

CHAPTER I

INTRODUCTION

1.1 Background

Lake Maninjau is one of the most important lakes in West Sumatra which is located in Tanjung Raya, Agam with the geographical position of 0°19'S, 100°12 'E. Lake Maninjau, classified as a volcanic lake that was shaped caldera about 60,000 years ago due to a devastating volcanic eruption. The lake bathymetry indicates that the surface area is 9737.50 ha, the maximum length is 16.46 km, the maximum width is 7.5 km, the circumference is 65 Km, and the catchment area is 13.260 ha (Fakhrudin et al, 2002).

Lake Maninjau has potential functions as tourism, renewable resource of energy for West Sumatra and Riau provinces, source of water for lakeside residents, fish farming activities, and fisheries (Fakhrudin et al, 2002). These functions led to changes in quality and quantity of water and threaten the sustainability of the lake.

Since 1991, Lake Maninjau has been utilized as fish farming with floating net cage system. The development of fish farming using floating net cage has positive impacts on the creation of job opportunity and has increased local incomes and social welfare. Due to high profit that could be earned, the total of floating net cages (FNC) increase every year without any control and any regulation of local government. The total number of FNC in 1996 was 1,886 units, then in 2000 became 3,856 units, in 2014 numbered 16,520 units and in 2015 has reached 16,734 units (Central Bureau of Statistics, 2015). Total of FNC is growing rapidly from year to year and now it has

already exceeded the support ability of lake which is only 6000 units of FNC (Nontji, 2016).

An increase in total FNC will lead to augmentation of waste that ultimately causes negative impacts on environmental condition such as eutrophication and decrease in water quality. Because of low knowledge about the impacts of fish farming activities with floating net cage system on water quality, the FNC has caused silting up of lake depth and heavy water pollution due to the sedimentation of fish feed.

Due to natural factors like season changes from the dry season to the rainy season, the sediment built up in the bottom of the lake had resulted in heavy polluted water and in increasing toxic compounds. These main pollutants could lead to eutrophication that could cause mass death of fish every year due to lack of oxygen and massive economic losses that has to be endured by the people who live around it. The decrease in water quality can be proved by the change in water clarity level and water odor.

Since 1985, Lake Maninjau has been utilized as hydropower. The existence of hydropower has led to change in the surface water level. The surface water level before the existence of hydropower was 463.7 mamsl - 464.5 mamsl, while after the existence of hydropower it has shrunk to 462.5 mamsl - 463.1 mamsl (Fakhrudin, 2002). This condition has influenced the biodiversity of the lake because some species could not survive the fluctuation of the surface water level. The existence of hydropower also disturbs the natural flushing system of water because the outlet of

water is diverted through hydropower intake. This disruption of water cycle led to decline in water quality (Nontji, 2016).

However, the pressures on the environment of Lake Maninjau isn't only caused by the rapid development of fish farming activity but also due to any activities on the lakeside such as agriculture, animal husbandry, an intensive use of land in the catchment area, habitation, etc. These pressures directly influence the water quality because these activities produce waste and there is no initiative for waste management from neither the government nor the local residents.

Even after this condition, there is still not much attention and concern from the local residents about the ecosystem of Lake Maninjau. Most of lakeside residents don't understand about the ecological principles of Lake Maninjau such as the carrying ability and the impact of their activity that is related to Lake Maninjau. It is proved by the increase in total floating net cages until 2015 and the decline in water quality of Lake Maninjau is likely to continue over time.

The current condition of Lake Maninjau indicates that water pollution that has occurred is getting more apprehensive since it can threaten the sustainability function of the lake. This is an issue that needs to be immediately addressed seriously in order to avoid it widespreading and getting worse in the future. This issue is the responsibility of both the local government and lakeside residents and it can be overcome by conducted environmental management action for lake sustainability. Based on the explanation above, the writer has put interest in studying, analyzing, identifying and estimating the lakeside residents' willingness to pay, their economic

behavior, and the impacts of water pollution to their lives. That is why the writer gave a thesis entitled:

“The Estimation of Willingness to Pay and Identification of Economic Behavior of Lakeside Resident in Tanjung Raya, Agam, West Sumatera”

1.2 Research Problems

Lake Maninjau is a multifunctional lake which has become one of the main sources of income for most people who live around it. Due to economic needs, Lake Maninjau has been utilized as fish farm with floating net cage system. Because of the higher profit that can be earned from fish farming, FNC system has attracted not only the local residents but also people from different areas. Nowadays, the sum of floating net cage in Lake Maninjau already exceeds the recommended number and therefore starts to cause water pollution. But water pollution in Lake Maninjau is not only because of FNC activity but also caused by household waste and disposal, water hyacinth, hydropower activity, etc. The problems of Lake Maninjau tend to be homogenous with other regions. Thus, according to this phenomenon the writer will outline the questions:

1. What is the lakeside residents' perception of the water pollution that has occurred?
2. How much is the lakeside residents' willingness to pay (WTP) for water quality improvement in Lake Maninjau?
3. What factors that influence the lakeside residents' willingness to pay (WTP) for water quality improvement in Lake Maninjau?

4. What kind of motivations that underlie the lakeside residents' willingness to pay (WTP)?

1.3 Objectives of Research

The objectives of this research are to calculate the value of the residents' willingness to pay for water quality improvement in Lake Maninjau, identify factors that influence WTP value and examine what kind of motivation that underlie the lakeside residents' WTP which is related to lakeside residents' perception towards water pollution that has occurred. The results of this study should provide useful information for local government.

1.4 Limitation of Research

The limitations of this research are as follows:

1. The research takes place on Tanjung Raya, Agam, West Sumatera.
2. This research examines the perceptions of lakeside residents about the decline in water quality.
3. Calculate the lakeside residents' willingness to pay.
4. Assume that water pollution occurs every year.
5. The respondents are households in Tanjung Raya sub district.

1.5 Hypothesis

Based on the research problems and objectives described above, then the hypotheses are: First, the value of the willingness to pay (WTP) obtained with single bounded dichotomous choice method where there will be more lakeside residents that are willing to pay on lower bid value. The value of WTP obtained from four bid

classes offered and probably would generate the value of WTP between first and second bid class. Factors that influence lakeside residents' WTP depend on lakeside residents' characteristics like age, education, number of dependents, income level, perceptions of water quality, dependency on water quality and the bid value offered. It is assumed that the lakeside residents' are concerned about the occurrence of decreasing water quality due to environmental conditions and the possibility of motivations that underlie the WTP of lakeside residents who have no dependency on Lake Maninjau are for water quality improvement and better management for sustainability of the lake, while the possibility of motivation that underlie the WTP of lakeside residents who have dependency on Lake Maninjau is for the increase in productivity of fish. Thus, lakeside residents who have dependency on water quality are more willing to pay for water quality improvement.

1.6 Benefit of Research

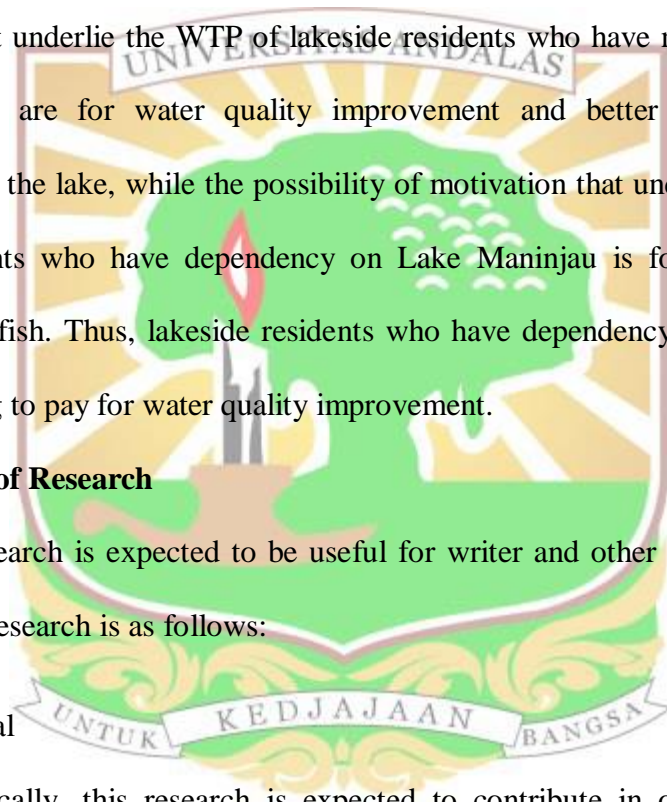
This research is expected to be useful for writer and other interested parties. Benefit of this research is as follows:

1. Theoretical

Theoretically, this research is expected to contribute in order to raise the awareness of lakeside residents about the impact of their activities on water quality and the cost that they should pay for water quality improvement.

2. Practice

a) For Government



The results of this research is expected to be an additional reference for government when creating and enforcing regulations that is related to the decrease in water quality and environmental condition and its impacts to the people who live around the lake.

b) For Local Residents

The results of this research can be additional scientific information about the current environment condition around them, especially Lake Maninjau. So, this research is expected to raise residents' awareness about the importance of maintaining environmental sustainability.

c) For Academics

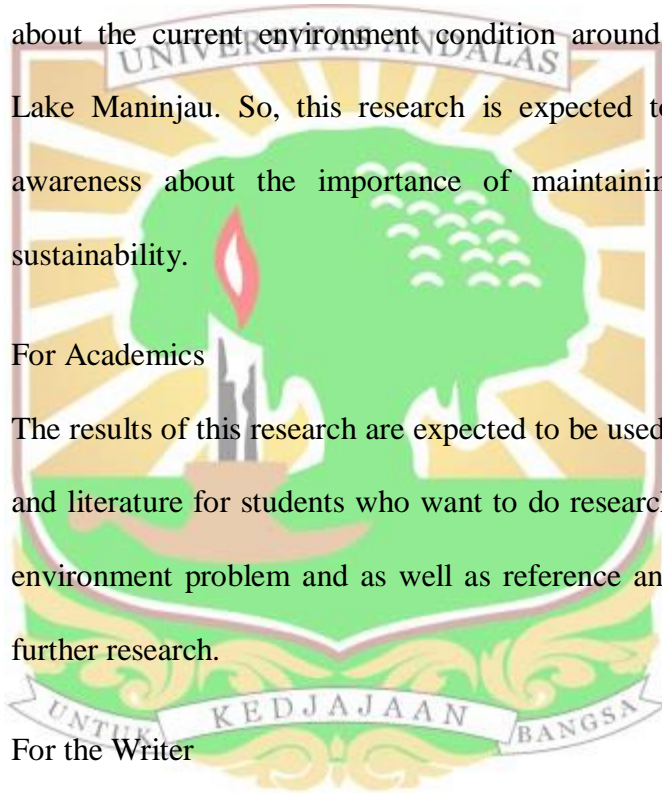
The results of this research are expected to be used as study material and literature for students who want to do research about economic environment problem and as well as reference and information for further research.

d) For the Writer

The writer will obtain additional knowledge related how to estimate willingness to pay in order to maintain the water quality which can be experience to complete any other related cases.

1.7 The Scope of Research

The scope of research conduct analyses on the characteristics of lakeside resident in Lake Maninjau and the factors that influence the willingness to pay to



maintain water quality. Respondent in this research is household who live around Lake Maninjau because their activity has contribution in changes in environmental quality.

