

# Analysis of impact of city forest utilization to improvement of environment quality in Serang City

Anis Masyruoh<sup>1,\*</sup>, Djoko M. Hartono<sup>1</sup>, Herman Haeruman<sup>1</sup>, and Emirhadi Suganda<sup>1</sup>

<sup>1</sup>School of Environmental Science, Universitas Indonesia, 10430, Salemba, Indonesia.

**Abstract.** Serang city is the capital city of Banten province surrounded by cities and counties nearby. At this time serang city has become center of activities and migration of the counties nearby that cause the past population growth. This of course will affect to the building both physical and non physical ones. At the same time environment problem increases too, such as the height of temperature, the increase of air pollution, traffic jam, the decrease of water quality. One of the ways of handling the problems is by keeping and developing green open space, that will become city forest. This research is to find out the potency of the impact of city forest management to environment in Serang city, like air quality, CO<sub>2</sub> decrease, noise, moisture, and potency of carbon as well as potency of water absorbance. Research methodology used is using primary data of environmental quality test in five locations in Serang city which is placed near the city forest area to calculate the potency of carbon absorbance using formula of biomass tree calculation which is calculated based on the ability of plantation water absorbance. The research shows that the value of physical environment in city forest area is better than the condition of physical environment which is further from the city forest.

## 1 Introduction

Serang city is the capital city of Banten province surrounded by cities and counties nearby. At this time Serang city has become the center of activities and migration of the counties near it that causes the past population growth. This of course will affect to the building both physical and non physical ones. Industrial Building, for example: In 2014 it increased until 1.144 compared to the year of 2013 which was only 1000, besides that the increase of property in 2015 has occupied 89,95 m<sup>2</sup> (Regional Development Planning Agency Serang City, 2015) [1]. These two components both directly and indirectly will change physical site plan of the city like land functional shift and city ecosystem change. In that case the available area will have environmental burden while Serang city only has an area of 266,74 km<sup>2</sup>. The environment problem is getting bigger and bigger such as the height of temperature, the increase of air pollution, traffic jam and the decrease of water quality. The direct impact

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\* Corresponding author: [anismasyruoh@gmail.com](mailto:anismasyruoh@gmail.com)

of the building of utilities can be seen from the conversion of green open space that keeps happening.

The data of statistic Departement shows that the sport of green open space was 39% of Serang city area in 2010 but now it becomes 35% in 2015. If we let this happen again then, as the population growth that is about 6,2% per year, environmental problem will increase Serang city if it is not balanced by good building plan. Green open space that is one of the ecosystem factors with its ecology function can help us avoid environment damage, so the efforts of control must be done soon. One of the alternative ways which can give significant impact to settle the environment problem is trough making and managing city forest which is used for buffering water need, natural environment and flora and fauna protection in the city.(Nazarrudin, 1996)[2] Beside city forest can also become the most effective carbon that can decrease carbon emission in athmosphere.

Photosynthesis is the most important process as the role of carbon cycle. At this time Serang city has 9000 m<sup>2</sup> of city forest which are not cared well and doesnot look like city forest in general. So its existense is maximum with its function as ecology that can give positive value to the environment.

## 2 Method

Method used is methods of survey and observation to measure CO<sub>2</sub> of temperature, moisture, noise in five location which are divided into the nearest to the city forest until the forest ones.

Research Variable. Environment variable of chemistry phisics, namely CO<sub>2</sub>, Temperature, moisture, noise, and carbon value. Social environment social aspects that includepeoples percaption of city forest, economy environment. To calculate carbon economy and the value of water reserve.

Technique of Collecting Data.To know the role of city forest to are quality and comfort is by primary data. While secondary data is used to know and describe the condition of city forest and situation of Serang city environment from and structure and function of city forest calculating the value of carbon Absorbance. The determine the value of carbon absorbance in Serang city is based on the measuring ralue of biomassa is done by doing plotting ( 10 x 10 ) of city forest . Then the biomassa that is available in the trees is used the formula of brown and iverson (1992)[3] from Balitanhut Bogor(2007)[4] with the following.

$$Y = 42,69 - 12800 ( D ) + ( D^2 )$$

Where Y = Biomassa ( kg/m<sup>2</sup> )

D = diameter ( cm )

To determine the content of carbon in city forest in Serang city is 0,5 of Biomassa of the trees.

Economics value of water absorbance. To know the value of water absorbance is counted on the ability of plantation water absorbance assumming that one tree of age of 10 years old can buffer about 7 m<sup>3</sup> which is the similar to 5 m<sup>2</sup> of wood ( Kodoatie dan Roestan Syarief, 2006 )[5].

## 3 Discussion

### 3.1 The Result of City Forest to CO<sub>2</sub>

The result of measurement shows that measuring five areas to carbon dioxide the forest area from city forest shows the highest carbondioxide in area of measurement is in the fourth area. The fourth are is the area of Serang city office district. The possibilities the influence of the heigh carbondioxide is the crowd of vehicles activities and humans as well nearby.

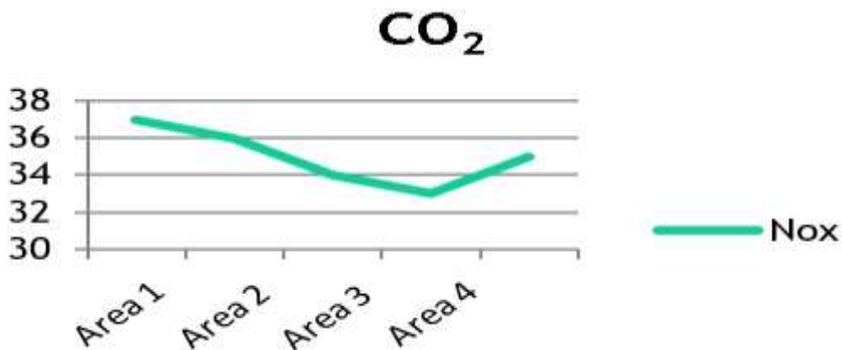


Fig. 1. The result of CO<sub>2</sub> measurement.

### 3.2 City forest role to the temperature

The result of measurement shows that measuring five areas to the temperature, the forest area from city forest shows the highest temperature the measurement done in the city forest shows the lowest temperature. This means that the city forest can reduce city temperature either from the vehicles or from the activities of humans remembering that terminal is the center of vehicles and activities more our these are no green area and for location.

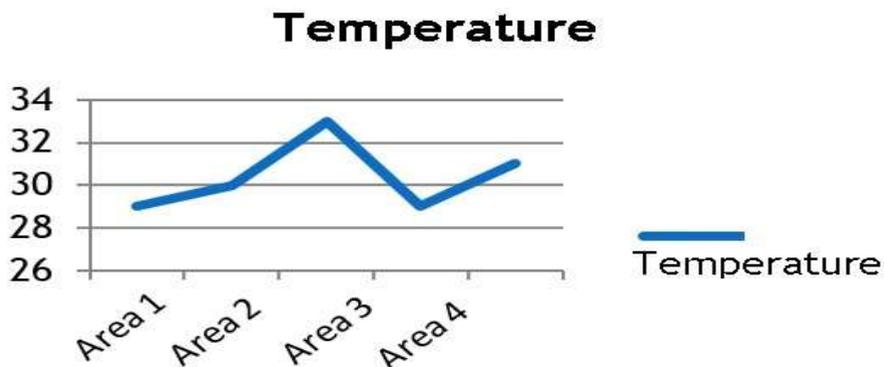


Fig. 2. The result of temperature measure.

### 3.3 City forest role to Humidity

The result of measurement shows that measurement five areas (Location) to moisture shows that the highest moisture is in the fourth location of measurement this is influenced by the green effort around Serang city governmental district although it is far from city forest.

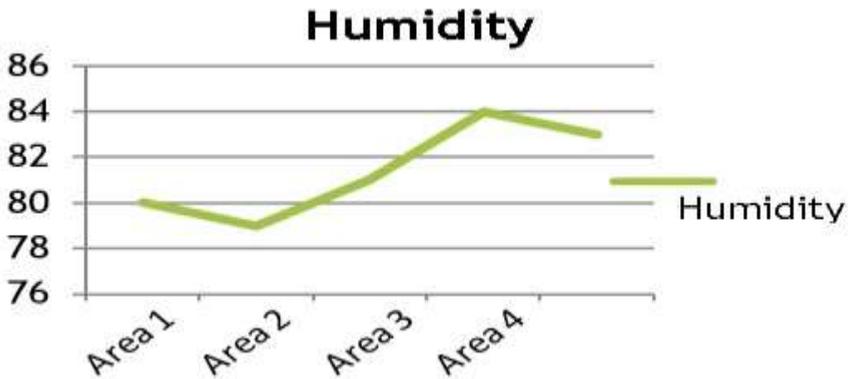


Fig. 3. The result of humidity measure.

### 3.4 City forest role to noise

The result of measurement shows that measure five location to noise, the forest location shows the highest noise. The measurement done in the city forest shows the highest noise. This shows that city forest can reduce city noise, either from the vehicles or from other sources.

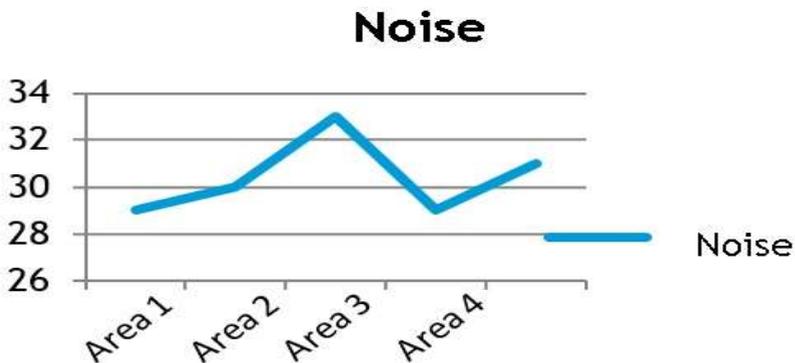


Fig. 4. The result of Noise measure.

### 3.5 Potency of carbon absorbance

According to the National Standardization Agency (2011)[6] the measurement is done on level of tegakan and PILE with diameter of 5-7,20 cm and level of trees with diameter of 7,20 cm. The result of calculation in city forest of Serang city shows the potency of carbon absorbance 1361.667,96 kg/m<sup>2</sup> per area.

### 3.6 Potency of water absorbance

The value of water absorbance of Serang city and calculated based one true ability of trees to hold water. This is expressed by kodo alie ane sjarief ( 2006 )[7] assuming that a 10 year old tree can afford 7 m<sup>2</sup> which is similar to 5 m<sup>3</sup> of wood most of the trees in city forest are 10 years old. From the calculation it is gained that the value of wood potency owned by Serang city forest is 2000 m<sup>3</sup> per hectar so it is estimated that the trees of city forest can afford 2000 m<sup>3</sup> water per hectar.

## 4 Conclusion

Based on the measurement of physical environment quality to carbondioxide, temperature, moisture, and noise done in five locations in Serang city which is from the nearest and the forest ones can describe that environment quality near city forest is much better that the for ones like the contents of carbondioxide in city forest area is 38 ppm, condition of temperature is 29°c which is colder than the forest location of 33°c. Moisture quality in city forest is better than the other locations of 80. Noise also shows that location near city forest is smaller than others of 29 dba. The potency of carbon absorbance city forest is 61.667,97 kg/m<sup>2</sup> per hectar and water absorbance is 2000 m<sup>3</sup> per hectar.

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