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Green line strategy in mitigating climate change: case study in Tarakan City, North Kalimantan

Sulistya Rini Pratiwi^{a*}

^a*Borneo Tarakan University, Amal Lama Street No.1, Tarakan 77111, North Kalimantan, Indonesia*

Abstract

Green belt is one of efforts in reducing urban air pollution level by planting trees along the road to absorbing pollutants. The purposes of this study are: (1) to know the Willingness to Pay (WTP) to reduce air pollution in Tarakan city, (2) to identify the factors that affect WTP. Locations of residential yard plantings are located on the roadside at the content exceeding the Threshold Limit Value. WTP method was used in calculating the community's willingness to pay for the planting of vegetation absorbs pollutant. The result of this research is that people are willing to pay (WTP) for IDR.7.325.98. The new prices are obtained by WTP is smaller than the current price set. And from the results of field's collected data there is only one variable that significantly affects the WTP of respondents, is the treatment cost

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1. Introduction

Physical development of the city and establishment of industry center accompanied by the surge of motor vehicle production cause the increase of traffic density and of vehicle's side production, which produce one of air pollution (Soedomo, 2001). Air pollution resulted from motor vehicle emission will degrade the quality of air and endanger health of human being.

* Corresponding author. Tel.: +6281328528628; fax: +0-000-000-0000 .

E-mail address: miss.rainy@gmail.com

Agglomeration causes an increase in travel costs and production costs (Scott in Kuncoro, 2004). Urban air quality is extremely decreased due to the high level of transportation activities. Motor vehicles' emissions such as gasoline (premium) or diesel fuel produce CO (Carbon Monoxide), NO₂ (nitrogen dioxide), SO₂ (sulfur dioxide), CO₂ (Carbon Dioxide), Particle Pb (Lead), and photochemical smog, all of which can harm the health (Wardhana, 2004). Because of causing emissions, the rate of motor vehicle usage becomes significant upon a level of air pollution. If the contaminants stayed in the atmosphere for several times, it will be mixed with the rest of the atmosphere due to the effect of the global meteorological process. This can lead to a reduction in the ozone layer and to the greenhouse effect (Tjasyono, 2004).

If this is the case, then we need to find a way to reduce air pollution. For this case it is caused by lead (Pb). One of the efforts to reduce air pollution is through planting vegetation by the manufacture of the green line. Green line can be performed by planting the absorbing pollutant trees along the way that are useful to reduce the pollutants containing the city air. Types of shade trees that affect the up taking of lead content are *Filicium Decipiens*, *Pterocarpus Indicus*, *Caesalpinia Pulcherrima*, *Terminalia Catappa*, and *Acacia Auriculiformis* (Hendrianty, 2003).

The average growth of vehicle per year from 2004-2011 amounted to 9.87% (BPS, 2014). Furthermore, the length road in Tarakan is not increased significantly. This will cause congestion on major roads and the concentration of pollutants in congested areas. Environmental Management Agency (Badan Pengelolaan Lingkungan Hidup/BPLH) in Tarakan City has conducted a movement of reforestation. This movement is started from environment of Tarakan local government, i.e. Government Office Building in General Sudirman Street. At behind of this office building, BPLH have conducted cultivation of tree, flower and decorated the surrounding of the building environment with some banner and name-board to remind the society to love environment. Participation in controlling air pollution is also conducted by private party. PT Inhutani (Forestry Ltd) dispensed some tree seeds through Tarakan local government.

Air pollution effect of motor vehicle emission represents one of external expense that the responsibility should be taken by perpetrators, those who contribute more in producing air pollution. In fact, the external expense is not directly charged upon the perpetrators. Thus the external expense have to be assessed in some amount of money, so the external expense can be directly charged upon the perpetrators and the obtained fund can be used to increase the air quality.

Contingent valuation method is used to calculate the environmental cost, which is not included in market prices. The researcher uses willingness to pay method, which is one of types in contingent valuation methods. WTP is done by asking people some questions through questionnaires about how much compensation they need to protect the environment from air pollution caused by vehicle emissions, or "how much they want to pay to prevent this circumstance" (Button, 1996).

The offer of Willingness-To-Pay or of willingness-to accept obtained through a form of questioner survey and a form of elicitation (acquirement), with which people are asked to specify the maximum of their willingness-to-pay for environmental services, or compensation minimum of their willingness-to-accept for environmental services (Willis and Garrod, 1999).

1.1 Issue

1. What is the society's WTP value from their participation in reducing air pollution (Lead/Pb) by planting vegetation in Tarakan City?
2. Which are variables that significantly affect the value of WTP society participation in reducing air pollution (Lead/Pb) by planting vegetation in Tarakan City?

1.2 Literature review

Monetary valuation toward natural resources-based-trees is expressed by Tejo (2003) in his research of urban forest in Gadjah Mada University and by Campbell (1993) suggested in Zimbabwe. Both researches used contingency valuation method (CVM) to see the value of trees as a natural resource inventory. Samudro (2004) examined the impact of air pollution for public health in Sleman Regency. His research took data from patients of Sardjito Hospital suffered from diseases caused by CO, with code J.45 medical record. The result of this research is the increase of public expenditure due to the rising level of CO in the air.

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