Study on Physical Improvement Strategy for Deteriorated Riverside Settlement in Developing Country

(発展途上国における荒廃水上居住地の改良手法に関する研究)

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Abstract

This study aims to formulate scenarios for managing deteriorated urban riverside residential areas in the Third World. Using case studies in our target locations in an Indonesian river city, called Banjarmasin, this research is carried out to answer our biggest question: How to manage or revive deteriorated riverside areas which are currently under the occupation of informal and slum settlement. We hypothesize that the enhancement of traditional vernacular houses and the improvement of physical setting can reinforce the quality and the identity of a place, in this case, riverside area, without victimizing poor dwellers, but on the other hand, can achieve ecological balance as well as urban spatial order.

Introduction part (Chapter 1) states the background problems and the motives for performing this study. This chapter begins with introducing some issues on deteriorating conditions of riversides and the occupancy of human settlement. To solve those problems, many governments in the developing countries initiate relocation or resettlement programs that often ended up in victimizing the current dwellers. Considering these matters, this study is conducted to figure out proper strategies that may offer more benefits for all aspects: human, environment, and city.

Chapter 2 consists of theoretical backgrounds related to riverside settlement and marginal societies. This chapter also intends to gain a deeper understanding of the historical values and cultural activities in terms of dwelling through study literature, including international and local researches, as a preliminary study. The fact, condition, problems, as well as results from the prior studies, were summarized and analyzed to find out some core issues and the originality of our study. This part also clarifies two methodological strategies adopted by this study, which are *historical* and *cultural* approaches. However, this study will only cover solutions related to architecture and urban design, thus, proposing guidelines limited to physical treatment or enhancement.

The possibilities of utilizing our approaches will be verified through case studies. The introduction of our study location will also be covered in Chapter 2. In this chapter, we argue the reasons why we select our study area in Banjarmasin city, more specifically at the traditional settlement of Kuin Utara riverside. General conditions of riverside settlement in the target will be explained as well.

A discussion on the historical approach through enhancement of vernacular houses will be covered in Chapter 3. This chapter aims to understand the historical value in terms of dwellings and how they can contribute to today's urban development. We expect that preserving the physical structure of old houses may reinforce the identity of a place. This chapter begins with the explanation on the traditional vernacular architecture in general and in our target location. Field surveys collected data on the condition of remaining architectural features of the target houses, including material, form and shape, façade, space, and ornaments, as well as the inhabitants' socio-economic characteristics and their influence on the houses' current states. The results are evaluated, scored, and classified through an architectural assessment to determine their visual value and what kind of protection action fits each group. This section formulates that there are three basic factors to determine the architectural value of a vernacular house: construction and form, design, and space. The result also shows that even vernacular houses with cultural insignificance play a supportive role to enliven a traditional area and will be a good example if many survive. This study also suggests that houses that are regarded as irrelevant for preservation should not be simply thrown out from the city planning. Decayed vernacular houses resided by low-income inhabitants when ignored may turn into scattered roofs and lead to another problem: slum housing.

Chapter 4 presents a discussion on the second case study regarding traditional riverside dwellings, which occupy most part of the Kuin Utara riverside as slum housings. This study urges to seek an understanding of the livelihood, social activities, and the conditions of existence of slum riparian settlement. The research attempts to formulate what kind of physical improvement can be applied in

such settlements. The data was collected by a field survey, observing on the inhabitants and their living situation, dwelling and utility, as well as community activities and environment. This study also analyzes and evaluates existing riverside upgrading pilot projects by the local government, as a reference when proposing an improvement plan. This chapter discloses that the basic concept for physical upgrading in a slum settlement consists of three elements: (1) arranging street networks as the fundamental system that structures the settlement, (2) constructing public utility systems that are essential for livelihoods, and (3) providing common space and amenities as 'external organs' that form identities and reveal the visual charm of the location. The proposed infrastructures shall be directed to protect the local cultures and the socio-cultural activities of the inhabitants. The plan should also be adjusted with respect to the economic constraints in developing countries. Moreover, the improvement strategy for poor housings shall not orientate to modernization nor merely to that of beautification without considering the basic aspect: to maintain the dweller's livelihood.

The conclusion of this study is covered in Chapter 5, emphasizing on the importance of performing riverside improvement plans that consider local wisdom and livelihood aspects of current dwellers. This part argues that slum riverside management cannot be generalized because each area has different needs and characteristics. However, we can create universal or basic standards, while details should be adjusted to each area. Thus, outcomes provided by this study are of a general concept, which is also applicable as a basis for managing riverside settlement in other developing countries. Our contribution of both historical and cultural approaches can be implemented in any riparian neighborhood using locally-based physical improvements.

List of Publications

List of Papers/Journals with Referee's Review

1. Meidwinna Vania Michiani and Junichiro Asano, "Influence of Inhabitant Background on the Physical Changes of Banjarese House: A Case Study in Kuin Utara Settlement, Banjarmasin Indonesia," Frontiers of Architectural Research, Vol. 5, 412-424, 2016.
2. Meidwinna Vania Michiani and Junichiro Asano, "A Study on the Historical Transformation of Physical Feature and Room Layout of Banjarese House in the Context of Preservation, Case Study in Kuin Utara Settlement, Banjarmasin, Indonesia," Urban and Regional Planning Review, Vol. 4, 71-89, 2017.
3. Meidwinna Vania Michiani and Junichiro Asano, "A Physical Upgrading Plan for Slum Riverside Settlement in Traditional Area: Case Study in Kuin Utara, Banjarmasin, Indonesia," Frontiers of Architectural Research, 2019. (https://doi.org/10.1016/j.foar.2019.03.005)

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CHAPTER 1. Introduction

1.1 Background Problems

Rivers have been playing important roles and have given abundant benefits for human life. Streams are not only a source of water and food for daily use but they are also necessary for the industry and as transportation routes. Floods from rivers also brought nutrient-rich sediments that provided the potential for prosperous agricultures and for organized societies to develop urban culture (Macklin and Lewin, 2015). Because of all those 'blessings', people dwelled along riverside ever since the ancient time, where people started new civilizations from the edge of streams, such as adjacent to the famous Nile River and China's Yellow River.

Even now, rivers still play significant supports for many cities and their inhabitant. However, in a time of rapid urban development, compared to the prosperity and the sacred of rivers in the old times, the current riverside development is largely abandoned. Rivers may still provide countless environmental services for the city, but the riverbank itself does not seem beneficial towards the establishment of advanced cities nor seem like a prospective place for becoming a part of urban development, resulting in a gradual deterioration its environment – and this phenomena happen all over the world, especially in growing cities in the developing countries where are currently at a relatively early stage of exploiting and managing their urban waterways (Vollmer and Grêt-Regamey, 2013). Nevertheless, having been excluded from the urban rules and regulations, this forgotten area which becomes cluttered and disorder with priceless or unworthy land value has attracted other parties to settle in its environment, especially those who were also ignored by the city: the marginal societies.

Marginal area for marginal people. The growth of marginal settlements is closely linked to the rapid urbanization that has taken place in most developing countries (United Nations, 1978). More and more people come to settle in the riverside area, which has become a popular destination for not only urban poor, but also for penniless migrants coming from rural areas seeking for life betterment in the city. The poor started to develop spontaneous small shacks with limited budget and resources, and of course without any legal permission; they built low-standard shelters next to each other, creating densely populated neighborhoods. The severe and uncontrolled expansion of squatter and slum settlements along riverbank emerges the second level of problems, where the area gets more and more deteriorated in terms of urban spatial, environment, and so on. The overlapping and sporadic development of urban riverside dwellings causes spatial and physical problems such as the poor condition of houses, walkways, a lack of water supply, sanitary facilities, and waste management facilities, as well as pollution and environmental decay resulting from household waste directly disposed to the river (Prayitno, 2013; Sarwadi et al., 2002; Seelig, 1978).

Just now that the complication gets worse, many governments started to realize the urgency to save their riverside from getting more disintegrated. Unfortunately, the authorities often misunderstood the main problems between 'human occupancy' and lack of proper service and attention; in the end, they chose to blame those squatter inhabitants. They argue that such a society does not have any rights to keep staying and need to be kicked out despite have been living for years. Although trying to seek solutions, the government of many nations does not focus on upgrading existing private properties nor helping people to overcome their difficulties but initiating land acquisition to clear out riverside areas from such dwellings, without realizing bigger problems that may generate from this kind of operation. They called this relocation or resettlement programs that may include providing compensation or facilitating affordable housing for those low-income families who were evicted. Nonetheless, prior experiences have revealed many unsuccessful stories of this 'slum eradication' project. Some programs ended up in eviction without paying off the victims (see case study in Nigeria in Daniel et al., 2015) or providing houses that do not meet the traditions and the preferences of the inhabitants which in some cases triggered the destruction of the apartment by the new dwellers (see case study in Bulgaria in Slaev, 2007).

River and its environment are in danger, on the other hand relocating dwellers from riverside also do not seem a good idea. Poor people become poorer and eviction may cause greater harms not only for the victims but also for the city itself. Considering those problems, this study is conducted to figure out the most proper strategies that may offer more benefits for all aspects: human, environment, and city.

1.2 Study Objectives

This study aims to formulate scenarios for managing deteriorated urban riverside residential area in the Third World. Using case study in our target locations in an Indonesian river city, called Banjarmasin, this research is carried out to answer our biggest question: '*How to manage or revive deteriorated riverside areas which are currently under the occupation of informal and slum settlement?'*

The point of departure of our research is that enhancement of heritage values and protection of cultural activities of the locals may strengthen the identity of a place. Thus, we presume that 'historical value' and 'indigenous activities' can be adapted to solve the riverside problems without victimizing poor dwellers, but on the other hand can achieve ecological balance as well as urban spatial order. Our conjecture generates sub-questions of this research:

1) Historical approach
   - *What is 'history' in terms of dwellings?*
   - *How can historical aspects contribute to reviving a riverside area?*
2) Cultural approach
   - *What are the indigenous activities of riparian societies?*
   - *How do cultural activities able to improve the condition of a riverside area?*

However, the scope of our study is limited to 'built environment as a physical structure', hence, the investigation and solutions provided by this research will be in the form of physical enhancement.

The historical value of a riverside area can be represented in its vernacular houses, while the cultural activity might be improved when its physical setting is improved. Considering that, this study hypothesizes that the enhancement of traditional vernacular houses and the improvement of physical setting can reinforce the quality and the identity of a place, in this case, riverside area.

References:

1) Daniel, M. M., Wapwera, S. D., Akande, E. M., Musa, C. C., Aliyu, A. A., 2015. Slum Housing Conditions and Eradication Practices in Some Selected Nigerian Cities. Journal of Sustainable Development, Vol. 8, No. 2, 230-241.

2) Macklin, M. G. and Lewin, J., 2015. The Rivers of Civilization. Quaternary Science Reviews, 114, 228-244.

3) Prayitno, B., 2013. An Analysis on Spatial Permeability and Fluid Dynamics of Wind and Thermal in Tropical Riverside Residential Areas of Banjarmasin City, Indonesia. J. Manusia dan Lingkungan (Journal of Human and Environment), Vol. 20, No. 2, 199-212.

4) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2002. Study on the Improvement Process by Inhabitants in an Urban Riverside Settlement, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 556, 297-304.

5) Seelig, M. Y., 1978. The Architecture of Self-Help Communities, The First International Design Composition for the Urban Environment of Developing Countries. Architectural Record Books, New York.

6) Slaev, A. D., 2007. Bulgarian Policies towards the Roma Housing Problem and Roma Squatter Settlements. European Journal of Housing Policy, Vol. 7, No. 1, 63-84.

7) United Nations, 1978. Aspects of Human Settlement Planning, edited by The Habitat Conference Secretariat. Pergamon Press, USA, p.3.

8) Vollmer, D. and Gret-Regamey, A., 2013. Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River. Global Environmental Change, Vol. 23, 1542-1555.

CHAPTER 2. General Background

2.1 River, City, and Dwelling

2.1.1 The Beginning of Civilization

History has shown us that most of the ancient cities emerged along rivers. Namely the prehistoric settlements along Jonk River in Mahanadi India (Padhan, 2016) and the Maya communities that dwelled along tributaries of the Belize River (Awe et al., 2014). The first Old World civilizations that were developed along Huang He, Indus, Nile, Tigris and Euphrates rivers, depended on natural inundation or controlled irrigation from river water (Awe et al., 2014). The Chinese water region is located at the Yangtze Delta, the Lake Tai, and on both sides of the Qiantang River and the Hangzhou Bay (Gan, 1999); riverbank was the most favored place for a town, supporting transportation, defense, water supply, as well as irrigation (Kostof, 1992, p.39; Waley, 1990). Long before the European arrived in 1492, many Native Americans had been living adjacent to the Mississippi River, where their daily life depends on, and growing a large quantity of staple food (Kline, 2011, p.19). In addition, the first settlement in Balkan was established along rivers taking advantage of the fertile condition and naturally irrigated land (Skoulikidis et al., 2009). It was the material that rivers carried, as well as the water they delivered, that determined river potential for long-term civilized societies (Macklin and Lewin, 2015).

As one of the most important natural resources, the utilization pattern of water resources is a reflection of the historical behavior of humans (Xie et al., 2017). The ancient population increased along rivers due to successful advancement in hunting-gathering technique, even nowadays the river remains important for society, whose main source subsistence are agriculture, gathering, fishing, and occasional hunting (Padhan, 2016). Rivers and their floodplains provide 'environmental service' for people, such as fertile land for agriculture, water for consumption and irrigation, and a means of transporting goods and discarding waste (Vollmer and Grêt-Regamey, 2013) (Figure 2-1). Floods from the river brought nutrient-rich sediments that provided the potential for prosperous agriculture and for organized societies to develop urban culture, however, need not be either too large nor too small or infrequent (Macklin and Lewin, 2015). Nutrient input, the build-up of fine sediment, the delivery of saline waters, the formation or natural levees, the stability of shifting channels, as well as network expansions greatly determined how suitable floodplain environment was for settlement from one generation to the next (Macklin and Lewin, 2015).

2.1.2 An Introduction to Riverside Dwelling

The uniqueness of riverside areas depends on the geographical setting, history, culture, politics, and other potencies of a city (Sastrawati, 2003). Conversely, the peculiarity of the site and the way settlement meets the water give characteristics to the city form (Kostof, 1992, pp.39-41). Riverside settlement, some also use the term amphibious houses due to its land and water elements, generally are self-organized, spontaneous, and organic in their growth (Prayitno, 2017); they are patterned, structured, and arranged to nature and disposed over the environment (Padhan, 2016). Riverside dwellings reflects their environment, phase of technology, social interaction, control maintained by culture (Padhan, 2016) and are developed from the vernacular wisdom of the inhabitants through adaptation strategy to deal with environmental condition: tides and wind movement, precipitation, temperature, humidity, and so on (Fitri, 2018; Purwanto and Darmawan, 2018). The inhabitant takes advantage of river tides and overflowing water instead of controlling them (Fitri, 2018), in other words, their dwellings are controlled by environment and nature.

Just like the ancient civilization, many modern cities developed from settlements along riversides (Figure 2-2), such as in the central Sweden, where the original settlement stretched along the riverbank (Kostof, 1992, pp.39-41). In Asia alone, we can find a number of cities that were born next to a river,

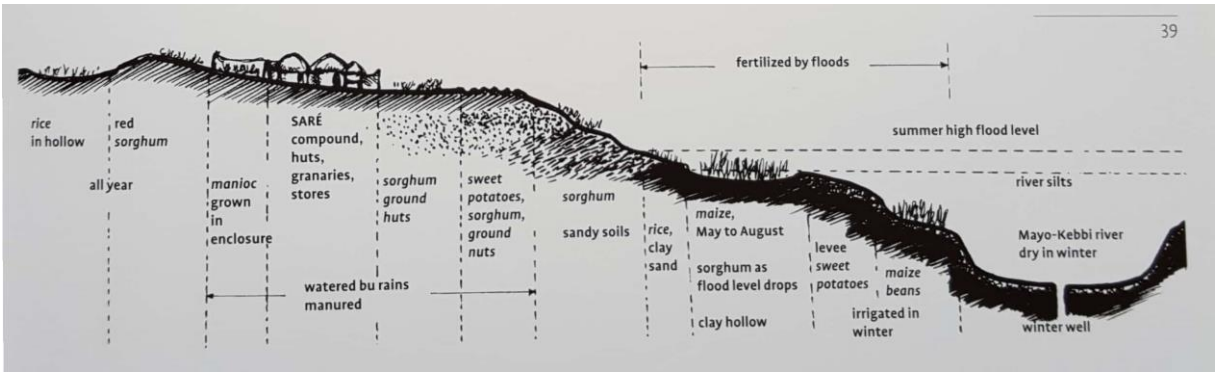

Figure 2-1. Environmental Service by River
(Source: Oliver, 2003)

Figure 2-2. Netherlands
(Source: Kostof, 1991, p.56)

such as Vientiane city in Lao Peoples Democratic Republic along Mekong River (Thanousorn and Oikawa, 2010) as well as Ayutthaya and Bangkok in Thailand (Boat and City). Even today, riverside vernacular houses spread across Thailand at the basin of Chaophraya delta (Tachakitkachorn and Shigemura, 2005), in the city of Ayutthaya, Bangkok, Chachoengsao, Uthaithani, Phitsanulok, Kanchanaburi, Nongbualampoon, Lampoon Provinces, and many more places in Thailand (Denpaiboon et al., 2000). Not to mention, the riparian settlement in China's Yangtze River valley (Li et al., 2010).

As a nation blessed with a richness of nature, a large number of Indonesian cities were born and developed from riversides. The city of Palembang was developed during the Sriwijaya Kingdom in the 6-12th century along Musi River (see Fitri et al., 2017; Widodo, 2004; Lussetyowati, 2014; Fitri, 2018; Sarwadi et al., 2001a, 2001b, 2002), while the city of Palangkaraya began from kampong Pahandut at Kahayan riverside in Central Kalimantan (Wijanarka, 2001; Sangalang and Darjosanjoto, 2011). For the reason of waterway transportation and water resources, most cities, towns, villages in the Kalimantan region are laid close to streams, hence, most of the settlements are preferably constructed on riverbanks (Permana, 2012), such as along Kahayan and Arut Rivers (Darjosanjoto, 2012; Purwanto and Darmawan, 2018), as well as next to rivers in "The City of Thousand Rivers", Banjarmasin. Also, in the olden times of South Sulawesi, some small settlements that consist of platform-houses built along riverfronts (Mattulada, 1982).

In the Java island, several riparian vernacular dwellings can also be found at the Code River in Yogyakarta (Soemardjono and Gusma, 2014), Ciliwung River in Jakarta (Vollmer and Grêt-Regamey, 2013), Pepe River in Surakarta (Darmastuti et al., 2018), as well as Wonokromo and Surabaya canals in Surabaya that are resided by approximately five thousand families (Bawole, 2009; Laurens, 2011). In addition to contemporary vernacular houses, some Indonesian riverside areas, especially in the Kalimantan region, are also occupied by traditional vernacular riverside dwellings: the Banjarese house

in Banjarmasin (see Zohrah and Fukukawa, 2007, 2010; Zohrah, 2012; Mentayani, 2015) and Dayak Ngaju settlement along Kahayan River, Palangkaraya (Sangalang and Darjosanjoto, 2011).

There many more riverside settlement houses that cannot be mentioned in this study. However, the examples displayed above is sufficient to give us insight that rivers are extremely beneficial not only for a city but also for assisting livelihood for people who dwell along their banks. Despite the disaster that may occur caused by rivers, riparian dwellers tend to consider the bigger advantage that they can gain for their livelihoods, such as a source of water and food. Rivers are a convenience: principal highway, source of drinking water power for industry, although some societies may adore it as something pretty and enjoyable (Kostof, 1992, pp.39-41).

2.1.3 Riversides and Marginal Shelters

The proximity of a body of water, whether a river, a lake, or the sea, has always been of great consideration in the choice of a community (Rudofsky, 1964, p.42). Even now, living near a river is still popular in today's society, hence, in some nations, the perception of riverside dwelling has slightly change into a negative view, especially in developing countries. Nowadays, riverbank seems to be an area that highly attracts squatter communities. Providing cheap living, urban riverside settlements have become alternative places for urban poor, as well as suitable places for building first step shelters for urban migrants (Sarwadi, et. al, 2002; Sarwadi, et. al, 2001), resulting that the worst living conditions in many third world cities are to be found in the houses that are built along the banks of rivers or even on stilts above the river itself (Waley, 1990). Riverside areas are regarded as unsuitable for urban development, thus these areas have been ignored; as a result, a substantial number of uncontrolled development of marginal settlement around the world occupies riverbanks since dwellings in these areas present a comparatively lower risk of eviction (Vollmer and Grêt-Regamey, 2013; Wulandari, 2009).

According to UN-Habitat, more people live in urban areas than in rural areas, with 54 percent of the world's population residing in urban areas in 2014, and is projected to grow by 2.5 billion urban dwellers between 2014 and 2050, with nearly 90 percent of the increase concentrated in Asia and Africa (UN-Habitat, 2015) (Figure 2-3). The growth of marginal settlements is closely linked to the rapid urbanization that has taken place in most developing countries (United Nations, 1978, p.3). Urban growth is a product of the growth and spreading of settlement, the population in urban areas, and the transformation of urban society's lifestyle, linked with industrialization, commercialization, and overall economic growth (Permana, 2012, p.11). The attractiveness of the city has lure rural people to come to the city seeking for self-betterment. Urban migration occurred in many cities due to physical blandness and lack of diversity of most suburban; people come to cities which has 'more interesting' buildings and neighborhoods (McNulty and Kliment, 1976). Compared with the pressures of underemployment in rural areas, cities have promised steady employment in a factory or industry with at least enough payment with minimum wages (Oliver, 1987, p.217).

Urbanization caused population growth not only in big cities but also in small-medium cities below one million population (Permana, 2012). Although providing several social benefits such as improving access to public services and job market, on the other hand, urban migration also leads to increasing demand for housing (Permana, 2012). The problem that caused by urbanization is not only due to the 'amount' of migrants, but also the low 'quality' of the urban migrants (Silas, 1987, p.138). Young people from rural areas migrated to cities expecting for a better living, however, due to their capacity as unskilled labor, penniless, and low-level education, they face deterioration of circumstances, including inadequate housing, during their early urban stay causing the degradation of urban environmental quality and sustainable development (Sarwadi et. al, 2002; Ragheb et al, 2016). These people must also contend with higher land prices and a higher cost living which they sometimes cannot afford (Darmastuti et al., 2018).

Urbanization had affected the formation of the urban fabric as well as changed the dwellers' perception (Nunta and Sahachaisaeree, 2012). Rapid urbanization has resulted in the imbalance

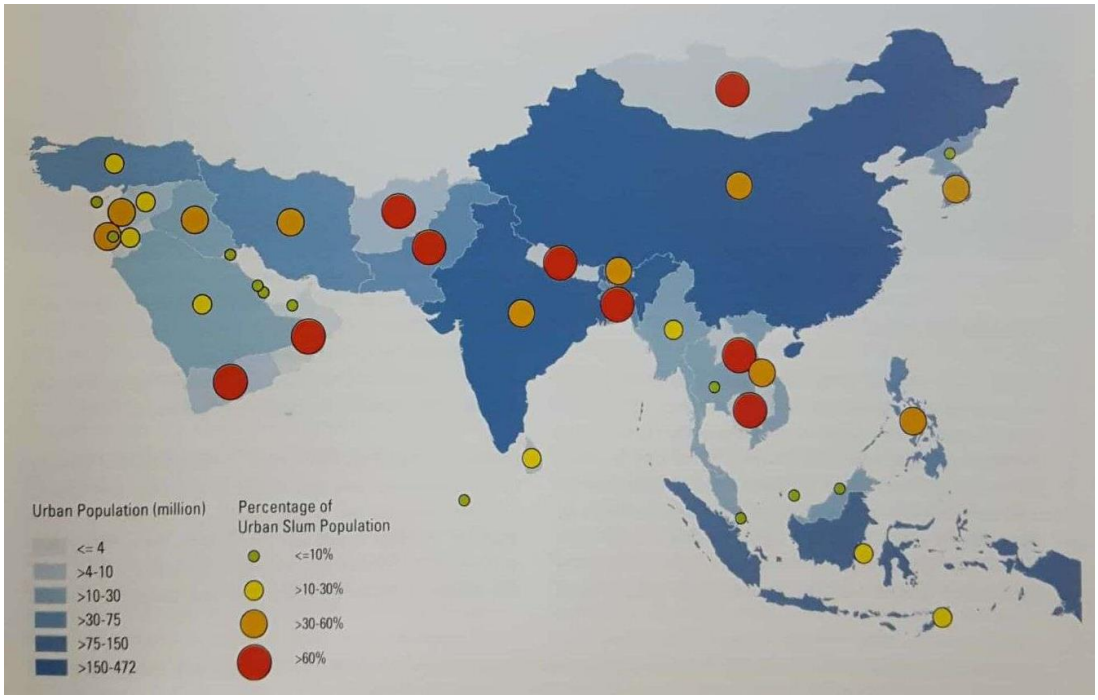

Figure 2-3. Urban Population and Slum Proportion in Asian Countries in 2001
(Source: UN-Habitat, 2005 cited in UN-Habitat, 2006, p.23)

development between the city and human settlement, where the government has difficulties in providing affordable housing for all urban people. This emerges the growth of informal settlements in marginal areas that somehow bring advantages to the marginal communities. The very places of cities that were once seen as obsolescent, such as waterfronts, decaying factory buildings, and so on, have the potential for the things cities alone can offer: residential, neighborhood environment, high density (McNulty and Kliment, 1976). As a result, urban poor tend to occupy marginal lands for living as it is affordable and easy to maintain (Darmastuti et al., 2018) (Figure 2-4).

Over one billion urban residents live in inadequate housing around the world, mostly in slums with poor living and insufficient services (Permana, 2012). In many developing countries more than half population of principal cities live in shantytowns with no legal land titling, no basic community facilities, remote from job opportunities and basic urban service (Seelig, 1978, p.viii). In Indonesia, after its independence in 1945, despite the enacting of Housing Law in 1964, housing was mainly supplied by individuals, where low-income housing in the city was mostly incrementally and informally constructed (Silas, 1987, p.146). Urbanization in Indonesian has been recorded since the early 1950s, during the revolutionary period, where many vacant houses and land were illegally occupied by revolutionaries who return to the cities (Silas, 1987, p.136). During the first year of the Indonesian development plan (1969-1974), unbalanced growth of population in relation to the housing supply has caused the emergence of unhealthy urban neighborhoods and illegal slums (Silas, 1987, p.140). Later on, the urban migration trend increased rapidly in the 1980s causing 54% urban population living in slum and squatter settlement (Permana, 2012, p.15).

Informal settlements are considered to be the major issue within many urban areas; particularly problems related to transportation, population, health, safety, as well as joblessness, hunger, disease, crime, pollution, environmental decay (Ragheb et al, 2016; Seelig, 1978, p.viii) (Figure 2-5). One-quarter of all urban housing units in developing countries are temporary structures and more than one third do not conform to building regulation (Permana, 2012). According to Turner (1966), very poor immigrants family tend to live in a cheap shelter to the proximity within walking distance to their workplace and sources of livelihood, without any concern to security or legality as well as the quality of their shelter; for them, the higher the density, the lower the rents and greater the effectiveness of

living space. Therefore, many of those urban poor living in a spontaneous shelter in crowded areas with lack of public utility services and infrastructures, unhealthy environment, deteriorated housings.

Many intermediate-sized cities which are growing rapidly and these cities are also witnessing the emergence of peripheral squatter and slum settlements. When inner-city slums reached their upper limits of population growth, squatter settlements appeared in peripheral areas (Ulack, 1978).

However, some cases in developing countries show that the status of 'informal' that attached to those marginal shelters is not the actual problem. Informal settlements in Jakarta shows that their existence is tolerated, although they are rarely incorporated into the city's formal infrastructure systems (Vollmer and Grêt-Regamey, 2013). In another city in Indonesia, the Yogyakarta people have been living in areas which are actually owned by the local Kraton (royal palace), where the Sultan of Yogyakarta kingdom generously showing his wisdom by 'lending' the land for the welfare of people according to an agreement (Prayitno, 2017).

Despite the pro and contra of the 'value' of settlements along riverbanks and whether they should not be evicted or not, for the purpose of this study, we consider the positive side of such dwellings as a home for the low-income society that is unique in characteristics and has interesting patterns. Therefore, aiming to revive riverside areas through environmental and ecological improvement and managing urban space, the authorities should not ignore to maintain the continuity of livelihood of the dwellers.

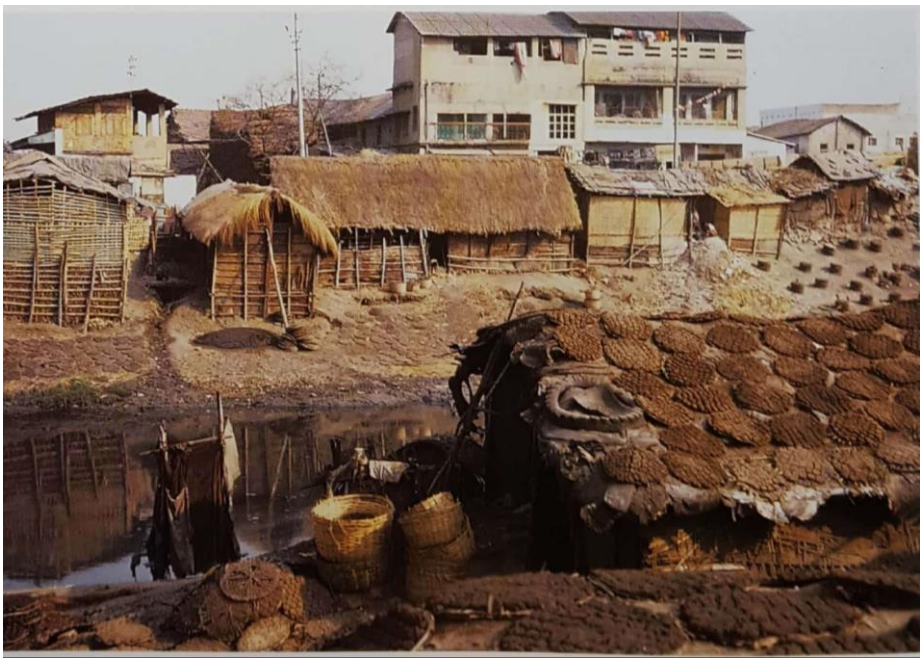

Figure 2-4. Squatter on the Banks of Calcutta Canal, India
(Source: Oliver, 2003, p.216)

Figure 2-5. Deteriorated Environment of Riverside Settlement, Banjarmasin, Indonesia
(Source: Field Survey)

2.2 Methodology and Framework

2.2.1 Theories on Dwelling

Oliver stated in his book 'Dwelling' that the processes of building in the organization of space, details, the disposition of domestic articles and the patterns of daily use in a shelter express the values of its occupiers (Oliver, 1987, p.222). They are built to meet specific needs, accommodating the values, economies, and ways of living of the cultures that produce them (Oliver, 1997, quoted in Bronner 2006). These need to be articulated and accommodated in the building of new dwellings or the adaptation and upgrading of traditional ones.

Hassan Fathy believed that the result of the human-environment interaction constitutes culture, where vernacular architecture is one of the most concrete manifestations of this interaction (Oliver, 2003). Amos Rapoport (2006), a prominent traditional-environment architect and scholar, also argues that vernacular environments are most clearly linked to culture, hence, study of vernacular is essential in clarifying the ways in which culture and environment are related and might play a role in resolving issues such as the extent on constancy/variability of cultural expression. The most common approach is to romanticizing vernacular architecture by copying its certain physical qualities, such as shapes, massing, details, and so on, however, he criticized that approach is unlikely to work.

Rapoport (2006) continues that it is insufficient to study just buildings, one needs to study systems of settings where activities take place, thus, the only valid approach is to derive general lessons and principles by analyzing concepts, models, theories of vernacular environments and applying those lessons to design. He added his explanation by mentioning three basic issues that need to be investigate when using vernacular as an approach: (1) psychological and cultural characteristics of human that influence characteristics of built environment, (2) effect of environment on human, and (3) mechanism that link people and environment, such as physiology, anatomy, perception, cognition, and so on. The fact that social groups of vernacular environments are relatively homogenous makes it possible to define the typical culture or characteristics of the environment. Moreover, compared to the contemporary society where choice is virtually unlimited, the society of vernacular environments was challenged with limited resources and technology, hence their impact on people becomes greater.

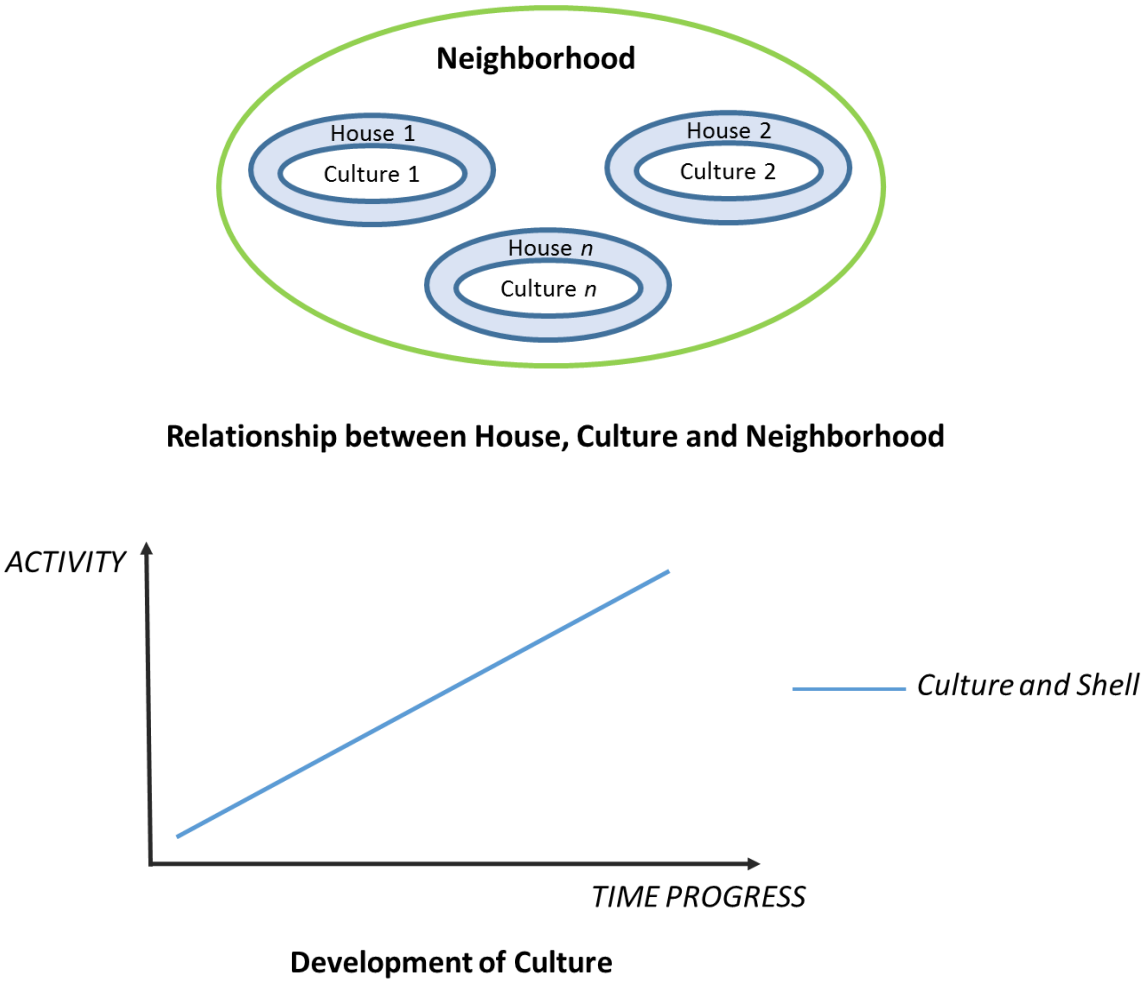

Figure 2-6. Relationship between Human Settlement and Culture

2.2.2 Conceptual Framework

It is essential and fundamental to develop conceptual frameworks to integrate different aspects of a topic and to facilitate a holistic understanding of a study, thus we need to organize beforehand the relationship between problems, aims, approaches, and goals of this study to design a scheme. The background problem that motivates us to carry out this study is due to the deteriorated condition of today's urban riverside, which was once regarded as city's pride, the authority of many nations find the necessity of undertaking actions to save riverside environments from getting even worse. Believing that slum and squatter dwellings as the source of the problem, many governments decide to clear out riverbanks from the occupancy of urban poor's settlement, despite having been living for years. Unfortunately, eviction programs seem to cause huge loss and trigger greater harms not only for the victims but also for the city itself. Considering these problems, we urge to formulate an improvement plan for riverside residential areas that do not harm the livelihood of its current inhabitants.

From the theories mentioned in the previous section, this study summarizes that when dwelling can be defined a shell that is formed by the culture of its inhabitants, then, a neighborhood is a bigger shell that is shaped by various culture (Figure 2-6). However, according to Rapoport (2006), the social groups of vernacular environments are relatively homogenous. On the other hand, culture itself is a social system that is shaped by the social customs and activities that develop over time. In the context of improving riverside areas, it is then necessary to activate local culture and history that are reflected in both shell or environment and inhabitant activities towards rivers. Waterfront place identity

development is closely related to the level of attachment and strength of the existing image; thus, reinforcing of place identity should be done on a local scale (area-based or citywide-based) (Prayitno, 2018).

We presume that 'historical value' and 'cultural activity' approaches can be adopted in our study to solve the problems without victimizing poor dwellers, but on the other hand can achieve ecological balance as well as urban spatial order. The possibilities of utilizing our approaches will be verified through a case study in Banjarmasin, Indonesia.

1) Historical approach
   This approach will firstly define the elements of a shelter that is related to 'history'. Using an example of traditional vernacular dwelling in Banjarmasin, which is called as the Banjarese house, this study is trying to figure out how vernacular dwellings can contribute to developing a riverside area. The result of our case study will be deduced to plan historical preservation guidelines for traditional vernacular houses in general.
2) Cultural approach
   The second approach will argue the necessity of investigating the relationship between indigenous activity and its physical setting. When talking about communal activities, we cannot separate from their setting or place. However, in the case of informal settlement, a place for communal activities is scarce due to the limited space. Concerning that, we find it crucial to provide public space in any kinds of a neighborhood. Thus, using an example of slum riverside settlement in our target location, this research intends to plan a physical upgrading scenario for slum riverside settlement. The expected result will demonstrate how physical upgrading of slum settlement can support reviving riverside areas. The result of the case study is expected to be a standard strategy that can be applied in other nations.

Both ideas from our two methods will be summarized and concluded to formulate an integrated scheme for reviving riverside residential area in general, which is hopefully can be adapted in another area, especially in the developing countries. The framework of this study is illustrated in Figure 2-7.

In addition, prior experiences showed the importance of involving multi-disciplinary studies in performing any slum improvement projects; when architects or planners like us trying to enter another study realm, then the plan will unlikely be effective. Realizing our limitation, this study will only cover solutions related to architecture and urban design, thus, proposing guidelines limited to physical treatment or enhancement.

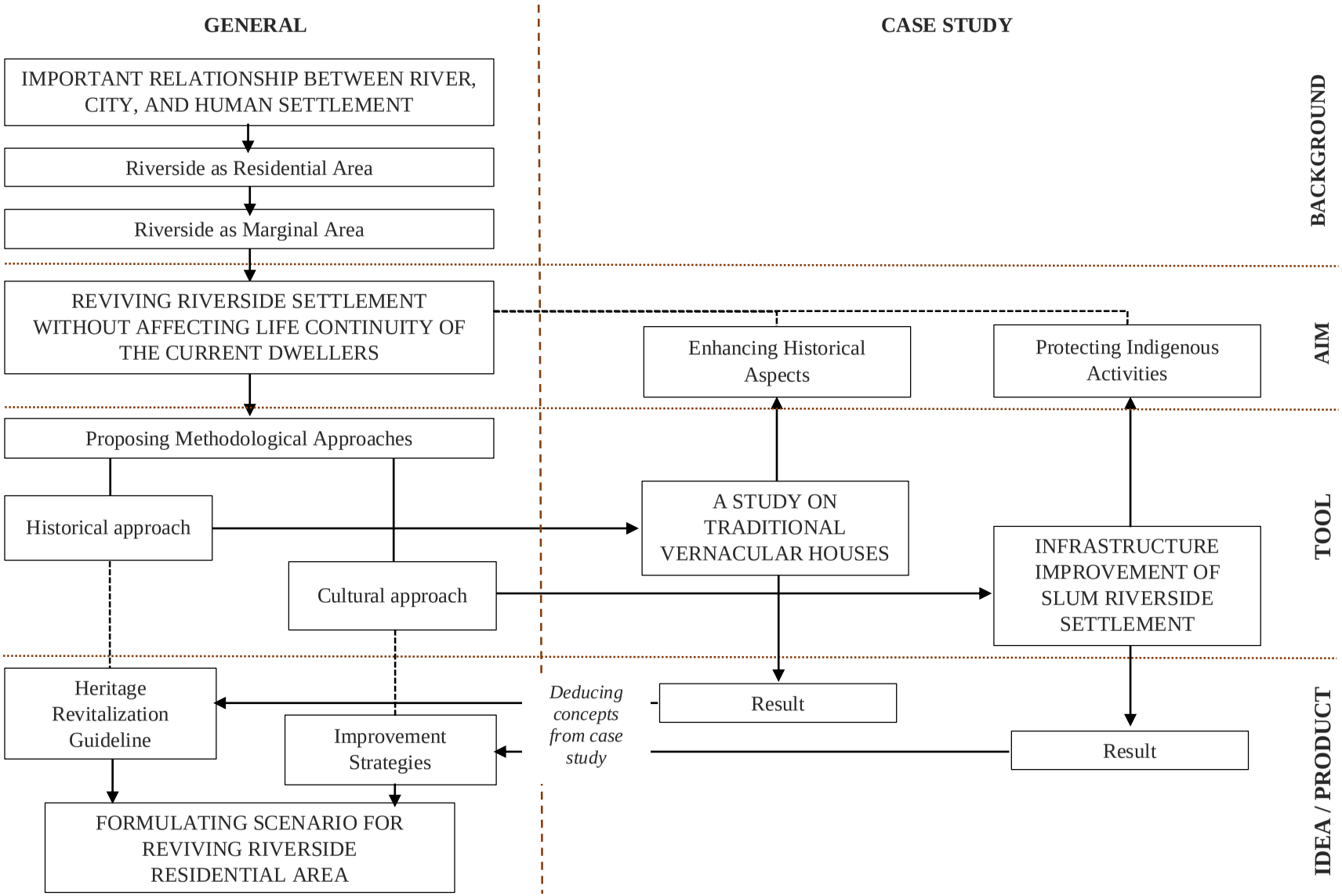

Figure 2-7. Study Framework

2.3 Literature Review

2.3.1 Understanding History and Culture of Dwellings

2.3.1.1 International Literature

The study of Pinijvarasin (2002-2003) aimed to illustrate morphological changes in Thai vernacular compounds. The study also intends to determine the effects that modern developments have had on the formation of such family housing compounds in Thai vernacular houses. The result showed three significant changes, such as the loss of the relationship between houses and the watercourses through physical growth of the houses of the villages. Also, small houses that once clustered around the roofless platform and extended along the watercourse have become larger, forming compact containers for individual family units and enclosed from the environment. The last significant change is that the physical form of the houses in particular groups of relatives has changed from a collection of communal houses clustering around a single roofless platform to housing compounds defining open space on the ground between them.

A study on spatial analysis of traditional Thai dwellings was carried out by Wongphyat and Suzuki in 2008. This research discussed Thai dwellings in three evolution periods, the 'old', the 'transitional', and the 'old and new' tradition. To understand how Thai dwellings respond to the ever-shifting contexts, the research focuses on the re-examination of the interrelationship between the broad, natural and cultural, context and the intimate, spatial, content and the reintegration between the horizontality and verticality of the house's lived space. The study also aims to clarify their spatial essence and transformation processes in a line of tradition.

Their study stated that architecture is an integral part, thus not only the dialogical relationship between the cultural and spatial realms of Thai dwellings but also the multidimensionality such as horizontal and vertical dimensions of the houses' lived space. The result showed that the 'old' tradition of Thai dwellings served as a crucial frame of orientation in the creation of the flexible, sharable, and interchangeable spatial characteristics of the old houses. The 'transitional' tradition showed the transition from the interconnected whole to the independent entities of Thai dwellings, where the spatial orientation remained almost unchanged, the spatial identification of the dwelling core, such as the half-open/half-enclosed, semi-outdoor, terrace, and the house boundary was somewhat modified. By contrast, the 'old and new' tradition bring about changes in the houses' spatial essence, such as the cut-off, separate, and fixed space externally and internally as well as horizontally and vertically.

A study by Ombeni and Deguchi (2009) was carried out regarding the transformation of traditional residential units into commercial spaces in a central business district. The purpose of the study is to bring a new understanding of the relation between the change of building function and the transformation of building components at the residential unit level. Took place in Kariakoo, Tanzania, this research also aims to clarify how the transformed building components lead to possible patterns of new uses space in the area. Firstly, the original architectural features, layouts, and meanings, of the local architecture of the residential units which existed in the study area before their transformation were reviewed. Then, the changes in building functions were analyzed in the current situation while new architectural features and space usage caused by transforming residential units into commercial spaces were identified.

The study of Ombeni and Deguchi showed that due to the change of building functions from residential to commercial, most of the features and building components such as the floor, front veranda, windows, entrance doors, and roofs, were transformed to facilitate commercial activities while new materials and technology was also improvised. Based on those observations, they concluded that transformation did not only affect building components but also the entire building through the demolition of the traditional buildings to give room for modern commercial facilities. On the other hand, the transformation has attributed to make the area an important hub in the city center by combining working and living space within the urban context. Nonetheless, there is a need to control and monitor the transformation in order to preserve the history of the Kariakoo area.

Wan Ismail (2012) researched on identifying cultural determinants in the design of Bugis traditional houses in Johor, Malaysia. The findings suggest that there was a strong adherence to culture by Bugis people in the form of the making of their houses. It suggested that even though the houses were built away from their homeland in Sulawesi, Indonesia, the culture of the Bugis descendants remain intact as expressed in the house forms, plans, and the elevations of the houses.

2.3.1.2 Local Literature

The study by Zohrah and Fukukawa (2007) presented to estimate the formation of vernacular houses for environmental impacts of river network evolution. The objective of the study is to clarify the sense and to decide the patterns of different type of traditional and vernacular buildings based on the regional and historical background using 'Open Building Theory'. The result shows that although the form of vernacular houses in each area varies, the most basic principle among the settlements is similar. One is the generations and variations from another.

Zohrah and Fukukawa did another study in 2010, aiming to explain the rules of the house design by clarifying the form and structural characteristics of traditional houses in South Kalimantan, Indonesia. The study also intends to evaluate them as cultural heritage in view of their special architectural qualities. The observation showed that the distribution of spaces in the houses looks complicated due to ethnicity, tradition, and limitations. On the contrary, the space formation demonstrates the characteristics of shared socio-cultural norms. The floor plan is divided into smaller territories according to the degree of openness or intimacy gradient by various means such as putting transit spaces, setting screens, differentiating the height of floors and roofs-ceiling. The houses may vary in size; those in urban area are relatively smaller and compact compare to those in a rural area, without any significant difference in the fundamental distribution of spaces. Also, modernization through the usage of space and the arrangement of furniture have changed gradually with time, the core is maintained.

Zohrah performed further research in 2012, studying on the traditional house groups of kampong (village) in South Kalimantan, Indonesia. She aimed to clarify the organizing principles of those houses 'RBT' for the meaning of urban fabric, as a basis for potential reconstructing kampong in keeping with the sociocultural context. The common model of the 'RBT' house, the structure of kampong, kinship grouping, and the changing pattern of traditional house groups were investigated. The result suggested that the characteristics of the unaltered 'RBT' houses in the target location present an opportunity to return to the original quality of life with the rest of the urban fabric. Those that were modified for use by a single-family along with several new housing units can have the properties of the old houses by promoting the design principle approach to the local society.

The findings also stated that the space formation of contemporary 'RBT' houses can be explained as the variants of typical 'RBT'. Regarding the spatial composition in urban kampong of the study location and 'RBT' kin-groups, shared yards were consciously giving easy to the community to provide an internal route for those regarded as extended families. Despite several positions of 'RBT' groups and social differentiation developed within the kampong, important place such as a mosque will be always the focal point in the kin-group and high privacy in the kampong.

Hanan (2012) performed a study on the cultural transformation of vernacular houses in a traditional settlement in a famous touristic destination on the island of Samosir, Indonesia. The result showed that the process of modernization had replaced the locally practiced way of living with universal value in the living environment. The former socially determined framework in utilizing space in a traditional house has been changed into individual preferences in managing activities and functional needs of inhabitants. Also, tourism has impacted the disappearance or serious modification on the traditional pattern of personal favors and privileges between landowners and laborers, and of kinship and ritual duties.

Sardjono, et al. (2016) researched the characteristics of traditional houses in the old town of Kudus, Indonesia, aiming to explore and discover the architectural elements that form a Kudus traditional house. The result showed that Kudus traditional houses have a lot of similarities with a Javanese traditional

house, indicating that the one in Kudus eventually absorb the principal of a Javanese traditional architecture and adapt it to local culture and natural conditions.

2.3.1.3 Traditional Settlement

Hareedy and Deguchi (2010) investigated on rural villages, which encompassed into urbanized areas, that undergone physical transformations, causing them to lose their original identities but rarely gain full urban one. The study aimed to examine the physical characteristics and transformation experienced in the target neighborhood as a typical case of an encompassed village. This study also intended to identify the transformation trends, while also indicating the existing and expected problems in the case of continued uncontrolled transformation, for the purpose of further study on control strategies. The study clarified several issues regarding the physical characteristics and transformations in the area: (1) the changing urban fabric from an organic to more grid-like, and eventually to a random linear structure, (2) the decrease in plot areas due to inheritance practices and a linear subdivision system for agricultural land, and (3) changing trends in building heights and construction materials.

The results also indicated main existing physical problems: (1) inadequacy of street networks concerning vehicle access, (2) incompatibility of decreasing plot areas to the application of planning laws, and (3) lack of maintenance concerning street, buildings, and infrastructure. Finally, the study suggested the formation of a partnership between villagers and the city government to establish special local bylaws, such as minimum requirements for vehicle street widths, building heights and the minimum dimensions of plot subdivisions, and to promote improvement projects applicable to encompassed villages.

Hossain (2013) did a case study in an old settlement in Old Dhaka to promote the historic quality of the old city through a clear and sustainable integration of the settlements in the existing fabric. This study attempts to analyze the settlement and correspondingly outline strategic approaches to protect historic artifacts. The results indicated that a substantial buffer, construction restrictions, and traffic restrictions may not only reduce the possibility of physical deterioration but also ensure proper access and visual exposure. The preservation of building envelops is highlighted to maintain street and riverside elevations to strengthen the state of authenticity in the integrity at the urban level. Also, managing the urban dynamics to control the increasing pressure on establishment functions that cause rapid transformation is important. Policy and plans should be formulated to focus on the adaptive reuse of monuments and thus safeguard historical patrimony and ensure social-economic viability.

Kametani (2014) studied on traditional dwellings in a historic district and tourist destination of Koyasan, Japan, where old temples are scattered among the houses all over the town. Through collecting and clarifying the opinions of residents and visitors regarding the traditional houses and townscape of the city, the study aimed to enable Koyasan to keep its historic and scenic appeal while continuing its development in a sustainable manner. It can be derived from the study that not only temples but also traditional houses are important for Koyasan. Many visitors walk around the town, while many residents who cannot relate to the activities of temples live in the town. In order to be a sustainable town, Koyasan has to change from a religiously governed town to a residential town, where visitors able to experience not only temple activities, but also everyday life in Koyasan in a traditional house, so that they can understand the town.

The study by Al-Bishawi and Ghadban (2015) investigated the relationship among socioeconomic changes, physical spaces and social behaviour, particularly with respect how they are simultaneously influenced each other in traditional neighborhoods and how their interaction within the same context is important for the design and development of the built environment, particularly in the developing countries of the Middle-East, where traditional neighborhoods suffer from a state of serious decline. The result of this study indicated that the three variables are none-fixed and dependent on each other.

First, social behavior both influences and is influenced by socio-economic changes and physical space. Social life can be enhanced when the spaces are inhabited by individuals of low status or relatives, or by providing open (less divided) spaces of good appearance. Second, physical space both influences

and is influenced by socio-economic changes and social behavior. The physical conditions of the spaces can be enhanced when the spaces are inhabited by their owners or individuals of high status or when the spaces are used for social gathering rather than services. Lastly, socioeconomic status both influences and is influenced by social behavior and physical space. Individuals of high status care more about the physical conditions of the space and less about social relations than do individuals of low status. Therefore, the interaction between these three variables should be studied simultaneously, which is important for the design and development of the built environment.

2.3.2 Riverside Dwellings and Their Inhabitants

Sarwadi et al. (2001a) studied on the inhabitant's characteristics of an urban riverside settlement in Palembang City to identify the relationship between the settlement and the city corresponding the inhabitant's characteristics. The result defined raft and pillar houses in the Musi riverside urban settlement as a first step housing for migrants coming from other places. The study also concluded that the existence of raft houses of Musi riverside settlement mainly depend on the trend of migration from the area surrounding Palembang and the urban activities around Musi River as a provider of a job opportunity. Within the same year, Sarwadi et al (2001b) did another study aiming to identify the typology of houses and people-gathering places in the Musi urban riverside settlement in order to consider some principles for improvement programs. The study revealed that there is no relationship between building area and family size or income in both raft and pillar houses. The room arrangement 'Dinning+Kitchen, Guest+Living/Guest+Living+Sleeping, Sleeping' was identified as the most popular pattern on both types of houses. The study also recognized that inhabitants of the raft and pillar houses constituted a community using some places for doing outdoor activities together.

Another researched on Musi urban riverside settlement was done by Sarwadi et al. in 2002 to recognize the improvement process by the inhabitants. The objective of the study is to improve the knowledge of riverside settlements in Indonesia and to provide exact information on the Musi urban riverside settlement. The study found out that besides improving their houses, inhabitants in the settlement also improved the environmental infrastructure and provided neighborhood facilities such as a small mosque and daily good stalls. The study also recognized that improving houses and environmental infrastructures had been derived from the habitual activities of the inhabitants in the settlement.

Sangalang and Darjosanjoto (2011) performed a study on the Dayak community behavior and their adaptation to suit the riverside environment of the Kahayan River in the city of Palangkaraya, Indonesia. The study identified that the behavioral factors and their adaptation determined the old neighborhood to exist. The element of uniqueness behavior embodied in physical forms such as housing and settlement patterns as well as non-physical such as social lifestyle is paramount determination.

Mentayani and Prayitno (2011) observed the inhabitants lifestyle and the physical elements of the riverside of Banjarmasin. Three physical elements, which are the houseboat, footbridge, and *batang* (traditional sanitary facility on the river edge), were analyzed. This study suggested an eco-living style concept such as the usage of natural material for riverbank elements.

The study of Darjosanjoto (2012) clarified waterfront settlement form of Mariso in Makassar City and Pahandut in Palangkaraya City. The result indicated that the form of settlement was strongly influenced by environmental conditions and the waterfront social and cultural conditions. Also, new settlements grew spontaneously without considering the environmental damage on the riverbanks.

Vollmer and Gret-Regamey (2013) examined the demand for environmental services of inhabitants of an informal settlement in the neighborhood on Ciliwung River, Jakarta. They analyzed and mapped the patterns of use of six environmental services provided by the river: direct sanitary use, recreation, harvesting plants, groundwater use, solid waste disposal, and sewage disposal. The study found out that proximity to the river significantly influences households' behavior toward the river, as do infrastructure-related variables and neighboring households' behavior, while household demographic factors appear less significant. The study also indicated that many households rely on multiple

environmental services and that residents most reliant on these services are also at greater risk of water-related hazards, service disruption, and potential eviction. This pattern of floodplain development is prevalent in many low-income countries, and a better understanding of how informal settlements rely on environmental services can be used to assess their vulnerabilities and inform more sustainable courses of development.

Rahmitiasari et al. (2014) delivered a study to identify factors that cause the change of riverbank houses facing the direction from the river to land. The result showed five factors that cause the change: economy and infrastructure, social, house, environment, and culture.

Dahliani et al. (2015) conducted a research to find the changes in architectural expression in traditional floating houses in Banjarmasin. The result showed that most room layouts and buildings frontage were not oriented towards the river anymore. Elements that supported activities connected to the river was also gone, this was because the essential activity of the river like river transportation has long gone.

The study by Fitri et al. (2017) examined slum resident's preferences with the analysis conjoint with cluster analysis to identify groups of residents in similar housing preferences. The study also explored the relationship between the groups and demographic characteristics in the area Musi riverbank, Palembang. Each of the cluster formulated by this study had a different consideration of preference settlement with the distinguished demographic characteristics about attachment to the settlement, dependence on the river, and economic competence. Cluster 1 'transition community' consisted of inhabitants who had no dependence on the river in terms of basic services, settlement, and occupation; their preferences were beneficial ecologically because it can save development land and provide more natural land for ecosystem service needs. Cluster 2 'riverbank community' showed the dependence on the river due to their job and the attachment to the community and place; the settlement improvements for them could be planned by modified the house type which is more land-efficient by reducing land cover can create more open space and soft structure for ecological planning. Cluster 3 'land oriented community' represented residents who had strong place attachment, but less dependent on the river. Although the lifestyle, including jobs and daily activities, of those in Cluster 3 had shifter to land-oriented, they still felt like a part of the river community. The settlement that improves the infrastructure in suitability with river culture living by mimicking the performances of the ecosystem will be easily accepted by Cluster 3. Cluster 4 ' migrant' referred to them who had lived on the short duration in the settlement, with low-income and non-permanent job, did not feel comfortable with their living space and did not feel like a part of the community. Living in the riverbank was not their priority for settlement preferences; they rented a riverbank house because it provided a cheap and strategic location to the city center.

Hamidah et al. (2017) performed a study to analyze the pattern of physical integration between formal and informal settlements in Kahayan urban riverside settlement. The result indicated three important aspects to improve urban neighborhood into urban planning: security of tenure, built form and territorial claim, and mapping of morphological.

Prayitno (2018) published a paper aiming to explore the characteristics of riverside settlement using architectural image observation method and space syntax method for analyzing settlement configuration in Kuin riverside settlement, Banjarmasin. The result showed five compositions forms of attachment of riverbank elements to the river: pilling, spanning, floating, embracing, and ascending. The result also indicated that self-organized and self-customized residents were more aware of the river environment and the local assets and social space. The hybrid and mixed-use compositions that combined residential, occupational, and recreational functions were a form of residential regeneration village that was achieved through the redefining, reconnect, revitalize, reconstruct, and re-imagine approaches.

2.4 Flow of the Study

The structure of this thesis is shown in Figure 2-8. First, this study will start with the introduction of the topic by stating the problems, hypothesis, and aims (Chapter 1). Chapter 2 covers the theoretical background and literature reviews to provide a basic understanding of carrying out the topic. This chapter will also illustrate methodology and framework, as well as the structure of this book. Then, the basic information related to our case study will also be presented in this chapter.

The discussion section will be divided into two parts. Chapter 3 covers the discussion about preservation plan for vernacular houses, the 'Banjarese house', in our target location. The second sub-topic on physical upgrading strategies for slum riverside settlement will be analyzed in Chapter 4.

Then, the result of both Chapter 3 and 4 will be summarized and concluded in the last chapter (Chapter 5). This chapter will also propose an integrated scheme for managing slum riverside settlement, which hopefully can be applied in many other developing countries.

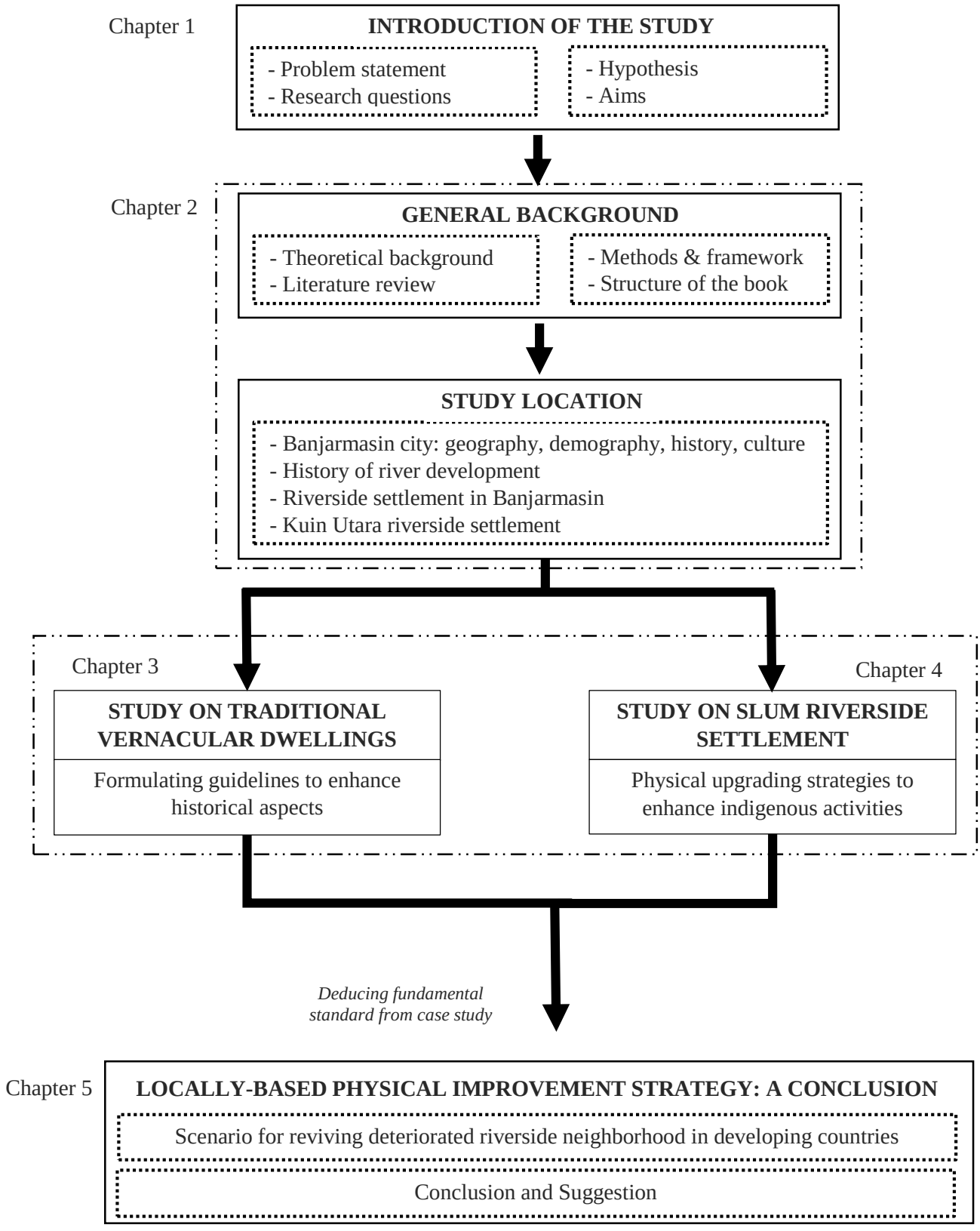

Figure 2-8. Structure of the Thesis

2.5 Study Location

2.5.1 Banjarmasin City

Located in Southeast Asia, Indonesia is the world's largest archipelago country, which is made up over 13,000 islands. Indonesia is the fourth most populous country in the world with 255,185,144 inhabitants; 135,616,086 people living in urban areas, while 119,569,058 people in rural areas (SUPAS 2015). The area is approximately 5.8 million square kilometers (75%) of water and 1.9 million square kilometers (25%) of land. Possessing a vast area of waterscapes, Indonesia is regarded as the biggest maritime nation in the world (Silas, 1987, p.135), which encompassed in many aspects, such as maritime culture, marine resources, trade and commerce, connectivity, navy, empire, etc. One of the areas which played an important role in the Indonesian maritime history is Borneo (now Kalimantan).

Kalimantan is the third largest island in the world and the largest in Asia, located in the middle part of Indonesia. According to Petersen (2000), annual rainfall of 300-500 cm over the major part of Borneo results in what is known as "the island with the big river". He continues that aside from the plenitude of water in the rivers, the heavy rainfall has also resulted in massive rainforests in the interior; rainforest covers most of Borneo, in fact, before man penetrated the island.

The forested area of Kalimantan is almost 77% of its total surface, however, forest clearance has accelerated since 1970, mostly related to the cutting of trees for timber production, especially for export, as well as land clearing for transmigration of people from the densely populated islands of Java, Bali, and Madura (Petersen, 2000, p.129). In addition, this region also suffered several great fires of its forest, such as in 1982-1983 and in 1997-1998. Sadly, afforestation action to replace the rainforest has not yet been afforded; instead of planting various species of rainforest trees, afforestation programs have been planting oil palm and rubber tree plantations (Petersen, 2000, p.15).

Banjarmasin is the capital of South Kalimantan Province with an area of approximately 98.46 square kilometers, which is about 0.26% of the area of the province. As seen in Table 2-1, based on the data from the Statistics of Banjarmasin City 2017, the number of population of Banjarmasin is 684,183 persons with around 175,907 households. The annual population growth rate is 1.29%. The population density reaches 6,949 people per square kilometer, showing that Banjarmasin is the densest compared to the other cities in South Kalimantan.

The sex ratio in Banjarmasin in 2016 stood at 100.36, which mean the male population was larger than the female. In the economical aspect, the economic growth of Banjarmasin decreased from 5.79% in 2015 to 6.28% in 2016. The dependency ratio in Banjarmasin is 44.04%. Regarding poverty, the number reaches up to 28,750 people in 2016 or about 4.22 percent of the total population. The poverty line of Banjarmasin City is listed as 417,174 IDR per capita per month. Banjarmasin City is dominated

Table 2-1 Basic Data of Banjarmasin in 2016

Aspects		Information
Geographical Feature	Land Area	98.46 square kilometres
	Land Elevation	0.16 below sea level
	Number of sub-district	5
Population	Population	684,183 persons
	Number of households	175,907 (in 2014)
	Population density	6,949 people per square kilometre
	Sex ratio	100.36
Economy	Economic growth	6.28%
	Number of poverty	28,750 people (4.22% of total population)
	Poverty line	417,174 IDR per capita per month

(Sources: Statistics of Banjarmasin, 2017)

by the younger age group of 0-29 years old with 360,903 people (52.94%); while the population of 15-64 years old is 69.45%.

Lying in the confluence of the Martapura and Barito Rivers, Banjarmasin City is located at an average altitude of 0.16 m below the sea surface with an extensive swampy-marshy area and relatively flat. This area was geologically formed by alluvial deposit from the biggest river in the island, the Barito River, and one of its tributary, the Martapura River (Dahliani, 2012). Most of the region will be flooded at the moment of high tide. Because of its geographical condition, people in Banjarmasin raise the ground level of their house by building pillars as house foundation, in order to prevent being flooded.

2.5.2 Riverside Settlement in Banjarmasin

Banjarmasin is the oldest city in the Borneo Island which was first built around the 16th century along Kuin and Alalak River (Subiyakto, 2004). Banjarmasin comes to be called "Venice of the East" and "The City of Thousand Rivers", as it has numerous rivers flowing through the city; more than 100 major rivers are identified.

The development of Banjarmasin City is originally based on the river (Figure 2-9, Figure 2-10). The rivers are used as transportation line, economical activities, as well as for supporting daily life activities. From the past until now, rivers in Kalimantan have important roles in economic development and have become a vital part related to the activities of the community (Purwanto and Darmawan, 2018).

In general, the embryo of cities in the Kalimantan region, including Banjarmasin City, develop from riparian settlements (Wijanarka, 2001). The traditional Kalimantan house style on this city is consistently related to the mosaic of the river network and their old development pattern, while modern house styles on the Banjarmasin are related to the pattern of road colonies and their new development patterns (Zohrah and Fukukawa, 2007). People dominantly occupied around the Banjarmasin riverfront in a traditional small settlement. The settlement grew spontaneously along rivers, showing that riverbanks settlement as a part of river culture. Riverside houses represent local wisdom that manifests in the form of Indonesian architecture as an adaptive-response to the tropical-humid environment (Purwanto and Darmawan, 2018).

Different from the riverside settlement in general that always associated with contemporary slums and squatters, riverfront dwellings in Banjarmasin has been developed since the pre-colonial era, and even years before Christ (see Petersen, 2000). They are occupied not only by squatters as in many cities but also by traditional vernacular houses. Living along or above streams have become an identity and a peculiar characteristic of this city. Considering that, the riversides and dwellings in this city have a strong connection and worth to be studied.

Despite its brand as "city of thousand rivers", Banjarmasin is now facing a shift from a river-based city to a land-based city due to rapid land-based infrastructure development, which results in the degradation of environmental and architectural quality, as well as the loss of place identity of river-based settlement (Prayitno, 2018). Unfortunately, governance of the area disregards this unique identity of Banjarmasin and implements policy approaches to urban planning that are based on general formal guidelines, that is the guideline which does not take the nature of riverside settlements, resulting in a shift from river-based to land-based development (Prayitno, 2018; Wijanarka, 2001).

Figure 2-9. A Row of Buildings along River
(Source: Field Survey)

Figure 2-10. Market at a Riverbank in Banjarmasin
(Source: Field Survey)

2.5.3 Kuin Utara Riverside Settlement

This study focuses on the traditional settlements along the Kuin riverbank, in the Kuin Utara sub-district in the North District of Banjarmasin (Figure 2-11). Kuin Utara is about 1.45 square kilometers wide and located six kilometers from the central city. The population of Kuin Utara in 2016 is 11,577 people with a density of 7,984 people per square kilometers. Based on the Decree of Banjarmasin Mayor No. 488A/DPU-CK/VII/2009 about the priority of handling squatter area and traditional settlements, Kuin Utara is one of five sub-districts, which is selected as a traditional area in Banjarmasin City (Rahmitiasari et al., 2014).

The settlement along the downstream of Kuin River is the embryo of Banjarmasin, the oldest Banjarese village that had developed to be the greatest Islamic kingdom in Borneo (Goenmiandari t al., 2010). The Banjarese Kingdom is the first Islamic empire in Borneo, built by Sultan Suriansyah (1526-1550). In 1612, the palace was burnt down by the VOC and then moved to Martapura. No remains exist; thus, the exact location of the palace cannot be determined. However, researchers and scientists believe that the site of the palace is in the same place where the present royal burial complex of Sultan Suriansyah is (Muchamad et al., 2006).

The local government has also designated the area of Kuin Utara as one of the city's cultural heritage (Figure 2-12). As stated in the Spatial Planning Act of the Banjarmasin City 2013-2032, several areas in Kuin Utara have been allocated for tourism and strategic area for socio-cultural purpose, specifically in three locations: the royal grave of the former king of Banjarese palace, the ancient Sultan Suriansyah Mosque, and the Muara Kuin floating market. Concerning these three attraction spots, the local government organizes an improvement plan to strengthen the area as a historical tourism destination.

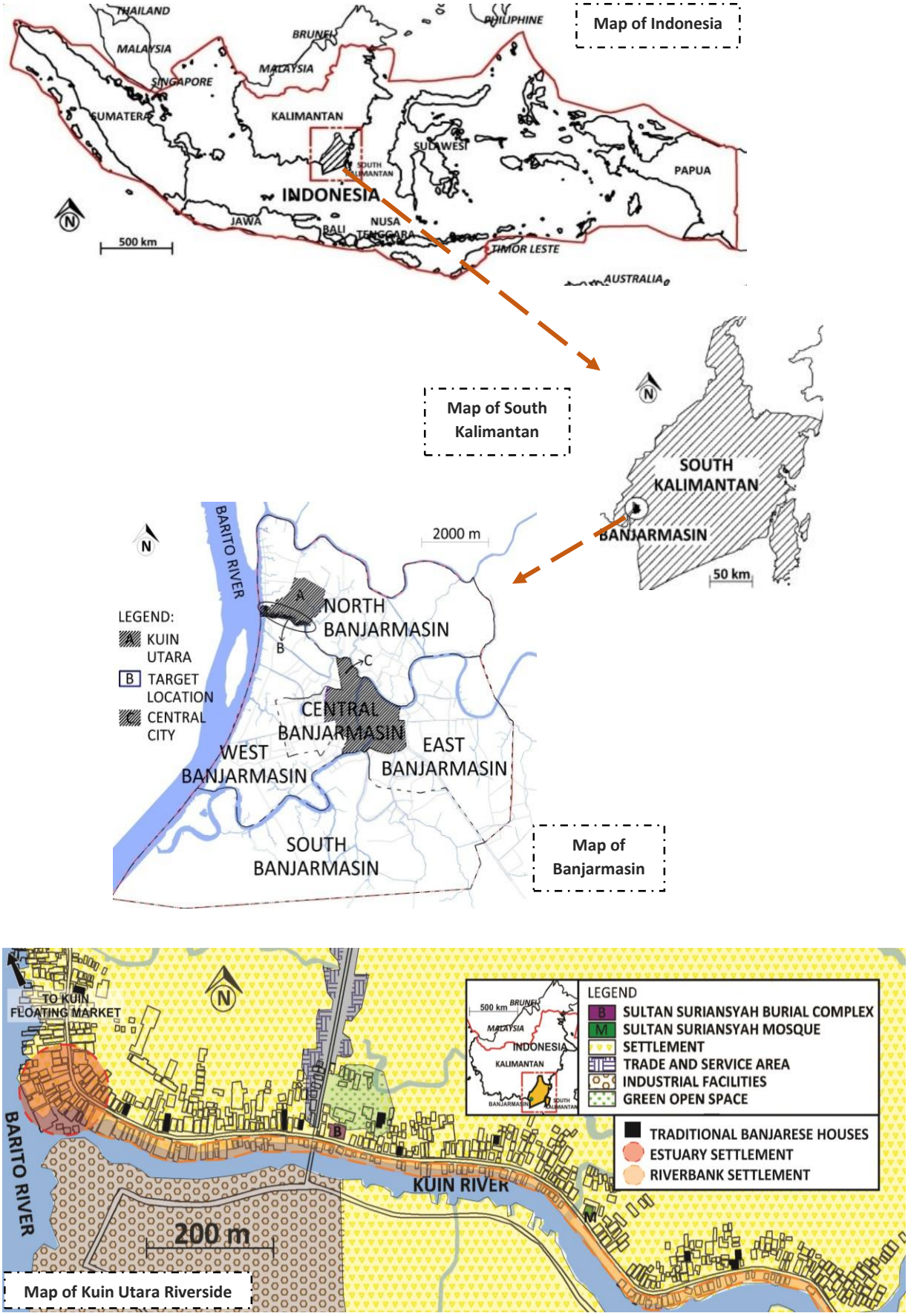

Figure 2-11. Map of Location
(Drawn by Author)

Despite its label, Kuin as a region of famous for its traditional floating markets is currently experiencing a decrease in value of its identity (Prayitno, 2018). Floating houses, stilt structures, footpaths, traditional boats, floating market, and boat mooring docks are strong elements of Kuin area, however, there is an indication of the declining number of floating market traders, the increase of housing density and the degradation of quality of the river, which in turn affected riverside settlements (Prayitno, 2018). Kuin area is where the starting point of the Banjarmasin city development was, but today, Kuin is just no different than other urban villages in the fringe of the city (Rochgiyanti, 2011). Local governments tend to not only focus on tourism attractions and disregard vernacular settlement and environment but also to exclude Kuin area from current planning priority due to its unstrategic location.

There are several considerations for selecting Kuin Utara urban village as the target location. As an area with considerable cultural heritage backgrounds, this study expects that Kuin Utara neighborhood will be a suitable location to utilize historical and cultural approaches. Moreover, located in the suburban area of the Banjarmasin city, the residential area of Kuin Utara is relatively less crowded and less disintegrated, thus, it might be easier to study its historical and cultural pattern[1] (Figure 2-13).

[1] According to Patton and Subanu (1988) there are basically two kinds of urban villages in Indonesia: central and peripheral villages. The central village is consistently poor and overcrowded, usually located on marginal land close to activity centers of the city, and mostly resided by the lowest income level of the population who works as food peddlers, garbage collector, scavengers, or other informal-sector workers. The peripheral village is less crowded and has better-constructed houses with higher-income residents, generally located farther from urban activity centers, but still within easy reach of most urban service. Patton and Subanu added, not being the primary target of rural migrants and having larger tracts of land, peripheral urban villages started to be considered as land resources. Middle-income families began to move into them, which cause the increase of building densities, but it introduced better-constructed houses that increase the value of its land.

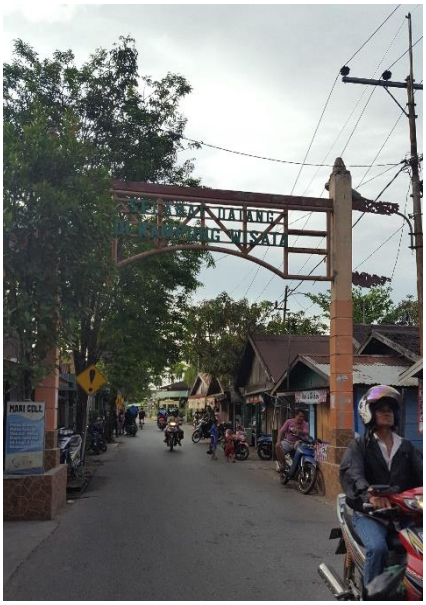

Figure 2-12. The Kuin Utara Tourism Village
(Source: Field Survey)

Figure 2-13. Settlements along Kuin River
(Source: Field Survey)

References

1) Awe, J. J., Hoggarth, J. A., Helmke, C., 2014. 'Prehistoric Settlement Patterns in the Upper Belize River Valley and Their Implications for Models of Low-Density Urbanism' in Helmke, C. and Sachse, F. (ed.) A Celebration of the Life and Work of Pierre Robert Colas, Acta Meso Americana, Vol. 27. Verlag Anton Saurwein.

2) Bawole, P., 2009. The Settlement of Stren-Kali Wonokromo-Surabaya: The City Image Based on the Development of Marginal Society. DIMENSI, Journal of Architecture and Built Environment, Vol. 47, No. 1, 1-8.

3) Bishawi, M. A. and Ghadban, S. S., 2015. Physical Space, Social Behavior and Socioeconomic Changes in Traditional Neighbourhoods: A Case Study of the Traditional City of Nablus. City, Culture and Society, Vol. 6, 125-133.

4) Bronner, S. J., 2006. 'Building Tradition: Control and Authority in Vernacular Architecture' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

5) Dahliani, 2012. Konsep Pengolahan Tapak Permukiman di Lahan Rawa Banjarmasin [Concepts of Residential Site Utilization Plan on Wetlands in Banjarmasin]. LANTING Journal of Architecture, Vol. 1, No. 2, 96-105. (In Indonesian).

6) Dahliani, Faqih, M., Hayati, A., 2015. Changes of Architecture Expressions on Lanting House Based on Activity System on the River. History Research, Vol. 3, No. 1, 1-8.

7) Darjosanjoto, E. T. S., 2012. Revised Form of Settlement from the Aspect of Waterfront Sustainability in Kampung Mariso and Kampung Pahandut, Indonesia. J. Basic. Appl. Sci. Res. Vol.2, No.5, 4501-4509.

8) Darmastuti, A. I., Wardana, A. W., Nirawati, M. A., 2018. Alternative Use of Space in Slum Settlement, Case Study: Kampong Gandekan and Kampung Baru in Kali Pepe River Surakarta. AIP Conference Proceedings 1931, 030071.

9) Denpaiboon, C., Tohiguchi M., Matsuda, H., Hashimoto, S., 2000. Typology and Life Style Analysis of the Raft House (Ruan Pae) in Riverine Settlements in Thailand. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 533, 173-180.

10) Fitri, M., 2018. The Settlement Morphology along Musi River: The Influence of River Characteristics. DIMENSI, Journal of Architecture and Built Environment, Vol. 45, No. 2, 133-140.

11) Fitri, M., Harun, I. B., Triyadi, S., 2017. A Typology of Residents of Settlement in Urban Riverbank, Indonesia. Journal of Economics and Sustainable Development, Vol. 8, No. 24, 181-191.

12) Gan, T., 1999. Living with Water: Traditional Settlements of Chinese Water Towns. [Thesis]. School of Architecture, McGill University, Montreal.

13) Goenmiandari, B., Silas, J., Supriharjo, R., 2010. Konsep Penataan Permukiman Bantaran Sungai di Kota Banjarmasin berdasarkan Budaya Setempat [The Concept of Managing Riverside Settlement in Banjarmasin Based on Local Culture]. Seminar Nasional Perumahan Permukiman dalam Pembangunan Kota [National Seminar of Settlement and Housing in the Context City Development], ITS. (In Indonesian).

14) Hamidah, N., Rijanta, R., Setiawan, B., Marfai, M. A., 2017. Physical Analysis of Formal and Informal Integration in Urban Riverside Settlement. MIMBAR, Vol. 33, No. 1, 115-123.

15) Hanan, H., 2012. Modernization and Cultural Transformation: The Expansion of Traditional Batak Toba House in Huta Siallagan. AcE-Bs 2012 Bangkok, ASEAN Conference on Environment-Behaviour Studies, Bangkok, Thailand, 16-18 July 2012. Procedia – Social and Behavioral Sciences, Vol. 50, 800-811.

16) Hareedy, A. N. and Deguchi, A., 2010. Physical Transformation of Rural Villages Encompassed into Egyptian Borders. Journal of Asian Architecture and Building Engineering, Vol.9, No.2, 379-386.

17) Hossain, M. S., 2013. Strategies to Integrate the Mughal Settlement in Old Dhaka. Frontiers of Architectural Research, Vol. 2, 420-434.

18) Kametani, Y., 2014. Conservation and Possible Relocation for the Traditional Town of Koyasan, Based on the Surveys of Residents and Visitors. Journal of Asian Architecture and Building Engineering, Vol.13, No.3, 571-578.

19) Kline, B., 2011. First Along the River, A Brief History of the U.S. Environmental Movement. Rowman & Littlefield Publishers Inc., Maryland.

20) Kostof, S., 1991. The City Shaped, Urban Patterns and Meanings Through History. Thames and Hudson, London.

21) Kostof, S., 1992. The City Assembled, The Elements of Urban Form Through History. Thames and Hudson, London.

22) Laurens, J. M., 2012. Changing Behaviour and Environment in a Community-based Program of the Riverside Community. Procedia, Social and Behavioral Sciences, 36, 372-382.

23) Li, Z., Munemoto, J., Yoshida, T., 2011, Analysis of Behaviours along the Waterside in a Chinese Residential Quarter. Journal of Asian Architecture and Building Engineering, Vol.10, No.1, 85-92.

24) Lussetyowati, T., 2014. Preservation and Conservation through Cultural Heritage Tourism, Case Study: Musi Riverside Palembang. Procedia, Social Behavioral Sciences, 184, 401-406.

25) Macklin, M. G. and Lewin, J., 2015. The Rivers of Civilization. Quaternary Science Reviews, 114, 228-244.

26) Mattulada, 1982. South Sulawesi, Its Ethnicity and Way of Life. Southeast Asian Studies, Vol. 20, No.1, 4-22.

27) McNulty, R. H. and Kliment, S. A, 1976. Neighborhood Conservation, a Handbook of Methods and Technique. The Whitney Library of Design, New York.

28) Mentayani, I. and Prayitno, B., 2011. Arsitektur Tepian Sungai, Potret Life style Masyarakat di Kota Banjarmasin [Riverbank Architecture, a Portrait of Inhabitant Lifestyle in Banjarmasin]. Seminar Nasional dan Workshop: Life Style and Architecture, Universitas Atmajaya, Yogyakarta [National Seminar and Workshop: Life Style and Architecture, Atmajaya University, Yogyakarta]. (In Indonesian).

29) Mentayani, I., 2015. Transformasi Adaptif Permukiman Tepi Sungai di Kota Banjarmasin Kasus: Barito-Muara Kuin, Martapura, dan Alalak [An Adaptive Transformation of Riverside Settlement in Banjarmasin City, Case Study in Barito-Muara Kuin, Martapura, and Alalak]. [Thesis]. Universitas Gadjah Mada. (In Indonesian).

30) Muchamad, B. N., Aufa, N., Kasnowihardjo, G., 2006. Melacak Arsitektur Keraton Banjar [Architectural Investigations of the Banjarese Palace]. Dimensi Teknik Arsitektur, Vol. 34, No. 2, 106-114. (In Indonesian).

31) Nunta, J. and Sahachaisaeree, N., 2012. Cultural Landscape, Urban Settlement and Dweller's Perception: A Case Study of a Vernacular Village in Northern Thailand. Procedia, Social and Behavioral Sciences, 42, 153-158.

32) Oliver, P., 1987. Dwellings: The House across the World. The University of Texas Press, Austin, Texas.

33) Oliver, P., 2003. Dwellings: The Vernacular House World Wide. Phaidon, London.

34) Ombeni, S. and Deguchi, A., 2009. Transformation of Residential Units into Commercial Spaces in the Central Business District of Dar es Salaam, Tanzania. Journal of Asian Architecture and Building Engineering, Vol.8, No.1, 159-166.

35) Padhan, T., 2016. Prehistoric Settlement Pattern of Jonk River, Upper Mahanadi Basin, India. Heritage, Journal of Multidisciplinary Studies in Archaeology, 4, 325-341.

36) Permana, I., 2012. Analysis of the Illegal Settlements in Palangkaraya City, Indonesia, Urban Economics Studies. [Thesis]. Toyohashi University of Technology.

37) Petersen, E., 2000. Jukung-Boats from the Barito Basin, Borneo. The Viking Ship Museum, Roskilde, Denmark.

38) Pinijvarasin, W., 2002-2003. Changes in Thai Vernacular Housing Compounds. Journal of the Faculty of Architecture Silpakorn University, Vol. 19, 74-86.

39) Prayitno, B., 2017. Co-habitation Space: A Model for Urban Informal Settlement Consolidation for Heritage City of Yogyakarta. Journal of Asian Architecture and Building Engineering, Vol.16, No.3, 527-534.

40) Prayitno, B., 2018. Sustainable Customized Consolidation Design of Kuin Riverside Kampong Regeneration in Banjarmasin, Indonesia. SHS Web Conferences, Vol. 41, 07001. https://doi.org/10.1051/shsconf/20184107001

41) Purwanto and Darmawan, 2018. The Adaptation Strategy of Dwelling in the Riverside Settlement of the Arut River in Pangkalan Bun City, West Kotawaringin Regency, Central Kalimantan. IOP Conference Series: Earth and Environment Science 213.

42) Ragheb, G., El-Shimy, H., Ragheb, A., 2016. Land for Poor, Towards Sustainable Master Plan for Sensitive Redevelopment of Slums. Procedia, Social and Behavioral Sciences, 216, 417-427.

43) Rahmitiasari, R., Antariksa, Sari, K. E., 2014. Perubahan Arah Hadap Bangunan pada Permukiman Tradisional di Tepi Sungai Kuin Utara, Banjarmasin [Changes on Building Direction of the Traditional Settlement along Kuin Utara River, Banjarmasin]. Planning for Urban Region and Environment, Vol. 3, No. 1, 1-10. (In Indonesian).

44) Rapoport, A., 2006. 'Vernacular Design as a Model System' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

45) Rochgiyanti, 2011. Fungsi Sungai bagi Masyarakat di Tepian Sungai Kuin Kota Banjarmasin [The Roles of Rivers for Kuin Riverside Inhabitants in Banjarmasin City]. Jurnal Komunitas, Vol. 3, No. 1, 51-59. (In Indonesian).

46) Rudofsky, B., 1964. Architecture without Architects, an Introduction to Non-Pedigreed Architecture. The Museum of Modern Art, New York.

47) Sangalang, I. and Darjosanjoto, E. T. S., 2011. The Dayak Adaptation in Kampong of Kahayan Riverside, Palangkaraya, Indonesia. J. Basic. Appl. Sci. Res. Vol.1, No.4, 283-289.

48) Sardjono, A. B., Hardiman, G., Prianto, E., 2016. Characteristics of Traditional Houses in the Old Town of Kudus City, Indonesia. International Journal of Scientific and Research Publications, Vol. 6, No. 2, 109-118.

49) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2001a. An Analysis of the Riverside Settlement Inhabitant‘s Characteristics in Relation to an Urban Situation, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 544, 225-231.

50) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2001b. A Typological Analysis of Houses and People-Gathering Places in an Urban Riverside Settlement, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 546, 207-214.

51) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2002. Study on the Improvement Process by Inhabitants in an Urban Riverside Settlement, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 556, 297-304.

52) Sastrawati, I., 2003. Prinsip Perancangan Kawasan Tepi Air, Kasus: Kawasan Tanjung Bunga [Design Principles of Riverside Areas, Case Study in Tanjung Bunga]. Jurnal Perencanaan Wilayah dan Kota, Vol. 14, No. 3, 95-117.

53) Seelig, M. Y., 1978. The Architecture of Self-Help Communities, The First International Design Composition for the Urban Environment of Developing Countries. Architectural Record Books, New York.

54) Silas, J., 1987. ‘Indonesia’ in Ha, S. (ed.) Housing Policy and Practice in Asia. Croom Helm Ltd, New York.

55) Skoulikidis, N. Th., Economou, A. N., Gritzalis, K. C., Zogaris, S., 2009. ‘Rivers of the Balkans’ in Tockner, K., Uehlinger, U., Robinson, C. T. (ed.) Rivers of Europe. Elsevier, USA.

56) Soemardjono, B. and Gusma, A. F., 2014. The Development of Code River Area in Yogyakarta as a Sustainable Urban Landscape Asset Acknowledging Local Traditional Knowledge. International Review for Spatial Planning and Sustainable Development, Vol. 2, No. 4, 4-18.

57) Statistics of Banjarmasin, 2017. Kota Banjarmasin dalam Angka 2017 [Banjarmasin in Figures 2017]. Badan Pusat Statistik [Statistics of Banjarmasin]. Catalog No: 1102001.6371. (In Indonesian).

58) Subiyakto, B., 2004. Infrastruktur Pelayaran Sungai Kota Banjarmasin Tahun 1900-1970 [Infrastructures of River Voyages of the Banjarmasin City in the 1900-1970]. The 1st International Conference on Urban History, Surabaya. (In Indonesian).

59) SUPAS, 2015. Population of Indonesia, Result of the 2015 Intercensal Population Census. Statistics Indonesia. (In Indonesian).

60) Tachakitkachorn, T. and Shigemura, T., 2005. Morphology of the Agriculture-based Deltaic Settlement in the Western Basin of the Chaophraya Delta. Journal of Asian Architecture and Building Engineering, Vol.4, No.2, 361-368.

61) Thanousorn, V. and Oikawa, K., 2010. Spatial Development of Lao Dwellings along Mekong River. Journal of Asian Architecture and Building Engineering, Vol.9, No.2, 403-407.

62) Turner, J. F. C., 1966. A New View of the Housing Deficit. San Juan Seminar Paper, Social Science Research Centre, University of Puerto Rico, Rio Piedras, Puerto Rico.

63) Ulack, R., 1978. The Role of Urban Squatter Settlements. Annals of the Association of American Geographers, 68(4), 535-550. Retrieved from http://www.jstor.org/stable/2562142

64) UN-Habitat, 2006. State of the Worlds' Cities 2006/7, the Millennium Development Goals and Urban Sustainability: 30 Years of Shaping the Habitat Agenda. United Nations Human Settlements Programme.

65) UN-Habitat, 2015. World Urbanization Prospects 2014.

66) United Nations, 1978. Aspects of Human Settlement Planning, edited by The Habitat Conference Secretariat. Pergamon Press, USA.

67) Vollmer, D. and Gret-Regamey, A., 2013. Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River. Global Environmental Change, Vol. 23, 1542-1555.

68) Waley, P., 1990. The Sumida: Changing Perceptions of a River. Revue de Geographic de Lyon, Vol. 65, No. 4, 261-275.

69) Wan Ismail, W. H., 2012. Cultural Determinants in the Design of Bugis Houses. AcE-Bs 2012 Bangkok, ASEAN Conference on Environment-Behaviour Studies, Bangkok, Thailand, 16-18 July 2012. Procedia – Social and Behavioral Sciences, Vol. 50, 771-780.

70) Widodo, J. 2004. Boat and the City: Chinese Diaspora and the Architecture of Southeast Asian Coastal Cities. Marshall Cavendish Academic, Singapore.

71) Wijanarka, 2001. Dasar Dasar Konsep Pelestarian dan Pengembangan Kawasan Tepi Sungai di Palangkaraya [Basic Principles of Preserving and Developing Riverside Areas in Palangkaraya]. [Thesis]. Universitas Diponegoro, Semarang. (In Indonesian).

72) Wongphyat, W. and Suzuki, H., 2008. Spatial Analysis of Traditional Thai Dwellings in the Phrapradaeng District. Journal of Asian Architecture and Building Engineering, Vol.7, No.2, 225-232.

73) Wulandari, A. P., 2009. The Slums at the Riverbanks and Challenge for Cultural Change, in Informal Settlements and Affordable Housing, Sustainable Slum Upgrading in Urban Areas, pp. (III)41-(III)51.

74) Xie, Y., Bie, Q., He, C., 2017. Human Settlement and Changes in the Distribution of River Systems in the Minqin Basin over the Past 2000 Years in Northwest China. Ecosystem Health and Sustainability, Vol. 3, No. 11, DOI: 10.1080/20964129.2017.1401011

75) Zohrah, L. and Fukukawa, Y., 2007. The Formation of Vernacular House in South Kalimantan Province, Indonesia: Environmental Impact of River Network Evolution. International Conference of 21st Century COE Program of Tokyo Metropolitan University. Proceeding of Building Stock Aviation: 5-7 Nov 2007, Tokyo, Japan, 2007, 375-382.

76) Zohrah, L. and Fukukawa, Y., 2010. Characteristics of Traditional High Ridge Houses in Banjarese Kampung, South Kalimantan, Indonesia, a Study on Building Form and Structure. J. Archit. Plann., AIJ, Vol.75, No.647, 149-156.

77) Zohrah, L., 2012. Traditional High Ridge House Groups of Banjarese Kampung to Clarify the Organizing Principles in the Meaning of Urban Fabric. LANTING Journal of Architecture, Vol. 1, No.1, 57-67.

CHAPTER 3. Study on Traditional Vernacular Dwellings

3.1 Introduction

3.1.1 Defining Vernacular Architecture

The term 'vernacular architecture' was firstly introduced by Paul Oliver to define buildings that are native and unique to a place, that express a local or regional dialect, produced without the need for imported components and processes, possibility built by the individuals who occupy it, and evolved from within the communities and perfected itself over a long period of time (Bronner, 2006; AlSayyad, 2006; Özkan, 2006). All form of vernacular architecture is built to meet specific needs, accommodating the values, economies, and ways of living of the cultures that produce them (Oliver, 1997, cited in Bronner 2006).

The term vernacular entirely embraces other terms in addressing such buildings: *'traditional architecture'* that emphasize on the traditional process within a particular society that had culminated and inherited in built form (Özkan, 2006; Oliver, 1987, p.9); *'primitive architecture'* indicates that the building embodies the basic necessities of society in their simplest form (Guidoni, 1975) and governed by ecological factors (Rudofsky, 1977, p.11); *'folk architecture'* which related to ethnographic premises (Özkan, 2006); *'indigenous architecture'* that are native, particular and original to a region or geographical setting (Özkan, 2006; Oliver, 1987, p.9). They are also often to be called *'anonymous'* referring to insignificantly determinable architectural authorship and *'un-institutionalized architecture'* in some academic discourse.

Vernacular architecture covers both those that are built in the pre-modern era, or often to be called as traditional vernacular environment, and contemporary indigenous houses that are built in the modern era, or often to be called the spontaneous shelter (Figure 3-1, Figure 3-2, Figure 3-3). Nonetheless, the discussion of this chapter is limited to vernacular building traditions that have been existed before or during the colonial encounter.

3.1.2 Traditional Vernacular Architecture in Modern Era

Vernacular dwellings, that are built by their owners and inhabitants using locally available resources and technologies, according to regulations and forms that have been handed down and adapted to circumstances through local traditions, are presently believed to constitute about 90 percent of the world's total housing stock (Oliver, 2003, cited in Asquith and Vellinga, 2006). Most vernacular houses are to be found in developing countries, where traditional economies, social structures, and cultural value have been more persistent in comparison to the more developed countries like Europe and North America, where modernization, urbanization, and globalization processes took place at an earlier date (Vellinga et al., 2007).

However, in the current days, pre-modern or vernacular architecture traditions are facing degradation in their physical condition and even total loss. Modernization, that changes the living habits and the needs of the inhabitants indirectly, has an impact on changing the characteristics of their dwellings (Pinijvarasin, 2002-2003). The physical and functional changes represent the efforts to fulfill the resident's needs and way of life and to adapt to the lack of natural material on today's modern market (Lestari, 2013). This situation provokes a dilemma for the present inhabitants between maintaining tradition and keeping up with a modern lifestyle.

On the other hand, according to Oliver (1999 cited in Asquith and Vellinga, 2006), in a time of rapid technology developments and globalization, vernacular architectures still occupy a marginal position and continue to be associated with the past, underdevelopment and poverty with lack of recognition and support from professionals and policymakers involved in the fields of architecture and housing; even in architectural history and theory, they are still frequently ignored (Rapoport, 1969).

Figure 3-1. Igloo, Canada
(Source: Oliver, 2003)

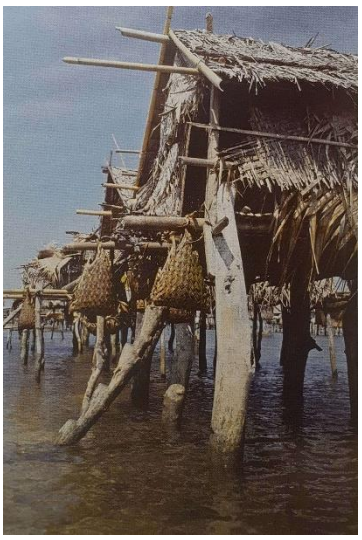

Figure 3-2. Stilt Houses of the Badjao, Philippines
(Source: Oliver, 2006)

Figure 3-3. Gassho Style House, Shirakawago, Japan
(Source: Field Survey)

They may be admired for their aesthetic qualities, but they are regarded as irrelevant to current housing projects or as obstacles on the road to progress, which should be replaced by house types and living patterns that fit western notions of basic housing needs but which are adverse to the norms, wishes, and values of the cultures concerned (Asquith and Vellinga, 2006).

This study urges the need for paying attention to decayed traditional vernacular houses. This study believes that those houses, despite often considered as a scar on the city's environment, cannot be thrown out from the city planning.

3.1.3 Vernacular Architecture Studies

According to Schefold et al. (2004, p.1), until the 1960s, the research on them concentrated on the documentation and classification of the traditional forms of houses and their decoration, with the final aim of reconstructing the historical spread of building types; references to symbolic meanings of dwellings and to customs relating to their habitation are rare, especially in a comparative perspective. But in the last few decades, they continued, the studies attempted to describe and compare specific building traditions and to interpret them in their natural and social contexts.

In most studies, vernacular architecture is (still) often regarded as exotic, distinctive, and valuable artifacts from the past, which is seen as a homogenous and static product, therefore need to be protected

in their original form, without any modification in the design. Many argue that the vernacular and the modern cannot go together and that the arrival and incorporation of new technologies, materials, and functions are seen as contamination of the authenticity that may trigger the loss and decline of vernacular buildings.

However, there are some scholars who oppose this point of view, asserting that many traditions that are now seen as vernacular authentic in fact evolved out of the adaptation, hybridization, and amalgamation of different traditions, such as the Siberian Yupik, the Kipsigis hut in Kenya, the Negeri Sembilan Malay traditional house, and the syncretism of Hispanic and Anglo-American culture in shaping Santa Fe, New Mexico (Vellinga, 2006; Oliver, 1987; Masri, 2012; Shacklette, 2011). We have to accept that vernacular architecture are built by the locals or the dwellers themselves with the constraints and limitation of the local condition, including social structure, climate and soil condition, as well as resources (Kellett, 1995) and that gradual change may occurs in vernacular architecture over long periods of time as a result of geographic or economic limitations of the local population of a region (AlSayyad, 2006).

Moreover, using the case study in Maasai, Oliver (1987) showed that most indigenous building traditions were built and constructed by the individual builder to suit his requirements; they were neither slavish copies of their predecessors, nor wilful deviants from them, but the result of deliberate decisions related to perceived needs. In indigenous dwelling, there is design too, but it is carried out on a one-to-one scale, not abstracted in the drawing board (Oliver, 1987, p.69). The examples have proven, as Vellinga contended, that the outside influences are therefore indigenized or 'vernacularized' as an active adaptation and continuation of a living tradition (Vellinga, 2006, p.87). If there is a variation of vernacular houses, then, what is the actual meaning of 'vernacularly authentic' that the opposite theorists insist on? The differences are hard to notice but significantly contribute to the slow-changing traditional form as innovations are introduced and influences assimilated (Oliver, 1987, p.69). This gives us an understanding that cultural transfer and exchanges have always taken place in the past and will undoubtedly continue to do so in the future (Vellinga, 2006, p.86).

Dwelling is both artifact and process (Oliver, 1987, p.7); it can be either a noun or a verb (Turner, 1972, p.151). Housing as a noun, commodity, or product, that describes the nature, qualities, and attributes of the resulting environments, can be measured by specification or physical standard, while housing as a verb, process, or activity of a housing, that describes how vernacular environments is created or come to be, can be measured by dwelling units, financial costs, time invested, human effort, and satisfactory of needs (Turner, 1972, pp.151-152; Rapoport, 1988, p.53; Rapoport, 2006). It is, therefore, necessary to understand both the building process and form as a whole.

Nevertheless, the interest of many earlier studies on vernacular architecture was in the documentation, classification, and naming of historic or traditional forms, plans, materials and styles, most of which were regarded as destined to disappear, without paying much attention to cultural context or, indeed, the future potential of the traditions concerned (Asquith and Vellinga, 2006, p.4). The studies in developing nations have led to a far more progressive characterization of the vernacular as the architecture of every day while those developed countries cling to the preservation of vernacular typology (Hourigan, 2015). Moreover, the studies tend to romanticize the past or the remnants of an underdeveloped society, rather than discussing on the importance and relevance to many cultures and peoples in the world, past, present, and future (Asquith and Vellinga, 2006, p.2). Therefore, humane and appropriate housing will only be achieved when dwelling as an artifact is again possible for every culture through the fully realized potential of dwelling as a process (Oliver, 1987, p.223).

In terms of preservation, traditional vernacular houses should not be regarded merely as an artifact to be restored as it was in the past. Hence, when preserving the physical building of vernacular architectures, it is more essential to consider what contribution such houses can make for today and the future.

3.1.4 Historical Aspects of Kuin Utara

Kuin Utara is a riverside area in the North Banjarmasin, South Kalimantan. The downstream of Kuin Utara is the embryo of Banjarmasin City, where the first and the greatest Islamic Banjarese Kingdom was developed, and closely linked to the history of the city. Based on the Decree of Banjarmasin mayor No. 488A/DPU-CK/VII/2009 about the priority of handling squatter area and traditional settlements, Kuin Utara that located on the northern side of Kuin River, is set as one traditional area in Banjarmasin City. The local government has also designated the area of Kuin Utara as one of the city's cultural heritage.

As stated in the Spatial Planning Act of the Banjarmasin City 2013-2032, several areas in Kuin Utara have been allocated for tourism and strategic area for socio-cultural purpose, specifically in three locations: the royal grave of the former king of Banjarese palace, the ancient Sultan Suriansyah Mosque, and the Muara Kuin floating market. Concerning these three attraction spots, the local government organizes an improvement plan to strengthen the area as a historical tourism destination.

Although it has been commonly assumed that the historical and cultural landmarks have the most significant effect on the area improvement, today's Kuin Utara is surrounded by settlements that may also have some contributions and supportive roles toward the area improvement and may play important roles to enhance the value of the area. Vernacular house traditions that have been developed together with the city, can also be identified in this area. However, their existence is likely ignored despite their historical value. Accordingly, the development plan of Kuin Utara traditional settlement should also consider looking after traditional vernacular houses, as a supportive element to sustain historical and traditional buildings in the area.

3.1.5 Aims of the Study

In many cases, the government's laws and policies are not in accordance with practical actions. Many policies and strategies exist, but ineffective. Should we just sit and wait until the system is better? No. While we are waiting and doing nothing, many more vernacular houses disappear from existence. We need to establish standard concepts to bridge between existing policies and practical guideline. In addition, Thompson (1977) argued that reclaiming old buildings for adaptive or continuing use has become an important element in today's architectural practice and construction activity; when one revitalized building acts as a catalyst for other such projects in its vicinity, and a whole section of a city enjoys a renascence. Thus, despite the poor condition of many traditional vernacular houses in the present days, the development of a city or an area should not abandon them.

Through studying old buildings, many beneficial lessons can be derived from values and customs of past civilizations for today and the future. Therefore, this research aims to understand the historical values of traditional vernacular house and how they can contribute to today's urban development. We expect that looking after the physical structure of old houses may reinforce the quality and the identity of a place, as well as regenerate cultural pride (Figure 3-4, Figure 3-5).

3.2 Indonesian Traditional Vernacular House

Indonesian traditional vernacular houses can mainly be grouped into two categories: *maritime* and *agriculture*. Maritime houses are stilt houses built alongside the river or sea, found in Sumatera (see Sarwadi et al., 2001, 2002; Fitri, 2018), Borneo (see Zohrah and Fukukawa, 2007, 2010; Mentayani, 2008a, 2008b, 2015), and Sulawesi (see Mattulada, 1982; Sastrawati, 2009), while agriculture or landed houses are particularly seen in Java, Bali, etc. Compared to the landed one, aquatic dwellings exist only in a few places across the globe, including Indonesia.

Schefold et al. (2004) wrote in their book about Indonesian houses that the traditional dwellings and settlements of the several hundred ethnic groups in Indonesia are objects of conspicuous importance, extremely varied, and all have their own specific history. Those houses express the great diversity of

Figure 3-4. Takayama Old Town, Japan
(Source: Field Survey)

Figure 3-5. Toraja Village, Indonesia
(Source: Oliver, 2003)

local forms and display amazing creativity in adapting regional circumstances and social changes (Schefold et al., 2004). They continued that as in any dwellings, changes over time and variation can also be found, but ignored as if the design has remained static through the centuries without undergoing any major changes. Moreover, there is a tendency to discuss a particularly impressive house, then regarded it as representative of the house of a whole ethnic group, while disregarding other house types encountered in the same region or locality.

Giving an example, the famous theme park Taman Mini in Jakarta displays various Indonesian traditional vernacular houses or *rumah adat*, yet, each provincial identity is marked by one style only (Schefold et al, 2008). Thus, when talking about the vernacular house of Borneo (now Kalimantan), many people will consider the Bornean longhouses as the typical structure that widespread in the interior of the island (see Guerreiro, 2004, p.285). In fact, several tribes inhabit the island and produce their own cultures which might slightly different from others, namely the Banjarese society, which reside in the most part of Barito basin, in the Southern part of Borneo Island, and built its own style architecture, the *Banjarese house*.

3.2.1 The Banjarese House

Banjarese house is a typical maritime architecture, which was developed from the Barito basin, Banjarmasin, South Kalimantan Province (Figure 3-6). They are formed as riverside vernacular dwellings of the Banjarese tribe that were built since the Dutch colonization, as a response to the tropical climate of the area (Saleh, 1982; Zohrah and Fukukawa, 2010). The houses grew spontaneously along the river and the central city in the old village (*kampung*), showing the dwelling as a part of a river culture, where the daily activities of the inhabitants depend on the river as a source of drinking water, a place for bathing and washing, transportation, etc.

At present, the Banjarese house is in a state of extinction and experiencing major physical transformations (Figure 3-7). Michiani and Asano (2016) found out that only a small number of the houses remain; mostly in a condition that was different from their initial style and from what the book says about common Banjarese house style. The most famous and common type of Banjarese house is called *Bubungan Tinggi*, nonetheless, not more than 25 houses left throughout South Kalimantan region in 2008, where nine of them are in severe damage resulting only 16 houses can be recognized as the last *Bubungan Tinggi* that exist (Muchamad and Aufa, 2008). The remaining houses are spread across some of the areas of South Kalimantan, such as Keramat Baru, Sungai Jingah, Marabahan, Teluk Selong, Banua Anyar, Kuin Selatan, Kuin Utara, etc.; mainly stand as single buildings and not as a part of a group of houses. This a very unfortunate situation. If the most common style of Banjarese house is already situating in a 'tragic' and critical condition, we can imagine how bad the situation of the infamous ones. The changes in vernacular housing have occurred mainly due to the introduction of new building materials and systems (Viquar, 1998). According to Mentayani (2015), five factors influence the development of vernacular houses to cease: (1) the limited supply of original house materials, (2) the lack of skilled carpenters, (3) the development of newer building materials, (4) change in lifestyle, and (5) the need for more privacy.

Aside from that, a lack of attention from the local government in protecting the traditional houses and a lack of self-consciousness by dwellers has also contributed to the further worsening of the overall physical condition of the remaining houses. The Indonesian governments may actually signal a certain commitment to the architectural heritage of the nations, by opening a traditional houses theme park in Jakarta for example, however, their interest is not followed up with any genuine support of that heritage; if the governments sincerely plan to conserve and restore their heritage, required materials from forests that have become even more distant since the time of the original construction should have been concerned as well (Schefold et al, 2008).

An immediate preservation action is required for keeping the traditional architecture as a part of the habitat of the community (Noviarti et al., 2013). Without protection, the buildings tend to lose their characteristics. Nevertheless, the viability of the traditional structures is governed by motivations and functional considerations of the people inhabiting the house (Hanan, 2010). Furthermore, it should be noted that the absence of a concrete vision for urban planning and development control tools caused the occurrence of physical and social transformation in the area (Hareedy and Deguchi, 2010).

The traditional vernacular house that originally formed as riverside architecture is rare and unique, nevertheless, despite facing major physical deterioration, Banjarese house has not yet been received the scholarly attention they deserve, except local researchers. Moreover, the alarming situation that faces Banjarese houses should have motivated us to do immediate actions to protect the remaining houses. Thus, this 'heartbreaking' condition led us to investigate the Banjarese house.

Figure 3-6. A Preserved Banjarese House in Teluk Selong
(Source: Field Survey)

Figure 3-7. Decayed Banjarese House(s)
(Source: Field Survey)

3.2.2 History of Banjarese House

According to Zohrah and Fukukawa (2010), longhouse[2] has traditionally been a common form of dwelling in the Kalimantan region, built as a part of settlement or village ruled by a chief of each district. In 1526, the chief of one district became the first Banjarese king; this area is now known as Kuin Utara, located at the bank of Kuin River and became the embryo of the city of Banjarmasin. The king's house became the first palace (Table 3-1), but then it had to be distinguished from the ordinary house by attaching special features to the house; this modified house then became the prototype of the *Bubungan Tinggi*, the first Banjarese house (Zohrah and Fukukawa, 2010). As a part of the compound of the Banjarese palace, *Bubungan Tinggi* was built as the central and surrounded by other buildings for nobles and officials, where later became another style of the Banjarese house. The complex of Banjarese palace was surrounded by commoner dwellings, such as maritime traders and craft specialists (Zohrah and Fukukawa, 2010).

In the 16th to 19th centuries, the first king authorized royalty and aristocrats to build their houses in the same style as the palace (Zohrah and Fukukawa, 2010); this is where Banjarese house started to be built outside from the palace compound and mingled together with the ordinary group of houses for the commoner. However, in 1612, the palace was completely burnt by the Dutch colonial, with no remains exist (Goenmiandari, et al, 2010). A new palace was then constructed in a rural district, named Martapura, and continued to rule the Banjarese Kingdom between 17th to 18th centuries before it finally collapsed on 11 June 1860.

After the fall of the Banjarese Kingdom, wealthy citizens started to build any style of Banjarese house and modify the original shape, layout, and ornament according to their taste and preferences (Anhar, 2010). The houses spread throughout the can be found in most of the settlements in mountainous areas, flatlands, as well as along riverbanks throughout the Kalimantan region. As the riverside area became crowded, the Banjarese house later expanded into other areas such as on the flatlands and in the mountains.

In addition, the government system and territorial divisions were changed several times under the Dutch rule, affecting urban character and growth pattern of the Banjarmasin city, such as gridded road system was built replacing the original river way system and relocating houses along the new roads (Zohrah and Fukukawa, 2010). As a result of the cultural transformation and modernization, Banjarese houses are no longer constructed; the local government adopted national strategy to build a million units of small houses for a single-family (Zohrah and Fukukawa 2010) as a more 'suitable' alternative replacement for large space of houses like Banjarese house, especially in the city where the availability of space is limited. Nowadays, many original Banjarese houses have been modified by their owner and thus become contemporary houses. Considering the complicated history of the Banjarese house, no wonder that there are not so many of them left in this region.

[2] According to Vellinga et al. (2007, p.76), the Southeast Asian longhouse is regarded as the most well-known example of community house, which is widespread especially in Kalimantan or Borneo. Typically the Bornean longhouse consists of a number or individually owned apartments, joined by a long gallery and sometimes a veranda.

Table 3-1 History of Banjarese House

	Year	Description	Location
The Longhouse of Borneo		Longhouse as a common dwelling typology in this region[1]	All over Borneo, including Banjarmasin
The Original Banjarese House	1526	The complex of Banjarese palace as the origin[1]	Riverbank, specifically in Kuin Utara
The Development of Banjarese House	16th - 19th	Royalty and aristocrat started to build Banjarese house[1]	Riverbanks, flat lands, mountains
		The Banjarese houses developed together with ordinary house for commoners[1]	
	1612	The palace in Kuin Utara was burnt down[2]	
		A new palace of the Banjarese Kingdom in Martapura	
	1860	Fall of Banjarese kingdom[3]	
		Degradation of owner[4]	
		Commoners who have money started to build Banjarese house[4]	
		Modification of original shape, layout, and ornament of the house[4]	
	Now	People stop building Banjarese house[5]	
		The number of existing Banjarese house is decreasing[5]	

Sources:
[1] Zohrah and Fukukawa, 2010 [2] Goenmiandari et al., 2010 [3]Artha, 1970
[4] Anhar, 2010 [5] Mentayani, 2015

3.2.3 Classification of Banjarese House

The Banjarese house can be grouped into eleven types. The classification considers many elements of the house, such as layout, shape, ornament, structure, and residents (Anhar, 2010) (Figure 3-8). A different class of society resided in each type as shown in Table 3-2. *Bubungan Tinggi*, the most iconic one, which was a part of the palace complex, is where the king and his family resided. This type catches the most attention of scholars who study about Banjarese house, because it is the most common form of construction of the traditional Banjarese house (Zohrah and Fukukawa 2010), nevertheless, there are no more than 25 houses left from all area of South Kalimantan in 2008, where 9 houses are in severe damage, thus only 16 *Bubungan Tinggi* are left (Muchamad and Aufa, 2008).

There are six other buildings that were also a part of the palace complex, resided by royal families, nobles, as well as palace officers: *Gajah Baliku, Gajah Manyusu, Balai Laki, Balai Bini, Palimasan,* and *Palimbangan.* The rest was for commoners, which are *Cacak Burung, Tadah Alas, Joglo,* and *Lanting.* Various kind of the original Banjarese house basically shows the difference in economic and social strata.

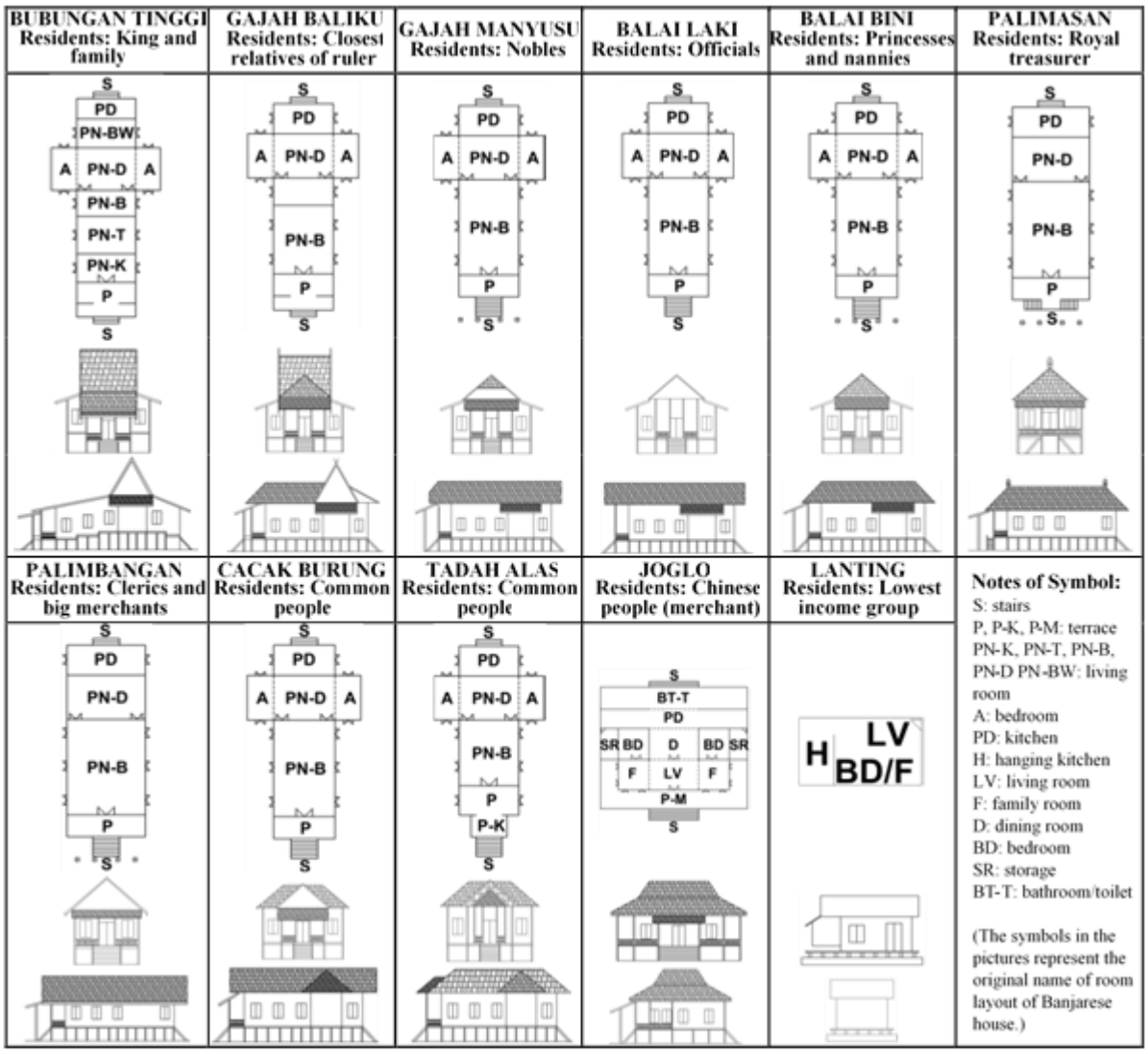

Figure 3-8. Layout and Façade of Banjarese House
(Source: Seman and Irhamna, 2001; Redrawn by Author)

Table 3-2 Classification of Banjarese House

No	Name	Residents	Roof Type	
			Main Roof Type	Others
1	Bubungan Tinggi	King and family	High ridgepole gable	Shed roof
2	Gajah Baliku	Closest relatives of the ruler	High ridgepole gable roof	Gable roof with hip end, shed roof
3	Gajah Manyusu	Nobles	Half-hipped roof	Shed roof
4	Balai Laki	Officials	Gable roof	Shed roof
5	Balai Bini	Princesses and nannies	Gable roof with hip ends	Shed roof
6	Palimasan	Royal treasurer	Gable roof with hip ends	-
7	Palimbangan	Clerics	Gable roof	-
8	Cacak Burung	Commoners	Gable roof	Gable roof with hip ends
9	Tadah Alas	Commoners	Overlapping gable roof with hip ends	Gable roof with hip ends
10	Joglo	Chinese merchant	Rectangular cone-shaped roof (*Joglo*)	-
11	Lanting	Lowest income group	Gable roof	-

(Sources: Seman and Irhamna, 2001)

3.2.4 Room Kinds and Layout of Banjarese House

Different from the longhouse of Borneo that is resided by multiple families (see Guerreiro, 2006), Banjarese house is originally resided by nuclear families. Figure 3-8 shows the type of rooms which can be found in the Banjarese house. Each room has a specific name in Banjarese language. However, we have converted their names into English in order to ease the explanation in this study. Each room will be explained in order by their position, from the front to the back.

Every type of Banjarese house has a certain pattern of room arrangement according to the level of privacy and social sense. Each Banjarese house has two stairs which are located symmetrically in the front and back of the house. Terrace or *palatar* (P) can be found as the first room, just after the front stairs, as a space for public or welcoming guests. In addition, the terrace of Banjarese house reflected an adaptive response to the wetlands; doing activities in a wet yard is not possible, thus terrace provide the function for it (Mentayani, 2008a). Some Banjarese houses have special terrace: P-K (*palatar kacil*) which can be translated as small terrace can be found in the *Tadah Alas* type, while P-M (*palatar muka*) or front terrace can be found in the *Joglo* type.

Each house has some similarity in layouts between others, most are crossed shape. The room layouts for *Gajah Baliku*, *Gajah Manyusu*, *Balai Laki*, *Balai Bini*, and *Cacak Burung* are similar. As for *Bubungan Tinggi*, the layouts are almost the same except for the living room or *panampik* (PN), which has not only PN-B and PN-D but also PN-K/PN-T/PN-BW. *Panampik* (PN) is the space next after terrace which is designated as a gathering space inside the house or living room. PN or living rooms in a Banjarese house are divided into several rooms, the farthest the room from the front door, the higher the hierarchy is. Among the other rooms, PN-D has the highest hierarchy, in other words, the most important space of the house designated for the family. Aside from PN-D, other PN rooms are designated from guests; the higher the status of the guests, in the higher hierarchy of room will they be received.

Different from the usual cross shape of the other Banjarese houses, *Palimasan* and *Palimbangan* do not have *anjung* (A) or bedroom, thus their shapes are rectangular and both have the same room layouts. Aside from both types, A of a Banjarese house is located next to the PN-D or family room. They are located on the side part of the house, both on the right and left side. The right one is the parent's bedroom, while the left one is for the children. The next room is the kitchen or originally named as PD (*padapuran*). It is located at the hindmost part, just before the back stairs.

Joglo, which adopt the traditional Javanese style house, has a completely different shape and room layout from the others. *Lanting* is also completely different, which has the simplest layout and consists of a living room, family room, bedroom, and hanging kitchen.

Banjarese house is typically a one-story building. There is no predefined size for a Banjarese house[3]; it depends on the owner's preference. Those located in rural areas tend to have larger space than those located in the capital city, which is relatively small and compact in scale (Zohrah and Fukukawa, 2010).

3.2.5 Characteristics of Banjarese House

Eight characteristics of the Banjarese house are defined as below (Seman and Irhamna, 2001):

(1) Wooden house
Timber is a material of surroundings that can be found easily in Kalimantan forest, as the main material for Banjarese house (Figure 3-9). Some important wood for constructing a house is (i) *ulin* wood (used for pillars, girders, tie beams, floorboards, stairs, etc.) and (ii) *galam* wood (used as the lowermost foundation, planted into the ground). Timber in its various forms provides one of the most important, longest-used, and most durable kinds of building material which combine compression strength with elasticity and tensile strength (Oliver, 1987, p.89).

(2) Stilt house
Wooden poles that support the house as a foundation, consists of the lowermost one made of *galam* and the upper made of *ulin*. There is no standard for the floor height from the ground, commonly around 1-2 meter, in order to anticipate flood (Figure 3-10). The stilt houses are connected to each other by wooden walkways that are also built on pillars above the water (Zohrah and Fukukawa, 2010).

(3) Symmetrical layout and façade
The room arrangement of a Banjarese house is symmetry and mostly form a crossed-shape plan. The symmetrical façade is formed by the façade elements, such as door, windows, fence, stairs, and so on.

(4) *Anjung*
Anjung is a sleeping place, located symmetrically on both the right and left wings of the house. However, not every type of Banjarese house has *anjung.*

(5) Roof covered by *sirap* (a high-quality wooden roof) or palm leaf.
Sirap (shingle), a high-quality roof for a permanent building in Kalimantan, made of special timber called *ulin* (Figure 3-11). Thatch, another roofing material, especially for emergency building and ordinary house in villages.

(6) Two stairs
Banjarese house commonly has two stairs at the front and back of the house and located in the middle axis of the house.

(7) Two access doors
Banjarese house commonly has two access doors at the front and back of the house and located symmetrically in the middle of the main axis of the house.

(8) *Tawing halat*

[3] Vernacular architecture is seldom based on precise measurements; human proportions are commonly the source of the measurements (Oliver, 2003).

Tawing halat a dividing wall between the front part and the main room. It has symmetrical twin doors on the right and left.

Like other traditional vernacular architecture, Banjarese house has many terminologies to address its components to ensure that the necessary materials and component parts are obtained and the methods used can be described and can be passed to the next generation. Naming the parts maintains the stability of tradition, where it can indicate modifications and variants (see case study in Kipsigis, Kenya by Oliver, 1987).

Figure 3-9. *Galam*, Banjarese Houses' Material
(Source: Field Survey)

Figure 3-10. Stilt House
(Source: Field Survey)

Figure 3-11. Shingle Roof
(Source: Field Survey)

3.3 Literature Review

Most studies on Banjarese house are discussing on *Bubungan Tinggi* or high ridge house, which was originally built as the central building of the palace for the king to reside, thus among the other style, Bubungan Tinggi is regarded as special and has the highest value. Zohrah and Fukukawa did several studies on this type, investigating its formation in relation to river network evolution (2007) and evaluating its characteristics as a cultural heritage to understand its importance (2010). Zohrah (2012) conducted another study to analyze the formation of Banjarese neighborhood in Kuin Utara in terms of kinship group that developed from *Bubungan Tinggi*. The result showed that unaltered *Bubungan Tinggi* has the opportunity to return the original quality of life with the rest of the urban fabric, while those that were modified for use by a single-family along with several new housing units can have the properties of the old one by promoting design principles approach to the local society.

Muchamad and Aufa (2008) collected data on existing *Bubungan Tinggi* houses from all over South Kalimantan to study their characteristics, aiming to propose possibilities for reconstructing the first Banjarese palace. Mentayani (2008a) analyzed the historical process and product of *Bubungan Tinggi*, including room, structure, wooden construction, as well as ornaments. The result showed that Islamic religion, Malayan ethnic, and natural condition influence the housing process and the character of *Bubungan Tinggi*. However, Mentayani did not discuss the changes that happen in the development of *Bubungan Tinggi* (Mentayani, 2008a).

Some scholars also carried out studies on *Lanting* or the Banjarese floating house. Dahliani et al (2015) investigated the changes in expression of floating house towards the river in terms of physical aspects. Mutia and Dahliani (2014) also carried a study on Banjarese floating house, aiming to analyze the living preferences of the dwellers in a *lanting;* the result shows that there is a possibility to preserve the existence of current houses by upgrading the building and environment condition of the *lanting* house. Afdholy (2017) also conducted a study on the *lanting* house to identify factors that cause its loss, however, he only presented physical factors without relating it to cultural process.

Another study on Banjarese house was conducted by Mentayani (2008b) that discuss the similarities between Banjarese houses of Banjarese and Bakumpai tribes in South Kalimantan. She surveyed on several houses and found out that the Bakumpais has similar style of houses like the Banjarese: *Bubungan Tinggi*, *Balai Bini, Palimasan, Cacak Burung*, dan *Joglo.* The investigated houses had similar room arrangement, roof structure, and form and shape. However, she only analyzed physical features, not relating it to socio-cultural explanations.

Most of the studies only focus on either historical or physical aspects of the Banjarese house as an admiration of the design, while only a few analyze the relationship between house and socio-culture. Those which analyze the contribution to contemporary and future purpose are even rare. To the best of our knowledge, none of the prior studies discuss on the relationship between the development of physical features of Banjarese house and cultural process its inhabitants, for the purpose of formulating detail strategy to preserve the existing housing through physical assessment.

We previously published two academic papers related to the Banjarese house. The first one (Michiani and Asano, 2016), which was published in 2016, discussed the influence of inhabitant background on the development changes of Banjarese house. Using the same case study, a deeper analysis on the historical development of house component, room arrangement, and form was discussed in the second paper (Michiani and Asano, 2017); the overall condition of the houses were assessed and the results were examined using SWOT method to estimate the possibilities for preserving the houses. The discussion of this chapter will refer to our previous publications while upgrading the analytical discussion by using a more detail physical assessment and proposing standard guidelines for preservation.

3.4 Method and Limitation of the Study

This topic is a continuation of our previous works for Master Degree studying on the current situation of Banjarese House in the context of preservation. The same raw data was used in this study, where general information of the target location along the Kuin Riverside in Kuin Utara sub-district was acquired. The observation of target houses, which were chosen up to the fourth layer as a maximum from the main road, indicated that only thirteen remaining Banjarese houses were still occupied. Integrative research approaches were held to gain the data by field survey, observation, and interviewing. The dwellers from the target houses were interviewed by using questionnaires, consisting of questions about their construction and renovation chronologies: year, reason, shape, and size. Building condition was also examined by measuring, sketching, and taking photographs. In further investigation, only 11 houses were available to be studied and are indicated in this paper with the alphabet letters *a* - *k* (Figure 3-12).

Differ from our former research, this study emphasizes the condition of physical features that are considered essential to determine the value of a Banjarese house. This study proposes a basic assessment of vernacular houses in general. The target houses will be observed, scored, and classified according to their grade (Figure 3-13). The classification will determine what kind of protection action is fit for each group. However, we understand that the complex history and amalgamation of cultures that shape the Banjarese house resulting in many variations through the region. Considering this, the term 'authentic' and 'inauthentic' is irrelevant to the address all the variations of Banjarese house, rather the term 'earlier example' or 'later example' is more appropriate for classifying the house.

The protection action is expected to contribute to improve and revive the riverside area. However, in this study, the building's evaluation is limited to physical observation, or what it is called as architectural assessment, as the first step investigation, where academics, as well as non-profit organizations who concern about vernacular settlements, can propose an improvement project with less complicated procedures.

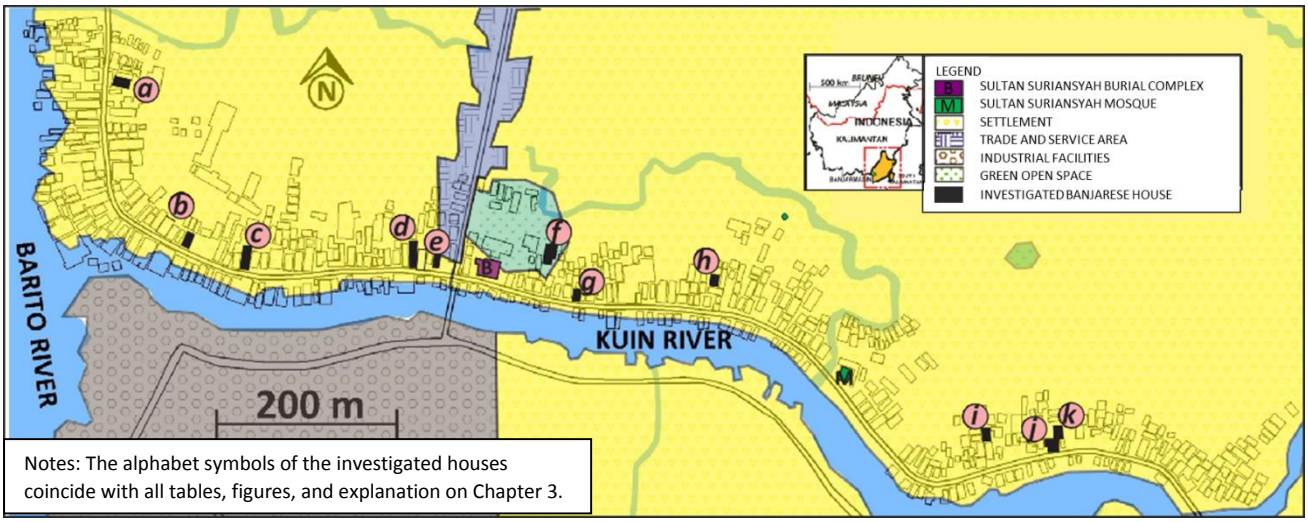

Figure 3-12. Target Location
(Drawn by Author)

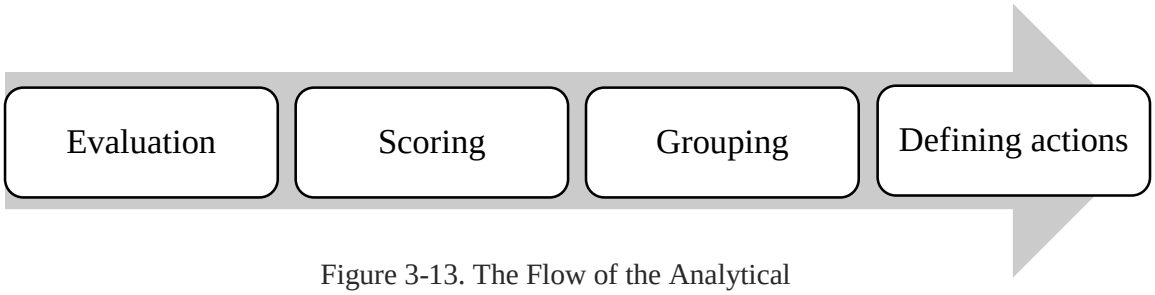

Figure 3-13. The Flow of the Analytical Process

3.5 Field Investigation

3.5.1 Architectural Features

Investigating the condition of house features is an important part to determine the value of a Banjarese house. Referring to the eight characteristics of the Banjarese house classified by Seman and Irhamna (2001) mentioned in the previous section, the current condition of the target house's authentic components will be examined. For an easier understanding, this study classifies the physical features into five: material, form and shape, façade, layout or space, and ornament.

3.5.1.1 Material

The Kalimantan region is blessed with abundant and prosperous tropical rainforests, which indeed produce sufficient timber for human use. Therefore, the typical building material of an initial Banjarese house is timber, specifically *ulin* (Eusideroxylon Zwageri). *Ulin* is one of the most durable timbers and an excellent quality local wood, which was chosen as the primary material for most of the house elements, including foundation, floor, and the wall (Figure 3-14). Moreover, wooden is a porous and lightweight material that is suitable for an environment with tropical-humid climate and swampy soil (Purwanto and Darmawan, 2018). However, in the present day, the availability of *ulin* has decreased, and its price is relatively high. Forest clearance has accelerated since 1970, mostly related to the cutting of trees for timber production, especially for export, and land clearing for creating living space for transmigrants from the densely populated islands of Java, Bali, and Madura (Petersen, 2000). Sadly, afforestation action to replace the rainforest has not yet been afforded.

For that reason, *ulin* is no longer preferable; people, in general, use another material for building a house instead. The scarcity of these wood resources also affects the condition of the Banjarese house. Despite the bad state of the remaining Banjarese houses, *ulin* can be found as housing foundations and floors. The observation reveals that in spite of the high price, the usage of *ulin* for foundations and floors is a reflection of its high-capability to bear the load of the building and its ability to adapt to wet soil. Nonetheless, outer walls do not need any specific material. There are many options for substituting *ulin*, thus, the dwellers tend to use cheaper wall material for renovation, such as different types of timber for outer wall or cement board (kalsiboard) for the inner wall (Figure 3-15). Some also use asbestos or zinc as a wall, especially for WC/bathroom.

Figure 3-14. Wall Made of *Ulin* (House *k*)
(Source: Field Survey)

The observation on flooring materials is quite interesting. The original wooden structure is still used for flooring, however, for the interior, the current inhabitants mostly use patterned plastic sheets to cover the wooden floor to ease cleaning or as decorations. In the case of decoration, we can see that there is a change in perceiving the sense of beauty; exposing natural wooden material is no more attractive, but covering it with sheets is beautiful. However, the deteriorating condition of original flooring might also trigger the dwellers to cover it with something nice.

One particular characteristic of the Banjarese house is that its roof is enclosed with *sirap,* a high-quality wooden roof made of *ulin*; some alternatively use palm leaf. Due to natural degradation over time, the material should regularly be changed in the range of five and ten years (Seman and Irhamna, 2001). However, the rare and pricey *sirap* in today's market generates alternatives for roofing material. The current residents tend to choose a cheaper material for renovation, such as zinc (Figure 3-16). Among our target houses, only one house is still using *sirap* to cover some parts of its roof (house *f*).

Combining tensile and compression strength with elasticity, timbers provide one of the most important vernacular building materials in the world, however, as they are subject to rot and vulnerable to fungi and fire, they have to be selected and used carefully (Vellinga et al., 2007). This shows that most societies using timber have already acquired and mastered the skill and knowledge of 'timber technologies' to utilize it as a building material. In addition, the selection of the material of original Banjarese houses was responsive to what is called as 'existential context' or constraints such as climate, topography, availability of material, and so on.

Figure 3-15. Cheaper Wood for Wall (House *i* and *f*)
(Source: Field Survey)

Figure 3-16. Cheaper Material for Roof (House *c*)
(Source: Field Survey)

3.5.1.2 Shape and Form

The house plan of most Banjarese house forms a cross shape. It is expected that the meaning of the house form is influenced by the culture and belief of the old Banjarese Kingdom. The field survey clarified that all existing Banjarese houses in the study area were classified as the crossed-shape type: Bubungan Tinggi, Balai Bini, and Balai Laki. However, many of the current houses had transformed into different shapes. Some houses had undergone loss of their part due to land dispute or road construction, while some suffered from self-destruction due to lack of maintenance. On the other hand, there were some houses that encountered no particular change on the exterior shape and could still be identified as a cross shape with a moderate change, such as house *b*, *g*, and *h*. The observation shows that self-destruction or modification by the owner has altered the authentic forms of all of the remaining Banjarese houses.

Tropical wetlands are the characteristic of the soils in Kalimantan, as a result of alluvial deposits formed by Barito and Martapura Rivers (Dahliani, 2012). The area is drenched with water, either permanently or seasonally. To adapt to the soil condition, buildings in the area should be supported by pillars on the bottom side to keep them above the water level, creating a hollow beneath the buildings. This is an effective method to reduce the dampness of the house so that the durability of the building's structure will be increased (Anhar, 2010). Using a pillar structure allows air circulation under the house, so that accumulated heat can be removed (Purwanto and Darmawan, 2018). Moreover, by erecting the structure from the ground, the soil beneath the building is able to absorb run-off water on its surface and prevent from the flood (Dahliani, 2012); this region is a low-risk flood due to the ability of the land to absorb water and the post structures of the buildings. Hence, all initial Banjarese houses are categorized as stilt houses, as they are supported by pedestals as well. Pile dwellings, which are responsive to the natural condition[4], show good examples for modern architecture, yet they have never been adopted for practical purposes.

The investigation of the current houses reveals that despite the bad condition, the pillar structures remain the same. However, the hollows become smaller due to the piles of garbage dumped beneath the houses (Figure 3-17). The Banjarese traditional house can also be easily identified from its roof shape. Despite the current physical condition, the roof structure of most investigated houses remained the same. Three houses even lost half of their mass, either front or back part (Figure 3-18), but could still be identified from the roof shape. Unfortunately, those three houses were the only three earlier examples

[4] Pile dwellings, characterized by the use of timber posts and a raised floor that creates a void between the occupied structure and the ground, can be found mainly in tropical areas due to advantages it offers in terms of ventilation and cooling, as well as protection against insects, wild animals, and flooding (Vellinga et al., 2007, pp.74-75).

Figure 3-17. Pile of Garbage beneath House *d*
(Source: Field Survey)

left our target area. Preservation action is possible for house *f* and *k*, but not for house *j*, whose front part disappeared due to local road construction.

Figure 3-18. Loss of Building Mass (House *f*, *j* and *k*)
(Source: Field Survey)

3.5.1.3 Façade

A Banjarese house can be distinguished from its particular façade, including roof, stairs, fence, poles, doors, and windows that are arranged in a symmetrical balance between the right and the left parts. The façade features of initial houses, such as stairs steps and window components have a particular number. These rules, however, are no longer applied in the investigated houses. The design of vernacular dwellings is adjusted to dwellers' taste (Oliver, 1987), thus, the design of every Banjarese house also slightly differs from another and be varied in each area.

The facade of most investigated houses has been replaced by a non-symmetrical one. This indicates a change in the taste of the current inhabitants and 'abandonment' of cultural rules. However, as we already discussed in the historical background of the Banjarese house, political changes in the earlier time have affected an 'instability' of the design. Hence, modifications and variations of Banjarese houses –even in the earlier styles—can not be avoided.

Figure 3-19. Façade Modification (House *b* and *g*)
(Source: Field Survey)

Having two stairs, one at the front and one at the backside of the house, is one of the distinctive features of the Banjarese house. Differed from ordinary stairs, the stairs in the Banjarese house have some special rules such as the number of steps and are placed right in the middle of the central axis, as a connector of the outside (lower ground) and inside (upper level). The front stairs are attached to the veranda, which is enclosed by a fence. However, as the lower ground becomes higher due to some sedimentation and pavements, the function of both terrace and the stairs lose value. The recent dwellers tend to reconstruct the front stairs as conventional ones and move the position, resulting in that they can no longer be classified as Banjarese stairs. Conversely, the back stairs of the present house have ceased to be of importance as they no longer play a major role.

In accordance with the stairs, the authentic Banjarese house has only two access doors: one front door and one back door, which connects the house and the outside. The doors are placed in parallel in the same axis as the stairs. The observation exposes that all front doors have been modified. They have been moved from their original position to the side of the façade or side of the house (Figure 3-19). Conversely, similar to the back stairs, the back doors have perished due to their de-functioning.

The back stairs and the back doors connect the kitchen and the outside. This indicated that they have a private function. To put it differently, they are designated as private access for the residents to enter and go out of the house without being noticed by a guest or the public. Nevertheless, because of the growth of settlements, the houses are built closer to one another than in earlier days. To adjust with this situation, the back access of most houses has been sealed, and in some houses, it has been moved to the side door. Based on the review, it can be noted that the disappearance of the back elements showing the change of the house orientation that the back part of the house is no more substantial in today's situation.

The investigation of the target houses showed that only one house expressed a high quality of earlier example (house *k*), despite its poor condition due to aging, while two houses (*b* and *g*) expressed the effort of their owners to preserve the façade. The façade of two other houses were 'too simple', while the rests are either destroyed or blocked by additional house massing or in a total loss.

3.5.1.4 Layout

It is important to study not only the form and meaning of dwellings but also examine how the form is used by people at different stages in their life cycle and throughout the history of the building (Kellett and Napier, 1995). We obtained information about the chronological building transformation from oral history; no written evidence exists. Figure 3-20 and Figure 3-21 show the comparison between the existing house layout and its authentic form, revealing that all of the houses have been modified. House type *a* is *Balai Bini*; this house lost its right *anjung* (bedroom) due to a land dispute. House *b* is also *Balai Bini*; there is no particular change in the exterior shape. The initial form of house *c* is quite different from the common *Balai Bini*. There are many changes in the house *d*. *Anjung* has disappeared; this house was also divided into three parts resided in by family members. As for house *e* (*Balai Bini*), the rear part has vanished. The house shape does not look like a cross anymore. The front parts of house *f* cannot be located while the other parts remain intact. There are hardly any changes in house *g*; only several room divisions and the addition of a bathroom/WC. House *h* still represents a cross shape, but some rooms have been divided into smaller ones. In the house *i* (*Balai Bini*), the back part had perished and was restored with a bathroom/WC as a new function. As for house *j* (*Bubungan Tinggi*), the front part was destroyed due to the construction of a road. House *k* suffered from self-destruction in the middle and back part as it was once abandoned.

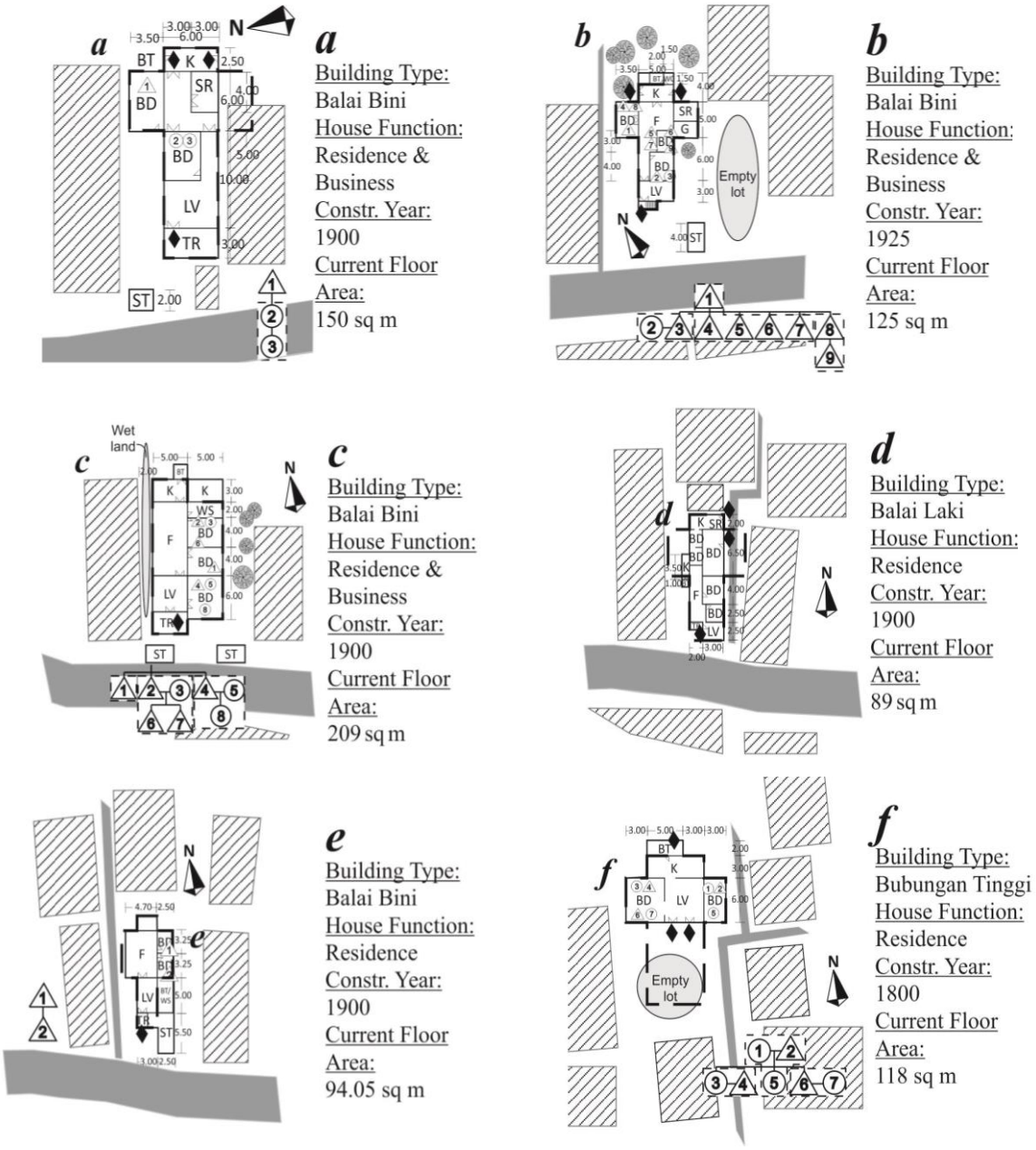

Figure 3-20. Investigated House Profile (1)
(Drawn by Author)

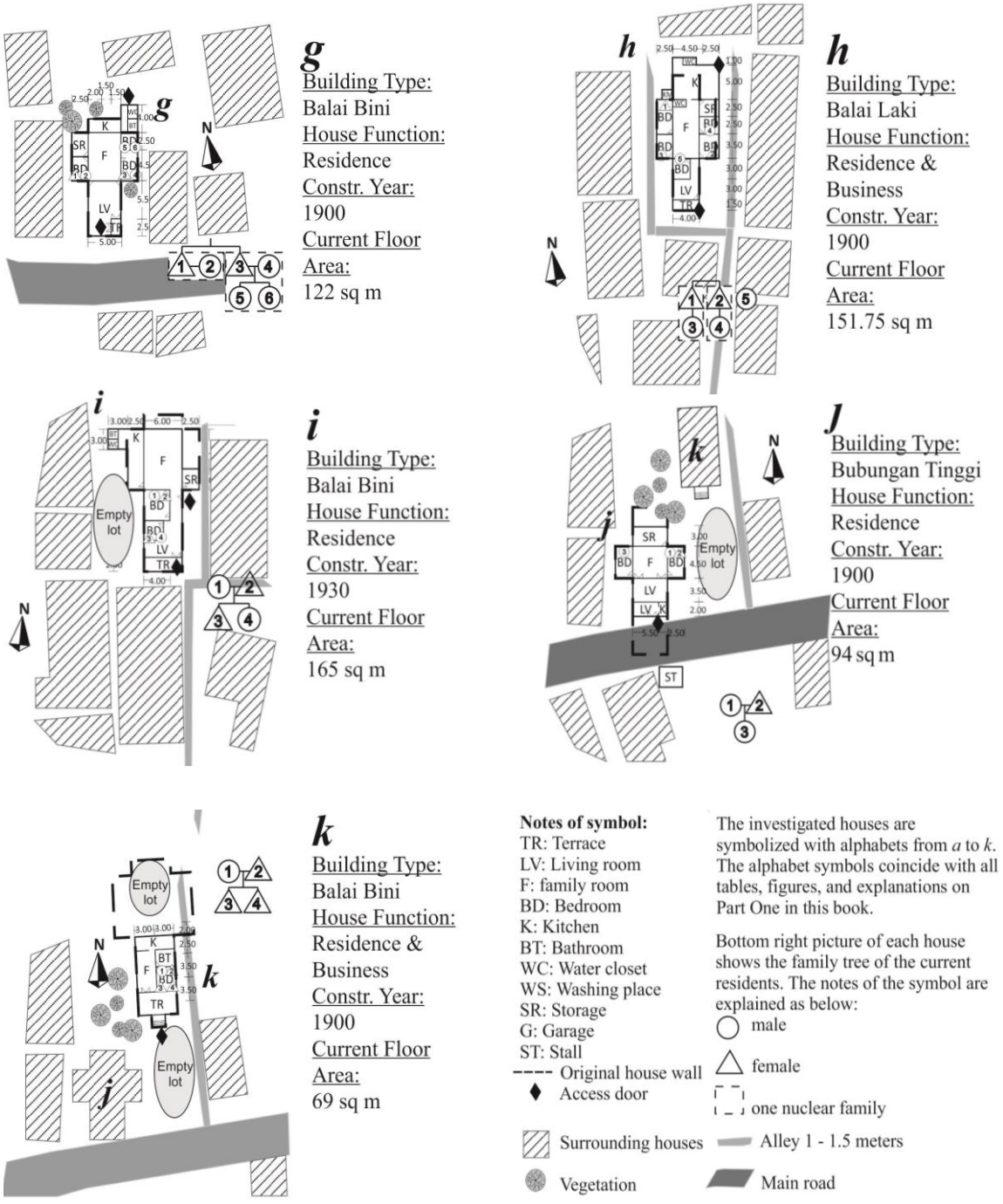

Figure 3-21. Investigated House Profile (2)
(Drawn by Author)

Figure 3-22. Business Space in Front of House *e*
(Source: Field Survey)

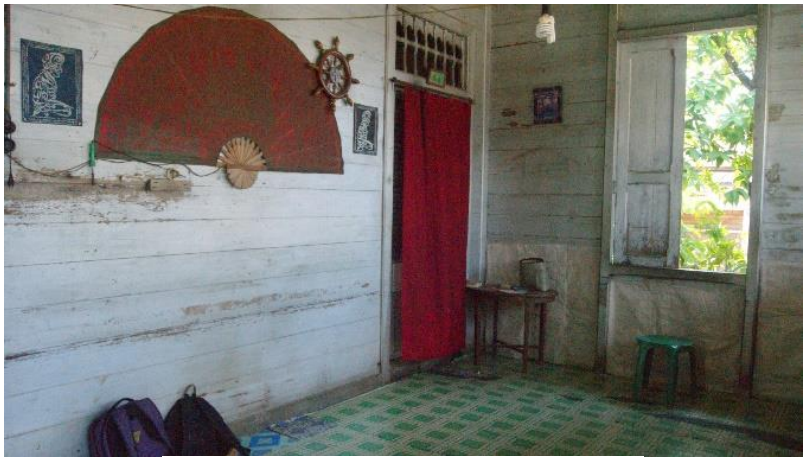

Figure 3-23. Living Room (House *b*)
(Source: Field Survey)

A plan, or the layout of a building at ground level, is influenced by environmental and cultural factors, as well as the capabilities and constraints of construction materials and technologies (Vellinga et al., 2007, p.68). In the authentic floor plan, Banjarese house consists of two bedrooms, called *anjung*. Attached symmetrically on the right and left of the house, *anjung* is formerly built for the purpose of sleeping spaces. *Anjung* still exists in most of the current houses, however, due to the current need of the residents, some of them are divided into smaller rooms. The need for a greater number of spaces has generated the alteration of *anjung*. Additional sleeping spaces can be found in some current houses. This phenomenon reflects the different needs and privacy requirements of the residents. People started to see sleeping rooms as individual accommodation space.

Near the end of the 20th century, people started to build a bathroom and water closet, as well as a plumbing system. The early inhabitants of the settlements went to the river for bathing and urinating. However, people started to think about privacy and hygiene, so they moved these activities away from the river into the house. Moreover, building a private bathroom and water closet inside the house is more convenient compared to going to the river. Aside from bedroom and WC, other functions were also added such garage, storage, and as well as business space or stall (Figure 3-22).

There is a tendency of the development of the houses towards functionality, which is to say that every room will be occupied optimally to prevent any room from being useless. Some rooms may be modified to accommodate every function needed. The layout of the current houses was various, but the room arrangement was basically following the level of privacy. Rooms which are designated for public,

such as stall, terrace[5], and living room, are located in the front part of the house, while the semi-private area, the family room (F), that provide space for family for gathering and relaxing is placed in the middle of the house (Figure 3-23). Private space or the bedrooms were initially placed on the side part of the house. However, nowadays, bedrooms expanded to the middle or front part as well (Figure 3-24, Figure 3-25). In Indonesian culture, the service area such as kitchen and washroom should be placed in a hidden spot, in the back part of the house (Figure 3-26).

The room layout of the investigated house was mostly either in medium or severe damage, while few alterations of the room configuration can be identified in two houses (house *f* and *k*); despite the severe damage both house form, room layout was not altered so much.

[5] The terrace or veranda, is a feature of vernacular traditions in many parts of the world to adapt with the climate conditions, as well as providing social function: facilitating circulation between the outside and inside of a building, serving communication, hospitality and work purposes according to need (Vellinga et al., 2007, pp.90-91).

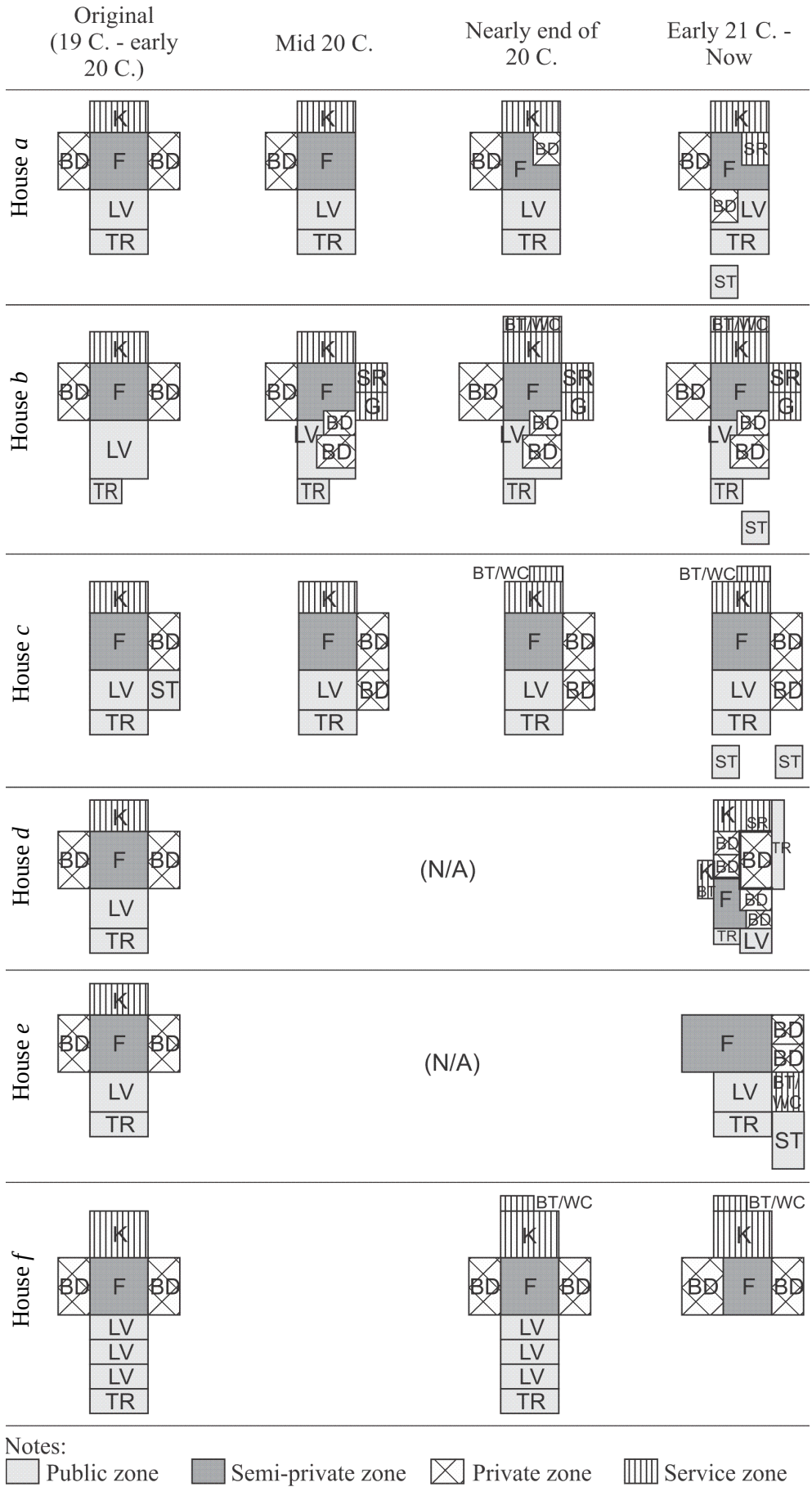

Figure 3-24. Spatial Transformation Process (1)

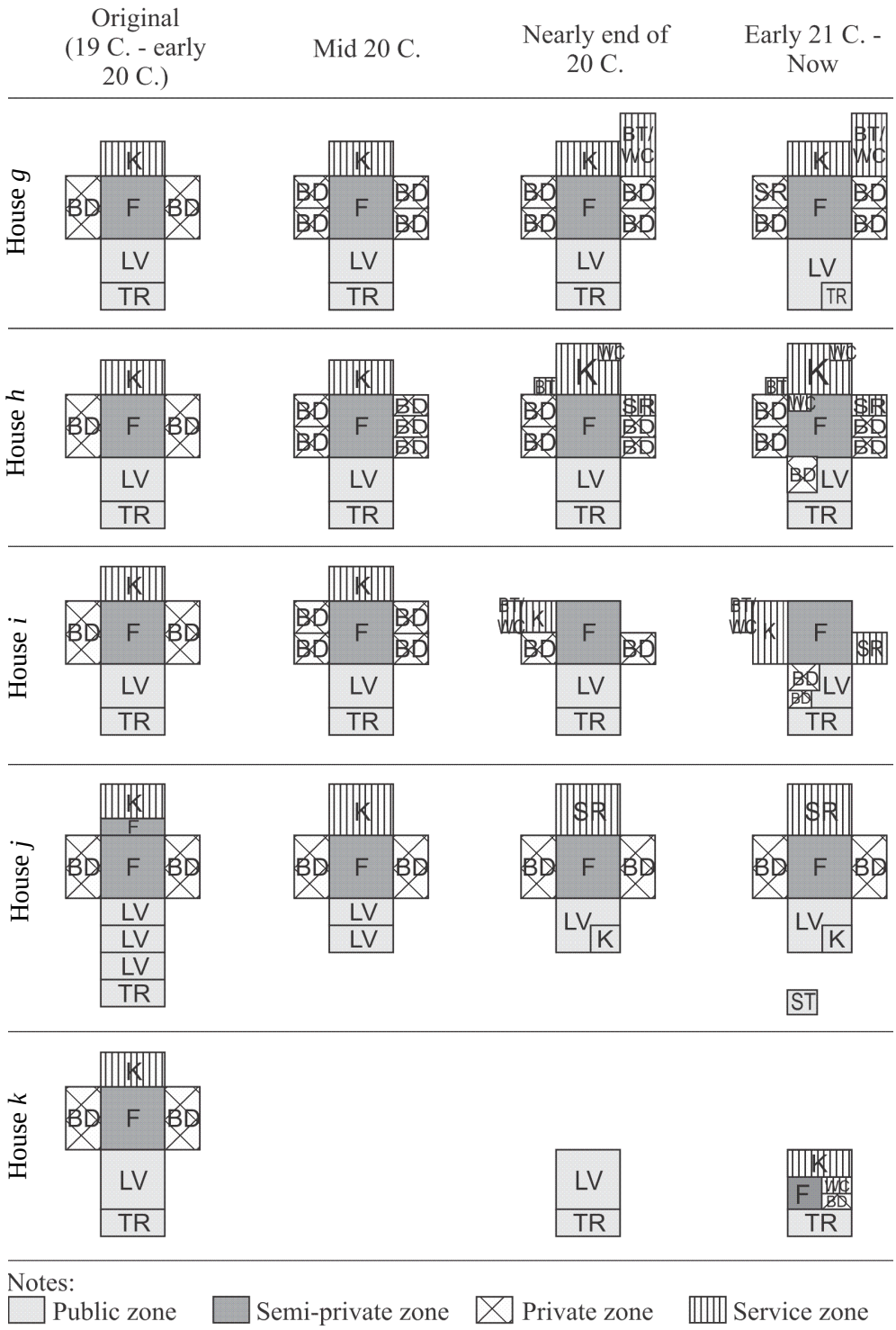

Figure 3-25. Spatial Transformation Process (2)

Figure 3-26. Kitchen (House *f*)
(Source: Field Survey)

3.5.1.5 Ornament

Banjarese houses are decorated with ornaments on both exterior and interior, as a means to express the house owner's taste and to attract guests. Every ornament of Banjarese house has philosophical meaning that reflects the cultural value of old Banjarese society (Seman and Irhamna, 2001); meanings depend on social and historical contexts of an area and emanate from the shared of the human experience of natural phenomena (Vellinga et al., 2007, p.102). In addition, the ornamentation of vernacular buildings is generally restricted to specific elements that are considered relatively important and viewable (Vellinga et al., 2007, p.104).

Roof ridge cresting and roof trim with a unique design that beautifies the house façade were found in some investigated houses (Figure 3-27). A distinctive design of balusters decorated the fence of initial Banjarese houses. However, only two existing houses decorated with Banjarese style balustrades. Ventilation is one important component in a tropical environment, which allow air circulation and reduce the heat temperature inside the house. Having decorative grille for house ventilation above the windows or doors is one of the characteristics of Banjarese house, yet, it could be seen in only a few observed houses (Figure 3-28).

Take a look inside Banjarese house, a special wall named *tawing halat* is decorated beautifully with ornaments and built as a background for living room. *Tawing halat* is a dividing wall between the front parts (PN-B) and the main room (PN-D) of the house that features symmetrical twin doors on the right and left. This wall represents a gate to enter the inner part of the house and a background for the living room (Seman and Irhamna, 2001). In the early Banjarese house, *tawing halat* would be decorated beautifully with some ornaments to symbolize the status and the interest of the house owner (Seman and Irhamna, 2001). This special wall stands alone with no other wall attached to its surface. The current *tawing halat*, however, have either disappeared or been modified into an ordinary wall (Figure 3-29). This expressed that the present inhabitant tends to simplify the house components, from a decorated symbol to a simpler and more functional component. The observation shows that the original decorative exterior can still be identified from six out of eleven houses, while interior's ornaments can be found in two houses only (house *j* and *k*)—although there were in bad condition.

Figure 3-27. Roof Ornaments (House *d*)
(Source: Field Survey)

Figure 3-28. Front Door Ventilation (House *k*)
(Source: Field Survey)

Figure 3-29. Modified *Tawing Halat* (House *f*)
(Source: Field Survey)

3.5.2 Inhabitants' Influence on Building

3.5.2.1 Household

All inhabitants of the observed houses are Banjarese Muslim. The former Islamic Banjarese kingdom that was settled in the area of Kuin Utara had a great influence on the beliefs of the locals, resulting in a domination of Banjarese Muslims inhabiting the riverside area of the Kuin Utara. According to Leirissa (1996), in the 17th century, the Banjarese Kingdom became the largest Islamic kingdom in Indonesia. This Islamic background has affected the socio, economic, and cultural aspects of Banjarese people that are reflected in their daily life, in their social interaction with neighbors, as well as in the ornaments of their house. According to our interview, the social interaction in this area is relatively high, which is likely influenced by religious factors and status of Kuin Utara as a historical and cultural village.

The investigated Banjarese houses had been existed for more than 50 years and were constructed around 1800-1900. Most of the current dwellers had been residing since birth, in the house that was passed from generation to generation. However, according to the interview, the ownership of most houses was still assigned to the parents. This kind of phenomenon is common in developing countries. In most cases, informal agreements play a more important role in securing tenure than titling (UN-Habitat, 2006). The importance of land tenure and freehold ownership will only increase as income increases (Turner and Fichter, 1972). Therefore, no matter whose name is written in the certificate of ownership, the current residents can still live their life.

On the basis of the number of members, a household can be classified into three types: small family (1–4 persons), middle-sized family (5–7 persons), and big family (more than 7 persons). Half of the respondents lived in a small-sized family (45.5%), while the rest were middle-sized (27.3%) and big-sized household (27.3%). It is common in the Indonesian culture to live in the parent's house even when they have become a parent themselves. The investigation shows that some households live as a nuclear family (54.5%) while some others live with their extended family (45.5%), which may include grandparents, siblings, cousins, and so on. This shows a shift of residing in Banjarese house from a single-family in the past to more than one households in the current days.

To accommodate all household member living together, some people extended the size of their house. However, the density of the area makes it difficult for some others to expand their house horizontally. The houses were built next to each other without any clear land border. Most of them do not have sufficient barrier, neither by a house yard or fence, some of them are separated only by small alleys. Moreover, extending their house might be costly for some people, so, they divide the existing house into some smaller rooms. For some people, the cheapest way is combining several purposes in one room, such as transforming the living room into a bedroom at night. This indicates that the number of family member influences the transformation of the house layout and room function.

3.5.2.2 Economy

Primarily, the predecessors of riverside society worked as fishermen or water-related occupations. As time has passed by, more job varieties have become available. People started to change their work field which is more promising in the context of income. Most of the inhabitants work in the informal sector (81.8%) as a motorcycle taxi driver, tomb guardian, vendor, mosque committee member, craftsman, broker, boat guard, and boat driver. However, the change of jobs of 'riverside dwellers' in the target area is not only due to the 'unpromising' water-related occupations, but also the result of public road construction, that cut off the direct connection from the houses to the river, resulting a shift of attention and orientation from water to land. This result shows that infrastructure has a huge role in directing the character of an environment, either leading it into a negative or a positive way.

According to Statistics of Banjarmasin (2017b), the average monthly expense per person of Banjarmasin City in 2017 is IDR 1,581,972, while the minimum wage is IDR 2,290,000 (Statistics of Banjarmasin, 2017a). The result shows that 72.7% of the family backbones' income was below the

Table 3-3 Socio-cultural and Economic Background of Inhabitants

	Description			House Code											Total	
				a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*		
Household	Year of Construction	Around 1800							○						1	(9.1%)
		Around 1900		○		○	○	○		○	○		○	○	8	(72.7%)
		After 1925			○							○			2	(18.2%)
	House and Land Ownership	Parents		○	○	○	○	○		○		○			7	(63.6%)
		Head of household							○		○		○		3	(27.3%)
		Rent												○	1	(9.1%)
	Origin	Original resident		○	○	○	○	○	○	○	○	○	○		10	(90.9%)
		Different village, same city												○	1	(9.1%)
	Family Type	Nuclear				○			○	○		○	○	○	6	(54.5%)
		Extended		○	○		○	○			○				5	(45.5%)
	Family Size	Small (1-4 persons)		○				○				○	○	○	5	(45.5%)
		Middle (5-7 persons)							○	○	○				3	(27.3%)
		Big (>7 persons)			○	○	○								3	(27.3%)
Economy	Income	< IDR 1,581,972*		○	○		○		○		○	○	○	○	8	(72.7%)
		IDR 1,581,972 - 2,290,000						○		○					2	(18.2%)
		> IDR 2,290,000**				○									1	(9.1%)
	House Function	Residence					○	○	○	○		○	○		6	(54.5%)
		Residence and business		○	○	○					○			○	5	(45.5%)
	Aspiration to Move	Yes/no	Yes	○	○							○		○	4	(36.4%)
			No			○	○	○	○	○	○		○		7	(63.6%)
		If yes, why?	Economic	○	○										2	(50.0%)
			Better dwelling									○		○	2	(28.6%)
	Desire to Preserve	Standard		○						○			○	○	4	(36.4%)
		No idea			○	○	○	○	○		○	○			7	(63.6%)

Notes:
*IDR 1,581,972 is the average monthly expense per person in Banjarmasin City (Statistics of Banjarmasin 2017)
**IDR 2,290,000 is the minimum wage of Banjarmasin City in 2017

average monthly expense per person, while 18.2% obtained income more than the average expense per person but under the minimum wage of Banjarmasin (Table 3-3). An inhabitant who earns less than the average monthly expense per person can be classified as a very low-income class, while those who acquire higher than the average monthly expense but lower than the minimum wage can be labeled as a low-income class.

As explained before in the introductory of Banjarese house, after the fall of the Banjarese kingdom, rich merchants started to build their own style of Banjarese house. In other words, the original owners of the target houses were wealthy people. But, why do the current residents live far from prosperity? The explanation might be related to dwelling location and job opportunity. Located in the outskirts of

Figure 3-30. Economic Activities at Home
(Source: Field Survey)

Banjarmasin city, the riverside area offered less opportunity for employments. Especially occupation that engages to the river seemed less encouraging to support their financial condition. Also, due to the decrease in human activities towards rivers, job occupancies related to rivers become less. This also affects the amount of salary for river workers, where river-related workers earn less than being an officer or doing an entrepreneur on land. Unless local governments support river activities as it was in the past, river workers will keep facing economic difficulties. To overcome the situation, some people started to do business at home that changes the function of the house from dwelling purpose to business-residence purpose (Figure 3-30). Unless they found work with a stable income, their economic might will not surpass the minimum wage.

Despite the poor economic condition that they had to face, given a choice to move, most of the respondents prefer to stay (63.3%). Only a small number wanted to move for a better dwelling and for economic reasons. As original inhabitants who were born and grew up there, they feel quite satisfied with current conditions and have no desire for a better quality of life with a better environment and occupation. The original inhabitants are a type of community who still keep with local wisdom in staying put in the place they were born and grew up in. Moreover, moving to another place might be too risky for them. Leaving their current house means that they need to purchase a new place to settle in, which might be not easy. Avoiding the risks, most people prefer to stay in their comfort zone. Low-income households who have already sheltered permanently are able to maintain a normal household at low but locally acceptable standards (Turner, 1966).

The financial condition also affects how the inhabitant maintains their house. Repairs and maintenance and needed to relieve the accumulated rot of ages, the physical obsolescence of the fabric (Benson, et al 1980). Made of natural wood, the maintenance of a Banjarese house is not only more difficult but also more costly compared to that of common houses. Natural materials need special treatment or protection to make them last longer. They are also more vulnerable towards insects, dampness, and so on. Once in several years, decayed material needs to be replaced by a newer one. The expense to renovate is, of course, a burdensome for a family with less income. For now, maintaining their required living standard is the utmost priority. House maintenance that they can afford will be limited to fix small damages with cheap materials without proper repair. As stated by Turner and Fichter (1972), low-income society typically tend to prioritize conventional minimum standard dwelling units with permanent structures. As long as the current house is fair enough for them to live in without any problem, they do not need to worry about house improvement. This part shows that economic condition influences how they cherish or perceive their house in terms of preservation.

Thompson (1977) mentioned that a changing economy, changing customs, changing family conditions have brought to market buildings with the potential for reducing the size of dwelling units and increasing the shared amenities in ways not possible with a single-family house. This phenomenon can be seen from the investigated houses that most current dwellers divided the original rooms into smaller rooms. Also, less income made house restoration difficult for the inhabitant. Unless economic condition improves, the awareness of Banjarese house's value and the willingness to preserve the Banjarese house will not increase.

3.5.3 Summary of Physical Observation

Table 3-4 and Table 3-5 shows the observation on architectural features of target houses, while the tendency of building transformation and the cultural process that occurred can be summarized as in Table 3-6. The selection of the material of original Banjarese houses was responsive to what is called as 'existential context' or constraints such as climate, topography, availability of material, and so on. The current days, due to the scarcity and high price of original materials, for the purpose of house renovation, the dwellers' response the situation by using materials which are more affordable in terms of price and availability, while still considering the climate and topographical condition. Theoretically, organic materials are renewable, stocks to replenish resources being grown with good management, at a rate that will ensure a continuing supply (Oliver, 1987, p.96). Thus, if the local government really wants to preserve the existence of their heritage, 'protecting' required materials from forests that have become even more distant since the time of the original construction should be one of the most priorities (Schefold et al, 2008).

In traditional vernacular houses, aside from transformation caused by natural degradation, changes and innovation do occur as a result of adjusting what it is called as 'tradition and standard practice' to individual and family needs. In fact, most traditionally built forms appear to be modified in some measure by the owner-builders, to suit their taste (Oliver, 1987, p.66). Some modifications can be identified on the physical features, including façade, ornament, and space.

Banjarese houses were originally built by wealthy citizens to express their economic and social status through the design of both exterior and interior and the provision of large rooms, where each room has only one function. But today, the houses were inherited to their low-income descendant, resulting in the transformation from a luxury-spacious house to a more simple-functional one. Their current residents need more space to accommodate contemporary functions, hence, aside from attaching new massing to the initial house, they divided the existing large room into smaller one; in other words, they tend to avoid "waste of space". In addition, the original house is decorated beautifully not only to express the owner's taste and to attract guests but also containing philosophical meaning. However, in the current days, the importance of the house to express meaning has been replaced by functionality and simplicity.

A conclusion can be derived from Section 3.5 that the change on physical features of today's Banjarese houses was an adaptive response to the current constraints, such as income, job occupancy, and availability of material, as well as to the transformation of perception, such as lifestyles, needs, and privacy. The present residents tend to develop their houses towards functionality, resulting in the transformation from a luxury-spacious house to a more simple-functional one. Moreover, Banjarese house has shifted from being resided by a single to more than one nuclear families, thus the transformation of house layouts and room functions can be identified.

Table 3-4 Current Condition of Architectural Features (1)

House	Description
	House *a* M: Using timber except for roof; roof in bad condition. SF: Moderate change F: Totally asymmetry; front view is blocked by another building. Totally modified front stairs and fence; position of front door not in the center. L: Moderate change; right *anjung* disappeared O: Not found
	House *b* M: Using timber except for roof. SF: Intact cross shape with minor change F: Banjarese style; asymmetry; minor damage L: Moderate change with few additional rooms O: Superficial damage of exterior ornaments; interior ornament not found
	House *c* M: Using timber except for roof. SF: Pattern of house shape cannot be identified. F: Totally asymmetry; front view is blocked by another building. Totally modified front stairs and fence; position of front door not in the center. L: Total change; both *anjung* disappeared O: Superficial damage of roof ornaments; interior ornament not found
	House *d* M: Using timber except for roof. SF: Pattern of house shape cannot be identified; additional massing F: Totally modified; front view blocked by another building; stairs and fence not found; front door position not in the center. L: Severe change; both *anjung* disappeared O: Superficial damage of roof ornaments; interior ornament not found
	House *e* M: Using timber except for roof. SF: Pattern of house shape cannot be identified. F: Totally modified; front view blocked by another building; stairs and fence not found; front door position not in the center. L: Severe change; both *anjung* disappeared O: Superficial damage of roof ornaments; interior ornament not found
	House *f* M: Using timber; wooden roof in some part SF: Severe damage and loss of massing; represent earlier examples of Banjarese house construction F: Original façade destroyed L: Front zones disappeared; but remaining layout superficial change O: Not found

Notes: M: Material; SF: Shape and form; F: Façade; L: Layout; O: Ornament

(Source: Field Survey)

Table 3-5 Current Condition of Architectural Features (2)

House	Description
	House *g* M: Using timber except for roof. SF: Cross shape with moderate change F: Façade in good condition; asymmetry; modified stairs, fence, and front door L: Moderate change O: Roof and fence ornaments can be found; interior ornament not found
	House *h* M: Using timber except for roof. SF: Cross shape with moderate change F: Asymmetrical façade elements; modified version L: Moderate change O: Not found
	House *i* M: Using timber except for roof. SF: Severe change F: Asymmetry; non-banjarese style façade elements L: Moderate change O: Not found
	House *j* M: Using timber except for roof. SF: Severe change, front mass missing but impossible to replace due to road construction; was an earlier example of Banjarese style F: Original façade destroyed L: Front zone disappeared; severe change O: Traditional decorative wall still exist but severe change
	House *k* M: Using *ulin* wood; non timber roof SF: Front mass represents earlier example of Banjarese house; back part of house totally destroyed F: Earlier examples of façade elements L: Back zones disappeared; but remaining layout superficial change O: Roof ornaments missing; but fence and ventilation ornaments remain intact; few interior ornaments remain; *tawing halat* exists

Notes: M: Material; SF: Shape and form; F: Façade; L: Layout; O: Ornament

(Source: Field Survey)

Table 3-6 Summary of Physical Feature Observation

Features	Transformation Tendency	Cultural Process	
1) Material	Using cheaper material for renovation due to the scarcity and high price of original materials	Responsive to local constraints: availability and price of material. Thus, 'protecting' required materials from forests should be one of the most priorities.	
2) Structure and Form	- Modification - Partial loss due to land dispute or road construction, or due to lack of maintenance	- Change from philosophical expression to functionality and simplicity - Change of inhabitant lifestyles, needs, and privacy influences house transformation	Transformation of house form to fit with modern or current needs
3) Facade	- Either destroyed or blocked by additional house massing - Two houses (*b* and *g*) expressed owner's effort to preserve the façade		Façade was originally decorated beautifully to attract guests. However, it has now become a less important element.
4) Layout	Divide existing rooms into smaller one		- Transformation from a luxury-spacious house to a more simple-functional one. - Optimally using the space, to prevent 'waste of space'
5) Ornament	From a decorated symbol to a simpler and more functional component.		Ornament was originally means to express house owner's taste and to attract guests. However, it has now become a less important element.

3.6 Physical Assessment

3.6.1 Existing Laws for Protection

According to *the Nara document on authenticity 1994,* cultural diversity and heritage diversity is an irreplaceable source of spiritual and intellectual richness for all humankind, which should be respected. Conservation of cultural heritage is rooted in the values attributed to the heritage, where knowledge and understanding of authenticity are fundamental. According to *Burra Charter 1999,* conservation is an integral process of managing or looking after a place to retain its cultural significance, such as aesthetic, historic, scientific, social or spiritual value for past, present, or future generations.

In protecting old buildings, a sensitivity of current use and need of the users is essential; if the house is to be continued to be in its original use, some modifications will be needed to allow for the amenities of modern life and to permit the installation of up-to-date technology improvements, and these will have to be done without major changes in the original character of the building (Thompson, 1977).

Referring to some existing global charters or protecting protocols, there are several alternatives management actions for heritage buildings. *Preservation* means maintaining or repairing the fabric of a place in its existing state and retarding deterioration, including all the physical material, interiors, subsurface remains, as well as excavated material (Burra Charter 1999).

On the other hand, *restoration* means returning the existing fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material (Burra Charter 1999); the replacements of missing parts must integrate harmoniously with the whole, but at the same time must be distinguishable from the original so that restoration does not falsify

the artistic or historic evidence (Venice Charter). Both preservation and restoration are appropriate only if there is sufficient evidence of cultural significance and of an earlier state of the fabric, thus requires the discovery of lost details, unsuspected color or decoration, secret economies, make a romantic adventure of the apparent dustiness and mustiness of historic restoration (Thompson, 1977).

In the case of a historical building that is incomplete through damage or alteration, a *reconstruction* program is necessary to return the place into its earlier state, but of course, sufficient evidence to reproduce an earlier state of the fabric is essential (Burra Charter 1999). Introduction of new material into the fabric is permissible.

According to Burra Charter 1999, *adaptation* means modifying a place to suit the existing use or proposed use, where the introduction of new services, or new use, or changes to safeguard the place may be involved in the project. However, adaptation is acceptable only where it has minimal impact on the cultural significance of the place and should involve minimal change to significant fabric, achieved only after considering alternatives.

Remodeling is not included in the preservation laws, nonetheless, this study argues that remodeling should be considered to protect buildings with less cultural significance. When doing remodeling, façade might get altered; it is also possible to either preserve interior detail and material or totally change the interior. But, wherever possible, original materials were preserved intact. New materials were introduced sensitively, and the scale of generously portioned spaces was retained. We need to strive to preserve the building's exterior aesthetic while bringing its functional standards up to the current level of acceptability (see Thompson, 1977).

Preservation, restoration, and reconstruction actions need accurate historical proof as well as strict assessment and rules in the revitalization process, thus only authentic houses are selected to this process while those with cultural insignificance will be ignored. On the contrary, the assessment of our study is limited to evaluating current physical expression or condition of the traditional houses with no consideration of any historical proof. Our evaluation is not judging their authenticity, but to select existing Banjarese house—whether it is original or modified—which is potential to improve the area in term of visual quality or which can be a good example as a 'modern era' of Banjarese house, meaning although it is modified, but still protecting traditional rules.

3.6.2 Grading Architectural Features for Assessment

Despite the poor condition of the investigated houses, they could still be identified as Banjarese house due to the existence of some house elements. Learning from the architectural investigation of Banjarese house, it can be derived that significant architectural elements of a vernacular house can be grouped into three: construction and form, design, and space (Table 3-7). Evaluating these factors is necessary to determine the architectural value of a vernacular house.

A. Construction and Form

   Notable, rare, unique, and early example of structure, construction method, and architectural style are the most important factors in defining a traditional building's value. However, construction may be evaluated only if the assessor is certain of the nature of the structure (Kalman, 1980). The usage of a particular material may also be considered for the physical evaluation, yet, this may differ from each area. In the case of Banjarese house, it is likely that the most significant features are its peculiar structure and form (max. score= 40), while the usage of wooden material is considered less significant (max. score= 10) concerning that many commoner houses aside from the vernacular Banjarese houses use timber as well.

B. Design

   Design refers to a particularly attractive, unique and early example of composition and details. Some kinds of vernacular houses have beautiful façade with unique compositions and rich ornaments, which expresses its authentic style. A Banjarese house can easily be recognized

from its façade elements and composition (max. score= 30). Ornaments of the exterior also upgrade the artistic value of a house (max. score= 15).

C. Layout

Space or layout is not always a relevant criterion for investigation; it may differ for each area. Some kinds of vernacular houses do not have a specific room arrangement, while some do. Space may be much less important or may not be scored at all. Banjarese house is one of them which has a special room configuration. Its layout express hierarchy and special meaning, thus, it is essential to consider its layout for assessment (max. score= 5).

In can be argued that the exterior of a vernacular house has a more important role than the interior. This chapter formulates that a basic architectural evaluation shall start from observing the form and structure of a house, followed by the design quality. Investigating the space or layout is only necessary when a vernacular house has a special room pattern or arrangement. These three basic criteria are general standards to be applied in another area.

Each of the basic criteria mentioned above should be extracted into some detailed criteria, according to their local and regional context. Determining a precise score is necessary to be assigned to each detailed criterion.

Table 3-7 Grading of Architectural Component

Criterion			Standard Concept	Score	
				Per Item	Max
Construction and Form	Structure	1) Style 2) Shape	E: Superficial change/damage	40	40
			VG: Minor change/damage	25	
			G: Moderate change/damage	10	
			F: Severe change/damage	5	
			P: Total change/damage	0	
	Material	1) Foundation 2) Floorboard 3) Outer wall 4) Roof	E: Perfectly using original material	10	10
			VG: Original material in good condition	7	
			G: Original material in fair condition	4	
			F: Dominantly different material	1	
			P: Totally using different material	0	
Design	Façade	1) Composition 2) Elements	E: Perfectly expressing earlier example	30	30
			VG: Good example	15	
			G: Fair example	8	
			F: Low	4	
			P: Not found	0	
	Ornament	1) Exterior 2) Interior	E: Perfectly expressing earlier example	15	15
			VG: Good example	10	
			G: Fair example	5	
			F: Low	2	
			P: Not found	0	
Layout	1) Room configuration 2) Room division		E: Superficial change/damage	5	5
			VG: Minor change/damage	3	
			G: Moderate change/damage	2	
			F: Severe change/damage	1	
			P: Total change/damage	0	

Notes: E: Excellent; VG: Very good; G: Good; F: Fair; P: Poor

3.6.3 Architectural Assessment for Vernacular Buildings

The previous section has revealed that the current houses had undergone transformation either by self-destruction or modification by the owner. Individual preferences and needs had a great influence on transforming the current houses, resulting in many variations of the design. Some parts of the houses no longer play important roles due to the change of the current needs and lifestyles of the residents, such as *tawing halat*, back doors, and back stairs. It can be noted that the disappearance of the back elements showing the change of the house orientation that the back part of the house is no more substantial in today's situation. The original wooden material, *ulin*, can still be found in some investigated houses, especially for foundations and floors. Notwithstanding, due to natural degradation, wooden material should regularly be changed. However, the current dwellers tend to use cheaper material for renovation due to the scarcity and the pricy of *ulin*. This matter will be a challenge in preserving Banjarese house in its original form.

Façade, a component that is supposed to stand out the most, lost many of its element resulting that the remaining houses were difficult to be recognized as Banjarese house without examining other features, such as ornaments. In the past, house façade and ornaments had a strong impression to show the status of the owner (Table 3-5, Table 3-6). Nowadays, the present inhabitant tends to focus on house function rather than decoration. As visual appearance becomes less important than function, a lot of transformation can be noticed in the house layout. Rooms were added according to inhabitant needs and lifestyle.

In order to find out appropriate actions in term of revitalization, appointed houses should be undergone thorough appraisal process. Assessment or evaluation is basically an objective exercise that determines quality to identify the best buildings that possess heritage significance within the area being surveyed, which will be declared for protection (Kalman, 1980; Hoi An protocol). There is no perfectly objective measurement of assessment, nonetheless, the use of grades and scores allow an assessor to come much closer to the ideal of objectivity. Several dimensions for evaluating building have been proposed worldwide, whose standards differ in different areas. Five basic criteria adopted by Canada are architecture, history, environment, usability, and integrity (Kalman, 1980). The states of Jersey uses another consideration: history, age, architecture, archaeology, and artistic interest. Depending on the type of cultural heritage, and its cultural context, properties may be understood to meet the conditions of authenticity if their cultural values are truthfully and credibly expressed through a variety of attributes: form and design; materials and substance; use and function; traditions, technique and management system; location and setting; language and other form of intangible; spirit and feeling; and other and external factors (UNESCO, Operational Guidelines for the Implementation of the World Heritage Convention). According to Burra Charter 1999, cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations; cultural significance may change as a result of the continuing history of the place.

The more damages or changes does a building encounter, the more efforts needed for repairing. The richer the historical value of a house, the more detail and deeper inspections needed. Without any accurate proof, restoring a building into its original form cannot be undertaken. However, when talking about historical aspects, only authorities or historians possess detail heritage documents and information. Those who do not acquire sufficient knowledge and information have no "right" to carry out a preservation plan. Common researchers or architects can only observe a vernacular building through architectural value when contributing to the protection.

Assessment can be either general or very detail, especially in the case of reconstruction or restoration where accurate evidence is mandatory, but this study only adopts architectural criteria for the investigation. As mentioned in the beginning part, this research aims to evaluate the current physical quality of existing Banjarese houses as an initial action on handling vernacular houses (Table 3-8). Using an architectural approach to conduct the initial selection allows researchers, educators, or non-profit organizations who concern about the vernacular settlement to propose an improvement project with less complicated procedures.

Table 3-8 Architectural Assessment

Criterion			House Code										
			a	***b***	***c***	***d***	***e***	***f***	***g***	***h***	***i***	***j***	***k***
Construction and form	Structure	1) Earlier example						40				40	40
		2) Later style	25	25	25	25	25		25	25	25		
		1) Cross shape		25					25	25			
		2) Few alteration	10									10	
		3) Unidentified			5	5	5	5			5		5
		(Max score = 40)	**17.5**	**25**	**15**	**15**	**15**	**22.5**	**25**	**25**	**15**	**25**	**22.5**
	Material	1) Timber roof						7					
		2) Non timber roof	0	0	0	0	0		0	0	0	0	0
		(Max score = 10)	**0**	**0**	**0**	**0**	**0**	**7**	**0**	**0**	**0**	**0**	**0**
Design	Façade	1) Earlier example											30
		2) Decorative		15					15				
		3) Simple								8	8		
		4) Blocked	4		4	4	4						
		5) Loss						0				0	
		(Max score = 30)	**4**	**15**	**4**	**4**	**4**	**0**	**15**	**8**	**8**	**0**	**30**
	Ornament	1) Decorative (Ex)		15	15	15	15		15				15
		2) No ornament (Ex)	5					5		5	5	5	
		1) Yes (In)										5	5
		2) No (In)	0	0	0	0	0	0	0	0	0		
		(Max score = 15)	**2.5**	**7.5**	**7.5**	**7.5**	**7.5**	**2.5**	**7.5**	**2.5**	**2.5**	**5**	**10**
Layout		1) Few change						3				3	
		2) Medium change	2	2	2				2				
		3) Severe change				0	0			0	0		0
		(Max score = 40)	**2**	**2**	**2**	**0**	**0**	**3**	**2**	**0**	**0**	**3**	**0**
Total Score			**26**	**49.5**	**28.5**	**26.5**	**26.5**	**35**	**49.5**	**35.5**	**25.5**	**33**	**62.5**

Points	**Description**											
80-100	A (Major Significant)											
60-79	B (Important)											○
40-59	C (Supportive)		○					○				
20-39	D (Less Supportive)	○		○	○	○	○		○	○	○	
0-19	E (Irrelevant)											
Group		**D**	**C**	**D**	**D**	**D**	**D**	**C**	**D**	**D**	**D**	**B**

3.7 The Treatment

This paper recommends five classifications for the physical evaluation system (Table 3-9). Group A covers buildings with a major significant architectural value that has the strongest possible recommendation for preservation. Their building structure and design are early examples that survive. Room layout, if counted, also shows the example of an original configuration. Physical damages, if any, considered as artificial or insignificant changes. Houses in this group can be declared for restoration or reconstruction, where original structure, façade, ornament, material, and layout shall not be altered.

Houses in group B are considered as having important architectural values. Structure and façade are still intact with minor or tolerable changes, as well as the room arrangement. Houses in this group can be considered for rehabilitation or adaptation, where structure and façade shall not be altered. It is not necessary to replace every single original ornament and material, however, wherever possible original ornament and material should be preserved. Small alteration or addition with minimal impact to meet the current need is permissible. Modification of layout and addition of new service or use is also tolerated.

However, undertaking restoration, reconstruction, rehabilitation, and adaptation requires a careful inspection of historical records as well as considering other attributes. Therefore, buildings in both Group A and Group B, that are considered as possessing a significant heritage value, are subjected to be investigated further that may involve authorities and experts in historical buildings, such as architects, historians, architectural historians, and so on. Moreover, it is important that any preservation plan should consider social-economic issues of the dwellers, especially when the buildings are resided by low-income society. The current resident's continuity of living, if not improved, should be prioritized. We have already mentioned in the previous chapter that less income made house restoration difficult for the inhabitant. Unless economic condition improves, the awareness of Banjarese house's value and the willingness to preserve the Banjarese house will not increase. Therefore, the local government should commence the initial repair then providing regular incentives which is mandatory to make sure the program succeeds.

One target house included in this group B is house *k*, an excellent example of original Banjarese style house, which perfectly expressed through its construction method and façade elements such doors, windows, ventilation, fence, as well as ornaments. Unfortunately, the backside of this house was totally damaged, left behind less than half of the entire building. We have to admit that this is the fact that is faced by many vernacular houses; natural degradations prey their existences gradually unless any protection action is taken, they will disappear entirely soon or later. To deal with this kind of house, the remaining original parts should be protected, either by adaptation or rehabilitation. If possible, disappearing parts shall be rebuilt. Nevertheless, it should be noted that self-help improvement by the owner this kind of house is unlikely to work, especially due to economic matter. Thus, houses belong to

Table 3-9 Kinds of Appropriate Action

	Group/Score	A (80-100)	B (60-79)	C (40-59)	D (20-39)	E (0-19)
	Importance	Major significant	Important	Supportive	Less Supportive	Irrelevant
	Possible Treatment	Reconstruction, Restoration	Adaptation	Remodelling	-	-
Feature	Construction and Form	x	x	△	○	○
	Façade	x	x	△	△	○
	Ornament	x	△	△	○	○
	Material	x	△	○	○	○
	Space	△	△	○	○	○

Notes: x : no alteration allowed; △: insignificant alteration allowed; ○: alteration allowed

this group certainly need genuine support from the local authorities as well as professionals to prevent them from being a loss.

The architectural value of houses in Group C are considered fair; not good enough to be referred to as excellent earlier examples due to their significant physical changes. However, they can still be recognized as an 'average score' of vernacular house, which will be a good example if many survive. They also carry a supportive role to enliven a traditional area. Hence, houses in this group are highly recommended to refer to the original style when doing remodelings, such as for the house construction and façade. Original details and ornaments are suggested to be preserved. Although alteration of material and interior is permissible, in case of Banjarese houses, this study encourages the usage of the timber as their original material (a cheaper version is allowed), especially for those houses in a traditional area like Kuin Utara.

House *b* and *g* were physically in a good condition, but their construction and design were modified, thus, did not express an excellent earlier example of Banjarese style. Their existence is considered as a good example of remodeling, where other houses can be referred to when doing a renovation. They have shown a good example that traditional house transformation can be either positive or negative in terms of impact on cultural value. Therefore, the owner of these two houses should be appreciated for their effort in protecting their Banjarese style house through remodeling and should be encouraged to keep maintaining it as it is.

Houses with extreme changes, as in Group D and E, were below than average condition, either bad or very poor. However, in the case of houses located in a historical area like Kuin Utara, their exterior or façade if preferable to be in accordance with the façade of a vernacular house. Therefore, these houses should be upgraded in accordance with the design rules of the traditional house. This study proposes that in order to improve or support the quality of Kuin Utara neighborhood as a traditional area, the existing Banjarese houses should be upgraded at least to reach group C.

Vernacular houses vary from high and valuable style to those with less notable or insignificant construction or design. However, the current vernacular house protection programs initiated by historian and government tend to pay attention to houses with high value. Although low physical quality houses such as in group D and E were irrelevant for preservation, it does not mean that they should be thrown out from the city planning. If too many such buildings are allowed to be destroyed, the city will lose an important and irreplaceable element (Kalman, 1980). Also, decayed vernacular houses resided by low-income inhabitant when ignored may turn into scattered roofs and lead to another problem: slum housing. This is where academics and architects should fill the role to propose a way to prevent this from happening.

3.8 Conclusion and Suggestion

3.8.1 Conclusion

Despite the title as city's cultural heritage area, the Banjarese houses of Kuin Utara sub-district are in poor condition. No remaining houses can be considered as possessing high architectural value. It is likely that the title of 'traditional area' is only appointed to the ancient mosque and the burial complex of the previous ruler. The status of Kuin Utara riverbank as the embryo of Banjarese house has nothing left or reflected in on the commoner houses.

This study convinces that revitalization does not always mean restoring old buildings to its original state or to only protect buildings with significant value, any kinds of traditional houses should be looked after. The initial action to carry out a protection plan for vernacular houses is evaluating their architectural conditions. The architectural approach allows researchers, educators, or non-profit organizations who concern about vernacular settlements to propose an improvement project with less complicated procedures. However, we should be aware that many vernacular houses are resided by low-

income residents. Having difficulties in the economy, low-income society tends to prioritize on providing their basic necessities rather than worrying about improving their house or keeping the heritage value of their house. This causes danger for the preservation of vernacular houses. Unless economic condition improves, their awareness of heritage value and their willingness to preserve their house will not increase.

The remaining houses had lost their architectural value due to two kinds of possibilities. Resided by low-income inhabitants, no money can be allocated for house repair resulting in natural degradation over time. Even if they can afford the repair, they will spend as little as possible for purchasing cheaper materials. The other possibility is that some residents may repair the broken part without considering the original architectural-engineering style. Aging, short of funds, and ignorance are the main causes of the loss of vernacular houses.

This part formulates that there are three basic factors to determine the architectural value of a vernacular house: construction and form, design, and space. The architectural evaluation shall start from observing the form and structure of a house, followed by the design quality. Investigating the space or layout is only necessary when a vernacular house has a special room pattern or arrangement.

The result shows that houses with significant architectural value shall proceed for a thorough inspection to be declared for preservation. The 'average score' of vernacular houses, that is not good enough to be preserved, plays a supportive role to enliven Kuin Utara as a traditional area and will be a good example if many survive. Also, this study also suggests that houses that were regarded as irrelevant for preservation should not be simply thrown out from the city planning. If too many such buildings are allowed to be destroyed, the city will lose an important and irreplaceable element (Kalman, 1980).

Decayed vernacular houses resided by low-income inhabitant when ignored may lead to another problem: slum housing. In contrary, enhancing them can reinforce the quality and the identity of riverside areas. This is where academics and architects should fill the role to propose a way to prevent the more low-quality vernacular houses getting lost. Through physical assessment, researchers can figure out and recommend some protection guidelines, then convince the local government.

3.8.2 Suggestion

Due to limited funds and amount of works, it is likely that it would be difficult for the authorities to handle literally all remaining vernacular houses. Therefore the first selection of appropriate house is needed. For the houses which are lower than standard, the authorities may not take care of them, but academics and architects are able to contribute for protection for those 'rejected' houses. They can approach the residents directly, educate, convince, and propose upgrading recommendation, such as the limitation of what is allowed and what is not allowed to be altered. With the help of non-profit organizations, this program might get easier.

It should also be noted that the challenge of a preservation plan, in general, is the limited supply of original house materials and the lack of skilled carpenters. To solve this matter, local government should cooperate with the locals to plant and manage some forests, which provide materials for the current and future generations. Also, the local government should encourage and support young carpentries, by providing training and fund as well.

In addition, as we already mentioned in the introduction part that Kuin Utara riverside is a special area designated for the cultural-historical purpose. Thus, the protection of Banjarese house plays an essential role in supporting that purpose. Considering that, the local government should have included vernacular houses in the development plan for Kuin Utara along with other historical landmarks.

References

1) Afdholy, A. R., 2017. Rumah Lanting, Arsitektur Vernakular Suku Banjar yang Sudah Mulai Punah [Lanting House, the Endangered Vernacular Architecture of the Banjarese Tribe]. Local Wisdom, Vol. 9, No.1, 103-117. (In Indonesian).

2) AlSayyad, N., 2006. 'Foreword' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

3) Anhar, P., 2010. Inventarisasi Arsitektur Banjar [Inventory of Banjarese Architecture]. Universitas Lambung Mangkurat Press, Banjarmasin. (In Indonesian).

4) Artha, A., 1970. Sejarah Kota Banjarmasin [History of Banjarmasin City]. Museum Lambung Mangkurat, Banjarmasin. (In Indonesian).

5) Asquith, L. and Vellinga, M., 2006. 'Introduction' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

6) Benson, J., Colomb, P., Evans, B., Jones, G., 1980. The Housing Rehabilitation Handbook. The Architectural Press, London.

7) Bronner, S. J., 2006. 'Building Tradition: Control and Authority in Vernacular Architecture' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

8) Dahliani, 2012. Konsep Pengolahan Tapak Permukiman di Lahan Rawa Banjarmasin [Concepts of Residential Site Utilization Plans on Wetlands in Banjarmasin]. LANTING Journal of Architecture, Vol. 1, No. 2, 96-105. (In Indonesian).

9) Dahliani, Faqih, M., Hayati, A., 2015. Changes of Architecture Expressions on Lanting House Based on Activity System on the River. History Research, Vol. 3, No. 1, 1-8.

10) Fitri, M., 2018. The Settlement Morphology along Musi River: The Influence of River Characteristics. DIMENSI, Journal of Architecture and Built Environment, Vol. 45, No. 2, 133-140.

11) Goenmiandari, B., Silas, J., Supriharjo, R., 2010. Konsep Penataan Permukiman Bantaran Sungai di Kota Banjarmasin berdasarkan Budaya Setempat [The Concept of Managing Riverside Settlement in Banjarmasin Based on Local Culture]. Seminar Nasional Perumahan Permukiman dalam Pembangunan Kota [National Seminar of Settlement and Housing in the Context City Development], ITS. (In Indonesian).

12) Guerreiro, A. J., 2004. 'The Bornean Longhouse in Historical Perspective, 1850-1990, Social Processes and Adaptation to Changes' in Schefold, R., Nas, P. J. M., Domenig, G. (ed.) Indonesian Houses, Volume 1: Tradition and Transformation in Vernacular Architecture. Singapore University Press, Singapore.

13) Guidoni, E., 1975. Primitive Architecture. Electa Editrice, Milan.

14) Hanan, H., 2010. Sustainability of the Traditional Form of Batak House in Samosir Island. Indigenous Architecture as Basic Architecture Design, A-102 - A-109.

15) Hareedy, A. N and Deguchi, A., 2010. Physical Transformation of Rural Villages Encompassed into Egyptian Borders. Journal of Asian Architecture and Building Engineering, Vol.9, No.2, 379-386.

16) Hoi An Protocols, 2009. Hoi An Protocols for Best Conservation Practice in Asia: Professional Guidelines for Assuring and Preserving the Authenticity of Heritage Sites in the Context of the Cultures of Asia. UNESCO Bangkok. ISBN: 978-92-9223-242-9 (Electronic version).

17) Hourigan, N, 2015. Confronting Classifications, When and What is Vernacular Architecture?. Civil Engineering and Architecture, Vol. 3, No. 1, 22-30.

18) Kalman, H., 1980. The Evaluation of Historic Buildings. Environment Canada Parks Service, Minister of the Environment, Ottawa. Catalogue No. R64-98/1979. ISBN 0-662-10483-8

19) Kellett, P. and Napier, M., 1995. Squatter Architecture? A Critical Examination of Vernacular Theory and Spontaneous Settlement with Reference to South America and South Africa. Traditional Dwellings and Settlements Review, Vol. 4, No. 11, 7-24.

20) Leirissa, R. Z., 1996. The Bugis Diaspora. In Reid, A. (Ed.). Indonesian Heritage: Early Modern History. Singapore: Editions Didier Millet. 90-91.

21) Lestari, D. E., 2013. Perubahan Ruang dalam Rumah Tradisional di Kawasan Desa Adat Hiliamaetaniha, Nias Selatan [Room Change of Traditional House in the Indigenous Village of Hiliamaetaniha, South Nias]. [Thesis]. Universitas Gadjah Mada. (In Indonesian).

22) Masri, M., 2012. The Misconceptions of Negeri Sembilan Traditional Architecture. Procedia, Social and Behavioral Science, 68, 363-382.

23) Mattulada, 1982. South Sulawesi, Its Ethnicity and Way of Life. Southeast Asian Studies, Vol. 20, No.1, 4-22.

24) Mentayani, 2008a. Analisis Asal Mula Arsitektur Banjar, Studi Kasus: Arsitektur Tradisional Rumah Bubungan Tinggi [An Analysis of the Banjarese Architecture‘s Origin, Case Study: The Rumah Bubungan Tinggi Traditional Architecture]. Jurnal Teknik Sipil dan Perencanaan, Vol. 10, No.1, 1-12. (In Indonesian).

25) Mentayani, 2008b. Jejak Hubungan Arsitektur Tradisional Suku Banjar dan Suku Bakumpai [Traces of Traditional Architectural Relationship between the Banjarese and the Bakumpai Tribes]. DIMENSI Teknik Arsitektur Vol. 36, No.1, 54-64. (In Indonesian).

26) Mentayani, I., 2015. Transformasi Adaptif Permukiman Tepi Sungai di Kota Banjarmasin Kasus: Barito-Muara Kuin, Martapura, dan Alalak [An Adaptive Transformation of Riverside Settlement in Banjarmasin City, Case Study in Barito-Muara Kuin, Martapura, and Alalak]. [Thesis]. Universitas Gadjah Mada. (In Indonesian).

27) Michiani, M. V. and Asano, J., 2016. Influence of Inhabitant Background on the Physical Changes of Banjarese House: A Case Study in Kuin Utara Settlement, Banjarmasin, Indonesia. Frontiers of Architectural Research, Vol. 5, No. 4, 412-424.

28) Michiani, M. V. and Asano, J., 2017. A Study on the Historical Transformation of Physical Feature and Room Layout of Banjarese House in the Context of Preservation, Case Study in Kuin Utara Settlement, Banjarmasin, Indonesia. Urban and Regional Planning Review, Vol. 4, 71-89.

29) Muchamad, B. N. and Aufa, N., 2008. Rekonstruksi Keraton Banjar [Reconstructing of Banjarese Palace]. DIMENSI Journal of Architecture and Built Environment, Vol. 36, No. 2, 115-126. (In Indonesian).

30) Mutia, I. and Dahliani, 2014. Eksistensi dan Preferensi Bermukim di Rumah Lanting [The Existence and Preference of Settling in a Lanting House]. LANTING Journal of Architecture, Vol. 3, No. 1, 48-62. (In Indonesian).

31) Noviarti, Irsa, R., Putra, A., Masdar, A., 2013. Preserving Minangkabau Traditional Building in West Sumatera, Indonesia: Toward Sustainable Community. Mediterranean Journal of Social Sciences. Vol. 4 (10), 465-469.

32) Oliver, P., 1987. Dwellings: The House across the World. The University of Texas Press, Austin, Texas.

33) Oliver, P., 2003. Dwellings: The Vernacular House World Wide. Phaidon, London.

34) Oliver, P., 2006. Built to Meet Needs, Cultural Issues in Vernacular Architecture. Architectural Press, Burlington.

35) Özkan, S., 2006. 'Traditionalism and Vernacular Architecture in the Twenty-First Century' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

36) Petersen, E., 2000. Jukung-Boats from the Barito Basin, Borneo. The Viking Ship Museum, Roskilde, Denmark.

37) Pinijvarasin, W., 2002-2003. Changes in Thai Vernacular Housing Compounds. Journal of the Faculty of Architecture Silpakorn University, Vol. 19, 74-86.

38) Purwanto, E. and Darmawan, E., 2018. The Adaptation Strategy of Dwelling in the Riverside Settlement of the Arut River in Pangkalan Bun City, West Kotawaringin Regency, Central Kalimantan. IOP Conference Series: Earth and Environment Science 213.

39) Rapoport, A., 1969. House, Form and Culture. Prentice-Hall Inc., Englewood Cliffs, USA.

40) Rapoport, A., 1988. 'Spontaneous Settlements as Vernacular Design' in Patton, C. V. (ed.) Spontaneous Shelter: International Perspectives and Prospects. Temple University Press, Philadelphia.

41) Rapoport, A., 2006. 'Vernacular Design as a Model System' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

42) Rudofsky, B., 1977. The Prodigious Builders: Notes toward a Natural History of Architecture. Harcourt Brace Jovanovich, New York and London.

43) Saleh, M. I., 1982. Banjarmasih: Sejarah Singkat Mengenai Bangkit dan Berkembangnya Kota Banjarmasin serta Wilayah Sekitarnya sampai dengan Tahun 1950 [Historical Development of the Banjarmasin City and Its Surrounding Areas until the Year of 1950]. Direktorat Permuseuman Kalimantan Selatan, Direktorat Jenderal Kebudayaan, Departemen Pendidikan dan Kebudayaan. Museum Lambung Mangkurat, Banjarbaru. (In Indonesian).

44) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2001. An Analysis of the Riverside Settlement Inhabitant's Characteristics in Relation to an Urban Situation, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 544, 225-231.

45) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2002. Study on the Improvement Process by Inhabitants in an Urban Riverside Settlement, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 556, 297-304.

46) Sastrawati, I., 2009. The Characteristics of the Self-Support Stilt-Houses towards the Disaster Potentiality at the Cambaya Coastal Area, Makassar. DIMENSI, Journal of Architecture and Built Environment, VOl. 37, No. 1, 33-40.

47) Schefold, R., Nas, P. J. M., Domenig, G., 2004. 'Introduction' in Schefold, R., Nas, P. J. M., Domenig, G. (ed.) Indonesian Houses, Volume 1: Tradition and Transformation in Vernacular Architecture. Singapore University Press, Singapore.

48) Schefold, R., Nas, P. J. M., Wessing, R., 2008. 'Introduction' in Schefold, R., Nas, P. J. M., Domenig, G. (ed.) Indonesian Houses, Volume 2: Tradition and Transformation in Vernacular Architecture. KITLV Press, Netherlands.

49) Seman, S. and Irhamna, 2001. Arsitektur Tradisional Banjar Kalimantan Selatan [Traditional Banjarese Architectures of South Kalimantan]. Ikatan Arsitek Indonesia Daerah Kalimantan [Indonesian Institute of Architects Kalimantan Area], Banjarmasin. (In Indonesian).

50) Shacklette, B. K., 2011. Syncretistic Vernacular Architecture, Santa Fe, New Mexico. ARCC 2011, Considering Research: Reflecting upon Current Themes in Architecture Research, 645-659.

51) Statistics of Banjarmasin, 2017a. Kota Banjarmasin dalam Angka 2017 [Banjarmasin in Figures 2017]. Badan Pusat Statistik [Statistics of Banjarmasin]. Catalog No: 1102001.6371. (In Indonesian).

52) Statistics of Banjarmasin, 2017b. Statistik Kesejahteraan Rakyat Kota Banjarmasin 2017 [Statistics of Social Welfare of Banjarmasin City 2017]. Badan Pusat Statistik [Statistics of Banjarmasin]. Catalog No: 4101002.6371 (In Indonesian).

53) The Burra Charter, 1999. The Australian ICOMOS Charter for Places of Cultural Significance, 1-10.

54) Thompson, E.K., 1977. Recycling Buildings: Renovations, Remodelings, Restorations, and Reuses. McGraw-Hill.

55) Turner, J. F. C., 1966. A New View of the Housing Deficit. San Juan Seminar Paper, Social Science Research Centre, University of Puerto Rico, Rio Piedras, Puerto Rico.

56) Turner, J. F. C. and Fichter, R., 1972. Freedom to Build, Dweller Control of the Housing Process. Macmillan, New York.

57) UNESCO World Heritage Centre, 2017. Operational Guidelines for the Implementation of the World Heritage Convention.

58) UNESCO World Heritage Committee. 1994. Nara Document on Authenticity. http://whc.unesco.org/archive/nara94.htm

59) UN-Habitat, 2006. State of the Worlds' Cities 2006/7, the Millennium Development Goals and Urban Sustainability: 30 Years of Shaping the Habitat Agenda. United Nations Human Settlements Programme.

60) Vellinga, M., 2006. 'Engaging the Future: Vernacular Architecture Studies in the Twenty-First Century' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

61) Vellinga, M., Oliver, P., Bridge, A., 2007. Atlas of Vernacular Architecture of the World. Routledge, Oxon, United Kingdom.

62) Venice Charter

63) Viquar, S., 1998. Modernization and Cultural Transformation: Change in Building Materials and House Forms Karimabad, Pakistan. [Thesis]. School of Architecture of McGill University, Montreal.

64) Zohrah, L. and Fukukawa, Y., 2007. The Formation of Vernacular House in South Kalimantan Province, Indonesia: Environmental Impact of River Network Evolution. International Conference of 21st Century COE Program of Tokyo Metropolitan University. Proceeding of Building Stock Aviation: 5-7 Nov 2007, Tokyo, Japan, 2007, 375-382.

65) Zohrah, L. and Fukukawa, Y., 2010. Characteristics of Traditional High Ridge Houses in Banjarese Kampungs, South Kalimantan, Indonesia. Journal of Architecture and Planning, AIJ. Vol. 75, No. 647, 149-156.

66) Zohrah, L., 2012. Traditional High Ridge House Groups of Banjarese Kampung to Clarify the Organizing Principles in the Meaning of Urban Fabric. LANTING Journal of Architecture, Vol. 1, No.1, 57-67.

CHAPTER 4. Study on Slum Riverside Settlement

4.1 Introduction

4.1.1 Riverside Slum

Today, marginal or squatter settlements are probably the fastest-growing types of human settlements in developing nations (United Nations, 1978, p.4) (Figure 4-1). More and more people come to settle in the riverside area (Figure 4-2), which has become a popular destination for not only urban poor, but also for penniless migrants coming from rural areas seeking for life betterment in the city. The poor started to develop spontaneous small shacks with limited budget and resources, and of course without any legal permission; they built low-standard shelters next to each other, creating densely populated neighborhoods. The severe and uncontrolled expansion of squatter and slum settlements along riverbank emerges the second level of the problem, where the area gets more is more deteriorated in terms of urban spatial, environment, and so on.

The overlapping and sporadic development of urban riverside dwellings causes spatial problems that tend to be detached from traditional urban settings (Prayitno, 2013). The settlements have become alternative places for urban poor, which encounter physical problems such as the poor condition of houses, walkways, a lack of water supply, sanitary facilities, and waste management facilities (Sarwadi et al., 2002). Besides, these riparian areas also face social and economic problems such as the illegal status of sites and low-level education and income of their inhabitants (Sarwadi et al., 2001). In addition, the buildings on rivers create environmental problems such as waste resulting from mining activities and household waste directly disposed to the river (Prayitno, 2013). Moreover, human settlement has changed the distribution of water resources and triggered the deterioration of the ecosystem of the river (Xie et al., 2017). Their invasion on the floodplain and greenbelt has also become such an issue that the many governments see a need to revitalize the floodplain by relocating some riverbank houses.

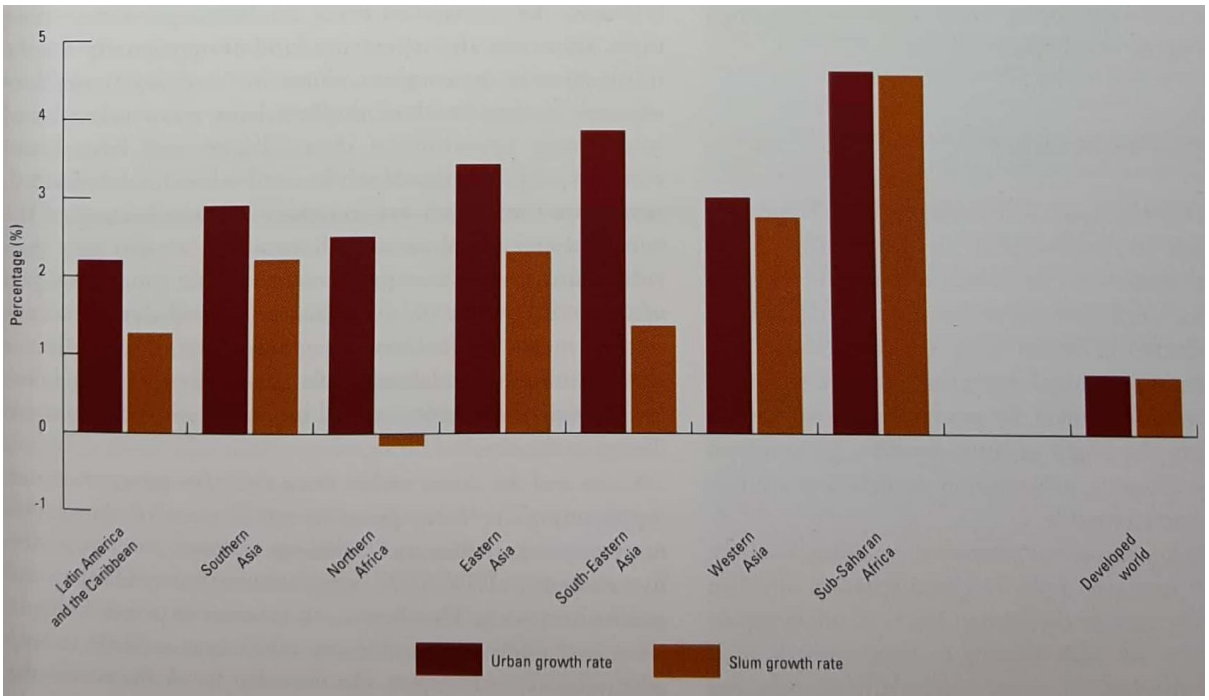

Figure 4-1. The Annual Growth Rate of Cities and Slum
(Source: UN-Habitat, 2005 cited in UN-Habitat, 2006, p.49)

Figure 4-2. Shelters above a River in Banjarmasin, Indonesia
(Source: Field Survey)

4.1.2 Slum, Squatter, or Spontaneous Settlement?

There is not even one accurate and appropriate definition of slum environment; dense areas with poor people living in shelters that are built and constructed using 'non-durable material', and inadequacy to the provision of basic service are often called *slums* (Oliver, 1987, p.221; Palmer and Patton, 1988, p.4). Slum can also be defined as a settlement in an urban area in which more than half of the inhabitants live in inadequate housing and lack basic services (UN-Habitat, 2006, p.19), while unauthorized shelter which is built illegally on a land or property is often called *squatter* or *informal* housing (Rapoport, 1988, p.52; Palmer and Patton, 1988, p.4; Cattaneo and Martinez, 2014). However, not every 'poor settlements' are squatting the land illegally, some are considered legal houses (see Bawole, 2009); in other words, slum can be either informal or legal.

On the other hand, the term *spontaneous* shelters address any contemporary houses that were built without professional designer, left entirely the design to individuals to live on the land, and developed with the change of time, environment, and the daily life of the citizen, including slums and squatters houses (Perry, 1998, p.53; Castagnoli, 1971, p.124); this term is somewhat similar to the definition of vernacular house. As we have already mentioned in the previous chapter, vernacular architecture is defined as buildings that are native to a place, built to meet specific needs and accommodate values, economies, and local cultures, produced without the need for imported components and processes, possibility built by the individuals who occupy it, and evolved from within the communities and perfected itself over a long period of time (Bronner, 2006; AlSayyad, 2006; Özkan, 2006; Oliver, 1997, cited in Bronner 2006). Thus, spontaneous architecture, including slum and squatter housing, is often called a *contemporary vernacular house*. Whatever such buildings are called, in the urban context, these type of buildings often cause a spatial problem, virtually damage the city, and considered as a scar on the city's environment. Official policies and middle-class public opinion in most developing countries tend to view marginal settlements as a pathological phenomenon which should be suppressed (United Nations, 1978, p.4). Therefore, the discussion of this study will use all those terms to address *'substandard housing'*.

4.1.3 International Experience in Handling Squatters

Public policy towards the formation of squatter settlements ranges from the eviction and destruction of their homes to acceptance of these settlements along with the program to provide them social services (United Nations, 1978, p.6). In general, there are three basic stages that the international policies have undergone; the initial approach was formulated in the 1950s and 1960s as 'slum eradication' that often resulted in a severe disparity between new housing and the needs of the inhabitants (Slaev, 2007).

At the historical moment when cities began modernizing their physical elements and facilities, the government urged to direct budget for several needs for the city dwellers as well as large newcomer waves coming into the city looking for life betterment, yet, they confused the problems; was it the migrants to blame, or the lack of supporting services or facilities in the city (McNulty and Kliment, 1976). Thus the earliest response of the government of many nations was not focusing on upgrading property nor helping people to overcome their difficulties, but clearance of slum without paying any compensations.

McNulty and Kliment added that in the 1960s, urban planners against these redevelopment priorities arguing that the governments tended to favor and subsidy businessmen by providing makes room for luxury facilities and houses, while forced relocation, as well as constructing highway over the relocated site of the poor. Moreover, previous experiences have shown the failures of slum clearance, such as prefabricated apartment blocks for Roma neighborhoods in Bulgaria that failed to meet the traditions and the preferences of the inhabitants which triggered the destruction of the apartment's interior finishing works by the dwellers (Slaev, 2007). Likewise, forced evictions without adequate compensations for affected households occurred in some cities in Nigeria (Daniel et al., 2015). Over time, many failures of this policy directed the abandonment of the 'slum eradication' movement.

Learning from those experiences, although relocation has been seen as the easiest way for the government to deal with urban shanty areas, bulldozing informal housings and moving a group of people from their original place to a new place does not really solve the main problem. In most cases, the consequences of resettlement are negatively portrayed in terms of lack of compensation and assistance, accompanied by the loss of social network and economic problems (Fuller, 1995).

Supported by the World Bank, a second approach was introduced as a 'site and service' policy in 1972, where the governments provided the land or building lot and essential services on which the households may build and develop their own house in the form most appropriate to their cultural requirements by using initial loan from the government (Slaev, 2007; Oliver, 1987, pp.222-224). Successful projects such as the supervised housing credit experiment carried out in a squatter settlement extension of Lima called Huascarán (Turner and Fichter, 1972, p.125).

Many countries in South America, Asia, and Africa have adopted the 'site and service' approach to solving the problem of informal settlements, where plots of lands, essential infrastructure, and possibly basic shelter, are provided, with the goal being 'slum clearance' (Reynoso et al., 2016). The core housing system is a variation of the 'site and service' approach, where one complete room structure is provided to the beneficiaries (Reynoso et al., 2016). However, local culture and living habits need to be considered in order to apply the core housing system successfully in different places.

At the beginning of the 1960s, many Bulgarian towns and villages, such as in Roma neighborhood, adopted the 'site and service' policy by building land provided with infrastructure and was made available to households free of charge, however, some later changes and interventions made the approach become inefficient; some neighborhoods were not supplied by public services and the later projects ended up become a 'slum eradication' project (Slaev, 2007). Several schemes were also initiated in Kenya; the largest was the in Dandora aimed at the lowest-income group sector, by providing a residential plot with sanitary facilities that connect to water and sewerage pipes, access to road, waste collection, and street lighting, which in the end faced many difficulties: the time consuming planning stage that took six years as well as management problems and misunderstandings arising from poor communication (Oliver, 1987, pp.223-224).

In practice, 'site and service' policy are too rigidly controlled the site layout, servicing systems, plot size, and regulations, as well as minimalizing the involvement of community in the planning (Oliver, 1987, p.224); the degree of authorities control deters individual initiative (Lloyd, 1979, p.26). Due to the complex issues that 'site and service' projects require to consider, this approach was also identified

as inefficient, for instance, access problems due to the peripheral locations of the new settlement[6], low rates of development, as well as financial difficulties: how much can local government provide or borrow, how much can be expected in repayments from householders, at which rate of interest and over how long (Slaev, 2007; Bah et al., 2018; Oliver, 1987, p.224). Moreover, this scheme is unsuitable to apply and do not resolve the problems when the participants are truly homeless, jobless, and penniless to be eligible (Oliver, 1987, p.224)[7].

Learning from both 'slum eradication' and 'site and service' practices, we can see that despite the attempts to solve slum problems, many uncontrolled settlements continued to grow. The probability might be that both policies did not give enough consideration to user's needs and preferences, where aspiration and participation from the local community were restricted. Certified professional sometimes assume himself knows more than the 'uneducated', reducing his ability to listen and learn about situations different from his own social and economic experience and impose his solutions to those who are not strong enough to resist (Turner, 1972, pp.146-147). The disability to understand these communities in terms of culture, socio, and economy then leads to the expansion of informal settlements despite some attempts to stop them (Moustafa, 2014).

The problems of prior approaches caused the emergence of a new policy, which became a new trend after the UNHCS Habitat Conference in Vancouver in 1976 and then dominated the policies of the UNCHS and the World Bank since its establishment (Kellett and Napier, 1995; Slaev, 2007). This policy formulated the 'squatter and slum upgrade' approach aimed to improve the living conditions in existing slums by providing public amenities and improving public spaces, streets, and infrastructure.

One model of settlement upgrading projects were offered in 1969 by the Kampung Improvement Project (KIP) projects in Jakarta, Indonesia, that were concerned with upgrading physical infrastructure: roads, footpaths, drainage, canals, water supply, sanitation, solid waste disposal, as well as educational and medical facilities (Oliver, 1987, p.224; Devas, 1981). This program, which was fully financed by the city government with loans from the World Bank since 1974, aimed to increase the standard living of *kampong* (village) households through the implementation of an integrated physical, social and economic package which will: reduce deficits in household needs of essential public services; increase human capacity, income, and productivity; increase households' and enterprises' control of capital assets; promote social and economic stability and reduce vulnerability within kampong; and promote self-help and self-reliance among kampong people (Devas, 1981). Adopting modest standard and regulation in the program, KIP program did not concern with housing, however it was found that as security and their settlements upgraded, households gradually improved their dwellings and managed community development program that included literacy, health, livelihood generation, security, and environmental development (Oliver, 1987, p.225; Payne, 2006, p.172).

In addition to 'squatter and slum upgrade' program, governments effort to legalize land in existing neighborhoods, and to provide planning services, basic infrastructure, and eventually funding for improvements to existing units, while imperfect in many respects, seem to be realistically directed and offer some hope for consolidation of viable neighborhoods for low-income residents, such as the study case in Ecuador (Glasser, 1988). However, some Third World officials dislike the idea of upgrading poor areas, arguing that an upgraded area still looks like a slum, even though life may have become a little better for the dwellers (Palmer and Patton, 1988).

Aside from three slum handling approaches discussed above, several efforts were initiated by international competitions to design dwelling units for rehousing squatters, such as the Proyecto Experimental de Vivienda (PREVI) by the United Nations and the government of Peru. The winning

[6] To minimize costs, governments bought land relatively far from city centers, but this land was also removed from potential jobs, thus, some people sold their units and returned to their original homes to be nearer employment opportunities (Palmer and Patton, 1988).

[7] The World Bank admits that its sites and services projects, which attract the relatively better-off among the poor, are affordable only to those above the 20th percentile in income (Palmer and Patton, 1988).

schemes were built, but several years later, the houses were heavily altered by the residents, indicating a lack of consideration of user's needs and preferences in the design. Five years later an international competition was held for the design of 500 dwelling units for Dagat-Dagatan, an area of Manila scheduled for rehousing of 17,000 squatters; however, the winning design was not carried out (Oliver, 1987, p.230). Several attempts were also made by professional architects, such as Hassan Fathy and Laurie Baker, who worked closely with the villagers 'building with people' to plan and design low-cost housing projects using traditional approach (Oliver, 1987; Özkan, 2006, pp.104-105).

International actions pioneered by organizations or individual practitioners inspire us that architects should make use of their architectural knowledge in humanitarian missions to develop socio-economic of the poor and produce a comprehensive design to solve the problems. Demolitions and forced relocations are now rare, but the ideal partnership between the state and the citizens has not been realized, not least because of deteriorating economic circumstances (Kellett and Napier, 1995). Difficulties and failures would probably challenge us, but it should not discourage us from contributing to squatter settlement improvement actions. It should also be noted from the prior experiences that achieve a successful program, the handling scheme should understand the desire and demand of communities in terms of culture, socio, and economy. Moreover, physical conditions such as the location of settlements; the land uses in them; settlement layouts; and the sizes of the lots within them can impact the success of upgrading strategies, particularly, the preference of beneficiaries for different strategies (Mukhija, 2001, pp.213-222).

4.1.4 Lessons from Prior Policies

Oliver stated in his book 'Dwelling' that the processes of building in the organization of space, details, the disposition of domestic articles and the patterns of daily use in a shelter express the values of its occupiers (Oliver, 1987, p.222). These need to be articulated and accommodated in the building of new dwellings or the adaptation and upgrading of traditional ones. However, housing provisions for the homeless by the authorities rarely take into account the culture of specific communities and seldom reflects the values of the family, where the design are drawn from rule-books and standard design rather than from the analysis of physical, psychological, and social needs (Oliver, 1987, p.222). Moreover, he continued that the research publications and technical data that support architects or authorities are not paralleled by similar support as a result of anthropological fieldwork; anthropologists have a broader and deeper knowledge of human behavior compare to those understood by architects. Consequently local government, technical advisors, engineers, architect and planners, even academics, frequently plan communities and design housing on pragmatic data with little or no knowledge of indigenous dwelling types and patterns. Even so, we cannot easily blame on authorities, architects or anthropologists for our ignorance of mankind's housing and our lack of concern over the homeless (Oliver, 1987, p.222).

Lack of success of previous slum improvement policies and actions give us understanding that finding out solutions for handling spontaneous settlement is not a piece of cake. Even if one project success at the beginning, it is not impossible that it might collapse as time goes by. Or, when a project in a specific location success, it does not guarantee success in other location even when using the same method. Many governments, professionals, academics, organization are still seeking for a solution. Moreover, this gives us a perception of the importance of involving multi-disciplinary studies in performing any slum upgrading projects; an effective upgrading program can only be achieved when multi-discipline experts are involved. Multi-disciplinary teams, consist of architects, planners, engineers, economists, anthropologists, sociologists, as well as management experts, are able to avoid wasted efforts and provided a more stimulating professional environment to work in, since each team member was able to see issues from a different perspective than their own and broaden understanding (Payne, 2006, p.167).

The common concept of a slum overlooks the strong social and cultural networks that exist in such areas and the benefits they provide to poor societies (Palmer and Patton, 1988). This does not mean to

romanticize such areas, but the fact that spontaneous settlement in general cause negative impacts, such as towards deteriorating environments, should motivates us to stop or control the expansion of slum dwellings, while on the other hand, when considering that those houses expresses honesty and modesty of poor society, rather than demolishing their existence, upgrading or betterment the current condition is a desirable solution to deal with slum and spontaneous settlement. It is also important to acknowledge the nature of the 'conditions of existence' experienced by the inhabitants of informal settlements; the fact that urban informal settlement is constructed in dominant situations of artificial constraint should not lose our interest on it (Kellett and Napier, 1995).

We have to start seeing spontaneous architecture as 'slums of hope' rather than holding on to narrow-minded sentiment that 'slums is despair'. Spontaneous dwelling is incremental buildings that emerge and continue to expand towards progressive development. There are some real-life examples where we can learn from.

Most spontaneous dwellings start as temporary shacks, but as time goes by, they slowly develop into a thriving residential neighborhood, such as in Arequipa, Peru (Turner, 1972, p.131). Different from the settlement in Arequipa, which the improvement was unaided self-help, the squatter dwellers in Miraflores were fortunate enough to obtain de facto ownership, hence they quickly converted their initial encampment into a more standard home (Turner, 1972, p.131). The slums Musi riverside inhabitant in Palembang, Indonesia, also improved their house and environmental infrastructure, indicating their struggle to upgrade the quality of their dwellings (Sarwadi, 2002). Informal houses in the spontaneous settlement of Azul, Dominican Republic, were initially built as minimum dwelling pattern, then, as the dwellers had adapted their lifestyle to the current situation, the houses were improved and expanded according to dwellers capabilities, needs, and life cycle stage, through room addition as well as upgraded furniture (Reynoso et al., 2016). The progressive development of such settlement takes several years, fifteen years or so, before they take on the character of a more or less fully developed residential neighborhood (Turner, 1972, p.131), nevertheless, we should appreciate and support their effort by assisting them to upgrade their settlement using our 'professional' knowledge.

4.1.5 Studies on Slum Settlement

Most studies on contemporary spontaneous settlements in general emphasis on various aspects of processes rather than product, much more about the ways in which settlements come about than on the characteristics of the resulting built environments, while some emphasis exclusively on economic, political, and social aspects of living in such settlement; the relation of the built environment to culture as integral components in the housing equation had been discussed very little (Rapoport, 1988, p.51; Kellett and Napier, 1995).

Slum and squatter shelters are far from what people perceive as beautiful, hence many authorities and researchers do not acknowledge them as a 'product of creativity'. In fact, spontaneous settlements, like all human environments, do not just happen; they are designed in the sense that purposeful changes are made to the physical environment through a series of choices among alternative available (Rapoport, 1988, p.52). Nonetheless, some argue that in the spontaneous settlement, the alternatives, the constraints, and the choices made are informal and are not based on explicitly stated models or theories (Rapoport, 1988, p.52), in other words, the constraints are perceived as unnatural or artificial. Aside from the 'fake' financial restraint, squatter settlements are usually located in manmade 'institutional' or 'professional' environments, rather than being located in natural environments (Kellett and Napier, 1995).

The thing is that many people deny the reality of the extreme conditions of poverty and injustice are increasingly prevalent throughout the Third World (Kellett and Napier, 1995). Spontaneous vernacular architecture, built from need and without formal design, reflects an urban lifestyle that could inform replication (Farrell, 2013), which, therefore, urban squatter and slum houses are products of economic constraints of people in the developing countries. Squatter settlement represents a complex and dynamic history, effort, cultural process, constraints, freedom of expression and creativity, as well as the social system of its inhabitant (Setiawan, 2010). Thus, humane and appropriate housing will only

be achieved when dwelling as an artifact is again possible for every culture through the fully realized potential of dwelling as a process (Oliver, 1987, p.223).

4.1.6 Aims of the Study

In spite of its lag and clutter, the urban indigenous settlement has a rich and unique history, hence the potency, effort, struggle, pressure, and freedom of its inhabitant should be valued. Building and maintaining infrastructure and public amenities is a major step toward formalizing and upgrading informal settlements (Tsenkova, 2012). Upgrading is limited to improving infrastructure in the neighborhood, yet, it has encouraged the residents to improve their house (Nazire, 2016). In some riverside settlements, improving the houses and environmental infrastructure have become a part of the habitual activities of inhabitants, which indirectly indicate their hope that the government should be involved in the improvement process (Sarwadi et al., 2002). However, it should be noted by the government that the upgrading strategy should not segregate those neighborhoods in the periphery of the city from those in the inner-city, rather establish integrated planning that harmonizes the central city and suburbs by effectively boosting the positive characteristics of each target area. The plan, yet, should not regard the city barely as an object for infrastructure development, rather it should be primarily concerned with the citizens' livelihood aspects, the intricacies of its uses and activities, as well as to preserve each place with their own identities, rooted in a regional and/or historical context (Prayitno, 2016; Tibbalds, 2001).

Considering the richness of the cultural value of the place or the inhabitants, this study is conducted to prove that not all spontaneous houses that built along riverbanks should be relocated. Using our case study in Banjarmasin, this study urge to seek an understanding of the livelihood, social activities, and the conditions of existence of slum riparian settlement. The research attempts to formulate what kind of physical improvement can be applied in such settlements. The result is expected to be applicable as global concepts for physical improvements of slum riverside settlement in the developing countries.

4.2 Slum Riverside of Banjarmasin

4.2.1 Slum Problems in Banjarmasin

The city of Banjarmasin in Indonesia is renowned for its unique waterscape and has come to be called 'the City of a Thousand Rivers' as numerous rivers flowed through the city in its earlier days. However, modern development has affected the disappearance of most rivers, resulting in that only 102 rivers are now left in Banjarmasin as stated in the Decree of the Mayor of Banjarmasin No. 158 in 2011.

The Banjarmasin City initially began from traditional settlements which grew spontaneously along the streams, forming the term known as 'river culture'. 'River culture' refers to the adaptive characteristics of riverside dwellers in physical, social, and economic life towards the river (Goenmiandari, 2010), showing the dependency of the inhabitants towards it as a source of drinking water, a place for bathing and washing, transportation modes, and so on (Michiani and Asano, 2017) (Figure 4-3). Together with urban growth, living above water becomes an identity and a peculiar characteristic of this city.

Notwithstanding, the overlapping and sporadic development of urban riverside dwellings in Banjarmasin causes spatial and physical problems such as the poor condition of houses, walkways, a lack of water supply, sanitary facilities, and waste management facilities, as well as pollution and environmental decay resulting from household waste directly disposed to the river (Prayitno, 2013; Sarwadi et al., 2002; Seelig, 1978). Their invasion on the floodplain and greenbelt has also become such an issue that the local government sees a need to revitalize the floodplain by relocating some riverbank houses, except for some settlements that are permissible with the condition of no remodeling, additions, and repairs as stated in the Banjarmasin River Act. The facts provide enough reason for the handling of

Figure 4-3. Taking a Bath at a River in Banjarmasin, Indonesia
(Source: Field Survey)

the riverside slums problem to be taken seriously and that the numerous factors stated above need to be taken into account.

To deal with the issue of deteriorating neighborhoods, Banjarmasin is being targeted by the local government to reach zero slum areas by 2019. A plan, that refers to the National Policy 2015-2019 for managing deprived areas called the '100-0-100' program, has been established (Bappenas, 2014). This is a collaboration program between national and local governments achieving 100% clean water distribution for society, a 0% slum area, and 100% sanitation systems installed.

One of the appointed areas of this program is the riparian slum settlement in the Kuin Utara sub-district. Although basic instructions were drafted by the central government, the finer implementation guideline detail will be under regional government authority. Nonetheless, there is not yet any detailed principle approach or scenario on how to manage each target area in Banjarmasin, as well as in Kuin Utara. It is likely that the proposed plans only suggested improvement strategies without any standards for their realization.

4.2.2 The Traditional Area of Kuin Utara

Located in the confluence of Kuin and Barito Rivers, the Kuin Utara urban village is acknowledged as an old area in the fringe of northern Banjarmasin (Figure 4-4). The downstream of this sub-district is the embryo of the city, where the oldest Banjarese village developed (Michiani and Asano, 2016). Today, that former village has expanded from land to the river embankment and above water, whether it is floating or erected overflowing stream (Figure 4-5).

Based on the Decree of the Banjarmasin mayor No. 488A/DPU-CK/VII/2009 about the priority of handling squatter areas and traditional settlements, Kuin Utara is one of five sub-districts, which is appointed as a traditional area in Banjarmasin City (Rahmitiasari et al., 2014). The local government has also designated the area of Kuin Utara as one of the city's cultural heritage sites. As stated in the Spatial Planning Act of Banjarmasin City 2013-2032, several areas in Kuin Utara have been allocated for tourism and strategic areas for socio-cultural purposes. It can be agreed that Kuin Utara, also known as the Old Banjar, has prominent socio-historical values worthy of being paid attention to.

Like other riverbanks, the riparian area of the Old Banjar is encountering disintegration of not only physical but also socio-cultural aspects. The local government has targeted the slum riverside settlement of Kuin Utara to be placed under the 100-0-100 program. However, despite its beneficial historical background, this urban village is not being put into the current planning priority due to its unstrategic location on the outskirts of the city.

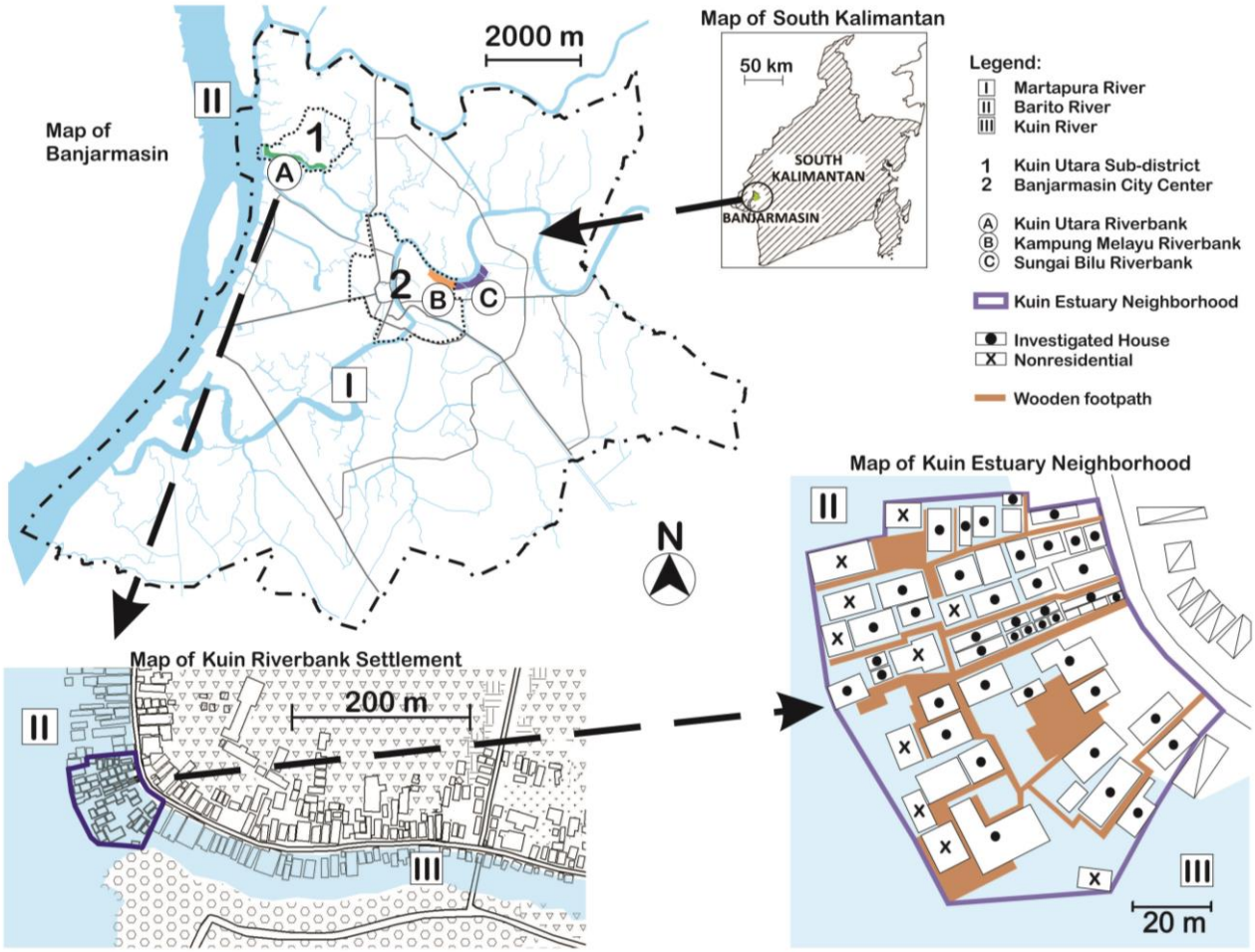

Figure 4-4. Location of Target Area
(Drawn by Author)

Figure 4-5. Riparian Settlement at Kuin River in Kuin Utara Sub-district, Banjarmasin
(Source: Field Survey)

The investigated area is approximately 0.75 hectares, which consists of 0.54 hectares of hardscape (walkways, building, and soil ground) and 0.21 hectares of waterscape. The survey result shows that there are 49 houses in the target area with the average number of residents per house being 4.26 persons. From that number, the total population can be estimated at 208.83 persons.

According to the Indonesian National Standard Number 03-1733-2004, the riverside part of Kuin Utara sub-district that was investigated is highly populated with the total of 278.44 people per hectares, while the land is density 386.72 people per hectares. The population is dominated by productive age groups: young ages (under 25 years old) as the major group, followed by the middle age group (25 to 49 years old).

4.3 Literature Review

In order to rehabilitate river's ecosystem, many still see the "best" solution for slum riverside dwellings is resettlement or relocating them to vertical communal housings while widening the river (see Soemardjono and Gusma, 2014). That kind of opinion is not totally wrong, but it cannot be simply applied without any detail investigation or deep understanding of the target inhabitant. Some only consider physical potency of the area, without considering socio-culture and economic as well as the future livelihood of the inhabitant.

According to Laurens (2012), the Surabaya city government published a local regulation in 2007 that allowed limited settlement's existence along the riverbank and gave the community five years to upgrade their settlements instead of relocating them. The study by Kellett and Napier (1995) argued that the consolidation process of spontaneous settlements made by their residents' as a gradual movement away from what is regarded as informal characteristics toward increasing formality. The authors successfully demonstrated why and how we must revise our view of spontaneous shelters and attach appropriate importance to the study of the built environment, nevertheless, they provided no concrete concept or solution that we can adopt to deal with slum and squatter neighborhoods.

Aziz and Shawket (2011) published a study to formulate a strategy of upgrading slum areas in developing countries using vernacular trends to achieve sustainable housing development. According to the questionnaire result, they deduced three phases for upgrading strategy. The first phase was *planning adjustment* as a primary stage for upgrading any required area; including the planning of layout and building lines, space networks, town cramming and density, street width, the form of urban tissue, and road hierarchy. The second phase was called *façade adjustment*, focusing on improving the visual image of the whole through changing buildings' facades, such as opening, materials and colors, elevation width, block size, and texture. The last phase was urban image adjustment by respecting landmarks and edges of the surrounding environment. Aziz and Shawket have proposed a solution for physical upgrading of slum areas, however, they did not provide any information related to human aspects.

4.4 Method and Limitation of the Study

The selection process for the case study location was performed using three steps (Figure 4-6):

Firstly, the data collection begins with general visual surveys of the riverbank settlement at the confluence of Kuin and Barito Rivers (Figure 4-4). We carried out the observation several times in 2014-2017 to notice the typical pattern of the house expansion. The buildings along Kuin River form only one layer, built at the edge of the river. Approaching the mouth of Kuin River, where it meets a bigger river called Barito, the layer of settlement becomes thicker. The houses overlap one another and occupy not only the riverbank but also expand forward above the water body up to 4-5 layers. The layer thickness of the dwellings that face the Barito River are even greater, up to 10 layers or more, subsequently, the river cannot be seen from the main street.

Figure 4-6. Process for Selecting the Location

Figure 4-7. Kuin Utara Estuary
(Source: Field Survey)

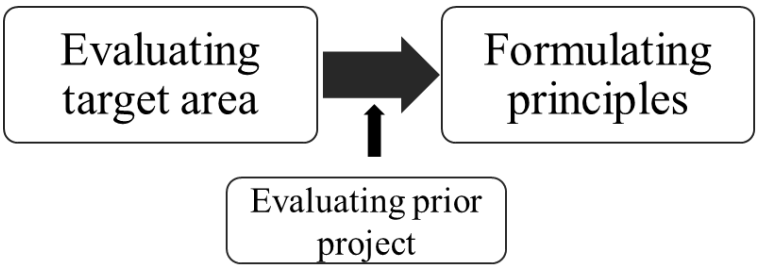

Figure 4-8. The Flow of the Analytical Process

Secondly, the investigation of this study is limited to the settlement at Kuin Estuary (Figure 4-7). Basically, an estuary is a popular place for settlement as is has a more dynamic environment. The riverbank area of Kuin Estuary is cramped with residential units but less crowded than those fully facing the Barito River, thus it is easier to study the socio-cultural pattern of its inhabitants. Then, certain physical borders were determined to define the range of the investigated area.

Thirdly, a questionnaire survey was conducted in September-December 2017 to understand the basic characteristics of the inhabitants and their living conditions, including daily activities and interaction between neighbors. Although this study focuses on the physical upgrading of the public infrastructure, socio-cultural background information of the dwellers is needed as it indirectly determines whether the project will fit the users or not. From the total 49 target houses, 42 houses were interviewed, while 7 were not available to be interviewed. Non-residential buildings such as shop and storage were not investigated.

Secondary data was also collected by interviewing some Banjarmasin City government officers[8] at the Housing and Human Settlement Office, the Government Tourism Office, and the Public Works and Spatial Planning Office. The interview allowed us to observe the existing Banjarmasin government projects regarding slum upgrading in the settlement of Sungai Bilu and Kampung Melayu.

The results of the questionnaire were evaluated beforehand to profile the inhabitant characteristics and to gain knowledge of the problems in the study location (Figure 4-8). Evaluating some existing projects helps to define planning concepts in managing riparian shanty dwellings in general. Both lacks and good points of previous programs are worthy of consideration to form a better upgrading proposal. In the last part of the discussion segment, the suggested planning standards were implemented in the target area. The scope of the study is limited to the public domain, not those owned by individuals, hence, no invasion of private properties.

4.5 Field Observation

4.5.1 Inhabitant and Living Space

4.5.1.1 Inhabitant and Living

The former Islamic Banjarese kingdom that was settled in the area of Kuin Utara had a great influence on the beliefs of the locals, resulting in a domination of Banjarese Muslims inhabiting the area of the Kuin Estuary riverbank. Most of the residents were natives of Kuin Utara (66.7%), while the rest were migrants from other areas (Table 4-1).

Both the original inhabitants and the migrants had motives to live near family, whether living in a residential space inherited from parents or building their own house. The main houses of the parents were built on land while the children set up secondary houses of their own along the riverbank. This phenomenon shows the tendency of suburban inhabitants to live in a group with their family and relatives, constructing a family kinship within the neighborhood.

The dwellers mostly resided as a nuclear family (64.3%), with the households' size distributed between small-sized (52.4%) and middle-sized (40.5%) family. Only a small percentage of the inhabitants were living in a large household (7.1%).

That of riverbank occupants labeled as low educated people is affirmed by the investigation result of this area. The amount of compulsory education that should be completed by every citizen in Indonesia is 9 years (now 12 years). In fact, almost half of the head of households (47.6%) in the target location had only attended elementary school. This phenomenon shows that poor people tend to work rather than go to school.

Despite living above or next to a river, a substantial number of residents do not work as river workers, rather as informal sector workers and laborers. Most of them work as vendors, such as

[8] Mr. Titok Prasetyo (Housing and Human Settlement Office), Mr. Mokhamad Khuzaimi (Government Tourism Office), and Ms. Prita Sulistiani (Public Works and Spatial Planning Office)

cellphone credit sellers, greengrocers, furniture sellers, timber merchants, or staple food sellers. Only 9.5% work as boat drivers. The Statistics of Banjarmasin has recorded the decreasing number of river transports from 194 to only 110 boats being left as of 2016 (Statistics of Banjarmasin, 2017a). This indicates that only a few of today's' riparian dwellers occupations in the target area depend on the rivers. Rather, waters' edge housing provides an affordable living place and inexpensive economic activity for a low-income society.

According to Statistics of Banjarmasin (2017b), the average monthly expense per person of Banjarmasin City in 2017 is IDR 1,581,972, while the minimum wage is IDR 2,290,000 (Statistics of Banjarmasin, 2017a). The result shows that 54.8% of the family backbones' income was below the average monthly expense per person, while 23.8% obtained income more than the average expense per person but under the minimum wage of Banjarmasin. An inhabitant who earns less than the average monthly expense per person can be classified as a very low-income class, while those who acquire higher than the average monthly expense but lower than the minimum wage can be labeled as a low-income class.

However, in fact, some very low and low-income class societies have the ability to maintain, through struggle, their required living standards. Despite earning below the average wage, compared to a penniless immigrant family who sheltered in proximity to sources of livelihood, low-income households who have already sheltered permanently are able to maintain a normal household at low but locally acceptable standards (Turner, 1966). Some other family members will also financially support their head of household by working to improve their economic situation (Table 4-1). Based on the criteria from Turner and Fichter (1972), they can be classified as upper-lower sector with dependents and with a much improved economic status to lose. Their need for identity or social recognition may increase if opportunities for higher incomes shrink as time passes. Opportunities for escaping their present situation will be less important for the head of the household, although it may still be very important for their children (Turner and Fichter, 1972).

Table 4-1 Inhabitant and Living

Description			Total	(%)
	Origin	Original inhabitants	28	66.7%
		Outside Kuin Utara	9	21.4%
		Another riverside area	1	2.4%
		Out of the city	4	9.5%
	Move-in motivation	Workplace	8	19.0%
		Family reason	23	54.8%
		Water resources	2	4.8%
		Cheap living	2	4.8%
		No specific reason	7	16.7%
Household	Type	Single	2	4.8%
		Nuclear	26	64.3%
		Extended	13	31.0%
	Size	Small (1-4 persons)	22	52.4%
		Middle (5-7 persons)	17	40.5%
		Big (>7 persons)	3	7.1%
	Education level (head of household)	Elementary	20	47.6%
		Middle High	7	16.7%
		High School	13	31.0%
		University	1	2.4%
		No answer	1	2.4%
	Head of Household Income*	< IDR 1,581,972**	23	54.8%
		IDR 1,581,972 - 2,290,000	10	23.8%
		>IDR 2,290,000***	9	21.4%
	Household Income	< IDR 1,581,972**	15	35.7%
		IDR 1,581,972 - 2,290,000	9	21.4%
		>IDR 2,290,000***	18	42.9%
Utility	Electricity	State-owned electricity company	40	95.2%
		State-owned electricity company (share with neighbor)	2	4.8%
	Drinking water	River	2	4.8%
		State drinking water supply	29	69.0%
		Retail	10	23.8%
		Share	1	2.4%
	Water Pipe	Installed	32	76.2%
		Not installed	10	23.8%
	Sanitation pipe	Installed	19	45.2%
		Not installed	23	54.8%
	Water closet	Private without septic tank	16	38.1%
		Private with septic tank	20	47.6%
		River	6	14.3%
Total number = 42 interviewed household				

Description:

*Income of the main financial supporter of the family (backbone)

**IDR 1,581,972 is the average monthly expense per person in Banjarmasin City (Statistics of Banjarmasin 2017)

***IDR 2,290,000 is the minimum wage of Banjarmasin City in 2017

4.5.1.2 Dwelling and Utility

A particularly substantial number of investigated houses were constructed between the years 1970-1990, stood on the riverbank and above the stream as piled wooden structures. Despite endangered by seasonal flooding that may raise the level of waters above floor levels, riverside society 'prefer' to stay considering strong incentive to live near rive such as food stocks (Oliver, 1987). To adapt with the natural condition, they need to protect their dwelling by either floating it on water erecting it on piles.

Stilt structure is commonly used as house foundation for the marshy soil of Banjarmasin, in case of riparian houses, pillar construction is used to adapt to river tide or rise and fall of the river elevation. Moreover, using pillar structure may remove accumulated heat under the building through air circulation (Purwanto and Darmawan, 2018) and the river that flows beneath under the house; this cooling down system is suitable for a tropical-humid area like Banjarmasin. Contemporary riverbank settlement that built on a wooden pillar is quite peculiar. However, in Indonesia, these kinds of structures can also be found in few places such as in Wonokromo riverside settlement in Surabaya (Bawole, 2009), Musi riverside settlement in Palembang (see Sarwadi; Fitri et al., 2017), settlement along Kahayan and Arut rivers in Palangkaraya (Sangalang and Darjosanjoto, 2011; Purwanto and Darwawan, 2018).

Residential buildings in the target area mingled together with shops and storages (Figure 4-9). Aside from wooden piled structures, one traditional floating house and one floating shop could be identified during our first visit in 2014, although both were abandoned. Sadly, according to our last visit in 2017, the floating house one was disappeared, thus only the abandoned shop was left. Compare to stilt structures, the existence of floating houses are more distinctive, rare, and decreasing over time because of the growth of the city, not only in Banjarmasin (Dahliani et al., 2015), but also around the world, which can only be found in a small number of areas such as in Musi riverside in Palembang (see Sarwadi;) and Thailand (Denpaiboon et al., 2000).

A large number and various timbers are produced by the vast rainforest of this region for human usage, thus, wood became a typical material for foundations, floors, and walls of the common houses in Banjarmasin, although that material is currently facing scarcity due to deforestation. Moreover, wooden is a porous and lightweight material that is suitable for an environment with tropical-humid climate and swampy soil (Purwanto and Darmawan, 2018). In addition, the roof structure of the target houses is gable-style roof covered with zinc; typical roofs for contemporary Indonesian vernacular houses are either gable or hip roof, as an adaptive response to heavy rainfall in the area. The material for floor construction of the target houses is also wood, but for interior, plastic sheets are used as decorations to cover the wooden floor. The observation shows that the same as traditional vernacular houses, material and building construction of contemporary indigenous settlement were responsive to what is called as 'existential context' or constraints such as climate, topography, availability of material, income, and so on. Therefore, the choice that they made, are more suitable to their taste and need than to legal standard that is decided by the government (Bawole, 2009).

Figure 4-9. Economic Activity Mapping
(Source: Field Survey)

The investigated houses were mostly built as a one-story and a single-unit detached house. Some others were multiplex houses that were shared with relatives or even strangers. Most of the houses were relatively small in size, not larger than 100 square meters, especially those built on water tend to have a smaller size than those on the edge between river and land. The dwellers typically tend to prioritize conventional minimum standard dwelling units with some modern conveniences. A small and minimum standard house was chosen as an adaptive response to economic constraint, including construction and maintenance cost, and limited space. Having a house with large space is not the priority of low-income society, they tend to modify and creatively use their narrow space as much as possible or as effective as possible to fulfill their need. Thus, many inhabitants tend to utilize one room for more than one function.

The riverbank dwellings in the study location were labeled as informal houses since none of them possessed an official certificate. The houses built before 1998 were authorized by an unofficial letter called *segel adat*[9] given by the head of sub-district. Notwithstanding, according to UN-Habitat, in developing countries, informal agreements between owners and tenants play a more important role in securing tenure than titling. In most cases, land in both rural and urban areas is neither registered nor is there an official title for it (UN-Habitat, 2006). Although the most important priority that determines their longer-term plans is the security of not being evicted, the importance of land tenure and freehold ownership will only increase as income increases (Turner and Fichter, 1972).

The procedures to obtain building permit and security of tenure are often very complicated, time-consuming, as well as too costly for urban poor, thus driving them to violate the law by the illegal invasion of public land. Moreover, even without any legal certificate for their house and land, with the situation in Indonesia, it is still possible for them to access public utility services, hence no practical benefit to having a legal title (Hamidah et al., 2017).

Also in Indonesia, the lengthy process of spatial planning has often led to delay in transforming such planning into regulations, which gives adequate time to the squatters to stabilize their territory by improving their shelter (Hamidah et al., 2017). This shows that even without any legal status, those spontaneous houses may transform themselves from ‘substandard’ and slum housing to ‘standard’, in terms of physical and environmental quality.

Although electricity had been distributed to every house in the target area, the demand for drinking water had not been fully addressed. However, riparian dwellers with clean water system connected to their house still tend to grab their bucket and go to the river to fill it with cashless water provided by the river, although slightly less dependent, as water supplied by the municipal is low in service and not free. The installation of water pipes compensated 76.2%, while the installation of sanitation pipes compensated only 45.2%. From the result, we can see that the activity of riverbank dwellers to pollute rivers through the disposal of human excreta is due to lack of infrastructure.

[9] There are many kinds of land ownership in Indonesia, such as SHM, SHGB, SHRS, Girik, and Letter C.

4.5.1.3 Activities and Environment

The residential units in the cramped Kuin estuary neighborhood were connected by wooden pathways at the size of an alley or passage, approximately 60 – 120 centimeters wide, with an elevation almost the same as the riverside (Figure 4-10). As in the typical slum and squatter area, the houses were built along the trails with almost no distance between the front door and the footpath. Typical house design in Indonesia has veranda to adapt with tropical climate and as a space for interacting with neighbors or for accepting unfamiliar or uninvited guests (those who are neither acquaintances nor friends, such as salesman or collector)[10], due to the density of this neighborhood as well as other slums riparian settlement, most of them omit the provision of front terrace. As a replacement, the inhabitant of such neighborhood use the public footpath in front of their house as a de facto veranda for social interaction (see Reynoso et al., 2016). The dwellers even leave their house door open, showing privacy and security as having less priority for slum dwellers. It is common in Indonesia to let the door of their house open, to show others that they are home and as a hospitality expression that they welcome any visitors. However, Indonesian societies with higher incomes tend to build barriers around their properties with a yard and fence, to prevent intruders trespassing onto their properties and invade their private space inside the house. This indicates that the level of income determines the level of openness and security; the lower the income, the lesser sense of privacy they have.

Due to the limited space, no designated public space can be found in the target location. The inhabitant utilizes neighborhood alley not only as a walking pass but also for open space, social interaction, as well as relaxing and enjoying the nature at the river edge (Figure 4-11). Also, due to limited space, they 'creatively' modify or occupy alley for personal use, such as parking (Figure 4-12), shops, hanging laundry, put personal belongings, and so on. In such kind of settlement, the border between public and private space is unclear; for them, public space is basically shared space where it is also tolerable for some part to be used as private space. This shows the flexibility of informal settlement, that they are not bound by technical boundaries or rules.

As in many other urban villages, neighborhood alleys have become an alternative shared space to gather and to interact with neighbors who have residential units that do not have front yards (Prayitno, 2017), as well as to chat with neighbors, which has been a regular part of Indonesian cultural activity especially in rural areas (Michiani and Asano, 2017). Due to the wetland characteristics of Banjarmasin, many of these narrow lanes are formed as wooden boardwalk alleys that pass amongst houses in the neighborhood. This confirmed the importance of wooden footpaths serving as socio-cultural spaces for the riparian inhabitant.

The usage of alleys as 'common space' was determined by unwritten rules of time-sharing: housewives occupied the space during the daytime hours after sending their children off to school, while feeding and taking care of their younger kids. Children and youth took their turn after school until dusk. Some male grown-ups also took over space after returning home from work.

It is impractical and often impossible to have a designated playground for children in a congested urban village. The unavailability of space has meant that children entertain themselves by playing along the alleys, river, and in any possible space (Figure 4-13). Notwithstanding, space for children has been gradually taken away as the condition of wooden paths worsen, as well as by the occupancy for private uses and as vehicle lanes (Setiawan, 2010). They often go to land to play in the yard of their neighbors or of a mosque in the village. Aside from being a worship place, Indonesian societies commonly utilize a mosque as a space to interact with their neighbor. Currently, there are one mosque and 13 smaller mosques in the Kuin Utara sub-district (Statistics of North Banjarmasin, 2017).

[10] Basically, veranda in Indonesian culture has many functions, not only as a transitional are between outside and inside, but also as a space for interaction, relaxing, cooling down, storing goods, as well as economic purposes.

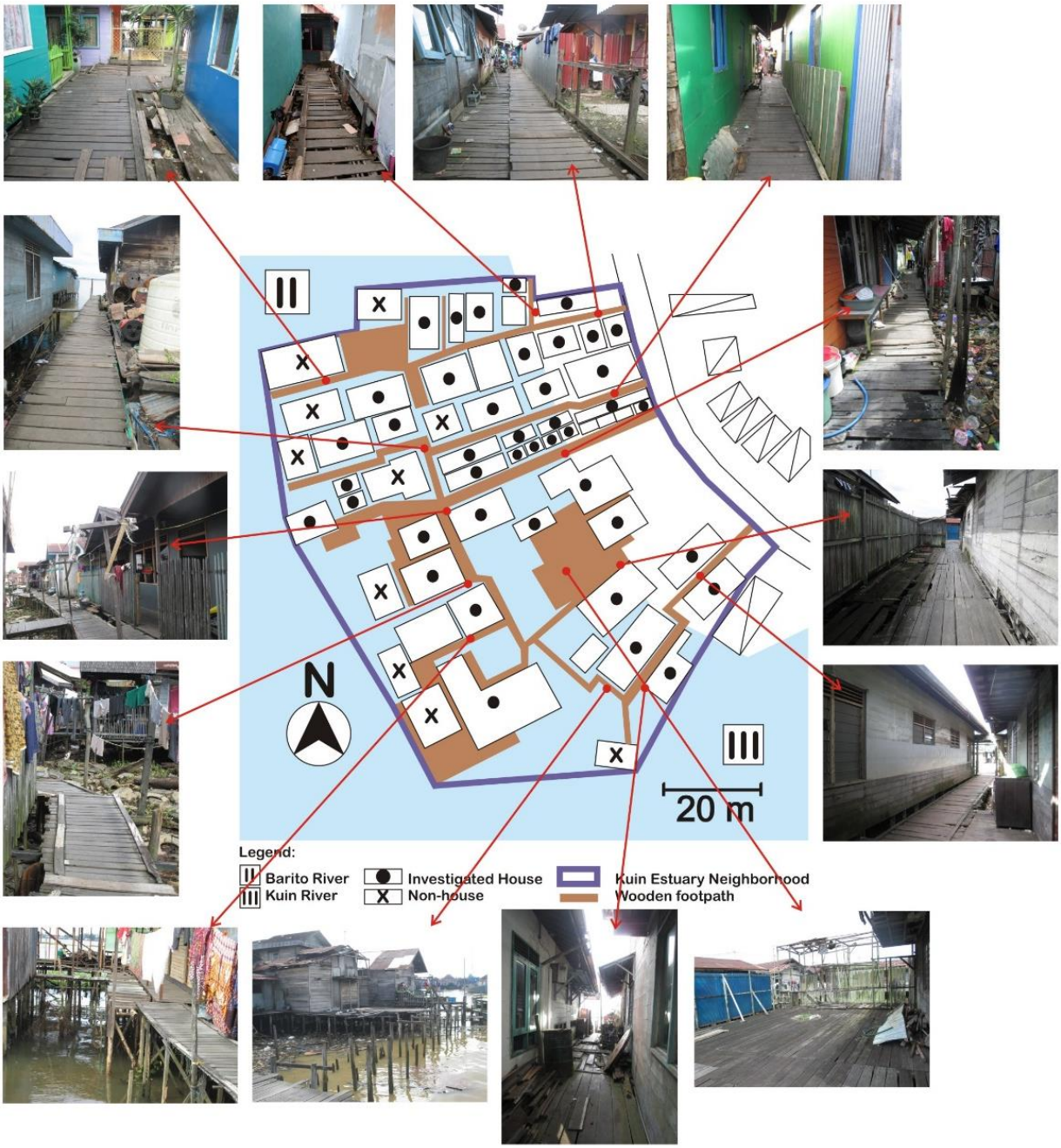

Figure 4-10. Trail Network Mapping
(Source: Field Survey)

Figure 4-11. Activities Mapping
(Source: Field Survey)

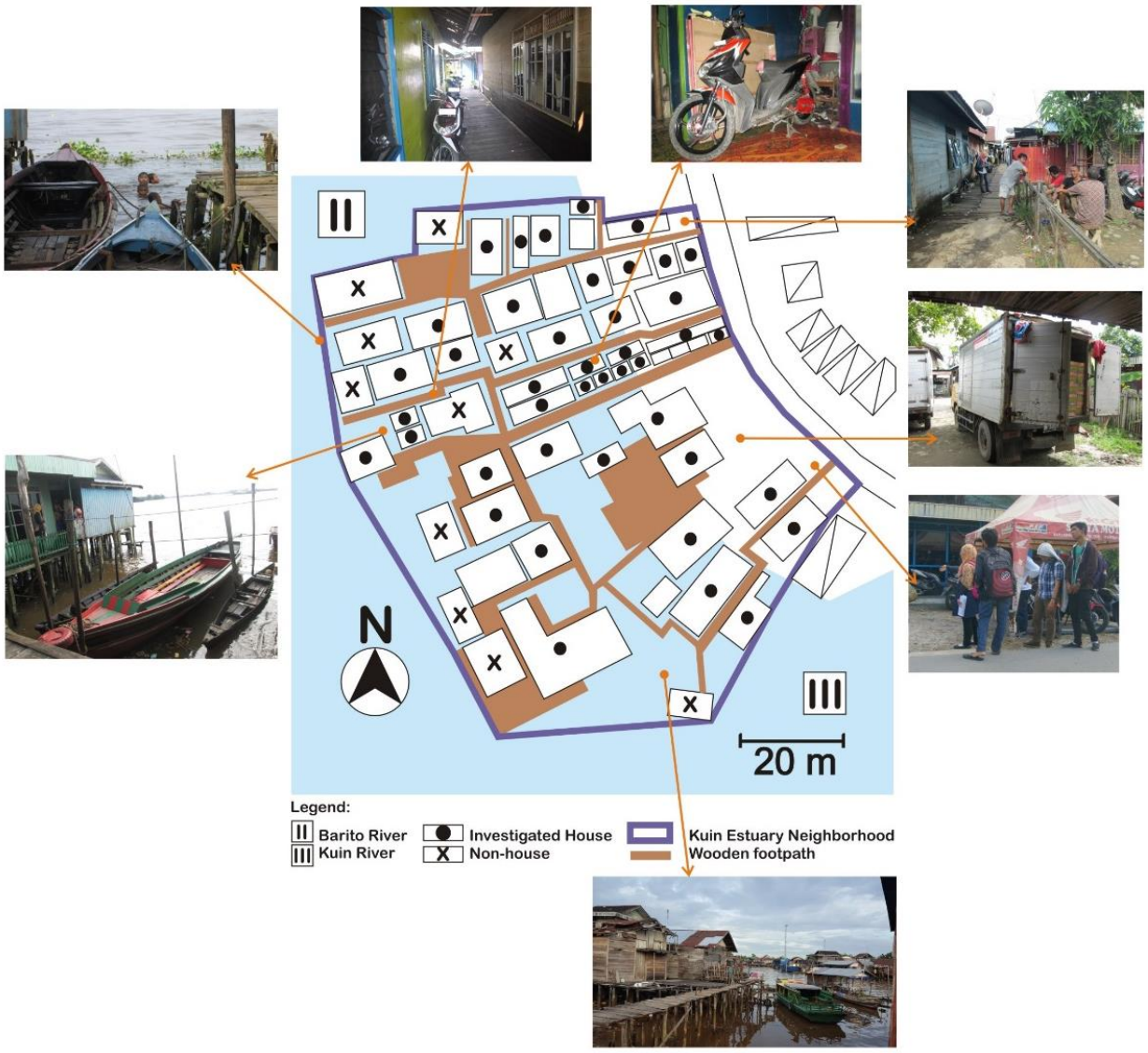

Figure 4-12. Parking Spots
(Source: Field Survey)

Figure 4-13. Inhabitant Activities in the Kuin Estuary Settlement
(Source: Field Survey)

For riparian people, rivers have been very important for them in providing free water (Table 4-2). Although most of the current dwellers have stopped drinking water taken from rivers as they become aware that the water was no longer safe, washing activities including bathing and laundry are still ongoing. It should be noted that the usage of a washing machine is something exclusive and unaffordable for low-income societies, hence, hand washing of their laundry is their best manageable choice. Rinsing activities at the rivers' edge have become a custom of the riverbank inhabitants that might need to be considered, but, as the present activity is harmful to environmental health, it cannot continue unless wastewater is managed properly.

Presently, waste disposal activities are not yet effectively controlled. Some residents are aware of the importance of placing trash in an appropriate place, either in their private trash box or at a designated garbage collection point. However, some inhabitants do not seem to care about the prohibition of littering. Around 42.9% of citizens were still littering into the river, although some of them owned a private trash box at their home. Some argued that even though they knew the harm of littering, as throwing garbage into the river was the easiest and the cheapest way, they did not want to trouble themselves disposing of trash properly. This indicates that education on proper littering is still needed in this area, and probably in many other places in Indonesia as well. However, the bad habits of some riparian dwellers to throwing trash away to the river do not necessarily mean that they are the only culprits and deserve 'punishment' by relocating them from their homes, in fact, many people living in the formal and non-slum settlement also contribute to dumping their garbage to the river. What matter is, there are still many Indonesian societies lacks the awareness to take care of garbage properly.

Table 4-2 Inhabitant Activities and Environment

Description			Total	(%)
Interaction with neighbor	Kinds of activity	Chatting	32	76.2%
		Trading	2	4.8%
		Events	2	4.8%
		Nothing	6	14.3%
	Intensity	Often	31	73.8%
		Sometimes	3	7.1%
		Rare	6	14.3%
		Never	2	4.8%
Children activities place	House		23	54.8%
	Alleys		4	9.5%
	Schoolyard		2	4.8%
	River		10	23.8%
	Abstain		3	7.1%
Interaction with river	Kinds of activity	Taking water	7	16.7%
		Washing	19	45.2%
		Trashing	1	2.4%
		Buying food	3	7.1%
		Selling	2	4.8%
		Chill out	1	2.4%
		Nothing	9	21.4%
	Intensity	Everyday	9	21.4%
		Often	15	35.7%
		Sometimes	1	2.4%
		Rare	14	33.3%
		Never	3	7.1%
Washing Place	Body	House	24	57.1%
		River	7	16.7%
		House and river	11	26.2%
	Clothes	House	28	66.7%
		River	7	16.7%
		House and river	7	16.7%
	Dishes	House	29	69.0%
		River	5	11.9%
		House and river	8	19.0%
Trashing spot or method	Private trash box		13	31.0%
	Garbage collection point		9	21.4%
	Burn		2	4.8%
	River		15	35.7%
	Private and river		1	2.4%
	Burn and river		2	4.8%

Total number = 42 interviewed household

4.5.2 Local Government's Existing Projects

4.5.2.1 Location

Martapura urban river is the main river crossing the city center of Banjarmasin whose embankment has been dwelled by inhabitants, not to mention the construction of informal slum housings. In consequence of its location, Martapura River plays an important role in the city's image. Therefore, the current program of upgrading slum riverbank housing, initiated by the local government, mainly focuses on settlements along this river.

In 2015-2016, the initial project was executed in Sungai Bilu (now completed) and Kampung Melayu (ongoing), two urban villages that are located side by side at the edge of the Martapura River. Compared to the suburb Kuin Utara settlement, these villages are strategically situated right in the heart of the city (Figure 4-4).

4.5.2.2 Projects Appraisal

From observation, the physical improvements in the settlement of Sungai Bilu and Kampung Melayu can be summarized as follows.

The most notable upgrading was the change of footpath material from timber to concrete. In most cases, the construction of wooden paths is one of the biggest issues. To sustain the existence of its surrounding slum settlement, durable infrastructure is definitely required.

Footpaths were originally designated for pedestrians, but as the need for transportation has increased, people have tended to drive motorcycles along the wooden path escalating its damage. Forbidding motor vehicle use is not a wise solution for the inhabitants, rather it is essential to build robust and durable walkways. In response to that need, the local government decided to replace the original material with concrete, which is also more durable. Yet, the conversion of material had also caused a dilemma. The original wooden paths, one characteristic of riverside settlements in Banjarmasin, expressed a strong relationship with nature. The typical neighborhood timber boardwalk exists only in a few areas in Indonesia, mostly in the island of Borneo, as an adaptation to swampy lands. In other words, replacing original materials would neglect the culture and the peculiarity of riverbank settlement.

The other initiative was to build a new pedestrian trail parallel to the riverbank, with a width of 1.8 – 2 meters, creating a physical border between the houses and the bodies of water (Figure 4-14). This idea had come about in an effort to stop the further expansion of new buildings above the river. Following this new construction, the dwellers of the outermost houses along the river in Sungai Bilu settlement were instructed to change their buildings' orientation to face towards the river, as a part of beautifying the façade of riverside buildings. The promenade also targeted to level the platform, as the elevations of the existing houses were irregular. Aside from physically beautifying the riverbank, this program attempted to improve the inhabitants' behavior towards the river so that they would value it more.

Compared to the pattern of the 'outer' concrete riverbank trails in Sungai Bilu, the footpaths in the Kampung Melayu neighborhood are quite different. There was no newly built promenade in its neighbor village. Rather, the existing footpath parallel to the watercourse was improved by changing the material into concrete with fences at the interface to the river.

Nevertheless, public wooden trails in both settlements that were upgraded to concrete paving were limited to some primary passages that access the new riverbank promenade. Meanwhile, secondary and private footpaths were not affected by the project. This shows a tendency that, instead of improving the walkways for the sake of the dwellers, this 'beautification' project mainly intends to attract visitors.

Figure 4-14. Local Government Project
(Source: Field Survey)

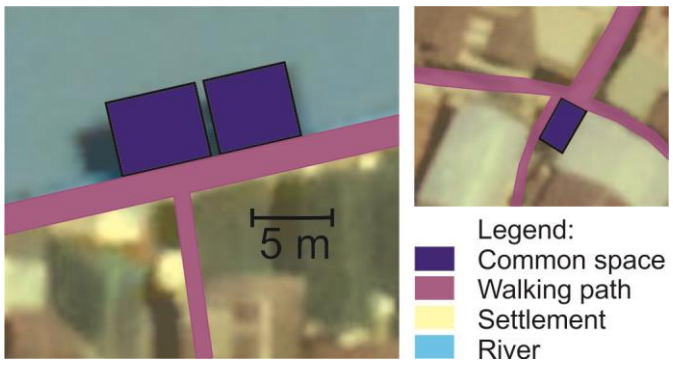

Figure 4-15. Common Spaces Pattern of the Existing Projects
(Drawn by Author)

A landscape beautification of riverbanks has to be followed by providing street amenities, such as enclosure, vegetation, common space, and so on. Fences and pergolas were built to improve the green awareness of the residents which was very low. Signage as an educational campaign, mainly stressing on keeping the river clean, was placed in some locations. Electricity poles and street lighting with overhead power lines were also installed along the street corridor.

The newly built pathway was enclosed by a railing, attached with some small doors and stairways as access down to the river, to accommodate activities such as taking water, getting on and off boats, as well as river bathing. Although people were not supposed to bathe in the river, some riparian people are unable to refrain from doing so as it had become a part of their cultural custom.

According to the river database stated in the Decree of the Mayor of Banjarmasin No. 158 in 2011, the Martapura River is classified as a big river with a width of 40 – 211 meters and a maximum depth of 12 meters; thus, it is unsafe to plunge into the river. In planning riverbank areas, the local government or any planner should have considered the safety level of each river – which was lacking from these existing projects. In case of a river where swimming is inadvisable, an intermediary between the boardwalk and river should be built to reduce the danger of falling into the water.

Boating became an important activity for some riparian inhabitants in Banjarmasin. The traditional dock called *'batang'* can still be found in many places within this city to receive boats. Aside from public *batang,* there were also *batang* owned by private individuals that attached them to their houses. Accordingly, infrastructure improvements for riverbank settlements should also respect this aspect. Although the number of boats in Banjarmasin is declining, there were still some boat owners in the neighborhood of Sungai Bilu and Kampung Melayu. Hence the local government provided gates along the railing of the newly built promenade, where the residents can moor them.

Likewise, some gazebo-like common spaces were placed at the crossed junction of some alleys either at the edge of the river or amongst dwellings (Figure 4-15). They were built to support interaction with neighbors, which in reality were misused by the residents as private use, such as private parking for motorcycle, hanging laundry or mattress, keeping bird cages, drying food, even for a stall. This attitude proved the tendency of common Indonesian people to occupy empty spaces for their own profit or private use. As a reference, there was a small project in 2013 by a private organization to build an open public space at the estuary of Sungai Jingah. The newly built facility had successfully accommodated social interaction and leisure space for the locals, but lately, it has been slightly deserted as the stall next to the facility has since closed down. This indicates a tendency that economic activities can trigger the usage of space.

The houses in the slum riparian neighborhood were relatively too narrow to provide a private parking area, thus, some dwellers parked motorcycles inside their living rooms or in a public area. In the cases of Sungai Bilu and Kampung Melayu settlements, the vehicles were parked at the gazebos or along the footpath. This attitude expresses their need for parking space. The planning process should

have noticed this need by considering the provision of communal parking combined with other functions, such as common space.

Nonetheless, infrastructure improvement of the existing projects mainly focuses on arranging permanently built street networks and their amenities such as common spaces and public furniture. Aside from burying utility pipes under the footpath, there was no enhancement for the public sanitation system. Public toilets and bathrooms without wastewater treatment and septic tanks could still be found in several spots. The garbage disposal was also not physically addressed yet, although there were some new campaigns on waste disposal education.

4.6 Formulating Improvement Standard

Since their completion, the projects in Sungai Bilu and Kampung Melayu have become pilot projects acting as a valuable reference for researchers and local governments. Learning from those projects, it can be argued that building permanent infrastructure is essential to improve the physical condition of neighborhoods and to safeguard informal settlements. In case of riparian neighborhoods, infrastructure acknowledges the 'legality' of the already built houses, but will not accept any future housing expansions. Hence, some important concepts and action plans for managing riparian deteriorated settlements through physical improvement can be formulated as in Table 4-3:

1) Arranging trail network or footpath

Arranging a suitable footpath network should be the primary step as it shapes the neighborhood pattern and gives structural support for the settlement. Trails refer to a walking labyrinth that passes amongst houses, that connects to the river, and that is placed along its edges.

The river promenade is not merely for beautifying the façade and landscape, rather it contributes to accommodate social interactions and recreational uses, and to offer ecological opportunities (Macdonald, 2018). Building riverfront walking passages or promenades in shabby riparian areas is expected to improve their physical quality.

2) Construction of public utility system

Public utilities refer to the infrastructure services provided to the public, such as water, sewage, gas, electricity, and so on. They are supplied via a network system and are fundamental for the standard of living. The distribution of utilities should be supported by proper networks installation to fulfill the needs of all inhabitants.

According to the UN-Habitat, the indicators of shelter deprivations are lack of durable housing, lack of sufficient living area, lack of access to improved water, lack of access to improved sanitation, and lack of secure tenure (UN-Habitat, 2006). A good sanitation system

Table 4-3 Evaluation of Existing Projects

Improvement Type		Target	Standard Concept
Trail networks	a. Strengthen the structure	Durable footpath	1. Arranging street networks or promenade with upgraded structure
	b. New footpath along riverbank	Change of house direction towards river	
		Change of behavior towards river	
Public Utilities	Installing electricity poles	Lighten the street at night	2. Constructing public utility system
Street Amenities	Gazebo, railings, vegetation, street lighting, signage, etc.	- Beautification - Educating through signage - Enliven the area by open public space	3. Providing common spaces and street amenities

reflects a healthy environment. Thus, the most crucial public utility that should be prioritized is clean water, sanitation, and hygiene. Other utilities such as electricity, although it is also important, might be completed once priorities are fulfilled.

3) Providing public space and street amenities

Public spaces are urban elements that provide many spaces for a wide range of additional functions and activities and act as a glue that bonds people that make up the city together (Curran, 1983). The character and quality of the public domain are necessary keys that give experience for the users.

Street amenities are important visual aspects of trail corridors that should be integrated properly to forge character and a sense of space, such as seating, litter bins, signage, lighting, and so on. The availability of street furniture will attract and encourage people to come and use the space. Therefore, it should develop for the comfort and safety of its users.

In can be concluded that assimilated to the human body, a walkway network plays a role as the skeletal system that supports the whole body, while utilities resemble the vital internal organ systems that are essential for survival. External organs that develop senses, form identities, and reveal visual appeals are represented by public spaces and amenities.

4.7 Physical Improvement Guidelines

According to the type of substructure, riverside infrastructure can be categorized into five groups (Table 4-4). Type 1 (T1) speaks of infrastructures that are on the land. Type 2 (T2) refers to transitional infrastructure that stands at the border between land and water. Infrastructures that build over water can be classified as Type 3 (T3), including those supported by piles or overhangs. Type 4 (T4) indicates infrastructures that float on the water surface, which are adaptable to the fluctuating rise and fall of the water, while water can flow unimpeded beneath them (Prominski et al., 2017). Type 5 (T5) represents submergible infrastructures that are regularly subjected to river flooding; some might need to be cleaned after high tides. Employing these variations in the planning strategy can give a strong visual impact and various experiences of the site (Figure 4-16).

The physical upgrading scheme should demonstrate the characteristics of the city's unique relationship to the river (Andersson, 2017), as well as to protect the local culture and custom, including activities, original structure, and environment – especially in the case of a traditional area like Kuin Utara, they should be the topmost priorities. Banjarmasin riparian settlements are formed by a rich 'river culture' expressed through their man-made environment, such as the floating house *'lanting'* and the communal space *'batang'* for multiple usages: bathing, washing, latrine, as well as dock (Mentayani, 2015). Not to mention the wooden passages that connect houses in the neighborhood and the floating market.

Moreover, an improvement strategy for poor housings should not orientate to modernization nor merely for beautification without considering the basic aspect: to improve the living conditions of the inhabitants. 'Improvement' refers to betterment for a more comprehensive scope, which covers all aspects requiring enhancement. Its plan should reflect the simplicity and the modesty of the neighborhood. Projects that only superficially beautify objects to attract tourists, rather than prioritizing for inhabitants to live their life comfortably and with self-sufficiency, should definitely be avoided. Thus, the plan should not be regarded as simply polishing the urban face, rather it should respond to substantial needs and actual conditions (Table 4-5). The issues indicated in the previous section such as low level of income, house legality, poor sanitation and WC, lack of common space, damage walkways, as well as environmental health problems should be taken into account.

Table 4-4 Infrastructure Variations for Riverside Settlement

	Promenade		Utility	Common Space and Amenities	
	Perpendicular Access	Parallel Access		Common Space	Amenities
Type 1: Landed	Trails	Trails	Utility pipes	Parking space, deck/plaza/square, shops, playing ground, dock, jetties, moored ships/island	Plant, seating, garbage receptacles, signboards, lighting
Type 2: Transitional	Trails, bridges, steps, ladders, ramps, natural slopes	Trails, broad riverbank steps	Utility pipes, communal toilet and washroom, communal reservoir and septic tank		
Type 3: Over the water	Trails	Trails			
Type 4: Floating	Trails	Trails			
Type 5: Submergible	Trails, steps, ladders, ramps, natural slopes, stepping stones	Stepping stones	Utility pipes	Dock, jetties	Plant, seating

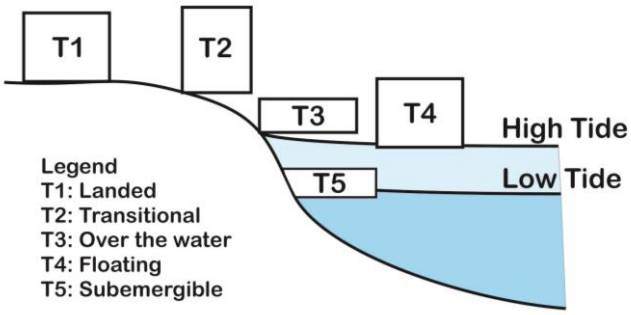

Figure 4-16. Riverside Infrastructures According to the Type of Substructure
(Drawn by Author)

Table 4-5 Physical Improvement Guidelines for Traditional Riverside Settlement

Description	Improvement Plan		
	River Promenade	Public Utility System	Public Space and Amenities
Economic Activities			Considering the importance of economic aspect to enliven public areas, local shops shall be placed nearby. Providing docks may welcome passing boat food stall. (T1, T2, T3, T4)
House	Improved footpath and the installation of utility pipes passing through the neighborhood will gain the 'legality' of the informal houses. (T1, T2, T3, T4, T5)		Any deserted structures, if possible, shall be revitalized in terms of historical asset and shall be refurbished for public use. (T4)
Utility	The construction of footpath shall allow space for burying clean water and wastewater pipes. (T1, T2, T3, T4)	Clean water, wastewater, and septic system shall be installed and connected properly to every washroom and private house. Communal sanitation tanks shall also be placed in several place to suffice all demands. (T1, T2, T3, T4)	Jetties for placing sanitation tanks shall be accommodated. (T2, T3, T4)
		Considering the behavior of residents to do washing activities at the rivers' edge, communal washrooms that equipped with wastewater treatment and septic system shall be provided at the river embankment. (T2, T3, T4)	Any traditional multi-use docks shall be improved and placed in several spots at the river embankment. (T3, T4)
Common space	River promenade shall provide not only leisure, but also to ensure the safety and comfort of the users. Boardwalks restricted to pedestrian shall be differentiate from pedestrian-motorcycle way. (T1, T2, T3, T4, T5)		Common space shall be placed at the cross junction of some alleys or in an open area surrounded by several houses. In consideration to the limited space, multiuse jetties shall be provided to cover many functions such gathering place, playground, trading, communal parking, as well as to receive boats. (T2, T3, T4, T5)
	Footpath and bridge shall be improved with durable structure and material. In the case of narrow rivers, parallel trails along the water edge is unfeasible. Perpendicular connections down to the river shall be added for comfort and safety. (T1, T2, T3, T4, T5)	Electricity poles with overhead power lines shall be installed along the street corridor. (T1, T2, T3)	Street lighting shall be installed at several points along the street corridor, such as at the intersection, public space, and public toilets. (T1, T2, T3, T4)
Environmental health	Non-structural construction and local material are preferable to reduce harming the environment. Timber foundation casted with concrete and covered with wooden slat is recommended. (T1, T2, T3, T4, T5) Street corridor should be also equipped with waste receptacles and greenery.	Garbage collection center shall be built to assort or buy garbage from the residents. (T1, T2, T3, T4)	Putting litter bins in several places, especially at the edge of river, may deter people from littering. (T1, T2, T3, T4) To warn and to educate people to trash properly, signage shall also be placed. (T1, T2, T3, T4, T5) Plantation shall also be placed within the neighborhood. (T1, T2, T3, T4, T5)

Notes: Type of infrastructure refer to Table 4: T1=Landed; T2=Transitional; T3=Over the water; T4=Floating; T5=Submergible

4.7.1 Trail Network or Footpath

Urban riverscapes that have been long neglected before are currently being developed into the most prestigious sites in town (Prominski et al., 2017). A river promenade has become an important aspect in accommodating social interaction and providing a beautiful landscape. However, the attention of most prior walkways projects has concentrated on the riverbank in inner-cities and attempts to attract tourists rather than to provide comfortable facilities for residents. Particularly in slum housing areas, the value of a promenade has not yet been considered. In fact, some traditional riparian dwellings had applied the concept of walking trails long before the modern movement. That is the traditional wooden pathway that provides not only a networking space for the residents but also acts as a common space.

The wooden path, as the main infrastructure of a typical riverside area in Banjarmasin, had become defective and decayed provoking not only discomfort but also a danger for pedestrians. Hence, an immediate solution to this condition is essential. Footpaths should be improved by strengthening their structure and replacing the existing material with a durable one. However, to ensure the health of the urban waterway, it is preferable to reduce the use of structural constructions and hardscapes (Andersson, 2017). Timber foundation cast with concrete and covered wooden slat should be used as an alternative solution since they are favored to maintain the sense of nature and tradition of the area.

Wooden construction might be seen as outdated, less durable, and decay easily. Nevertheless, several projects worldwide have disproved those negative opinions on timber structures. The river deck at Fox River in Green Bay, USA, was constructed using a wooden platform that spread out over existing steel bulkhead walls; its paving is of pervious material, allowing water to recede quickly after flood events and heavy rain (Prominski et al., 2017). In the river promenade of Quai des Gondoles in Seine River, France, the wooden deck rests on a solid flood-resistant steel construction, which has been fixed underground (Prominski et al., 2017), while the Willmington Riverwalk in North Carolina, USA, is constructed using timber equipped with unimposing concrete railings (Cape Fear Visitors Guide,

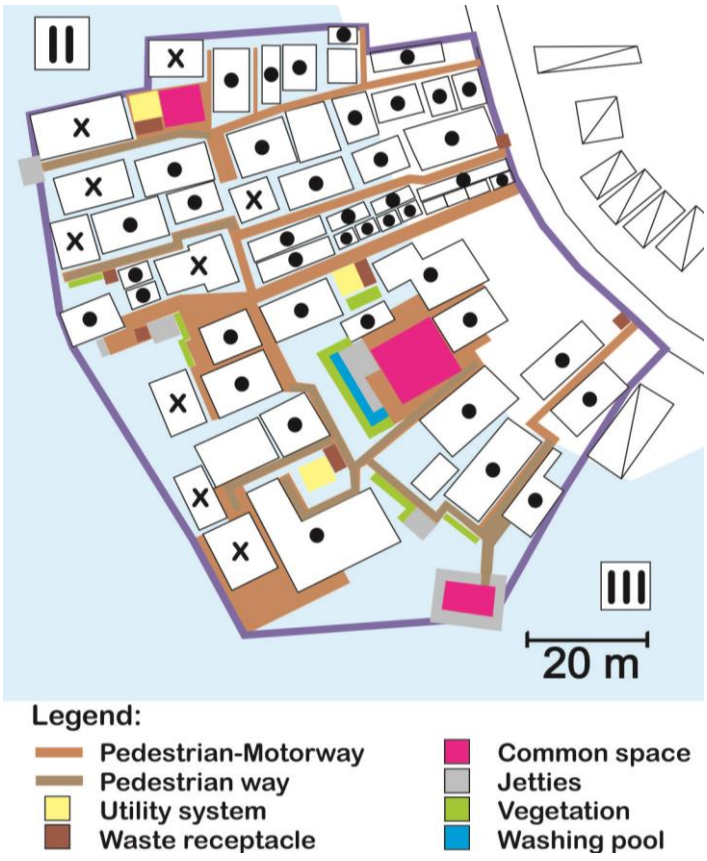

Figure 4-17. Illustration Plan for Kuin Estuary
(Drawn by Author)

Wilmington Riverwalk, 2018). Through those examples, it can be agreed that advanced technologies have made the usage of timber possible even for modern constructions. However, in the case of developing countries, ideas derived from developed countries should be adjusted with respect to the shortage of funds. For instance, the project in Sungai Jingah mentioned in Section 4.4.2.2 shows that it is not impossible to apply ideas from developed countries into developing countries. Using a simple timber construction, the wooden deck in Sungai Jingah, which is placed on the water at the end of an alley, provides a leisure space for the inhabitants.

Based on its location, a promenade for riparian settlements can be classified into three: alleys that pass amongst houses; parallel sidewalks along a river's edge; and perpendicular connections across or down to a river. In the case of the narrow Kuin Utara, constructing a walking trail following the watercourse is unfeasible. Rather perpendicular connections across and down to the river would be needed to respect the river views, and by placing a wide-open space at the end of the passages, the interaction between the residents and the river will be feasible (Figure 4-17). Steps or ladders are also needed to ensure the safety of the residents who dive into the river.

Aside from providing space for leisure for both adults and children, the river promenade should create a good façade and landscape for the riverfront. Hence, in the future, houses by the waters' edge should face the Kuin River. It should also be noted that boardwalks in some slum neighborhoods are no longer limited to pedestrians, but are also used as motorways for the residents. The future trails should accommodate both needs and differentiate between pedestrian-only and pedestrian-vehicle ways. In consideration of safety, narrower secondary footpaths with a width of fewer than 90 centimeters shall be restricted only for the pedestrian. Motorcycles are only allowed to pass through primary pathways.

It can be argued that regardless of its location, proper trail networks should be built in any riparian neighborhood as it has a substantial role to not only safeguard informal settlements but also to accommodate the socio-cultural activities of the inhabitants.

4.7.2 Public Utility System

According to UN-Habitat, sanitation is not simply about the disposal of human waste but encompasses the safe removal, disposal, and management of solid household waste, wastewater, industrial waste, and the like. The access to sanitation is defined by direct connection to a public piped sewer; direct connection to a septic system; or access to pour-flush latrines or ventilated improved pit latrines, allowing for acceptable local technologies. Regardless of its life-threatening consequences, many slum dwellers perceived poor sanitation as tomorrows' priority (UN-Habitat, 2006). Currently, in the target area, there are only 54.8% of houses that have installed sanitation properly. Although most of the houses had built private restrooms, there are still 38.1% of households who own a WC without a septic tank; in other words, dirt is disposed directly to the water.

Indeed, proper installation of water and sanitation pipes that connect to every house is needed; the pipes should be buried under the walkways. Furthermore, this poor level sanitary condition and washroom usage should be improved by communal utility tanks. A water reservoir should be provided to supply the community demand for clean water. A communal wastewater treatment system is also needed to ensure the wastewater is safe enough to be disposed to the river. The other, no less important system, is a communal septic tank for collecting human excreta, either from a private or public toilet. The public utility tanks might be placed either separately or in a group – for example, in a designated jetty that can accommodate utility tanks.

The proposed wastewater communal utility can be constructed using a decentralized system, where the handling of the treatment is close to the point of generation (Omenka, 2010). The system requires a shorter pipeline and smaller spaces in separated places. Most people in developing countries rely on some form of decentralized or self-provided services, sometimes with NGO support but commonly without any assistance from central authorities (UN, 2017). The decentralized system is therefore not only a long-term solution for small communities but also more reliable and cost-effective (Chirisa et al, 2017).

Bathing at the edge of river has become a cultural habit and tradition for so many riparian inhabitants, which should not be abolished without regard, rather it should be understood as a unique character to be protected. Especially for the Banjarese riverfront dwellers, bathing and washing activities at the rivershore have been supported by the floating multi-use washroom, called *batang*. In regard to the tradition, *batang* should be maintained to preserve communal washing activities (Figure 4-10). Nonetheless, its system should be developed and equipped with wastewater treatment and septic tanks to prevent harming the river with pollution. The idea of Badeschiff, a floating swimming pool within a moored vessel, in the Spree River, Berlin, might be a good precedent to be adapted to this project.

Garbage and river pollution are still substantial problems for the slum riparian society. Even in the current projects mentioned in the previous section, waste management has not yet been handled properly. While integrated solutions are needed for this issue, providing trash collection center at the waters' edge might deter people from littering into the river.

4.7.3 Public Space and Street Amenities

Although it has been confirmed that the Indonesian suburbs dwellers are highly sociable with their neighbors, space for interaction has not yet been well provided. Statistically, parks and playgrounds are not only facing a deficiency in their amount but also a lack of distribution of availability – either land values are too expensive to be allocated as open space for recreation or existing parks are swallowed up by commercial and industrial areas (Gallion and Eisner, 1983). Due to the density of some areas, villagers do not bother to get in touch with each other without any designated space. House yards, streets, guardhouses, or stalls are common places where people usually gather. However, in the context of urban design, a common space including gathering space and playground should be provided for inhabitants' recreational purposes.

To attract people to gather, common spaces shall be placed at the cross junction of some alleys or in an open area surrounded by several houses. Putting an open space at the edge of water encourages direct contact with the river and various activities such as fishing, boating, as well as relaxing. In consideration of the limited space of the target location, integrated public spaces that compromise multiple functions should be designed (Figure 4-10). Jetties intended for leisure such as fishing, playground, or relaxing might be combined with shops run by locals, as economic activities can trigger the usage of space.

Floating construction that adapts flexibly to water levels can act as a strong visual feature in the design (Prominski et al., 2017). This kind of structures, common in Banjarmasin, is known as the traditional raft houses or *lanting*. *Lanting* is built on two or three logs and some vats which make them able to float and to act as transport on the river; they could also help in preventing riverbanks from erosion by breaking the waves (Seman and Irhamna, 2001; Anhar, 2010). In the case of Kuin estuary, there was only one *lanting* left that has been long abandoned by the owner. This should convince the local government to buy and refurbish it as a facility for the public. The upgraded *lanting* should be attached to the piled footpath via a mobile jetty adaptable to the water level fluctuation. A good example of such a floating pontoon would be the Leine Suite in Hannover, Germany.

The study on the government's existing projects suggests providing a specified space for the residents' communal parking. Nevertheless, although it is not attainable, it would be difficult to provide pocket parks in a dense area like the Kuin estuary neighborhood.

Street lighting should be installed at several points along passages that need it the most, such as in the jetties, intersections, bridges, and so on. Potted plants and vines should be placed along the riparian corridor. If possible, submergible planting can also be an alternative. Groundskeeping in the river's flood area at the foot of riverbank can enhance the space considerably (Prominski et al., 2017).

The behavior of littering to the river could be cut off by providing waste receptacles at the spots where people generally litter. To warn and to educate people to trash properly, signage should also be placed. Also, considering the behavior of riverside residents to undertake their washing activities at the

river's edge, communal washrooms should be provided at the river embankment.

This section concludes that a proper walkway network should be built in any riparian settlement as it has an important role to not only formalizing informal settlements but also to accommodate the socio-cultural activities of the inhabitants. Street systems are regarded as the most basic public infrastructure that supports the pipeline networks for utilities and the provision of people-gathering space. Therefore, it is essential to build a robust and durable walkway using natural material in regard to maintaining the sense of nature and tradition of the area. It is also necessary to apply a cost-effective utility system in developing countries, hence, a decentralized system is suggested. To attract people, common space shall be placed at the cross junction of some alleys or in an open area surrounded by several houses. Multi-use jetty is an alternative solution for the narrow and dense neighborhood.

4.8 Conclusion and Suggestion

4.8.1 Conclusion

This research argues that the improvement of a settlement's infrastructure would be the most humane approach in handling slum areas. Upgrading the infrastructure verified that the deteriorated environment and river floodplain can be revitalized without bulldozing the current dwellers, besides, it is essential to safeguard informal settlements. In case of relocation, it is crucial for the local government to be carefully selective; not every slum housing area need to be evicted. Eviction might be applied when a neighborhood is deteriorated enough that no possible action can be conducted to refine its condition. Otherwise, a slum settlement should be managed by upgrading its infrastructure.

This paper disclosed that the basic concept of physical upgrading in a slum settlement consists of three elements. *The first* step is arranging street networks as fundamental systems that structure the settlement. *The second* step is constructing a public utility system that is essential for the inhabitants' livelihood. *The third* phase is providing common space and amenities as 'external organs' that develop senses, form identities, and reveal the visual charm of the location.

A proper trail network should be built in any riverside neighborhood as it has an important role to not only enhance land tenure security in informal settlements but also to accommodate the socio-cultural activities of the residents. Street networks are regarded as the most fundamental public infrastructure that supports the networks for utilities and the provision of people-gathering space. Therefore, it is essential to build robust and durable walkways using natural material in regard to maintain the sense of nature and tradition of the area. It is also necessary to apply a cost-effective utility system in developing countries, hence, a decentralized system is suggested. To attract people, common space shall be placed at the cross junction of some alleys or in an open area surrounded by several houses. Multi-use jetty is an alternative solution for the narrow and dense neighborhood.

The study case on Kuin estuary settlement illustrates that the plan should be developed and directed to protect the local culture and custom. The 'river culture' that is expressed through their man-made environment, such as the wooden path that connects houses in the neighborhood, the floating house *'lanting'*, and the multi-use space *'batang'* should be protected. Moreover, an improvement strategy for poor dwellings should not orientate to modernization nor merely for beautification without considering the basic aspect: to enhance the quality of life of the dwellers.

4.8.2 Suggestion

It should be noted that infrastructure upgrading is just an initial step to deal with slum settlements. This study, however, suggests that along with the physical refinement, livelihood improvement such as social, economic, and capacity building are subsequently needed. Long term programs such as land use and spatial planning and institutional consolidation should follow later, supported by political will (Prayitno, 2016).

This study also recommends that the action plan for neighborhood improvement should involve the citizens as they will be the ones most strongly affected either positively or negatively. Riverfront

promenade would feel exclusive if local people are not involved in their design or if the needs and desires of diverse people are not taken into account (Macdonald, 2018). Local participation can be defined as empowering them to utilize their own abilities to manage resources, make decisions and control activities that influence their lives (Mohamed, 1997). High participation of the citizens is needed in terms of community administration, self-build or community planning and design, to gain their responsibility, attitude, and perception on their environment (Moughtin and Mertens, 2003).

A slum settlement improvement plan should firstly prioritize formalizing and securing the land of the people inhabiting the site. In the future, however, a successful program will indirectly attract visitors to appreciate and experience the spirit of the neighborhoods as cultural tourism, where people are able to explore or experience the different way of life of other people, reflecting social customs, religious traditions and the intellectual ideas of a cultural heritage which may be unfamiliar (Fladmark, 1994). In the case of our target area, the future estuary settlement would possibly contribute to reviving Kuin Utara as an integrated cultural tourism destination, along with other cultural and historical attractions in the sub-district.

References

1) AlSayyad, N., 2006. 'Foreword' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

2) Andersson, T., 2017. Waterfront Promenade Design: Urban Revival Strategies. The Image Publishing Group, Australia.

3) Anhar, P., 2010. Inventarisasi Arsitektur Banjar [Inventory of Banjarese Architecture]. Universitas Lambung Mangkurat Press, Banjarmasin. (In Indonesian).

4) Aziz, T. A. and Shawket, I. M., 2011. New Strategy of Upgrading Slum Areas in Developing Countries using Vernacular Trends to Achieve a Sustainable Housing Development. Energy Procedia, 6, 228-235.

5) Bah, E., Faye, I., F. Geh, Z., 2018. Slum Upgrading and Housing Alternatives for the Poor, in: Housing Market Dynamics in Africa, pp.215-253.

6) Bappenas, 2014. Kebijakan dan Program Nasional, Penanganan Permukiman Kumuh 2015-2019 [National Policy and Program, Handling Slum Settlement 2015-2019]. Kementerian Perencanaan Pembangunan Nasional/Badan Perencanan Pembangunan Nasional [Ministry of National Development Planning/National Development Planning Agency]. Launched in Jakarta, 22 December 2014. (In Indonesian).

7) Bawole, P., 2009. The Settlement of Stren-Kali Wonokromo-Surabaya: The City Image Based on the Development of Marginal Society. DIMENSI, Journal of Architecture and Built Environment, Vol. 47, No. 1, 1-8.

8) Bronner, S. J., 2006. 'Building Tradition: Control and Authority in Vernacular Architecture' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

9) Cape Fear Visitors Guide, Wilmington Riverwalk, 2018. (https://www.wilmington-nc.com/wilmington-riverwalk.html, Retrieved: 23 July 2018).

10) Castagnoli, F., 1971. Orthogonal Town Planning in Antiquity. MIT Press, Cambridge, Massachusetts.

11) Cattaneo, C. and Martinez, M. A., 2014, 'Squatting as an Alternative to Capitalism: An Introduction' in Cattaneo, C. and Martinez, M. A. (ed.) The Squatters' Movement in Europe: Commons and Autonomy as Alternatives to Capitalism. Pluto Press, New York.

12) Chirisa, I., Bandauko, E., Matamanda, A., Mandisvika, G., 2017. Decentralized Domestic Wastewater Systems in Developing Countries: The Case Study of Harare (Zimbabwe). Applied Water Science, Vol. 7, No. 3, 1069-1078.

13) Curran, R. J., 1983. Architecture and the Urban Experience. Van Nostrand Reinhold Company Inc., New York.

14) Dahliani, Faqih, M., Hayati, A., 2015. Changes of Architecture Expressions on Lanting House Based on Activity System on the River. History Research, Vol. 3, No. 1, 1-8.

15) Daniel, M. M., Wapwera, S. D., Akande, E. M., Musa, C. C., Aliyu, A. A., 2015. Slum Housing Conditions and Eradication Practices in Some Selected Nigerian Cities. Journal of Sustainable Development, Vol. 8, No. 2, 230-241.

16) Decree of the Mayor of Banjarmasin No. 158, 2011. Penetapan Sungai Sebagai Fasilitas Umum dan Aset Pemerintah Kota, Database Sungai Kota Banjarmasin 2009 [Decree of River as Public Facility and Local Government Asset, Database of River of Banjarmasin City 2009]. (In Indonesian).

17) Denpaiboon, C., Tohiguchi M., Matsuda, H., Hashimoto, S., 2000. Typology and Life Style Analysis of the Raft House (Ruan Pae) in Riverine Settlements in Thailand. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 533, 173-180.

18) Devas, N., 1981. Indonesia's Kampung Improvement Program: An Evaluative Case Study. Ekistics, Housing Policies, Part I: Positive Aspects Of Squatter Settlements, Vol. 48, No. 286, 19-36.

19) Farrell, L., 2013. In Situ Slum Upgrading and Vernacular Architecture: Lessons for Kibera. (April 16, 2013). Available at SSRN: https://ssrn.com/abstract=2251988

20) Fitri, M., Harun, I. B., Triyadi, S., 2017. A Typology of Residents of Settlement in Urban Riverbank, Indonesia. Journal of Economics and Sustainable Development, Vol. 8, No. 24, 181-191.

21) Fladmark, J. M., 1994. Cultural Tourism. Donhead, London.

22) Fuller, N., 1995. The Impact of Relocation on Public Housing Tenants, a Survey of Residents' Experiences. Australian Planner, Vol. 32, No. 3, 175-180.

23) Gallion, A. B. and Eisner, S., 1983. The Urban Pattern City, City Planning and Design. Van Nostrand Reinhold Company Inc., New York.

24) Glasser, D. E., 1988. 'The Growing Housing Crisis in Ecuador' in Patton, C. V. (ed.) Spontaneous Shelter: International Perspectives and Prospects. Temple University Press, Philadelphia.

25) Goenmiandari, B., Silas, J., Supriharjo, R., 2010. Konsep Penataan Permukiman Bantaran Sungai di Kota Banjarmasin berdasarkan Budaya Setempat [The Concept of Managing Riverside Settlement in Banjarmasin Based on Local Culture]. Seminar Nasional Perumahan Permukiman dalam Pembangunan Kota [National Seminar of Settlement and Housing in the Context City Development], ITS. (In Indonesian).

26) Hamidah, N., Rijanta, R., Setiawan, B., Marfai, M. A., 2017. Physical Analysis of Formal and Informal Integration in Urban Riverside Settlement. MIMBAR, Vol. 33, No. 1, 115-123.

27) Kellett, P. and Napier, M., 1995. Squatter Architecture? A Critical Examination of Vernacular Theory and Spontaneous Settlement with Reference to South America and South Africa. Traditional Dwellings and Settlements Review, Vol. 4, No. 11, 7-24.

28) Laurens, J. M., 2012. Changing Behaviour and Environment in a Community-based Program of the Riverside Community. Procedia, Social and Behavioral Sciences, 36, 372-382.

29) Lloyd, P., 1979. Slums of Hope? Manchester University Press, Manchester.

30) Macdonald, E., 2018. Urban Waterfront Promenades. Taylor&Francis, New York.

31) McNulty, R. H. and Kliment, S. A, 1976. Neighborhood Conservation, a Handbook of Methods and Technique. The Whitney Library of Design, New York.

32) Mentayani, I., 2015. Transformasi Adaptif Permukiman Tepi Sungai di Kota Banjarmasin, Kasus: Barito-Muara Kuin, Martapura dan Alalak [Adaptive Transformation of Riverside Settlement in Banjarmasin City, Case Study in Barito-Muara Kuin, Martapura and Alalak] (Thesis). Universitas Gadjah Mada. (In Indonesian).

33) Michiani, M. V. and Asano, J., 2016. Influence of Inhabitant Background on the Physical Changes of Banjarese House: A Case Study in Kuin Utara Settlement, Banjarmasin, Indonesia. Frontiers of Architectural Research, Vol. 5, 412-424.

34) Michiani, M. V. and Asano, J., 2017. A Study on the Historical Transformation of Physical Feature and Room Layout of Banjarese House in the Context of Preservation, Case Study in Kuin Utara Settlement, Banjarmasin, Indonesia. Urban and Regional Planning Review, Vol. 4, 71-89.

35) Mohamed, B., 1997. Public Participation towards Sustainable Tourism Development. Journal of Japanese Institute of Tourism Research, the Tourism Studies Quarterly, Vol.8, No.2, 19-28.

36) Moughtin, C. and Mertens, M., 2003. Urban Design Street and Square. Architectural Press, Elsevier Ltd.

37) Moustafa, W. F. O., 2014. Vernacular Architecture Approach to Achieve Sustainability in Informal Settlements. World SB14 Barcelona.

38) Mukhija, V., 2001. Upgrading Housing Settlements in Developing Countries: The Impact of Existing Physical Conditions. Cities, Vol. 18, No. 4, 213-222.

39) Nazire, H. and Kita, M., 2016. Specifying Characteristics of Informal Settlements by Comparing Four Areas from the Aspects of Houses, Land Tenure and Social Factors in Kabul, Afghanistan. J. Archit. Plann, AIJ, Vol. 81, No. 728, 2197-2206.

40) Oliver, P., 1987. Dwellings: The House across the World. The University of Texas Press, Austin, Texas.

41) Omenka, E., 2010. Improvement of Decentralised Wastewater Treatment in Asaba, Nigeria (Thesis). Lund University.

42) Özkan, S., 2006. 'Traditionalism and Vernacular Architecture in the Twenty-First Century' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

43) Palmer, E. K. and Patton, C. V., 1988. 'Evolution of Third World Shelter Policies' in Patton, C. V. (ed.) Spontaneous Shelter: International Perspectives and Prospects. Temple University Press, Philadelphia.

44) Payne, G., 2006. 'A Journey Through Space: Cultural Diversity in Urban Planning' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

45) Perry, C., 1998. 'The Neighbourhood Unit', from the Regional Survey of New York and Its Environs, Volume VII, Neighbourhood and Community Planning. Neighborhood and Community Planning. Routledge/Thoemmes Press, London.

46) Prayitno, B., 2013. An Analysis on Spatial Permeability and Fluid Dynamics of Wind and Thermal in Tropical Riverside Residential Areas of Banjarmasin City, Indonesia. J. Manusia dan Lingkungan (Journal of Human and Environment), Vol. 20, No. 2, 199-212.

47) Prayitno, B., 2016. Skema Inovatif Penanganan Permukiman Kumuh [Inovative Scheme in Handling Slum Settlement]. Gadjah Mada University Press, Yogyakarta. (In Indonesian).

48) Prayitno, B., 2017. Co-habitation Space: A Model for Urban Informal Settlement Consolidation for the Heritage City of Yogyakarta, Indonesia. Journal of Asian Architecture and Building Engineering, Vol.16, No. 3, 527-534.

49) Prominski, M., Stokman, A., Zeller, S., Stimberg, D., Voermanek, H., Bajc, K., 2017. River Space Design, Planning Strategies, Methods and Projects for Urban Rivers. Birkhaeuser Verlag GmbH, Basel.

50) Purwanto and Darmawan, 2018. The Adaptation Strategy of Dwelling in the Riverside Settlement of the Arut River in Pangkalan Bun City, West Kotawaringin Regency, Central Kalimantan. IOP Conference Series: Earth and Environment Science 213.

51) Rahmitiasari, R., Antariksa, Sari, K. E., 2014. Perubahan Arah Hadap Bangunan pada Permukiman Tradisional di Tepi Sungai Kuin Utara, Banjarmasin [Changes on Building Direction of the Traditional Settlement along Kuin Utara River, Banjarmasin]. Planning for Urban Region and Environment, Vol. 3, No. 1, 1-10. (In Indonesian).

52) Rapoport, A., 1988. 'Spontaneous Settlements as Vernacular Design' in Patton, C. V. (ed.) Spontaneous Shelter: International Perspectives and Prospects. Temple University Press, Philadelphia.

53) Reynoso, L. G. D., Kobayashi, H., Morinaga, R., Jung, J., Tarvainen, T., 2016. Rural-Urban Adaptation in Dwelling Patterns in an Informal Settlement in the Dominican Republic: A Case Study of Azul in San Francisco de Macoris. Journal of Asian Architecture and Building Engineering, Vol. 12, No. 1, 95-102.

54) Sangalang, I. and Darjosanjoto, E. T. S., 2011. The Dayak Adaptation in Kampong of Kahayan Riverside, Palangkaraya, Indonesia. J. Basic. Appl. Sci. Res. Vol.1, No.4, 283-289.

55) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2001. An Analysis of the Riverside Settlement Inhabitant's Characteristics in Relation to an Urban Situation, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 544, 225-231.

56) Sarwadi, A., Tohiguchi, M., Hashimoto, S., 2002. Study on the Improvement Process by Inhabitants in an Urban Riverside Settlement, A Case Study in the Musi Urban Riverside Settlement, Palembang City, Sumatra, Indonesia. Journal of Architecture, Planning and Environmental Engineering, AIJ, No. 556, 297-304.

57) Seelig, M. Y., 1978. The Architecture of Self-Help Communities, The First International Design Composition for the Urban Environment of Developing Countries. Architectural Record Books, New York.

58) Seman, S. and Irhamna, 2001. Arsitektur Tradisional Banjar Kalimantan Selatan [Traditional Banjarese Architecture of South Kalimantan]. Ikatan Arsitek Indonesia Daerah Kalimantan [Indonesian Institute of Architects Kalimantan Area], Banjarmasin. (In Indonesian).

59) Setiawan, B., 2010. Kampung Kota dan Kota Kampung, Potret Tujuh Kampung di Kota Jogja [Urban Village and Slum City, Portrait of Seven Urban Villages in Yogyakarta]. Pusat Studi Lingkungan Hidup, Universitas Gadjah Mada. (In Indonesian).

60) Slaev, A. D., 2007. Bulgarian Policies towards the Roma Housing Problem and Roma Squatter Settlements. European Journal of Housing Policy, Vol. 7, No. 1, 63-84.

61) Soemardjono, B. and Gusma, A. F., 2014. The Development of Code River Area in Yogyakarta as a Sustainable Urban Landscape Asset Acknowledging Local Traditional Knowledge. International Review for Spatial Planning and Sustainable Development, Vol. 2, No. 4, 4-18.

62) Statistics of Banjarmasin, 2017a. Kota Banjarmasin dalam Angka 2017 [Banjarmasin in Figures 2017]. Badan Pusat Statistik [Statistics of Banjarmasin]. Catalog No: 1102001.6371. (In Indonesian).

63) Statistics of Banjarmasin, 2017b. Statistik Kesejahteraan Rakyat Kota Banjarmasin 2017 [Statistics of Social Welfare of Banjarmasin City 2017]. Badan Pusat Statistik [Statistics of Banjarmasin]. Catalog No: 4101002.6371. (In Indonesian).

64) Statistics of North Banjarmasin, 2017.

65) Tibbalds, F., 2001. Making People-Friendly Towns, Improving the Public Environment in Towns and City. Spon Press, London.

66) Tsenkova, S., 2012. Urban Planning and Informal Cities in Southeast Europe. Journal of Architectural and Planning Research, Vol. 29, No. 4, 292-305.

67) Turner, J. F. C., 1966. A New View of the Housing Deficit. San Juan Seminar Paper, Social Science Research Centre, University of Puerto Rico, Rio Piedras, Puerto Rico.

68) Turner, J. F. C. and Fichter, R., 1972. Freedom to Build, Dweller Control of the Housing Process. Macmillan, New York.

69) UN-Habitat, 2006. State of the Worlds' Cities 2006/7, the Millennium Development Goals and Urban Sustainability: 30 Years of Shaping the Habitat Agenda. United Nations Human Settlements Programme.

70) United Nations, 1978. Aspects of Human Settlement Planning, edited by The Habitat Conference Secretariat. Pergamon Press, USA.

71) United Nations, 2017. The United Nations World Water Development Report 2017: Wastewater: The Untapped Resource, Facts and Figures. United Nations World Water Assessment Programme.

72) Wulandari, A. P., 2009. The Slums at the Riverbanks and Challenge for Cultural Change, in: Informal Settlements and Affordable Housing, Sustainable Slum Upgrading in Urban Areas, pp. (III)41-(III)51.

73) Xie, Y., Bie, Q., He, C., 2017. Human Settlement and Changes in the Distribution of River Systems in the Minqin Basin over the Past 2000 Years in Northwest China. Ecosystem Health and Sustainability, Vol. 3, No. 11, DOI: 10.1080/20964129.2017.1401011

CHAPTER 5.
Locally-based Physical Improvement Strategy: A Conclusion

5.1 Conclusion

Existing programs of riverside residential areas tend to only focus on rehabilitating riverside ecology and promoting riverside spatial structure. The most popular plan provided by governments and even academics to normalize river and maintain its ecosystem is by uniformly widening them, providing distance between building and rivers, involving relocations of potentially a great amount of existing dwellers (Vollmer and Grêt-Regamey, 2013; Fitri, 2018). Proposing 'eviction' for current dwellers to move into 'better' vertical housings seems more interesting than 'remodeling' or 'rearranging' existing environment—especially for architects, where they can express their idea to generate a new design (see Soemardiono and Gusma, 2014).

As already mentioned in the previous chapters, many prior programs on relocating slum residents were lack of success due to the inability of the enabler to understand such societies. Communities nonetheless had a major role in determining the form and nature of local development (Payne, 2006, p.164). However, there is often different perception between the community and authorities regarding the most important factors to revive and regenerate riverside residential area; the residents view livelihood and social interaction as the most important, while governments view regulation, investment and ease of implementation as the key factors (see Prayitno, 2018). Authorities, as well as planners, should focus on livelihood and social-culture of the residents rather than just considering environmental qualities and urban spatial developments as indicators.

The primary power of attracted people on the waterfront is visual landscape effects of water for relaxation (Timur, 2013); and we should acknowledge that vernacular riparian houses are parts of visual landscapes that should be considered in the riverside development plan. It addition, it seems that non-western ways of perceiving and using space provide people with an important sense of their own identity (Payne, 2006, p.155). Thus, implementing western-style 'modernity' instead of 'locality' of a development plan in developing countries, including that for riverside areas, is unlikely appropriate.

The role of the professional was to work with the grain of local traditions rather than remove all the pieces and start again (Payne, 2006, p.160). This study is convinced that locally-based approach can be adopted to manage deteriorated riverside settlement in developing countries. Therefore, aiming to revive riverside area while cherishing livelihood of the current inhabitant, we presume that 'historical value' and 'indigenous activities' can be adapted to solve the riverside problems (Table 5-1). However, the scope of this study is limited to 'built environment as a physical structure', hence, the investigation and solutions provided by this research will be in the form of physical enhancement.

The first case study of Banjarese house discussed how historical value that expressed through vernacular house's physical form can contribute to riverside development. This study expects that preserving the physical structure of old houses may reinforce the identity of a place. Field surveys collected data on the condition of remaining architectural features of the target houses, including material, form and shape, façade, space, and ornaments, as well as the inhabitants' socio-economic characteristics and their influence on the houses' current states. The results were evaluated, scored, and classified through an architectural assessment to determine their visual value and what kind of protection action fits each group. This part formulated that there are three basic factors to determine the architectural value of a vernacular house: construction and form, design, and space. The result also shows that even vernacular houses with cultural insignificance plays a supportive role to enliven a traditional area and will be a good example if many survive. This study also suggests that houses that are regarded as irrelevant for preservation should not be simply thrown out from the city planning.

Decayed vernacular houses resided by low-income inhabitant when ignored may turn into scattered roofs and lead to another problem: slum housing.

The second case study presented a discussion on slum housings that occupy most part of the river embankment in our target area. In the view of aesthetics and historical value, those buildings are regarded as unattractive and source of not only physical problems but also socio-economic and environmental problems for the riverside area. But we often forget to consider that such settlements are shaped by local wisdom and cultural activities of the local that may strengthen the identity of a place. When talking about communal activities, we cannot separate from their setting or place. However, in the case of informal settlement, places for communal activities is scarce due to the limited space. Concerning that, we find it crucial to provide public space in any kinds of neighborhoods.

The data was collected by a field survey, observing on the inhabitants and their living situation, dwelling, utility, as well as community activities and environment. This study also analyzes and evaluates existing riverside upgrading pilot projects by the local government, as a reference when proposing an improvement plan. The outcome of the second case study formulates a basic concept for physical upgrading in a slum settlement that consists of three elements: (1) arranging street networks as the fundamental system that structures the settlement, (2) constructing public utility systems that are essential for livelihoods, and (3) providing common space and amenities as 'external organs' that form identities and reveal the visual charm of the location. The proposed infrastructures shall be directed to protect the local cultures and the socio-cultural activities of the inhabitants. The plan should also be adjusted with respect to the economic constraints in developing countries. Moreover, the improvement strategy for poor housings shall not orientate to modernization nor merely to that of beautification without considering the basic aspect: to maintain the dweller's livelihood.

Finally, the study asserted that a specific scenario might address the design for specific groups or in specific locations (Payne, 2006, p.183). Slum riverside management cannot be generalized because each area has different needs and characteristics. However, we can create universal or basic standards, while details should be adjusted to each area. Thus, outcomes provided by this study are of general concept, which is also applicable as a basis for managing riverside settlement in developing countries. Our contribution of both historical and cultural approaches can be implemented in any riparian neighborhood using locally-based physical improvements.

5.2 Suggestion

Many authorities and planners still perceive that protecting slum dwellers do not give any benefits for a city, especially in terms of economic profits. Nevertheless, in some cases, the vernacular environment may support an area through intangible values. Several indirect impacts such as the improvement of the sense of attachment, inhabitant willingness to cherish its cultural area and activities, as well as the possibility to attract tourists should not be ignored.

Table 5-1 Two Approaches on Physical Improvement Strategies for Slum Riverside Settlement

Main Goal	Approach	Object	Aims	Outcome(s)	Direct Impact	Indirect Impact		
						Inhabitant	House	Area
To manage deteriorated riverside residential area in developing country To revive riverside settlement while maintaining livelihood of current dwellers	Historical Approach	Traditional vernacular house	To enhance physical condition of vernacular houses To improve the quality of riverside settlement	Three basic factors to determine architectural condition: • Construction and shape • Design • Layout Cluster for revitalization treatment	Survival of traditional vernacular houses	Improve the sense of place attachment of the inhabitant Improve willingness to cherish and to protect historical artefacts in the area	History provides design guideline for renovating old house as well as modern house to be in line with historical rules Improved house may become a catalyst for other houses to upgrade their physical condition	Improved house may become a historical landmark that give positive impacts to upgrade the quality of environment Upgraded historical facilities may attract not only local residents, but also tourists
	Cultural Approach	Slum neighborhood at river embankment	To support cultural activities through public infrastructure upgrading To protect indigenous activities to reinforce the identity of riverside area	Three basic elements for infrastructure upgrading: • Trail network • Public utilities • Street amenities	Fulfillment of public infrastructure for communal activities	Continuation of current livelihood, if not betterment Reviving river-related activities 'river culture' in a more sustainable way without harming the river ecosystem	Infrastructure upgrading will trigger the inhabitant to improve their house	Upgraded infrastructure may improve the condition of slum riverside area Reorientation of area development towards river

References:

9) Fitri, M., 2018. The Settlement Morphology along Musi River: The Influence of River Characteristics. DIMENSI, Journal of Architecture and Built Environment, Vol. 45, No. 2, 133-140.

10) Payne, G., 2006. 'A Journey through Space: Cultural Diversity in Urban Planning' in Asquith, L. and Vellinga, M. (ed.) Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice. Taylor & Francis, New York.

11) Prayitno, B., 2018. Sustainable Customized Consolidation Design of Kuin Riverside Kampong Regeneration in Banjarmasin, Indonesia. SHS Web Conferences, Vol. 41, 07001. https://doi.org/10.1051/shsconf/20184107001

12) Soemardjono, B. and Gusma, A. F., 2014. The Development of Code River Area in Yogyakarta as a Sustainable Urban Landscape Asset Acknowledging Local Traditional Knowledge. International Review for Spatial Planning and Sustainable Development, Vol. 2, No. 4, 4-18.

13) Timur, U. P., 2013. 'Urban Waterfront Regenerations' in Murat Özyavuz, Advances in Landscape Architecture. IntechOpen, DOI: 10.5772/55759. Available from: https://www.intechopen.com/books/advances-in-landscape-architecture/urban-waterfront-regenerations

14) Vollmer, D. and Gret-Regamey, A., 2013. Rivers as Municipal Infrastructure: Demand for Environmental Services in Informal Settlements along an Indonesian River. Global Environmental Change, Vol. 23, 1542-1555.