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## **Orientation Analysis of Urban Population to Support the Amelioration of Global Climate Change Indonesia: A Comparative Study of Bandar Lampung and Bogor**

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### **Abstract**

As the Indonesia governmental budget, however, certainly will not be able to fully finance the improvement of global climate change, so a fund rising effort on community participative scheme cannot be denied. A strategy to raise community funds widely for the amelioration of global climate change is urgently needed to be began through a series of research which is aim at analyzing funding potential available amongs community in Indonesia. Therefore this research has been conducted in Bandar Lampung City with the aim of: 1) analyzing people's perception on climate change; 2) analyzing the value of Temperature Humidity Index (THI); and 3) analyzing the Willingness To Pay (WTP) to improve the global climate and 4) comparison analyzing of the 3 results of the above studies with similar research results by Saputra and his colleagues (2016) in Bogor city. The data were collected using a closed ended questionnaire designed with One Score One Criteria Scoring System (Avenzora, 2008), then analyzed with Kruskal Wallis and Dunn Test, THI calculation and multiple linear regression; and finally, continued with comparative analysis. The results of the study show that the public have perceived higher temperature and air humidity in Bandar Lampung City than those in Bogor City.

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Similarly, THI value of Bandar Lampung City (more than 27) is also higher than the value in Bogor City (26). it means the environmental condition of Bandar Lampung City are not being comfort any more for the inhabitants. Since the WTP-values of both cities are not different significantly -- where Bandar Lampung City has WTP-value of 15620 IDR/KK/month while Bogor City just had 12413 IDR/KK/month -- therefore the estimated potential of community participation fund in Bandar Lampung City (44.01 billion IDR/year) is not just being a strong another evidence of Saputra's finding in Bogor (2016) but also become a significant data to construct a new paradigm of community-power to support the climate change amelioration globally. As Indonesia consists of 98 Cities and 416 Districts, so it can be expected that the estimated funding potential of non-government for global climate improvement in Indonesia is at least in the range of 19.86 billion IDR to 22.62 billion IDR per year.

**Keywords:** Climate improvement; community participation fund; One Score One Criteria Scoring System; Temperature Humidity Index (THI); Willingness To Pay (WTP).

## **1. Introduction**

Earth's current temperature rise of 40°C does not only adversely affect the environmental aspects as well as the economic aspect of various nations, but also has clearly threatened human existence. [12] stated that the industrial revolution in Britain in 1950 became the beginning of the rise in the earth temperature of 0.74oC. It is feared in 100 years later the earth temperature will rise 5oC. As according to [28] the increase in earth temperature of 3oC was equivalent to a loss of 1.3% of revenues; where according to [44] in 2000 there were about 150000 deaths caused by climate change. [43] excites the latest data that in November 2016 the earth's temperature has increased by 1.1°C. In relation to Indonesia, the study of [9] showed that the condition of the air became hotter throughout the twentieth century, where the average annual air temperature had increased by approximately 0.3oC. [20] research also showed that in the last 28 years the average air temperature in the Jakarta area experienced an increase rate of 0.17oC.

Various programs for climate improvement have been planned by the Indonesian government, but the available budget has not been fully able to realize the program. The solid government budget of 2016 to improve climate is only 857.1 Billion IDR; this fund is small to compare with the industrial ministry's budget of 3.16 Trillion IDR [23]. Above that, a strategy is needed to raise funds from the community as a form of public participation in mitigating and amelioration of global climate. Community participation will be more appropriate if it is addressed to the community in urban areas. [10] states that urban development can raise local temperatures because the rate of temperature rise is proportional to the rate of urban development. This is supported by [13] assertion that commonly temperatures in cities are higher than those in villages, where temperature differences may reach 6°C; this is due to differences in energy consumption, absorption of latent heat exchange, and turbulence. According to [7], urban environments accounted for 67 to 76% of energy use and 71 to 76% of CO<sub>2</sub> emissions.

Bandar Lampung city became one of the cities that should be used as a research location aimed to analyze the potential of participative funding that is available in the Indonesian society. According to [3] research results

show that there has been a very dynamic change in trend and variability of climate variables (temperature and rainfall) in Bandar Lampung City so that it is expected to cause more extreme events in the future. This is evidenced through the data of the [33] that in 2016 there have been 111 times of natural disasters as the impact of climate change; the figure increased 11% compared to 2015 which contained 89 natural disasters. The material loss suffered in 2016 amounted to 12.26 billion IDR; the number increased compared with the year 2015 which was 8.63 billion IDR. In addition, in the year 2016, per capita income figures produced Bandar Lampung City has increased significantly compared to five years ago; where in 2012 they were 27.76 trillion IDR increasing to 43.79 trillion IDR [39].

In estimating the potential of participatory funding on a national scale, a comparative study of the potential of community participation between the two towns is required; so we can know the pessimistic and optimistic estimations of the value of public participation funds available in Indonesia. Comparative studies help researchers to relate concepts that shape theory to observable indicators, understand the expectations of established theory and explain whether the theory can be materialized according to expectations. In addition to the study in Bandar Lampung City, there is similar study that has been done by [36] in Bogor City; where there is potential for participative funding of 3.22 billion IDR per month or 38.64 billion IDR per year. Thus, this study becomes important to do; in addition to analyze the potential estimates of community participation in Bandar Lampung City, it will also be possible to estimate the potential of participatory funding available on a national scale. The hope is that the results of this study will be used as a reference for the Government of Indonesia in implementing community participatory fund raising strategies to optimize global climate improvement efforts.

## **2. Method**

In line with the comparative analysis in this study, the criteria for determining the study area of Bandar Lampung is carried out with the same approaches as [36] in Bogor City, which started from the district level determined purposively on the basis of the percentage of residential areas that represent three classes based on land cover area; "Low-grade" (16% to 35%), "moderate" (36% to 54%) and "high class" (55% to 74%). Subsequently, sub-district is determined on the basis of three classes of population density, namely low, medium and densely. These three classes have different criteria depending on the population and the area of the sub-district. In Kedaton Sub-district, "low-class" has population density of 15 people/km<sup>2</sup> to 26 people/km<sup>2</sup>, "moderate class" (27 people/km<sup>2</sup> to 36 people/km<sup>2</sup>) and "densely-class" (37 people/km<sup>2</sup> to 47 people/km<sup>2</sup>), while in Tanjung Karang Pusat, the "low-class" has population density of 24 people/km<sup>2</sup> to 40 people/km<sup>2</sup>, "medium class" (41 people/km<sup>2</sup> to 52 people/km<sup>2</sup>), "densely-class" (53 people/km<sup>2</sup> to 64 people/km<sup>2</sup>) and for Sukarame Sub-district, the density at "low-grade" is 3 people/km<sup>2</sup> to 6 people/km<sup>2</sup>, "medium class" (6 people/km<sup>2</sup> to 9 people/km<sup>2</sup>), "densely class" (10 people/km<sup>2</sup> to 13 people/km<sup>2</sup>). Respondents were determined by simple random sampling with 30 heads of household (HH) per sub-district; so the total sample in the study was 270 families. The study was conducted in June to November 2016.

In conducting a large drawing process related to the estimation of potential participatory funding estimates in the Indonesian community, the research focused on four objectives: 1) analyzing public perceptions of global

climate change, 2) analyzing the THI (Temperature Humidity Index) value, 3) analyzed the WTP value of the community to participate in improving the global climate and 4) analyzed the comparison of the three results of the above study with the same research results by [36] in the city of Bogor. Public perceptions and THI values based on direct measurement results in the field are needed to conclude whether the environment of Bandar Lampung City is in a comfortable or uncomfortable category. Thus, the value of WTPs provided by the people of Bandar Lampung city and Bogor city will be a valid estimation in estimating potential of potential participatory funding in Indonesian society to be used as global climate improvement fund.

In the context of community perception, there are three main data that have been taken, namely: 1) public perception on the causes of decreasing environmental comfort, 2) public perception on the benefits of green open space and 3) public perception of temperature and humidity at the beginning of stay and now. All three data were collected using a closed ended questionnaire measured using One Score-One Criteria Scoring System [1]; with scale range 1 to 7. Furthermore, to see the difference of public perception in each sub-district to the factors causing the decrease of environmental comfort was used Kruskal Wallis analysis, then continued with Dunn Test to know the factors that most influence the decrease of environmental comfort in each sub-district. Meanwhile, to know the difference of public perception to air temperature and humidity at the beginning of stay with current was used Wilcoxon Match Pair Test analysis.

Furthermore, THI values are based on the actual temperature and humidity values that have been measured using a portable digital thermometer at the same time as distributed questionnaire. In addition, temperature and humidity data from Meteorology Climatology and Geophysics Agency of Bandar Lampung in 2012 to 2016 were also taken; then compared with the actual temperature and humidity data to see the suitability of the data. Furthermore, THI value analysis is performed per time measurement using Temperature Humidity Index [27], namely:

$$THI = 0,8T + \frac{RH}{100} \times T$$

500

T = Air temperature (°C)

RH = Air Humidity (%)

THI = Temperature Humidity Index; THI index value shows the level of comfort in an area. According to [27] in general the comfort index is divided into 3 conditions, namely: comfortable (THI: 21-23), moderate (THI: 24-25), and uncomfortable (THI: > 26).

In the community WTP analysis, five data were collected using closed ended questionnaires: 1) WTP, 2) education level, 3) income, 4) population category and 5) long domicile. There are three approaches taken to determine the amount of WTP provided by the community; 1) respondents are given the freedom to declare the value of rupiah willing to be paid (WTP direct), 2) the number of WTPs given based on the opinion of the respondents on the ability of the surrounding community with the minimum WTP range up to maximum of 1%

of the income of the community (indirect WTP) and 3) the value given is based on the allocation of funds from substitute goods to a comfortable environment (Choice Experiment).

The average value of WTPs was derived from the total sum of WTPs divided by the number of respondents. Meanwhile, the factors that influence the value of WTP given by the community can be known through multiple linear regression analysis.

Furthermore, to analyze the comparison of research results in Bandar Lampung City with those in Bogor City, there are seven research results that have been compiled: 1) public perception on the cause of environmental degradation, 2) public perception on climate change, 3) THI value, 4) Direct WTP, 5) Indirect WTP, 6) Direct WTP regression model, 7) allocation of funds from substitution goods to obtain a comfortable environment. Kruskal Wallis analysis was used to compare the results of community perception of Bandar Lampung City and Bogor City on the cause of environmental degradation; then proceed with Dunn Test to see which factors are most influencing in each city.

Furthermore, Test Z was conducted to determine differences in climate change (temperature and humidity) in the two cities based on community perception as well as direct climate measurement results in the field. In addition, Test Z was also used to determine the difference in the allocation of funds from substitution goods to obtain a comfortable environment between Bandar Lampung City and Bogor City. Meanwhile, to determine the difference in the value of community WTP Bandar Lampung City with Bogor City was conducted by T Test analysis.

### **3. Results**

#### ***3.1 Comparison of Community Perception Values***

Related to the factors causing the decrease of environmental quality, the result of perception study which is depicted by mean rank value shows 7 different perception values significantly between the people in Bandar Lampung City and Bogor City: (1) smoke of industrial activity, (2) vehicle emission, (3) waste decay, (4) fertilizer use, (5) land function changes (6) reduced green space and (7) increase in population (Table 1).

Higher mean value rank Bandar Lampung City explained that the activity of the 7 factors causing the decline in environmental quality of Bandar Lampung City is higher than that of Bogor City. Different perception values influenced by the culture of the people of Bandar Lampung City are straightforward and detailed in providing an assessment while the Bogor community has a soft culture and seldom choose extreme value.

[42] states that a person's perception is influenced by psychological factors, family and culture. In Table 1 it is also seen that the perception of people in Bandar Lampung and Bogor City on the factors that most influence the decrease of environmental quality is significantly different; the most influencing factors in Bandar Lampung City are vehicle emission and population increase whereas, Bogor City main factor is changing land function and decreasing green open space.

**Table 1:** Comparison of community perception value in Bandar Lampung City and Bogor City on the Degradation causes of environmental quality

Factor	Perception	Mean Rank	
		Bandar Lampung	Bogor
Macro	Industrial Activity	326.55	168.27
	Vehicle Emission	372.37	196.15
	Waste Decay	322.69	180.39
	Fertilizer Use	319.70	191.62
Micro	Land Function Changes	344.84	221.30
	Reducing RTH	349.38	218.31
	Population Increase	360.61	214.45

Furthermore, the value of Z Test (0.0001) on public perception of temperature and humidity change in Bandar Lampung and Bogor City with 5% confidence interval showed that there has been a change of temperature and higher air humidity in Bandar Lampung City compared with Bogor city. This is supported by data from [21], [22] that in the last five years there has been an increase in temperature (1.2°C) and humidity (2.1%) in Bandar Lampung City; higher than the temperature increase (1°C) and humidity (1.8%) in Bogor City. Data from [39], [40] also shows that in the last five years the population density in Bandar Lampung City has increased by 445 people/km while that in Bogor City has increased only by 387 people/km. Increasing the number of population resulted in the diversity of urban activities and activities that ultimately directly or indirectly can affect changes in local climate elements or city climate, especially air temperature [19].

The results of studies related to green space benefits show that there is no significant difference between the perceptions of people in Bandar Lampung City and those in Bogor City; as space to get a cool air. This can explain that both the people of Bandar Lampung City and the City of Bogor perceive that green space is important in improving global climate to get a comfortable environment.[15] states that vegetation affects the climate and comfort of a city where vegetation is able to absorb sunlight for the photosynthesis process and its shadow effect is able to block the surface heating under vegetation. [48] indicates that an RTH with an area of 680 ha can lower air temperature from 1.6 to 2.5°C and increase air humidity of 2.9% to 5.2%. [17] explains that the solar radiation energy absorbed by the canopy system can reach 90% of the total energy it receives. In addition, green open space also serves as a ventilation as well as a supplier of fresh and clean air that can be placed between or surround the structure which is massive to neutralize air pollution [2].

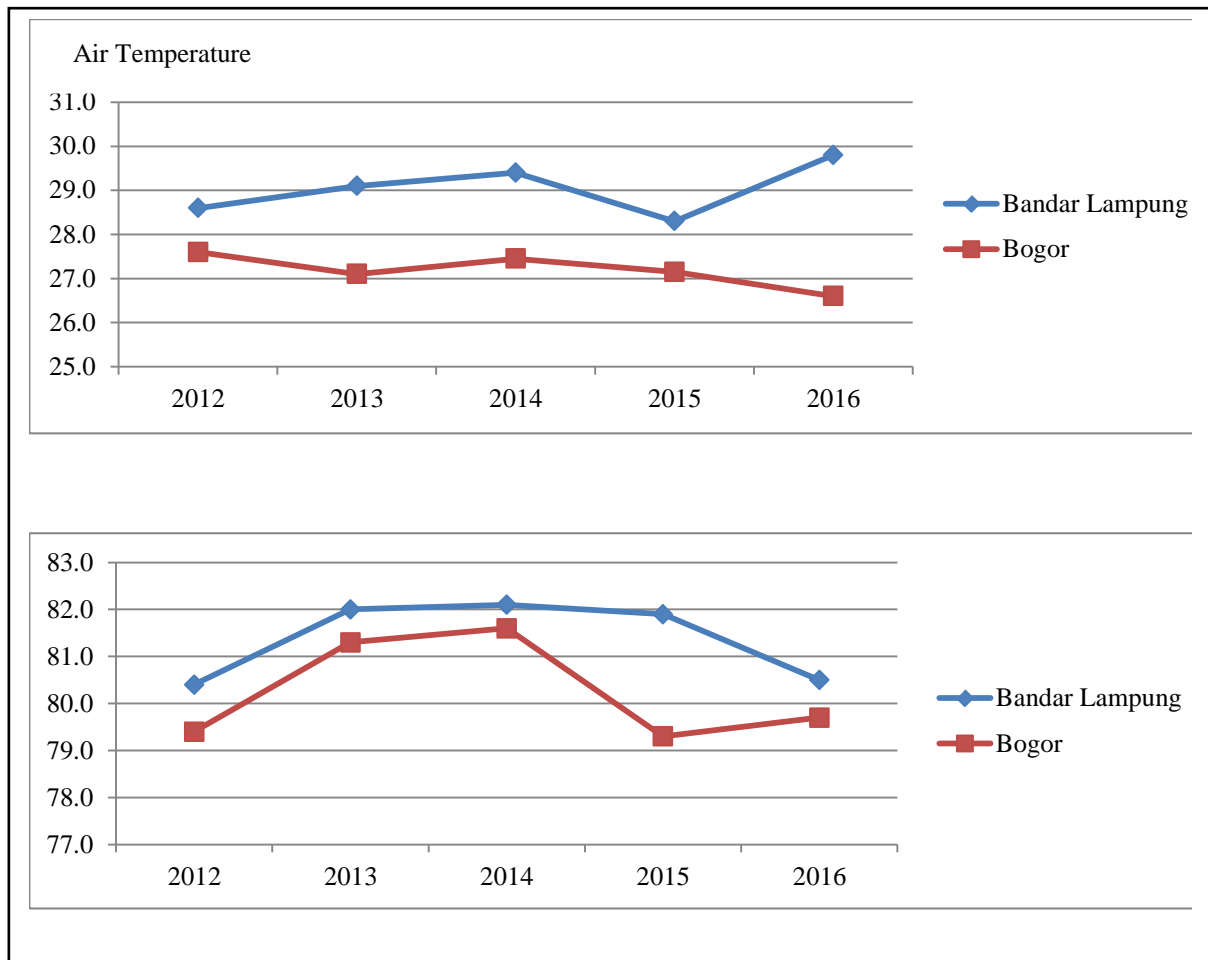
**3.2 Comparison of THI Values**

Related to the comparison of THI value (actual temperature and humidity), the result of Z Test (0.0001) with 5% confidence interval shows that the temperature of Bogor City is lower than that of Bandar Lampung City either morning, noon, afternoon and night. In the contrary, the air humidity of Bogor City is higher than the air

humidity in Bandar Lampung City. [39], [40] indicate that the available RTH in Bogor City (21%) is higher than that of RTH in Bandar Lampung city (11%). [8] research shows the Bogor region has a potential absorption of CO<sub>2</sub> of 0.48 x 10<sup>8</sup> to 0.52 x 10<sup>8</sup> tons of CO<sub>2</sub>. The higher air humidity of Bogor City is affected by rainfall. Climatology Station data of Baranangsiang FMIPA-IPB (2016) shows that rainfall tends to increase in the interval of five years both the rainy season and the dry season. [38] states that high rainfall will cause air humidity in the high area.

Furthermore, the level of environmental comfort (THI value) shows that the city of Bogor (> 26) is more comfortable than Bandar Lampung City (> 27), it is proportional to data [21], [22] that during the last five years temperature and humidity in the city of Bogor is lower than those of Bandar Lampung City (Figure 1).

[27] suggest that air temperature and humidity affect THI values, increasing temperature and humidity also increasing THI values. [34] uses THI equations for his research in Bandung regency, and concludes that at THI of 21 to 24°C, and 100% of human populations declare it to be comfortable. Whereas at THI of 25 to 27°C, 50% of human populations declare it to be convenient and at THI > 27°C, 100% of human populations have stated that it is uncomfortable.



**Figure 1:** Comparison of temperature and humidity of Bandar Lampung City and City of Bogor based on BMKG data.

### **3.3 Comparison WTP Values in Global Climate Change Amelioration**

#### **3.3.1 Comparison of Direct WTP (Willingness To Pay) Values**

The result of comparative analysis of direct WTP value which is depicted by result of T test (0.1352) with 5% confidence interval shows that there is no significant difference between WTP value given by community of Bandar Lampung City and City of Bogor. This means that both the people of Bandar Lampung City (15620 IDR) and the people of Bogor City (12413 IDR) are willing to pay each month to participate in global climate amelioration in order to obtain a comfortable environment. In addition, the results of statistical analysis related to explanatory variables affecting the value of WTP in Bandar Lampung City and Bogor City are the same, namely: 1) variable income level, 2) education level, 3) population category and 4) long domicile. [6] in his research concluded that there are several factors that affect the willingness of the community to pay as an effort to improve the environment, namely knowledge, attitude, behavior and community participation in the environment. [35] in his research in Pekanbaru found that the large willingness of the community to pay the cost of clean water supply in Pekanbaru City varies based on the economic aspect of the community; ( 6671.13 IDR/m<sup>3</sup>), this tariff is higher than the average tariff of PDAM Tirta Siak Pekanbaru (3.300 IDR/m<sup>3</sup>).

Results of multiple regression analysis depicted by the value of coefficient of determination ( $R^2$ ) showed good regression model obtained;  $R^2$  value of Bandar Lampung (61.82%) and  $R^2$  Bogor city (59.43%). Associated with [16] statement that the greater the value of  $R^2$ , the better the regression model obtained. According to [24] the value of  $R^2$  does not necessarily have to be large in research on the environment related to human behavior. Thus, the results of research CVM (Contingent Valuation Method) this can be believed the truth and reliability. In addition, the correlation coefficient (R) of Bandar Lampung is 0.776 and the coefficient of Bogor City is equal to 0.763 indicating that the correlation in the regression equation is strong; where according to Colton (1974) the value of  $R = 0.51-0.57$  has shown a strong correlation.

#### **d Bandar Lampung**

In the case of comparison of WTP regression equation in each kelurahan, the result of analysis shows that each kelurahan in Bandar Lampung City and Bogor City has an average expectation of different WTPs (Figure 2). This difference is caused by 4 things namely; 1) the economic condition of society (income), 2) the level of community awareness, 3) the categories of the population (native or migrant) and 4) long domicile. Research [26,18] and [4] demonstrated that community WTPs against environmental services relate to income levels. Research [32] related to the estimation of environmental services value of Ciseel sub-watershed using contingent valuation method shows that the average estimation of WTPs (users of irrigation water and PDAM subscribers) is 6535.152 IDR / person / year. This value is still smaller when compared with the value of WTP people in the Arau watershed which reached 93.90 million IDR – 15.62 million IDR/ year [29]. The low value of WTP in the Ciseel sub-watershed is due to two reasons: first the economic condition of the people in the Ciseel sub watershed is lower than that of the Arau River Basin; Secondly, the level of public awareness in the Ciseel sub-watershed towards environmental sustainability is also lower than the community in the Arau River Basin area.



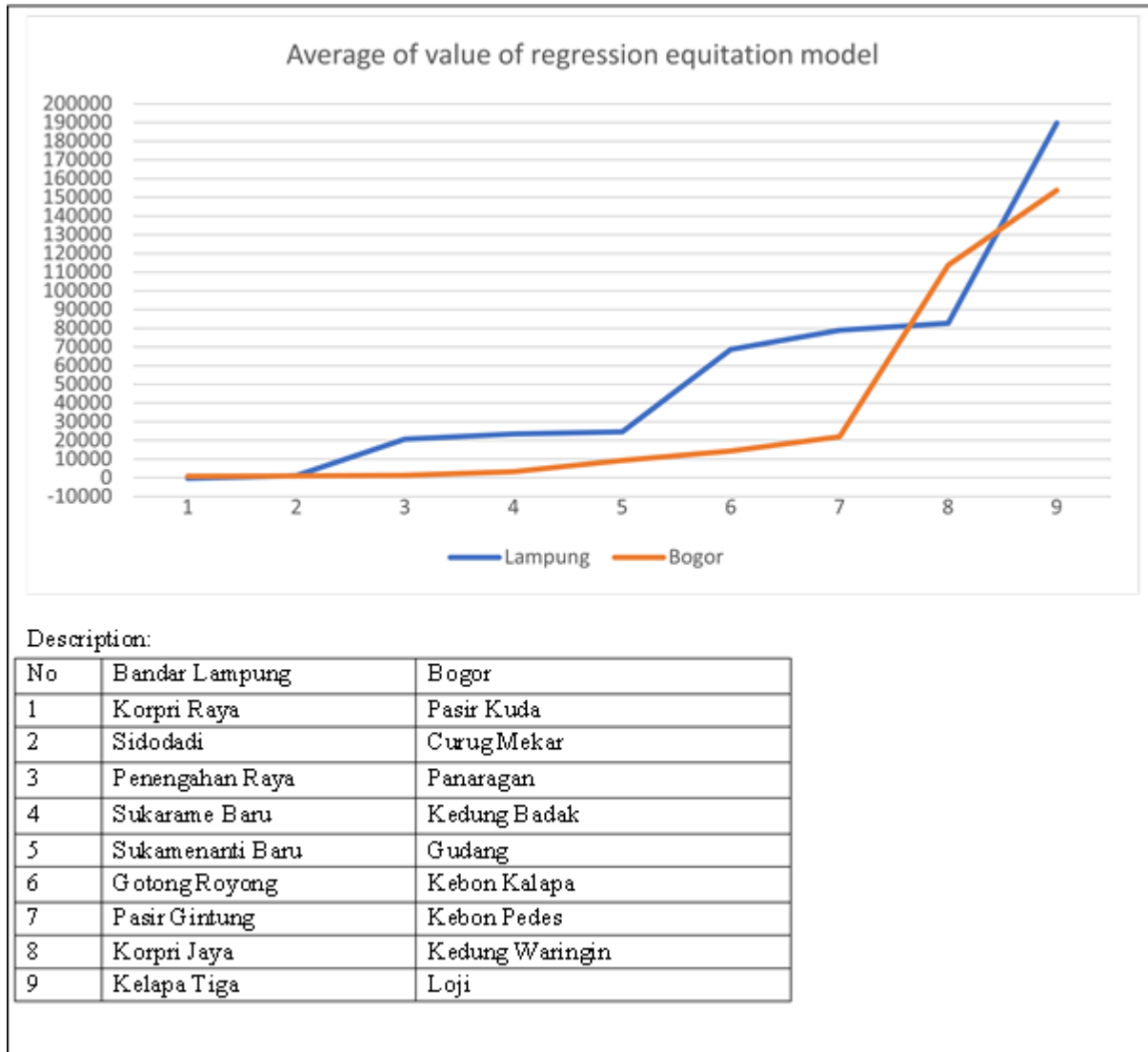


Figure 2: Comparison of average estimation of WTP Bogor an

### 3.3.2 Comparison of WTP (Willingness To Pay) Indirect Value

The value of WTP is not directly based on the respondent's perception on the financial ability of the people living around their residence. The result of the study based on T test, where p-value is equal to 0.0001 ( $< \alpha$  0.05) explains that indirect WTP value of people in Bandar Lampung City (15967 IDR) and in Bogor city (4872 IDR) is significantly different. Respondents of Bandar Lampung City tend to see the ability of other people in giving WTP equal to the ability of respondents themselves, on the contrary the respondents of Bogor City see the ability of the people around it tend to be lower than their ability. These different perceptions are influenced by the value system and personality traits of the respondent; [37] states that perception is a person's ability to differentiate, group and focus the assessment on an object. This approach refers to a community disposable income of 1% of their income. Statistically, the magnitude of  $\alpha$  exceeding 5% can give a significant effect so that if it is assumed that the income received by society is only taken at 1%, then it does not give significant effect to the disposable income of society

**3.3.3 Comparison of WTP value based on Choice Experiment (CE) approach**

In the context of the efforts that people have made in modifying the microclimate, there are 7 businesses that have been done by the people in Bandar Lampung City and Bogor City to get a comfortable environment for their own families, namely: 1) shelter/canopy building, 2) raising house, 3) buying fan, 4) buying air conditioner, 5) buying fan and air conditioner, 6) adding windows and 7) planting trees. The result of comparison study shows that there are 6 businesses that have p-value <0.01 which means that there are significant differences in the value of funds allocated by the community in Bandar Lampung City and Bogor City in creating a comfortable environment namely 1) shelter/canopy building,(2) buying fan, (3) buying air conditioner, (4) buying fans and air conditioning, (5) adding windows and (6) planting crops, while the allocation of funds to raise houses is not significantly different; in detail can be seen in Table 2. There is a significant different fund allocation value of the effort that has been done depending on the needs of each respondent and the purchase price of goods in a region; Bogor City is administratively adjacent to the capital of the State of Indonesia while Bandar Lampung City is located in different islands with the State Capital of Indonesia, so the purchasing price of goods is more expensive in the city of Bandar Lampung. [30] states that perception is influenced by internal factors related to oneself (educational background, experience difference, motivation, personality and needs).

**Table 2:** Value Comparison of Fund Allocation for Climate Amelioration Efforts

<b>Modification Effort</b>	<b>P-value</b>	<b>N (HH)</b>	<b>Bogor</b>	<b>N (HH)</b>	<b>Bandar Lampung</b>
Canopy Building (Z-test)	<0.0001	57	3.250.877	183	1.088.524
Elevate House (Z-test)	0,1661	51	57.941.176	81	48.679.012
Buying Fan (Z-test)	<0.0001	181	121.104	152	230.526
Buying AC (T-test)	<0.0001	23	2.060.869	87	3.293.103
Buying Fan and AC (T-test)	<0.0001	20	2.264.250	19	3.544.736
Adding Window (Z-test)	<0.0001	85	1.424.705	115	3.293.913
Planting Trees (Z-test)	<0.0001	220	63.454	266	597.612

Table 2 shows that planting crops is the most common undertaking by the people of Bandar Lampung City and Bogor City in microclimate amelioration to create a comfortable environment in their homes. People who prefer to plant trees in the yard indicate that people still have concern for the environment.

The community realizes that the trees/plants in the yard will contribute quite important for fresh and clean air circulation for the residents living in urban areas with high levels of air pollution. Urban yards with trees/plants can play a role as ecosystem buffer, healthy oxygen supplier and air cleaner, noise reducer, natural cooler so that air conditioning work is not too heavy and they also save electricity usage.

The composition of vegetation in the park has a considerable influence on the comfort index value due to the

evapotranspiration process which causes the temperature and humidity to cool down [25].

### 3.4 Discussion

As a follow-up to the findings of this study, the discussion sessions will be directed to two important fundamentals for discussion: 1) potential estimation of participatory funding that is available Indonesian society, and 2) strategies for realizing the potential of participatory funding into actual to be used as a fund of amelioration global climate of Indonesia.

People in Bandar Lampung City and Bogor City have the same orientation in supporting global climate change amelioration which is indicated by the absence of significant differences in the value of WTP.

In addition, it can be seen that the potential funding estimation from each city is not significantly different; the potential estimation of participatory fund in Bandar Lampung City is 44.018 billion IDR per year with 234838 head families [39] and potential of participant fund in Bogor City is 38.645 billion IDR per year with 259442 head families.

Furthermore, the value of the potential of both cities' participatory funding can serve as a basis for estimating the amount of participative potential existing in Indonesian society; consisting of 98 Municipalities and 416 Regencies, so that potential participatory fund estimation which is available in Indonesian society in supporting Indonesian global climate change amelioration is at least in the range of 19.863 trillion IDR to 22.626 trillion IDR per year.

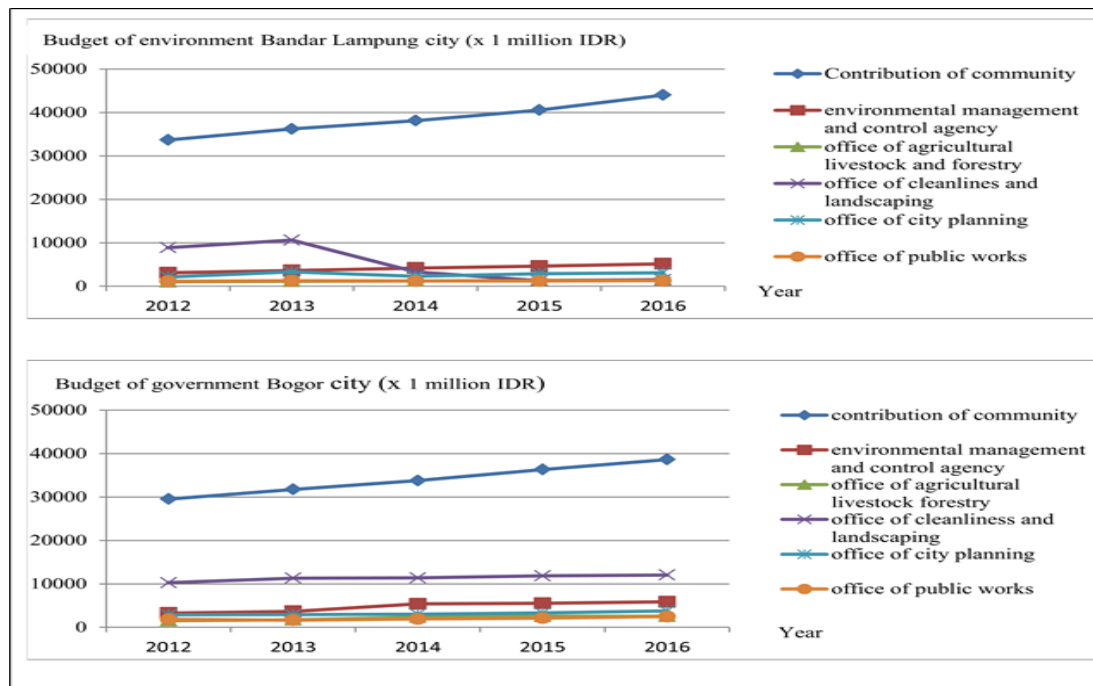


Figure 3: Comparison of SKPD funds for environmental management in each stakeholder

Although the government budget fund of Bandar Lampung City and Bogor City that is in the same regional

work unit is combined, the fund will not be able to balance the value of the potential of participative fund of society in one city. It is proved that in the last five years the fund of environmental improvement in various regional work unit related to urban environmental management is smaller than the potential of participative fund in each city; the government of Bandar Lampung City has only averages 1/35 of the potential of available society participatory funds, and the government of Bogor City has only 1/19 of the potential of available society participatory funds (Figure 3). The greater the government budget of Bogor City in each regional work unit related to the management of urban environment compared with the city budget of Bandar Lampung City is influenced by the area and also the number of natural disasters that occur in each city every year. [39], [40] shows that the total area of Bandar Lampung City is 19722 Ha, wider than the area of Bogor city of 11850 Ha. However, for the vulnerability of the city to the occurrence of natural disasters, Bogor City is more vulnerable than Bandar Lampung city where in 2016 the number of natural disasters that occurred in the city of Bogor was 141 disasters, while natural disasters that occurred in Bandar Lampung was only 111 disasters.

In terms of the strategy of realizing the potential of community participatory funding into actual funds, it is needed an institute that is formed on community initiatives in the form of a non-profit entity to run and oversee the community fund management program independently. This is based on the results of studies showing that respondents in Bandar Lampung city (88.15%) and in Bogor city (86%) prefer the community groups that manage the funds independently. Consequently, the existence of environmental NGOs in Indonesia is important for functioning especially long-standing NGOs and extensive experience so that the role of facilitator and coordinator of environmental program management from community participatory funds can be taken over by NGOs -Environment.

Associated with the rapid development of environmental NGOs in Indonesia - but not accompanied by tangible results in the process of improving environmental quality and the emergence of various critiques about their performance - environmental NGOs as alternative development agents experience a gap between their goals and existing reality. [44] research indicates that the performance of an NGO-environment as an alternative development agent has no consistency in fighting for its vision and ideals, but only as an executive of other larger forces. It is undeniable that the majority of NGOs in Indonesia still rely on overseas funding sources of up to 65%, while 35% are obtained from various domestic sources [14]. NGO-environment dependence on foreign funds is considered very chronic and has an impact on the image and effectiveness of NGO-environment work. According to [45] foreign funding system like a double-edged knife, on the one hand, foreign funds have played a major role in encouraging the growth and development of environmental NGOs in Indonesia. However, on the other hand, foreign funds also create dependence and shut down the NGO-environment creativity. [43] also mentioned that NGO-environment dependence in Indonesia on foreign funds also caused them to be less creative, especially in mobilizing local potential. Thus, the existence of the above participative community funding potential becomes the momentum for the NGOs to improve their performance and integrity professionally and to re-create the real role of LSM-environment, namely as a pillar of civil society.

Compared with Climate and Land Use Alliance (as one of the largest donations) during 2014 to 2016, the potential of available participatory community funding in Indonesia is able to reduce NGO-environment dependency on foreign donors and even NGOs no longer need funds from foreign donors. Indeed, CLUA's

funding for environmental NGOs only amounts to 550 billion IDR or about 5% of the potential of available participatory urban funding in Indonesia [5]. If managed well, the potential of participatory funding can even be used to carry out the consolidation movement of settlement land. [31] states that land consolidation serves as a basis for the development and development of dynamic urban communities to participate in urban development, and to prevent the occurrence of social vulnerability due to differences in the settlement environment. Land consolidation is one of the strategies to overcome the problems of land management and to encourage community participation in order to reorganize land tenure by adjusting land use by taking into account the needs of the area. This becomes necessary to be done as an effort in improving the quality of the environment so that the structuring of a region becomes more directed. In the context of Bandar Lampung City, the potential of available participatory funding can be used to free land for the manufacture of green space in each urban village effectively every year. Referring to the price of land applicable in the year of research conducted, to build RTH in one urban village with an area of 12000 m<sup>2</sup> required funds amounting to 3.66 billion IDR. For that matter, for 116 urban villages in Bandar Lampung it only takes 10 years to make every urban village has adequate and functional Green Open Space.

#### **4. Conclusions and Suggestions**

##### ***4.1 Conclusion***

Indeed, the negative impacts of climate change have been felt by society at large in their daily lives. This is shown through the perception of people in Bandar Lampung City and Bogor City which states that the environment where they live in is not comfortable anymore. Environmental problems were experienced by each sub-district was increasingly complex. This public perception is supported also by the calculation of THI value which indicates that the environment of both cities is not comfortable anymore. The indication of discomfort has prompted individuals to conduct limited amelioration efforts in their dwellings and are also willing to participate through monthly contributions (WTP) in support of global climate change amelioration. The large potential of participatory community funding available in Indonesia has demonstrated that the non-governmental movement has the potential to overcome the limitations of government funds in conducting climate improvement efforts. In fact, these funds can serve as a source of funding for environmental NGOs to maintain their existence and sustainability. The amount of WTP they show not only illustrates their willingness to participate, but also reflects their need for air comfort in their respective lives

##### ***4.2 Suggestions***

Further research is needed in relation to community participatory fund management. This becomes very important to improve the effectiveness and transparency of community participatory fund management.

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