Journal of Contemporary Issues in Business and Government Vol. 27, No. 3, 2021
https://cibg.org.au/

P-ISSN: 2204-1990; E-ISSN: 1323-6903
DOI: 10.47750/cibg.2021.27.03.179

Environmental education and perception of the population on the excessive use of plastic bags in the city of Juliaca – Peru

QUISPE MAMANI J. C.[1]*; AGUILAR PINTO S. L.[2]; BARRA QUISPE D. E.[3]; MAMANI FLORES A.[4]; BARRA QUISPE T. L.[5]; YAPUCHURA SAICO C. R.[6]; HUILLCA MALDONADO H. R.[7]

[1,3,4,5,7] Mg. Universidad Nacional del Altiplano, Puno, Perú.
[2] Dr. Universidad Andina Néstor Cáceres Velásquez, Juliaca, Perú.
[6] Dr. Universidad Nacional del Altiplano, Puno, Perú.
*Corresponding Author
Email ID: jcquispe@unap.edu.pe, licimacoaguilar@gmail.com, davidbarraq28@gmail.com, adder_16_mf@hotmail.com, tanislauris@gmail.com, cyapuchura@unap.edu.pe, hallyrhm@gmail.com,

Abstract: The objective of this research was to establish the perception of the population about the excessive use of plastic bags in the city of Juliaca, in addition to determining the relationship between the socioeconomic level and the level of perception about the excessive use of plastic bags and determine if environmental education within the city of Juliaca will contribute to reducing the use of plastic bags. A non-experimental, quantitative methodology was applied with a multinomial Logit model, where the primary data were collected from questionnaires that were carried out on a sample of 380 consumers and were processed in the SPSS statistic. The model has shown that 67.37% of the population of Juliaca shows concern and is aware of the problem caused by the excessive use of plastic bags and 80.26% are informed about the negative effect it causes on the environment, but they have no knowledge about which one, it is the friendliest packaging. Finally, the environmental education of the residents contributes to the reduction of plastic bags, since the relationship between the reduction in the use of plastics, with the knowledge about the existence of ecological bags, reuse of plastic bags and environmental awareness is direct; while replacing plastic with another material inversely affects the low reduction in the use of plastic bags.

Keywords: Pollution, environmental education, environment and plastic bags.

INTRODUCTION

Plastic has become ubiquitous material and contributes a serious danger to the lives of living beings on earth, and demand is increasing; studies from various institutions around the world indicate that production will double over the next 20 years (Gomez, 2016). In fact, this material is one of the most used in both industry, trade and everyday consumption, this is due to resistance to deterioration, waterproofness and low cost. However, this material is not easy to recycle, being able to pollute the environment for many years (Chen et al., 2006; Franz & Freitas, 2012; Mahfuzur et al., 2017; Mamani et al., 2021).

Plastic is known to originate in 1860 because of a competition in the United States that it sought an ivory substitute to make billiard balls (González et al., 2013). From that contest to this day, the evolution of plastic has been expanded and globalized around the world, creating different classifications and thus creating polyethylene, polypropylene, polyvinyl chloride, polytetrafluoroethylene, polystyrene, expanded polystyrene and polyethylene terephthalate (PET), becoming as use in the daily life of the human being, since this material is so common and has a high demand in its use and acquisition , allowing since its invention the use in the development of daily activity, but since its excessive use has become a cause for serious environmental concern for the amounts used and for the damage to flora and fauna basically (Barrett, 2009; Murcia Florián, 2016).

The composition of plastics is the basis of chemicals and hazardous substances such as bisphenol A (BPA), phthalates, bronked flame retardants and polyfluorinated chemicals, etc., which are a serious risk factor for human health and the environment (Franz & Freitas, 2012; Murcia, 2016; Rojo & Montoto, 2017). According to Muñetón-Santa et al. (2019), PET generation is estimated at 280 million tons a year of plastic materials worldwide that are discarded, accumulating on land and oceans around the world (Rojo & Montoto, 2017). Plastic waste in the ocean mostly originates on the Earth's surface, with low recycling rates, which, according to the environmental protection agency in the United States, reach 9% (Pereira, 2019), while in Peru the 92 thousand tons of PET only 43 thousand are recovered, and the rest ends up in landfills, water mirrors or are burned emitting polluting gases (Muñetón-Santa et al., 2019; Potts Carr, 1998; Ruano & Zambrano-Monserrate, 2019).

Since the 1960s, plastic production has surpassed that of almost all other materials. Much of the plastic we produce is designed to be discarded after being used only once (Segura, 2015). As a result, plastic packaging accounts for about half of the world's plastic waste (Góngora, 2014). Most of this waste is generated in Asia, while the United States, Japan and the European Union are the world's largest per capita producers of plastic packaging (De & Debnath, 2016; Jiang et al., 2020; Omoleke, 2004; Perdomo, 2002; Ponisio et al., 2015).

Therefore, around 13 million tons of plastic are discharged into the oceans each year, including micro particulate matter entering the food chain and affecting the health of all living things on the planet (Xalapa, 2009). In addition, current projections show that plastic production will soar in the coming decades (Barrett, 2009). According to Perdomo (2002) it is expected to reach a staggering 619 million tonnes by 2030.

Pilco-flores et al. (2020) mention that it is estimated that between 500 to 700 billion plastic bags are used annually worldwide and the United Nations Environment Program estimates that for every square mile of maritime ocean it contains 46,000 floating waste, of which it is mainly plastic. In addition, it shows four global problems of how the manufacture of plastic damages health and the environment. From its creation to the present, plastic continues to exist due to its slow degradation that takes at least thousands of years to disappear, this means that even that which has not been recycled is still on the planet, and the only way to has disappeared is that it burns, but by doing this it would be damaging even more the ozone layer and poisoning people with the smoke that it generates, which is even worse (Quispe et al., 2020).

In addition, only 9% of the nine billion tons of plastic that have been produced so far in the world have been recycled (Quispe, 2019). Most end up in landfills, dumpsters or in the environment. If current consumption patterns and waste management practices continue, then by 2050 there will be approximately 12 billion tons of plastic waste in landfills and in the environment. If growth in plastics production continues at the current rate, then by this date 20% of total global oil consumption could come from the plastics industry (Beigl et al., 2008; Kapadia & Agrawal, 2019; Rose & Shea, 2007; Udomsri et al., 2010).

In this sense, in Peru, in December 2018 Law No. 30884 was enacted in our country, a law regulating single-use plastic and disposable containers or containers that aims to establish the regulatory framework on single-use plastic, other non-reusable plastics and disposable polystyrene containers or containers (Tecnopor) for food and beverages for human consumption in the national territory. Within this regulation it states that actors such as the Ministry of the Environment (MINAM), the Ministry of Education (MINEDU) and decentralized governments, must develop actions or activities of education, training and awareness-raising to generate, within all (Quispe et al., 2020); a high degree of awareness in children, adolescents and citizens in general about the adverse effects of bags on the environment, as well as the need to migrate to the use of non-polluting goods and reusable bags (Huacani & Mamani, 2017). Hence the importance of knowing the preception that the population has to initiate and strengthen environmental education actions at all levels with regard to the use of plastics in the development of daily life (Michael & Díaz, 2019).

According to Matusevich (2012), in researching consumer perception and behaviour regarding taxes placed on plastic bags in Ireland, he explains that if something is to be reduced or eliminated, an extra tax should be placed on that product, so after the government applied an extra tax on the use of plastic bags they decreased by 90% , therefore, it was a success that the government applied and the citizens accepted it quite well.

According to Zárate (2018), by analyzing the perception of the impact it would have if plastic bags are completely removed in Ripley Mall stores, it determines that, if the new policy of not delivering the product in bags is implemented, 15% will stop consuming in Ripley Mall stores, while 85% will continue to prefer the store and this has a lot to do with attitudes , habits and environmental education of consumers; therefore, when considering Muñetón-Santa et al. (2019), which studied the gaps between attitudes and habits of young consumers of beverages packaged in PET, was able to determine that people of adulthood in the city of Medellín Colombia feel a concern about the contamination generated by the consumption of packaged beverages, in addition It has been shown a probability that these people achieve recycling in this way, evidence that older people have greater environmental awareness.

On the other hand, in one of the recent publications by Muñetón-Santa et al. (2019), which seeks to empirically evaluate the perception that consumers have of PET products, showing that there is a clear concern of users and that they are informed about what happens to the environment, but they are not clear about which is the most friendly packaging for not compromising the environment and this is corroborated by Tito (2019), where he determines that the annual flow of macro plastic from the Scheldt basin to the sea affects many marine species, where these species suffer entanglements, injuries, etc. and therefore These polluting materials compromise the reproduction of these species (Pereira, 2019).

The same way Pinedo & Vargas (2015), by seeking to determine the frequency of excessive use of polyethylene bags by housewives, they were able to determine that the use of plastics by housewives is alarming, as 69% of them use between 3 to 5 plastic bags per day, and only 16% of mothers undergoing the study, make use of 2 or fewer bags of that same time span.

It is therefore important to emphasize that the process of treating plastics as part of the results of environmental education is important and such experiences already exist globally, hence Pilco-flores et al. (2020), stresses that

the collection of solid waste in environmental pollution is important and reduces major polluting waste and environmental laws could be established to reduce plastics (Abreu & Cañedo, 1998) and the respective contribution to formal environmental education, and in this way we would be committing ourselves to the irresponsible use of waste (Quispe et al., 2020).

It is necessary to understand family waste management in order to contribute to the reduction of the generation of plastic waste, and families must participate in a segregation program contribute a good practice for the conservation of the environment and at the same time contribute to the generation of economic income of people who are dedicated to recycling and experiences of this type are being implemented in the District of Paucarpata (Arequipa), where of the total waste production only 16% is recyclable material but not all of this percentage is being recycled since the minimum amount of the population is dedicated or participates in the segregation program (Flores, 2018). The opposite is currently happening in the city of Juliaca, where the excessive use of plastic bags is observed daily in the lives of the inhabitants, since they use plastic bags to move the objects they acquire and use in their daily lives (Quispe, 2020). In this sense, the problem of excessive consumption of plastic bags requires attention from various aspects, one of them being environmental education (Brown & Moore, 2001).

Therefore, one of the most important concerns today is the excessive and inappropriate use of plastics and polyethylene terephthalate, they are everyday objects that are used in homes worldwide (Franz & Freitas, 2012). So much so that in recent years there has been an increase in the debate about the environmental impact of its use; This concern has led some governments to create laws that restrict or even prohibit the use of these types of products (Tito, 2019); however, not only the Peruvian population but also worldwide have an excessive consumption of these products, this is due to the following reasons: the generalized distribution "free of charge", its practicality and easy accessibility for the consumer; This has generated, in some sectors of society, the idea that its use is associated with consumer habits, product vendors distribute it intensively and customers or housewives, for a matter of culture, receive it with liking (Muñetón-Santa et al., 2019; Segura, 2015; Zárate, 2018); this leads us to ask the following question: What is the perception of the population about the excessive use of plastic bags in the city of Juliaca, 2019? What is the relationship between the socioeconomic level and the level of perception about the use of excessive plastic bags? And will the environmental education of the population of Juliaca contribute to reducing the use of plastic bags?

The objective of this research was to establish the perception of the population about the excessive use of plastic bags in the city of Juliaca, 2019, in addition to determining the relationship between the socioeconomic level and the level of perception about the excessive use of plastic bags and determine if environmental education within the city of Juliaca will contribute to reducing the use of plastic bags.

METODOLOGY

In this research work a quantitative approach is used, since it measures the perception of excessive consumption by the inhabitants of the area. This method was chosen because it is possible to accurately measure the different factors (Cazau, 2006). In this sense, surveys were applied directly to plastic consumers in the city of Juliaca (Hernández, Fernández & Baptista, 2010).

The main step for the research was the preparation of surveys that were applied to the population in order to know their perception, the next elementary step was the analysis of the same with their respective tabulation, for which the method was used Multinomial LOGIT (Gujarati & Porter, 2010) that analyzes the behavior of the population against the excessive use of plastic balls (Mendoza, 2014).

Research design

The present research work, boasts as a type of non-experimental research design, the phenomena are observed as they occur, without intervening in their development and precisely in this article the analysis is only applied through the formulation of econometric models that by themselves will give a result without any modification (Mendoza, 2014).

Method

This article, according to epistemologists, belongs to the category of General Method, since it is used by all or almost all the sciences, such as: induction, deduction or analysis; in our case we use what concerns deduction (from the general to the particular) and the analysis (Echenique & Sedano, 2017).

Instruments

To analyze the data obtained through a survey, we used as processor programs the following: Word, Excel, SPSS and STATA, which helped us to obtain and analyze the results (Tumi & Escobar, 2018).

Data collection techniques

It is essential to determine and consider the data collection techniques and methods and the type of instrument to be performed during the investigation process. There are a wide variety of techniques or tools for the collection of information, being the most used: interview, survey, questionnaire, self-application, direct observation,

document analysis, registration, counting, among others. It must meet the conditions of reliability and validity. Therefore, in this article, we will use previous research and surveys (Solano & Álvarez, 2005).

Techniques for information processing

If the analysis is quantitative, select the appropriate statistical tests to analyze the data, depending on the hypotheses formulated and the measurement levels of the variables (Seoane & Martín, 2007).

Population

The population of interest for this study consists of the total population of men and women over the age of 18 and under 65 in the Juliaca district, which, according to the National Institute of Statistics and Informatics (2017) was 146,752.

Simple

It has been taken as a criterion, the selection as a sample for the following research to male and female individuals over the age of 18 and was obtained through the statistical formula for the finite population using a margin of error of 5% (Lacort, 2014). Calculating the sample we have:

$$n = \frac{Z^2 * P * Q * N}{(N-1) * E^2 + Z^2 * P * Q}$$

Where: n= Sample size, Z= Value of Z nominal curve (Confidence level: 95%): 1.96, P= Probability of success: 0.5, Q= Probability of failure: 0.5, N= Population, E= Sample error is 5%, Replacing in the formula:

$$n = \frac{(1.96)^2 * (0.5) * (0.5) * (146752)}{(146752-1) * (0.05)^2 + (1.96)^2 * (0.5) * (0.5)}$$

n= 383.22

Therefore, the research sample is 383 people.

Multinomial logit model

The multinomial logit model is an extension of the binary logit model, it has more than two values in the dependent variable. The probability of a certain individual and choosing the alternative j is given by (Pérez, 2005):

$$P(y_i = j) = \frac{e^{x_i \beta_j}}{1 + \sum_{j=1}^{m} e^{x_i \beta_j}}$$

j= 1, 2, …, n

Where xi is the vector of the independent variables associated with individual i and β_j is the vector of parameters associated with the j alternative (Llopis, 2002).

Methodology by objectives

Objective 1: Establish the perception of the population on the level of pollution generated by plastics in the city of Juliaca.

Table 1: Variables used to determine population perception

Variables	Indicator	Coding
Perception	People	1 = Very bad 2 = Bad 3 = Regular 4 = Good 5 = Very good
Environmental damage	Knowledge of the main environmental damage	1 = They take years to degrade 2 = They pollute the environment 3 = They plug drains 4 = Does not know the topic
Polluting sources	Pollutant sources causing environmental problems	1 = Ourselves 2 = Industries and / or factories 3 = Merchants 4 = Hospitals 5 = All
Contamination	People	1 = Yes 0 = Not

In Table 1, the explanation and quantification of dependent and independent variables, to be used in the multinomial logit model of perception of plastic pollution, can be seen.

From the explanation and categorization of the variables can be raised the following multinomial Logit model:

$$\Pr\left(Perception = Very\ bad\right) = \frac{e^{(\beta_0+\beta_1 Environmental\ damage+\beta_2 Polluting\ sources+\beta_3 Contamination)}}{1+e^{(\beta_0+\beta_1 Environmental\ damage+\beta_2 Polluting\ source+\beta_3 Contamination)}}$$

Where $\beta_0,\ \beta_1,\ \beta_2\ y\ \beta_3$, are parameters of the model. Then, a priori, the signs of the parameters are expected to be positive $\beta_0,\ \beta_1,\ \beta_2,\ \beta_3 > 0$, because each of them would have a positive effect on perception.

Objective 2: Determine the relationship between socioeconomic level and level of perception about over-consumption by plastic bags.
Below is the explanation and quantification of the variables that will help us identify a person's socioeconomic level.

Table 2: Variables used to determine the respondent's socioeconomic level

Variables	Indicator	Coding
Perception	People	1 = Very bad 2 = Bad 3 = Regular 4 = Good 5 = Very good
Sex	Gender of the population	1 = Male 0 = Female
Age	Age of women and men	1 = 18- 24 years 2 = 25 - 34 years 3 = 35 - 44 years 4 = 45 - 54 years 5 = 55 - 65 years
Income	Monthly economic income	1 = less than S / .500 2 = S / .500 - S /. 1500 3 = S / .1500 - S / .2500 4 = S /. 2500 - S /. 3500 5 = more than S /. 3500
Education level	Level of education achieved	Whole number
Inhabitants in the home	Number of people living in a household	Whole number
Environmental Knowledge	Main damage to the environment	1 = Not 0 = Yes

From Table 2, an additional model is proposed, which aims to determine the relationship between the socioeconomic level of the respondent and the perception it has about the pollution generated by excessive plastic use.
The model to be used will be a multinomial Logit model expressed below:

$$\Pr\left(Perception = Very\ bad\right) = \frac{e^{(\beta_0+\beta_1 Sex+\beta_2 Age+\beta_3 Income+\beta_4 Education\ level+\beta_5 IInhabitants\ in\ the\ home+\beta_6 Environmental\ awareness)}}{1+e^{(\beta_0+\beta_1 Sex+\beta_2 Age+\beta_3 Income+\beta_4 Education\ level+\beta_5 IInhabitants\ in\ the\ home+\beta_6 Environmental\ awareness)}}$$

Where $\beta_0,\ \beta_1,\ \beta_2,\ \beta_3,\ \beta_4, \beta_5\ and\ \beta_6$ are parameters of the model. Then, a priori, the signs of the following parameters are expected to be positive $\beta_2,\ \beta_3,\ \beta_4, > 0$, because each of them would have a positive effect on perception; on the other hand, it is also expected that the parameters $\beta_1,\ \beta_5 < 0$, since families as a whole, the more numerous they are, generate more pollution from plastic (Llopis, 2002).

Objective 3: Determine whether environmental education within the city of Juliaca will contribute to reducing the use of plastic bags.
The following model is available to determine the reduction in the use of plastic bags.

$$\Pr(reduction = *) = f\begin{pmatrix}\text{Environmental talks, Knowledge of ecological bags, Modify your lifestyle,}\\ \text{Replace plastic, Reuse plastic, Environmental awareness}\end{pmatrix}$$

The following table shows the explanation and quantification of the variables used for the multinomial logit model for reducing the use of plastic bags.

Table 3: Variables for determining environmental education

Variable	Indicator	Coding
Reduction of the use of plastic bags	Amount of garbage produced daily.	1 = 1 to 2 bags 2 = 2 to 3 bags 3 = 3 to 4 bags 4 = 4 to 5 bags 5 = 5 to more bags
Environmental talks	Talks about plastic pollution.	1 = Yes 0 = Not
Knowledge of ecological bags	Know the ecological bags	1 = Yes 0 = Not
Modify your lifestyle	You are willing to change something in your daily life in order to reduce the use of plastic bags	1 = Yes 0 = Not
Replace plastic	Is willing to replace plastic bags with another type of plastic	1 = Yes 0 = Not
Reuse plastic	Reuse the plastic you acquire	1 = Yes 0 = Not
Environmental awareness	You are willing to pay for the use of eco-friendly bags	1 = Yes 0 = Not

RESULTS

Analysis of the perception of the population about the excessive use of plastic bags in the city of Juliaca

To verify the hypothesis that the population describes environmental pollution caused by excessive use of plastic bags as very bad, the analytical methodology was used; for this purpose, information was collected by survey of 380 interviewees, and then developed a model to explain the perception of the population and its main determinants. The population's perception of excessive plastic consumption is that 57.89% of respondents have a very bad perception of excessive plastic bag consumption, followed by misperception with 32.63% (Figure 1).

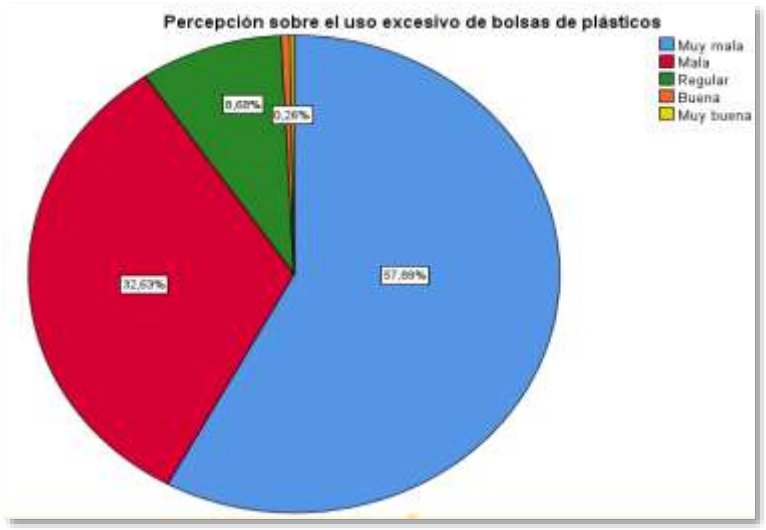

Fig.1: Perception of excessive use of plastic bags

Excessive use of plastics affects the environment, and when consulting on their perception of the main damage caused by plastic, 38.68% of respondents recognize that plastic takes years to degrade and 32.11% consider it to pollute the environment. However, 19.74% of respondents have no knowledge of the subject, which is a really worrying issue (Figure 2).

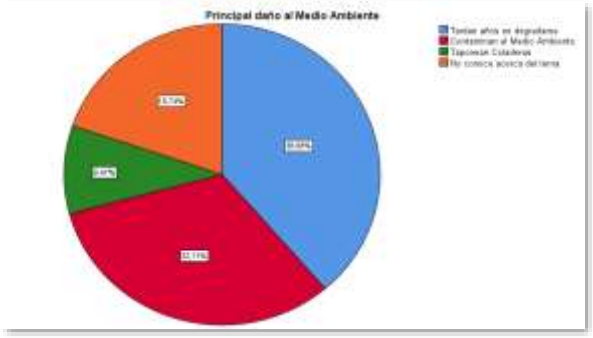

Fig.2: Main damage plastic causes to the environment

In this regard below to demonstrate the perception of excessive use of plastic bags, the Multinomial Logit Model was applied.

$$\Pr\left(Perception = Very\ bad\right) = \frac{e^{(\beta_0+\beta_1 Environmental\ damage+\beta_2 Polluting\ sources+\beta_3 Contamination)}}{1+e^{(\beta_0+\beta_1 Environmental\ damage+\beta_2 Polluting\ source+\beta_3 Contamination)}}$$

The dependent variable was considered the level of perception on excessive consumption of plastic bags, which is encoded in 5 categories (very bad, bad, regular, good and very good) according to the perception of the respondent. The signs below each variable indicate the a priori ratio you expect each variable to have on perception about excessive use of plastic bags. In this sense, the results are as follows:

Table 4: Estimate of the Logit Multinomial model (Model 1)

Perception	**Bad Perception**		**Regular perception**	
	Coefficient	**P>|Z|**	**Coefficient**	**P>|Z|**
Environmental damage	1.011606***	0.000	3.156207***	0.000
Polluting sources	.4079354***	0.000	.7494183***	0.001
Contamination	-1.712042***	0.000	-18.68291	0.973
Constante	-1.884032	0.000	-10.19305***	0.000
r2_p	.40975591			
chi2	293.69174			
p	9.902e-56			
ll	-211.52815			
N	380			
Aic	455.0563			
legend: * p<.15; ** p<.05; *** p<.01				

Table 4 shows that for the "bad perception" category, environmental damage, polluting sources and pollution variables are statistically significant at 99%. However, for the category "regular perception" only the variables environmental damage and polluting sources are significant at 99%, while the contamination variable is not statistically significant and therefore does not explain to the category "regular perception" of the dependent variable.

To determine the impact of independent variables on perception, the marginal effects of the multinomial Logit model were obtained. The following results show the marginal effects of the perception model on excessive use of plastic bags for the categories "very bad perception", "bad perception" and "regular perception" (Table 5).

Table 5: Empirical results "Marginal effects" (model 1)

Variable	**Very bad perception**		**Bad Perception**		**Regular perception**	
	dy/dx	**P>|z|**	**dy/dx**	**P>|z|**	**dy/dx**	**P>|z|**
Environmental damage	-.2497302***	0.000	.24857302***	0.000	5.04e-08	0.998
Polluting sources	-.100705***	0.000	.107305***	0.000	1.06e-08	0.998
Contamination	.4025336***	0.000	-.3811644***	0.000	-.0213692	0.143*
legend: * p<.15; ** p<.05; *** p<.01						

In this sense, Table 5 can conclude that the contamination variable statistically explains to all three categories simultaneously of the overuse perception model. For the variable environmental damage (Dambiental), for the very bad perception category, the coefficient is -24.97%, which means that the higher the perception of

environmental damage by respondents, then the probability to rate excessive plastic bag consumption as very bad decreases by 24.97%. The bad category for the variable environmental damage, this has a positive relationship with a value of 24.85, indicating that if the interviewee knows the environmental damage caused by plastic then the probability that it qualifies as bad perception by excessive use of plastic bags increases by 24.85% (Table 5). Regarding the variable sources pollutants (Fcontaminants) is significant only for the categories "very bad" and "bad". For very bad category, polluting sources have a 10.07% inverse effect on the likelihood of population perception of excessive consumption of plastic bags. For misperception, the variable (Fcontaminants) has a positive impact of 10.73% on the probability of poor perception (Table 5). For the pollution variable, for the very bad category, pollution has a positive impact of 40.25% on the probability of very bad perception. For misperception, pollution has a reverse impact of 38.11% on the likelihood of misperception. Finally, for regular perception, contamination has a negative effect of 2.13% on the likelihood that the body rated as regulating perception by excessive use of plastic bags (Table 5).

Analysis of the ratio of socioeconomic level and perception of plastic bag contamination

Analyzing the characteristics of the respondent to the population of Juliaca, 57.9% value as very bad the pollution caused by plastic bags, as they show that the population is not aware when using plastic bags, in addition to that they also state that both the regional and local government do not care about managing investment projects to decontaminate the city of Juliaca and despite successive visits by senior officials there are no indications of solution. 32.6% of the population rates plastic bag contamination as bad, followed by 8.7% of the population that qualifies as regulating contamination in the city of Juliaca (Table 6).

Table 6: Perception of excessive use of plastic bags

Description		Frequency	Percentage
Valid	Very bad	220	57,9
	Bad	124	32,6
	Regular	33	8,7
	Good	2	,5
	Very good	1	,3
	Total	380	100,0

When asking about the gender of the respondent, 55.5% of the total interviewees are men and 45.5% are women (Table 7).

Table 7: Respondent's gender

Description		Frequency	Percentage
Valid	Feminine	169	44,5
	Masculine	211	55,5
	Total	380	100,0

Regarding the age range of the interviews conducted at Juliaca, it is detailed below.

Table 8: Respondent's age range

Description		Frequency	Percentage
Valid	18-24 years old	106	27,9
	25-34 years old	147	38,7
	35-44 years old	74	19,5
	45-65 years old	53	13,9
	Total	380	100,0

On the results on the income range of the interviewees, 66.1% indicate that they belong to interviewees with incomes under S/. 1,500 followed by individuals reporting a total income between 1,500 and 2,500 soles by 10.3%. In a minimum percentage are interviewees with incomes greater than S/ 3,500 of total (Table 9).

Table 9: Respondent's income range

Description		Frequency	Percentage
Valid	Less than 1500 soles	251	66,1
	Between 2500 to 3500 soles	83	21,8
	Between 1500 to 2500 soles	39	10,3
	Greater than 3500 soles	7	1,8

	Total	380	100,0

The educational level of interviewees in the city of Juliaca is most closely in those who have secondary school studies with 38.68%, followed by those who have higher education in a total of 30.53%. Also, with primary-level studies only 8.95% (Table 10).

Table 10: Respondent's level of education

Description		Frequency	Percentage
Valid	Primary	41	10,8
	High school	156	41,1
	Technical	83	21,8
	Higher education	100	26,3
	Total	380	100,0

When analyzing the inhabitants of the house, the total number of inhabitants residing in the interviewee's home, the total number is between 1 to 11 inhabitants, where the highest percentage is 5 inhabitants per dwelling representing 22.9% of the total, followed by 4 inhabitants and 3 making a percentage of 21.8% and 15.0% respectively (Table 11).

Table 11: Number of inhabitants in the household

Description		Frequency	Percentage
Valid	1	9	2,4
	2	30	7,9
	3	57	15,0
	4	83	21,8
	5	87	22,9
	6	56	14,7
	7	22	5,8
	8	12	3,2
	9	12	3,2
	10	10	2,6
	11	2	,5
	Total	380	100,0

Therefore, the importance of knowing the descriptive statistics of the sample with the survey information carried out on the population of the 380 observations, has as a dependent variable the level of perception on the level of contamination generated by the excessive use of plastic bags (Perception), which is a categorical variable of 5 responses with a minimum value of 1 and a maximum of 5 (Table 12).

Table 12: Descriptive sample statistics (model 2)

Variable list	Obs.	Mean	Std. Dev.	Min	Max
Perception of overuse	380	1.526316	.6981635	1	5
Sex	380	0.5552632	.4975918	0	1
Age	380	2.194737	.9981374	1	4
Income	380	1.478947	.7528864	1	4
Education level	380	2.636842	.9879007	1	4
Inhabitants in the home	380	4.797368	1.973035	1	11
Environmental knowledge	380	.7052632	.4565255	0	1

The gender variable of the respondent is a dichotomical variable with a value of 0 if the interviewee is female and 1 if he is male. The age variable of the interviewee is a categorical variable since it is grouped into 4 age groups. The income level is an ordered categorical independent variable representing the respondent's monthly income, taking at least value to incomes less than 1,500 soles, followed by incomes between 1,500 and 2,500 soles, 2,500 and 3,500 soles and finally with incomes of more than 3,500 soles. The educational level variable is a categorical variable that represents the educational level of the interviewee and takes values between 1 and 4 which means whether the interviewee has primary, secondary, technical and higher education respectively. The inhabitant variable in the house is an independent numerical variable that represents the number of people living in a certain home; the sample shows that the total number of interviewees live between 1 and 11 people per dwelling (Table 12). In this sense, taking into account the variables already described, the following specification of the

multinomial Logit model is proposed to determine the relationship between the socioeconomic level and the level of perception about the excessive use of plastic bags in the city of Juliaca.

$$\Pr(Perception = *) = f(sex, Age, Income, Education\ level, Inhabitants\ in\ the\ home, Environmental\ awareness)$$

The results obtained are the following.

Table 13: Estimate of the Logit Multinomial Model (Model 2)

Variable	Bad Perception		Regular perception	
	Coefficient	P>|Z|	Coefficient	P>|Z|
Sex	2.159945***	0.000	1.783442***	0.005
Age	-.8317007***	0.000	-1.005358***	0.000
Income	.572302**	0.014	-.2257594	0.641
Education level	-.2417107*	0.123	-1.378408***	0.000
Inhabitants in the home	-.1207054*	0.074	-.1654689*	0.137
Environmental awareness	.1227021	0.710	-1.231791**	0.013
Constant	.1660346	0.842	3.869688***	0.006
r2_p	.25942302			
chi2	184.80313			
p	8.834e-27			
ll	-263.77949			
Aic	583.55898			
legend: * p<.15; ** p<.05; *** p<.01				

As shown in Table 13, the results show us that for the category misperception socioeconomic variables such as gender and age are statistically significant at 99%, while the income variable is statistically significant at 95%. Finally, variables such as educational level and environmental knowledge are statistically significant at 85%. However, the variable environmental knowledge is not significant, i.e. environmental knowledge does not explain the level of (bad) perception of the population by overuse of plastic bags.

On the other hand, for the regular category variables such as gender, age and the level of education of the population, are statistically significant at 99%, while the variable environmental knowledge is significant at 95%. Finally, the resident variable in the household is statistically significant at 85% of the confidence level. However, the income level of the population is not significant for this category of regular perception (Table 13).

The following results show the marginal effects of the model of the relationship between socioeconomic level and perception level on the relationship between socioeconomic level and level of perception on excessive use of plastic bags for the categories "very bad perception", "bad perception" and "regular perception" (Table 14).

Table 14: Empirical results "Marginal effects" (model 2)

Variable	Very bad perception		Bad Perception		Regular perception	
	dy/dx	P>|z|	dy/dx	P>|z|	dy/dx	P>|z|
Sex	-.433171***	0.000	.4037146***	0.000	.0314813**	0.086
Age	.1943954***	0.000	.03823***	0.000	-.0235323***	0.019
Income	-.112625**	0.025	.1241619**	0.011	-.0132411	0.383
Education level	.0799656**	0.021	-.0370353	0.264	-.041763***	0.001
Inhabitants in the home	.0279035*	0.058	-.0242143*	0.087	-.0040814	0.259
Environmental awareness	.015197	0.833	.0437886*	0.503	-.0542732**	0.065
Legend: * p<.15; ** p<.05; *** p<.01						

Therefore, it is determined that the variable gender and age, are the variables that statistically explain the three categories simultaneously of the perception model (Table 14). For the gender variable and the very bad perception category, the ratio is inverse, which amounts to 43.3% indicating that; when the interviewee's gender is male, the likelihood of rating contamination from excessive plastic bag use as very bad decreases by 43.3%. For the bad and regular categories of the gender variable, a direct relationship is observed, which is 40.3% and 3.14%, respectively, about the probability of perception, which shows that when a person is female, the probability of qualifying as bad or regular increases by 40.3% and 3.14% respectively.

With regard to the variable age and for the categories of perception very bad and bad the ratio is direct, which amounts to 19.4% and 3.8% respectively indicating that; when the interviewee's age is older, the likelihood of rating as very bad and bad the perception about excessive use of plastic bags will increase by 19.4% and 3.8% respectively. However, for the regular category of the age variable, it is observed that there is an inverse relationship, which is 2.35% on the probability of perception, i.e. the higher the age of the respondent, the probability of qualifying as regular decreases by 2.35%. For the income variable, this is significant only for very

bad and bad perception categories, for the first case with an inverse ratio on probability of 11.2% indicating that the higher the person's economic income, the likelihood of qualifying as very bad will decrease by 11.2%. On the other hand, for the misperception scenario for the variable income is direct, which shows that the higher the economic income that the person perceives, the probability to classify as bad the contamination caused by the excessive use of plastic bags will increase by 12.41%. With regard to the variable education, this is significant only for very bad and regular perception categories, with an effect of 7.99% and -4.17% respectively. So, in the scenario of very bad perception for the educational level variable, the relationship it presents is direct, indicating that; the higher the level of education achieved by the interviewee, the likelihood of rating excessive use of plastic bags as very bad will increase by 7.99%. However, for the regular perception category with the educational level variable there is an inverse relationship, i.e. the higher the respondent's education the likelihood of qualifying as a regular perception will decrease by 4.17% (Table 14).

On the other hand, you have the variable number of inhabitants in the respondent's home, which is only statistically significant for very bad and bad perception categories. For the very bad category, the number of inhabitants in the house has a direct relationship about the probability of very bad perception. What is the same, the higher the number of inhabitants in a home, the greater the likelihood that the respondent will consider as very bad the nation contamination caused by the excessive use of plastic graves. For misperception, the population number variable has an inverse ratio, which amounts to -2.42% on the probability of poor perception (Table 14).

Finally, the interviewee's variable environmental knowledge is only significant for categories of poor and regular perception. For misperception the variable environmental knowledge has a direct relationship with the probability of misperception with an effect of 4.37%, which means that when the interviewee has knowledge about the damage caused to the environment the excessive use of plastic bags increases the likelihood of qualifying as bad by 4.37%. However, there is an inverse relationship for regular perception category with an effect of -5.42%, which clearly shows that when the interviewee has environmental knowledge the probability of qualifying as regulating perception decreases by 5.42% (Table 14).

Analysis of environmental education determination on reducing the use of plastic bags

Analyzing the characteristics of the respondent, 35.53% value as very low the reduction in the use of plastic bags, 22.63% of the population rates as low the reduction of plastic bags, followed by 15.26% of the population that qualifies as regulating the reduction of plastic bag use in the city of Juliaca (Table 15).

Table 15: Reducing the use of plastic bags

Description		Frequency	Percentage
Valid	1-2 bags	135	35.53
	2-3 bags	86	22.63
	3-4 bags	58	15.26
	4-5 bags	52	13.68
	5 or more	49	12.89
	Total	380	100.0

On environmental education talks, 51.05% of all respondents did not receive any talk on environmental education and the other 48.95% if they received at least one talk on environmental education (Table 16).

Table 16: Talks on environmental education

Description		Frequency	Percentage
Valid	Received no talks	194	51.05
	If you received talk	186	48.95
	Total	380	100.0

With regard to the knowledge of ecological bags 48.68% do not know the ecological bags and the other 51.32% if they know the ecological bags (Table 17).

Table 17. Knowledge of the existence of green bags

Description		Frequency	Percentage
Valid	Does not know	185	48.68
	If you know	195	51.32
	Total	380	100.0

Regarding the willingness to modify some of their daily lives to reduce the use of plastic bags, 32.63% of respondents said they would not be willing to modify some of their daily lives, while the other 67.37% if they are willing to change their lifestyle in order to reduce plastic use (Table 18).

Table 18: The interviewee modifies something from his daily life to be more environmentally friendly

Description		Frequency	Percentage
Valid	Does not modify	124	32.63
	If you modify	256	67.37
	Total	380	100.0

In the case of replacing the use of plastic, 49.74% would not replace the use of plastic with eco-friendly bags or some other type of biodegradable bag, while 50.26% if they are willing to replace the common plastic with another type of bag and the way to be more environmentally friendly (Table 19).

Table 19: Replace plastic bags

Description		Frequency	Percentage
Valid	Does not replace	189	49.74
	If you replace	191	50.26
	Total	380	100.0

On the reuse of plastic bags, 48.16% of respondents say they do not reuse plastic bags, while 51.84% say that if they reuse their plastic bags (Table 20).

Table 20: Interviewee reuses plastic bags

Description		Frequency	Percentage
Valid	Do not reuse	183	48.16
	If you reuse	197	51.84
	Total	380	100.0

In addition, on the availability to be paid for biodegradable bags, 48.68% of respondents would not be willing to pay for biodegradable bags, while the other 51.32% say that if they would be willing to pay for biodegradable bags (Table 21).

Table 21: Availability to pay for biodegradable bags

Description		Frequency	Percentage
Valid	Not	185	48.68
	Yes	195	51.32
	Total	380	100.0

In this sense, applying the multinomial Logit model of determination of environmental education on the reduction of the use of plastic bags, the following specification of the multinomial Logit model is proposed to determine the relationship that exists of environmental education on the reduction of the use of plastic bags.

$$\Pr(reduction = *) = f\begin{pmatrix}\text{Environmental talks, Knowledge of ecological bags, Modify your lifestyle,}\\ \text{Replace plastic, Reuse plastic, Environmental awareness}\end{pmatrix}$$

The dependent variable is the level of reduction of plastic bags per day in a household, which is coded into 5 categories (reduction 1 to 2 bags, reduction 2 to 3 bags, reduction 3 to 4 bags, reduction from 4 to 5 bags and reduction from 5 to more bags) according to the opinion of the respondent. The results of the Logit multinomial model for determining environmental education on reducing the use of plastic bags are as follows:

The model was estimated for the respective determination of the relationship between the level of environmental education and the level of plastic bag reduction in each household using STATA version 15.1 software. The estimate is based on the category as a "reduction 1 to 2 bags" of the variable reduction of plastic bags. Table 22 shows the results for the categories of "reduction 2 to 3 bags" and "reduction 3 to 4 bags".

Table 22: Estimate of the Logit Multinomial model (Model 3)

Reduction of the use of plastic bags	Reduction from 2 to 3 bags		Reduction from 3 to 4 bags	
	Coefficient	P>|Z|	Coefficient	P>|Z|
Environmental talks	.3931223	0.257	0.4987227	0.184
Knowledge of ecological bags	1.07023***	0.003	1.060253***	0.007

Modify your lifestyle	-.0179322	0.961	1.184483**	0.011
Replace plastic	-.2118598	0.553	-.0033953	0.993
Reuse plastic	1.985951***	0.000	2.211659***	0.000
Environmental awareness	2.924921***	0.000	2.262328***	0.000
Constant	-3.807314***	0.000	-4.926058***	0.000
r2_p	.2914			
chi2	338.25			
Prob>chi2	0.0000			
ll	-411.18461			
N	380			
Legend: * p<.10; ** p<.05; *** p<.01				

As can be seen in Table 22, the results show us that for the category "reduction 2 to 3 bags" variables; respondents' environmental education, knowledge of ecological bags, whether they reuse plastic bags and the availability to pay for biodegradable bags are statistically significant at 99%, while the variables they represent that if they modify something in their daily life, the variable representing whether the individual received environmental talks and the variable indicating whether the individual would replace plastic bags are not statistically significant , that is, whether or not he replaces plastic bags or whether or not he received environmental talks, besides that whether or not he would change something in his daily life have no impact on the low reduction of plastic use that the individual may present.

On the other hand, for the category "reduction 2 to 3 bags" the variables that indicate whether the individual knows the ecological bags, reuses the plastic bags and if he would be willing to pay to use the biodegradable bags, are statistically significant to 99%, while the variable indicating whether the individual would modify some of his daily life is significant at 95%. Finally, the variable indicating whether the individual received any environmental talk is statistically significant at 81% of the confidence level. However, the variable indicating whether the individual would be willing to replace plastic bags is not significant for this category of regular reduction in plastic use (Table 22).

Below are the marginal effects of the model of the relationship between the level of environmental education and the level of reduction in the use of plastic bags on the relationship between the level of reduction in plastic bag use and the level of environmental education for the categories "reduction 1 to 2 bags", "reduction 2 to 3 bags" and "reduction 3 to 4 bags".

Table 23: Empirical results: marginal effects (Model 3)

Variable	**Reduction 1 to 2 bags**		**Reduction 2 to 3 bags**		**Reduction 3 to 4 bags**	
	dy/dx	**P>|z|**	**dy/dx**	**P>|z|**	**dy/dx**	**P>|z|**
Environmental talks	-.1307015*	0.051	.0177913	0.720	.0279812	0.490
Knowledge of ecological bags	-.2857106***	0.000	.0828288*	0.103	.0551636	0.180
Modify your lifestyle	-.0967108	0.180	-.0544663	0.341	.12261***	0.002
Replace plastic	-.104391*	0.126	-.1000473**	0.049	-.0376124	0.357
Reuse plastic	-.2873326***	0.000	.2524849***	0.000	.2081348***	0.000
Environmental awareness	-.4766901***	0.000	.3291594***	0.000	.1271155***	0.001
legend: * p<.15; ** p<.05; *** p<.01						

Of which, the variables that indicate whether the individual reuses plastic balls and whether he would be willing to pay for ecological bags, are the variables that statistically explain the three categories simultaneously of the reduction model (Table 23). For the variable "reuses the plastic bag" and the category "reduction 1 to 2 bags", the ratio is inverse, which amounts to 28.73% indicating that; when the individual reuses the plastic bag, the likelihood that the individual will reduce the use of plastic bags from 1 to 2 bags decreases by 28.73%. For the categories "reduction 2 to 3" and "reduction 3 to 4 bags" and the variable "reuse the plastic bag", a direct relationship is observed and is 25.25% and 20.81%, respectively, about the probability of reducing the use of plastic bags, which shows that when a person reuses plastic bags, the likelihood that the individual will further reduce the use of plastic bags between 1 to 2 bags and 2 to 3 bags , the reduction increases by 25.25% and 20.81% respectively (Table 23).

With regard to the variable "environmental awareness" and for the categories of "reduction 2 to 3 bags" and "reduction 3 to 4 bags" the ratio is direct, which amounts to 32.9% and 12.7% respectively indicating that; if the individual is willing to pay for green bags, the likelihood of increasing the reduction in plastic bag use from 2 to 3 balls and 3 to 4 bags will increase by 32.9% and 12.7% respectively. However, for the category of "reduction 1 to 2 bags", the variable environmental awareness, it is observed that there is an inverse ratio, which is 47.7% on the probability of reduction, that is, if the individual is willing to pay for ecological bags, the probability that reducing 1 to 2 balls decreases by 47.7% (Table 23).

For the variable "knowledge of the existence of ecological bags", this is significant only for the categories of "reduction 1 to 2 bags" and "reduction 2 to 3 balls", for the first case with an inverse ratio on the probability of 28.57% indicating that, if the individual knows the ecological bags, the probability of reducing 1 to 2 plastic bags is 28.57%. On the other hand, for the scenario of reduction 2 to 3 bags the variable knowledge about ecological bags has a direct relationship, which shows that when the individual knows the ecological bags, the probability of increasing the reduction from 2 to 3 bags is 28.57% (Table 23). With regard to the variable "replace plastic with other material", this is significant only for the categories of "reduction 1 to 2 bags" and "reduction 2 to 3 bags" of plastic, with an effect of -10.4% and -10% respectively. Therefore, the relationship it presents is inverse, indicating that; when the individual replaces plastic bags, the probability of reducing from 1 to 2 bags and from 2 to 3 plastic bags decreases by 10.4% and 10% respectively (Table 23).

On the other hand, you have the variable "modify some of everyday life", which is only statistically significant for the category of "reduction 3 to 4 bags"; the relationship between this variable and the "reduction 3 to 4 bags" of plastic bags is direct and very significant, which means that if the individual modifies some of his daily life with the aim of reducing the use of plastic bags, this will cause the probability of reducing 3 to 4 plastic bags to increase by 12.26% (Table 23). The variable "educational talks", is only significant for the category of "reduction 1 to 2 bags", where it has an inverse relationship with the probability of reduction 1 to 2 plastic balls with an effect of 13%, of which, if the individual received any talk on environmental education, the probability of reducing 1 to 2 plastic bags decreases by 13% (Table 23).

DISCUSSIONS

The results show that 57.89% of respondents have a very bad perception about excessive consumption of plastic bags, followed by poor perception with 32.63%. The category of perception very poorly the relationship between age variables, the level of education and the number of inhabitants in the household with perception is direct; while between the variable gender and income with perception is inverse (Tito, 2019).

according to Zárate (Zárate, 2018), of all the variables that were taken into account for the research work, only two of them were significant, on another occasion different variables could be taken such as the degree of education of the person, and also gender (García & Rendón, 2018), where to determine if these could also be significant in the research work.

This work did not take into account the variable degree of education, since in our country and specifically in this sample, those who were Ripley consumers of the Southern Mall (Zárate Gómez, 2018), they have a low degree of education. For this reason, do not take this variable, which in other international authors did (Matusevich, 2012).

CONCLUSIONS

From the results obtained from the survey carried out in this work, it was obtained that the Juliaqueña population is not satisfied with the current situation of the city this because of the high degrees of pollution.

The relationship between the socioeconomic level and the level of perception of environmental pollution caused by the excessive use of plastic bags in the city of Juliaca 2019, for each category of the perception model we have:

- ✓ For the category of very bad perception, the relationship between the variables of age, the level of education and the number of inhabitants in the home with the perception is direct; while between the variable gender and income with the perception is inverse.
- ✓ For the category of bad perception, the relationship between the variables gender, age, income level and environmental knowledge with perception is direct; while between the variable inhabitant in the home with perception is inverse.
- ✓ For the regular perception category, the relationship that exists between the gender variable is direct; while between the variables age, level of education and environmental knowledge, perception is inverse.

The environmental education of the inhabitants of the city of Juliaca contributes to the reduction of plastic bags in the city of Juliaca, for each category we have:

- ✓ For the category “reduction 1 to 2 plastic bags”, the relationship that exists between the reduction variable and the variables; talks on environmental education, knowledge about the existence of ecological bags, replacing the plastic with another material, reusing plastic bags and environmental awareness is inverse; that is, these variables inversely affect the reduction 1 to 2 plastic bags.
- ✓ For the category “reduction 2 to 3 plastic bags”, the relationship that exists between the reduction variable and the variables; knowledge about the existence of ecological bags, reuse of plastic bags and environmental awareness is direct, that is, these variables positively affect the reduction of the use of plastic bags; while the variable replacing plastic with another material has an inverse effect on the low reduction in the use of plastic bags.
- ✓ For the regular category “reduction from 3 to 4 plastic bags”, the relationship that exists between the reduction variable and the variables; modifying daily life, reusing plastic bags and environmental awareness have a direct relationship.

It should be noted that the variable modify daily life is not significant in the categories of "reduction 1 to 2 bags" and in the category of "reduction 2 to 3 bags" of plastic, but is very significant in the category of "reduction 3 to 4 bags".

REFERENCES

1. Abreu, M. D. L. C., & Cañedo Andalia, R. (1998). Gerencia total de la calidad en las organizaciones. *Scielo.Sld.Cu*. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=s1024-94351998000200002
2. Barrett, J. R. (2009). *¿Estrógenos en una botella?*. *51*(5), 443–444.
3. Beigl, P., Lebersorger, S., & Salhofer, S. (2008). Modelling municipal solid waste generation: A review. *Waste Management*, *28*(1), 200–214. https://doi.org/10.1016/j.wasman.2006.12.011
4. Brown, L. D., & Moore, M. H. (2001). Accountability, strategy, and international nongovernmental organizations. *Nonprofit and Voluntary Sector Quarterly*, *30*(3), 569–587. https://doi.org/10.1177/0899764001303012
5. Cazau, P. (2006). *Introducción a la investigación en ciencias sociales*. http://www.academia.edu/download/37844523/cazau_-_metodologia.pdf
6. Chen, B., Bao, Z., & Zhu, Z. (2006). Assessing the willingness of the public to pay to conserve urban green space: the Hangzhou City, China, case. *Journal of Environmental Health*, *69*(5), 26–30. http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&DbFrom=pubmed&Cmd=Link&LinkName=pubmed_pubmed&LinkReadableName=Related Articles&IdsFromResult=17190339&ordinalpos=3&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum
7. De, S., & Debnath, B. (2016). Prevalence of health hazards associated with solid waste disposal-A case study of kolkata, India. *Procedia Environmental Sciences*, *35*, 201–208. https://www.sciencedirect.com/science/article/pii/S1878029616301700
8. Echenique, E. G., & Sedano, C. C. (2017). *Metodología de Investigación: manuales autoformativos interactivo*. https://34.199.100.111/handle/20.500.12394/4278
9. Flores Vizarreta, C. (2018). GESTIÓN FAMILIAR DE RESIDUOS SOLIDOS Y SU IMPLICANCIA EN LA GENERACION DE INGRESOS ECONÓMICOS DE RECICLADORES DEL DISTRITO DE PAUCARPATA, 2018. *UNSA Investiga REPOSITORIO INSTITUCIONAL*, *2018*(Ley 29497), 1–194. http://repositorio.unsa.edu.pe/bitstream/handle/UNSA/7386/DEDpalola.pdf?sequence=1&isAllowed=y
10. Franz, B., & Freitas, M. A. V. (2012). Generation and impacts of floating litter on urban canals and rivers: Rio de Janeiro megacity case study. *WIT Transactions on Ecology and the Environment*, *167*, 321–332. https://doi.org/10.2495/ST110291
11. García Guerrero, J., & Rendón Arteaga, C. M. G. G. (2018). Percepciones y acciones de las y los estudiantes de la Universidad Autónoma del Estado de México respecto a la educación en el desarrollo sostenible / Perceptions and actions of Autonomous University of the State of Mexico students in regard to a sustaina. In *RIDE Revista Iberoamericana para la Investigación y el Desarrollo Educativo* (Vol. 9, Issue 17). https://doi.org/10.23913/ride.v9i17.379
12. Gomez, G. (2016). Diagnostico del impacto del plastico (botellas) sobre el medio ambiente: Un estado del arte. *Universidad Santo Tomas*, 81.
13. Góngora, J. (2014). La industria del plástico en México y el mundo. *Comercio Exterior*, *64*(5), 6–9. http://revistas.bancomext.gob.mx/rce/magazines/761/3/la_industria_del_plastico.pdf
14. González García, Y., Meza Contsrerass, J. C., González Reynoso, O., & Córdova López, J. A. (2013). Síntesis y biodegradación de polihidroxialcanoatos: Plásticos de origen microbiano. *Revista Internacional de Contaminacion Ambiental*, *29*(1), 77–115.
15. Gujarati, D. N., & Porter, D. C. (2010). *(PDF) Econometria - Damodar N. Gujarati | Yeico Sebastián ... - Buscar con Google*. https://www.google.com/search?sxsrf=ALeKk03U8Sb9dybGziSPWyTfeHKBV4cFeQ:1599599672885&q=(PDF)+Econometria+-+Damodar+N.+Gujarati+%7C+Yeico+Sebastián+...&spell=1&sa=X&ved=2ahUKEwjQxaOSvdrrAhWfILkGHQUoBmMQBSgAegQIDBAq&biw=1366&bih=608
16. Hernández Sampieri, R., Fernández Collado, C. & Baptista Lucio, P. (2010). *Metodología de la investigación*. http://www.academia.edu/download/38911499/Sampieri.pdf
17. Huacani, Y., & Mamani, J. (2017). *Valoración ambiental del reciclado de residuos sólidos: El caso de Juliaca, Perú*. 32.
18. Jiang, Y., Luo, H., & Yang, F. (2020). Influences of migrant construction workers' environmental risk perception on their physical and mental health: Evidence from china. *International Journal of Environmental Research and Public Health*, *17*(20), 1–17. https://doi.org/10.3390/ijerph17207424
19. Kapadia, K., & Agrawal, A. (2019). Municipal Solid Waste to Energy Options - A Review. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3361532

20. Lacort, M. O. (2014). *Estadística descriptiva e inferencial-Esquemas de teoría y problemas resueltos* (Primera Ed). https://books.google.es/books?hl=es&lr=&id=fZWpBgAAQBAJ&oi=fnd&pg=PA41&dq=Lacort,+M.+O.+(2014).+Estadística+Descriptiva+e+Inferencial-Esquemas+de+Teoría+y+Problemas+Resueltos.&ots=YUHl5i_nR3&sig=8e-wm01S4XePRoIjXL2Gs1oyXAA#v=onepage&q&f=false
21. Llopis, J. A. S. (2002). Stata 7.0 para windows. *Revista de Economía Aplicada*, *X*(28), 163–174.
22. Mahfuzur Rahman, M., Alam, K., Karim, R., & Karimul Islam, M. (2017). Willingness to pay for improved water supply: A policy implications for future water security. *American Journal of Environmental and Resource Economics*, *2*(3), 116–122. https://doi.org/10.11648/j.ajere.20170203.14
23. Mamani, J. C. Q., Gallardo, N. J. U., Mamani, M. G., Vilca, A. C., Guizada, C. E. R., & Mamani, F. A. R. (2021). Willingness to pay for the recovery and conservation of urban green areas for public use in the city of Juliaca, Peru. *Journal of Contemporary Issues in Business and Government*, *27*(1), 1704–1723. https://cibg.org.au/article_8335.html
24. Matusevich, M. V. (2012). *Percepción de los habitantes de la ciudad autónoma de Buenos Aires sobre el uso de bolsas plásticas (Doctoral dissertation, Universidad Internacional de Andalucía)*.
25. Mendoza, W. (2014). *Cómo investigan los economistas: Guía para elaborar y desarrollar un proyecto de investigación*. https://books.google.es/books?hl=es&lr=&id=GaLNDwAAQBAJ&oi=fnd&pg=PT3&dq=como+investigan+los+economistas+waldo+mendoza&ots=IG4hQ3lutj&sig=g7_k1sVwRjRA5bXX7M12lCiTd90
26. Michael, E., & Díaz, D. (2019). *EFECTO DE LA REUTILIZACIÓN DE BOLSAS PAPEL-PLÁSTICO PARA AUTOCLAVE EN LA ESTERILIDAD DE SU CONTENIDO*.
27. Muñetón-Santa, G., Valencia-Cárdenas, M., Vanegas-López, J. G., & Restrepo-Morales, J. A. (2019). Actitudes, hábitos y barreras en el consumo de bebidas empacadas en plásticos en Medellín: análisis mediante modelos multivariados. *Sociedad y Economía*, 31–52. https://doi.org/10.25100/sye.v0i36.5954
28. Murcia Florián, J. (2016). *Logística inversa aplicada al manejo de residuos plásticos como aporte estratégico del marketing verde*. 28. http://repository.unimilitar.edu.co/bitstream/10654/14529/3/MURCIA FLORIAN JONATHAN ALEXANDER 2016.pdf
29. Omoleke, I. I. (2004). Management of Environmental Pollution in Ibadan, An African City: The Challenges of Health Hazard Facing Government and The People. *Journal of Human Ecology*, *15*(4), 265–275. https://doi.org/10.1080/09709274.2004.11905704
30. Perdomo, G. (2002). Plásticos Y Medio Ambiente. *Revista Iberoamericana Polìmeros*, *3*(2), 1–13. http://www.ehu.es/reviberpol/pdf/abr/perdomo.pdf
31. Pereira, S. (2019). Plastic Perceptions: Surveyi g Public Opinion Of Plastic Pollution In Rhode Island. *University of Rhode Island*, *1480*, 57.
32. Pérez López, C. (2005). Métodos estadísticos avanzados con SPSS. In *Thompson. Madrid* (p. 8). http://dspace.ucbscz.edu.bo/dspace/bitstream/123456789/13117/1/9970.pdf
33. Pilco-flores, G. A., Mancheno-saá, M. J., & Quisimalín-santamaría, M. (2020). *Plástico: material de desarrollo con efectos sociales, turísticos y ambientales*. *V*, 337–365.
34. Pinedo Pinedo, C. L., & Vargas Araujo, L. M. (2015). *Frecuencia y factores en el uso de bolsas de polietileno por las amas de casa de la urbanización popular Pedro Castro Alva, Chachapoyas, 2015*. 71. http://repositorio.untrm.edu.pe/bitstream/handle/UNTRM/1482/CHAPA GRANDEZ SALLY PATRICIA.pdf?sequence=1&isAllowed=y
35. Ponisio, L. C., M'gonigle, L. K., Mace, K. C., Palomino, J., De Valpine, P., & Kremen, C. (2015). Diversification practices reduce organic to conventional yield gap. *Royalsocietypublishing.Org*, *282*(1799), 20141396. https://doi.org/10.1098/rspb.2014.1396
36. Potts Carr, A. J. (1998). Choctaw Eco-Industrial Park: An ecological approach to industrial land-use planning and design. *Landscape and Urban Planning*, *42*(2–4), 239–257. https://doi.org/10.1016/S0169-2046(98)00090-5
37. Quispe, J. C. M., Maquera, H. R. M., Sonco, V. Y. F. M., & Coaquira, R. R. A. (2020). *Efectos de la contaminación hídrica sobre la salud pública de la población de la cuenca Coata, de la región de Puno–2019*. 1–16.
38. Quispe Mamani, J. C. (2019). *DISPOSICIÓN A PAGAR POR EL SISTEMA DE RECOLECCIÓN DE LOS RESIDUOS SÓLIDOS DOMESTICOS EN LA CIUDAD DE JULIACA, 2019*. *08*(2), 67–99.
39. Quispe Mamani, Julio C. (2020). Determinación de la Eficiencia en la Gestión de Residuos Sólidos en las Municipalidades Distritales de la Región de Puno - Perú. *Ciencia Latina Revista Científica Multidisciplinar*, *2215*(2), 473–509. https://doi.org/10.37811/cl_rcm.v4i2.93
40. Quispe Mamani, Julio Cesar, Guevara Mamani, M., Marca Maquera, V. R., Mamani Sonco, V. Y. F., & Marca Maquera, H. R. (2020). Estimación de la disposición a pagar por un sistema de recolección mejorado de residuos sólidos domésticos en la ciudad de Juliaca - 2020. *Ciencia & Desarrollo*, *19*(26), 77–87.

https://doi.org/10.33326/26176033.2020.26.935
41. Rojo Nieto, E., & Montoto, T. (2017). Basuras marinas , plásticos y microplásticos. In *Creative Commons*. https://www.mapama.gob.es/es/ceneam/recursos/pag-web/basuras-marinas-plasticos-microplasticos.aspx
42. Rose, S., & Shea, J. A. (2007). Chapter 6 Environmental geochemistry of trace metal pollution in urban watersheds. In *Developments in Environmental Science* (Vol. 5, pp. 99–131). Elsevier. https://doi.org/10.1016/S1474-8177(07)05006-1
43. Ruano, M. A., & Zambrano-Monserrate, M. A. (2019). Do you need a bag? Analyzing the consumption behavior of plastic bags of households in Ecuador. *Elsevier*. https://doi.org/10.1016/j.resconrec.2019.104489
44. Segura, D. (2015). *Contaminación ambiental y bacterias productoras de plásticos biodegradables*. *January 2007*, 361–372.
45. Seoane, T., & Martín, J. (2007). Capítulo 7: estadística: estadística descriptiva y estadística inferencial. *Academia.Edu*. http://www.academia.edu/download/50445620/s1138-3593_2807_2973945-x20161120-28483-117t2l5.pdf
46. Solano, H. L., & Álvarez, C. R. (2005). *Estadística descriptiva y distribuciones de probabilidad*. https://books.google.es/books?hl=es&lr=&id=3Tkb8HJ5toUC&oi=fnd&pg=PR11&dq=Solano,+H.,+%26+Álvarez,+C.+(2005).+Estadística+descriptiva+y+distribuciones+de+probabilidad.&ots=lT9PTb6ATR&sig=0i3315C5o7tCjtoQd0tzkQdJo9A#v=onepage&q=Solano%252C H.%252C %2526 Álvarez%25
47. Tito Zuñiga, Y. N. (2019). *Educación ambiental y la reducción del uso de bolsas plásticas en la institución educativa Coronel Pedro Portillo Silva de Huaura*.
48. Tumi Quispe, J. E., & Escobar Mamani, F. (2018). Incidencia de factores sociales y políticos en al inversión ambiental del Gobierno Regional de Puno - perú. *Revista de Investigaciones Altoandinas*, *20*(2), 235–250. https://doi.org/10.18271/ria.2018.367
49. Udomsri, S., Martin, A. R., & Fransson, T. H. (2010). Economic assessment and energy model scenarios of municipal solid waste incineration and gas turbine hybrid dual-fueled cycles in Thailand. *Waste Management*, *30*(7), 1414–1422. https://doi.org/10.1016/j.wasman.2010.02.009
50. Xalapa, Z. (2009). *Diagnóstico preliminar sobre la distribución de las bolsas plásticas procedentes de los centros comerciales de Tuxpan, Veracruz*. 9–14.
51. Zárate Gómez, J. I. (2018). *Percepción Del Consumidor Ante La Eliminación De Bolsas Plásticas En La Tienda Por Departamento De Ripley Mall Del Sur*. 19. http://repositorio.usil.edu.pe/bitstream/USIL/3205/3/2018_Zarate-Gomez.pdf