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VALUATION OF POBLACION, SAN CARLOS CITY, PANGASINAN AIRSHED

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Abstract: *This study assessed the economic value of Poblacion, San Carlos City, Pangasinan airshed. Permission from authorities concerned to do the surveyon 40 tricycle drivers and 40 passengers as respondents were done. Validation of the questionnaire was accomplished consisting personal demographic profile of the respondents and with the used of 4-point Likert Type scale as 0 score for not polluted, moderately polluted-1, and polluted-2 to indicate the level of awareness of the respondents in the status of airshed in the area. The data gathered from the respondents were computed using the SPPS, Benefit Transfer Method, Contingency Valuation Method, Market Price Method and Protection- Damage Cost Method. The demographic data showed that majority of the respondents are single, in the age range of 10-19 years old with a highest educational attainment of high school graduate and are Roman Catholics. Results showed that respondents considered headache as the major health effect of air pollution to them and even severe in summer season and that the indoor air quality in the area is not polluted while the outdoor air quality and odor of air as moderately polluted. The estimated total economic value of Poblacion, San Carlos City, Pangasinan Airshed is valued as Php 18,826,141,499 ha/yr. This study recommends to design online information, communication, and education (IEC) materials to enhance respondents' awareness and further studies on the airshed of Poblacion, San Carlos City, Pangasinan is encouraged to accurately quantify the parameters and construct a baseline data gathering for the valuation of airshed.*

Keywords*: economic valuation, airshed*

INTRODUCTION

Air quality is one of the major concerns of the Environmental Management Bureau of Department of Environment and Natural Resources (EMB-DENR). Due to this, a negative result in the air index can lead to a more serious matter in the environment affecting all organisms contained in it or resulting to air pollution.

Hence, Filipinos need to be equipped with knowledge on the ambient air quality, the possible air pollutants, its economic value and extent of effect on the environment. But most of the time those who belong in the local community were left uninformed that even the simplest chore of cooking can contribute in polluting air. San Carlos City was once known as Binalatongan. From the time of its founding up to the middle of the 19th century, it was considered as the biggest and most populous town of Pangasinan composing a whole third of the Province. It is recorded in history as a bastion of freedom fighters, with famous uprisings against Spaniards led by Andres Malong (1660) and Juan dela Cruz Palaris (1762). These heroic acts prompted the Spanish colonizers to change the name of the town to San Carlos in honor of King Carlos III of Spain. San Carlos became a city by virtue of Republic Act No. 4487 signed on June 19, 1965.

OBJECTIVES OF THE STUDY

The study assessed and valuate the Poblacion, San Carlos City, Pangasinan Airshed through

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the (1) determination of the benefit transfers and contingent method in terms of market prize method, (2) identification of the use and non-use values of the airshed and; (3) quantifying of he identified parameters necessary for valuation.

MATERIALS AND METHODS

The study was conducted along the barangays of Perez Boulevard, PNR Site- Mc Arthur, Quezon Boulevard, Rizal Avenue, and Roxas Boulevard, San Carlos City, Pangasinan. The sampling method is a purposive sampling through a survey questionnaire evaluated by eighty (80) pre- defined respondents composed of forty (40) tricycle drivers and forty (40) passengers.

The results of the survey were subjected to the Market price method, WTP method, Survey instrument, Benefit transfer method, Damage cost, Option/ Bequest Value, Existence Value, and Total Economic Value as value for the Airshed and its conservation and protection.

RESULTS AND DISCUSSION

Table 1. Age Distribution of Respondents

Table 1 shows the age range distribution of the total respondents. Out of the 80 respondents, 27.5% belongs to the age range of 10-19 years old, 25% to 20- 29, 17.5% in 30-39, 15%, 12,5%, and 2.5%, for age range 40-49, 50-59, and 60- above respectively. The age range of tricycle drivers varies while the passengers falls between 10-39 years old.

	Frequency	Percent	Tricycle Driver	Passenger
10 - 19	22	27.5	2	20
20 -29	20	25.0	4	16
30 - 39	14	17.5	10	4
40 - 49	12	15.0	12	0
50 -59	10	12.5	10	0
60 - Above	2	2.5	2	0
Total	80	100.0	40	40

Table 2. Highest Educational Attainment of Respondents

Table 2 shows the highest educational attainment of respondents in percentage. Respondents with high school level as the highest educational attainment is 42.5% of the total respondents, while 7.5% are in college level, 5%, and are college graduate. The tricycle driver and passenger respondents are majorly had High School Level as highest educational attainment.

	Frequency	Percent	Tricycle Driver	Passenger
High School Level	34	42.5	18	16
High School Graduate	36	45.0	16	20
College Level	6	7.5	2	4
College Graduate	4	5.0	4	0
Total	80	100.0	40	40

Table 3. Religious Affiliation of the Respondents

Table 3 shows the religious affiliation distribution of respondents. Respondents who are Roman Catholic are 87.5% of the total respondents, 7.5% are Protestant, and other to 5% which are Born Again, Christian. Majority of the respondents both from tricycle driver and passengers is Roman Catholic on their religious affiliation.

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	Frequency	Percent	Tricycle Driver	Passenger
Roman Catholic	70	87.5	36	34
Protestant	6	7.5	0	6
Others, Christian	4	5.0	4	0
Total	80	100.0	40	40

Table 4. Civil Status of Respondents

Table 4 shows the civil status distribution of respondents. Out of the 80 respondents, 60% are single while 40% are married. Most of the tricycle drivers are married while majority of the passengers are single.

	Frequency	Percent	Tricycle Driver	Passenger
Single	48	60.0	10	38
Married	32	40.0	30	2
Total	80	100.0	40	40

Table 5. Monthly Family Gross Income of Respondents

Table 5 shows the monthly family gross income of respondents. Respondents with below Php 9,999 as monthly family gross income is 40% of the total respondents while the 60% have an income of Php 10,000- Php 19,000. Majority of the tricycle drivers has a monthly family gross income of below Php 9,000 while most of the passengers fall on the range of Php 10,000-19,000.

	Frequency	Percent	Tricycle Driver	Passenger
9,000 - Below	32	40.0	24	8
10,000 - 19,000	48	60.0	16	32
Total	80	100.0	40	40

Table 6. Monthly Family Expenditure of Respondents

Table 6 shows the monthly family expenditure of respondents. Respondents with below Php 9,999 as monthly family expenditure is 95% of the total respondents and the remaining 5% have an expenditure of Php 10,000- Php 19,000. The respondents both from tricycle drivers and passengers mostly has a monthly family expenditure of Php 10,000- Php 19,000.

	Frequency	Percent	Tricycle Driver	Passenger
9,000 - Below	76	95.0	36	40
10,000 - 19,000	4	5.0	4	0
Total	80	100.0	40	40

Table 7. Monthly Family Net Income

Table 7 shows the monthly family net income of respondents. Respondents with below Php 9,999 as monthly family net income is 82.5% of the total respondents and17.5% have an net income of Php 10,000- Php 19,000. The respondents both from tricycle drivers and passengers mostly has a monthly family net income of Php 10,000- Php 19,000.

	Frequency	Percent	Tricycle Driver	Passenger
9,000 - Below	66	82.5	28	38
10,000 - 19,000	14	17.5	12	2
Total	80	100.0	40	40

Table 8. Health Effects of Air Pollution to the Respondents

Table 8 shows the distribution of health effects of air pollution to the respondents.
Respondents who answered headache is

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	Frequency	Percent	Tricycle Driver	Passenger
Not Polluted	42	52.5	22	20
Moderately Polluted	32	40.0	12	20
Polluted	6	7.5	6	0
Total	80	100.0	40	40

47.4%, 8.8% experiences allergy, respiratory diseases in 15.8%, and cough and fever with

	Responses		Percent of Cases	Tricycle Driver	Passenger
	Frequencies	Percent			
Headache	54	47.4%	69.2%	24	30
Allergy	10	8.8%	12.8%	6	4
Respiratory Diseases	18	15.8%	23.1%	10	8
Cough/Fever	32	28.1%	41.0%	12	20
Total	114	100.0%	146.2%	52	62

28.1%.

Air pollution is a major cause of non-communicable diseases. The most recent study on the Global Burden of Disease estimates that 7.5% of deaths globally were attributable to ambient air pollution in 2016. (Li, 2018)

This is also reflected that respondents identified headache as the most evident effect of air pollution to human health.

Table 9. Awareness of Respondents in Indoor Air Quality

Table 9 shows the distribution of the awareness of respondents in the indoor air quality. Out of 80 respondents, 52.5% thinks that the indoor air quality is still not polluted, 40% said it is moderately polluted, and 7.5% for polluted.

Several studies by EPA, states, and independent scientific panels have consistently ranked indoor air pollution as an important environmental health problem. While most buildings do not have severe indoor air quality problems.

Same as to the respondents that identified that the status of indoor air quality in Poblacion, San Carlos City, Pangasinan is not polluted or not a mere problem.

Table 10. Awareness of Respondents in Outdoor Air Quality

Table 10 shows the distribution of the awareness of respondents in the outdoor air quality. Out of 80 respondents, 22.5% thinks that the outdoor air quality is polluted, while 60% said it is moderately polluted, and 17.5% for polluted.

Air pollution levels are tightly linked to the topography of the area. Surfaces such as roads (gravels, dirt, asphalt) can generate air pollution when vehicles drive on them. Dangerous concentrations of pollutants are trapped that sometimes causing dense smog over urban areas. (Britannica Online, 2004)

This can be inferred why the outdoor air quality of the urban area of Poblacion, San Carlos City, Pangasinan is identified by the respondents as moderately polluted.

	Frequency	Percent	Tricycle Driver	Passenger
Not Polluted	18	22.5	10	8
Moderately Polluted	48	60.0	22	26
Polluted	14	17.5	8	6
Total	80	100.0	40	40

Table 11. Awareness of Respondents in the Odor of Air

Table 11 shows the distribution of the awareness of respondents in the odor of air. Out of 80 respondents, 35% thinks that the odor of air is polluted, while 55% said it is moderately polluted, and 10% for polluted.

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Exposure to unpleasant odors is one of the frequent causes of air quality complaints in both industrial and urban areas. The chemical compounds responsible for odor generation are volatile species (Olafsdottir and Gardarsson, 2013): once emitted from a source, their transport, dispersion and fate in the environment is controlled by the complex interaction among strength of emission (Campolo, et al., 2005)

Urbanized areas such as Poblacion, San Carlos City, Pangasinan are prone to air pollution due to the presence of industries. It is evident in the responses that the odor of air quality is moderately polluted.

	Frequency	Percent	Tricycle Driver	Passenger
Not Polluted	28	35.0	22	6
Moderately Polluted	44	55.0	12	32
Polluted	8	10.0	6	2
Total	80	100.0	40	40

Table 12. Total Economic Value for Airshed

The computation of the total economic value of the airshed is presented in the table below;

	Valuation Method	**Estimated Value (Php/yr)**
Direct Use Value		
1. Extractive Value from Income of Tricycle Drivers	Market Price Method	Php 134, 976.32
2. Non- Extractive Value (Education & Research)	Benefit Transfer Method	Php 154,758.89
3. Tourism Value	Benefit Transfer Method	Php 771, 120.00
Indirect Use Value		
1. Protection Cost	Damage-Cost Valuation Method	Php 18,278,420,858
2. Non- use Value (Preservation Cost)	Contingent Valuation Method	Php 546,659,786.2
Total Economic Value		Php 18,826,141,499

CONCLUSION AND RECOMMENDATION

Results showed that respondents considered headache as the major health effect of air pollution to them and even severe in summer season. The data on the awareness of respondents showed that the indoor air quality in the area is not polluted while the outdoor air quality and odor of air as moderately polluted. The total economic value of Poblacion, San Carlos City, Pangasinan Airshed were valued using appropriate methods as Php 134, 976.32 for the Extractive Value of Airshed, Php 154,758.89 for the Education and Research Value, Tourism Value of Php 771, 120.00 , Protection Cost at Php 18,278,420,858, and Preservation Cost of Php 546,659,786.2 per hectare per year.

The Poblacion, San Carlos City, Pangasinan Airshed has Use Values of . Extractive Value from Income of Tricycle Drivers and Tourism Value as direct uses, and Protection as indirect value. Non- use values identified were Option Values as Research, Aesthetics, Cultural, Recreational, and Preservation for the Existence Value.

The estimated total economic value of Poblacion, San Carlos City, Pangasinan based

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on the Benefit Transfer Method, Contingency Valuation Method, Market Price Method, and Protection- Damage Cost Method is Php 18,826,141,499 ha/yr.

The study recommends further study on the airshed of Poblacion, San Carlos City, Pangasinan is encouraged to accurately quantify the parameters. Organization of Communication, Education, Public Awareness (CEPA) campaigns in partnership with the Department of Environment and Natural Resources- Environmental Management Bureau (DENR- EMB) and the Local Government Unit (LGU) of San Carlos City, Pangasinan to raise awareness on the effects and status of unimproved airshed and conduct baseline data gathering for the valuation parameters. Inclusion of other public utility vehicle such as jeepney drivers in the respondents.

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