The first keeps conventional bags available through a charge, thus primarily serving as a cost transfer mechanism to the consumer, without necessarily leading to a significant reduction in consumption. The second, widely observed in the establishments studied, replaces conventional bags with reusable, compostable, or other material alternatives, generally at a higher price and with added environmental benefits. This strategy can contribute to reducing the consumption of conventional plastic, although its effectiveness depends on the frequency of reuse and the actual reduction in the total number of bags purchased. The third directly eliminates bag distribution and, therefore, acts on consumption rather than simply modifying the material used.

The main difference between substitution and elimination strategies lies in their mechanism of action; that is, while the former maintains the purchase of a bag as part of the shopping experience, the latter introduces a restriction that forces the consumer to have their own means of transporting their products. Consequently, the availability of so-called "*eco-friendly*" alternatives does not, in itself, constitute evidence of a reduction in environmental impact. To determine their effectiveness, it would be necessary to know the number of bags distributed per establishment, their frequency of reuse, and the total number of bags used before and after implementing these measures. The absence of these indicators limits the possibility of determining whether the observed strategies represent an effective reduction in consumption or merely a substitution of the material.

From a business perspective, the marketing of reusable bags can combine environmental objectives with economic interests, particularly when establishments replace free bags with paid alternatives. In this context, incorporating environmental attributes can function simultaneously as a business differentiation strategy and as a cost reduction or transfer mechanism. However, the environmental effectiveness of these measures depends on whether charging for or substituting materials generates real changes in consumer behavior. Senturk and Dumludag (2021), analyzing the implementation of a charge for plastic bags in Turkey, found statistically significant changes in bag usage patterns after the measure was implemented, demonstrating that economic instruments can contribute to modifying consumption practices. Nevertheless, in the context of the establishments analyzed, the presence of payment alternatives identified as environmentally friendly does not, by itself, determine an effective reduction in the total number of bags used. Therefore, the alignment between environmental rhetoric and actual results must be evaluated using quantifiable indicators of reduced consumption, frequency of reuse, and total volume of bags distributed.

From a public policy perspective, the results suggest that measures aimed at reducing the impact of plastic bags should establish verifiable targets for consumption reduction and reuse, in addition to regulating the characteristics of the materials. Furthermore, alternatives must remain affordable to prevent the environmental transition from placing a disproportionate burden on consumers with lower incomes. In the establishments studied, bags identified as eco-friendly were priced as high as MXN \$24.00, meaning their frequent purchase can represent a considerable cost compared to lower-priced conventional alternatives. Therefore, an effective policy should combine gradual restrictions, incentives for using personal bags, and verifiable environmental information, prioritizing reduction at the source over simply substituting materials.



CONCLUSIONS

The transition to alternatives to plastic bags in Veracruz-Boca del Río was heterogeneous, with significant differences in materials, prices and delivery conditions between establishments.

The marketing of bags identified as “*ecological*” does not in itself guarantee an environmental benefit, due to the limited information on their reuse, life cycle and final disposal, as well as the persistence of practices of acquiring new bags.

To achieve an effective reduction of environmental impact, it is necessary to prioritize reducing consumption and reusing materials over simply substituting them, through commercial strategies and public policies with verifiable indicators.

REFERENCES

1. Antinyan, A., & Corazzini, L. (2025). breaking The Bag Habit: Testing interventions to reduce plastic bag demand . Ecological Economics, 228, 108454. <https://doi.org/10.1016/j.ecolecon.2024.108454>
2. Badhwar, A., Islam, S., Tan, C.S.L., & Panwar, T. (2024). Unraveling green marketing and greenwashing: A systematic review. Sustainability, 16(7), 2738. <https://doi.org/10.3390/su16072738>
3. Chong, A., Karlan, D., Shapiro, J., Savonitto, B., & Zinman, J. (2010). Information campaigns to reduce the use of plastic bags in supermarkets in Mexico. Innovations for Poverty action. <https://es.poverty-action.org/information-campaigns-reduce-plastic-bag-use-supermarkets-mexico>
4. Civancik-Uslu, D., Puig, R., Hauschild, M., & Fullana -i-Palmer, P. (2019). life cycle assessment of carrier bags and development of a littering indicator. Science of the Total Environment, 685, 794–804. <https://doi.org/10.1016/j.scitotenv.2019.05.372>
5. Delmas, M.A., & Burbano, V.C. (2011). The drivers of greenwashing. California Management Review, 54(1), 64–87. <https://doi.org/10.1525/cmr.2011.54.1.64>
6. Fella, S., & Bausa, E. (2024). Green or greenwashed? Examining consumers ' ability to identify greenwashing. Journal of Environmental Psychology, 95, 102281. <https://doi.org/10.1016/j.jenvp.2024.102281>
7. Gallego-Schmid, A., Mendoza, JMF, & Azapagic, A. (2019). Environmental impacts of takeaway food containers. Journal of Cleaner Production, 211, 417–427. <https://doi.org/10.1016/j.jclepro.2018.11.220>
8. Goodrum, R., Bartokova, B., & Roy, P. (2024). life cycle assessment of banned single-use plastic products and their alternatives. Microplastics, 3(4), 614–633. <https://doi.org/10.3390/microplastics3040038>
9. Jakovcevic, A., Steg, L., Mazzeo, N., Caballero, R., Franco, P., Putrino, N., & Favara, J. (2014). Charges for plastic bags: Motivational and behavioral effects. Journal of Environmental Psychology, 40, 372–380. <https://doi.org/10.1016/j.jenvp.2014.09.004>
10. Jambeck, JR, Geyer, R., Wilcox, C., Siegler, TR, Perryman, M., Andrady, A., Narayan, R., & Law, KL (2015). Plastic waste inputs from land into the ocean. Science, 347(6223), 768–771. <https://doi.org/10.1126/science.1260352>
11. Li, Y., & Wang, B. (2022). Environmental motivation or economic Motivation? Explaining individuals ' intention to carry reusable bags for shopping in China. Frontiers in Psychology, 13, 972748. <https://doi.org/10.3389/fpsyg.2022.972748>
12. Martinho, G., Balaia, N., & Pires, A. (2017). The Portuguese plastic Carrier bag tax: The effects on consumers ' behavior . Waste Management, 61, 3–12. <https://doi.org/10.1016/j.wasman.2017.01.023>
13. Muposhi, A., Mpinganjira, M., & Wait, M. (2022). Considerations, benefits and unintended consequences of banning plastic shopping bags for environmental sustainability: A systematic literature review. Waste Management & Research, 40(2), 248–261. <https://doi.org/10.1177/0734242X211003965>
14. Muthu, S.S., Li, Y., Hu, J.Y., & Mok, P.Y. (2011). Coal footprint of shopping (grocery) bags in China, Hong Kong and India. atmospheric Environment, 45(2), 469–475. <https://doi.org/10.1016/j.atmosenv.2010.09.054>
15. Napper, I.E., & Thompson, R.C. (2019). Environmental deterioration of biodegradable, oxo -biodegradable, compostable, and conventional plastic carrier bags in the sea, soil , and open-air over a 3-year period . Environmental Science & Technology, 53(9), 4775–4783. <https://doi.org/10.1021/acs.est.8b06984>
16. Nguyen, H.V., Nguyen, C.H., & Hoang, T.T.B. (2019). Green consumption: Closing the intention – behavior gap. Sustainable Development, 27(1), 118–129. <https://doi.org/10.1002/sd.1875>



17. Poortinga, W., Whitmarsh, L., & Suffolk, C. (2013). The introduction of a single-use carrier bag charge in Wales: Attitudes, behavior and policy effectiveness. *Environmental Science & Policy*, 27, 163–174. <https://doi.org/10.1016/j.envsci.2012.11.009>
18. Romero Valenzuela, DM, & Camarena Gómez, BO (2023). Sustainable and responsible consumption: Concepts and analysis from the perspective of consumer behavior. *Vértice Universitario*, 25(94), e75. <https://doi.org/10.36792/rvu.v25i94.75>
19. Senturk, G., & Dumludag, D. (2021). An evaluation of the effect of plastic bag fee on consumer behavior: Case of Turkey. *Waste Management*, 120, 748–754. <https://doi.org/10.1016/j.wasman.2020.10.042>
20. Thomas, G.O., Sautkina, E., Poortinga, W., Wolstenholme, E., & Whitmarsh, L. (2019). The English plastic bag charge changed behavior and increased support for other charges to reduce plastic waste. *Frontiers in Psychology*, 10, 266. <https://doi.org/10.3389/fpsyg.2019.00266>
21. Tran, TV, Le, MT, & Melad, AM (2024). Intention to use reusable shopping bags in an emerging economy: A Bayesian Mindsponge framework Analysis. *Discover Sustainability*, 5, 529. <https://doi.org/10.1007/s43621-024-00763-9>
22. Xanthos, D., & Walker, T. R. (2017). International policies to reduce plastic marine pollution from single-use plastics (plastic bags and microbeads): A review. *Marine Pollution Bulletin*, 118(1–2), 17–26. <https://doi.org/10.1016/j.marpolbul.2017.02.048>.

Cite this Article: Génesis' Yamilet Romero Durán L.A., López Collado, C.J., Sedas, S.P., Burela, Á.C., Hernández, I.S., Lezama, R.Z. (2026). Transition From Free Bags to Eco-Friendly Alternatives: Economics, Greenwashing and Consumer Behavior in Veracruz, Mexico. International Journal of Current Science Research and Review, 9(8), pp. 4783-4794. DOI: <https://doi.org/10.47191/ijcsrr/V9-i8-50>