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MARKETABILITY AND ACCEPTABILITY OF COCO BAG AS PLASTIC BAGS ALTERNATIVE

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ABSTRACT

Plastic carrier bags remain one of the most widely used and most persistent forms of single-use packaging waste, and regulation alone has had limited success where affordable, accessible alternatives are lacking. This study examined the marketability and acceptability of the "Coco Bag," a square-shaped bag with handles made entirely of glycerin-treated coconut leaves, as an alternative to plastic bags in Borongan City, Eastern Samar. A descriptive research design was used. Data were gathered through a researcher-made, five-point Likert-type questionnaire administered to 134 randomly selected respondents aged 17 to 51, and the responses were analyzed using frequency, percentage, weighted mean, and standard deviation. Respondents rated the Coco Bag as marketable in terms of price (mean = 4.04) and acceptable in terms of quality (4.08) and utility (4.08). Raw materials were rated highly acceptable (4.28), the highest-rated attribute. The overall mean of 4.12 indicates that the Coco Bag is acceptable as a plastic bag alternative. Favorable ratings (4 or 5) ranged from 74.63% for price to 82.09% for utility. The findings suggest that locally sourced, biodegradable materials, together with a reasonable price of about PHP 50.00 to PHP 100.00, are the key drivers of acceptance, while price remains the attribute that most needs careful attention. Because the study measured perceived rather than tested durability, product testing and a life-cycle assessment are recommended. The study further recommends stronger government regulation and information campaigns on single-use plastics, greater household patronage of eco-friendly products, and active participation of local businesses in providing and promoting the Coco Bag.

Keywords: *coco bag, coconut leaves, plastic bag alternative, marketability, acceptability, Borongan City*

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INTRODUCTION

Background of the Study

For more than 69 years, plastic bags have been part of everyday life. Because of their convenience, durability, and flexibility, and because they are undeniably cheap, they have become the default option for shoppers (Geyer et al., 2017; Hopewell et al., 2009). A plastic carrier bag is a type of flexible packaging made of thin plastic film that is used to contain and transport food, powders, ice, chemicals, waste, and other goods. Despite its advantages, the same durability makes it nonbiodegradable, and plastic bag litter is among the most damaging negative environmental externalities, harming animal health and the natural beauty of the environment (Madigele et al., 2017). Because of these characteristics, plastic carrier bags have been rapidly and widely adopted worldwide, resulting in an enormous volume of plastic waste. For several decades, countries and cities around the world have therefore taken action toward a common goal: reducing plastic bag consumption.

The scale of the problem is large. Geyer et al. (2017) estimated that, as of 2015, about 8,300 million tonnes of virgin plastic had been produced and about 6,300 million tonnes of plastic waste had been generated; of that waste, only about 9% had been recycled and 12% incinerated, while about 79% had accumulated in landfills or the natural environment. More recent estimates by the Organisation for Economic Co-operation and Development (OECD, 2022) place global plastics production and use at 460 million tonnes in 2019, with plastic waste reaching 353 million tonnes and only 9% of it recycled. Single-use plastics, particularly the packaging used by businesses, account for a large share of this waste (United Nations Environment Programme [UNEP], 2018). UNEP (2018) also reports that between 1 and 5 trillion plastic bags are consumed worldwide, or roughly 10 million per minute; this figure is an extrapolation of an early-2000s estimate and should be read as an order of magnitude rather than a current count.

Plastic bags produced and used as packaging by small and large businesses alike negatively affect several sectors. The first is health, since plastics contain chemicals of concern to the human body. The second is the economy: McIlgorm et al. (2009) estimated that marine debris cost the 21 economies of the Asia-Pacific Economic Cooperation (APEC) about US$1.265 billion a year in damage to fishing, shipping, and marine tourism, and an update to that study raised the estimate to US$10.8 billion a year (McIlgorm et al., 2020). In addition, the future cost of removing single-use plastics that accumulate in the environment is expected to exceed the cost of preventing littering today.

In China, the government restricted free plastic bags in 2008, promoted cloth-based alternatives, and encouraged consumers to use alternatives when purchasing. A decade later, however, a Zero Waste Alliance survey cited by Wang (2018) found that 979 of 1,101 surveyed retailers were still giving out plastic bags, illustrating how weak enforcement and the absence of convenient alternatives can undermine such policies.

In Australia, plastic checkout bags were estimated at about 6.9 billion a year in the early 2000s, or just under one bag per person per day (Australian Bureau of Statistics, 2004; Planet Ark Environmental Foundation, 2004). Over 80 million plastic bags were reported to end up as litter on beaches, in straits, and in parks. Although Australia ranks among the countries whose citizens are most aware of environmental and nature issues, it faced the same waste problems as other Western countries, since about 4 billion plastic bags were imported every year. In 2002, the federal government and the Australian Retailers Association agreed to cut plastic checkout bag usage by 25% by the end of 2004, rising to 50% a year later (Planet Ark Environmental Foundation, 2004). Australian states and major supermarkets have since moved to ban lightweight plastic bags.

Canadians throw away over 3 million tons of plastic waste every year, representing up to 8 billion dollars per year in lost value and wasted resources and energy. The Government of Canada announced additional steps to reduce plastic waste, support innovation, and promote affordable and safe alternatives, including a ban on harmful single-use plastics such as bags, straws, cutlery, and plates, and standards and targets that make companies responsible for the plastic

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waste of the products they manufacture or package. With the longest coastline and one-quarter of the world's fresh water, Canada has a unique responsibility and opportunity to lead in reducing plastic pollution.

In the Philippines, the Global Alliance for Incinerator Alternatives (GAIA, 2019) estimated that almost 48 million shopping bags are used every day, roughly 17.5 billion pieces a year, in addition to about 164 million sachets and 45.2 million "labo" (thin retail) bags daily; these are extrapolations from waste assessments and brand audits in selected cities and municipalities rather than a national census. Modeling by Meijer et al. (2021) estimated that the Philippines is the largest national contributor of riverine plastic emissions to the ocean, at about 356,000 tonnes a year or 36% of the global total, although the authors caution that these estimates carry large uncertainty. In response, the national government and local governments have enacted laws and ordinances to mitigate plastic pollution. The Ecological Solid Waste Management Act of 2000 (Republic Act No. 9003, 2001) requires segregation at source and makes local government units responsible for solid waste management, and the Extended Producer Responsibility Act of 2022 (Republic Act No. 11898, 2022) obliges large enterprises to recover or offset an increasing share of their plastic packaging footprint, from 20% by 2023 to 80% by 2028. Micro, small, and medium enterprises are not covered by these obligations.

At the local level, Quezon City implemented a Plastic Bag Reduction Ordinance in 2012 that set a two-peso fee per bag, and later replaced the fee with a ban on the distribution of plastic bags by major retailers (Braganza, 2017; Quezon City Government, 2021). Waste segregation and collection at the source were introduced in Metro Manila more than two decades ago as a means to alleviate the waste problem, but adoption has been slow, and coverage limited owing to a lack of government support. A local study in Catbalogan City, Samar, which neighbors the study area, emphasized the disadvantages of overwhelming plastic pollution. It found that the province's ordinance was not fully followed by residents and that the local government had difficulty developing management plans because of the lack of baseline information and data on the functional elements of solid waste management (Moya, 2013).

Several studies on the plastic bag problem have focused on banning, levies, reduction, recycling, and proper solid waste management. Studies on how a locally made alternative, such as one made from coconut leaves, can be received by consumers and businesses are still lacking. The Philippines has an abundant resource base for such an alternative: the Philippine Coconut Authority (n.d.), citing national statistics, reports about 3.6 million hectares planted to coconut in 68 of the country's 81 provinces, some 3.5 million coconut farmers, and about 25 million Filipinos who depend directly or indirectly on the industry. Eastern Visayas, which includes Eastern Samar, is a major coconut-producing region. Thus, the purpose of this study was to determine the marketability and acceptability of a locally made plastic bag alternative, the Coco Bag, which may contribute to mitigating plastic bag pollution in Borongan City.

Review of Related Literature

Plastic Consumption

Plastics are among the materials used in the largest quantities by modern society. Plastic was first produced in the 1950s and has had one of the most significant impacts on the planet of any material (Barnes et al., 2009). The most likely reason people prefer plastic bags is convenience in packing shopping items, which accounted for 64.8% of responses in a Zimbabwean study; plastic bags are convenient, cheap, easily accessible, and ubiquitous (Chitotombe & Gukurume, 2014). Plastic bags are also commonly offered free of charge, so consumers assume that the cost of the bag is already included in the price of their purchase. Because of this, the environmental damage of plastic bags, which is an external cost, is not internalized into their true cost (Saidan et al., 2017). In Jordan, plastic bag consumption was estimated at about 500 bags per person per year, and the authors concluded that a blanket ban may not be the best possible solution, whereas an environmental levy could reduce consumption by as much as 70% (Saidan et al., 2017). Governments and people therefore cannot ignore the negative impact of plastic bags on the environment, and policy options to solve the problem should be proposed.

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Bans, Levies, and the Need for Alternatives

Evidence from other countries suggests that bans and levies work only when alternatives are available and enforcement is sustained. In Zimbabwe, a ban on thin plastic bags was partial, was imposed with little public awareness-raising, and worked only for a short time: thin bags were smuggled in from neighboring countries and consumers returned to using them (Chitotombe & Gukurume, 2014). In Botswana, young consumers bought plastic bags frequently and were more willing to pay a levy for them than to switch to eco-friendly alternatives, and their willingness to pay fell as the price rose; the authors concluded that a levy should be accompanied by public education (Madigele et al., 2017). A follow-up study in Maun found that only 12.3% of residents who were aware of the levy said it affected their consumption (Mogomotsi et al., 2019). A systematic review by Muposhi et al. (2022) attributed the limited success of plastic bag bans to the lack of suitable alternatives, the limited capacity of the state to monitor and enforce them, and thriving black markets. Together, these studies position an affordable, locally available alternative, such as the Coco Bag, as the missing element that can make local regulation workable.

The following variables help identify whether household consumers and businesses will accept the Coco Bag as a plastic bag alternative.

Price Acceptability of Household Consumers

At the end of the product design and process development stage, there should be reasonably accurate forecasts of production and distribution costs and some indication of probable marketing costs. Consumers exposed to the same price cue receive the same objective information (e.g., $49.95); however, each individual assigns a unique meaning to the objective price while translating it into a perceived or psychological price (Jacoby & Olson, 1977; Monroe, 1973). An affordable price will generally encourage consumers to buy environmentally friendly products, and a lower price is a positive approach for a company when demand is price-responsive. When prices are at a similar level, the positive ecological properties of a product can serve as a reasonable competitive advantage. If the price of the product is higher, promotion should be done carefully, and consumers should be ready to pay a premium; in such situations, price is the main consideration (Emgin & Türk, 2004).

Coconut Leaves as Raw Materials

Song et al. (2009) argued that the use of biodegradable materials contributes to sustainability and reduces the environmental impact associated with the disposal of oil-based polymers. Coconut leaves have long been used in the Philippines in everyday life, for example, as roofing material, as wrappers and woven pouches for cooked rice and native delicacies, and for storage and cooking. The coconut palm is also one of the country's most widely distributed crops (Philippine Coconut Authority, n.d.), which means that leaves are an abundant, locally available, and low-cost by-product that can be turned into a product without competing with food production.

Fresh plant leaves dry out and become brittle. Glycerin is a humectant that can replace water in plant tissue and keep leaves soft and pliable, which is why it is used in the preservation of foliage and in the processing of leaf-based materials. In the Coco Bag, coconut leaves are submerged in a glycerin-and-water solution as an organic preservation step. Glycerin treatment therefore supports pliability and shelf life, but its effect on strength under repeated loading remains to be tested, which is why durability is treated as a limitation in this study.

Quantity of Plastic Bags Consumed in Grocery Stores

Before 2011, nearly all grocery stores in the Philippines used plastic carrier bags to contain customers' purchases without charging any fee for them. Observations of customers in retail stores in Quezon City, made during the implementation of its plastic bag ordinance, found that individuals still showed a strong tendency to acquire plastic carriers, possibly because they prefer storing grocery items in them (Braganza, 2017). Shoppers generally did not use

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or bring cloth carrier bags as much as plastic or paper bags, possibly because they found it inconvenient or inappropriate to do so. The primary replacements for plastic carrier bags appeared to be paper bags and carton boxes. A bag that is as convenient as plastic, yet reusable and biodegradable, may therefore overcome barriers that cloth bags have not.

Public Acceptance of Eco-Friendly Products

In response to the increasing demand of health- and environmentally conscious customers, business firms have turned green and implemented green marketing strategies. In a study of Indian consumers, 80% preferred eco-friendly brands because they believed these products to be less harmful to the environment (Jain & Kaur, 2004). Given the highly negative environmental effects of plastics, demand for eco-friendly products created pressure to guarantee a cleaner ecosystem. Consumers thus showed great interest in green products because their purchasing behavior was significantly influenced by environmental beliefs.

In the Philippines, Aruta (2022) found, in a sample of 245 Filipino respondents, that attitudes, perceived behavioral control, and prescriptive norms predicted the intention to reduce plastic use. Ilagan et al. (2024) likewise applied an extended theory of planned behavior to Filipino green consumers and identified the antecedents of their behavioral intention. These findings suggest that acceptance of an alternative such as the Coco Bag depends on whether it is perceived as beneficial, easy to obtain, and socially encouraged.

Biodegradable and Reusable Alternatives

Biodegradable and compostable alternatives to conventional plastics, including starch-based materials and other bio-derived polymers, have been widely reviewed (Song et al., 2009). Starch is one of the most studied and promising raw materials for the production of biodegradable plastics because it is cheap, abundant, biodegradable, and edible (Curvelo et al., 2001; Wittaya, 2012). The scientific and business communities regard starch as a good alternative for biodegradable packaging because it is a renewable resource that is widely available and can be obtained from agricultural surplus and industrial leftovers from raw material processing (García et al., 2015). Unlike these processed materials, the Coco Bag is made directly from a natural leaf and requires only simple, community-level processing.

The environmental advantage of any reusable bag, however, depends on how many times it is reused. A life-cycle assessment of grocery carrier bags for the Danish Environmental Protection Agency found, for example, that a conventional cotton bag must be reused at least 52 times to match the climate-change performance of a single-use low-density polyethylene bag, and up to 7,100 times when all environmental indicators are considered (Bisinella et al., 2018). The review did not locate a life-cycle assessment of glycerin-treated coconut-leaf bags. Because the Coco Bag is made from an agricultural by-product, it may have a lower material burden than cotton, but this is a plausible rather than a tested advantage, and the number of times a bag can be reused is therefore an important quality attribute.

Theoretical Framework

The study is anchored on three established theories that provide insight into consumer behavior and the adoption of eco-friendly products: the Theory of Planned Behavior, the Diffusion of Innovation Theory, and Sustainability Theory. Together, they serve as the foundation for examining how households evaluate coco bags in terms of price, quality, utility, and raw materials.

The Theory of Planned Behavior (Ajzen, 1991) explains that household decisions are influenced by attitudes toward a behavior, subjective norms, and perceived behavioral control. Households are likely to adopt coco bags if they have a positive perception of their benefits, feel social encouragement, and perceive the adoption process as easy and accessible. The theory has been applied to the intention to reduce plastic use among Filipinos (Aruta, 2022).

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The Diffusion of Innovation Theory (Rogers, 1962, 2003) describes the factors that drive the acceptance of new products, such as the relative advantage of coco bags over plastic, their compatibility with household needs, and their ease of use. Households' willingness to try the product and to observe its benefits influences adoption.

Sustainability Theory highlights the importance of balancing environmental, economic, and social factors (Elkington, 1997; Gibson, 2006). Coco bags contribute to environmental sustainability by reducing plastic waste and pollution. Economically, they use locally sourced raw materials that can support community industries. Socially, promoting coco bags fosters eco-conscious behavior among households.

Through these theoretical lenses, the study investigates the acceptability of coco bags and seeks to understand how price, quality, utility, and raw materials affect household decisions and promote sustainable practices in Borongan City.

Conceptual Framework

The conceptual framework outlines the relationships and variables that influence the marketability and acceptability of the Coco Bag as a plastic bag alternative in Borongan City. It follows the Input-Process-Output (IPO) model (Figure 1), which clarifies the elements involved according to the study's objectives.

Input variables. These are the factors that influence households' acceptability and businesses' marketability of coco bags:

- **Price:** affordability of coco bags compared with plastic bags, and businesses' willingness to acquire an eco-friendly alternative to plastic bags.
- **Quality:** durability (ability to carry varying loads), resistance to wear and tear, and aesthetic appeal (design and visual attractiveness).
- **Utility:** ease of use in daily activities (e.g., shopping and storing items), versatility for different purposes, and storage convenience when not in use.
- **Raw materials:** availability of coco-based materials for bag production, sustainability and environmental impact of using coconut-derived materials, and biodegradability compared with plastic.

Process. The process covers the research methods and tools used to assess marketability and acceptability:

- **Data collection:** a survey administered to households and business establishments in Borongan City to evaluate perceptions of coco bags in terms of price, quality, utility, and raw materials; the framework also contemplates interviews and focus group discussions with manufacturers and stakeholders to understand the production process and its challenges.
- **Comparative analysis:** comparison of coco bags with plastic bags and other alternatives to assess strengths, limitations, and sustainability benefits.
- **Acceptability evaluation:** use of a Likert scale to measure business establishments' level of marketability in terms of price, and households' level of acceptability in terms of quality, utility, and raw materials.

Output. The expected results are the level of marketability, the level of acceptability, and recommendations:

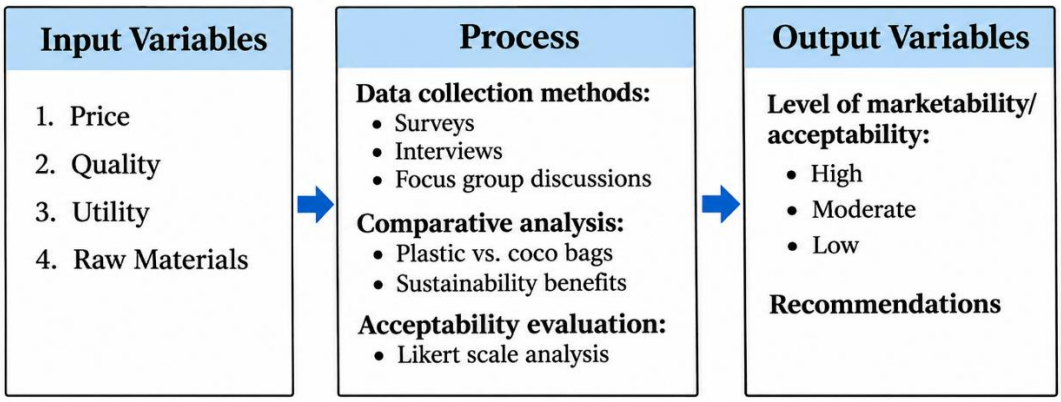
- **Level of marketability:** high (positive perceptions of price), moderate (satisfactory perceptions with minor concerns), or low (negative perceptions or unwillingness to procure coco bags).

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- **Level of acceptability:** high (positive perceptions of all four variables: price, quality, utility, and raw materials), moderate (satisfactory perceptions with minor concerns), or low (negative perceptions or unwillingness to use coco bags).
- **Recommendations:** suggestions for improving coco bag production and distribution to enhance acceptability, and policy implications for promoting sustainable alternatives in Borongan City.

Figure 1. Input-Process-Output (IPO) Framework of the Study



Statement of the Problem

This study investigated the marketability and acceptability of the Coco Bag as a plastic bag alternative. Specifically, it sought to answer the following questions:

1. What is the level of marketability of the "Coco Bag" among business establishments as a plastic bag alternative in terms of price?
2. What is the level of acceptability of the "Coco Bag" among households in Borongan City as a plastic bag alternative in terms of (a) price, (b) quality, (c) utility, and (d) raw materials?

Significance of the Study

The study is important to the following:

- **Community and households.** Improper disposal of plastic bags can clog waterways and contribute to public health hazards such as mosquito-borne diseases. The study can raise awareness among residents of Borongan City that excessive use and improper disposal of plastic bags can be hazardous to their daily lives.
- **Department of Environment and Natural Resources (DENR).** The study can help mitigate the overwhelming negative environmental effects of the heavy plastic consumption of businesses and households around Borongan City.
- **Government and local government units.** Cleaning areas affected by plastic waste is more expensive than recycling and reusing. The study can show that alternatives made from natural resources are cost-friendly and can reduce the future economic cost of acting against plastic pollution. It can also inform local ordinances that depend on the availability of acceptable alternatives to plastic bags.
- **Local coconut farmers and community enterprises.** Because the Coco Bag uses a locally abundant by-product, evidence of its marketability can support livelihood opportunities in a coconut-producing region.

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- **Future researchers.** The study can serve as a reference and information guide for future valuable and impactful research.

Scope and Delimitation

The study focused on the marketability and acceptability of using "coco bags" as an alternative to plastic bags among business establishments and households in Borongan City, Eastern Samar. It examined marketability in terms of price and acceptability in terms of quality, utility, and raw materials, in order to provide insight into whether coco bags can serve as a viable eco-friendly substitute for plastic bags for local businesses and households.

The study was limited to small retail businesses and to households that are active users of plastic bags in daily activities such as shopping and storage, in selected barangays of Borongan City. It did not include large commercial establishments, industries, or institutions, nor respondents outside Borongan City. Although other eco-friendly alternatives, such as cloth or paper bags, exist, the study focused solely on coco bags. The results are specific to Borongan City and may not apply to other regions with different socioeconomic or cultural conditions. The study measured respondents' perceptions; it did not conduct laboratory or field tests of the bag's strength, durability, or environmental performance. The research was conducted within a three-month period covering survey distribution, data collection, and analysis.

Definition of Terms

The following terms are defined as used in this study:

- **Coco Bag** – a square-shaped bag with handles made entirely of coconut leaves.
- **Glycerin** – a preservation agent mixed with water in which the coconut leaves are submerged.
- **Plastic carrier bag / plastic bag** – the conventional bag against which the coco bag is compared in terms of usage, benefits, and impact.
- **Price** – the cost of the coco bag's materials plus labor and markup.
- **Raw materials** – the materials used in the production of the coco bag.
- **Quantity** – the number of coco bags used per day by businesses and households.
- **Quality** – the durability and aesthetic value of the coco bag as an alternative to the plastic bag.
- **Utility** – the practical usefulness of the coco bag in carrying and storing items and its reusability.
- **Marketability** – the degree to which business establishments consider the coco bag worth procuring and selling at its price.
- **Acceptability** – the degree to which household consumers find the coco bag satisfactory as a substitute for the plastic bag.
- **Household consumer** – a person who patronizes the use of plastic bags.

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METHODS

Research Design

The study employed a descriptive research design to assess the marketability of coco bags among businesses and their acceptability among households in Borongan City as an alternative to plastic bags. The descriptive approach was appropriate because the study aimed to gather data describing the perceptions, preferences, and attitudes of respondents toward coco bags in terms of price, quality, utility, and raw materials, without manipulating any variable (Creswell & Creswell, 2018). A survey was used as the method of data collection.

Research Locale

The study was conducted in Borongan City, Eastern Samar. Borongan is the capital of the province and is composed of 61 barangays (Philippine Statistics Authority [PSA], 2025). It had a population of 71,961 in the 2020 Census of Population and Housing (PSA, 2021). The information was collected and analyzed by the researchers from selected household consumers and small business establishments among the city's population.

Respondents of the Study

The target population was selected to include individuals from various demographic backgrounds in order to ensure broad representation of community views on the use of coco bags as an alternative to plastic bags. The researchers gathered data from one hundred thirty-four (134) randomly selected owners of small business establishments and one hundred thirty-four (134) household consumers aged 17 to 51 in Borongan City. Of the city's 61 barangays, the 10 with the highest number of households (15,120) were identified, and the 134 household respondents were drawn from these most highly populated barangays. Respondents were grouped according to age, sex, and level of acceptance of the product attributes.

Sampling Procedure

Simple random sampling was used, a probability technique in which every member of the population has an equal chance of being selected (Taherdoost, 2016). The first step was to define the target population, consisting of residents and establishments in Borongan City who are regular consumers and users of plastic bags. They were selected because they are the most relevant group for assessing the marketability and acceptability of coco bags as an alternative.

Next, a sampling frame was developed from the list of residents registered in the local barangay records. The list was refined to ensure diverse representation of residents across barangays, age groups, and socioeconomic statuses, reflecting the general population of Borongan City.

Once the frame was finalized, a unique number was assigned to each individual on the list. Using a random number generator or a drawing method, individuals were selected at random so that every resident had an equal chance of being chosen. A total of 134 individuals were selected, which was considered a sufficient sample size for valid and reliable results. The selected individuals were contacted and invited to participate. The researchers ensured that the sample was representative by considering age, gender, and geographic location.

By using simple random sampling, the study aimed to minimize bias and provide a fair representation of the population's views, so that the findings would reflect the true opinions of Borongan City residents on this potential environmental initiative and offer useful insights for local policymakers and environmental advocates.

Research Instrument

The instrument was a researcher-made questionnaire that evaluated the marketability and acceptability of the product. It used a five-point Likert-type scale in which each response category was assigned a numerical value; the highest

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score reflected the most favorable response and the lowest score the most unfavorable (Joshi et al., 2015). The questionnaire assessed respondents' knowledge, attitudes, and willingness to adopt coco bags as an alternative to plastic bags.

Data Gathering Procedure

The researcher disseminated the survey questionnaires and oriented the respondents about the product and the instructions to follow. Respondents needed at least two minutes to finish answering the questionnaire. After a day of distribution, the researcher compiled and organized the data and then used appropriate statistical tools to facilitate computation and analysis.

Data Analysis

Descriptive statistics were used. Frequency and percentage described how respondents were distributed across the scale points of each attribute. Measures of central tendency describe the center position of a distribution through the mean, median, or mode, which indicate the most common patterns in the data. To identify the marketability of the Coco Bag among business establishments and its acceptability among households, a five-point Likert-type scale was used, and the weighted mean was computed as the sum of each scale value multiplied by its frequency, divided by the total number of respondents. The weighted mean is an average in which each observation is multiplied by its weight before summing to a single average value; its use with Likert-type items is common when the scale is treated as approximately interval (Boone & Boone, 2012). The standard deviation was computed to describe how widely responses varied around each mean, and the combined percentage of favorable responses (scale points 4 and 5) and unfavorable responses (scale points 1 and 2) was computed for each attribute.

To determine the interval length of the five-point scale, the range was computed as $5 - 1 = 4$ and divided by 5, the greatest value on the scale ($4/5 = 0.80$). This value was then successively added to 1, the lowest value on the scale, to determine the upper limit of each interval. The weighted mean was interpreted using the scale in Table 1.

Table 1. Scale for Interpreting the Weighted Mean

Range	Marketability	Acceptability
1.00 – 1.80	Highly Unmarketable (HUM)	Highly Unacceptable (HU)
1.81 – 2.60	Unmarketable (UM)	Unacceptable (U)
2.61 – 3.40	Moderately Marketable (MM)	Moderately Acceptable (MA)
3.41 – 4.20	Marketable (M)	Acceptable (A)
4.21 – 5.00	Highly Marketable (HM)	Highly Acceptable (HA)

Measurement of Variables

Responses on marketability were scored as 1 = Highly Unmarketable, 2 = Unmarketable, 3 = Moderately Marketable, 4 = Marketable, and 5 = Highly Marketable. Responses on acceptability were scored as 1 = Highly Unacceptable, 2 = Unacceptable, 3 = Moderately Acceptable, 4 = Acceptable, and 5 = Highly Acceptable. The key variables, Price, Quality, Utility, and Raw Materials, were each measured through a set of indicators and corresponding survey questions.

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Price. To measure marketability in terms of price, respondents were asked about their perceptions of the cost of coco bags compared with plastic bags, specifically whether the price was considered affordable or expensive by the business establishments selling them. The variable was measured on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Quality. The quality of coco bags as an alternative to plastic bags was measured through respondents' perceptions of durability, strength, and overall satisfaction. Respondents rated their agreement with statements on quality using a scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Utility. To evaluate utility, respondents were asked about the practical aspects of using coco bags, including how well they served their intended purpose and how suitable they were for various household tasks. They agreed or disagreed with statements rated from 1 (Strongly Disagree) to 5 (Strongly Agree).

Raw materials. Acceptability in terms of raw materials focused on respondents' awareness of and attitudes toward the environmental impact of the materials used to make coco bags, particularly coconut leaves. Respondents were asked about their knowledge of the raw materials and their views on the sustainability of using them as an alternative to plastic. The items were rated from 1 (Strongly Disagree) to 5 (Strongly Agree).

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RESULTS

This section presents the results on the marketability and acceptability of the Coco Bag as a plastic bag alternative among the 134 respondents. Of the respondents, 59.70% were female, 40.30% were male, and their ages ranged from 17 to 51. The results correspond to the different attributes of the Coco Bag.

Price

Table 2. Price of the Coco Bag

Scale	Frequency (N = 134)	Percentage (%)
1 – Highly Unmarketable	1	0.75
2 – Unmarketable	5	3.73
3 – Moderately Marketable	28	20.90
4 – Marketable	53	39.55
5 – Highly Marketable	47	35.07
Total	**134**	**100.00**

As shown in Table 2, 53 respondents (39.55%) rated the price of the Coco Bag as marketable, followed by 47 (35.07%) who rated it highly marketable and 28 (20.90%) who rated it moderately marketable. Only 1 respondent (0.75%) rated the price as highly unmarketable and 5 (3.73%) as unmarketable. Taken together, 100 respondents (74.63%) found the price marketable or highly marketable.

Quality

Table 3. Quality of the Coco Bag

Scale	Frequency (N = 134)	Percentage (%)
1 – Highly Unacceptable	0	0.00
2 – Unacceptable	6	4.48
3 – Moderately Acceptable	20	14.93
4 – Acceptable	65	48.51
5 – Highly Acceptable	43	32.09
Total	**134**	**100.00**

Table 3 shows that 65 respondents (48.51%) accepted the quality of the Coco Bag and 43 (32.09%) highly accepted it, for a combined favorable share of 80.60%. Twenty respondents (14.93%) found the quality moderately acceptable. Only 6 respondents (4.48%) rated its quality as unacceptable, and none rated it highly unacceptable.

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Utility

Table 4. Utility of the Coco Bag

Scale	Frequency (N = 134)	Percentage (%)
1 – Highly Unacceptable	0	0.00
2 – Unacceptable	10	7.46
3 – Moderately Acceptable	14	10.45
4 – Acceptable	65	48.51
5 – Highly Acceptable	45	33.58
Total	**134**	**100.00**

As shown in Table 4, 65 respondents (48.51%) rated the utility of the Coco Bag as acceptable and 45 (33.58%) as highly acceptable, a combined 82.09%, while 14 (10.45%) rated it moderately acceptable and 10 (7.46%) rated it unacceptable. No respondent rated its utility as highly unacceptable.

Raw Materials

Table 5. Raw Materials Used in the Coco Bag

Scale	Frequency (N = 134)	Percentage (%)
1 – Highly Unacceptable	0	0.00
2 – Unacceptable	7	5.22
3 – Moderately Acceptable	21	15.67
4 – Acceptable	33	24.63
5 – Highly Acceptable	73	54.48
Total	**134**	**100.00**

Table 5 illustrates that 73 respondents (54.48%) highly accepted the raw materials of the Coco Bag and 33 (24.63%) accepted them, for a combined 79.10%. Twenty-one respondents (15.67%) found them moderately acceptable, while 7 (5.22%) did not accept the raw materials used. None rated them highly unacceptable.

Overall Level of Marketability and Acceptability

Table 6. Level of Marketability and Acceptability of the Coco Bag by Product Attribute

Attribute	1	2	3	4	5	Mean	SD	Interpretation
Price	1	5	28	53	47	4.04	0.88	Marketable
Quality	0	6	20	65	43	4.08	0.80	Acceptable
Utility	0	10	14	65	45	4.08	0.86	Acceptable

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Raw materials	0	7	21	33	73	4.28	0.91	Highly Acceptable
Overall mean						**4.12**		**Acceptable**

Note. Scale: 1 = Highly Unmarketable/Unacceptable; 2 = Unmarketable/Unacceptable; 3 = Moderately Marketable/Acceptable; 4 = Marketable/Acceptable; 5 = Highly Marketable/Acceptable. Frequencies are the number of respondents (N = 134). SD = sample standard deviation.

Table 6 summarizes the responses on the marketability and acceptability of the product attributes. Raw materials obtained the highest weighted mean (4.28, Highly Acceptable), followed by quality and utility, each with a mean of 4.08 (Acceptable). Price obtained the lowest mean (4.04, Marketable). The overall mean of 4.12 is interpreted as Acceptable.

Table 7. Favorable and Unfavorable Responses by Product Attribute

Attribute	Favorable (4–5)	%	Neutral (3)	%	Unfavorable (1–2)	%
Price	100	74.63	28	20.90	6	4.48
Quality	108	80.60	20	14.93	6	4.48
Utility	110	82.09	14	10.45	10	7.46
Raw materials	106	79.10	21	15.67	7	5.22

Note. N = 134. Percentages are based on the total number of respondents.

As shown in Table 7, favorable responses outnumbered unfavorable responses for every attribute. Utility had the highest share of favorable responses (82.09%), followed by quality (80.60%), raw materials (79.10%), and price (74.63%). Unfavorable responses were uncommon, ranging from 4.48% for price and quality to 7.46% for utility. Although raw materials had the highest mean, driven by the large number of respondents (54.48%) who selected the highest rating, price had the smallest favorable share (74.63%) and the largest neutral share (20.90%), which marks it as the attribute with the most room for improvement.

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DISCUSSION

Interpretation of Findings

Raw materials emerged as the most strongly accepted attribute of the Coco Bag (mean = 4.28). Respondents highly accepted that the bag is made of middle-aged coconut leaves that are locally sourced and highly available, preserved with glycerin as an organic preservative, and less costly to produce than the plastic bag. This is consistent with the literature, which holds that biodegradable materials contribute to sustainability and reduce the environmental impact of oil-based polymers (Song et al., 2009), and that consumers are drawn to green products because of environmental beliefs (Jain & Kaur, 2004). It also reflects the resource base of the Philippine coconut industry, in which coconut covers about 3.6 million hectares and supports some 3.5 million farmers (Philippine Coconut Authority, n.d.): a raw material that is abundant, local, and low-cost is easy for consumers to accept. The result is also in line with the Sustainability Theory strand of the framework, in which locally sourced inputs support environmental, economic, and social benefits at once (Elkington, 1997; Gibson, 2006).

Price received the lowest mean (4.04) but was still rated marketable, implying that respondents accept the product provided its price ranges from PHP 50.00 to PHP 100.00 or higher but remains economical. This agrees with the literature that an affordable price encourages consumers to buy environment-friendly products, and that a higher price requires careful promotion and consumers who are ready to pay a premium (Emgin & Türk, 2004). It also matches studies in other countries in which consumers endorsed eco-friendly alternatives in principle but were price-sensitive at the point of purchase: in Botswana, willingness to pay fell as price rose and was greater for a levy than for switching to alternatives (Madigele et al., 2017). Given that plastic bags are often perceived as free (Saidan et al., 2017), the price of the Coco Bag is compared against a reference price of zero, so pricing remains the attribute that merits the closest attention. The gap between the price mean (4.04) and the raw-materials mean (4.28), and the smaller favorable share for price (74.63%), indicate that the commercial risk lies in price rather than in the product concept. Because the Extended Producer Responsibility Act does not oblige micro, small, and medium enterprises (Republic Act No. 11898, 2022), a community-made Coco Bag would not face that cost burden, but it also would not benefit from the compliance demand that the law creates for large firms; this suggests that local ordinances and procurement may be the more effective route to market.

Quality and utility were each rated acceptable (mean = 4.08). Respondents accepted the quality of the bag provided that it is available in different styles and designs, lasts up to one month with glycerin treatment, resists heat and liquids, and is more environmentally friendly. They accepted its utility as a substitute for plastic bags in Borongan City if it can carry loads of up to 15 kg depending on its size, can be stored anywhere, and is more reusable than a single-use plastic bag. These findings address a concern raised in Quezon City, where shoppers did not use cloth carriers as much as plastic or paper bags, possibly because they found them inconvenient or inappropriate (Braganza, 2017); a durable, reusable, and locally made bag may overcome this barrier. Utility had the highest favorable share (82.09%), which suggests that practical usefulness, rather than novelty, is what respondents valued most.

Overall, the mean of 4.12 indicates that the Coco Bag is acceptable as a plastic bag alternative for households in Borongan City and, on the price attribute, is marketable to business establishments, regardless of the respondents' age and sex. These results are consistent with the theoretical framework. Favorable attitudes toward an eco-friendly product are consistent with the intention to use it (Ajzen, 1991), and attitudes, perceived behavioral control, and norms have been shown to predict the intention to reduce plastic use among Filipinos (Aruta, 2022; Ilagan et al., 2024). Positive perceptions of relative advantage, compatibility, and ease of use support adoption (Rogers, 2003): the Coco Bag has a relative advantage over plastic in biodegradability and local sourcing, is compatible with the household uses that plastic bags currently serve, and is simple to use.

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The findings also bear on policy. The literature shows that bans and levies reduce plastic bag use only when suitable alternatives are available and enforcement is sustained (Chitotombe & Gukurume, 2014; Muposhi et al., 2022), and that awareness of a levy does not necessarily change behavior (Mogomotsi et al., 2019). By showing that a locally made alternative is acceptable to households and marketable to small businesses, the study suggests that the Coco Bag can serve as one of the "available alternatives" that make local ordinances in Borongan City and similar localities more workable. This is consistent with the Philippine experience, in which implementation of the Quezon City ordinance depended on retailer and consumer practices (Braganza, 2017).

Summary of Findings

1. Regardless of age and sex, the respondents generally accepted the Coco Bag (overall mean = 4.12, Acceptable).
2. The Coco Bag's price is marketable (mean = 4.04) provided that it varies only from PHP 50.00 to PHP 100.00 or higher, but remains economical and reasonable. A total of 74.63% of respondents gave favorable ratings.
3. The Coco Bag's quality is acceptable (mean = 4.08) provided that it is available in different styles and designs, can last up to one month with glycerin, is heat- and liquid-resistant, and is more environmentally friendly. A total of 80.60% of respondents gave favorable ratings.
4. The Coco Bag's utility is acceptable (mean = 4.08) as a substitute for the plastic bag in Borongan City if it can carry up to 15 kg depending on size, can be stored anywhere, and is more reusable than a single-use plastic bag. A total of 82.09% of respondents gave favorable ratings.
5. The Coco Bag's raw materials were highly acceptable (mean = 4.28) to the respondents, since they are middle-aged coconut leaves that are locally sourced and highly available, preserved with glycerin as an organic preservative, and less costly to produce than plastic bags. A total of 79.10% of respondents gave favorable ratings.

Conclusions

Based on the survey of small business establishments and households in Borongan City, the study concludes that, regardless of sex and age, respondents are willing to accept an eco-friendly product and support the Coco Bag as an alternative to traditional single-use plastic bags, which are evidently harmful to the environment. The data showed that most respondents were female and aged 17 to 21 years. These respondents are environmentally conscious and are commonly regarded as the ones driving the sustainability movement and the shift in shopping trends toward eco-friendly alternatives to single-use plastic bags. Of the four attributes, raw materials obtained the highest level of acceptability.

The Coco Bag is therefore marketable in terms of price and acceptable across its attributes. The use of locally sourced middle-aged coconut leaves, with glycerin as an organic preservative and at a lower production cost than plastic bags, matters most to households in accepting the Coco Bag. Price, while still marketable, is the attribute with the narrowest margin and should be managed carefully.

Implications

Theoretical implications. The results are consistent with the Theory of Planned Behavior, the Diffusion of Innovation Theory, and Sustainability Theory, and suggest that perceived relative advantage, favorable attitudes, and local sourcing jointly shape the acceptance of an eco-friendly bag in a Philippine setting.

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Practical implications. Producers should keep the Coco Bag within an affordable price range, offer varied styles and designs, and communicate its biodegradability, local origin, and reusability. Local businesses can use the bag as a value-adding substitute for the plastic bags they provide to customers.

Policy implications. Local government units may consider pairing ordinances on single-use plastics with the promotion or procurement of locally made alternatives, consistent with the segregation and waste-reduction mandates of the Ecological Solid Waste Management Act (Republic Act No. 9003, 2001), and with community enterprise support for coconut-producing barangays.

Recommendations

Based on the findings and conclusions, the researchers recommend that:

1. The government impose laws and regulations and provide information to the community and local businesses on how to reduce the impact of single-use plastics, including the best alternatives, where these can be sourced, and how to reuse and recycle plastic.
2. Households become more conscious of the negative effects of continued use of single-use plastics and begin to patronize products that are less harmful to the environment, going beyond merely "friendly" to "eco-caring" products such as the Coco Bag, which not only reduce harm but can also extend the life of the environment.
3. Local businesses participate by offering consumers this alternative instead of traditional single-use plastics. Because the Coco Bag is locally sourced and readily available in the area, it can lessen their costs and create a new opportunity to exercise social and environmental responsibility through a better "eco-caring" product.
4. Producers and local government units test the durability of the Coco Bag (including load capacity, resistance to heat and liquids, and the number of reuse cycles) and the effect of glycerin treatment on its shelf life, so that the quality claims made by respondents and producers are supported by measured evidence.
5. Future studies conduct a life-cycle assessment comparing the Coco Bag with plastic, paper, and cotton bags, because the environmental benefit of a reusable bag depends on the number of times it is reused (Bisinella et al., 2018).
6. Future studies include other localities and larger establishments, compare the Coco Bag with other alternatives such as cloth and paper bags, estimate willingness to pay at specific price points, and examine actual purchasing and reuse behavior.

Limitations of the Study

The findings are limited to small businesses and households in selected, highly populated barangays of Borongan City and to the four attributes studied (price, quality, utility, and raw materials). Results are based on self-reported perceptions, which may differ from actual purchasing behavior, and may not apply to other regions with differing socioeconomic or cultural conditions. The study did not test the durability, load capacity, or shelf life of the bag, so statements about these attributes reflect respondents' perceptions and the producers' specifications rather than measured performance. The study also did not include a life-cycle assessment, so claims about environmental advantage over plastic or other reusable bags remain to be verified. Finally, the interviews and focus group discussions contemplated in the conceptual framework were not part of the data reported here.

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