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Collective Housing Concept for Riverside Settlement; Case Study in Padang, Indonesia

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ABSTRACT

Collective living is specifically built to house multiple families or individuals in the same complex or building, where they can share common facilities. This concept aims to use land efficiently, reduce construction and maintenance costs, and improve social interaction and community cohesion. This study explores the idea of collective housing in the Batang Arau riverbank area with a case study in Koto Baru Nan XX Sub-district, Lubuk Begalung District, Padang, Indonesia. The biggest problems in this area are vulnerability to flooding and lack of basic infrastructure. This research aims to find a settlement concept that can increase community resilience to disasters and improve a better quality of life. This study employs a qualitative methodology and uses many data-collection techniques, including literature review, field surveys, in-depth interviews, and Focus Group Discussions (FGD). Thematic analysis approaches were employed to analyze the data obtained from interviews and Focus Group Discussions (FGDs) to uncover prominent patterns and themes. Descriptive analysis was used to analyze the observation data and field surveys, providing a comprehensive overview of the current conditions. This research is expected to make a real contribution by mapping the problems and needs of riverside settlements in Koto Baru Nan XX Sub-district, Lubuk Begalung District, Padang, Indonesia.

1.0 INTRODUCTION

Koto Baru Nan XX Village, Lubuk Begalung District, is one of the river-type residential areas in Padang City, West Sumatra Province, Indonesia. This region is included in the category of vulnerable to disasters and has economic and social development problems. Frequent flooding and the resultant displacement of residents have highlighted the need for more resilient and sustainable housing solutions (Baker, 2012). In contemporary contexts, collective housing models such as co-housing and eco-villages have demonstrated the ability to foster strong community bonds and sustainable lifestyles (Pracastino Heston & Rayi Ayuningtyas, 2019). For instance, flood-resistant housing designs and community-based water management systems can mitigate the adverse impacts of environmental hazards (McGranahan et al., 2007). However, residents, despite the vulnerabilities, aim to remain at their original homes and to pursue possibilities to negotiate with the governments and ideally achieve fair alternatives for reducing the flood risk and changing the negative public image of their communities (Carrasco & Dangol, 2019). Therefore, there is an urgent need to develop sustainable and continuous measures for riverside settlements involving natural environmental strategies (Day, 2017).

In addition to environmental benefits, collective housing fosters social cohesion, which is vital for the well-being of riverside communities (Williams, 2005). Collective decision-making processes also empower residents, giving them a sense of ownership and responsibility towards their living environment (Somerville, 1998). By applying the concept of collective housing design to the arrangement of this riverside area, the advantage of the economic aspect is that the housing residents will subsequently gain access to cheaper and more cost-effective facilities and services (G, S. 2001). This economic efficiency can make housing more affordable and accessible, addressing one of the critical issues in urban living (Goebel, 2007). Moreover, collective housing can also stimulate local economies by encouraging cooperative businesses and sustainable economic practices (RV Anglin, 2017). Using the survey method and recognizing the effective factor's space as well as their relationships, a neighbourhood centre is suggested as the model to enhance the quality of social interactions in urban space (Razavizadeh et al., 2016).

This study also seeks to arrange the existing riverside settlement area in Koto Baru Nan XX Sub-district, Lubuk Begalung District, Padang City, West Sumatra Province, Indonesia, by applying the concept of collective housing design. This is carried out by focussing on the potential and problems of the area through a study and conducting a precedent study or existing case study to explore how such a concept can be implemented for environmental resilience and sustainability.

2.0 LITERATURE REVIEW

2.1. Collective Housing Concept

The design of the collective housing concept is characterized by the use of common space or communal space, meaning that residents can still interact with each other socially as well as in the past (Schmid, 2019). This research aims to explore the existing conditions of riverside settlement areas, not only to see the architectural design using the concept of collective housing design but also to improve the community's economy and social interaction, especially for environmental sustainability and resilience to disasters (Bramley & Power, 2009).

2.1.1. Interior Layout and Architectural Design on the Concept of Collective Housing Design

A communal lifestyle with an environmental sustainability perspective can improve the community's quality of life (Durrett, C., & McCamant, 2011). The design of the concept of collective housing is firmly rooted in the idea that the residential environment greatly influences the dynamics and behavior of the community as appropriate (Lawrence, 2019). For example, a communal space can be in the form of a shared kitchen, a shared dining room that can function as a social meeting room to strengthen social interaction (Durrett, C., & McCamant, 2011). Another critical design strategy is the use of clustering and layering of spaces to balance privacy and community interaction (Lozano, 1990). Route planning and circulation of the area are also important factors in serving the community (Jiang, S., & Verderber, 2017). Good and effective design must provide sufficient personal spaces for individuals and families and communal spaces for social interaction (Marcus, C. C., & Francis, 1997). Another challenge involves ensuring that collective housing projects are affordable and can be scaled effectively (McGranahan, 2015). Research on collective housing

concept is one of the appropriate solutions to overcome economic, social, and environmental problems to change the lives of urban communities, especially riverside areas.

2.1.2.The Economic and Social Impact of the Collective Housing Design Concept

One of the most significant social benefits is the creation of better social interaction with the concept of collective housing, such as communal space. This research explores the economic and social aspects of the local community and is supported by case studies (Ratcliffe, P., & Newman, 2011). The community as residents of collective housing, is often involved in joint activities such as eating together, mutual co-operation to clean the environment, and childcare centres. These things will strengthen the bonds of brotherhood and good social interaction (Törnqvist, 2021). Moreover, collective housing can enhance residents' quality of life by reducing social isolation (Dong, 2018). The concept of collective housing design not only offers benefits to social aspects but also economic aspects (Heuts, E., & Versele, 2016). The concept of collective housing design also enables low-income people to own or rent such housing (Brysch & Czischke, 2022). In addition, the concept of collective housing design can increase local economic growth by fostering cooperative businesses and supporting local businesses (RV Anglin, 2017). One of the challenges in this sectional housing design concept is ensuring the affordability of community to housing (McGranahan, 2015). Another challenge is managing the balance between private and communal spaces. Marcus, C. C., & Francis (1997) discuss how design can address these competing needs by incorporating flexible spaces that can be used for both private and communal purposes. Through thoughtful design and strategic planning, collective housing can promote social interaction, reduce costs, and support sustainable living practices (Durrett, C., & McCamant, 2011).

2.1.3. Environmental Sustainability in Collective Housing

Environmental sustainability is a cornerstone of the collective housing model, which emphasizes the efficient use of resources, the reduction of environmental impact, and the promotion of sustainable living practices (Hariram, N. P., Mekha, K. B., Suganthan, V., & Sudhakar, 2023).

2.2. Riverside Settlement

Riverside settlements often developed unplanned, with buildings erected semi-permanently or permanently along the riverbanks (Abram, S., Macleod, D., & Waldren, 2021). Drainage systems in riverside settlements are usually inadequate, which leads to waterlogging and worsens sanitary conditions (Rahman, 2014). However, the inhabitants of riverside settlements also face several social problems, including limited access to education and health services (Garnelo et al., 2020). Economically, riverside settlements offer various opportunities as well as challenges. The informal economy is very dominant in riverside settlements (Michiani & Asano, 2019). While riverside settlements face a variety of complex environmental problems (Michiani & Asano, 2019), the level of pollution in the river that passes through this settlement is very high, with the content of chemicals and pathogenic microorganisms exceeding safe limits (Emmanuel, E., Pierre, M. G., & Perrodin, 2019). In addition to pollution, flood risk is a significant environmental problem in riverside settlements (Carrasco & Dangol, 2019). While these settlements offer a wide range of economic opportunities and strong social ties, they also face serious challenges related to poor infrastructure, environmental risks, and economic uncertainty. Such a scenario includes the settlement on the banks of the Dead River, Berok Nipah Sub-district, Batang Arau. The large number of people who have taken over this area caused settlement problems such as construction of emergency houses, floods that continue to occur due to the narrowing of river areas and sedimentation, loss of water absorption areas, poor sanitation, an unhealthy residential environment, and a low social and economic impact on the community (Aryanti & Syalma, 2018).

3.0 METHODOLOGY

This research uses a qualitative approach with several data collection methods: literature studies, field surveys, in-depth interviews, and Focus Group Discussions (FGD). Data is generated from sites in Koto Baru Nan XX Sub-district, Lubuk Begalung District, Padang, Indonesia. The data from the interviews and Focus Group Discussion (FGD) were analyzed using thematic analysis techniques to identify the main patterns and themes, while the observation data and field surveys were analyzed descriptively to provide an overview of the existing conditions.

4.0 RESULT AND DISCUSSION

The function of housing located in the research area is slum, based on the decree on the banks of the Batang Arau River. The condition of the slums in the settlement of Koto Baru Nan XX Sub-district is influenced by the low cost of housing in the area, with the condition of the area protected from the intervention of the surrounding area. This can be observed from the existence of an area where such residential development produced an unclear residential pattern (scattered). However, conditions like this seem to provide opportunities for the growth of new residential buildings during high land prices.

Table 1. Elements and Influence of Research Area Conditions in the Formation of the Collective Housing. (Source: Author)

No	Element	Influence	Actions
1	Architectural Aspects	Climate air-conditioning, noise in areas protected by vegetation and limited by other settlements.	1. Improve the physical environment by changing the pattern of the house to face the river. 2. Increase public awareness to protect the residential environment.
2	Social and Cultural Aspects	1. Legality of residential land and quality of life in fulfilling infrastructure access. 2. Residence. 3. Evolving social and cultural values 4. The challenge for community survival against other communities that will be included in the area.	1. Ensuring the legality of the land, to be handled. 2. Increasing the type of construction of temporary and semi-permanent buildings to permanent. 3. The residence can be occupied by several heads of families.
3	Economic Aspects	1. Integration occurs according to residential characteristics with almost 61.5% being workers. 2. Residential locations can be fulfilled at low cost. 3. Lack of community involvement in building housing.	Zoning arrangements for activities to shape environmental character to support environmental sustainability and foster a sense of togetherness to maintain and design living spaces.
3	Environmental aspects	1. Environment links. 2. Artificial physique. 3. Networking. 4. Utility. 5. Temporary and semi-candy dwellings are located on the banks of the river. 6. Road access is divided into upper and inner areas. 7. Rental prices are very cheap. 8. The landowner is owned by one person who does not have legality.	1. Land preparation with clear land legality, before repairs are made to residential buildings 2. People who rent housing should be actively involved in shaping the residential space 3. Arrangement of pedestrian paths, arrangement of environmental roads, and improvement of public open spaces.

The existence of housing in the research area can be controlled by physical improvement of the area and management of the location of the area that considers the socio-cultural architecture (**Figures 1 and 2**). The location of the site is at Jalan Koto Baru, precisely in the Batang Arau Watershed (DAS) area, Koto Baru Nan XX Sub-district, Lubuk Begalung District, Padang City in West Sumatra Province of Indonesia. The research focuses on the settlement of the banks of the Batang Arau River with administrative delineation.

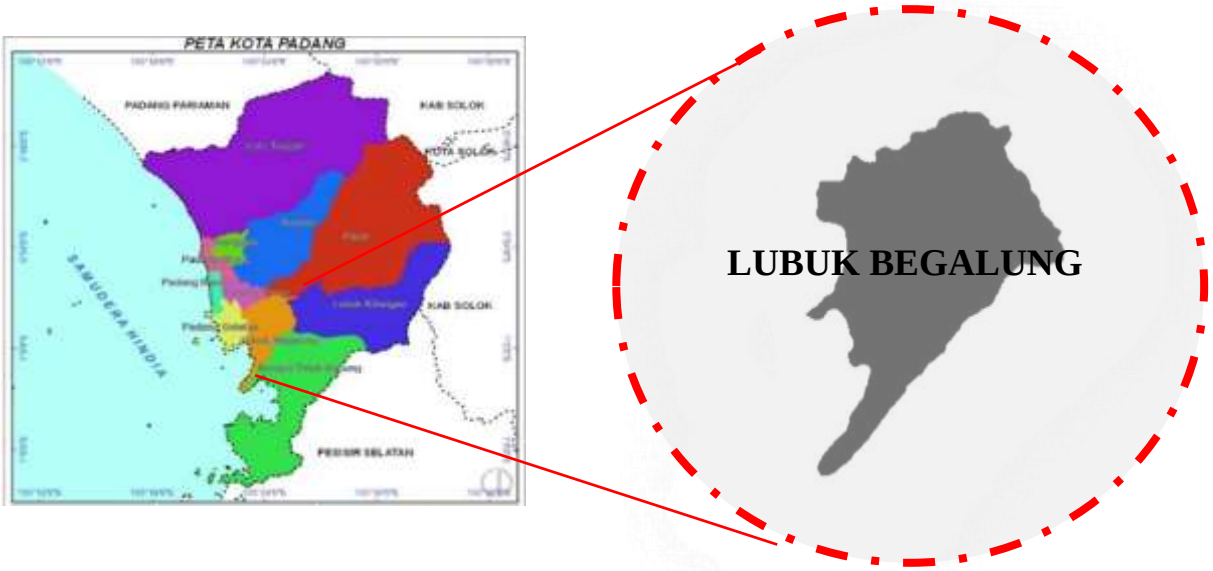


Figure 1. Data Location of the area near the river.
(Source: Author)

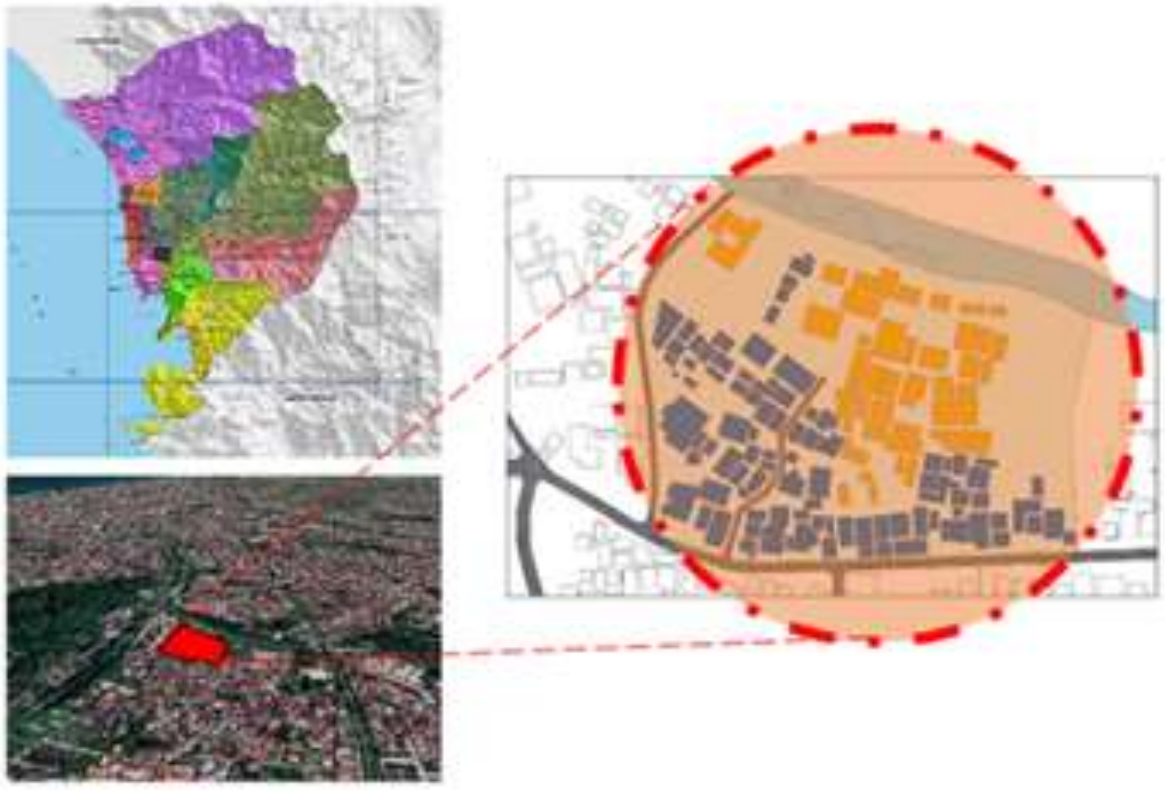


Figure 2. Planning location.
(Source: Author)

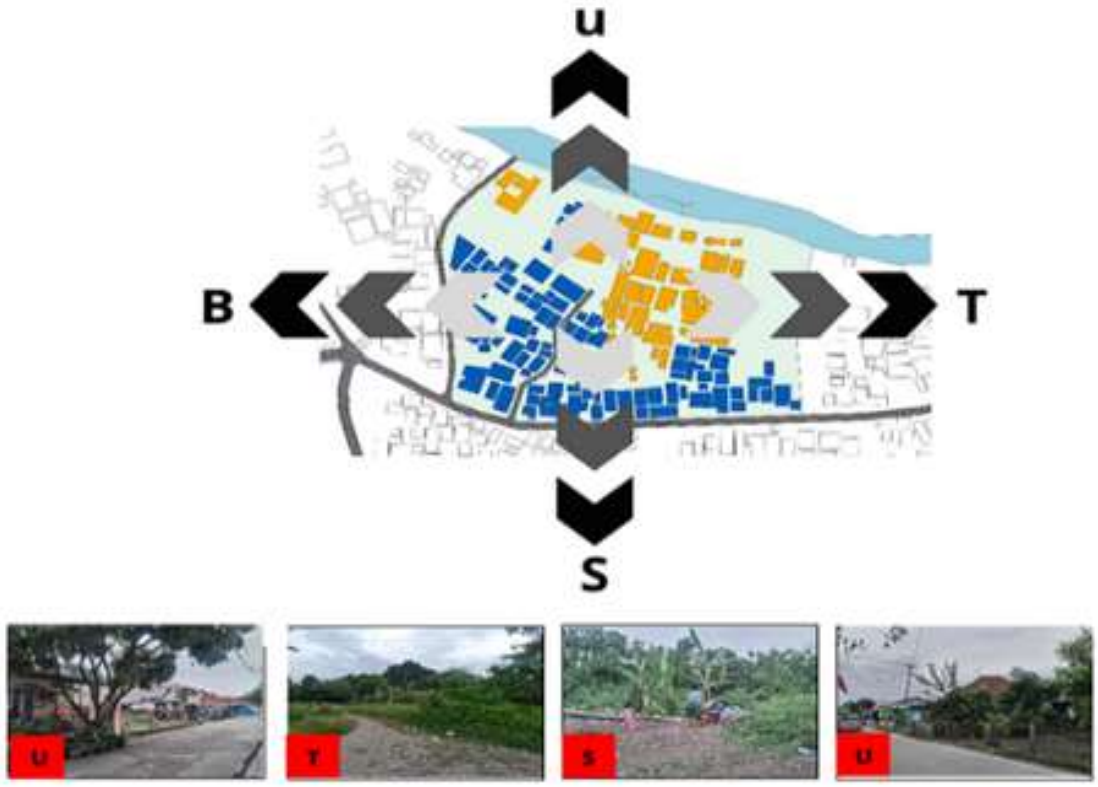


Figure 3. Administrative Delineation.
(Source: Author)

Referring to government regulations, the area is listed as a *negative* area along the Batang Arau River. This is based on SNI 03-1733-2004, concerning *Procedures for Residential Environmental Planning* which explain the level of population density of an area. Referring to SNI **(Table 1),** the research area has a low density as can be seen in **Table 2.** The data analysis conducted in this study refers to the Ekistics Theory developed to study and understand various aspects of human settlements, including their structure, function, and dynamics. The analysis of the research area is seen from these components, namely nature, community and humans, housing, and networking.

Table 2. Population Density.
(Source: SNI 03-1733-2004)

Classification of regions	**Density**			
	Low	**Medium**	**High**	**Very dense**
Population density	<150	151-200	200-400	> 400

Table 3. Number of population, population density in the research area.
(Source: Author)

Area	**Hectare**	**Population**		**Density/*Ha***
		Person	**Head of Family**	
Koto Baru Nan XX Sub-district	2.09	276	69	138 (Low)

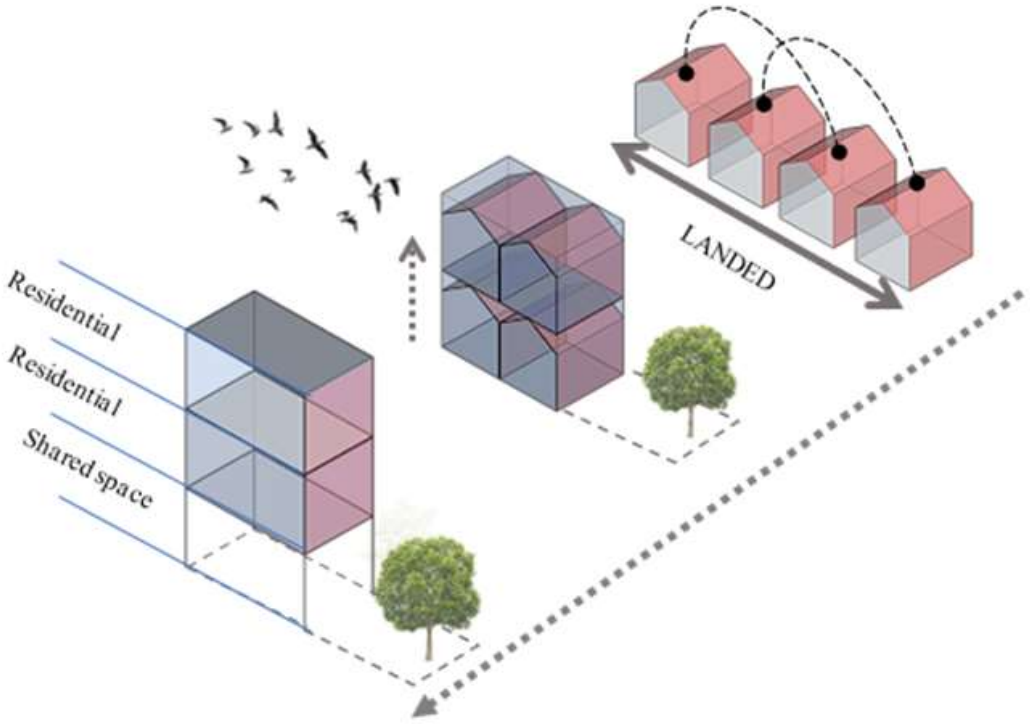


Figure 4. Collective Housing Concept.
(Source: Author)

Figure 5. Site plan.
(Source: Author)

4.1. Architectural Aspects

4.1.1. Climate

The air temperature in Padang City is quite high, which is between 23 °C–32 °C during the day and 22 °C–28 °C at night, with humidity ranging from 78%–81%. The rainfall level in Padang City reaches an average of 405.58 mm per month. On average, there are 17 rainy days per month. The high rainfall makes this city prone to flooding, and in November 1986 it was recorded in the MURI record as a city with a high level of rainfall of 5,254 mm. This condition will affect the surrounding area if there is a flood or overflow from the Batang Arau River.

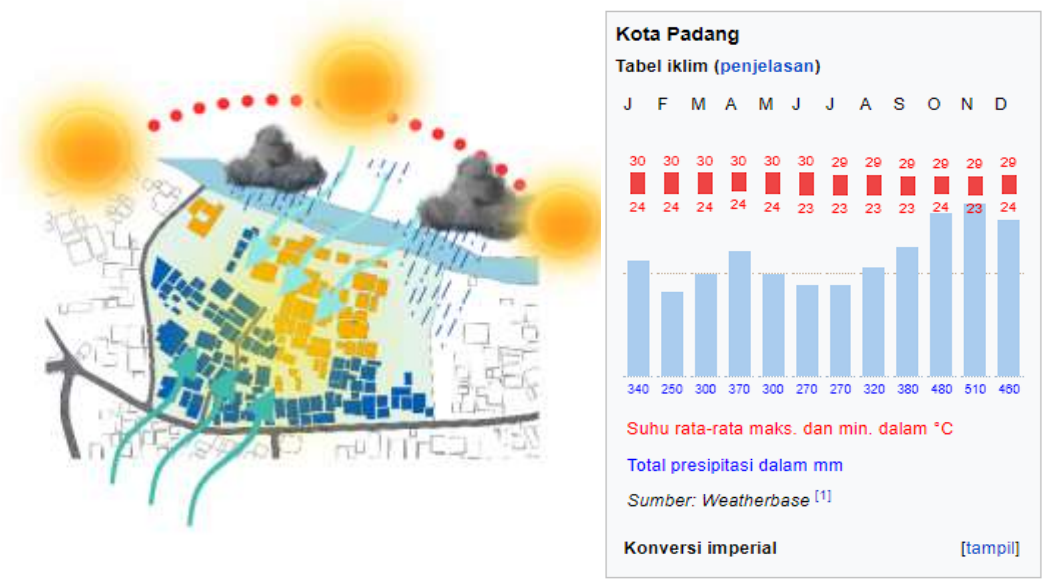


Figure 6. The influence of sun on the area.
(Source: Author)

4.1.2. View

The revived research area looks pleasant when viewed from the public main road. However, the view is unpleasant in the direction of the river and east of the site. Therefore, a good arrangement is needed so that the buildings look orderly.

Figure 7. The Five Senses.
(Source: Author)

4.1.3. Noise

Noise greatly affects the research area. However, the noise levels from the surrounding areas from the activities generated from the location do not affect the environmental conditions. This is because it is in an area surrounded by other residential areas.

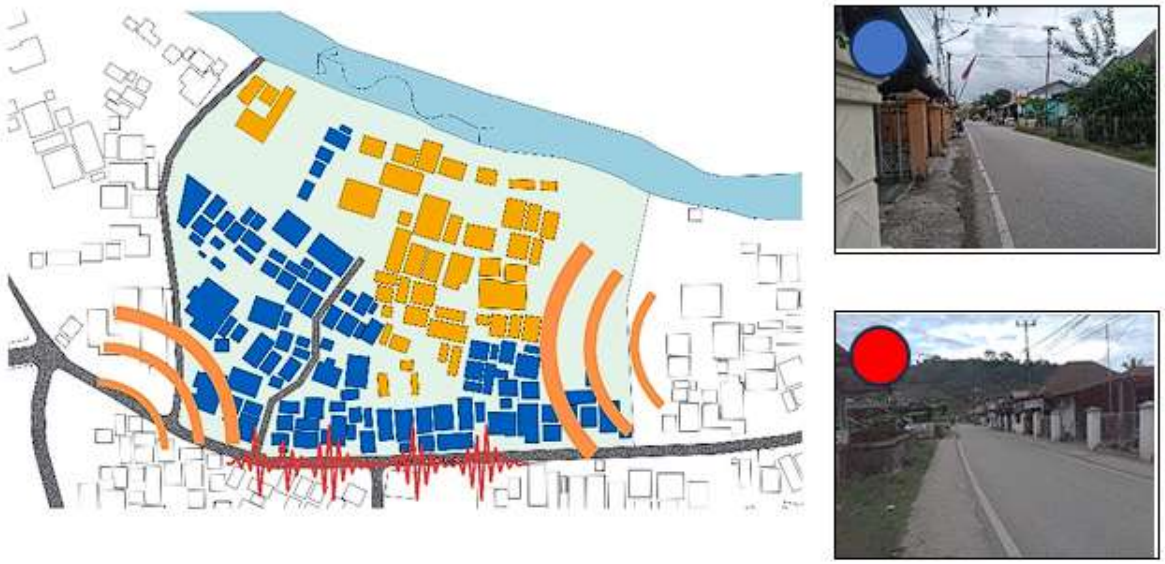


Figure 8. Effect of noise in the area of study.
(Source: Author)

4.1.4. Wind Direction

Good wind directions on the site come from north and south, affecting the occupancy (refer to **Figure 9** for wind direction). Settlements in residential areas feel comfortable even during the hot sun and are also influenced by vegetation inside and outside the study area (see **Fig. 11**).

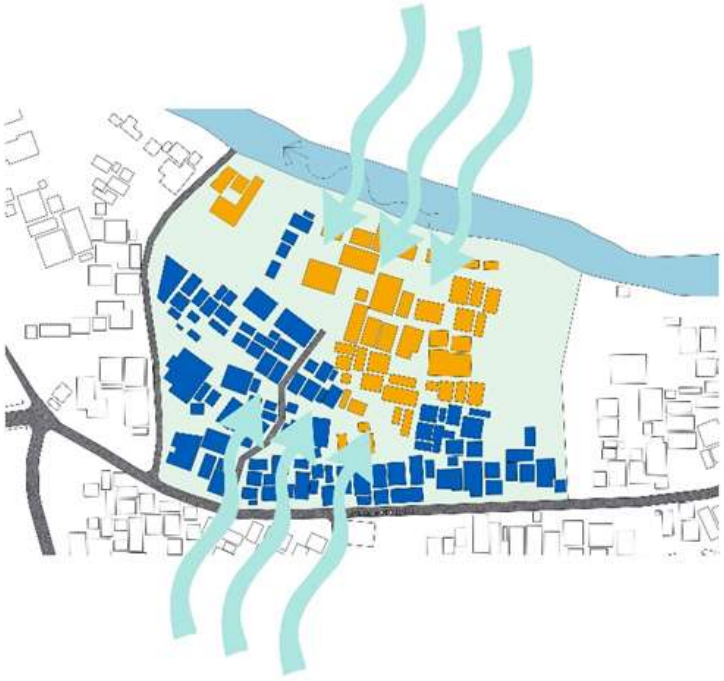


Figure 9. Wind Direction.
(Source: Author)

4.1.5. Solar Trajectory

The aspect of the sun's trajectory is very important in building planning, resulting in human comfort in the building, see **Figure 10**. This factor may contribute to the growth of housing in the research area as dwellers are feeling comfortable living in the planning area.

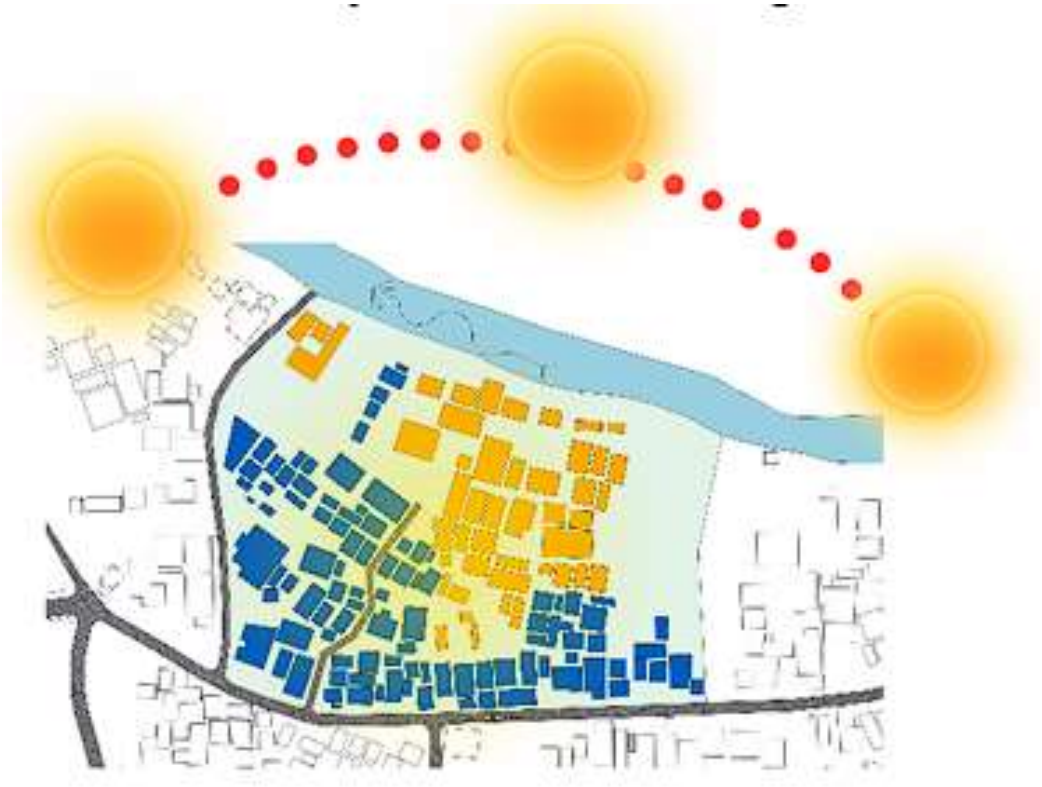


Figure 10. Solar Trajectory.
(Source: Author)

4.1.6. Vegetation

In the area adjacent to Jalan Koto Baru, mahogany trees and Trembesi trees are planted. These trees function to cool and protect from the scorching sun, as well as reduce the amount of rain carried by the wind. In addition, this type of vegetation can also function as a pollution filter for both pollutions produced by vehicles and noise from passing vehicles. In areas near residential areas, the provision of vegetation groups can be in the form of guiding trees. This type of tree grows symmetrically, does not break easily, and does not grow too tall. By adding the right types of vegetation, we can improve the quality of the environment and make the area more comfortable to live in. See **Figure 11** for the vegetation of the study area and alternative vegetation.

Existing

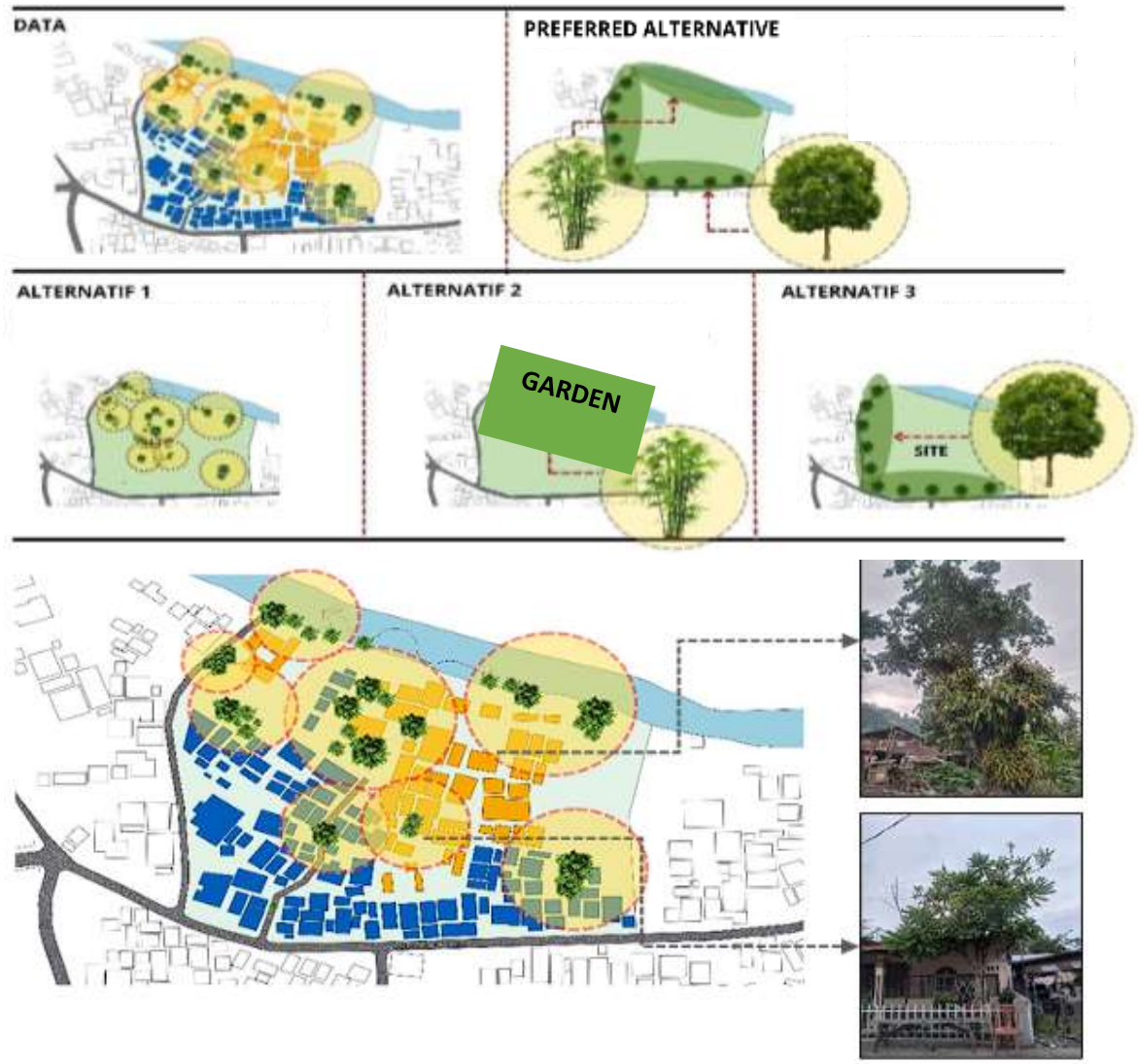


Figure 11. Vegetation of the study area.
(Source: Author, 2024)

In the area near Jalan Koto Baru, the same trees of Mahogany and Trembesi were found and function like in the adjacent of Jalan Koto Baru. Likewise, the rejuvenation process carried out are natural conditions/elements of the research area will provide convenience for the the government to manage the residential space attached to the banks of the Batang Arau River, especially the research area is a part of the existing residential conditions along the watershed that must be controlled. It addresses the concept of managing an area and addressing the challenges and the needs of the community to afford cheaper housing.

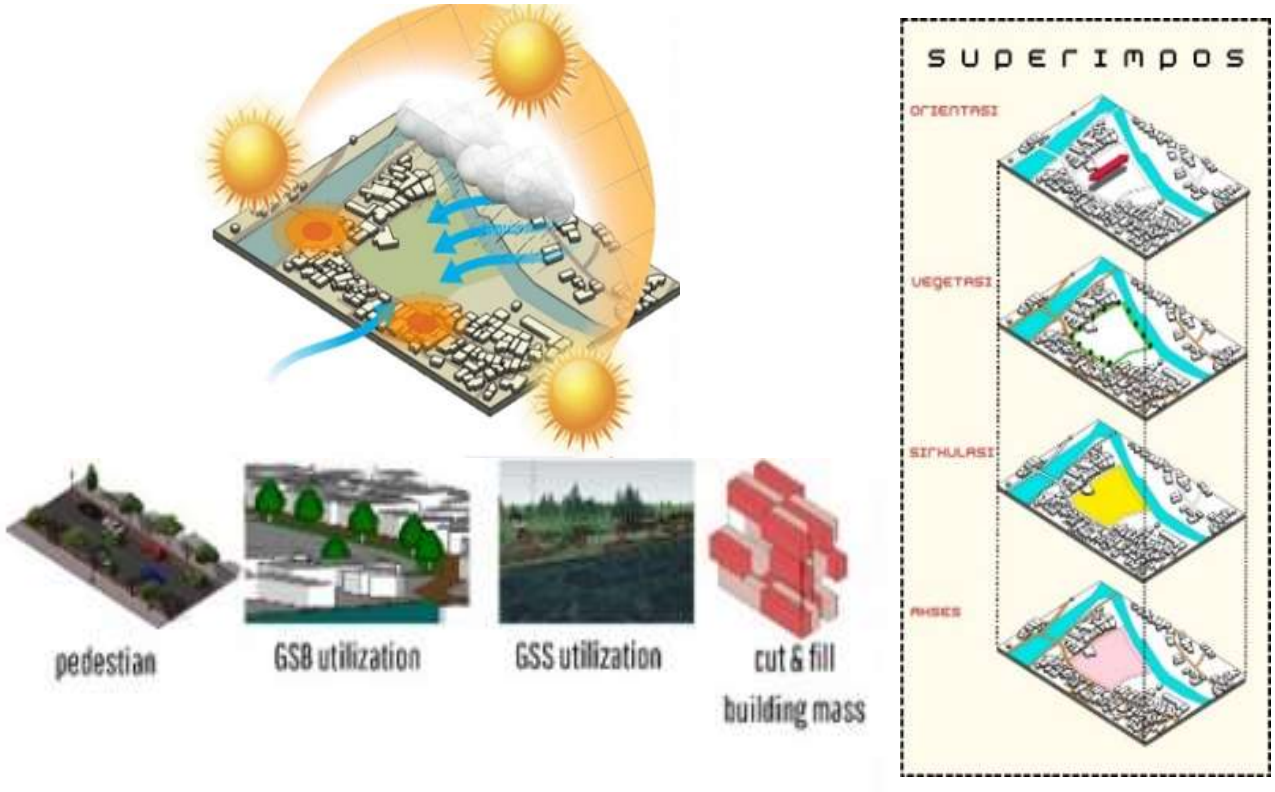


Figure 12. The concept of collective housing from natural elements.
(Source: Author)

4.2. Social and Cultural Aspects

The majority of people in Padang City, especially those in the Koto Baru Nan XX Sub-district are from the Minang tribe. However, many residents came from outside of the city of Padang and settled down due to urbanization, creating dense settlements and an inconducive environment for healthy living. This condition has awakened the community to be more aware of the importance of maintaining environmental cleanliness. Not only for personal health but also to preserve the environment and avoid the adverse effects of urbanization that further damage the surrounding environment.

Social and cultural aspects are influenced by:

a. Legality of residential land and quality of life in fulfilling infrastructure access

Settlements in the research area are settlements located on the banks of rivers and have buildings that do not have legality. Land for settlements is owned by one person without a land certificate and renting buildings in the research area at a low price. Through time and the legality of land ownership, housing develops according to the wishes of the people in the area. On the other hand, housing that is directly orchestrated by the community alone is not livable. The shift in the desire to own a home and the affordability of financing to own a home has an inversely proportional influence on the sustainability of home ownership into the future. Because there is no effort by building and land owners to improve the structure of the building, the result is a chaotic combination of semi-permanent and temporary residences on the banks of the river. Looking at the function of the river ecosystem, residential areas along the banks of the Badang Arau River can be used as a supervisory function for river conditions, but this does not happen due to the lack of community concern for the sustainability of the river as a source of clean surface water. Access to this infrastructure is also affected

by the condition of the environmental road network, as the size does not meet the standards, and domestic waste products are also directly discharged into the drainage or rivers.

Figure 13. Rivers that are regarded as dumpsters.
(Source: Author)

b. Residence

Residence derived from community housing is based on the residential field survey data in the study area that can be divided into three residential characteristics: temporary housing, semi-permanent housing, and permanent housing. **Figure 14** maps the spread of permanent, semi-permanent, and temporary housing. From the field results, the identification of buildings with permanent, semi-permanent, and temporary types can be carried out, as shown in **Table 4.**

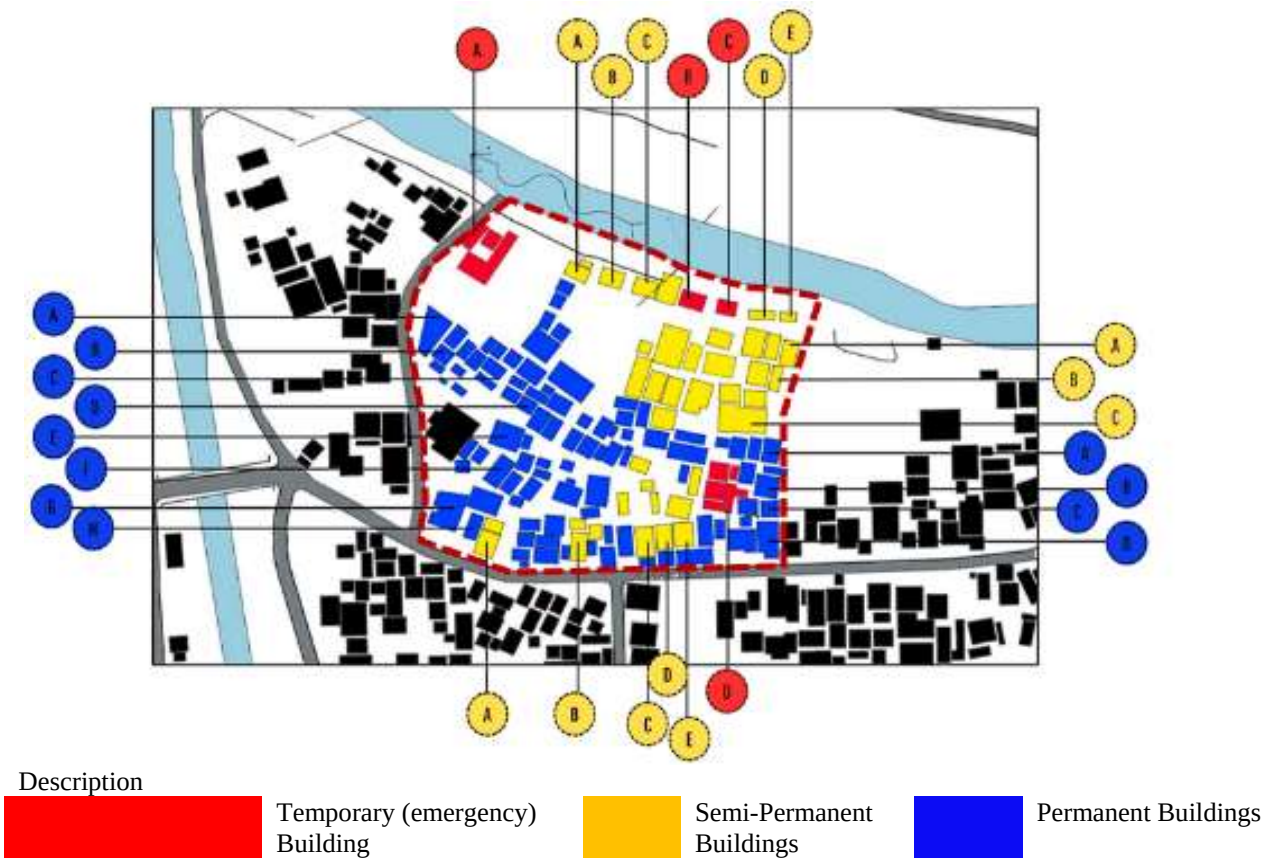
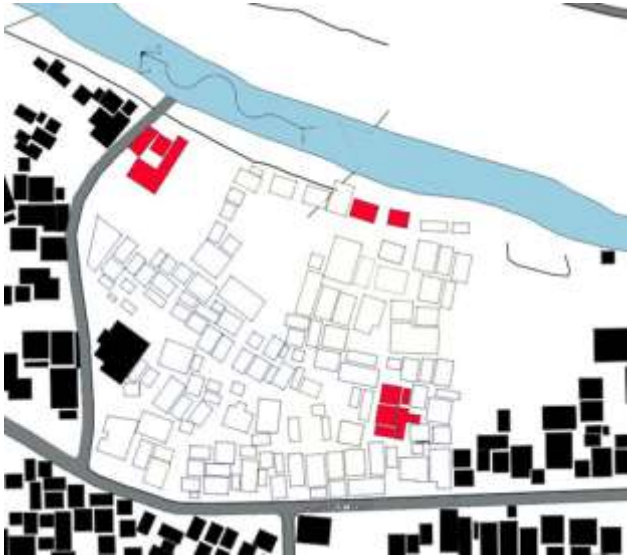
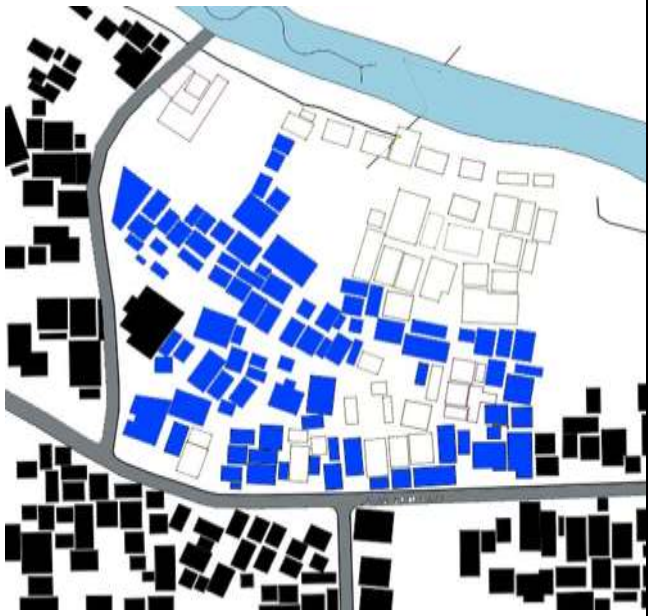


Figure 14. Map and documentation of the deployment.
(Source: Author)

Table 4. Tabulation of Building Types (Source: Author)

NO	TYPE OF RESIDENCE	LOCATION	FIGURE	NUMBER OF BUILDINGS
1.	Temporary (emergency) Building. The characteristics of temporary houses around this location are: • The residence is on the banks of the dead river with emergency house conditions generally in the form of stage. • Wood without finishing. • There is no toilet in the house and the sewer goes directly to the river. • The average resident is a fisherman. • The residence has its back to the river.			5

22	Semi-Permanent Buildings. The characteristics of semi-permanent housing in this location are: ● There are 2 types namely 1st and 2nd floor residence. ● For single-storey dwellings, concrete material on half walls or floors only, while two-storey dwellings, concrete material is used for lower-floor buildings			19
33.	Pemanent Buildings. The characteristics of permanent residence in the location are: ● There are two types namely pseudo-1st and 2nd-floor residences. ● The average resident works as an employee and has sufficient economic needs.			21

c. Evolving social and cultural values

The development of social and cultural values that are still maintained until today is the spontaneous occurrence of social interaction that creates a harmony between one community and the rest, establishing a strong social bond. This can be carried out by daily activities such as small talk at the stall that helps develop a sense of togetherness and solidarity (see **Figure 15**).

d. **Challenges to community resilience against other communities entering the area.**

The research area is located at a secondary arterial road that connects one sub-district to the other. Because it is far from the city center, the challenge for the survival of other communities in the area is low. However, it does not rule out the possibility of people from coming and adding dwellings on existing land. This condition must be patterned so that there is no spread of additional units but must be controlled by the formation of groups or by the form of collective decisions.

Figure 15. Interactions in the Research Area.
(Source: Author)

e. **Economic Aspects**

The economic aspect can be seen from the livelihood, education level, and income in the research area. The source of livelihood in the research area is dominated by laborers, almost 61.54%, with the average education level being high school as much as 38% with an income ranging from 1-1.5 million Indonesia Rupiah. From the income results, it can be concluded that the ability of the community to own a house can be regarded as having a high income. Locations are chosen by the community, because the price of house rental is still limited by the income of the population, and their type of work. Judging from the interaction process that occurs in the area, it can be suggested that the relationship has been harmoniously established amongst people of various types of work, as shown in Tables 5, 6 and 7 as well as **Figures 16, 17 and 18**.

Table 5 Types of Jobs.
(Source: Author)

No.	Jobs	Total	Percentage (%)
1	Fisherman	5	7.69
2	Workers	40	61.54
3	Self-employed	5	7.69
4	Public servant	4	6.15
5	Day trader	7	10.77
6	Scavengers	4	6.15
	Total	65	100.00

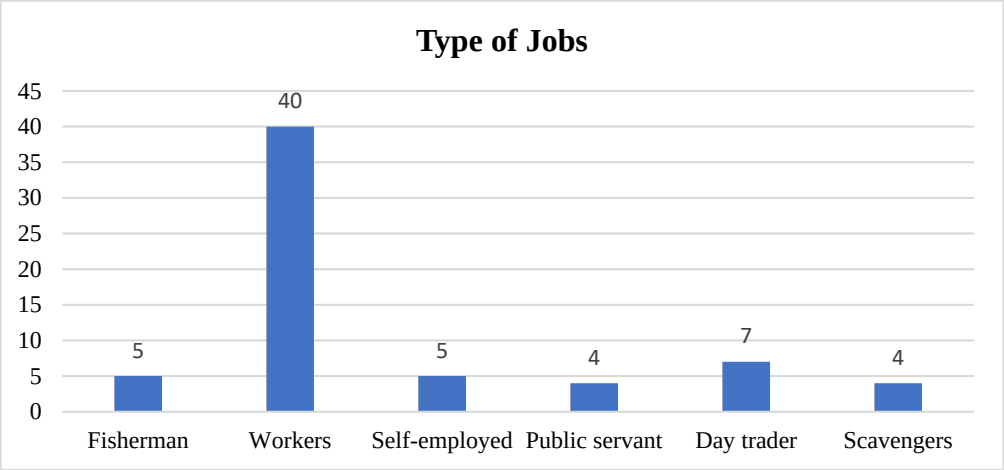


Table 6. Population by education level.
(Source: Author)

No.	Education	Amount	Percentage (%)
1.	SD	20	30.77
2.	SMP	15	23.08
3.	SMA/SMK	25	38.46
4.	Bachelor	5	7.69
	Total	65	100.00

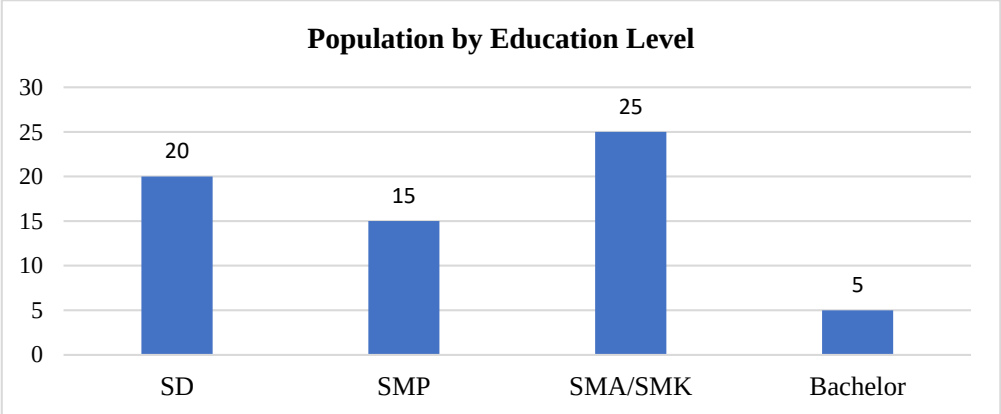
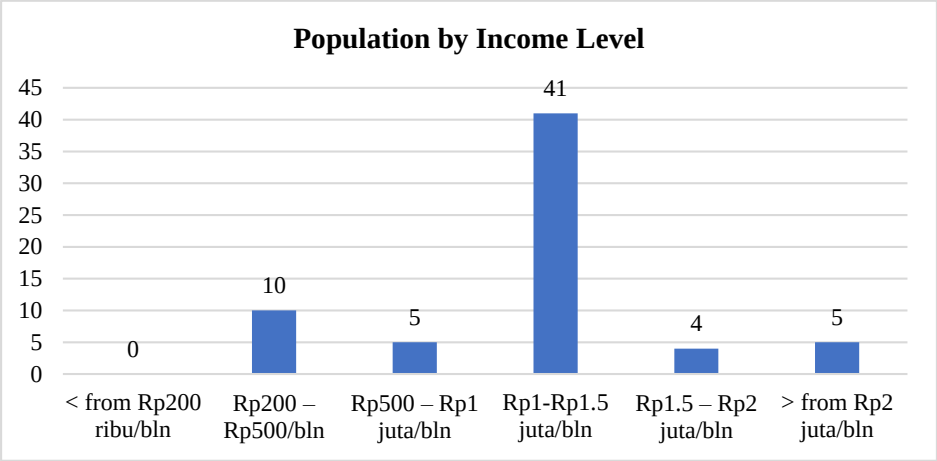


Table 7. Population by income level.
(Source: Author)

No.	Income	Amount	Percentage (%)
1.	< from Rp200 ribu/bln	0	0
2.	Rp200 – Rp500/bln	10	15.38
3.	Rp500 – Rp1 juta/bln	5	7.69
4.	Rp1-Rp1.5 juta/bln	41	63.08
5.	Rp1.5 – Rp2 juta/bln	4	6.15
6.	> from Rp2 juta/bln	5	7.69
	Total	65	100



4.3. Environmental Analysis

The surroundings of living things that affect their lives with conditions that continue to be preserved naturally or with the intervention of humans are considered influences in residential areas, involving environmental, artificial, physical, network, and utility links.

4.3.1. Environment links

According to environmental link, the environmental link is influenced by general facilities, health facilities, educational and service trading facilities, objects, and facilities around the site in a radius of 500 meters, including At-Taubah Mosque, Koto Baru Nan XX Sub-district, Mess Transit Lantamal II, PLN Koto Baru Warehouse, Koto Baru Nan XXx Village Office, Batang Arau River and Buai Koto Baru Bridge as explained in Figure 16.

Figure 16. Environment Links.
(Source: Author)

4.3.2. Artificial physique

Artificial physical conditions greatly affect the quality of human life because they can create a comfortable and safe environment for living and carrying out daily activities. However, we should take note that the creation of artificial physical conditions must safeguard the sustainability and environmentally friendly elements not to damage nature and the surrounding ecosystem (see **Figure 17)**. Perhaps the artificial physical planning is required to support the sustainability of life in planning.

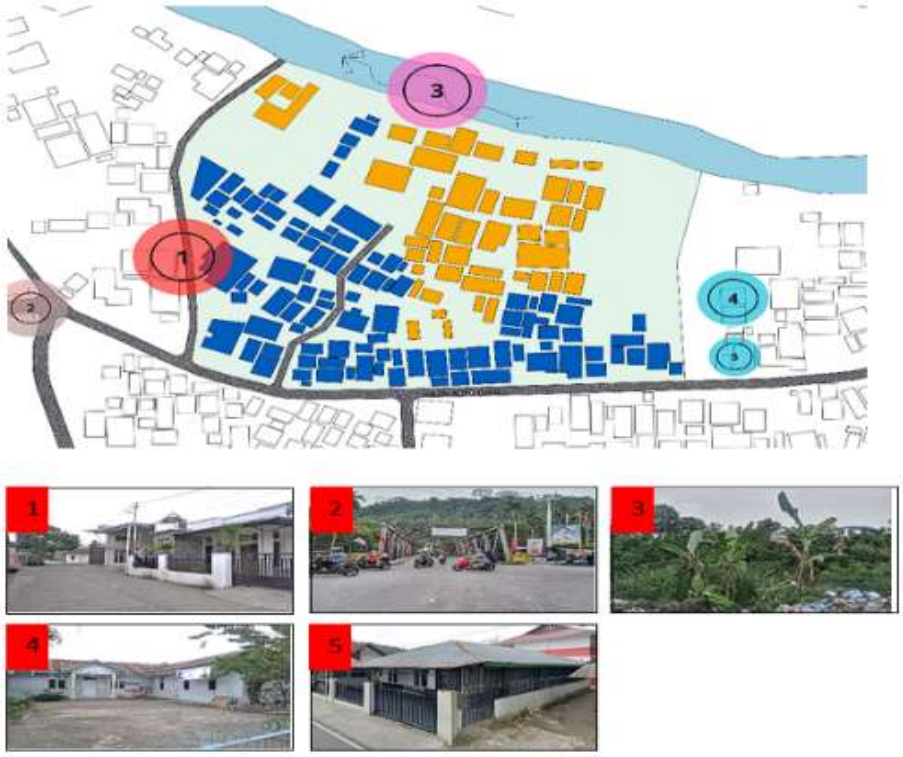


Figure 17. Artificial physical in the study area.
(Source: Author)

4.3.3. Networking

The condition of the network, such as alleys, which is a crucial area for the community, is an important area to be re-presented as an area of interaction between neighbors. In general, the circulation is a narrow alley that arises due to unplanned housing that appears behind residents' houses. The characteristic of the road is dirt road and concrete. In addition to the road network, the drainage network in the study area uses an improper drainage system **(Table 8).**

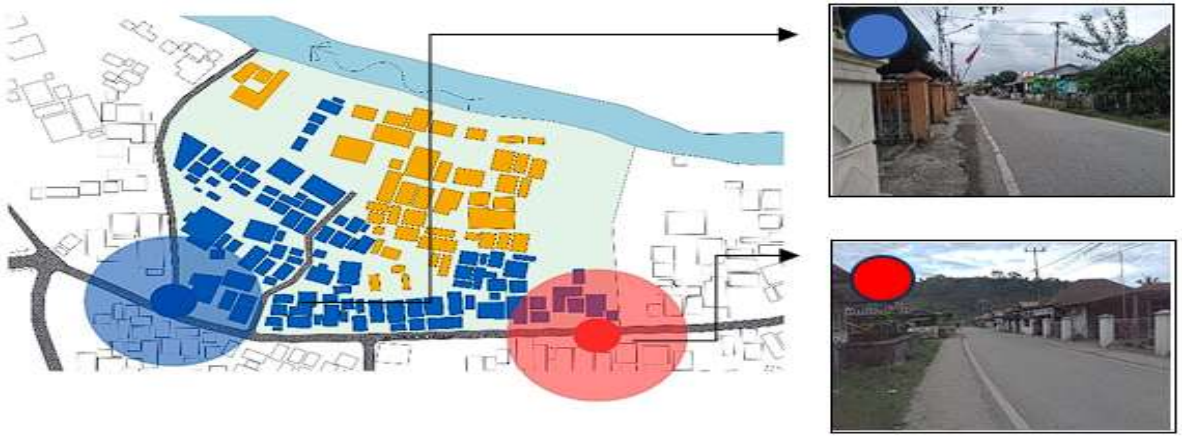
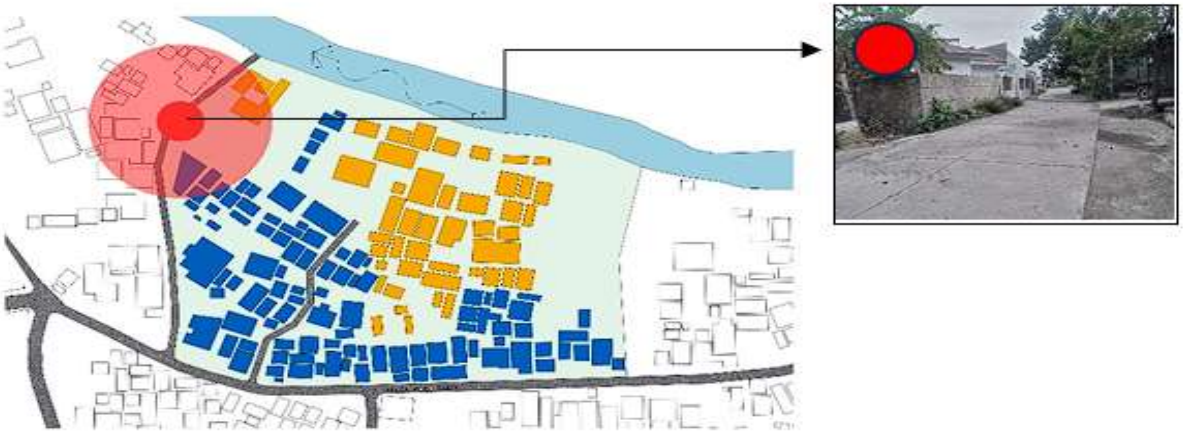
4.3.4. Utility

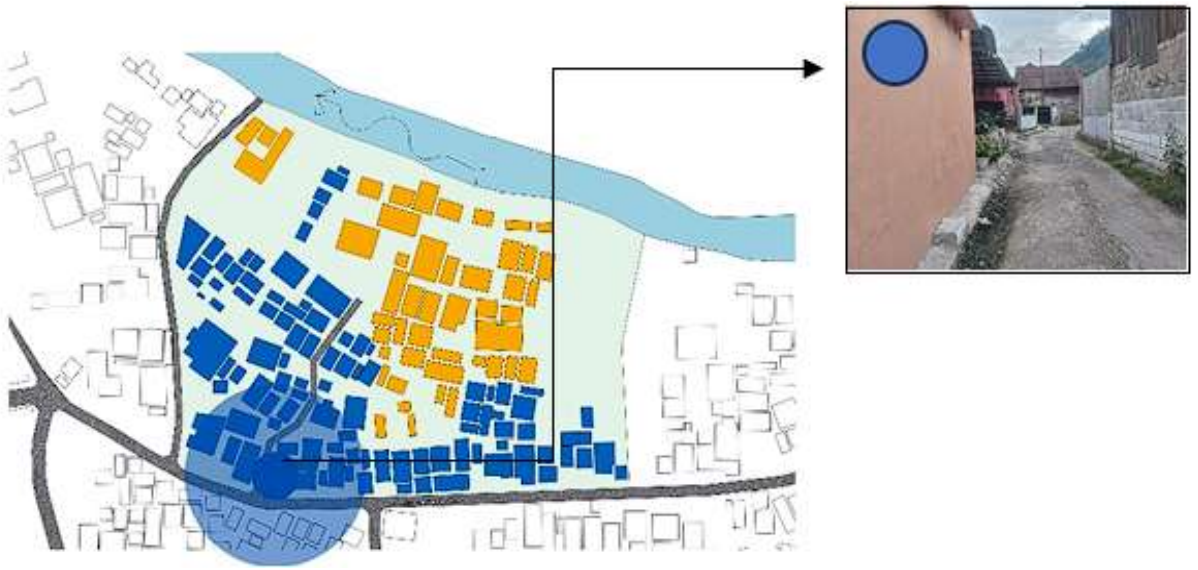
Building utilities include various supporting facilities such as electrical systems, clean water systems, wastewater treatment systems, heating and air-conditioning systems, as well as security and fire systems. In the research area, the available utilities include electric poles in residential areas, and drainage outside the area **(Table 8).**

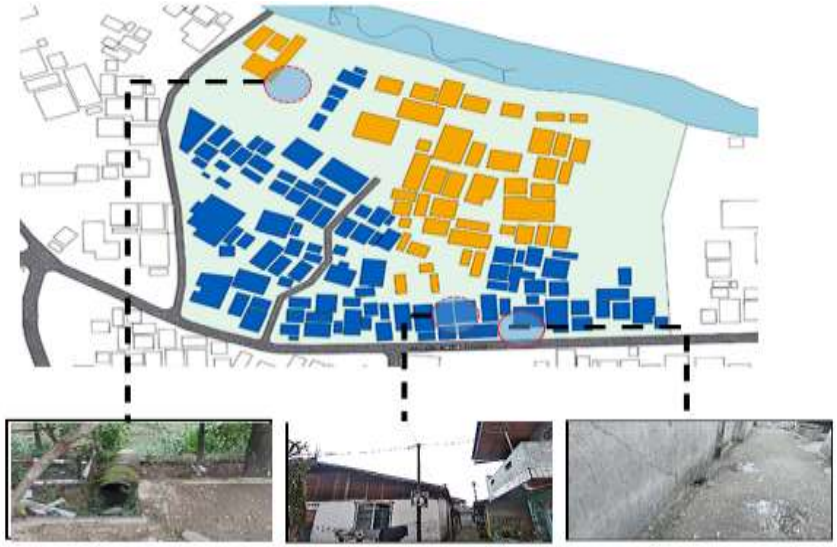
4.3.5. Human Circulation

Pedestrian circulation on the site depends only on one road, namely Jalan Koto Baru. The road has no pedestrian path for human circulation and there is no drainage on both sides of the road. This also increases the risk of accidents.

Table 8. Networking.
(Source: Author)

Circulation	Width	Surface type and condition	Problems	Image
Road				
Koto Baru Road Secondary neighborhood road	± 4M	Good condition asphalt	-Good asphalt condition	
Road A Ciculation in the village, the road leading to the Batang Arau riverbank.	± 3M	Concrete castings in good condition	-Narrow roads and poor drainage system -Frequent puddles on the roadside	

Road B Alley to enter the area	± 1M	Soil and cast concrete in poor condition	-Narrow road -No drainage -There are puddles when it rains heavily	
Road C Street residential neighborhood (gang senggol)	± 1M	Rocky soil with conditions	-Narrow road -No drainage -There are puddles when it rains heavily -Children's playground	
Utilities				

Type of utilities, drainage outside the delineation area, and electric poles.		Good Condition		
Human Circulation				
		Occurring on road B, road C, and Road D.	The mixing of human and vehicular access roads that cause rawan kecelakaan.	

While the network pattern system (*networking*) access in and out of the research area, drainage, and other infrastructure that connects various parts of the settlement in the area is visible, the settlement pattern is formed in a line with the characteristics of settlements in the area in the shape of scavenges and slums. Therefore, it is necessary to control the growth and development of housing in the research area. Thus, handling is needed. To increase the circulation of the garden, the best alternative that can be taken is to add entrances on all sides of the garden. This will facilitate access to the park from various directions. In addition, adding a path to the river can also help improve circulation around the park.

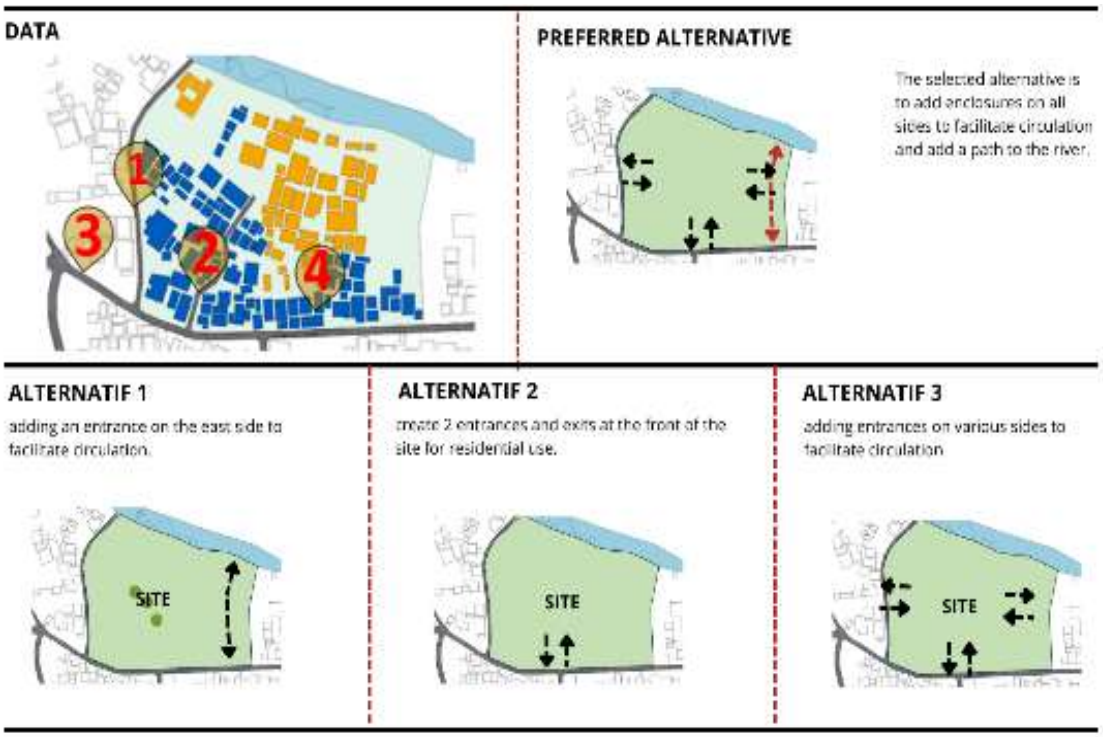


Figure 18. Circulation Alternatives.
(Source: Author)

5.0 CONCLUSION

This study aims to examine the application of the concept of collective housing as a solution to improve the quality of life in riverside settlements, using a case study in Koto Baru Nan XX Sub-district, Padang, Indonesia. Based on research methods that include literature studies, field surveys, in-depth interviews, and focus group discussions (FGDs). Some key conclusions can be drawn as below.

a. Identify the main problems:

1. Residents in Koto Baru Nan XX Sub-district face various problems, such as vulnerability to flooding, poor quality of infrastructure, and lack of access to basic facilities.
2. The socio-economic conditions of the community are also diverse, with many families being below the poverty line, complicating efforts to improve the quality of housing.

b. Potential for the application of the Collective Housing Concept:

1. The concept of collective housing shows great potential in overcoming the problem of limited space and increasing social solidarity among residents.
2. Residents are showing interest in this concept, especially when it comes to sharing facilities and resources to improve efficiency and sustainability.

c. Community needs and expectations:

1. Through interviews and FGDs, the community expressed the need for housing resistant to disasters, access to clean water, and adequate sanitation facilities.
2. The community's expectations also include the existence of green spaces and children's play areas to support a better quality of life.

d. Collective Housing Design Model:

1. The proposed design model includes multi-story buildings with communal areas for social and economic activities.
2. The design also considers sustainability aspects, such as the use of local materials, stormwater management systems, and renewable energy.

e. Policy and implementation recommendations:

1. The importance of collaboration between local governments, communities, and the private sector in the implementation of collective housing.
2. Recommendations include the development of policies that support collective housing development, the provision of incentives for developers, and educational programs for the public about the benefits of collective housing.

The application of a collective housing concept in Koto Baru Nan XX has great potential to improve the quality of life of the riverside community. An adaptive and sustainable design model, supported by the active participation of various stakeholders, can be an effective solution to address the challenges faced by riverside settlements. This research provides a solid basis for the further development and implementation of the concept of collective housing in other areas with similar characteristics.

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