EXAMINING URBAN AQUACULTURE AS A CATALYST FOR POVERTY ALLEVIATION AND ECOLOGICAL SUSTAINABILITY (THE CASE STUDY OF SURABAYA, INDONESIA)

THESIS
A thesis submitted in partial fulfilment of the requirements for
The Master Degree from University of Groningen and
The Master Degree from Institut Teknologi Bandung

By
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Double Master Degree Programme

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School of Architecture, Planning and Policy Development
Bandung Institute of Technology
And
Environmental and Infrastructure Planning
Faculty of Spatial Sciences
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ABSTRACT

Urban aquaculture is an effort to utilize minimal space in the urban areas to generate the fisheries product. Moreover, urban aquaculture is one method that combines the concept of sustainable development and community capacity which aims to improve the ability of low-income people in urban area to better deal with the poverty problems through the interaction between potential of community with the inside and outside factors. Furthermore, the aim of this research is to explore the role of urban aquaculture in term of support low-income people to cope with their economic problems. This thesis concludes that the implementation of urban aquaculture is Surabaya give positive influence to the low-income people regarding with economic prosperity, environmental stewardship, maintaining human health, social and self-worth.

Key words: sustainable development, sustainable aquaculture, urban aquaculture, community capacity

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Sofyan Mashudi

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CHAPTER I

INTRODUCTION

1.1. Background

Inevitably, poverty is a serious problem in many developing countries. There are several definitions of poverty based on some approaches such as economic, social, basic consumption needs, live expectancy, and mortality rate. According to Masika et al (1997), poverty condition usually defined by conventional economic definitions which use income or consumption complemented by a range of other social indicators such as life expectancy, infant mortality, nutrition, the proportion of the household budget spent on food, literacy, school enrolment rates, access to health clinics or drinking water. More generally, they also said that poverty including more subjective definitions such as vulnerability, entitlement and social exclusion. Moreover, Wratten (1995) in Masika *et al*. (1997) defined vulnerability, entitlement, and social exclusion. Vulnerability refers to defencelessness, insecurity and exposure to risk, shocks, stress and reduced by assets such as: human investment in health and education; productive assets including houses and domestic equipment; access to community infrastructure; stores of money, jewellery and gold; and claims on other households, patrons, the government and international community for resources at times of need. Entitlement refers to the complex ways in which individuals or households command resources which vary between people over time in response to shocks

and long-term trends. Social exclusion is seen as a state of ill-being and disablement or disempowerment, inability which individuals and groups experience. It is manifested in 'patterns of social relationships in which individuals and groups are denied access to goods, services, activities and resources which are associated with citizenship' (ILO, 1996 in Masika et al, 1997).

In addition, Osinubi (2003) stated that poverty is multi-dimensional and characterized by lack of purchasing power, exposure to risk, malnutrition, high mortality rate, low life expectancy, insufficient access to social and economic services and few opportunities for income generation. Moreover, poverty can be defined as a lack of ability to fulfil basic needs such as: food, clothing and/or shelter, also poverty refers to the lack of certain capacities such as being able to participate with dignity in society (Aluko, 1975 in Osinubi, 2003). Based on the World Bank Report (1990) poverty has been defined as the inability to attain a minimum standard of living, for example: life expectancy, infant mortality rate, primary school enrolment ratio and number of person per physician. Moreover, Towsend (1962) in Osinubi (2003) stated that poverty depicts as a situation which income earned by society is hardly enough to fulfil the necessities of life in that society.

In fact, the existences of poor households are always being a burden for the local authority especially in big city or urban area. They are always being marginal groups who are underestimated by other members of community. Moreover, low income people usually face food security problems, because this problem not only relates with the availability of food but also relates with livelihood and income.

Therefore, Foeken (2006) stated that one of the solutions to overcome the food security problems is Urban Agriculture. According to Zezza et al (2010) urban agriculture is defined as the production of agricultural goods by urban residents. Urban agriculture is the growing of plants and the raising of animals for food and other uses, and related processing, marketing, and distribution activities, within and around urban and peri-urban area.

Urban agriculture was originally based on the degradation of environmental quality of urban life. Hence, those conditions inspired the emergence of the great scheme of cities management across the city in the world. In addition, Viljoen (2005) stated that the inspiration also can be seen from the construction of Machu Picchu (the royal town which is located in the mountains at the height of the Inca Empire in 1450). In Machu Picchu, water is conserved and reused as part of the water management of the city and vegetables are designed to collect sunlight in order to extend the growing season (Viljoen 2005). Allotment gardens where appeared in Germany in the early 19th century as a response to poverty was an effort by citizens to reduce the pressure on food production to support the war (Holmer dan Drescher, 2005). Hence, this program is very influential in the rise of urban agriculture around the world.

There are three types of urban agriculture or urban farming. First of all, urban agriculture which is use vegetables, fruits, and many food crops as commodity such as, mushroom, spinach, and chilli. Secondly, urban livestock which is use poultry and rabbits as their commodity. Thirdly, urban fish farming or as known as urban aquaculture which is uses fish fresh water such as catfish, tilapia, carp, and pangasius. According to Van (2001) in Silva (2005) that the definitions of

aquaculture is the aquatic organisms farming such as fish, molluscs, crustaceans and aquatic plants. Moreover, he also stated that, "*Farming implies some sort of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated*" (Silva, 2005: 20).

The implementation of urban aquaculture for low income people in urban area can increase their income. As Adeogun *et al.* (2007) said that at the household level, low income people can make money from urban aquaculture, not only make money but also they can provide direct access to various foods which is rich of nutrition. Urban aquaculture also can increase the stability of household food consumption, and can increase the time for mothers caring for their children comparing if they have activities that are located far away from their home. Furthermore, impacts of urban aquaculture are not only to overcome the food security problem and increasing the income of poor urban families but also to fulfil or to supply the demand of food for urban communities.

Equally important, aquaculture cannot be considered only from technical aspects in isolation from social, economic and environmental contexts (Silva, 2005). It is clear that to achieve sustainability aquaculture, the aquaculture system itself must be integrated with the sustainable development concepts. As Naess (1995) said that the term of sustainable development has been increasingly used by urban planners since *'Our Common Future'* was presented in the Brundtland Commission's report in 1987. Sustainable aquaculture is the implementation of sustainable development in the aquaculture sector. The three aspect of sustainable development, namely: economy, social, and environment should be implemented

enough and balance among each aspect. Edwards *et al*. (1997) stated that sustainability is first defined in general terms and then specifically in relation to aquaculture in terms of production technology, social and economic aspects, and environmental aspects.

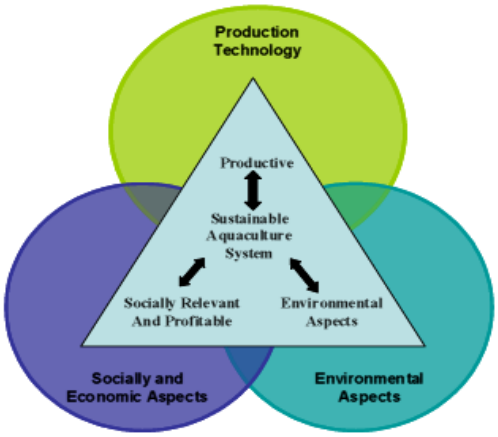

Figure 1.1 The concept of sustainable aquaculture
(Source: AIT, 1994 in Edwards et al, 1997)

Moreover, sustainable aquaculture tries to balance the three factors of sustainable development. The balance of those three factors is very important in order to ensure sustainability in aquaculture. Nowadays, there are a lot of aquaculture farm which have poor farming management and operational techniques. They use any ways to achieve greater benefits without paying attention to the environmental. Inevitably, the effluent discharged from land-based aquaculture can lead to serious environmental impact. The influence of untreated waste on the environmental increases with the production and intensity of aquaculture operations, and depends strongly on species, culture methods, stocking density, food composition, feeding techniques and hydro graphic conditions (Lucas *et al.*, 2003).

One of the methods of sustainable aquaculture that has been implemented in many countries is catfish aquaculture. According to Wellborn (2000) that, the first efforts at culturing cat fish were made in the early 1900's in several federal and state catfish hatcheries at United States of America. Afterward, in the 1950's commercial catfish farming first started in Kansas and Arkansas. In Indonesia the first catfish aquaculture was started in 1980's (Setya and Agung, 2012). Moreover, Setya and Agung (2012) stated that there are several advantages of catfish aquaculture. Firstly, catfish production rate is higher than other freshwater fish. Second, it is easy to farm in warm climates. Third, it can lead to inexpensive and safe food at local grocers. Fourth, it can be cultivated on narrow land and limited water resources with high solid stocking. Owing to the fact, catfish aquaculture has big chances to be developed in urban area in order to make money for additional income for low-income people.

Regarding with low-income people issue, Surabaya is the second largest city in Indonesia facing the same problem. Surabaya is located in East Java Province and also the capital city of East Java Province. As a capital city, it becomes central of economic activities in East Java Province. Those circumstances encourage people from other regency around Surabaya to come to this city, for instance Gresik, Bangkalan, Mojokerto, Sidoarjo, and Lamongan (Gerbangkertosusila). This activity will increase the level of urbanization in Surabaya. Inevitably, it can create many poor households in Surabaya. Based on the data obtain from Agriculture Agency of Surabaya that, this city has a population of 126,420 low-income people or around 4.23% of total population of Surabaya Municipality recorded in 2010 (Dinas pertanian, 2011). In general, some of the poor households

in Surabaya have jobs, but they have low income such as labourers and scavengers. Furthermore, they are also difficult to get access to economic activity occurred in Surabaya. Owing to the fact that this leads to social inequalities that occur between poor and rich people is widening.

Apparently, the local authority of Surabaya sees the catfish aquaculture as a window opportunity in regard to their effort to cope with urban issue in Surabaya, especially effort for reducing the poverty level. The implementation of catfish aquaculture was initiated in 2010 by the local authority of Surabaya through community empowerment program. This aquaculture is implemented by utilized narrow land, yards, and backyards. Additionally, around 6,000 of poor households are involved in this program. Through community empowerment program, the local authority of Surabaya wants to encourage the community capacity of low income people in Surabaya to cope with their economic problem.

Furthermore, it seems interesting to investigate relationship between the implementation of catfish aquaculture and community capacity of low-income people. The aim of this research is to explore the role of urban aquaculture in term of support low-income people to cope with their economic problems. The results of this research may become one of considerations to overcome the urban issues, especially in economic issue. Moreover, it is also expected to give information that the existences of low-income people are not always being a burden for the local authority of urban area and cannot be underestimated. Although, they are being marginal groups but their existence cannot be underestimated by other member of community. Fundamentally, aquaculture can be implemented in the urban area especially for catfish, while there is not sufficient land. The research

will be conducted in Surabaya, East Java Province due to catfish aquaculture already implemented since 2010. Furthermore, this research will examine the community capacity of the low-income people as the beneficiaries of urban aquaculture program by using the conceptual model of community capacity proposed by Jackson *et al.* (2003).

1.2. Research Questions

Based on explanation about urban aquaculture that explain about the low-income people who are engaged in the implementation of urban aquaculture and about the relationship between urban aquaculture and sustainable development, the research questions are as follows:

How and to what extent do urban aquaculture program foster community capacity and sustainable development?

1. How urban aquaculture can support low income people in Surabaya?
2. What are the obstacles and prospects for successful implementation of urban aquaculture in Surabaya?
3. Is waste from urban aquaculture polluting surrounding aquaculture area?

1.3. Research Objective

In order to answer the research problems, the objectives of this research are:

1. To understand the role of urban aquaculture in the development of community capacity;
2. To understand the contribution of urban aquaculture in supporting low-income people in Surabaya;
3. To understand the factors that lead to the successful implementation of urban aquaculture in Surabaya;
4. To understand the ecological impacts of waste from urban aquaculture on surrounding aquaculture area.

1.4. Research Methods

The research approach using in this research is deductive. A deductive approach is concerned with developing a hypothesis based on existing theory, and then designing a research strategy to test the hypothesis (Neuman, 2006). In other words, when a deductive approach is use in a research, it is start with a set of hypotheses that need to be tested. Then, through implementation of relevant methodology, the study is going to prove the hypotheses are right or wrong. This research starts with the general concept or theory about urban aquaculture including the impact of urban aquaculture and also the theory about community capacity. Afterward, those concepts will elaborate in the analysis with primary data obtained from field work observations and secondary data which obtain from government's (Agricultural Agency) and farmer group's documents through

visiting offices and internet browsing. In addition, this research will be conducted by using descriptive analysis approach (Neuman, 2006) with field research techniques. According to Neuman (2006) that this approach uses to depict and understanding facts which occurred in community. Moreover, the researcher makes in-depth interview in order to get more information or data from the government officers of Agriculture Agency of Surabaya and urban aquaculture farmers. Equally important, the case study methodology uses in this research due to it provides tools for researcher to study complex phenomena (Baxter and Jack, 2008). According to Yin (2009) said that the goal of use case study methodology for research is to understand complex social phenomena and real-life events.

1.4.1. Research Method Table

The data which is required in this research can be seen in the table 1.1 below

Table. 1.1. Data required for research

Research Objective/ Targets	Required Data	Data Sources / Information	How to Obtain the Data	How to Analyse the Data
1. The impact of urban aquaculture in terms of supporting low income people	1. The number of beneficiaries of urban aquaculture; 2. The average income of aquaculture farmers; 3. The harvest of urban aquaculture product.	1. Agriculture agency of Surabaya; 2. Aquaculture farmers.	1. Field work observation; 2. Government ’s document. 3. Farmer group’s document	1. Literature review; 2. Descriptive analysis.

2. The impact of urban aquaculture on environmental condition surrounding cultivation area	1. Data about the impact of urban aquaculture on environmental surrounding aquaculture area.	1. Agriculture agency of Surabaya; 2. Planning and Development Agency of Surabaya; 3. Environmental Agency of Surabaya; 4. The communities around the urban aquaculture area.	1. Field work observation; 2. Government 's document.	1. Literature review; 2. Descriptive analysis.
3. The factors that led to the success or failure of urban aquaculture	1. Behaviour of the farmer	1. Urban farmer; 2. Agriculture agency of Surabaya.	1. Field work observation.	1. Literature review. 2. Descriptive analysis.

1.4.2. Data Collection

This research uses two types of data which are primary and secondary data. Firstly, the primary data was obtained by field work and in-depth interviews with the government officers who have responsible for the program, with the member of farmer groups and academics. Moreover, in order to develop relaxed atmosphere between researcher and respondent, hence in-depth interviews conducted in unstructured and nondirective situation. Secondly, the secondary data fulfilled by conducted literature review or study. It can be done by browsing some information through internet, web site, e-journal, articles, and the previous research and also from books.

In addition, the participants of in-depth interview are 7 people consisting of 2 government officers of Agriculture Agency, 1 academics and 4 farmers from different 2 different sub-districts (Sawahan and Jambangan). Sawahan and Jambangan sub-district chosen as the case study due to they are the first sub-districts in Surabaya where the urban aquaculture program was initiated by the local authority of Surabaya. Also, those sub-districts have the biggest beneficiaries of urban aquaculture program in Surabaya. Moreover, there are also group of farmer in Sawahan and Jambangan Sub-districts who are success in the implementation of urban aquaculture. Even, one of farmer group in Sawahan Sub-district has training facilities where farmer from other sub-districts and outside of Surabaya can learn about the best practices of urban aquaculture. Moreover, there are several steps conducted by the researcher before, during and after the interview, which are:

a. Developing list of questions;
b. Making an appointment with the participants to make interview;
c. Conducting in-depth interview and recorded all of the discussion session and write all of the answer;
d. Transform all of voice recording into transcriptions and re-write all of notes into readable form;
e. Compare all information which obtained from the respondents in order to verify the validity of data;
f. Analyse the data.

1.4.3. Data Analysis

The descriptive and exploratory analysis approach (Neuman, 2006) used to analyse the data which was obtained from primary and secondary sources and already verified by researcher. Further, the analysis of the data will generate some information that can be used to answer the research question. There are several steps in the data analysis process, namely:

a. Learn more about the theoretical review, particularly relating with the conceptual model of community capacity;
b. Examining primary data which relevant with the aspects that influence community capacity and the impacts of urban aquaculture based on the theoretical review;
c. Examining secondary data in order to increase understanding of impacts of urban aquaculture and community capacity building in urban area;
d. Final steps, develop some conclusions and recommendations based on the information which had previously generated.

1.4.4. Research framework

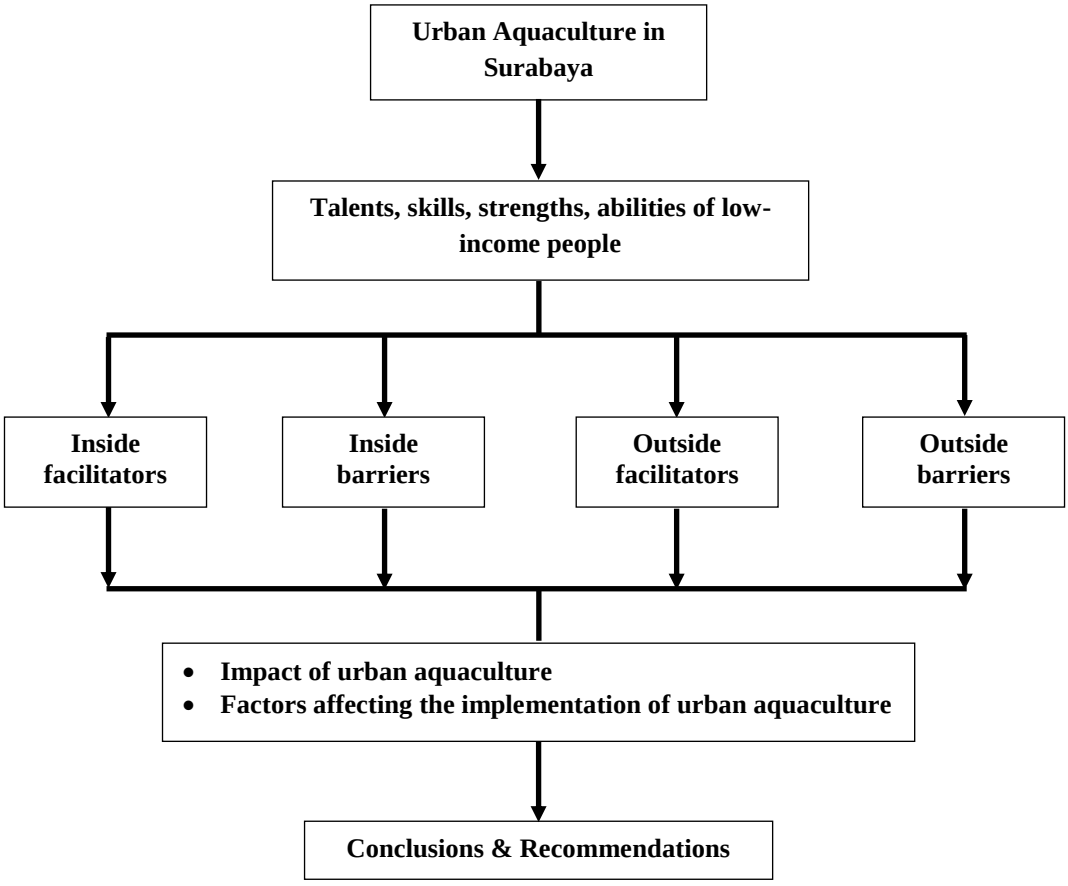

Figure.1.2. Research framework

1.5. Structure of the Research

This research is organised in five chapters which are:

a. Chapter I Introduction

This chapter consists of background, research questions, research objectives, and research methodology. The research methodology explains about method used, data required for the research, and research framework.

b. Chapter II Sustainable Development, Urban Aquaculture and Community Capacity

This chapter contains of theoretical review of the sustainable development concept, urban aquaculture, the impacts of urban aquaculture, affecting factors in urban aquaculture, and community capacity.

c. Chapter III Overview of Urban Aquaculture in Surabaya

This chapter contains information about Surabaya as a case study area including information about geographical conditions, socio-economic conditions. Also, this chapter explain about the implementation of urban aquaculture in Surabaya.

d. Chapter IV Urban Aquaculture: Towards Sustainable Development through Community Capacity

This chapter explores effects of the implementation of urban aquaculture regarding with how it is support low-income people and its impact on environmental surrounding aquaculture area in Surabaya.

e. Chapter V Conclusions and Recommendations

This chapter consists of some conclusions and recommendations for involved actors and the further research.

1.6. Conclusion

In conclusion, this research is aims at examining the role of urban aquaculture in terms of support low-income people to fight their economic problems. Moreover, this research also explores impacts of waste from urban aquaculture on the surrounding aquaculture area. Surabaya is chosen as area of the case study, because the local authority of Surabaya has implemented urban aquaculture and through it the government of Surabaya aims at encouraging community capacity of low-income people to better deal with their economic problems. Furthermore, the analytical tool used in this research is the conceptual model of community capacity developed by Jackson *et al*. (2003).

The second chapter will explains about theoretical review especially regarding with the sustainable development concept, urban aquaculture with the affecting factors and the conceptual model about community capacity.

CHAPTER II

SUSTAINABLE DEVELOPMENT, URBAN AQUACULTURE AND COMMUNITY CAPACITY

2.1. Introduction

The second chapter describes the theoretical review of sustainable development concept, urban aquaculture, its impacts and the affecting factors. In addition, this chapter also explains and provides the conceptual model of community capacity regarding with its role in order to cope with social issues. Moreover, this chapter is organised in four sections. The first sub-chapter explain about the general aims of the second chapter. The second sub-chapter explains about the concept of sustainable development which becomes fundamental concept to achieve better future condition in all of aspects. The third section describes the urban aquaculture and also as an application of the sustainable development concept in aquaculture sector. Furthermore, the implementation of urban aquaculture also needs active participation from the farmers and community. The fourth section describes the community capacity concept proposed by Jackson *et al.* (2003). Hence, the implementation of this concept would be appropriate solution to deal with urban issues. In connection with those aims, urban aquaculture could be an appropriate method to build community capacity.

2.2. Towards Sustainable Development

Nowadays, many scholars, ecologists, politicians, economists make sustainable development become a big issue and attracts their attention. It becomes a paradigm which is becomes slogan without any workable method of implementation (Lai and Lorne, 2003). Equally important, emerge of the phenomena such as: climate change, exploitation of non-renewable resources becomes new threat. Hence, many scholars and scientists in all part of the world conducted researches in order to invest much effort in their attempts to provide workable guidelines and indicators to achieve sustainable condition.

Initially, the concept of sustainable development arise as a response to the over exploitation of natural resources that accompanied economic and demographic growth in the late of 1960s. Then, the World Commission on Environment and Development Congress (WCED) in 1987 promoted their report *Our Common Future* also known as Brundtland Report concluded the classic term of sustainable development as "*the development that satisfies the needs of the present generation without compromising the ability of future generations to meet their own needs*" (WCED, 1987). Equally important, there is other definition which takes a broader view by defining sustainable development as *"the kind of human activity that nourishes and perpetuates the historical fulfilment of the whole community of life on earth"* (Engel & Engel, 1990; 10).

Munasinghe (1992) presented at the UN Earth Summit in Rio de Jenairo that sustainable development defined as a process for developing some opportunities which will enable individual human beings and communities to meet their needs,

as well as to achieve their aspirations and full potential over a sustained period of time, while maintaining the resilience of economic, social and environmental systems. Therefore, Munasinghe (1992) also stated that the concept of sustainable development has evolved to encompass three major points of view. First of all, economic dimension that related with improvement of human welfare, primarily through increases in the consumption of goods and services. Secondly, environmental dimension that related with the attempts of protect the integrity and resilience of ecological systems. Thirdly, Social dimension that emphasizing the enrichment of human relationships, achievement of individual and group aspirations, and strengthening of values and institutions.

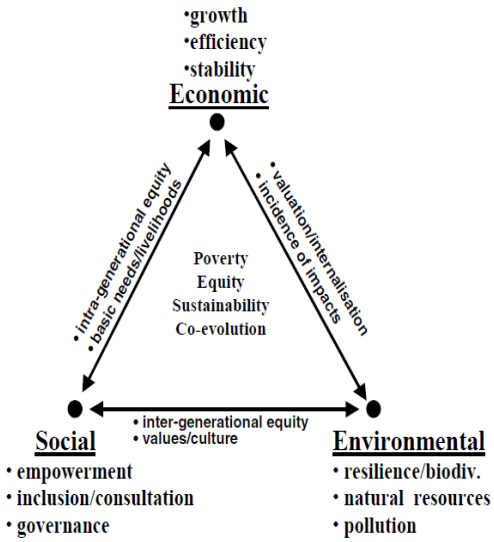

Figure 2.1 Sustainable Development
source: Munasinghe, 1992

Those three dimensions are also regarded as the planner's triangle pertaining to Campbell, (1996). He also stated in his journal which is titled *Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of*

Sustainable Development, Campbell stated that sustainable development is the balance of the three goals (economic development, environmental protection and equity social justice). Therefore, the position of sustainable development can be regarded at the centre (Campbell, 1996).

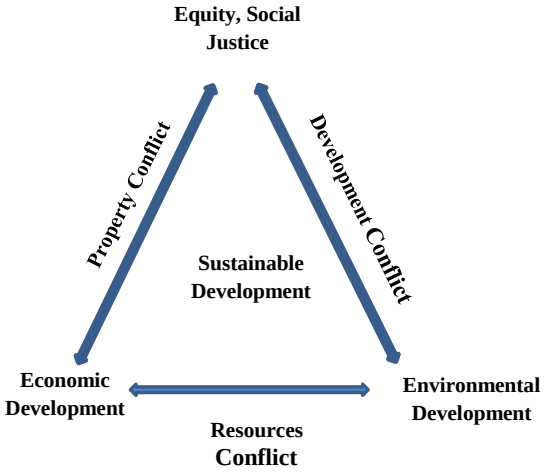

Figure 2.2 Planner's Triangle
Source: Campbell, 1996

According to Mehmood and Parra (2012: 1) said that "*sustainable development is a multidimensional approach that considers the social, economic, environmental, cultural and institutional aspects of human-nature interaction".* In addition, sustainable development implies the fulfilment of several conditions: preserving the overall balance, respect for the environment, and preventing the exhaustion of natural resources (Drexhage and Murphy, 2010). According to Plummer (2005), the aim of sustainable development is to define viable schemes combining the economic, social, and environmental aspects of human activity. Hence, these three areas should be taken into consideration by communities, companies, and individuals. The ultimate goal of the sustainable development is to find a coherent and long-lasting balance between these three aspects. Moreover, it is very important to determine the goals in order to translate the general concept of

sustainable development into tangible detail, but they are not sufficient (Pinter, 2013). Not only require the goal as the direction, but also require targets and indicators in order to measure progress (Pinter, 2013). To continue, those requirements (goals, targets, and indicators) are important for envisioning the future, developing transition pathways and strategies, turning strategies into policies and plans, guiding implementation, monitoring progress, and learning from results (Pinter, 2013).

Nonetheless, the phrase sustainable development covers a complex range of ideas and meanings and its conventional understanding which based on the three pillars model is flawed due to it implies that trade-offs can always be made between environmental, social and economic dimensions of sustainability (Adams, 2006). Moreover, the idea of sustainable development may bring people together but it does not necessarily help them to agree goals (Sneddon, 2006). This circumstance makes the implementation of the concept is different among countries in the world. It makes the difference prioritize of the three pillars of sustainable development due to the needs of each country, the characteristics of the community, the geographical condition, requirements and interest in the community are different one another (Robinson, 2004). Additionally, the development decisions by governments, business and other actors do allow trade-offs and put greatest emphasis on the economy above other dimensions of sustainability and this becomes a major reason why the environment continues to be degraded and development does not achieve desirable equity goals (Adams, 2006). To deal with this circumstance, it needs the role from governance systems

in terms of create integrated and coordinated policies with others actors (Lai *et al.*, 2003).

Despite this fact, the sustainable development concept has to be implemented in all sectors in order to achieve better condition and make our next future generations easily meet their needs as same as us without any difficulties. Moreover, Mehmood and Parra (2012: 5) said that *"sustainable development offers a relational view that calls for a more harmonious relationship between humans and nature"*. In addition, fishery is one important sector which has important role in human life in term of providing nutrients resources. By implement sustainable development concept, it can control the excessive exploitation of fish in order to preserve some species of fish from extinction threat and make sure their sustainability.

2.3. Urban Aquaculture

2.3.1. Sustainable aquaculture

There are three types of urban agriculture. The first type is agriculture which is use vegetables, fruits, and many food crops as commodity such as, mushroom, spinach, and chilli. Secondly, livestock which is use poultry, cow, sheep, goat and rabbits as their commodity. Thirdly, fish farming or as known as aquaculture which is uses fish such as catfish, tilapia, molluscs, and crustaceans.

According to Urban (2006: 2) said that *"Aquaculture is the farming of aquatic organisms in marine or freshwater. It implies some form of intervention in the rearing or growing process to enhance production, such as regular stocking, feeding, and/or protection from predators and disease. It also implies individual*

or corporate ownership of the stock or crop being farmed". Furthermore, aquaculture is a part from the agricultural which became the fastest growing sector of food production worldwide during the past decade that has very important role in terms of satisfying the needs of nutrients for world population. Moreover, freshwater aquaculture can be defined as aquaculture which is use freshwater fishes such as catfish, tilapia, and carp. Usually, freshwater aquaculture is conducted by households or communities who use extensive or semi-extensive methods to minimalize the cost production (Edwards and Demaine, 1998 in Silva, 2005). Extensive aquaculture method is a method that uses the natural environment, where the fish generally are gained from a hatchery, although in some cases wild spat or juveniles may be collected, and placed into a position where they can gain all their needs from an unmodified or minimally modified environment. However a semi–intensive aquaculture system is described more as supplementation of the natural system which may take many forms, such as additional aeration to guarantee sufficient dissolved oxygen, additional inorganic or organic fertilizer to improve natural productivity and additional prepared feeds for supplemental feeding (Lucas and Southgate, 2003).

In addition, as the fastest growing sector of food production, aquaculture increases the economic growth, social and environmental condition (Guettler *et al.*, 2011). However, this sector also requires special handling in order to make the waste from fishery industry do not lead to environmental degradation. Thus, the actors who involved in this sector such as: governments, supranational organizations, environmental groups, and industry participants have to find more sustainable means of aquaculture development. The United Nations Food and Agriculture

Organization (FAO) have developed the code which has purpose to emphasize that fishery resources need to be made use of in a manner that ensures their sustainability over the long term, is in harmony with the natural environment, and does not engage in capture and aquaculture practices that are harmful to ecosystems and communities (FAO, 2013). Owing to the fact, the technical aspect (for example feeding technique, cultivation technique, breeding technique) in the implementation of aquaculture has to be synergize and integrated with the three pillars of sustainable development (environmental, economic and social) (Silva, 2005).

Basically, the concept of sustainable development can be implemented in every sector including in aquaculture sector. Sustainable aquaculture is the cultivation of fish species for commercial purposes by using harmless means which do not emerge environmental degradation, contribute to local community development, and generate an economic profit (Edwards *et al*., 1997). As a concept, sustainable aquaculture has evolved and grown along with extinction threat of some fish species due to overexploited of wild fisheries. Furthermore, environmental degradation as a consequence of the negative impact from conventional aquaculture has also motivated those concerned with the oceans, fisheries, and food production to develop a comprehensive definition and set of practitioner's guidelines for sustainable aquaculture. However, there is no rigorously definition about sustainable aquaculture, although universally accepted definition has been agreed upon. Moreover, the purpose of sustainable aquaculture is to conserves land, water, plant, and animal genetic resources especially fish by using

appropriate technology, environmental friendly, economically viable and socially acceptable.

2.3.2. Urban aquaculture

Urban aquaculture is one implementation of sustainable aquaculture concept in urban area. Initially, urban agriculture developed in some Asia countries since 2000 years ago (Costa-Pierce and Effendi, 1988 in Costa-Pierce *et.al.*, 2005). At that time, fishes were kept life in woven baskets and bamboo cages in ponds and canals outside markets. In addition, urban aquaculture can be defined as the practice of aquaculture which occurring in urban settings or areas subject to urbanization, incorporating by definition, peri-urban conditions (Costa-Pierce *et.al.*, 2005). But urban aquaculture is not only about growing of aquatic plants and animals in the urban and peri-urban neighbourhoods, it also involve other aspect such as economy and social.

Cities are places that became centre of human activities in every aspect, such as economic, education, culture, social, information and also fabricated, heterotrophic parasites on the global landscape (Costa-Pierce, *et al.*, 2005). Almost all basic needs of the communities (such as, vegetables, meat, fish, and rice) supplied from outside urban area. Hence, the current challenge is how to make cities assist urban agriculture and aquaculture in the underutilized urban and peri-urban environments in order to supply the basic needs (Guettler, *et al.*, 2011). Urban aquaculture is not only about the growing of aquatic plants and animals in the cities and the peri-urban neighbourhoods, but it is more to the effort to fulfil demand of the basic needs for urban communities. Cities are the most important

marketplaces for all aquaculture products. This situation makes aquaculture becomes a new potential business to supply the needs of fresh food in urban area.

Equally important, not only become a new potential business, but urban aquaculture also become new trend in the rise of urban food planning. Therefore, planners should be considering food system into planning field, particularly since the beginning of the new millennium it was famously described as a new trend in the planning field (Pothukuchi and Kaufman, 2000 in Morgan, 2013). Moreover, in some countries the proximity of urban aquaculture to market place creates food supply chains become shorter and this circumstance support by the demands and tastes of the local food movement, where the farmers are selling their product directly to consumer in urban area without pass through the middlemen or distributor. Indirectly, the short food supply chains that created by urban aquaculture become a response to the food crisis (Morgan, 2013). However, urban aquaculture needs the role of governments to intervene to prevent supermarkets from screwing urban aquaculture into the ground and use their power to prevent the monopolistic control of the food supply (Steel, 2009).

Coto Coto *et al.* (2005) said that urban aquaculture involving poor families as the farmers and they establish family aquaculture. In general, the poor family always have problem with food security. It leads by the minimum requirement (money) to fulfil their basic needs (Stevenson and Irz, 2009). Furthermore, they also stated that there is direct and indirect effect of increased fish supply for consumption by the poor. The direct effect is an increase in supply of fish will decrease the price for protein in the local market. This will give benefit for the poor as the poor spend a greater percentage of their income on food. The indirect effect is more

long term positive nutrition and health effects of an increase in protein consumption by the poor are also expected but difficult to attribute to aquaculture, given the complexity and timescales associated with these causal links. Indeed, urban aquaculture has enormous potential for poverty alleviation. However, there are knowledge gaps and policy decisions that need resolving. Significantly, urban aquaculture has enormous potential for poverty reduction, but there are knowledge gaps and policy decisions that needs to be solved. Thus, urban planners rarely consider aquaculture when planning uses of urban water. They also lack of information about the relative importance and benefits associated with urban aquaculture.

Furthermore, based on Bunting and Little (2005) that there are prevailing management characteristics of urban aquaculture, namely: extensive, semi-intensive, and intensive production system. Firstly, extensive system is a system approach uses in aquaculture that consist of stocking fish in reservoirs and large urban water bodies, followed by recapture after a period of 1-2 years. This method uses the natural environment. Secondly, semi-intensive system is a system approach uses in aquaculture that pond-based aquaculture offers farmers greater control over the culture system and permits better surveillance, enabling producers to better guard against hazards such as theft, predation and contamination. This system tends to support or supplement the natural system such as, gives the additional aeration, give additional fertilizer to improve productivity, and gives additional feeds. Thirdly, intensive system is a system approach uses in aquaculture that use high cost investment combined with modern technological tools. The advantage of intensively managed farms is that operators can exert greater control over the operation of the system, regulating better factors

such as water quality, feed delivery and stock management. More intensive, less open systems also offer the producer greater control over public, animal and environmental health hazards. However, due to high capital and operating costs of intensive systems, in many cases it is only feasible to produce high value products, which are often destined for specialist markets.

Management intensity			
Characteristic	**Extensive**	**Semi-intensive**	**Intensive**
feed source	natural production enhanced indirectly through nutrient rich surface runoff and drainage water	exploitation of waste resources and fertiliser applications to enhance natural production and / or the provision of basic supplementary feed	dependence on externally supplied high-protein feed; which in some cases may have been produced using by-products e.g. tubifix worms, fly larvae
access, ownership and tenure	open access, common property resources	private, cooperatives, leaseholders, community-based management	private, commercial, research and development, vertically integrated
markets	subsistence, local retail markets	subsistence, local and regional wholesale and retail	high value food and ornamental species, regional and export oriented, food products processed to add value
constraints	variable productivity; access may be denied to poorer community members and new entrants; urban sprawl; competition with other user groups; theft and poaching	contamination of waste resources and pollution may inhibit production and affect consumer sentiment; urban sprawl; limited control over environmental perturbations	high capital costs; inherent financial risks; susceptible to disease outbreaks, technical failures, changing market conditions and competition

opportunities	poorer community members may benefit through continued access or cheaper food from low investment systems	where hazards can be minimised, local production of fish and plants from urban systems can contribute to food security, enhanced livelihoods and environmental protection	investment opens up access to new and larger markets; possibility of higher returns from money and resources invested

Table 2.1 Characteristics of urban aquaculture systems managed at different intensities
Source: Bunting, *et al.*, 2006

2.3.3. The impacts of urban aquaculture

The implementation of urban aquaculture may have various impacts, especially for poor communities. As Rana, *et al*. (2005) said that in several African countries the potential of aquaculture for urban employment, income generation and food security is being increasingly recognised. Reliable and high level demands for aquatic product in urban markets lead to the development of many urban aquaculture activities. As Bunting and Little (2005) said that urban farmers who involved in urban aquaculture have directs access to consumers due to their proximity from markets and it can help to decrease the transportation cost. They are able to deliver fresh aquaculture products to consumers that prefer to buy live fish as a guarantee of freshness. Moreover, it is also possible for the producers fulfil the demand of the market in low price due to low of transportation cost. As consequence, poor families more accessible to consumes fresh fish. It is clear that urban aquaculture make a significant contribution to poor families and communities in terms of food security.

Urban aquaculture can provide urban employment for large numbers of people. There will be many jobs created due to urban aquaculture activities such as, stocking, harvesting, maintenance and management, and indirectly in associated activities such as producing and supplying seed and feed, making nets and boats and transporting and marketing harvested products. For example, estimates suggest that urban aquaculture around Kolkata provided direct employment for 8,000 people, whilst employment in associated sectors servicing the farms was put at over 20,000 people (Kundu et al., 2005).

Urban aquaculture offers a possible solution to cope with limited access to nutrient inputs and water resources by reusing wastewater and by-products from agriculture and food processing. Additionally, utilization of water resources and nutrients contained in both solid and liquid waste will reduce pressure on the remaining renewable freshwater resource and non-renewable mineral resources. As urban areas become completely human-dominated ecosystems with people increasingly separated from nature, integrated aquatic ecosystems can help not only contribute to global food production and water sustainability while reducing impending environmental harm, but also reconnect people to the natural world, distant times and their ethnic roots (Costa-Pierce and Desbonnet, 2005).

Mazeereuw (2005) conveyed that the implementation of urban aquaculture can gives positive impacts to the social condition of the community due to it can create sense of community within community. To continue, the improvement of this sense will prevent the occurrence of social isolation on a particular group or member of the community. Also, the implementation of urban aquaculture will

enhance community empowerment and social relationship within the society due to this activity involves many members of the community (Adiyoga, 2004).

Furthermore, urban aquaculture is also helping facilitate the managed reuse of waste resources. Moreover, wastewater reuse through urban aquaculture could be an important component in the sanitation strategies of poor communities in developing countries. Providing sanitation is an important development process, and is recognized as being of prime importance in improving the general health of the communities. By providing sanitation, infant mortality caused by communicable diseases e.g. cholera, typhoid and diarrhoea is greatly reduced, as is the incidence of severely malnourished individuals with associated physical and mental health problems household and community health. In general, it has been suggested that life expectancy in communities generally increases as a result of providing sanitation (Bunting, *et al.*, 2006).

2.3.4. Constrainst in implementation of the urban aquaculture

Furthermore, in the implementation of urban aquaculture, there are several of constraints that usually faced by urban farmers. As Bunting, *et al.* (2006) stated that there are four major constrains in the implementation of urban aquaculture. Firstly, the increasing level of people migration from rural to urban will increase the demand of residential area. As a result, the development of new settlements area will decrease land for aquaculture. Moreover, the landowner is tends to change their land use for residential and industrial development due to its more profitable than use the land for urban aquaculture. Secondly, many urban dwellers are abandoning of all kinds of farming due to they can find more highly paid work

in the urban area and they think that farming is dirty jobs. This circumstance leads to shortages of labour and skill for farming. Thirdly, increase level of efficient infrastructure, such as toll road will cause the producers from outside urban area can easily reach the cities. Owing to the fact, the urban fish producers will lose their competitive advantage. Fourthly, pollution from home and industry will contaminate water surface resources which use for urban aquaculture. There is also health risks involved in consuming products grown using waste resource.

2.4. Community Capacity Building

2.4.1. Definition of community

Inevitably, the prosperity of nation can be seen from the health of its community. Equally important, the health of children and families also cannot be separated from the health of the community in which they live (Bronfenbrenner, 1979; Edwards & Bromfield, 2009 in Lohoar *et al.*, 2013). Moreover, the high levels of children exploitation which occurred in the developing countries indicate lack of humanity in the community.

In addition, community is already defined by many scholars and scientist from many discipline perspectives. Community can be defined as a group of people who coming together in physical, environmental, economic, relational, political or social ways (Kumar, 2005). In other definition, Maguire and Cartwright (2008) explained that community can be defined in three ways. Firstly, a community is a group of people living in the same area (geographic community). Secondly, a community is a group of people who have similar characteristic. For example, a group of farmers who have similar characteristic in relation with the water

resources utilization. Thirdly, a community is a group of people who may emerge in response to a number of issues or in response to regulatory reform.

2.4.2. Towards community capacity from capacity building

According to the area where the community live is divided into two types. Community who live in urban area called as urban community and community who lived in rural area called as rural community. To continue, there are three main differences between urban and rural community (Kelly, 2004). First of all, urban community is characterized by large scale industrialisation which is can be seen from the high job opportunities in this sector. In other hand, rural community is characterized by the absence of industrialisation and most of them work as farmer. Secondly, pollution is usually associated with urban community due to the existence of industrialisation and modern transport such as, buses, motorcycles, and cars. Although, the rural community still breathe in pure and natural air. Thirdly, urban community is very fast paced and seem to be in an eternal hurry trying to beat the clock. In contrast, rural community life in relaxed and slow paced, they have more time for leisure activities and seem to enjoy nature.

Kelly (2000) in Maguire and Cartwright (2008) argues that community is complex and dynamic and they tend to develop on an ad hoc basis according to the needs, desire and goals of their members. Undoubtedly, each community has their own capacity and sometimes it has particular characteristic and different between each other. Usually, capacity is related with the performance, ability, capability and potentiality when particularly assessing the characteristic of an object or a person (Liou, 2004). As a consequence, it requires an effort to build the capacity in order

to face the challenge and prepare the community in dealing with these changes. As Liou (2004: 3) said that capacity building is defined as *"multidimensional concept to create enabling conditions for individuals, institutions and communities that realize their potentials, values and prides to get skills, learning, and knowledge"*.

Furthermore, when performing an enhancement effort through capacity building to community, it seems to be like similar with community participation, community empowerment, community competence, community development and social capital. Recently, community capacity building become big issues especially in developing countries which attract the policy maker and the government to give more attention in term of enhance the ability of their community in dealing with uncertainties situation, such as: climate change, global economic crisis, etc. Originally, the measurement of community capacity can carried out by assessing the social and economic indicators. Although, it requires more than social and economic indicators in order to measure the community capacity building due to this term is used in a wide range of social, economic and environment context (Noya, Clarence, & Craig, 2009).

Additionally, the community capacity concept is appropriate to implement in coping with economic problems, especially for poverty problems. In the developing country such as Indonesia, many developments especially in urban areas tend to lead to poverty problems due to the inequalities between low-income people and high-income people. It is clear that community participation has important role to decrease the level of poverty due to the purpose of community

capacity building effort is to strengthen civil society where the focus is on social capital goals (Hunt, 2005).

The Aspen Institute (1996: 11) promoted that "*community capacity is the combined influence of a community's commitment, resources and skills that can be deployed to build on community strengths and address community problems and opportunities".* Likewise, Atkinson and Willis (2005: 3) proposed another definition of community capacity building as *"the networks, organisation, attitudes, leadership and skills that allow communities to develop according to their own priorities and needs".* Therefore, the other actors outside the community, such as: government and NGOs try to enhance skills of the community in order to identify the kind of the problems through common action. Then, the government or NGOs with their capacity utilise those skills to overcome the community problems. Moreover, it can be seen that community capacity building is an effort in terms of enhancing the development of community to be more 'health' or 'active' (Atkinson and Willis, 2005).

Equally important, the definition of community capacity used in this research was develop by Jackson *et al.* (2003: 345) which promoted that community capacity is *"the potential of a community to build on its strengths in order to work towards and achieve its goals and dreams, given both facilitating and barrier conditions coming from inside and outside the community".* This concept highlights the relation among social capital from community and factors which come from inside and outside of the community. The social capitals or also known as potential of community could be talents, strengths, skills and abilities which are

indicated by all of community members as well as the community level (Atkinson and Willis, 2005).

Talent/ skill category	Examples of talent/ skill
Organizing	• Organizing events from bingo and cards to big community events; • Facilitate meetings, speak in public and fundraise; • Lobbying and making politicians accountable for their actions;
Hospitality	• Making people feel welcome; • Being able to live harmoniously with many others of many cultures; • Providing baking (sometimes out of their own pocket); • Looking out for neighbours; • Tobermory was described as particularly warm and welcoming, with well-developed skills in caring and hospitality;
Human relations	• Residents helped and supported one another; • Willing to work together; • Part of many networks;
Technical	• Cooks, caterers, hairdressers, artists, poets, film directors, photographers, musicians, singers, dancers, writers, gardeners, tradespersons (e.g. carpenters, auto mechanics, painters, plumbers, electricians), seamstresses and tailors, child care workers, craftspeople, counsellors and community workers People who were good at sports and received recognition and scholarships;
Professional and academic	• Business, teachers, engineers, doctors (although their credentials are not recognized in Canada), researchers, accountants and lawyers; • Some youth have gone on to college and university;

Table 2.2 talent or skill of community as the social capitals
Source: Jackson *et al.*, 2003

Usually, internal factors could be the physical and social aspects described within the community's physical and social boundaries, whereas external factors could be the attitudes and policies of larger institutions, governments and other organizations which influence the community, or behavior which come from people who living outside the community (Jackson *et al.,* 2003).

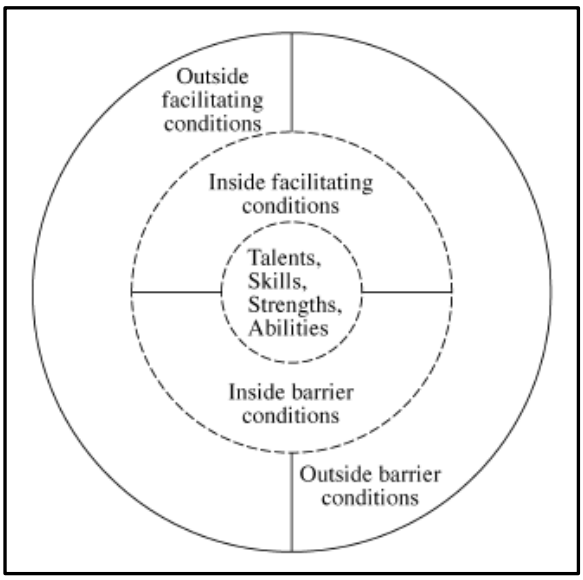

Figure 2.3 Community capacity model
Source: Jackson *et al.*, 2003

Figure 2.3 depicts the interaction among the component of social capitals and both of internal and external factors in order to produce desired result or outcomes to reach the community goals and dreams. In addition, Jackson *et al*. (2003) defined both of inside and outside factors into two, namely: facilitating conditions and barriers conditions.

a. **Inside facilitators** are the allowing condition develops by community which can support to work towards achieving the goals or dreams (Jackson *et al.*, 2003). The inside facilitators could be as social relationship among the members, social networks, and social interactions with other communities.

b. **Inside barriers** are the conditions created by community itself and its members which influence as hindrances the effort of the community to reach the goals or dreams (Jackson *et al.*, 2003). The inside barriers could be as a group of people in the community who exclude their self from other members, a group of people who always resist community program which have purpose to enhance the community capacity.

c. **Outside facilitators** are the external conditions which give positive influence to the community related with their attempt to reach their goals and desires (Jackson *et al.*, 2003). The outside facilitators could be as government's policies, the relationship between government officers with the members of community, convenient access to green space, government's services and programs.

d. **Outside barriers** are the external conditions which become hindrance for the community related with their attempts to reach their goals and desires (Jackson *et al.*, 2003). The outside barriers could be as the negative assessment from the media to the community and the members of community, government's policies which particularly increase the challenge of daily living.

2.4.3. Outcomes of community capacity

Usually, the challenges for the community related with the enhancement of their capacity is depends on how to develop its own commitment, resources and skills (The Aspen Institute, 1996). In the end of the community capacity building should be able to develop a 'healthy' community (The Aspen Institute, 1996) which produces valued outcomes. Moreover, to accomplish enhancement quality of life of the community, it needs role of many actors such as governments, politicians,

community developers and business leader (Beckley *et al*., 2008) in terms of create new policies which favour the interest of the community.

Actually, the main purpose of traditional community development is to enhance economic prosperity of the community (Beckley *et al.*, 2008). However, improvement economy quality is not enough to achieve better quality life in community. The community development has to be generating valued outcomes such as economic prosperity, social and political inclusion, environmental stewardship, social and self-worth, health, safety and security, social cohesion and this entire valued outcome will turn to become the new community assets (Craig, 2005). It needs social and political inclusion to facilitate the community interest in decision or policy making process by governments and politicians. Moreover, community also require healthy environment in the neighbourhood to make their daily live more comfortable. A good social status as a social and self-worth is needed by members of the community especially for low-income people in order to be recognized by other members.

Above all, urban aquaculture can be categorized as an effort to enhance ability of community in urban area. The implementation of urban aquaculture especially in developing country usually involved low-income people due to it can provide food and nutritional security and also additional income (Ahmed and Lorica, 2002). Recently, governments as the policymakers pay more attention to the community capacity building to increase the ability of communities in order to achieve better live in the future by considering social, environment and economic dimension (Marre and weber, 2010). Therefore, towards sustainable development can be done through the development of community capacity due to the

community can be the important role as Parra (2012: 1) said that "*it is argued that the social is not – as often depicted – the weakest pillar of the triad but the fundamental engine of the sustainability system*".

2.5. Conclusion

To sum up, the second chapter provide understanding of the fundamental concept of sustainable development, concept of urban aquaculture, the impacts and the influence factors, also the concept of community capacity as a method to achieve social sustainability. In addition, towards sustainable development can be done through the implementation of urban aquaculture which aims to enhance community capacity in urban area. Urban aquaculture also has enormous potential for poverty alleviation. However, there are knowledge and policy gaps that need to resolve.

The third chapter will explain about general condition of Surabaya Municipality as case study area, including geographical and socio-economic condition. Moreover, it also provides information about the implementation of urban aquaculture that already implemented since 2010 by the Local Authority of Surabaya.

CHAPTER III

OVERVIEW OF URBAN AQUACULTURE IN SURABAYA

3.1. Introduction

The third chapter examines the general condition of Surabaya Municipality as the location of the case study. Further, it is continue by explanation of the implementation of urban aquaculture in Surabaya. The researcher took Surabaya as case study due to urban aquaculture already implemented since 2010 by the local authority of Surabaya through community empowerment program. The purpose of this program is the local authority wants to encourage the community capacity of low-income people in order to cope with their economic problem.

Urban aquaculture in Surabaya is implemented by utilized narrow land, yards, and backyards. By providing starter package which consist of 1 set of tarp pond, 800 catfish seeds and 60 kg of fish feed, the Government of Surabaya tries to encourage the community capacity and human capital of low-income people. In addition, this program proved to be able to create job opportunities for low-income people as fish farmer. Moreover, urban aquaculture in Surabaya uses catfish as commodity due to this fish has many advantages than other types of fish.

3.2. General Overview of Surabaya

Indonesia is an archipelago country which is located in Southeast Asia. It is located close to the equator line and it makes Indonesia has tropical climates. The position of Indonesia is located at coordinates 6° North Latitude - 11°08' South Latitude and from 95° East Longitude - 141°45' East Longitude and is located between two continents, Asia and Australia / Oceania. Furthermore, the administrative boundaries of Indonesia are:

- North : Malaysia, Singapore, Philippines and South China Sea.
- West : Indian Ocean.
- South : Australia, East Timor and Indian Ocean.
- East : East Timor, Papua New Guinea and Pacific Ocean.

According to the Central Bureau of Statistics of Indonesia (BPS) that the population of Indonesia was 237,641,326 people in 2010 (http://www.bps.go.id, 2013). Although Indonesia has thousands of islands, but only five main islands are inhabited by most of Indonesian's population. They are Java, Sumatra, Sulawesi, Kalimantan and Papua. To continue, Java Island is become the centre of economic, education, politics of this country. Owing to the fact, more than half population of Indonesia dwelled in this island. This country is divided into 34 provinces and 403 regencies and municipalities.

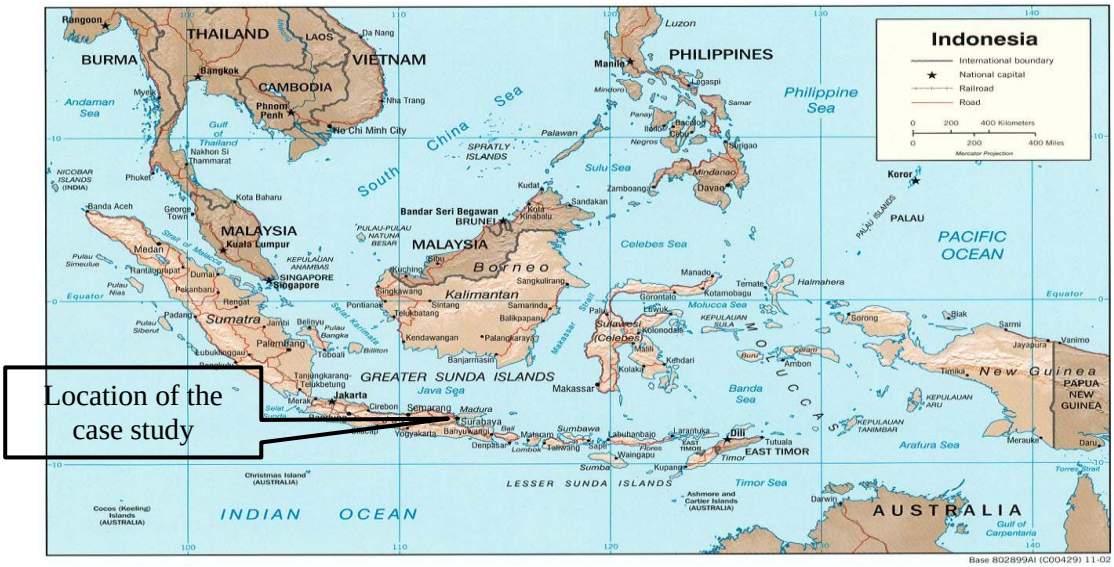

Figure 3.1 Map of Indonesia
Source: http:// blogger-indonessia.blogspot.nl/2011/08/download-peta-indonesia-terbaru.html, 2013

East Java Province is the important provinces in Eastern part of Indonesia due to its role as the centre of economic activities and has significant role for the economic condition due to it contributes 14.85 % to the National Gross Domestic Product (GDP). East Java Province has the largest area than six others provinces in Java Island. In 2010, the total population is more than 37 million and the total of land area of East Java province is 47,922 km^2 (http://www.jatimprov.go.id, 2013). Administratively, East Java Province divided into 29 regencies and 9 municipalities which make this province has the highest number of regencies or municipalities in Indonesia.

Figure 3.2 Map of East Java province
Source: http://www.javaindonesia.org/provinces/east-java-indonesia/, 2013

Surabaya Municipality is located in the north-east of the province and along the edge of the Madura Strait. In addition, Surabaya is the second largest city in Indonesia after Jakarta and the capital of East Java Province. It has significant role in the eastern part of Indonesia as the centre of business, commerce, industry, and education activities. Furthermore, it bounded by Madura Strait (in North and East side), Sidoarjo Regency (in South side) and Gresik Regency (in West side). The total land area of Surabaya is 33,306.30 hectares (http://www.surabaya.go.id, 2013) and around two-thirds of those total areas have already built. Based on the Regional Planning and Development Agency in 2009 that the proportion of land use in Surabaya are settlement (42 %), agriculture (16.24 %), fisheries area (15.20 %), economic, commerce and industry activities (18.06 %) and others (8.30 %) (Bappeko, 2010). Administratively, Surabaya Municipality divided into 31 sub-

districts and 163 villages. Surabaya features a tropical wet and dry climate, with very consistent average temperatures between 31^{o}-26^{o} Celsius. Wet season runs from November through May and dry season runs from June through October.

As the capital city of East Java province and centre of economic, commerce, industry activities, Surabaya attract people who living in others regencies around Surabaya such as Sidoarjo, Bangkalan, Gresik, Mojokerto, Malang even Lamongan. They came to Surabaya in order to achieve better opportunities to improve their lives and almost all of them motivated by economic. Some of them reside in others regencies around Surabaya and they came during the daylight period as workers. Owing to the fact, the population number of the city increases around 3 million people during the work time period (http://www.surabaya.go.id, 2013). According to the Population and Civil Registration Agency of Surabaya that this city has 3,110,187 populations which were recorded in 2012 with 1.2 % of growth rates per year (http://www.surabaya.go.id, 2013). Moreover, Surabaya is a city with multi-ethnic culture and there are many kinds of ethnic in Surabaya, such as ethnic Malay, Chinese, Indian, Arab, and European, Madurese, Sundanese, Batak, Borneo, Bali, Sulawesi. They mingle with the natives and through cultural pluralism they became part of the characteristic of Surabaya.

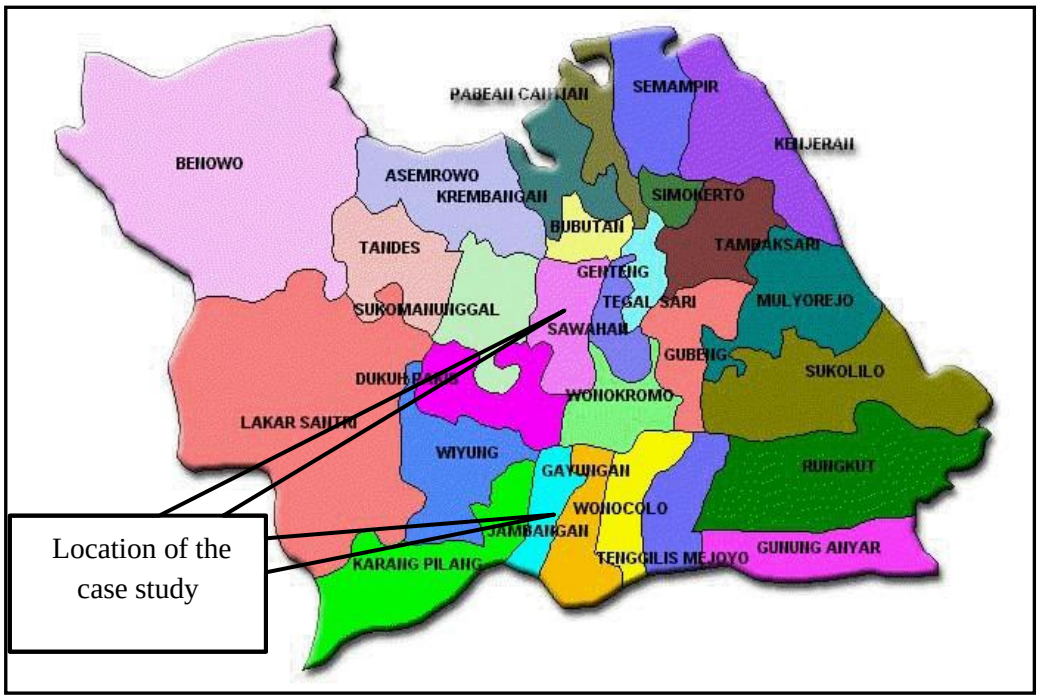

Figure 3.3 Map of Surabaya Municipality
Source: http://www.surabaya.eastjava.com/plan/peta/html/pkodya-surabaya.html,

GDRP (Gross Domestic Regional Product) is one of the most frequently used indicators to measure economic growth or economic conditions of a region. GRDP based on current market rates and constant. The percentages reflect the structure of the economy. Surabaya is one of city in East Java province that has the potential of the economy. GDRP Surabaya increased dramatically from approximately 7.026 million Euro in 2010 to approximately 8.107 million Euro in 2012 (see table 3.1). Table 3.1 below depict that the most contributor sectors for GDRP of Surabaya are trading sector than followed by transportation and services sector. It means that most of Surabaya community work in trading, hotel, restaurant, and industries sectors. In addition, it can be clear seen from table 3.2 that the biggest contributor for GDRP of Surabaya in agriculture field is fisheries. Although, the land which use for cultivate the fish in Surabaya was decreased year

by year due to urban development and changes the urban land use from pond fisheries to residential area.

	SECTOR	2010 (Euro)	2011 (Euro)	2012 (Euro)
1	AGRICULTURE	6,333.75	5,955.93	5,981.18
2.	MINING AND QUARRYING	508.26	520.89	539.46
3.	MANUFACTURE INDUSTRY	1,538,012.70	1,614,822.29	1,704,759.98
4.	ELECTRICITY, GAS AND CLEAN WATER	166,410.46	178,515.18	192,277.55
5.	CONSTRUCTION	471,223.61	503,347.99	538,755.10
6.	TRADING, HOTEL AND RESTAURANT	2,962,046.05	3,220,322.00	3,491,838.31
7.	TRANSPORTATION AND COMMUNICATION	806,580.77	887,381.95	963,759.39
8.	FINANCING AND RENTAL	459,656.16	493,482.90	528,442.99
9.	SERVICES	615,535.59	648,513.94	681,233.79
	TOTAL	**7,026,307.35**	**7,552,863.07**	**8,107,587.75**

*1 Euro = 12,500 IDR

Table 3.1 Gross domestic product of Surabaya Municipality 2010 – 2012
Source: http://www.surabaya.go.id, 2013

	SECTOR	2010	2011	2012
	Agriculture	1,655.79	1,735.90	1,898.87
	Animal husbandry/ livestock	703.60	724.81	762.68
	Forestry	0.00	0.00	0.00
	Fisheries	11,904.89	11,820.66	12,706.55
	TOTAL	**14,264.28**	**14,281.37**	**15,368.10**

*1 Euro = 12,500 IDR

Table 3.2 Gross domestic product of Surabaya in agriculture sector 2010 - 2012
Source: http://www.surabaya.go.id, 2013

3.3. Overview of Urban Aquaculture in Surabaya

Urban aquaculture was implemented in Surabaya since 2010. Initially, the idea of urban aquaculture came from the Regional and Development Planning Agency of Surabaya (Bappeko) when they saw that fresh fish has highly opportunity in the community. In addition, there were many low-income people who have food

security problem. Then, together with the Agricultural Agency, they formulated a program as a new alternative solution for low-income people to fight with poverty problems. According to the Agricultural Agency of Surabaya, there were 126,420 low-income people or 4.23 % of total population in Surabaya (Dinas Pertanian, 2011). However, there are only 6,000 low-income people involved in the beginning of the program in 2010 due to of limitation of budget and this number will be increase year by year. Through this program, the Local Authority of Surabaya aims at encouraging community capacity of low-income people to better deal with their poverty problems.

Furthermore, the implementation of urban aquaculture uses three main principles (Brotoadji, 2011). First of all, urban aquaculture has to use product or commodity which is easy to sell after harvesting period. Secondly, the cultivation or aquaculture areas do not require large area. In Surabaya, urban aquaculture utilizes narrow land, vacant land, and yards or backyards due to insufficient land. Thirdly, the farmers have to use organic feed in order to keep safety level of the product, especially when it consumed by human. Hence, the Agriculture Agency of Surabaya as the executor of the program decided catfish as the commodity. Moreover, according to Setya and Agung (2012) there are several advantages of catfish as commodity compared than others kind of fish such as tilapia or pangasius. Firstly, the harvesting period is faster than others fish. One harvesting period of catfish need 50-60 days, however tilapia or pangasius need 90-120 days. Secondly, the Feeding Conversion Rate (FCR) of catfish (0,8) smaller than tilapia and pangasius (1). It means that to reach 0,8 kg of catfish need 0,8 kg of feed fish, but for tilapia and pangasius to reach 1 kg need 1 kg feed fish. Thirdly, cultivation

of catfish is easier than tilapia and pangasius. Fourthly, catfish is more profitable than tilapia and pangasius.

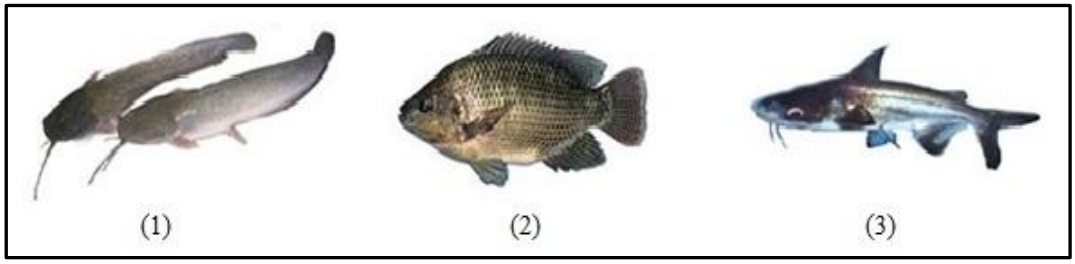

Figure 3.4 (1) catfish; (2) tilapia; (3) pangasius
Source: Brotoadji, 2011

Urban aquaculture in Surabaya is utilizing artificial pond made of bamboo and tarp. Utilization of tarp pond can facilitate people who do not have sufficient land for aquaculture. Moreover, sustainable aquaculture technique and appropriate technology by utilize narrow land, vacant land and yards such as tarp pond to make additional income is concrete solution for community economic empowerment. Equally important, catfish aquaculture in the tarp pond is also suitable for coastal, mountains or hills areas. According to Sujionohadi and Suhedi (2002) this technique is a solutions to problems of natural limitation and there are several advantages of using this technique, for instance: suitable for catfish aquaculture, do not require large area, effectively prevent catfish from other predators, minimize fish mortality, can be supplemented by a volume control water, easy moved and adjusted to the availability of land.

Figure 3.5 Tarp pond
Source: Author

Actually, the support which given to low-income people by the Local Authority of Surabaya consist of 800 catfish seeds, 1 sets of tarp pond size 2 x 3 M, and 60 kg of fish feed. Also, the government provide 1 people for each sub-district as assistant to assist, guide, and supports farmers in the field from the cultivation period until harvesting period. For example, in the cultivation periods the assistants give knowledge to the farmers about cultivation management, and teach about how to accelerate enlargement of catfish by pay attention to the quality of water and natural feeds. Therefore, the Local Authority of Surabaya provides two approaches that already implemented in order to optimize the implementation of urban aquaculture program, namely:

1. Basic strategy
    a. Establishment and reinforcement of community (farmers) groups;
    b. Technical and non-technical assistance as well as business management.

2. Operational strategy
    a. Identification and inventory of low-income people who are committed to engage in urban aquaculture program;
    b. Trainings which are conducted by assistants at the group meetings.

Equally important, the two strategies above are also to overcome the challenges which arise during the implementation of the program. Through this assistance, the government aims to inform about how to be a good fish farmer during the cultivation periods. Furthermore, the others challenge is the lack of public interest in fish consume due to the limited variation of how to create interesting and tasty food from fish and also, to cook fish is not as practical as others commodities, such as meat, chicken and eggs. Hence, the assistances also develop the knowledge of farmers regarding with diversification of aquaculture product, for example: catfish meatballs, catfish crackers. This method is expected can increase the level of public fish consumption especially in Surabaya.

In general, urban aquaculture in Surabaya managed by farmers groups which consist of 15-20 people in each group. All members of farmer groups are obliged to participate in managing the aquaculture and all kinds of farming activities including feeding, cleaning the pond, and keeping the water quality. Moreover, they hold regular meetings in every month in which the meeting was attended by the assistants professional. This meeting is intended as a means of communication among group members. Additionally, farmer groups earn approximately 7-10 million IDR (for 15-20 tarp ponds) in one of the harvest period. Then, the money is shared to all members after reduced for maintenance cost, buy new catfish seeds, and buy catfish feeds.

The total production of catfish in Surabaya is increase after the implementation of urban aquaculture compare than before the implementation of the program. The catfish production in Surabaya reflects significant growth from approximately 142.63 ton per year in 2009 to approximately 400.61 ton per year in 2011 (Dinas Pertanian, 2012). Furthermore, around 60% of the total catfish production was consumed by people in Surabaya and around 40% of the total catfish production consumed by people in outside of Surabaya Municipality, such as Gresik, Sidoarjo, Lamongan, Bangkalan, Mojokerto (Dinas Pertanian, 2012).

According to Smit *et al*. (2005) that the economic value or success of the implementation of urban aquaculture is shown by the possibility to earn income through employment and its funding no longer depend on the subsidies or government budget. In addition, the implementation of urban aquaculture must be able to increase the efficiency of transport cost, providing food needs for the urban community in order to realize the sustainability of food security, and improve the community's lives especially for the low-income people (Buttner, 2005).

3.4. Conclusion

In conclusion, tarp pond method is a concrete solution for aquaculture to cope with the natural limitation problems. In addition, it is also appropriate to facilitate people who do not have sufficient land for aquaculture, such as low-income people in the urban area. Owing to the fact, the Local Authority of Surabaya chooses tarp pond technique to cultivate catfish due to it has several advantages, for example: no require large of land, easy moved and adjusted, etc. The program

also proves the effort from the local authority to fight with the urban issues especially in economic problems which occurred in Surabaya. By providing starter package (1 set of tarp pond, 800 catfish seeds, 60 kg fish feeds) and 1 expert for each sub-district, the government tries to encouraging the community capacity and human capital of low-income people. In other hand, the big challenge is how to transform the thought and behaviour pattern and willing to accept change towards the better live.

Moreover, the fourth chapter will explain the analysis of the data which obtained through in-depth interviews with the government officers, farmers, and academics. The conceptual model of community capacity which proposed by Jackson *et al.* (2003) will be used to generate research findings.

CHAPTER IV

URBAN AQUACULTURE: TOWARDS SUSTAINABLE DEVELOPMENT THROUGH COMMUNITY CAPACITY

4.1. Introduction

The fourth chapter explores the effects of the implementation of urban aquaculture related with how it is support low-income people and its impact on environmental surrounding aquaculture area in Surabaya. Moreover, this chapter explains what factors lead to successful of the implementation of urban aquaculture. In addition, the fourth chapter also describes the implementation of community capacity building method to cope with urban challenges especially in poverty problem. This chapter is delivering into six sections. The first section is introduction which is explains about the general aims of this chapter. Second section explains the potential of community as the fundamental to enhance their community capacity. The third section explains inside factors that influence the enhancement of community capacity of low-income people. The fourth section explains the outside factors from the low-income people which influence the community capacity building. The fifth section describes the outcomes that generated by community capacity building and the last section is conclusions.

4.2. The Potential of Community

Nowadays, urban development occurs very rapidly in Indonesia, especially in big cities. In Surabaya, this development leads to the increasing level of poverty problems. Unfortunately, the difficulties of low-income people in Surabaya accessing economic activities become major cause of the inequality between low-income people and high-income people getting wider. The existences of low-income people in urban area always become marginal groups who always underestimated by other communities member and this is also occurred in Surabaya. Moreover, the low-income people also become hindrance for the Local authority of Surabaya in developing the city, such as increase the criminal level, lead to the slum area, emerge to the malnutrition. In other hand, there are a lot of low-income people who have multi talent and creativity but they cannot get out of poverty problems due to they do not have access to the economic activities and have sufficient money to start a business activity.

Unfortunately, other members of community are not realizing that actually the low-income people not only give negative influence to the community but also they have some positive potential. Based on the field observation conducted by researcher, there are characteristics of low-income people which can be community potential, such as: diligent, deft, easy to socialize with others, have strong willingness to move forward. Although, they do not have sufficient money to get various nutrition, such as meat, fish, chicken meat but they do not have any serious problem with their health due to the Local Authority of Surabaya provide health services for the low-income people.

	Talent, skill, ability, strength category	Examples given by respondents
1.	Organizing	• Lobbying and make politicians support their activities; • Facilitate meetings, speak in public and fundraise.
2.	Hospitality	• Looking out for neighbours; • Easy to socialize with other community's members; • Being able to live harmoniously with many others of many cultures; • Making people feel welcome.
3.	Human relation	• Have willingness to work together with others; • Have strong spirit of *gotong royong* (helping and supporting each other); • Have good relationship with other members of community
4.	Technical	• Craftspeople; • Have knowledge of agriculture and aquaculture
5.	Health	• Have good health condition

Table 4.1 community potential of low-income people in Surabaya
(Table adapted from Jackson et al., 2003)

Furthermore, the local authority of Surabaya sees this community potential as an opportunity which can develop the ability of low-income people through community capacity building program. Capacity building goes beyond community consultation and involvement. Community empowerment may include development of shared vision and recognition of shared history; large scale community involvement; and community ownership, direction setting and decision making (Mackendrick and Parkins, 2004). A key outcome of these processes is a greater sense of connectedness across the community. Capacity building efforts rely on active citizens, local leaders and community engagement. In addition, the aim of this program is to enhance the ability and willingness of low-income people to cope with the poverty problems. In addition, this problem not only related to the economic problem due to it is multidimensional (Osinubi, 2003) and can related to other aspect such as food security that lead to the health

problems. By provide assistance in the form of fisheries package, the local government tries to encourage the entrepreneurial spirit of the low-income people.

To continue, urban aquaculture is only a means to exploit the potential that had been owned by community, such as: ability to organize events, hospitality, technical, and human relation to be more developed through community capacity building. According Atkinson and Willis (2005) actually the potential of community reflect the feature of social life, networks, norms, and trust from the community. Moreover, it provides opportunity to create an identity and shared values across the community (Creyton, 2004). Additionally, people in Surabaya still have strong social cohesion with other members of community except for those who live in luxury residential area. It depicts that they still have strong social life even they live in a big city such as Surabaya.

4.3. Inside Factors

There are two inside factors that affecting the implementation of community capacity building, namely: inside facilitators factor and inside barriers factor. In order to achieve better result of community capacity building, the community should minimize the inside barriers factor and maximize the inside facilitators factor. In addition, it needs strong commitment among the members in community to realize it. Furthermore, the inside factors requires a strong internal focus, stressing the primacy of local definition, investment, creativity hope and control (Kretzmann and McKnight, 1993 in Creyton, 2004).

4.3.1. Inside facilitator factor

In the case of urban aquaculture in Surabaya, the main factor that has to be owned by low-income people is their strength and serious commitment to engage in urban aquaculture and their strength willingness to move forward. Farmer A as head of farmer group (2013) said "*The main reason for us to accept urban aquaculture aid from the local authority because of strong willingness from us to move forward and to come out from the poverty problems*".

Additionally, the social life among the members of groups has to be harmonious. This condition is very important in order to keep the atmosphere in the groups remained conducive and to prevent disputes that occur among members of the groups. Commonly, in a group which consist of several people tend emerging conflict among its members due to every people have different characteristic and have their own interest. To deal with this problem, the leader of the groups use persuasive was to prevent the conflict. The leader has conducted monthly meetings which are interspersed with various funny events such as: cooking and eating together with other members of group. Farmer D as leader of farmer group (2013) stated "*In order to improve the relationship among the members, we usually conducted monthly meetings which interspersed by funny events. This method is an effective ways to prevent the conflict that arises in the group. By this method, the communication among the members also increase and it lead to the harmonious situation of the group*".

Equally important, the other main inside facilitator factor is honesty. The group management especially in financial management which underlain by honesty will lead to successfulness of implementation of urban aquaculture. Moreover, in organizational life which is fortified with verity will form a sense of trust among members. As a farmer said:

> "*I always inform to all members of the groups about how much money we reach in one harvesting period. Then, I divided it into three, for tarp pond maintenance, for buy a new catfish seeds, and for shared to all members of the groups. By doing this method, it can develop sense of trust among the members and of course, it will lead to the successfulness of the implementation of urban aquaculture*" (Interview with farmers A as the head of farmer group, 2013).

Hence, it is clear that verity has important role in the organizational life in order to develop conducive atmosphere in the group and strengthen the commitment of the members to really get involved in the implementation of urban aquaculture program.

People in Surabaya especially for the low-income people, still have strong human relation among members of community such as helping and support each other (*gotong royong*) even they live in metropolitan city like Surabaya. It becomes main factor to create an identity of the metropolitan community who still concern about the other people who live around them. Also, it is needed to maintain the spirit and commitment of the low-income people in Surabaya to be more active in the implementation of urban aquaculture.

4.3.2. Inside barriers factor

In the case of urban aquaculture in Surabaya, the local authority form groups that consist of 15 to 20 low-income people in order to make easier for the government to evaluate and monitoring the implementation of urban aquaculture. Nevertheless, there are low-income people who did not want to be members of any groups. They want to implement the urban aquaculture by themselves. In order to overcome this problem, the government officers already informed the important of implement urban aquaculture by form a group and would leave those people if they still did not want to join with the group that has been form (interview with government officer A, 2013).

The other inside barrier factor founded by researcher is the repudiation from other community members surrounding the aquaculture area. They are afraid if the activities of urban aquaculture would disturb their lives. Actually, their fear is caused by lack of information regarding with implementation of urban aquaculture. Here, the role of professional assistant and the members of the group are needed in order to explain about urban aquaculture including the benefits and the disadvantages. "*By providing information about urban aquaculture to other member of community who rejected the program will reduce the inside barrier factors which threaten the successful of implementation of urban aquaculture in Surabaya*" (Interview with professional assistant A, 2013).

4.4. Outside Factors

There are two outside factors that affecting the enforcement of community capacity building, namely: outside facilitators factor and outside barriers factor. Moreover, it utilises, builds and extends on network, partnership and alliances which include valuing and supporting informal networks and the variety of relationship that already exist within the community as well as acknowledging the importance or relational leadership (Creyton, 2004).

4.4.1. Outside facilitators factor

The relationship between government and low-income people as the beneficiaries of urban aquaculture program can be one factor that leads to successful implementation of urban aquaculture. The role of key stakeholders, such as governments is needed to assist in facilitating and resourcing this process so that government is not working from a top down approach, but operating in partnership with civil society (Cavaye, 2000). In addition, the local government has big responsibility in terms of support, guide and foster the low-income people to come out from their poverty problems through urban aquaculture program. In order to realize this aim, the local authority provides 1 people as professional assistant in each sub-district to assist, guide and supports the farmers in the fields. Equally important, the professional assistants also have to deliver several methods about post-harvest fish processing, for instance: make meatballs from catfish, mince catfish and crackers from catfish. Furthermore, this method provide new insight for the urban farmers in terms of post-harvest activities so they could create a new business opportunities.

To continue, the Local Authority of Surabaya also includes farmers in many of fishery training both in regional or national level, such as: organic fish feed manufacture training, freshwater aquaculture training, accounting and financial management training, and post-harvest training. By this method, the local government is expected to improve the insight of urban farmers and also to encourage the urban farmers to be more creative and innovative in finding new breakthrough in urban aquaculture, for example: probiotic herbal. The urban farmers also can improve their network with other urban farmers come from other regions or sub-districts when they attend training and it also improve their knowledge when they share their experience to other farmers and exchange their knowledge. An urban farmer said:

> "*The Local Authority of Surabaya is really supporting the urban farmers to move forward. They allow me to follow many kind of training which can support the urban aquaculture activities. I am also very happy to attend the training due to I can make new relationship and share my experience with many experts, urban farmers from other regions. Truly unforgettable experience*" (Interview with farmer F, 2013).

Additionally, the Local Authority of Surabaya also helps urban farmers in marketing their product by allowed them to follow exhibition event not only in regional level but also in national and international level. For instance, the local governments allowed the farmers in the annual exhibition held by Ministry of Marines and Fisheries in Jakarta. The governments also allowed the farmers in annual visit to Kochi City, Japan. By followed regional, national and international

exhibition, the urban farmers able to build new networking and relationship with other stakeholders in fishery industries, thus they can get access to the link of economy global. Furthermore, it can lead their business getting bigger as well as the demand and increase their production.

Figure 4.1 The other products of urban aquaculture
Source: Author

4.4.2. Outside barrier factor

At the beginning of the implementation of urban aquaculture program in 2010, the politicians in the Local House Representative Surabaya doubted that this program will be successful. Thus, in the second year of the implementation of this program in 2011 they restrict the budget. The budget for the urban aquaculture program is 2.896 Billion IDR in 2010 and decrease to 1.705 Billion IDR in 2011. This condition opposed to the spirit of the local authority and low-income people who need transformation in order to come out from their problems. Actually, the outside barrier factor can be prevented by organizing discussion which involved the stakeholders who engaged in the urban aquaculture program. The purpose of

this forum is to facilitate each interest of the stakeholders in order to reduce appearance of conflicts.

4.5. Outcomes of Community Capacity

Outcomes of community capacity are goals or dreams of the community which derived from the interaction among the potential of community with both of inside and outside factors which aims to achieve better condition of life (Craig, 2005). In the case of urban aquaculture program in Surabaya, the implementation brings positive influence to the low-income people in the urban area, such as in economic prosperity, maintain human health, maintain environmental condition, and increase the social status and self-worth of the low-income people. Moreover, there are a lot of positive benefits which generated from the community capacity building process. In addition, the success of the urban aquaculture program in enhance the community capacity of low-income people in Surabaya can be seen from economy, health, social, and environmental aspects.

4.5.1. Economic prosperity

Economy is the root that leads to the poverty problems. Moreover, one of the purposes of implementation of urban aquaculture program is to enhance and maintain economic prosperity of low-income people in Surabaya. Government officers B (2013) said "*If the urban farmers still consistent, have strength commitment and high spirit in this activity, I do believe that they will able to come out from the poverty problems due to their economy condition is increase. Also, they could improve their social statue and self-worth and become independent without relying on any parties including government*". Farmer C (2013) said

"*Through the urban aquaculture program, I am sure that the low-income people will able to improve their standard of living and able to fulfil the secondary needs, include to finance the education needs for their children, easy to get access to good health facilitate and enhance their social living and does not depend anymore to the government aids*".

Most of the urban farmers in Surabaya believe that this program will provide positive influence for their live, as a consequence, they feel optimist in facing the future challenges. Through the implementation of this program, low-income people earn additional income approximately of 500,000 IDR (38.5 Euro) in one cultivation period (Interview with farmer E and B, 2013). Most beneficiaries for this program working as labour and their salary is not enough to satisfy their daily needs. In my opinion, what is produced by urban aquaculture in Surabaya at this moment is not enough to carrying out the low-income people from their economic problem. However, it is need large-scale of urban aquaculture to solve the problem. It is only enough to be consumed by low-income people and their families.

4.5.2. Health

Along with the increasing economic condition of low-income people especially for their financial, so they able to maintain their health due to they easy to get access of good quality of health care facilities and they able to fulfil the needs of various nutrition. Moreover, the use of organic feeds made by urban farmers also impact on the urban farmers health. Usually, the fish feeds made by factories blended using certain chemicals material in order to reduce the production cost.

This chemical material can be very dangerous for the human health especially for whom consuming the fish that have been fed by it. Furthermore, by using self-made fish feed means that the urban farmers also reduce the use of the dangerous chemical materials for feed fish that can lead to the improvement of health level. Farmer E (2013) said "*I am sure that if the economic prosperity of urban farmers increase, they will be able to maintain their health since they have enough money to get access to health care facilities and fulfil their nutrition needs*".

Moreover, the local governments also have program in health sector which can be combined with the urban aquaculture program in order to achieve better chance in maintaining the health for the low-income people and their families.

4.5.3. Social and self-worth

Along with the increasing condition of economic prosperity of low-income people, so their social living and their self-worth will also increase gradually. As a result, their presence has been increasingly recognized by other community members and does not consider anymore as the marginal groups. In addition, the implementation of urban aquaculture also increase the social relationship between urban farmers-urban farmers, urban farmers-government officers, and urban farmers-private sectors, hence they become famous and widely known by the community.

A leader of farmer group said:

> "*I do believe that by implement this program, the social relationship among the members of community can become more dynamic and harmonious and they will be able to better deal with the future challenges*" (Interview with farmer A as the group's leader, 2013).

4.5.4. Environmental stewardship

The implementation of urban aquaculture triggers new innovations in terms of environmentally friendly fish feeds. In 2011, one of the urban farmers in Surabaya has success in creating and making herbal probiotic which consist of live microorganisms that give positive impact on the fish health. He found the formula after followed training on how to make the catfish feed and combine with his experience as the maker of Javanese traditional medicine. Initially, he made this probiotic herbal in order to cure his catfish. This probiotic is made of eco-friendly natural materials which have a function to trigger the development of natural food, inhibit the growth of harmful microbes, increase production and eliminate odours in the tarp pond.

Above all, it is important to maintain the stability of the soil and water conditions, so it still has a good quality. Moreover, by giving this probiotic into the water, then when the water is disposed as waste at the harvest time, it does not pollute the environmental surrounding aquaculture area. This is because of the water containing beneficial microorganisms even it can be utilise as fertilizers for other plants. Furthermore, it proves that urban aquaculture program is able to maintain soil stability and develop the ecological sustainability.

4.6. Conclusion

In conclusion, the low-income people in Surabaya have already had the potential of community that can be utilise to generate positive outcomes through the community capacity building. Urban aquaculture program is one of the methods based on the community capacity building which aims to enhance the ability of the low-income people to better cope with their poverty problems. Through interaction between potential of community, inside and outside factors, the urban farmers build their future life in terms of economic, social, health, and environmental aspects.

Moreover, it can be prove that urban aquaculture is fishery activities which can be utilise to improve the ability of low-income people to better deal with their poverty problems, such as: food security (Ahmed and Lorica, 2002) and to achieve better live in the future by considering three pillars of sustainable development (social, economy, and environmental). Thus, it is clear that the sustainable development can be achieved by community capacity building in terms of providing the low-income people to face their challenge.

The fifth chapter will explain about the conclusions of this research and provide some recommendations that can be used as the background for further study about the implementation of urban aquaculture especially for the community capacity building for urban community.

Chapter V

Conclusions, Recommendations, and Reflections

5.1. Conclusions

The concept of community capacity is highlights the relation among the social capitals from community and factors which come from inside and outside of the community. Urban aquaculture is one method that combines the concept of sustainable development and community capacity which aims to improve the ability of low-income people in urban area to better deal with the poverty problems through the interaction between potential of community with the inside and outside factors. This program is an effort of the Local Authority of Surabaya in order to fight with the urban issues.

Moreover, the implementation of urban aquaculture provides positive impacts to low-income people. This program provides a sense of optimism to low-income people in facing the future challenge. In addition, in the implementation of urban aquaculture in Surabaya, low-income people as the beneficiaries of the program are assisted, guided and supported by the local government to build their own future, especially in terms of economic prosperity, social and self-worth, health and environmental stewardship. Moreover, the waste from the urban aquaculture do not pollute the environmental surrounding aquaculture area due to they use probiotic herbal which consist of live microorganisms that give positive impact on

the fish health, trigger the development of natural food, inhibit the growth of harmful microbes, increase production and eliminate odours in the tarp pond.

Above all, the successful of the implementation of urban aquaculture in Surabaya caused by several factors both originating from the community itself (inside factor) and originating from external condition of the community (outside). The inside factor are such as: harmonious relationship among members, the strength willingness and commitment from the low-income people to get involved continuously in the program, verity in the group management is absolutely needed in order to develop sense of trust from the other members. The outside factors, such as: the harmonious relationship between urban farmers-government officers, urban farmers-urban farmers from other region, urban farmers-private sectors. However, there are several obstacles that arise both from within the community (inside barriers), such as refusal by the residents about the urban aquaculture activities and obstacles arising from outside of community (outside barrier) such as disagreements from local house representative who against urban aquaculture program that influence to the reduction of budget.

5.2. Recommendations

In order to increase the successful of implementation urban aquaculture, thus there are some recommendations which might be utilised by the Local Authority of Surabaya.

1 The local Authority should integrate the planning urban aquaculture into spatial planning of Surabaya;

2 There should be diversification of urban aquaculture commodities which have high economic value, in order to reduce competition among the urban farmers;

3 The local authority should provide special funds to support research in fishery sector that can support the successful implementation of urban aquaculture.

5.3. Reflections

The implementation of urban aquaculture in Surabaya is not only about effort of the local authority to enhance the ability of the low-income people to better deal with their poverty problems, but it is also about urban food planning. What we can learn from Surabaya is about how the local authority tries to fulfil the demand for the fresh fish. Indeed, the government has to prevent supermarkets from screwing urban aquaculture into the ground and use their power to prevent the monopolistic control of the food supply (Steel, 2009).

Moreover, through urban aquaculture program, the local government tries to encourage the entrepreneur spirit of their community by utilize the vacant land, yards and back yards and change from the unproductive land to become productive land. In addition, with the right government supports, urban aquaculture in Surabaya could not only produce a significant proportion of fresh fish but they can create new recreational place for the community, such as fishing ground.

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APPENDIX

List of Interview Question (adapted from Beckley *et al*. (2008), The aspen institute (1996), Atkinson and Willis (2005)

A. List of Questions for Government Officers

1. What is background of UA program?
2. How could this innovation happen?
3. Are there any programs like this in other municipality/ regency in Indonesia?
4. How many poor families involved in this program?
5. Does the government give assistance to the farmers? To what extent?
6. Does the government give money to farmers to support UA?
7. What kind of formal training on UA method has been conducted?
8. To what extent entrepreneurship skills are developed among the farmers?
9. To what extent leadership skills are developed among the farmers?
10. How much in the average of farmer's income before and after the implementation of UA method?
11. How is the transportation access and facilities?
12. How is the access to the market?
13. How strong is social cohesion in the community?
14. To what extent the role of networks in the implementation of UA?
15. What are the internal factors in the society that trigger the implementation of UA?
16. What are the external factors in the society that trigger the implementation of UA?
17. Which are the roles of the public sector or the government in the implementation of UA?
18. Which are the roles of the private sector in the implementation of UA?
19. Which are the roles of NGOs and farmer groups in the implementation of UA?

20. Which factors in the community which contributes to the development of UA?
21. With the implementation of UA, to what extent the community can maintain and enhance the economic capacity?
22. With the implementation of UA, to what extent the community can maintain and enhance the civic vitality?
23. With the implementation of UA, to what extent the community can subsist and persist?
24. With the implementation of UA, to what extent the community can get access to state resources?
25. With the implementation of UA, to what extent the community can maintain and enhance the link to the global economy?
26. With the implementation of UA, to what extent the community can maintain ecological sustainability?
27. With the implementation of UA, to what extent the community can maintain and enhance the human health?
28. Is the UA program success? What do you think?

B. List of question for farmers (leader and member)

1. What is the average level of the farmer's education? **(for leader of groups only)**
2. How did farmers involve in UA program?
3. What kind of aids did farmers get from the government?
4. Why did farmers want to get involved in UA program?
5. What kind of informal training on UA has been followed?
6. How to get access to government services?
7. To what extent entrepreneurship skills are developed among the farmers? **(for leader of groups only)**
8. To what extent leadership skills are developed among the farmers? **(for leader of groups only)**
9. To what extent indigenous knowledge is developed among the farmers? **(for leader of groups only)**

10. To what extent life experience influences in the implementation of UA?
11. How much in the average of farmer's income before and after the implementation of UA?
12. How much in the average of households savings before and after the implementation of UA?
13. How is the business cash flow and operating funds? **(for leader of groups only)**
14. How is the access to water?
15. How is the transportation access and facilities?
16. How is the access to the market?
17. How strong is social cohesion in the community?
18. How many institutions in religious and cultural activities? How high the level of participation in those activities? **(for leader of groups only)**
19. Are there any local representatives in the legislative bodies? How big is their influence to the communities? **(for leader of groups only)**
20. How is the access to get financial services?
21. How is the access to governmental services?
22. Which is the role of community organizations in the implementation of UA?
23. Is there any community integration events? What are the results?
24. To what extent the role of networks in the implementation of UA method?
25. What are the internal factors in the society that trigger the implementation of UA?
26. What are the external factors in the society that trigger the implementation of UA?
27. Which are the roles of the public sector or the government in the implementation of UA?
28. Which factors in the community which contributes to the development of UA?
29. With the implementation of UA, to what extent the community can maintain and enhance the economic capacity?

30. With the implementation of UA, to what extent the community can maintain and enhance the civic vitality?
31. With the implementation of UA, to what extent the community can get access to state resources?
32. With the implementation of UA, to what extent the community can maintain and enhance the link to the global economy?
33. With the implementation of UA, to what extent the community can maintain ecological sustainability?
34. With the implementation of UA, to what extent the community can maintain and enhance the human health?
35. Is the UA program success? What do you think?

C. List of question for NGOs/ Academics

1. To what extent do you know about this program?
2. To what extent leadership skills are developed among the farmers?
3. To what extent entrepreneurship skills are developed among the farmers?
4. Which is the role of community organizations in the implementation of UA?
5. How strong is social cohesion in the community?
6. How is the access to governmental services?
7. Which is the role of community organizations in the implementation of UA?
8. To what extent the role of networks in the implementation of UA?
9. What are the internal factors in the society that trigger the implementation of UA?
10. What are the external factors in the society that trigger the implementation of UA?
11. Which are the roles of the private sector in the implementation of UA?
12. Which are the roles of NGOs and farmer groups in the implementation of UA?
13. Which are the roles of the public sector or the government in the implementation of UA?
14. Which factors in the community which contributes to the development of UA?

15. With the implementation of UA, to what extent the community can maintain and enhance the economic capacity?
16. With the implementation of UA, to what extent the community can maintain and enhance the civic vitality?
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20. With the implementation of UA, to what extent the community can maintain ecological sustainability?
21. With the implementation of UA, to what extent the community can maintain and enhance the human health?
22. Is the UA program success? What do you think?