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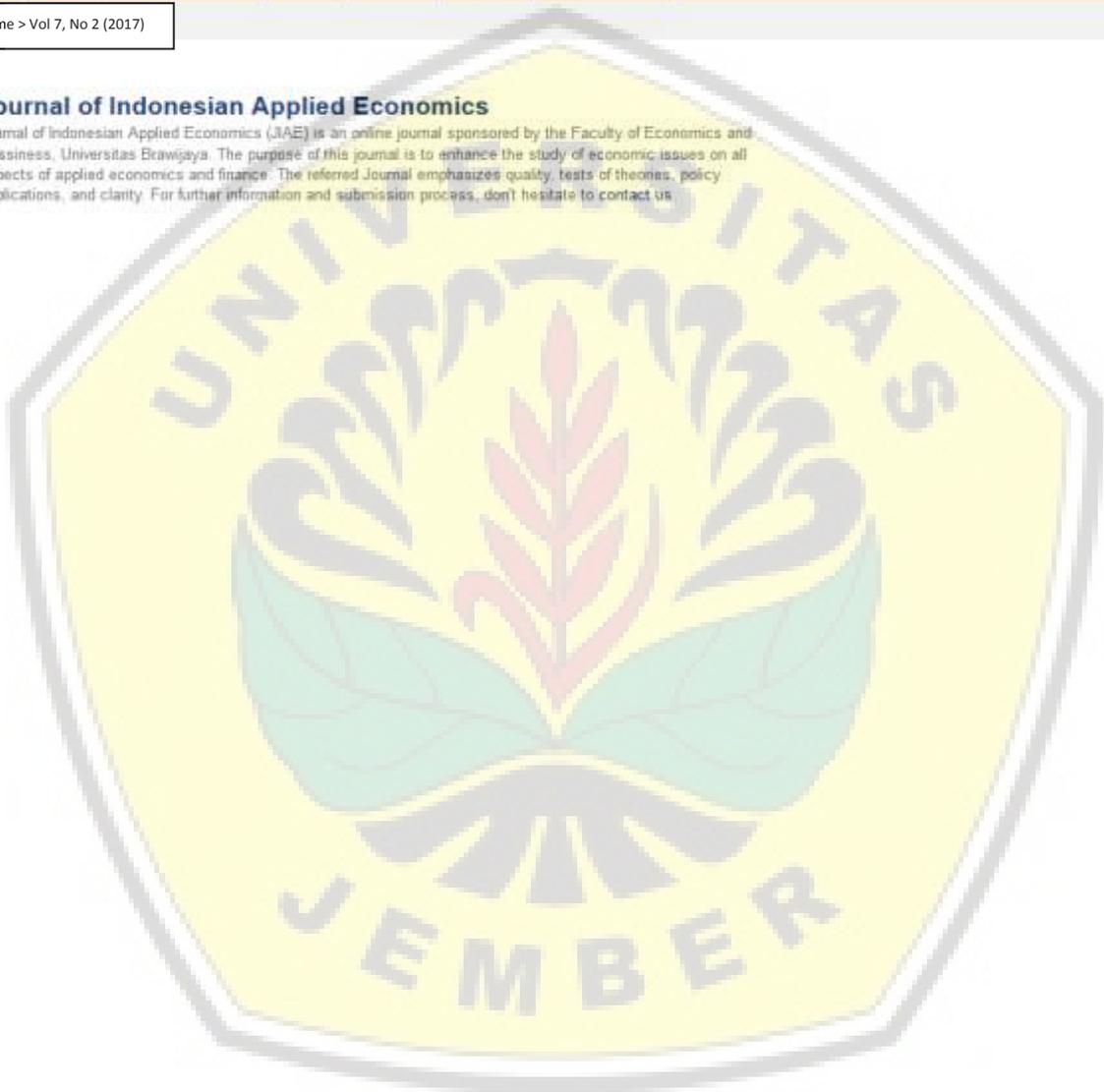
## Journal of Indonesian Applied Economics Universitas Brawijaya

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### Journal of Indonesian Applied Economics

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## ABILITY TO PAY AND WILLINGNESS TO PAY ANALYSIS OF CLEAN WATER NEEDS FROM DUSUN SEPURAN, JEMBER REGENCY

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### ABSTRACT

This study aimed to discover how the people of Dusun Sepuran in Jember Regency could fulfill clean water needs using Ability to Pay (ATP) and Willingness to Pay (WTP) approaches. This study used quantitative analysis method affirmed by qualitative method. Based on data processing result, it is known that the ATP of Dusun Sepuran people categorized within captive rider category. It means that, ATP value for water needs proportion is lower than WTP. This is due to high Electricity Base Tariff Rate which causes water fulfillment cost, as most of them must use water pump. Therefore proper policy implementation is needed at Dusun Sepuran in the future.

**Keywords:** Clean Water Crisis, Ability to Pay, Willingness to Pay

**JEL Classification:** Q25, Q56

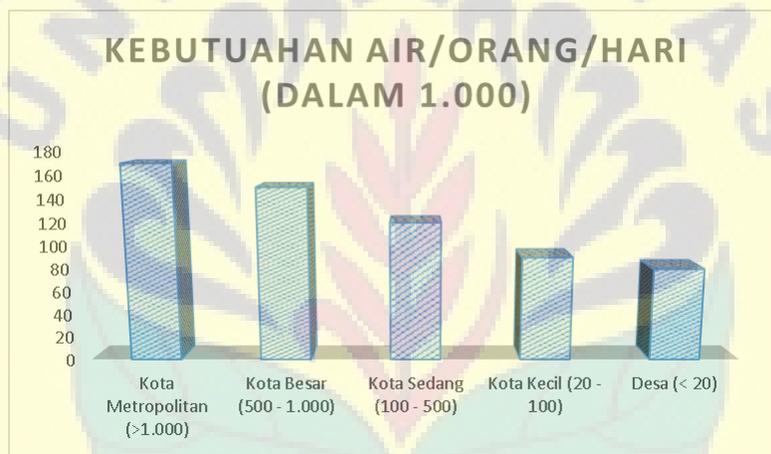
### INTRODUCTION

Water is basically one of human primary need that serves not only as consumption but as other function as well that support human life needs such as: transportation, irrigation, hydro power, and many others. Referred to the history, water management had been conducted by human since centuries ago. One of the historical proofs lies in Egypt, which since 7000 years ago had utilized water (around Nil river) as irrigation means (Hassan, 2010). Even, its management not merely as irrigation, but also in several years later developed as means as primary and the most effective one in Egypt. Even, several centuries later developed more into large scale with lifting water concept or river water transfer into higher location utilizing water stream as its lifting power.

High water needs by human as well as other living creature, makes certain action is needed to well maintain water resource sustainability for the future. One of the examples is study conducted by Hansen (2015), which from 2005 into 2010; water debit in several

regions in America suffered approximately 10% decrease so that water needs for every domestic purpose was limited from previously 98 gallons into 88 gallons per day. Water scarcity issues outbreak makes several parties to innovatively act, such as reducing water needs or even water recycling.

For Indonesia itself, water needs data as explained by Directorate General of Human Settlement of Public Work Board in 1996 is shown as Figure 1. From the figure it could be comprehended that highest water consumption was for society living in metropolitan city with more than 1,000,000 residents that reached more than 150 liters/person/day. Meanwhile rural society consumed the lowest water with 60 to 80 liters/person/day.



**Figure 1. Water Needs Per litres/person/day Based on Settlement**  
 Source: Planning Criteria of Directorate General of Human Settlement of Public Work Board, 2016

Given to the fact of water scarcity and water needs fulfillment, it would be interesting to refer to the case of Dusun Sepuran of Sumberjati Village of Silo district of Jember Regency. In this Dusun, water sources are abundant. With nine water sources or the most number compared with other dusun, but almost entire clean water needs for domestic consumption are served from private wells. The available water sources are only utilized for bathing and washing. Even, the available water sources are mostly utilized for fulfilling other dusun adjacent with Dusun Sepuran. Therefore, this study conducted using Ability to Pay and Willingness to Pay analysis approach. These two approaches selected to discover respondent

ability and willingness in fulfilling clean water needs. Referring to the background, study question in this study directed to the following question: How do the people of Dusun Sepuran fulfill clean water needs by using ATP and WTP approaches?

### **LITERATURE REVIEW**

Literature review serves to support and affirm theory and support in deepening study analysis. Therefore, literature review in this study directed to the following three issues: (i) Explanation concerning clean water utilization and (ii) Ability to Pay (ATP) and Willingness to Pay (WTP) approaches that commonly used to discover the people ability and willingness in fulfilling clean water needs.

#### **a. Clean Water Utilization**

Traced back from its history, water utilization had been basically conducted by human being since thousand years ago from the people of Egypt, Mesopotamia, Indus resident, Chinese Society, and others (Hassan, 2010). Most of ancient resident utilized water not only as consumption commodity and transportation means, but also as irrigation means. Method in obtaining water also developed rapidly. "Shaduf" was the first method used by Mesopotamia people in 2000 years ago. In this method, they transferred water using pole and tools made to resemble bucket. Next method was "The Saqiya" in which ferris wheel were used to transfer water from lower into higher place for irrigation means and daily needs. This method developed in 518 B.C. by Indus river valley society, 350 B.C. by the Indians, and followed by Egypt, Rome, and Greece Society in 525 until 322 B.C.

The last method which deemed to inspire water pump was "The Archimedean Screw," or usually called as Archimedes rotor pump. This method initially applied and rapidly developed in Egypt, thereafter followed by Roman and Spanish. Not far different from what prevail in several countries across the globe, water utilizations in Indonesia according to Ministry of Environment (2016) are as follows:

1. Consumption Needs
2. Transportation
3. Irrigation
4. Sanitation

- 5. Economic Needs
- 6. Cultivation
- 7. Energy

However, poor water utilization impacted toward low environment quality. According to WHO and UNICEF data in 2015, toddler death rate was 88% caused by bad sanitation and low access toward clean water. And even for clean water access itself, decrease every year (especially in urban area). UNICEF data revealed that clean water access in 2007 as of 63% decreased into 28% in 2010. This was merely due to clean water available in urban area suffering from decrease every year. This decrease merely caused by improper clean water utilization especially from domestic waste that commonly directly thrown into river or water tunnel with no filtration process previously.

b. ATP and WTP Approach

Ability to Pay (ATP) is someone ability to pay service obtained according to deemed ideal income. The referred service is not limited to service business but also normative service (service commonly unable to calculate) obtained by someone (Sagoff, 2010). For instance, service obtained from natural resource utilization and others. Approach generally used in ATP analysis is based on cost allocation for obtaining desired service from regular income. In other words, ability to pay is society ability to pay service cost they perform. In this study, the following are factors probably influence ability to pay:

- 1. Per month income size
- 2. Clean water needs
- 3. Total cost to fulfill clean water; and
- 4. Income percentage used for clean water fulfillment cost;

Based on calculation described by Susenas, its simulation could be seen in Table 1.

**Table 1. Domestic Paying Ability (ATP) Simulation (Per month)**

|                   | <b>2004</b> |
|-------------------|-------------|
| <b>Criteria I</b> |             |

|                                       |                  |
|---------------------------------------|------------------|
| Food (Essential) <sup>a</sup>         | 448,607.10       |
| Non Food (2) <sup>b</sup>             | 470,465.70       |
| Disposable Income                     | 470,465.70       |
| ATP = (5% disposable Income)          | <b>23,523.28</b> |
| <b>Criteria II</b>                    |                  |
| Cigarette                             | 94,498.48        |
| Cigarette + Non Food (1)              | 359,345.60       |
| ATP = 10% X (cigarette + Non food(1)) | <b>35,934.56</b> |
| <b>Criteria III</b>                   |                  |
| ATP = 4% X total expenditure          | <b>36,762.91</b> |

Source: Susenas, 2010

Willingness to Pay (WTP) is user willingness to disburse reward for service they obtain. Approach used within WTP analysis based on user perception toward cost from the obtained water service. The following are factors that might influence WTP in this study:

1. Water quality obtained
2. Material price fluctuation (including electricity and tools) to obtain water
3. User satisfaction (utility) toward water obtained.

There are several probabilities to discuss ATP and WTP analysis result, amongst them are (Guna, 2010):

1. ATP higher than WTP

This condition reveals that paying ability is higher than willingness to pay such service. This occur if user has relatively high income but with relatively low utility against service. User in this condition is referred to as *choiced riders*.

2. ATP lower than WTP

This condition is reverse of above condition, which user willingness to pay such service is higher than their ability to pay. This probably occurs for user with relatively low income but with very high utility against such service, so that user willingness to pay such service tends to be affected by utility. In this condition user in this condition is referred to as *captive readers*.

3. ATP equivalent to WTP

This condition reveals equivalent level between ability and willingness to pay service consumed by user. In this condition balance occur between user utility with cost disbursed to pay such service.

## **METHODOLOGY**

In this study, the following are aspects considered as study method compilation:

### **a. Study Location**

As uniqueness and case related with natural resource compensation, then Dusun Sepuran of Sumberjati Village of Silo District of Jember Regency was selected. This was due to this study has quite abundant water resources, yet unable to be utilized by its society to fulfill clean water needs. What make it worse, water resources in this dusun were utilized by other dusun and even village to sufficient the domestic clean water needs.

### **b. Data Type and Source**

The data types used in this study were primary and secondary data. Primary data obtained by conducting interview toward respondents through questionnaire. Total sample taken were 38 persons. Such data include education level, monthly income level, expenditure level to obtain clean water, people satisfaction level toward water obtained, people willingness to obtain clean water as determinant factors to obtain clean water raise (such as electricity basic fee increase, water pump increase, pipe price increase, and other) and many others.

Secondary data obtained from institutions related with how policy conducted to date in supporting society of Dusun Sepuran in obtaining clean water. Secondary data were also obtained from literatures relevant with this study topic.

### **c. Data Analysis Method**

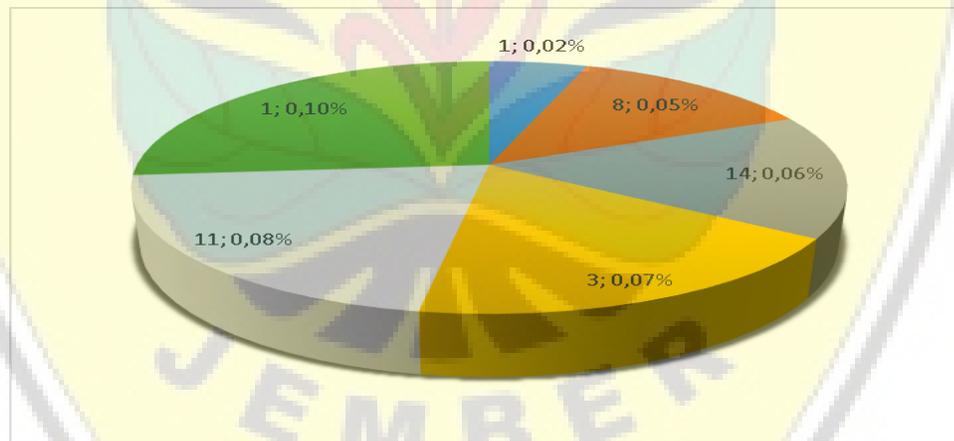
Data and information obtained from this study would be analyzed qualitatively and quantitatively. Quantitative data analyzed through ability to pay and willingness to pay approach. Meanwhile quantitative data affirmation conducted qualitatively.

## **RESULTS**

From this study result, there were to interpretations obtained based on field data description: (i) *Ability to Pay* and (ii) *Willingness to Pay*.

a. *Ability to Pay* of Dusun Sepuran people toward Clean Water Needs Fulfillment

Based on field data analysis, entire society at dusun sepuran utilizes wells. Meanwhile the available water resources only utilized for washing and bathing. ATP calculation result revealed that income percentage proportion toward monthly water needs could be detail comprehended in Figure 2. It could be translated that : (i) there was 1 person proportionated 0.02% of his/her income for water needs per month, (ii) 8 persons proportionated 0.05 of their income for water needs fulfillment per month, (iii) 14 persons proportionated 0.06% of their income for water needs fulfillment per month, (iv) 3 (three) persons proportionated 0.07% of their income for water needs fulfillment per month, (v) 11 persons proportionated 0.08% of their income for water needs fulfillment, and (vi) 1 (one) person proportionated 0.1% of his/her income for water needs fulfillment (see Figure 2).

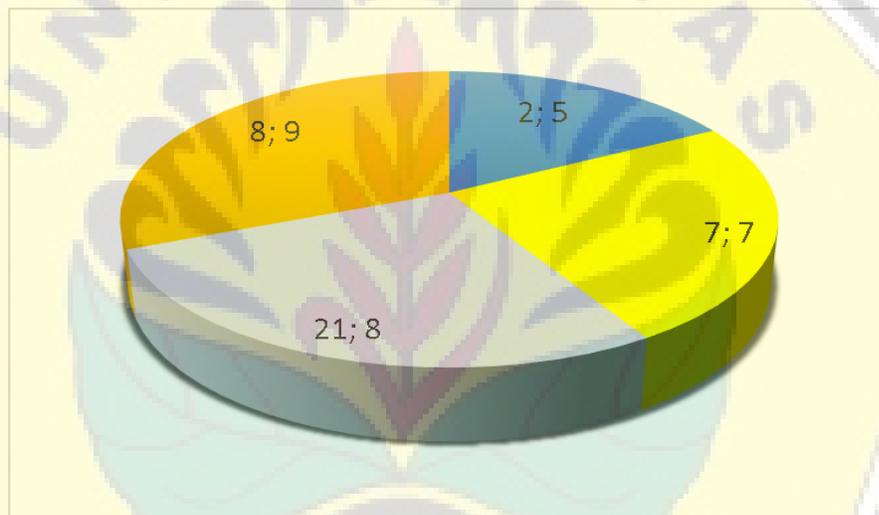


**Figure 2. Income Proportion Percentage for Water Needs Fulfillment Based on ATP Analysis**

Source: Field Data, 2016 (processed)

In average, monthly expenditure for water fulfillment ranged between Rp 35,000 until Rp 50,000 per month. This water needs size is conversion from electricity payment. This is due to in general respondent did not obtain clean water facility from PDAM. So

that, water needs fulfillment was attempted from private wells using water pump to lift it. Meanwhile total water needs scale per month could be seen in figure 3. In that figure, it could be comprehended that water needs per month ranged between 5 until 9 M<sup>3</sup>. In which: (i) 2 persons used 5 M<sup>3</sup> clean water month, (ii) 7 persons used 7 M<sup>3</sup> clean water per month, (iii) 21 persons that used 8 M<sup>3</sup> clean water per month, and (iv) 8 persons used 9 M<sup>3</sup> clean water every month. These water usages per month, according to respondent information were depended from total family member. The lesser total family member, then clean water usage per month would also lesser, and vice versa (see Figure 3).



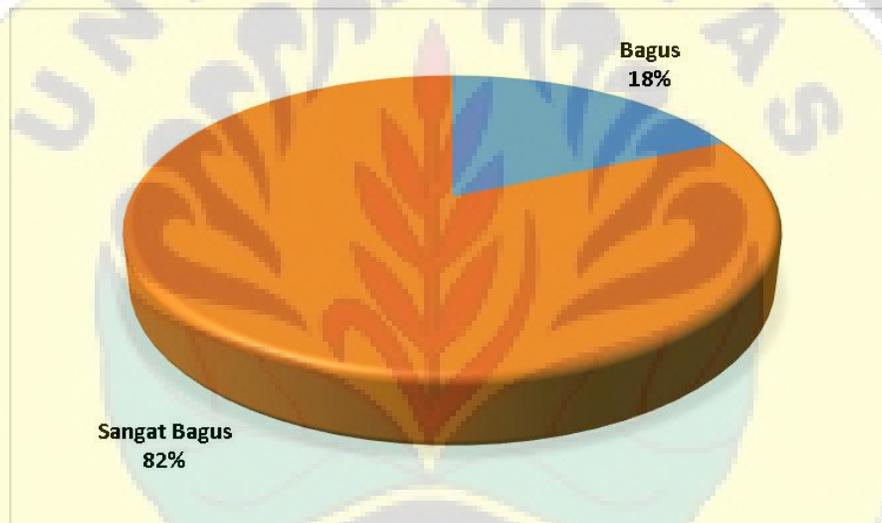
**Figure 3. Water Needs Per Month ( in M<sup>3</sup>)**

Source: Field Data, 2016 (processed)

Mostly, respondent worked as farmer or farmer labor with income ranged between Rp 500,000 until Rp 2,500,000 per month. People with income below Rp 1,000,000 mostly were farmer labor. Meanwhile those with more than Rp 1,000,000 income were farmer of field owner. Expenditure proportion average from respondents was from consumption (food) and non-food (including cigarettes). Income proportion for food consumption generally ranged from 30% until 40%. Meanwhile nonfood consumption ranged between 25% until 30%. The remaining portion, were for cigarette consumption that reached 10%.

b. *Willingness to Pay* of Dusun Sepuran People toward Clean Water Needs Fulfillment

*Willingness to Pay* analysis result revealed that the obtained water quality was mostly good. The detail is presented in figure 4. There were 18% (7 persons) respondents stated that water obtained from wells is in good quality. The remaining respondents, 82% (31 persons) of them stated very good water quality. This good water quality is nothing else but due to its location that lies in mountain directly adjacent with protected forest. So that maintained natural (environmental) condition provides positive impact toward recovering water quality. Even in general, the people are satisfied with water they obtained.



**Figure 4. Water Quality Obtained Based on Respondent Assumption**

Source: Field Data, 2016 (Processed)

But, electricity basic fee increase impacts the cost increase to fulfill clean water needs. Based on people information, electricity basic fee increased clean water consumption cost of Rp 20,000 per month. Detail of this Electricity Base Tariff Rate as analyzed within WTP yielded the following result (figure 5):



**Figure 5. WTP of Dusun Sepuran Society to Fulfill Clean Water Needs**

Source: Field Data Analysis, 2016 (Processed)

In figure 5 it could be comprehended that Dusun Sepuran WTP to fulfill clean water indicates Rp 20,000 increase that caused by electricity basic fee. There were 2 (two) respondents that previously paid Rp 35,000 per month for water needs, the new fee increased to Rp 55,000. For people who previously paid Rp 40,000 per month (14 respondents), as new Electricity Base Tariff Rate increased, they had to pay Rp 60,000 per month. Meanwhile the remaining 22 respondents that previously paid Rp 50,000 per month, the new fee became Rp 70,000.

Overall, respondents accepted this electricity fee increase, as most of them had no other option to fulfill clean water needs in cheap price. Therefore, as suggestion emerged from several parties concerning Village Local-Owned Enterprise establishment that handle clean water issue, entire respondents were agree for it. It was due to Village Local-Owned Enterprise that handle clean water issued was expected to reduce monthly costs to lessen society burden for clean water needs.

## CONCLUSION AND POLICY RECOMMENDATION

From study result, the following issue could be concluded and several policies are recommended. Field data analysis result revealed that Dusun Sepuran ATP categorized as *captive readers*. It is due to ATP value for clean water need proportion is lower than WTP value. This low ATP value is due to the people (respondent) of Dusun Sepuran on the whole

utilizes electricity (water pump power supply) to fulfill clean water needs. Therefore, Electricity Base Tariff Rate increase positively correlates with cost proportion increase for clean water needs fulfillment. Nevertheless, the people remain accepting Electricity Base Tariff Rate that impact cost increase for clean water need fulfillment since they have no other option for such clean water needs fulfillment. In addition, they also quite satisfy with clean water quality they obtain.

Study result revealed that proper policy formulation in handling clean water crisis at water shed is necessary. The following are policies that need to implement:

1. Urging Village Local-Owned Enterprise that handles clean water for the society to obtain cheaper and more guaranteed water.
2. Applying *triple helix* ABG (*Academic, Business and Government*) synergic strategy in creating new innovations, funding and control in clean water program implementation for Dusun Sepuran resident.

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