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Levels of environmental perception of marine pollution due to the effects of maritime traffic in Ecuador

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Abstract

This research is based on a positivist paradigm of a quantitative approach with statistical elements, which allowed delving into the situation of the research variables, of a descriptive - explanatory - propositional type; of a non-experimental design, taking 105 users of the National Port System as a sample population, for which a 29-item questionnaire with a Likert and dichotomous assessment scale was applied, where the dimensions and indicators of the variable, the El Data analysis was performed with statistical and instrumental validity using the IBM SPSS software.

The results achieved according to the goals of the analysis, indicated that 78% of the users of the national port system have little knowledge about marine pollution, 18% Regular and 4% Good; In relation to the magnitude of application of the MARPOL Annexes, 62% are classified as Good, 23% with little understanding and 14% as regular.

The results demonstrate the need to propose an initiative that defines programs that involve the port sector, achieving one: awareness, training, implementation and monitoring that manage

to provide a relevant contribution, with the application of MARPOL annexes I, II, III, IV and V. to which Ecuador is attached.

Keywords: Pollution, sea, maritime traffic, environmental perception

INTRODUCTION

This article is proposed to mitigate marine pollution due to the effects of maritime traffic in the Gulf of Guayaquil, Ecuador", emphasizing that currently the national port system lacks clear intervention policies to prevent pollution.

In these moments of crisis that humanity is currently experiencing due to the effects of Covid-19, it is necessary to take actions to preserve the marine ecosystem and measures to implement an action plan to strengthen control activities through education and environmental commitment.

For this, it is necessary to know the level of knowledge about marine pollution among the users of the national port system in the marine space of Ecuador, the application of local policies are subjects of constant variations of the origins of pollution by the vessels that they are complex and with few opportunities for intervention due to personnel limitations in the controls of aquatic spaces, as mentioned by the maritime authority MTOP (1980),

This is the case of the maritime authority MTOP (1980), which establishes verifications in coordination with the "National Directorate of Aquatic Spaces (DIRNEA) of the Ecuadorian Navy" (National Directorate of Aquatic Spaces (DIRNEA) of the Ecuadorian Navy). , Seen from the perspective of contamination by hydrocarbon spills, as indicated by CEIDA (2004), the problem of the impact caused by maritime transport can be appreciated at a general level and in the different environmental scenarios.

The study is theoretically justified, since it conceptually determines the study variables, on the management plan that allows strengthening the mitigation measures due to the effects of maritime traffic, within this context the literature allows the fulfillment of the objectives and the contracting The results of this analysis will allow us to propose specific solutions to mitigate the problem of the study variable.

The study scenario is carried out in a larger water inlet icon of the Pacific Ocean of South America, called the Gulf of Guayaquil, whose extreme outlets are established between Cabo Blanco, Peru and Punta de Santa Elena, Ecuador, zoned with a distance of 230 km, includes a very sensitive navigable route made up of a marine ecosystem that receives vessels that enter state and private ports and hence the importance of this topic of study due to the evident absence of local control tools to

prevent and remediate all the pollution generated by these. vessels that must be aligned to international standards such as the agreements of the Marpol annexes in the UN and the reply of certain countries that have defined their controls and their methodological resources for local application.

The general objective of the study was to design a management plan to mitigate the pollution caused by maritime traffic in the channel of the Gulf of Guayaquil-Ecuador, and the specific objectives were to determine the level of knowledge about marine pollution caused by maritime traffic in the Guayaquil Gulf Channel.

According to the nature and type of investigation and the results of the analysis, a proposal for an action plan was formulated.

MATERIAL AND METHODS

For the present study, an empirical model with a quantitative approach was discussed; Due to the fact that statistical factors and measurement units were used, this allowed to deepen the situation of the research variables according to the author Hernández, et al., (2014).

In the same way, it is descriptive - propositive - explanatory, this type of research uses resources and technical processes to "understand and solve problems", identify the causes that generate the research problem, from a fundamental perspective, it is developed as an alternative or proposal of action.

It is also a non-empirical design, characterized by the fact that the researcher does not intentionally manipulate or implement the research variables that would help test it at the right time.

Methods

The population was made up of 105 users of the National Port System registered in the Undersecretariat of Ports, Maritime and Fluvial Transport of the Ministry of Transport and Public Works.

All collaborators present common characteristics and are immersed in the maritime, port, social, cultural and economic spheres.

Table 1. Study population sample

Objective group	Men	Women	Total
civil servants	24	6	30
Port Operators	26	1	27
shipowners	4	0	4
Shipping	3	1	4

Agencies			
users	twenty-one	19	40
Total	**78**	**27**	**105**

Note: Table 1 shows the population of the target group.

The technique used was the survey. For Arias (2006) "points out that the research technique is a specific procedure or way of obtaining data or information" (p 67).

Table 2. instrument data

Instrument Name	Likert scale
Author	rensis likert
Application	individual and collective
Time	15 to 20 minutes
Age	From 21 years

Note: Table 2 refers to the data of the instrument applied with a Likert-type rating scale.

For the present study, a questionnaire was applied, with a Likert-type rating scale. In which it is expressed as: “a set of items that are presented in the form of statements to measure the behavior of the variable”, Hernández, et al. (2014), considering the information as an aspect of opportunity, interpretation or coherence of use, accuracy, accessibility and management, Matus (2007). Instrument developed to assess the level of knowledge about marine pollution.

In the collection of information, the "questionnaire research instrument" was determined, which consisted of 29 items, and was collected from each one, with the objective of ordering in a database, for which it was ordered in relation to dimension and indicator. corresponding to each of the variables in this study.

The internal levels of reliability of the instrument used as a pilot test allowed consistency and coherence in the results obtained. Likewise, from the study carried out, the reliability of the instrument was obtained, which shows the precisions regarding the structure of its proposed items, intervening the levels of complexity.

The reliability level of the instrument when applying Cronbach's Alpha obtained a value of 0.860, where it is categorically understood that there is a relationship between the values of each item. With a good level of reliability.

RESULTS AND DISCUSSION

Table 3. Variable results knowledge Pollution

Scale/Category	**Dimension: Knowledge**	
	F	**%**
Little knowledge (0-10)	82	78%
Fair (11-13)	19	18%
Good (14-17)	4	4%
Very good (18-20)	0	0%
Total	**105**	**100**
Dimension_Avg_Value:		
Little knowledge (09)		
Little knowledge (14)		
Fair knowledge (12)		

Note: Table 3 shows the behavior of the marine pollution variable; according to its dimensions Knowledge of marine pollution, the respondents have little knowledge, with a percentage of 78% with little knowledge and 4% as very good.

It should be noted that, within the survey processes of the users of the National Port System, the expectation arises regarding the levels of knowledge that may affect control actions, which are currently not being carried out, generating concern about possible preventions regarding the contamination that may exist in the waterways of Ecuador.

Table 4: Variable results Marpol knowledge Annexes

Scale/Category	**Dimension: Marpol Annexes**	
	F	**%**
Little knowledge (0-10)	24	23%
Fair (11-13)	fifteen	14%
Good (14-17)	Sixty-five	62%
Very good (18-20)	1	1%

Total	**105**	**100**
Dimension_Avg_Value:		
Little knowledge (09)		
Little knowledge (14)		
Fair knowledge (12)		

Note: With the Marpol Annexes Dimension we have that 62% apply the standards and 23% do not apply them, this represents a significant value of the level of knowledge with respect to the standards used in this international agreement established by the IMO, for the control of pollution from ships. They can be applied, suggesting new future work that can be carried out.

Within Marine Space, the application of Ecuadorian Policies has certain limitations in the controls of the spaces of beaches and bays, as indicated by the MTOP (1980) standard. From the point of view of contamination by hydrocarbon spills, as indicated by CEIDA (2004), the problem of the impact caused by maritime transport is seen. I must point out the importance of the subject of study, since it deepened the problems that exist in the Gulf of Guayaquil, especially in its navigation channel through which many boats transit and generate pollution in the marine ecosystem that has a negative environmental impact on the habitat. , protected areas and the interior navigation channel since there are currently no controls and environmental awareness that can prevent or mitigate it, such as solid waste, garbage composed of plastics, ballast water, bilges, full oil, among others.

CONCLUSIONS

According to the analysis of the results and in accordance with the general objective, it was concluded that in the behavior of the marine pollution variable, and its dimensions, knowledge of pollution and MARPOL annexes, 78% of the users rated themselves with little knowledge. of marine contamination, 12% and 4% showed regular and good level of knowledge.

Regarding the knowledge of the MARPOL Rules dimension, 62%, 23% and 14% qualified as good, bad and regular knowledge, respectively.

ANNEXES

Action plan

Aim

This management plan must be effectively implemented and monitored to achieve a significant reduction in marine pollution and protect Ecuador's marine biodiversity.

In Ecuador, the problem of marine pollution from maritime traffic has been growing in recent years.

This concern has led the government to design a new management plan, the main objective of which is to minimize the amount of hazardous waste in reasonable terms.

The plan is mainly based on a broad educational campaign for the proper use of marine resources. This includes establishing clear rules for navigation.

Behavior

1. Identify sources of marine pollution: An analysis of human activities that can cause marine pollution must be made. This may include port activity, exploitation of marine resources, tourism and others.
2. Establish preventive measures: Once the sources of contamination have been identified, measures must be established to prevent this type of contamination from occurring. For example, regulations can be established to limit the amount of waste that ships can discharge into the waters, or protection zones can be established for vulnerable marine species.
3. Educate the population: Education is key to the prevention of marine pollution. Public awareness campaigns should be carried out on the negative effects of marine pollution, as well as advice on how they can reduce their impact. This could include promoting sustainable fishing practices and reducing the use of single-use plastics.
4. Implement controls and follow-up: Controls and follow-up must be carried out to ensure that the preventive and educational measures that are carried out are being complied with. The results obtained from these must be published to guarantee the transparency of the process and maintain accountability to society.
5. Institutional collaboration: There must be institutional collaboration and co-responsibility in caring for the environment. Alliances can be formed with environmental organizations and educational institutions, as well as professional groups working to preserve and protect the environment.

Evaluation and continuous improvement: The progress of marine pollution management and the effects that are being achieved must be evaluated periodically. Based on this, improvements must be

implemented and the necessary adjustments made to achieve the objectives set.

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