CAR LAUNDRY IN THE CITY OF VILLAVICENCIO USE AND DISPOSAL OF RESIDUAL WATER

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ABSTRACT

Through a mixed exploratory procedure, applied to 44 car washes located in the municipality of Villavicencio Meta Colombia; A correlational order analysis was carried out, which determined the influence between the disposition of discharges from the laundries and compliance with environmental regulations for said sector. Sampling was realized of character universal, given the records of Villavicencio Chamber and Commerce, addressing those appearing legalized for intervention. Interviews were applied to collect information, which were structured according to the variables determined for the study; establishing that 66% of the establishments comply with environmental regulations, as well as that the rest do not have the minimum environmental permits for their activity, alleging ignorance of the regulatory agents for this purpose. Despite the fact that there is a high percentage of laundries that comply with the regulations, there is a low correlation between the final disposal of discharges and the available tributaries, determining that since they do not have wastewater treatment processes, they are deposited in the municipal sewerage, generating an additional load to the effluents since the municipality does not have Wastewater Treatment Plants.

KEYWORDS: Sustainability, Dumping, City, Final Disposal.

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1. INTRODUCTION

The generation of economic resources by the automotive market is increasing (Regalado Pezua & Zapata, 2019, p. 2); Along with this, the commercial auto parts and maintenance sectors are concentrated (Ayllón Candela, & Suárez Valentino, 2019, p. 22); the sector service of laundries, workshops and Lubrication Centers are important contributors to the nation's income, based on the creation of jobs (Flores, 2019, p.105). The accelerated momentum of the industry is also one of the main generators of negative acts on the environment (Drouet Jiménez, 2019, p. 78), whether these are generated as mobile sources or by the use and inadequate disposal of discharges such as solid waste (Chambilla Ccosi, 2019, p. 56) in addition to the excessive use of resources for its operation, such is the case of car washes that are found within the automotive production chain (Guerra & Santiago, 2019, p. 33); These establishments are in charge of carrying out internal and external cleaning tasks on a vehicle with an average water consumption of 75 to 250 liters per vehicle depending on the method used (Bravo Valencia, & Hurtado Ocampo, 2019, p. 41), determining that this link in the automotive chain is that of the increased water consumption (Frost & Hua, 2019, p. 23); Likewise, regarding the generation of discharges, the quantity is important both in terms of the quantity handled and the concentration of the pollutant (Xu, et al, 2020, p 173.). Solids are present

as substances of different origin that when deposited from inadequately they concentrate and produce a high contamination of both air and water bodies (Giampieri, et al, 2019, p. 3382); In addition to the above, there is the lack of separation of wastewater where, without distinction, domestic wastewater is mixed with industrial waste, increasing the impact generated (Viscardi, et al, 2020, p. 3). For the normal development of the activity, various chemicals are used that mix with solids and water, creating solutions that, if not adequately treated, negatively impact the environment (Sun, et al, 2019, p. 25). In Colombia there is regulation on the treatment and disposal of waste and dumping for car washes (Minambiente, 2015); there are created tools to control defined with Decree 1076/2015 and Resolution 0613 of 2015. In the city of Villavicencio, the automotive sector has tended to growth in the last five (5) years in 96 % (Alcaldía de Villavicencio, 2016), resulting in an increase in the use of laundries and therefore a greater production of discharges.

The present work deals with determining the management that the establishments that dedicate to car wash in Villavicencio city give to the waste generated by it, to verify compliance with current regulations.

2. MATERIALS AND METHODS

2.1. Venue Description

The work was carried out in different neighborhoods of Villavicencio city where the activity of the car washes takes place, for its location the respective consultation was realized with the Villavicencio Chamber of Commerce where the metadata of the establishments to intervene were collected. After establishing the matrix of the population in the city and its characterization, determining that all the laundries registered in a number of 44 were addressed, proceeding to interview their managers or administrators.

2.2. Selection of Analysis Variables

Variables were established for each dimension. The data comes from a survey carried out in the field during the second semester of 2019 that was subsequently tabulated and anonymized; processing them through Excel tables and with SPSS 20.0 software

DEPENDENT VARIABLE	INDEPENDENT VARIABLE
Impact generated	Supplies Technology Source of supply

Source: Authors (2019).

For the interpretation of the results of the correlations according to Molina (2017). "When its p value is less than 0.05, it is said to be significant and as it is positive, the relationship is direct." According to the Karl Pearson (1900) Correlation Coefficient method, the value of the correlation index varies in the interval $[-1, 1]$, the sign indicating the direction of the relationship:

If $r = 1$, there is a perfect positive correlation. The index indicates a total dependency between the two variables called the *direct relationship*: when one of them increases, the other also does so in a constant proportion.

If $0 < r < 1$, there is a positive correlation.

If $r = 0$, there is no linear relationship. But this does not necessarily imply that the variables are independent: non-linear relationships may still exist between the two variables.

If $-1 < r < 0$, there is a negative correlation.

If $r = -1$, there is a perfect negative correlation. The index indicates a total dependency between the two variables called the *inverse relationship*: when one of them increases, the other decreases in a constant proportion.

3. RESULTS

Table 1: Wastewater System Correlation

	Correlation between vector values			
	Frequently perform maintenance and grooming to your wastewater treatment system	What is the final disposal of the waste generated	The establishment is provided with dumping certification	It realizes the environmental impact generated by the activity
Frequently perform maintenance and grooming to your wastewater treatment system	1,000	, 338	, 807	, 460
What is the final disposal of the waste generated	, 338	1,000	, 199	, 165
The establishment is provided with dumping certification	, 807	, 199	1,000	, 543
It realizes the environmental impact generated by the activity	, 460	, 165	, 543	1,000

Source: Own elaboration with data fed into SPSS

Positive relationships of high significance and value are obtained between those who are certified and maintenance, but with a poor final disposal of discharges.

Table 2: Correlations of the use of Pollutants and Maintenance of the System

	Correlation between vector values		
	Contaminated supplies in water washing	The property is certified for dumping	Frequently perform maintenance and grooming to your wastewater treatment system
Contaminated supplies in water washing	1,000	, 003	, 065
The property is certified for dumping	, 003	1,000	, 807
Frequently perform maintenance and grooming to your wastewater treatment system	, 065	, 807	1,000

Source: Own elaboration with data fed into SPSS

There is a low relationship between the use of polluting substances in the washing process and being certified, showing that despite having permits, the appropriate chemicals with low impact on the environment are not used; adding that having certification for final disposal and generate frequent maintenance.

Table 3: Correlation between water Reception Served and Treatment Systems

	Correlation between vector values		
	Wastewater receiving sources	As your water treatment system is composed	What is the final disposal of the waste generated
Wastewater receiving sources	1,000	-, 148	-, 254
As your water treatment system is composed	-, 148	1,000	-, 117
What is the final disposal of the waste generated	-, 254	-, 117	1,000

Source: Own elaboration with data fed into SPSS

There is an inverse relationship given that they have treatment systems but the disposal of the wastewater does not correspond to the system installed in the same way for the sludge or solids generated in the process.

The laundries present in their majority a time of three years of operation, it can be inferred that this contributes to the ignorance of the processes of mitigation of impacts; additionally, they have a low employability rate, with medium-technology processes with a high use of polluting chemical substances, and most of the supply is made from municipal aqueduct networks; adding that they do not make any type of aggregate for the treatment of wastewater, giving as final disposal of the sewage network with the particularity that 60% of the establishments have a certificate or permit for discharges.

4. DISCUSSION

The results obtained in this work reflect that although the establishments are legalized, with permits for the use and disposal of water, the proper treatment processes are not carried out. As the sector is a strong generator of pollution that goes to the municipal sewer system, the one that does not have a Wastewater Treatment Plant, increasing the impact to be generated in the receiving tributary.

On the other hand, in the interviews carried out, it was found that the level of labor occupation is very low compared to the relationship of pollution generated and the resources used. It was observed that the presence by the environmental authorities of the jurisdiction is not frequent and is manifested by the interviewees, a situation that makes it possible to be lax in the treatment systems.

From a social point of view, the lack of awareness on the part of the owners and managers regarding the negative impact they cause on the environment with the operation they hold is the greatest element found in the study.

Lastly, the poor disposal of discharges as well as solid waste derives from unsuitable conditions for the sources that receive them and therefore from the territory of influence of the same. It is added that there is ignorance on the part of the participants in the activity of the processes of prevention and mitigation of the pollution, against the statements of informants it is argued that mobiles are economic rather than because of lack of information or training; without a doubt the lack of pressure on the part of the authority facilitates this situation.

5. CONCLUSIONS

The intervened establishments do not exercise proper use and disposal of the waste generated in the washing process; the regulations are not fully complied with, highlighting the lax action of the environmental authority in the sector.

Lack of knowledge and training in the use and management of adequate technology to mitigate impacts is manifested, but the reason is found to be economic.

The use of drinking water is very high in the processes since very few use rainwater or reuse the available water, being an excessive and inefficient use, adding that the final disposal goes to the municipality's water sources since there are no plants of treatment neither in the establishments nor the city.

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