

CHAPTER II

LITERATURE REVIEW

A. The Characteristics of Water Resources

Water is one of resources that cannot be separated for human life. In some areas, water still considered as public goods which can be used by everyone. This phenomenon makes water easily changes in quality and quantity because of the obscurity of the rights over the management and its utilization.

The water in this sense includes surface water, groundwater, rain water, and the sea water is utilized on ground. While, the notion of water resources is the water and all the potential contained in water, water sources, including the irrigation facilities and infrastructure can be utilized, but does not include animal wealth that exist there in (Sunaryo, 2004).

According Sanim (2003) water as a natural resources may be preparation and at the same time as the flow. Ground water, for example is the inventory that usually require flow and charging back by rain water. Water intake depends on the topographic and meteorological conditions, since both affect the process of absorption and the evaporation of water.

B. Water Availability and Water Needs

Water availability and water needs are includes natural resources that has vital function to the human life which exist in advance of this earth. The explanation indicates that water has a very strategic role and should remain available and sustainability, then have capability to supporting life and the implementation the development in the present or in the future because of the absence of water then life wouldn't be able to walk. The amount of water on the Earth about 97% is salt water and the rest is water tasteless, of course it is very important to given concern because the presence of water that can be used is limited so need a good management to in the present or in the future because of the absence of water then life would not be able to walk. (Soemarto, 1987).

Clean water needs in Indonesia seems more limited year to year, it is seen from the level of water availability in major cities in Indonesia that are in critical conditions. If this condition continues without any management efforts, it is feared on the coming years will occur water loss of clean water. Although the availability of surface water from time to time are relatively fixed because the following hydrological cycle, but the circumstances and the nature of its quality can limit the use of and benefits provided.

The needs of clean water depends on types of necessary is kick all of human activity. According from Kodoatie and Sjarief (2005), are as follows:

1. Domestic water needs, i.e. is the needs of water used a household. This water is determined by the needs of population and per-capita consumption. Population trends and the history of population is used as the basis of calculation of the domestic water needs especially in the determination of the trend rate of growth.
2. Non-Domestic water needs, i.e. the needs of water that conducted of commercial benefits, institutional needs, and industrialization needs. Commercial water needs for a given area tend to increase line with the increase in population and changes in land use. Institutional needs include the water needs for schools, hospitals, government buildings, places of worship and others.

C. The Development of Water Resources

The development of water resources played a role in the complex process of taking decision. Not only economic efficiency to be attention, but also the regional development, the quality of the environment, the distribution of benefits and costs, as well as other dimensions of human welfare as explicit destination that must be reach by decision making, therefore the complete information with sharp analysis and integrated need to presented by the decision makers (Sanim, 2011). Vision and mission in the national development of water resources in Kodoatie and Sjarief (2005) are as follows:

1. The Vision of the national water resources controlling; development and controlling water, land, and related resources that are sustainability and environmentally for welfare society.
2. The Mission of national water resources management is as follows:
 - a. Conservation water resources for sustainability water resources.
 - b. Proper water utilization fair, efficient, and effective.
 - c. Guarantee the availability of water for agriculture needs of the people.
 - d. Management of integrated water-related disasters (floods, landslides, drought, and etc)

In the plan of constitution on water resources, has mentioned that the development of clean water through effort water source can be made by State-owned enterprises (BUMN), The area owned enterprises (BUMD) in the field management of water resources or cooperation between State-owned enterprises with local government (article 46 section 2). Subsequently added in article 46 section 3 that effort of water resources during the referred to in article 46 section 2 above, may also be carried out by a business entity, individual or partnership between a business entity with the permission granted by the Government in accordance with the plan of allocation of water. Subsequently added in article 46 paragraph 3 that concessions of water resources during the referred to in article 46 paragraph 2 above, may also be carried out by a business entity, individual or partnership between a business entity with the permission granted by the

Government, The Government of the province or district/city Governments in accordance with the plan of allocation of water depend on water resources (Sanim, 2003).

D. The Management of Water Resources

Surface water and groundwater are source of water that can be obtained for necessary day by day. Surface water sources such as rivers, lakes, swamps, dam, and lake. The source of groundwater basin could consist of confined aquifer and unconfined aquifer, with spring. In surface water, the availability can be calculated based on the rainfall, the DAS and the characteristics of the land. But in the development and employee administration in groundwater has calculations more difficult due to the location being in the soil.

These last few years, the Government has already giving attention to need for improved management of water resources. Indonesia has a policy in the management of water resources is known as the principles of Integrated Water Resources Management (IWRM). Integrated water resources management is a process that the emphasis on the development and management of water resources, land use and other related resources are coordinated in order to maximize the resultant economic and social welfare in a fair manner without compromising the sustainability vital ecosystems. The principles of integrated water resources management was developed in response to a pattern of water resource management that is applied during this time tends to be separated (fragmented) so giving difficulties in

coordinating the various policies and programs that impact the incidence of a variety of problems including floods, intrusion of sea water due to taking of excessive groundwater, pollution and so forth (GWP, 2002 in Rajasa, 2000).

Some problems related to the lack of water resource management in Indonesia according to Sanim (2011), among other things:

1. The existence of the fragmentation of management between government agencies of the Republic of Indonesia and the difficulty of coordination between various agencies in managing water resources.
2. Management of water resources are still limited and oriented only on the side of the provision rather than on the side of sheer necessity.
3. The extravagant use of water for agriculture because of the low efficiency of the use of water for agriculture. As a user of 80-90 percent of all water users, the agricultural sector estimated water for effective plant growth only 50-60 percent, the rest is lost while streaming in channels pooled not optimal in the area of rice fields. If the currently allocated to irrigation water of around 4.000 cubic meters per second, then the increase in efficiency by about 10 percent alone would save meters of water per second.
4. Organization management of water resources still centralized in the Central that has not been decentralization although the autonomous region has proclaimed since 2000

5. The low level of society in the managing water resources on one side and on the other side is still not much involve the participation of local communities in the management of organizations.
6. Distribution of water services is uneven. The distribution more focused to serve the commercial activities that support economic development. Only consumers who capable to pay have access of clean water.
7. Water pollution that causes water in Jakarta and other major cities is not suitable as drinking water since water resources have been polluted, as the presence of bacterial content of coli in ground water.
8. The unsuitable of the Indonesia Government to expand its network of irrigation for agricultural purposes, so decreasing the production of rice.
9. The decreasing of water supply, even for clean water or drinking water causes depletion of catchment land over the function result.

E. The Economic Value of Water Resources

Water is an essential part of the natural resources that have unique characteristics compared to other resources. Soerjani, et.al (1987), argued that water should be used as an economical goods and its use must be regulated in order that achieved optimal welfare of society. Moreover, with the development of population and the advancement of technology will cause the water demand become increasingly large while the supply getting decreasing. Therefore need a policy to determine so the availability of water can be used efficiently with setting a price, not only on the clean water that produce by water companies, but also the entire water available.

According to Fauzi (2006), water also has intrinsic value and its utilization has added value because of the extraction to utilization directly gives consumption rise to costs which are quite substantial. Like other environmental goods and services, the value of water derived from the importance and contribution of water for humans and other living beings. The value of water can be identified from the role of water include the following:

1. The source of life (physiological need) for all living things, especially human (provisioning services)
2. Provide indirect benefits such as intermediate inputs in the production process, especially for the agricultural sector such as irrigation and industry, as well as maintain ecological processes and function ; and
3. Used for recreation, aesthetic, social and religious (cultural services).

From the economic point of view, the role of the water can be summarized into three kinds, namely as final goods for consumption, intermediate input for production, and a provider of environmental and ecosystem.

Economic value is generally defined as the measurement of the maximum amount someone who wants to sacrifice goods and services to obtaining goods and other services. Formally, this concept is called desire pay (willingness to pay) someone of goods and services that produced by natural resources and environment (Fauzi, 2006).

F. Public Goods

According to Mangkoesobroto (1993), public goods are goods which in the consumption by a specific individual will not reduce the consumption of other people of that good. An item is public goods that cannot be restricted to whom its use and as much as possible even someone does not need to expand money to get it. Public goods are to society in general (overall), so that from all sides of life can enjoy it. Public goods have characteristics that differentiate it from other items, namely:

1. Non Exclusive

If a public goods available, no one can dissuade anyone to get benefit from the goods or in other words, everyone has access to the item. So whether the person is willing to pay in consuming the goods or services he continues to get benefit.

2. Non-Rival

In the use of public goods mean that the consumer use to a goods will not reduce the chances of other consumers to consume the item.

3. Joint Consumption

Goods or services can be used or consumed together. A goods or services can be said to have a high consumption level joint if the goods or services can be consumed together simultaneously in the same time (joint consumption) without negating the benefits between one user with other user.

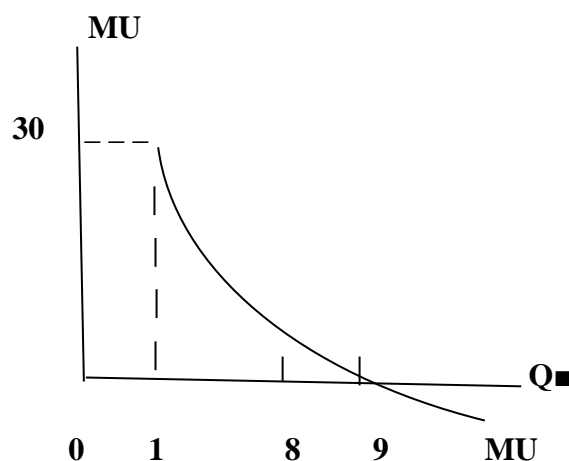
4. Externalities

Externalities are a side effect of certain parties to an action against the other party, the impact of advantages or disadvantages. Externalities will occur if the public get the impact or effects of certain outside goods or services that are directly related to the mechanism of the market.

According to Mangkoesobroto (1993) explains that there are several theories that elaborate on the provision of public goods, such as Pigou Theory and Bowen Theory. Each theory has advantages and weakness, are as follows:

1. Pigou Theory

Pigou argues that public goods should be provided to a level where the marginal satisfaction of public goods will be equal that would be marginally discontent withheld to finance government programs (providing public goods).



Source: Mangkoesobroto:1993

Figure 2.1
Curve Marginal Utility of Return

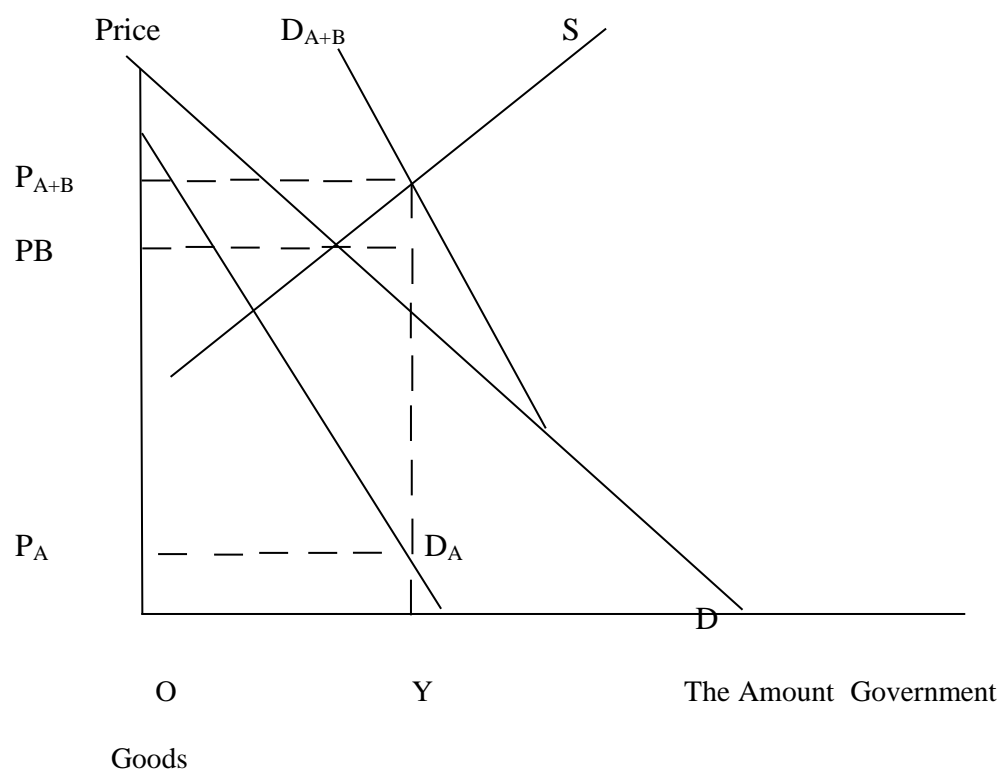
In the figure 2.1 describes the curve of satisfaction will be public goods. The curve has the form declined which suggests that more of the public goods that are produced will make lower the satisfaction perceived marginally the society. When public goods provided by the Government in 8 or 9 unit, then the additional benefits that are felt by society will decrease because of the pay taxes also getting bigger. The weakness of this analysis of Pigou's dissatisfaction on marginal community in paying taxes and the sense of satisfaction of the public goods would be marginal, while the satisfaction and dissatisfaction is something that cannot be resized in quantitative due its ordinal

2. Bowen's Theory

According to Mangkoesobroto (1993), Bowen's defined goods as public goods where the exception could not be determined. So once a public goods is readily available then there is no somebody which can be excluded from the goods of the beneficiary. The weakness of this theory is because Bowen's using supply and demand. The problem is because there is no public goods on the principle of exclusion so that people do not want to put forward the pleasure of that goods so there is no demand curve.

The curve of D_A and D_B shows individual requests of A and B in the public goods. $D_{(A+B)}$ is obtained by summing the vertical curve in D_A and D_B . The amount of the goods provided the Government of OY, i.e at the point of intersection curve of supply with the demand curve

$D_{(A+B)}$. The public goods provided by OY as much Government can be enjoyed by A and B in the same amount, but the satisfaction of A and B against the goods are different. Individuals of A not really need with public goods so he's just willing to pay as much as OPA i.e a number of marginal benefits acquired from public goods, while B is more public goods requires the willing to pay as much as the OPB.



Source: Mangkoesoebroto:2001

Figure 2.2
Bowen's Theory

G. Valuation Economy

Economic valuation in general is providing a quantitative value of a goods and services produced by the natural resources and environment, regardless of whether the market value available or not (Susilowati, 2002).

Economic valuation is a way that can be used in determining the quantitative value of goods and services produced by the environment and natural resources. Based on the analysis of non-market economic valuation can be used in terms of giving monetary value to products and services that are not marketed/ non-market goods.

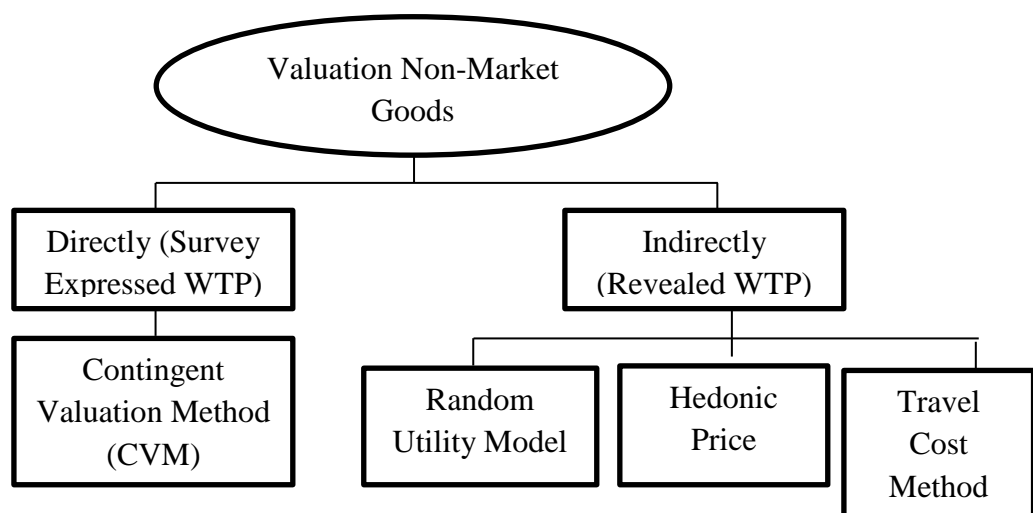
Environment as a public good is a thing that can't be measured physically-quantitative so it is difficult to judge with monetary or money forms, but very clearly the environment is a much-needed commodity. In other words, the environment is non-market goods. According to Patunru et.al (2004), non-market goods is a group of goods and services that the number or quality of goods is not traded in the market. This means that non-market goods are goods and services that do not have market prices. In some literature mentioned non-market goods are often ignored and given inaccurate weight, whereas the goods provide considerable benefits in the community, so it needs to identify the non-market goods in order to place the monetary value on the goods.

According to Suparmoko and Maria (2000) there are a few reasons why monetary units needed in economic valuation of natural resources and environment, namely:

1. The monetary unit used for assessing a person's level of concern for the environment
2. The monetary unit of the benefits and costs of natural resources and environment can support the environmental quality to be better

3. The monetary unit is the foundation of quantitative comparison material against some alternative policy including utilization of natural resources and environment.

The economic valuation of non-market goods can be described as follows:



Source: Fauzi, 2004

Figure 2.3
Scheme of Valuation Economic Non-Market Goods

Figure 2.3 explains that the choice of economic valuation methods that can be applied to the calculation of the economic value of the environment. Economic valuations that include non-market goods are divided into two, namely direct and indirect benefits are:

1. Hedonic Price Method (HPM)

According to Yakin (1997), HPM is a method based on the assumption that the market provides buyers and a number of services which may be

a quality of the environment. For example, building the house with fresh air quality around them, purchasers will receive as a complement.

The Advantages of HPM:

- a. The results of the calculation of the benefits that accrue based on the behavior of the market are examined. As a result, many economists has been treating this method better than the results of the survey.
- b. This method can be used to estimation the value of “green premium” on a clean environment on the eco-friendly consumer goods or the value of environment on human health risks through the differentiation of wages.

The Weakness of HPM:

- a. The price that is available must be valid.
- b. Not being able to get a price estimate by choice there is uncertainty.
- c. Could not estimation the value of measurement of well-being based on consumer surplus.
- d. The existence of a high degree of multicollinearity in the equation HPM.
- e. HPM has low reliability because the required data is very large and difficult to obtain.

2. Travel Cost Method (TCM)

According to Yakin (1997), this method is the underlying model assumptions that other people will travel over and over to the venue until the point where the marginal value of the last trip is worth the same amount money and time issued to reach the location and magnitude of the estimation value for the benefit of environmental quality changes and the effort of the recreational visited place.

The Advantages of TCM, are as follows:

- a. The results of the calculation of benefits based on the behavior of the market are examined.
- b. The method can be estimation to know the magnitude of consumer surplus.

The Weakness of TCM, are as follows:

- a. Travel costs which are used must be valid while in reality it is difficult to estimation appropriately.
- b. Opportunity cost should be included in the calculation.
- c. Economic theory fails to explain the relationship of the number of visits with travel costs.

3. Random Utility Model

This model focuses on options related to alternative tourist sites. Not much different from TCM, but the random utility model is not only fixed on the number of recreation visits at any given time but when the

location replacement factors are available the value of the characteristics of an alternative to another location can be measured.

H. Contingent Valuation Method

Contingency valuation (Contingent Valuation Method, CVM) is a method of calculating directly, in this case directly asking the willingness to pay to the society by assessing individual heavy point objects public goods on the standard money value (Hanley and Spash, 1993)

According to Fauzi (2006), CVM is a strongly method depends on the hypothesis that will we built, for example the extent of the costs to be born, how payment and so on. CVM method is technically can be done in two ways, namely through simulation and experimental technical engineering survey. CVM method is often used to measure the value of passive or natural resources are often also known as the value of existence. CVM methods essentially aim to find out the wishes of pay from the public of environmental improvement and a desire received compensation of environmental damage.

According to Prasetyo and Saptutyningsih (2013) the advantages of using Contingent Valuation Method are:

1. It is flexible and applicable to a variety of environmental niches, not just limited to objects or natural wealth that is measurable in the real market.
2. Can be applied to all conditions and has two important things, that is often the only technique to estimate the benefits, can be applied to various environmental policy contexts.

3. Can be used in various studies of environmental goods around the community.
4. CVM has the ability to estimate non-use value. A person who uses CVM can measure the utility of using environmental goods even if used directly.
5. Capacity CVM can guess the value of non-use value.
6. Respondents may be segregated into user groups and non-use values according to the information obtained from the interview activity, thus allowing the calculation of the use value and non-use value quotes separately.

In this method allows all commodities that are not traded in the market economy being estimated value, later can be obtained as a result of the economic value of an public goods of concept willingness to pay. Based on this assumption CVM can provide an assessment of the environmental goods with ask respondents how the maximum amount of money that will be spent by the customer household (Willingness to pay) of each month or year the environmental goods.

According to Hanley and Spash (1993), the implementation of CVM can be divided into six stages, namely:

1. Setting up the hypothesis market, this is the initial stage in the running of CVM with making hypothesis market and questions about the value of the goods/services environment.

2. Obtaining bids, after the questionnaire is created the next step is a sampling.
3. Suspect the average of WTP/Calculating Average WTP), the next stage after the data collected is estimate median value and mean value of Willingness to pay.
4. Suspect the curve value bid (bid curve), a curve of WTP can be estimated using dependent value and factors that influence value as independent variable. WTP curve use to estimate change of WTP values because the changing number of independent variable associated with situation of environmental.

$$WTP_i = f(Y_i, E_i, K_i, A_i, Q_i) \dots \dots \dots (1)$$

Where i is respondent-i

5. Aggregating Data, data is the process by which the sum of the average quote converted to the total population.

The decision in the calculating the data is determined by :

- a. Selection of the relevant population, the goal for identification all party that the utility is affected significantly by new policy
- b. Based on the average of the sample to the population average, the value of average can be duplicated by the number of household in a population of N. If the variable has been incorporated into the curve of the offer, estimated population average μ can be derived by incorporated the relevant population value into the curve of the bidding. This value can be duplicated with the N.

- c. Choice of the collection time periods generate benefits, depending on the pattern of the CVM that will be used.
6. Evaluating the CVM Exercise, in this stage assesses the extent to which the application of CVM has successfully done. The assessment by providing questions as to whether the respondents really understand about hypothesis market.

The purpose of the CVM is to calculate the value of the data offers that approach of the environmental goods are goods from the market really exists.

I. Dichotomous Choice CVM

One of the most public CVM model used is a dichotomous model. This approach considered to the other models, such as open ended game or bidding game. In the year 1980-90s realized the existence of weaknesses on the model of open ended and bidding game in terms of estimating the value of the appropriate WTP because the method requires respondents to construct the maximum WTP that often in the end give rise bias (Fauzi, 2006)

Dichotomous choice CVM method that is offered to respondent a certain of money and ask whether the respondent want to pay or not such a sum of money to obtain the improvement of environmental quality through the payment of environmental services. This method makes it easy for respondents to more understand the intent and goals of research compared to other method. This method makes easily to classification of respondents

who have a tendency to pay for improvements to the environment and who did not have a tendency to pay for environmental improvements.

According to Fauzi (2013) stated that in dichotomous choice CVM ecosystems value or natural resources value which are not marketed is calculated based on the value of Willingness to pay of questions that is discrete. The respondent submitted the willingness to pay (WTP) of X good for repair or an assessment of ecosystems services environment that are still intact. Because only two possible answers “Yes” or “No” or “Agree” or “Disagree”, then the method is called a dichotomous choice. The value of the rupiah has to offer that called “the value of bid”

Alberni et.al (2005) in Fauzi (2013), one of the advantages the use of dichotomous choice CVM is because this method more approached the market behavior which are consumers usually take the decision to purchase or not of the price offered. In addition the dichotomous choice CVM is also considered in accordance with the mechanism of incentives offered to the society, if the society obtain information as well as reduce the burden that faced by the cognitive society if had to choose open bid or plural option.

J. Willingness to pay

According to Hanley and Spash (1993), Willingness to pay is environmental conditions or value of natural resources and natural services in order to improve the quality of the environment. In willingness to pay calculated how far the ability of every individual or society in the aggregate to pay or spend money in order to improve the environmental conditions to

suit the desired condition. Willingness to pay is one part of the method of Contingent Valuation Method that used in this research.

CVM is a directly method of economic valuation through Willingness to pay. According to Pearce et al (2006) in Fauzi (2006), analysis basis involves three main stages:

1. Identification of goods and services will be valuation, researcher must have clear concept about what will be valuation.
2. Scenario hypothetical construction, the type of questions and scenarios would greatly influence on outcomes that will be generated in the analysis of the CVM.
3. The monetary value of the esilitasi method, is a technique to extract information from the respondent about the ability to pay by asking the magnitude of payments through a particular format.

Elisitasi format consists of five types: 1) Open ended, 2) Bidding game, 3) Payment card, 4) Single bounded dichotomous, 5) Double bounded dichotomous.

K. Literature Review

1. Research conducted by Genius et.al (2008), by the tittle “Evaluating Consumers’ Willingness to pay for Improved Potable Water Quality and Quantity” using contingent valuation method (CVM). The results point out that female respondents, households with high income, with children, and households which do not use tap water for drinking, are on average willing to pay more. The mean WTP for these future projects was

estimated to be 10.64 € (17.67% of the average bill). The mean WTP amount can be useful to decision makers undertaking an environmental cost benefit analysis, where full cost should be recovered.

2. The other research from Afifah et.al. (2013) entitled “Kesediaan Membayar Jasa Lingkungan Air untuk Konservasi di Twa Kerandangan Kabupaten Lombok Barat” using contingent valuation method concluded that the value of the average Willingness to pay water customers of Kerandangan IDR8,100 so an aggregate of Willingness to pay are IDR1,352,700 month and IDR16,232,400/year. Significant factors affecting the WTP partially are income, use of a water, the perception of the importance of water conservation, gender, and education with the highest probability of significantly <0.05 . Simultaneously there are three variables that significantly affect income, perception of the importance of water conservation and gender of respondents.
3. Other research conducted by Sandhyavitri et.al. (2016) entitled “Analisis Kesediaan Masyarakat untuk Membayar (Willingness to pay) Biaya Pengadaan Air Bersih (PDAM) di Kota Pekanbaru” using bidding games model to identify the two main factors that affected in middle society to pay clean water by PDAM (Y), namely the number of the family members and the magnitude family income (X2), the result of the desire to connect on the middle and upper society is 62.13% and in intermediate class downstairs is 44.44%. The magnitude of the price of clean water to the desired middle community IDR6,615/m³ and IDR4,971/m³ for the

middle class down. This rate is higher than the average rates tariff of PDAM in the 2014 is IDR3,300/m³. Variable that significantly affected the WTP of the middle and upper are income and the family members.

4. The next research by Sabri and Amelia (2016) entitled “Analisis Willingness to pay (WTP) dan Kebutuhan Air di Kecamatan Merawang” using contingent valuation method which using questionnaire and interviews to respondents in the village and the analysis using regression and correlation, the aims in this research is to examine the relationship between Willingness to pay (WTP) of clean water in PDAM and the urgent water needs. The results of research showed that the rates paid by people who are willing to be in the range of IDR50,000/month until IDR99,000/month, the average is IDR73,378/month. Based on the results, tariff of WTP is IDR2,197/m³. The variable in this research are water quality PDAM, latest Education , household Expenditure per month, employment ,number of the family members, total water consumption, population density, lack of vacant land within the area of residence, Limited source of groundwater in area of residence. Based on the correlation analysis, the most influential is the water quality of PDAM. However, in this case, the researchers chose the three variables that have the greatest correlation with the WTP, the last education, water quality PDAM, and household expenditure.
5. Research by Kuna et.al (2015) entitled “Exploring Households’ Willingness to pay for Improvements in Water Services: A case Research

in Terengganu, Malaysia (A Pilot Research)”, using contingent valuation method. The result shows the estimated mean WTP for improved domestic water services is RM0.686 applies on first 30m³. Variable independent are gender, race, education level, occupation of household, type of residence, price and income. Variable that have negative sign is price, and the variable have positive sign are education level, income.

6. Research conducted by Al-Ghuraiz et.al (2005) entitled “Ability and Willingness to pay for Water Supply Service in the Gaza Strip” with Contingent Valuation Method. The results of the research revealed that the Willingness to pay (WTP) for improved water supply service, that matches the WHO standard, was about 3.0 NIS/m³. This price also was affordable by all income groups. This paper has investigated the affordability and willingness to pay for improved water supply service in the Gaza Strip. It was recommended in this research to build tariff structure, to improved services and matches with WHO standards, on the average price 3 NIS/m³. Variable independent are household size and density, economic status, service improvements.
7. Research from Ladiyance and Yuliana (2014) by the title “Variabel-Variabel yang mempengaruhi Kesiediaan Membayar (Willingness to pay) Masyarakat Bidaracina Jatinegara Jakarta Timur”. In this research discussed about River pollution negatively impact on water used as supporting domestic needs, environmental health and economic activity. Economic losses due to river pollution associated with economic

valuation. The analysis used is the Contingent Valuation Method (CVM) and logistic regression. The results showed that the amount of WTP value is IDR4,325 and variables that affect the willingness to pay Bidaracina is knowledge of river pollution, home ownership status, education and household income last.

8. Other Research from Sistyanto and Pramono (2012) entitled “Penggunaan Air Domestik dan Willingness to pay Air Bersih PDAM di Kecamatan Temanggung Kabupaten Temanggung”. In this research the variables internal are job, level of education, and consumption, in the external the variables are quality and quantity of clean water, customer satisfaction about the service from PDAM .The research result shows that the physical quality and quantity, customer satisfaction of PDAM in Temanggung Sub district is influent enough to the value of willingness to pay. In the other hand, the use of water in research area has no big influence on the value of willingness to pay.
9. Another research by Kwak et.al (2013) entitled “Measuring the Willingness to pay for Tap Water Quality Improvements: Results of a Contingent Valuation Survey in Pusan”. In this research, use a scenario that the government plans to implement a new project of improving water quality and apply the contingent valuation method (CVM). A one-and-one-half bounded dichotomous choice question (OOHBDC) format is employed to reduce the potential for response bias in multiple-bound formats such as the double-bound model, while maintaining much of the

efficiency. Moreover, we employ the spike model to deal with zero willingness to pay (WTP) responses from the OOHBD CVM survey. From the spike OOHBD CVM model, the mean WTP for the improvement was estimated to be KRW 2,124 (USD 2.2), on average, per household, per month. The value amounts to 36.6% of monthly water bill and 20.2% of production costs of water. Variable Independent are Odor, Gender, age, education and Income. The positively significant to WTP is income.

10. The other research from Prasetyo and Saptutyningih (2013) by the title “Bagaimana Kesiapan untuk Membayar Peningkatan Kualitas Lingkungan Desa Wisata”. In this research done in Sleman Regency with approach of contingent valuation Method (CVM) and analysis of multiple linear regression. The variable in this research are age, education, earnings, number of family dependents, expense of visit frequency. Results show that age, education, earnings, influence on willingness to pay in the effort repair of environmental quality of the tourism village in Sleman regency after merapi eruption.
11. Another research by Tussupova et.al. (2015) entitled “Investigating Willingness to pay to Improve Water Supply Services: Application of Contingent Valuation Method”. Safe water supply is one of the important. Millennium Goals. For development of market water supply services, the willingness of consumers to pay is essential. The consumers’ willingness to pay (WTP) for piped water supply using the

contingent valuation method (CVM) with different starting point bids was investigated for the Pavlodar Region, Kazakhstan, the variables in this research are sex, family with children, water source, water quality, and connection fee. The significant variables are in standpipe water in the variables water quality and sex. The results showed that households with access to groundwater (well or borehole water users) perceived this as of good quality. Consumers without access to groundwater used open-source, standpipe or delivered water for which they had to travel and spend time or to pay. More than 90% of the consumers were willing to pay for better water quality and regular water supply.

From several previous studies, there are differences with this research, both regarding the location of research, time period, approach, variables and analytical tools used. In a research that took place in Yogyakarta City, the variables used were a combination of several previous studies and approaches and tools of analysis using Contingent Valuation Method (CVM). Research results are used for the author as literature review about quality improvements of PDAM Tirtamarta in Yogyakarta City.

Table 2.1
Relationship between Variable Dependent & Independent and their
References

No	Variable	Sign	References
1	Income	+	(Nugraheni, 2013; Irawan ,2009; Saptuyningsih, 2007; Genius et.al, 2008; Kayaga et.al, 2003; Prasetyo and Saptutyningsih, 2013)
2	Education	+	(Kuna et.al, 2015; Ladiyance and Yuliana,2014; Irawan 2009; Afifah et.al,2013; Sandhyavitri et.al,2016; Maskey and Singh, 2017; Prasetyo and Saptutyningsih, 2013)
3	Home Ownership	+	(Saptono,Heru, 2007; Kayaga et.al, 2003)
4	The family members	+	(Sandhyavitri et.al,2016; Nugraheni,2013; Saptutyningsih, 2007)
5	Water Quality	+	(Tussupova et.al, 2015, Nugraheni,2013, Sabri and Amelia,2016; Ayanshola et.al, 2013)
6	Customer Satisfaction	+	(Sistyanto and Pramono,2015; Getzner et.al, 2017; Jayaramu et.al 2014; Han et.al, 2015)

L. Hypothesis

Based on the formulation of the problem and research objectives, then the hypothesis of this research are as follows:

1. Family Income Variable thought positively influence the willingness to pay for quality improvement of PDAM Tirtamarta.
2. Education Variable thought positively influence the willingness to pay for quality improvement of PDAM Tirtamarta.
3. House Ownership Variable thought positively influence the willingness to pay for quality improvement of PDAM Tirtamarta.
4. The family members Variable thought positively influence the willingness to pay for quality improvement of PDAM Tirtamarta.
5. Water Quality Variable thought positively influence the willingness to pay for quality improvement of PDAM Tirtamarta.
6. Customer Satisfaction Variable thought positively influence the willingness to pay for quality improvement of PDAM Tirtamarta.

M. Research Framework

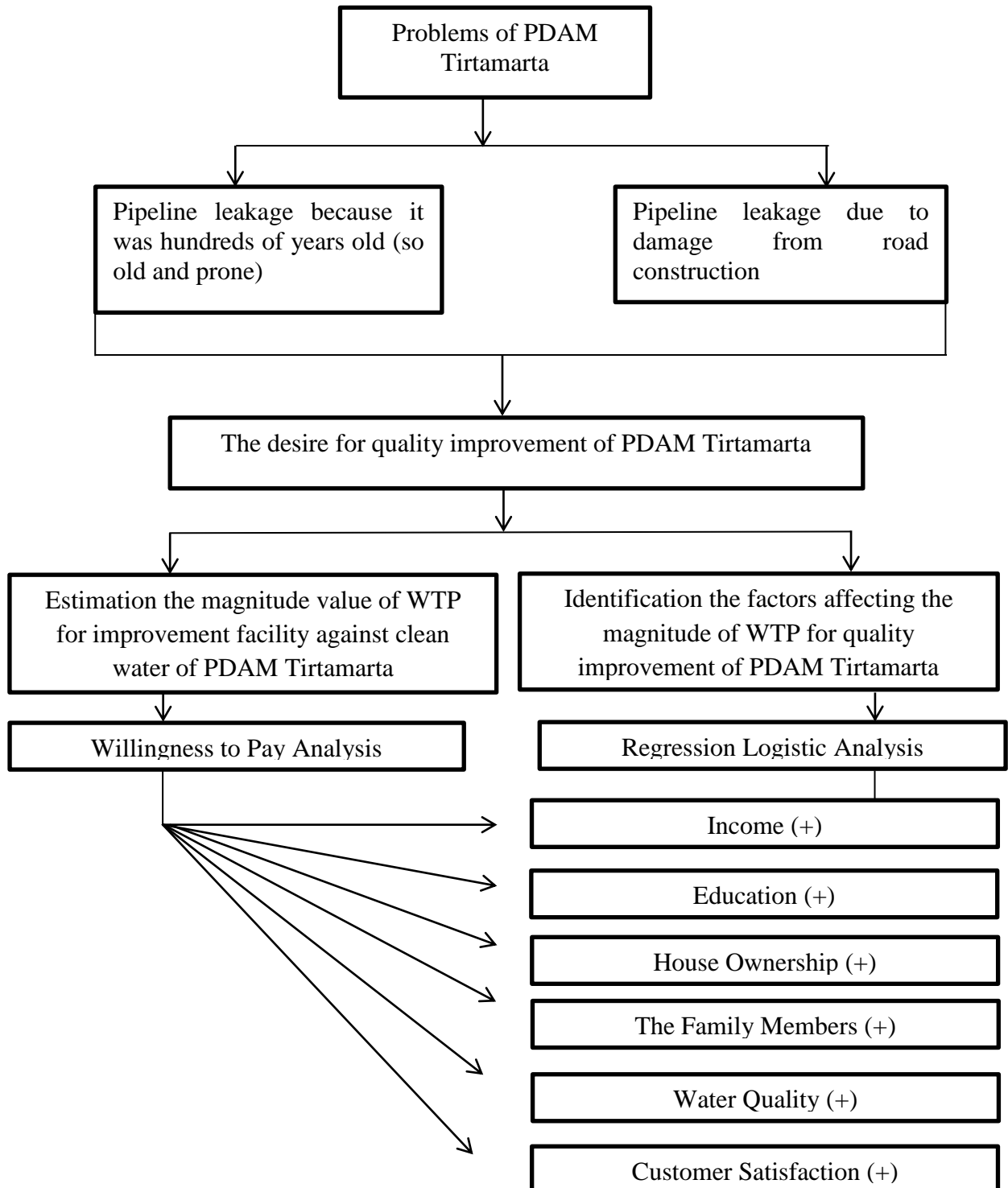


Figure 2.4

Flow of Thought