The characteristics of riverbank slum settlement in Indonesia. Case study: Depok, Palembang, Surabaya, and Surakarta

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Abstract. Slum settlement is one of the problems faced by various big cities in developing countries, including Indonesia. Cities in Indonesia that are developing and functioning as a centre of activity have invited the surrounding population to migrate to cities in the hope of finding a better job and life. This is not in line with the limited housing and settlement facilities in urban areas, thus encouraging low-income people to live in slum settlements, including riverbank areas. Settlement in riverbank areas that grows uncontrollably has formed a slum area and degraded the riverbank’s main function. This research aims to find the characteristics of riverbank slum settlements in Indonesia with observational case study in Depok City, Palembang City, Surabaya City, and Surakarta City. The research method used is descriptive qualitative by describing the characteristics of the slum settlement at the location of the study. Data collection was carried out by direct observation, literature study, and interviews. The result shows that the characteristics of riverbank slum settlement in the observed locations are formed by several aspects: (1) physical aspects including land availability, infrastructure, and house building, (2) socio-economic aspects including people’s livelihoods, the local community awareness, ethnic, and kinship factor.

1. Introduction

Today, cities are experiencing rapid development, marked by the increase of economy, both in formal and informal sectors. The significant economic improvement seemed to provide better livelihoods for urban residents. Massive urbanization becomes a megatrend in the 21st century that forms human settlements. Urbanization transforms the place, population, economy, and built environment [1]. Since the early 1950s, population growth in Indonesia has shown a sharp increase. Statistically, population growth shows the movement of population from rural to urban areas caused by economic, political, and psychological factors. Economic factor is caused by the development of job opportunities in cities related to their ongoing development. The political factor is the insecure situation in the regions, which...
reduces agricultural production. Meanwhile, psychological factor is caused by the city's attractiveness with an atmosphere of independence [2].

With complete facilities and infrastructure, cities are seen as a goal to improve the standard of livelihood. The availability of jobs that are so widely offered in cities, especially in the trade and service sectors, has attracted people’s interest to try their luck there. Unfortunately, not all people who migrate to cities can be accommodated in existing economic sectors, especially for unskilled people, who only have a minimal opportunity to work in the formal sector. In the end, people who do not meet the criteria to work in formal sectors then turn to the informal sector, such as street vendors, pedicab drivers, public transport drivers, scavengers, street singers, etc. This is in line with the fact that the complexity of spatial use impacts the decline in environmental quality, including poverty and the development of slum settlements [3]. The development of slum settlements is triggered by three factors: economic, geography and psychology. Slum settlements with the majority of low-income people choose the location of their homes that are close to their workplaces. Still, the availability of affordable land is challenging to obtain. Psychological factors can be seen from the community’s character, which is an “outdoor personality”, who enjoys doing activities outside the house [4]. In Indonesia, data on the percentage of urban slum households (40% and below) shows an increase in the number of urban slum households to 13.86%, meaning that from 100 households in Indonesia in 2018, 13-14 of them were slum households. [5].

The inability of the community to access jobs in formal sectors creates a new problem that is poverty in urban areas. With the high standard price of basic necessities, it is difficult for people who have migrated to urban areas to meet their basic needs, especially for housing. Housing prices that are no longer affordable for the middle to the lower economic community, ultimately force them to choose improper housing. The city is not yet ready with an urban planning system to accommodate the increasing number of migrants from year to year [6]. Furthermore, the inability of the city to accept, regulate, and utilize these newcomers, ultimately creates a very heterogeneous activity and slum settlements that develop out of plan [6].

Slum settlements are usually located in the middle of densely populated villages, along railways, under toll roads, and even along the riverbanks. Looking at the condition of slum settlements, the poor are forced to live side-by-side with various dangers, ranging from pollution, fires, and floods. Furthermore, these settlements can be said to be settlements with slum potential if they are not managed properly because of the densely populated areas, limited land availability, limited public space, more socially and physically vulnerable people, classified as homogeneous communities, and settlement patterns that follow river directions and are judged by cultural and traditional values [7-11]. Therefore, the problem of slum settlements must be addressed immediately. The middle and lower economic class people can immediately have the right to access housing and are also far from all dangers.

There are five elements in human settlement: nature, man, society, shells, and network [12]. There are three vital needs for communities in settlement areas based on the income level: identity, security, and opportunity [13]. The higher the income level, the identity becomes more essential. The low-income group in the settlement areas will have a very high priority to get out of the situation. The formulation of a strategy in the context of dealing with the problem of slum settlements, of course, must look further at the root of the existing problem. Each slum settlement location certainly has different characteristics. The approach to slum settlements requires multidimensional aspects to ensure a more systematic and holistic assessment [14]. Therefore, it is essential to understand the physical, social, and economic conditions of each slum area to be used as considerations in formulating policies in dealing with the problem of slum settlements.

Research related to riverbank settlements has been carried out in previous studies, including the characteristics of multi-ethnic settlement on riverbank based on physical and non-physical aspects of the settlement[10], multi-ethnic settlement patterns on riverbanks that form clustered patterns and follow the direction of the river [11], riparian planning due to limited space and the high price of land in the city and inheritance from their parents, [7], the waterfront concept is formed in an area because its location is a port, warehousing, and trade area [15], the interaction of ethnic communities by utilizing the existence of the river as a site [16]. Previous studies have analyzed the phenomenon of settlements
on the river banks with various focuses and different perspectives. This research aims to determine the characteristic of riverbank slum settlements in Indonesia with observational case study in Depok, Palembang, Surabaya, and Surakarta City. The settlement phenomenon can provide an overview of riverbank settlements with various variations from the physical, economic, and sociocultural aspects. This research is also expected to be an input for the government regarding what aspects need to be considered in handling slum settlements problems, especially slum settlements in riverbank areas. Thus, this research can complement the phenomenon of other riverbank settlements in Indonesia.

2. Methods
Study areas in this research are Kelurahan Sukamaju Baru in Depok City, Kampung 3-4 Ulu Laut. The research cases are some examples of cases in Indonesia that describe settlements on river banks. The selection of the cases is based on the uniqueness found in several aspects of the settlement, such as physical, economic, and sociocultural aspects. This uniqueness can be used as material to compare the characteristics of various cases of riverbank settlements in Indonesia: Palembang City, Kampung Sangkrah in Surakarta City, and Kampung 1001 Malam in Surabaya City. This research used descriptive qualitative method by describing the characteristics of the slum settlement at the location of the study. Data collection was carried out by direct observation, literature study, and interviews. Direct observation was done in the research field area to see the condition of settlements mainly based on the physical aspects. The literature study was used to enlarge the theoretical frameworks related to slum settlement areas. Interviews were done with the community and key persons in the areas to collect more in-depth information.

3. Results and Discussion
3.1. Slum Settlement in Depok City (Kelurahan Sukamaju Baru)
3.1.1. Physical Aspect
Riverbank slum settlement in Kelurahan Sukamaju Baru is located at some RTs (neighbourhood association) of RW 05 and RW 07 (citizens association 5 and 7). From the observation and interview, houses in the area are built with the permanent material and mostly have settled for 25-30 years. Some physical settings of houses are adjusted with the economic activity of the resident. The land itself was originally a rice field. Without any knowledge about the minimum setback requirement and the absence of institutional control, houses were growing naturally and incrementally over time in riverbank areas, making them categorized as a squatter settlement. With government financial assistance, the river embankment is constructed using concrete approximately 1.2 m high from the riverbank to prevent the river overflows into the community settlement. Even so, on the lowest topography of the riverbank settlement, RT 05-06/RW 05 and RT 06-07/RW 07 will experience the worst flooding when the rainfall is at a high intensity. Flooding is worsened by poor drainage infrastructure.
3.1.2. Economic Aspect

The population of riverbank settlement in Kelurahan Sukamaju Baru is mainly classified as a low-income group. The livelihoods are mainly in the informal sectors such as home industries, poultry and fish breeders, and various service businesses. Home industries there include tofu and tempeh factories. There are also some employees and civil workers in the community and from the interview conducted, it is known that some people are losing a job due a pandemic.

3.1.3. Social Aspect

Generally, social activities held at RW 05 and RW 07 Sukamaju Baru are social gatherings and Al-Quran recitation. For RW 05 itself, the mosque yard is used by residents for certain activities. The residents’ solidarity can be seen from the “Kerja Bakti” activity (community service) to build river embankments and drainage of settlements at RW 05. Community Service was also held in RW 07 in the context of “Kampung Tangguh” (Resilient Kampung) at an uncertain time.

3.2. Slum Settlement in Palembang City (Kampung 3-4 Ulu Laut)

3.2.1. Physical Aspect

The physical condition of the houses located in the slum settlements of Kampung 3-4 Ulu Laut on the banks of Musi River are warehouse home which can be categorized as non-permanent buildings because the material is made of wood. The house is inhabited by various ethnic groups who come from areas outside Palembang city and use the river as part of their life [5]. The Warehouse home was built because of its simple shape and it is suitable choice for local people who live on the riverbank. On the other hand, the formation of a slum environment in settlements is due to several factors, namely the unavailability of garbage disposal infrastructure, the lack of land availability which causes the position of houses that are close to each other, and the lack of awareness of the community to protect their environment. Furthermore, the settlement pattern that is formed is a spread pattern with the direction of the settlement following the direction of the river, and this pattern is formed due to economic factors that make the river a source of income.
3.2.2. Economic Aspect
People who live on the riverbank with slum settlement conditions, indirectly describe the economic conditions of the local people who can be categorized as low-income people. The majority of local people work as labourers, traders, and work in the informal sectors, such as construction workers, motorcycle taxi drivers, washers, pedicab drivers, boat drivers, and Nipah management. Therefore, it can be said that the economic condition of the local community is only sufficient to meet their daily needs because the income they get is uncertain.

3.2.3. Social Aspect
The social conditions in the slum settlements of Kampung 3-4 Ulu Laut on Musi Riverbank can be seen from the composition of the people who come from various ethnic groups from outside Palembang City. The reason why they live on the riverbank with slum settlement condition is because of the strong kinship factor that causes them to survive from generation to generation. On the other hand, social interaction is also shown by various kinds of activities, such as religious activities.

3.3. Slum Settlement in Surakarta City (Kampung Sangkrah)

3.3.1. Physical Aspect
The physical condition of the buildings in Kampung Sangkrah is classified as dense, jostling one another, with several RukunWarga (RW) having a density of >100 units/Ha (RPLP Document of Sangkrah, 2020-2024). Unplanned buildings with low-quality infrastructure are the causes as to why the settlement area of Kampung Sangkrah becomes a slum. In Kampung Sangkrah, there are also illegal settlements due to the location of Kampung Sangkrah, which is traversed by rivers (Bengawan Solo, Kali Pepe, and Kali Jenes) and the railroad tracks. Illegal areas along the railroad are in RW 2, 4, 5, 8, 9 and RW 10. Due to the location that is traversed by the river flow, the water overflows when the rain intensity is high.
3.3.2. Economic Aspect
In general, the population in Kampung Sangkrah can be categorized as middle to lower class society. The community’s livelihood are as labourers, employees, and the rest work in informal sector such as trader, home industry, and various service businesses. Kampung Sangkrah is located in the heart of Surakarta City. Kampung Sangkrah is surrounded by traditional markets as the economic centre of the community. In addition, the community in Kampung Sangkrah also work as painters of cloth used for various types of clothing. Skills in this field of work have been going on for generations.

3.3.3. Social Aspect
Social relations between the communities in Kampung Sangkrah are very close. This is proven that in many activities the communities meet and chat, children play together, and there are routine activities (social gathering) held by community organizations. In Kampung Sangkrah, there is no particular open space as a communal space, so the community usually take advantage of the streets, small terraces of houses, or stalls. However, on the other hand, Kampung Sangkrah is classified as an area with a high crime rate, including gambling and drinking alcohol.

3.4. Slum Settlement in Surabaya City (Kampung 1001 Malam)

3.4.1. Physical Aspect
The physical condition that can be observed from Kampung 1001 Malam is the type of buildings that are dominated by semi-permanent and non-permanent buildings. Residents are reluctant to build permanent buildings because they realize that at any time, the landowner, PT Jasa Marga and the government of Surabaya City, asks them to leave this area, so they must leave immediately. When it rains heavily, residents who live along the riverbank often have to find a higher shelter because the river is overflowing. Even when the river flows so swiftly, the riverbanks are eroded, causing landslides. Moreover, in the absence of a river embankment, it is feared that the landslide will spread, thus threatening the safety of the residents. For sanitation problems, residents use public facilities as shared bathroom and for washing. Despite receiving assistance from several NGOs, the sanitation conditions are still very inadequate. For clean water needs, a local drinking water company (PDAM) has reached this area.

![Fig. 4 Physical conditions in Kampung 1001 Malam](source: Field record, 2021)

3.4.2. Economic Aspect
Most of the residents living in the slum area of Kampung 1001 Malam are migrants from Madura who are trying to get better livelihoods in Surabaya. The majority of residents in this area work as scavengers, construction workers, beggars, petty traders, and street singers. Residents living in Kampung 1001 Malam are categorized as a low-income society because they can only earn Rp. 25,000-30,000 in a day, while the average of minimum salary in Surabaya City is around Rp 4,200,000 in a month. Some women
in Kampung 1001 Malam also have the skills to make embroidery. Then, they sell these handicrafts to increase their income.

3.4.3. Social Aspect
The residents who live in Kampung 1001 Malam are divided into two parts. The first part is the small families who live under the toll road. And the second part is more than 150 families occupying the Kalianak riverbank. Despite this improper settlement condition, people in Kampung 1001 Malam live harmoniously and have a high kinship. There are several social activities carried out in Kampung 1001 Malam. For example, religious agendas which are routinely held every week. Those who are Muslim, usually participate in the recitation activity, which is followed by the distribution of alms of food and other staples for the residents. Furthermore, some of the students from the universities in Surabaya were also involved in teaching school-age children in Kampung 1001 Malam.

4. Conclusion
The characteristics of riverbank slum settlements at four locations can be seen from several aspects. In this research, it is explained through economic, social, and physical aspects. The economic aspect in these locations indicates that the population is a low-income community working in the informal sector, both working in the local areas around their house and the urban areas. The economic characteristic in the four observed locations can also be seen through the physical types of the dwellings. The physical type of riverbank slum settlements can be grouped into permanent, semi-permanent, and non-permanent type. The locations with the permanent types of settlements are in Depok City (RW 05 and 07 Kelurahan Sukamaju Baru) and Surakarta City (Kampung Sangkrah), the semi-permanent physical types are seen in Surabaya City (Kampung 1001 Malam), and the non-permanent physical types are seen in Palembang City (Kampung 3-4 Ulu Laut). Riverbank slum settlement in Surabaya and Palembang City have never been provided any program from the government. The use of semi-permanent physical materials in Surabaya and Palembang City is caused by the economic factor and the unclear status of land ownership. Although Depok and Surakarta City also face the problem of land ownership status, several government programs have already been applied at these locations. In the social aspect, all four locations show strong kinship among the residents and there are many kinds of community activities. Finally, this research has provided an overview of the characteristics of riverbank slum settlements in Indonesia with four selected locations. Further research is needed to see the availability and the effectiveness of the slum settlement program so that the discussion would be more comprehensive.

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