



## ENVIRONMENTAL REGULATION AWARENESS AMONG TRICYCLE DRIVERS IN DIGOS CITY, PHILIPPINES

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### **Abstract:**

As humankind progresses into an age of heavy economic change, motor vehicle ownership rapidly increases, significantly altering Earth's biogeochemical composition, resulting in environmental pollution and loss of ecological stability. Given the need for global action, this study, however, investigated the level of environmental awareness in terms of environmental laws and environmental city ordinances in Digos City, Philippines. A quantitative-descriptive method was utilized in employing the study. A modified self-made questionnaire was administered to 200 tricycle drivers of Digos City, Philippines. Results revealed that older tricycle drivers and those who have long experiences have better awareness on environmental laws and city ordinances compared to young tricycle drivers and those who have shorter experiences as tricycle drivers. Thus, there is still a great need for heavy reinforcement regarding environmental legal frameworks, especially among young tricycle drivers in Digos City, Philippines.

**Keywords:** environmental laws, environmental city ordinances, environmental awareness, tricycle drivers

### **1. Introduction**

The hunger for change breeds various pollutants that affect not just Earth but also its inhabitants. As humankind progresses into an age of heavy economic change, motor vehicle ownership rapidly increases and significantly alters Earth's biogeochemical composition, resulting in environmental pollution and loss of ecological stability. Motor vehicular exhaust pollutants to the air and cause various health-related issues and environmental challenges such as climate change and global warming due to excessive greenhouse gases (Bennett et al., 2002; Karlsson, 2004). Also, ignorance and irresponsible human activities yield poor environmental health (Peter and Cheruto, 2013; Rogan, 2019).

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Moreover, the lack of environmental consciousness among vehicular drivers worsens environmental challenges; hence environmental education is crucial in awakening one's awareness about environmental problems and providing sustainable solutions.

Rapid motorization caused by heavy industrialization, urbanization, and overpopulation aggravates the environmental crisis. Atash (2007) and Tanaka (2015) examined that the growing fleet of motor vehicle ownership in developing countries strengthens environmental pollution. This was supported by the International Energy Agency (IEA) based on their recent study that developing countries such as China and India and developed country such as the USA has an increasing percentage of vehicular ownership, therefore, are the leading contributor of carbon dioxide thus pose an even more significant threat to the global environment. Countries such as Malaysia and Bangladesh have a recurring environmental issue due to vehicular emissions and improper environmental actions, especially in urbanized areas (Mahmood et al., 2019; Valavanidis et al., 2016). Thus, environmental action and awareness are being utilized globally to lessen the impact of vehicular emissions and negative human activities towards the environment, i.e., fuel standards implementation in China, limitations of fossil fuel emissions in the US, and more.

Moreover, environmental issues such as environmental deterioration, ozone layer depletion, pollution of air, water, and soil, loss of biodiversity, etc., are environmental awareness elements. These dilemmas become an egregious threat to both man and nature (Goleman, 2010). Despite learning these scenarios, it is not enough to suppress the underlying problem regarding the environment. Hence, the practice of sustainable living, environmental attitude, and values are the concepts of environmental awareness (Cui, Hoje, and Velasquez, 2015). Moreover, to ameliorate environmental degradation, man must reflect on how their action impacts the environment and the effect it produces. Anthropogenic pressure is said to be the leading bane of the global environment. As heavily emphasized by Stern et al. (2016) that unending human exploitation of nature further exacerbated environmental problems. Balundé, Perlaviciute, and Steg (2019) also postulated that these problems could be reduced if the citizens acted in friendly-environmental actions. The human population is slowly trampling Earth's resources, notwithstanding that there is life beyond their own.

In the Philippines, environmental pollution is a growing problem that is yet to be provided with long-term solutions due to the absence of environmental sensitivity and public awareness despite promulgating policies and regulations. For the past decades, the Philippines has already experienced the harsh reality of global warming due to emissions from various particulate matter sources, i.e., motor vehicle emissions. Thus, it is undoubtedly vulnerable to climate risk (Kreft, Eckstein, & Melchior, 2017). Aside from health risks, the natural aesthetic of nature will no longer prevail (Lualhati, 2019). Further, based on the report taken from the Land Transportation Office (LTO) and National Statistical Coordination Board (NSCB), tricycles and motorcycles significantly increased until they became the leading MV in the Philippines (DENR-EMB, n.d). Unfortunately, only a few examine the role of MV drivers in the environmental quality in the country. There is still a growing need to address environmental illiteracy among

MV drivers. As the main transportation locally, tricycle's exhausts emissions affect the city's environment and its inhabitants more. Environmental education and awareness among tricycle drivers can lessen environmental degradation and be more environmentally educated on the many aspects of environment-related issues.

## 2. Objectives

This study aims to uncover the environmental regulation awareness among tricycle drivers in Digos City, Philippines. Specifically, it is guided by the following objectives:

- 1) Determine the environmental laws and environmental city ordinance awareness among tricycle drivers in Digos City, Philippines.
- 2) Identify if there is a significant difference in the level of environmental regulation awareness among tricycle drivers when analyzed by their age and number of years in the job.

## 3. Material and Methods

This study utilizes a quantitative-descriptive research design. The study used this research design to assess the level of environmental regulations awareness of tricycle drivers in Digos City, Philippines, in 2021. There were 200 respondents chosen using the convenience sampling technique. In developing the survey questionnaire, some part of the questionnaire was adapted from Manila Solid Waste Management Project (2003), and some items were developed by the researchers. In addition, the researchers also translate the questions in the questionnaire in the native language of the area to ensure the full use of each item. Moreover, to ensure that the research questionnaire serves its purpose, the questionnaire was validated by experts and then underwent a reliability test. With these, a total of thirty-two (32) items were included in the survey questionnaire. The survey questionnaire was printed and distributed to the respondents. Moreover, in employing the data collection with the ongoing health crisis (Covid-19 Pandemic), the researchers strictly adhere to the health safety protocol implemented by the Department of Health in the City of Digos, Philippines.

In interpreting the data, the mean score was used to determine the respondents' environmental laws and environmental city ordinance awareness. In addition, table 1 shows the Likert-type scale used to interpret the descriptive data in the mean score. Moreover, the Kruskal Wallis test identified the significant difference in the levels of environmental regulations awareness among tricycle drivers when analyzed by age and number of years in the job.

**Table 1: Likert-Like Scale Used in Interpretation of Descriptive Data**

Numerical Scale	Range of Means	Verbal Description	Descriptive Meaning
5	4.21 – 5.00	Always observed	This means that environmental awareness is <i>always observed</i> .
4	3.41 – 4.20	Oftentimes observed	This means that environmental awareness is <i>oftentimes observed</i> .
3	2.61 – 3.40	Sometimes observed	This means that environmental awareness is <i>sometimes observed</i> .
2	1.81 – 2.60	Rarely observed	This means that environmental awareness is <i>rarely observed</i> .
1	1.00 – 1.80	Never observed	This means that environmental awareness is <i>never observed</i> .

#### 4. Results and Discussion

Table 2 shows the characteristics of the respondents. In terms of age, the highest age group who participated the survey were 29 to 38 years old (n=67, 33.5%), followed by 18 - 28 years old (n=65, 32.5%), 39 - 48 years old (n=44, 22%), 49 - 58 years old (n=24, 12%) respectively. In terms of years in the job, the highest number of years were, 26 - 30 years (n=1, < 1%), followed by 21 to 25 years (n=5, < 1%), 16 - 20 years (n=17, 8.5%), 11 - 15 years (n=59, 29.5%), 6 to 10 years (n=70, 35%), and finally 1 to 5 years (n=48, 24%) respectively. Based on the data, majority of the tricycle drivers in Digos City, Philippines has 6 to 10 years (n=70, 35%) experienced and the longest in the job is 26 - 30 years (n=1. < 1%).

**Table 2: Characteristics of 200 tricycle drivers included in the study**

Profile	f	%
<b>Age</b>		
18 to 28 years old	65	32.5
29 to 38 years old	67	33.5
39 to 48 years old	44	22.0
49 to 58 years old	24	12.0
<b>Number of Years in the Job</b>		
1 to 5 years	48	24.0
6 to 10 years	70	35.0
11 to 15 years	59	29.5
16 to 20 years	17	8.5
21 to 25 years	5	2.5
26 to 30 years	1	.5

Table 3 shows the level of environmental regulation awareness among tricycle drivers in Digos City, Philippines. Two indicators are being observed, the first is the awareness of the tricycle drivers in terms of environmental laws, and the second is in terms of environmental city ordinances. The overall mean yields 3.86 (SD=0.561), which means that the environmental awareness of tricycle drivers in Digos City is often observed.

**Table 3:** Digos City, Philippines Tricycle drivers' level of environmental regulations awareness

Indicators	Mean	SD
<b>Environmental Laws</b>	<b>3.65</b>	<b>0.620</b>
1. I have knowledge on Ecological Solid Waste Management Act of 2000 or RA 9003. (Aduna koy kahibalo mahitungod sa Ecological Solid Waste Management Act of 2000 or RA9003.)	3.69	0.870
2. I am concerned whether the final disposal is environmentally safe and acceptable. (Nabalaka ako kung ang katapusang paglabay luwas sa kalikopan ug dalawaton.)	3.96	0.791
3. I receive information about waste collection and disposal services provided for me including how it is done and where my waste eventually goes. (Nakadawat ako kasayuran bahin sa mga serbisyo sa pagkolekta sa basura ug mga serbisyo nga gitugyan alang kanako lakip na kung giunsa kini gihimo ug kung diin moadto ang akong basura.)	3.67	0.765
4. I am aware that Anti-Smoke Belching seminar is necessary. (Aduna ko kahibalo na kinahanglan gayud ang Anti-Smoke Belching Seminar.)	3.65	0.762
5. I participate in any government or local programs on segregation and recycling. (Nagaapil ko sa maski unsang programa sa gobyerno og LGU mahitungod sa segregation ug recycling.)	3.15	0.932
6. I act on keeping air healthy by evaluating my fossil fuel consumption. (Nagabuhat kog lihok aron mamintinar ang kapresko sa hangin sama sa pagpaghinay-hinay ug gamit ug fossil fuel.)	3.46	0.850
7. I am aware of fines and penalties for improperly disposing waste. (Aduna koy kahibalo batok sa mga multa para sa dili tama nga paglabay sa basura ingon man ang pagdump ug pagsunog.)	4.09	0.843
8. I take action in correcting waste disposal problem in the community. (Nagabuhat ko aksyon ug pamaagi para masulbad ang problema sa paglabay ug basura sa amoang komunidad.)	3.37	0.864
9. I know some waste segregation or recycling program. (Aduna koy kahibalo batok sa mga programang nagahisgut mahitungod sa segregation ug recycling.)	3.78	0.811
10. I engage in self-assessment on the protection of the environment. (Nag-apil ako sa pagsusi sa kaugalingon sa pagpanalipod sa kinaiyahan.)	3.73	0.895
<b>Environmental City Ordinance</b>	<b>4.07</b>	<b>0.555</b>
1. I segregate my waste products according to the proper waste disposal mandated by the city. (Gibulag nako ang akong mga produkto nga basura sumala sa husto nga paglabay sa basura nga gimando sa syudad.)	3.75	0.770
2. I install at least one trash receptacle inside my tricycle. (Aduna kog maski isa nga butanganan ug basura sa akoang tricycle)	4.15	0.811
3. I know smoking is strictly prohibited when maneuvering my tricycle. (Kahibalo ko na bawal ang pagpanigarilyo kung akoa magamaneho sa akoang tricycle.)	3.84	0.964
4. I install a No Smoking sign inside my tricycle. (Aduna koy No Smoking sign na nakapaskil sa akoang tricycle.)	4.00	0.894
5. I observe strict emission standard by going through smoke emission tests. (Nagasunod ko istrikto nga sukaranan sa pagbuga pinaagi sa pag-agi sa mga pagsulay sa pagbuga sa us aka aso.)	3.90	0.783
6. I observe proper driving habits. (Ginasiguro naku ang pagsunod sa tamang buluhaton samtang naka maneho.)	4.63	0.570
7. I understand that littering inside my tricycle is punishable by law. (Nakasabot ko nga bawal ang paghugaw-hugaw sa sulod sa akoang tricycle.)	4.39	0.762
8. I know incineration of garbage is prohibited. (Kahibalo ko na nga ginadili ang pagsunog ug basura.)	4.16	0.853

9. I am aware that Solid Waste Management seminar is necessary. (Aduna koy kahibalo na kailangan gayud ang Solid Waste Management Seminar.)	3.86	0.829
10. I recognize the importance of prohibiting the manufacturing, importing, and selling leaded gasoline and of engines/or components requiring leaded gasoline. (Akoang makita ang importansya sa pagbawal sa manufacturing, importing, pagbaligya ug leaded na gasoline ug paggamit ug mga makina ug/o piyesa nga gigamitan ug leaded na gasoline.)	4.06	0.875
<b>Overall</b>	<b>3.86</b>	<b>0.561</b>

The environmental awareness of tricycle drivers in terms of environmental law yields a mean score of 3.65 (SD=0.620), which is interpreted as oftentimes observed. This means that the tricycle drivers show positive traits in the existing environmental laws, with a high awareness of this indicator. Brick and Lewis (2016) revealed that the influence of personality traits on emission-reducing behavior is one of the highlighted predictors for behavior after being mediated by environmental attitudes. Moreover, in terms of environmental city ordinances, a mean score of 4.07 (SD=0.555), which was interpreted as oftentimes, were observed. This means that the tricycle drivers in Digos City show cooperation through abidance in the existing environmental ordinances to help lessen the environmental harm as inflicted by human actions due to fuel emissions from motorcycles. As environmental problems continue to alarm society, the people also learn to show concern and cooperation.

Table 4 shows a Kruskal Wallis test on differences. The result showed that there is a significant difference in the tricycle drivers' level of environmental regulation awareness based on their ages, Chi-square (3,200) = 32.410,  $p < .01$ . In Table 4, those aged 49 to 58 years old have higher mean ranks (148.81) as compared to those aged 39 to 48 (mean rank = 120.98), aged 29 to 38 (mean rank = 88.51), and 18 to 28 (mean rank = 81.15). This is also observed in terms of awareness in environmental laws (Chi-square (3,200) = 33.739,  $p < .01$ ) and in environmental city ordinance (Chi-square (3,200) = 24.150,  $p < .01$ ). This means that the older tricycle drivers have a better awareness of environmental laws and provisions implemented. Morrison and Beer (2017) concluded that aged '40s and '50s, and '60s showed a stronger relationship between age and pro-environmental attitudes. Older age among tricycle drivers significantly contributes to its high level of awareness.

**Table 4:** Kruskal Wallis test on the differences on the tricycle drivers' level of environmental education and awareness when analyzed by age

Indicators	Groups	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Environmental Law	18 to 28	65	82.32	33.739**	3	.000
	29 to 38	67	86.60			
	39 to 48	44	121.52			
	49 to 58	24	149.98			
	<b>Total</b>	<b>200</b>				
Environmental City Ordinance	18 to 28	65	82.88	24.150**	3	.000
	29 to 38	67	91.78			
	39 to 48	44	116.38			
	49 to 58	24	143.44			
	<b>Total</b>	<b>200</b>				

Overall	18 to 28	65	81.15	32.410**	3	.000
	29 to 38	67	88.51			
	39 to 48	44	120.98			
	49 to 58	24	148.81			
	<b>Total</b>	<b>200</b>				
*p<0.05, **p<0.01						

Table 5 shows a Kruskal Wallis test on differences showed that there is a significant difference in the tricycle drivers' level of environmental regulations awareness based on the number of years that they have served on this job, Chi-square (5,200) = 30.992,  $p < .01$ . The result shows that those who have been tricycle drivers for 26 to 30 years have higher mean ranks (197.00) as compared to those who were drivers for 20 to 25 years (mean rank = 184.20), followed by 11 to 15 years (mean rank = 119.69), then 16 to 20 years (mean rank = 117.76), 6 to 10 years (mean rank = 85.92), and 1 to 5 years (mean rank = 81.32). This is also observed in terms of awareness in environmental laws (Chi-square (5,200) = 30.357,  $p < .01$ ) and in environmental city ordinance (Chi-square (5,200) = 26.290,  $p < .01$ ). This may mean that those who have been tricycle drivers for longer have a better awareness of the implementation of environmental laws and provisions. This idea is similar to Thaller, Fleiß, and Brudermann's (2020) claim, where climate-friendly behavior differs across socio-demographic groups.

**Table 5:** Kruskal Wallis test on the differences on the tricycle drivers' level of environmental education and awareness when analyzed by number of years in the job

Indicators	Groups	N	Mean Rank	Chi-Square	df	Asymp. Sig.
Environmental Law	1 to 5	48	79.64	30.357**	5	.000
	6 to 10	70	87.51			
	11 to 15	59	119.14			
	16 to 20	17	118.50			
	21 to 25	5	182.90			
	26 to 30	1	193.50			
	<b>Total</b>	<b>200</b>				
Environmental City Ordinance	1 to 5	48	85.71	26.290**	5	.000
	6 to 10	70	85.14			
	11 to 15	59	119.05			
	16 to 20	17	113.29			
	21 to 25	5	176.50			
	26 to 30	1	194.00			
	<b>Total</b>	<b>200</b>				
Overall	<b>1 to 5</b>	<b>48</b>	<b>81.32</b>	30.992**	5	.000
	6 to 10	70	85.92			
	11 to 15	59	119.69			
	16 to 20	17	117.76			
	21 to 25	5	184.20			
	26 to 30	1	197.00			
	<b>Total</b>	<b>200</b>				
*p<0.05, **p<0.01						

## 5. Recommendations

After contemplating the analyzed results, the researchers came out with specific recommendations:

- 1) For future researchers, the researchers suggest looking into the attitudes and behaviors of tricycle drivers towards environmental regulations.
- 2) Policymakers and regulators should strengthen the environmental regulations campaign to the public, especially the youth since younger tricycle drivers are less aware than older tricycle drivers.
- 3) Tricycle drivers should be participating in environmental programs to increase their environmental regulations awareness and become catalysts of environmental sustainability.

## 6. Conclusion

Based on the findings of the study, the following conclusions are drawn. The tricycle drivers in Digos City, Philippines, are environmentally aware and educated regarding environmental laws and environmental city ordinances. Furthermore, the findings revealed that in terms of age, older tricycle drivers in Digos City have better awareness and education on environmental laws and environmental city ordinances compared to young tricycle drivers. Meanwhile, in terms of the number of years in the job, those who have been tricycle drivers for longer years have better awareness and education on environmental laws and environmental city ordinances.

### Conflict of Interest Statement

The authors declare no conflicts of interest.

### About the Authors

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