



## Systematic Literature Review: Modification Concept for Sustainable Houses in Urban Informal Settlements in Indonesia

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### ABSTRACT

Rapid urbanization and the urgent need for sustainable development have led to the emergence of slum areas in urban areas. These areas are characterized by declining physical, socio-economic, and socio-cultural conditions, often densely populated and inhabited by low-income communities with limited access to adequate facilities and infrastructure. As a solution to addressing urban population density, the Modified Concept for Sustainable Housing in Urban Informal Settlements needs to be planned and implemented. This study uses a systematic literature review to understand the Modified Concept for Sustainable Housing in Urban Informal Settlements, focusing on how such participation affects the success and sustainability of the project. The review evaluates various modes of community participation and identifies factors that influence the successful implementation of the Modified Concept for Sustainable Housing in Urban Informal Settlements. A systematic literature review method was used to assess relevant literature, identify key themes, and develop a framework for analysis and synthesis of findings. Initial results indicate that community involvement improves project sustainability, strengthens self-reliance, enables innovation in addressing local problems, and promotes inclusive and effective development. Supporting Inclusive and Resilient Cities, Sustainable housing modification is not just about buildings, but also about social justice, environmental preservation, and long-term urban planning.

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## 1. INTRODUCTION

Urban areas and their development are inseparable from each other. Urban areas with their complex activities will continue to develop over time and cover all areas of development. The development in urban areas will be a special attraction for people to live and carry out their economic activities in the urban area. This results in migration which adds to the burden on urban areas both in terms of space and intensity of activity.

The increasing number of population and intensity of activities in urban areas need to be addressed and anticipated early by the relevant local governments. This needs to be done considering that this phenomenon can raise many urban problems, especially those related to the availability of support for urban settlements and infrastructure. The development of settlements and urban infrastructure that does not anticipate or accommodate the development of urban areas will cause problems including: (a) uneven provision of urban infrastructure, and (b) the unavailability of a decent residential environment, uncontrolled development of settlements in non-residential areas, and (d) the occurrence of slums.

In Indonesia, the problems of settlement development and urban infrastructure as well as city/district development as a whole are handled and anticipated through 2 (two) forms of planning, namely: (1) development planning that provides direction for achieving sectoral development goals and (2) spatial planning that provides direction for spatial development. Both forms of planning are accommodated in 2 (two) documents, namely: (1) development plan documents (Long-Term Development Plan (RPJP)/Medium-Term Development Plan (RPJM)) and (2) spatial planning documents (General Spatial Plan and Detailed Spatial Plan).

Big cities with all their problems require good urban governance. The problem of informal settlements is one of the biggest problems that must be faced and resolved by the government together with the community. The increase in population and limited land have resulted in an increase in land prices in the city center. The government has not been able to provide access to low-income communities (MBR) to have decent housing. These houses grow organically and sporadically without planning and basic services. Informal settlements have irregular development patterns and are not supported by adequate public facilities and infrastructure. People living in informal settlements build facilities and infrastructure independently and far below the Indonesian National Standard (SNI) set by the government. Informal settlements in urban areas are mostly found on the banks of rivers and railways, and other marginal land locations without legal land ownership recognized by the state.

Urban informal settlements are residential areas where residents have no certainty of land or house tenure. These settlements are also known as shantytowns or slums.

Characteristics of informal settlements :

- Residents have no certainty of ownership of the land or house
- Housing does not comply with planning and building regulations
- Lack of adequate infrastructure and services
- Uncertain safety and security
- Socio-economic marginalization

Causes of informal settlements Rapid urbanization, Economic disparity, Lack of affordable housing, Mass migration of people seeking employment in urban areas, Fleeing from natural disasters such as war. According to the United Nations, around 1 billion people worldwide live in informal settlements. For tens of millions of people worldwide, urban settlements are their means of survival. Informal settlements have been the focus of extensive research from legal, political, anthropological, sociological and economic perspectives. However, most of these studies have paid little attention to aspects of urban form and architecture, and

understanding of how architectural and spatial practices interact with everyday activities in informal life is still limited.

Informal settlements and slums are observed in many countries, especially in the global south. Although having different connotation and being unique in their social-cultural aspects, they possess very similar physical characteristics. As an example, there are the *Kampungs* in Indonesia and the *favelas* and urban occupations in Brazil. Having similar characteristics, these settlements also face the similar problems. Although a certain generalisation is made, generalising should be done carefully as the homogenisation of informal settlements may lead to generalised eradication rather than upgrading strategies (UN-Habitat 2014a).

According to Rukmana (2018), the different housing policies implemented by the Indonesian government such as the KIP, could not solve the critical issue of informal settlements in most Indonesian cities. The author presents the *Kampung Deret Program* (KDP), which is more decentralised and provides housing through the construction of low-rise apartment blocks for low-income residents of *Kampungs* in Jakarta. Although the author describes the details of the existing housing policies for informal settlements and rural areas, he does not specify which type of design improvements and modifications are done at the housing level and how effective these are. Michiani and Asano (2019) emphasise the importance of the improvement of an informal settlement's infrastructure through three steps, namely the arrangement of street networks as fundamental systems that structure the settlement, the development of a public utility system that is essential for inhabitants' livelihood and the provision of a common space and amenities.

## 2. RESEARCH METHODS

The method used in this study is a systematic literature review. The systematic literature review method produces output based on available data and provides an explanation of existing findings, which will later be used as an example of research in developing a clear discussion of the issues to be studied (Andriani, 2022). The systematic literature review stages according to Cahyono et al. (2019) the first is to search for literature according to the research topic. After the literature is found, it is important to assess the credibility and relevance of the source. In addition, it is necessary to identify the main themes in the literature and any discrepancies between existing theories and practical conditions in the field. The next step is to develop an outline framework that will guide the observation structure. Finally, literature observations are arranged based on this framework to present findings systematically and organized.

Adjusting the research review with a focus on community participation in the development of urban thematic villages is done by adjusting the search and thematic focus. To help formulate research questions, keywords are determined, so that the article can systematically assess the existing literature to identify and describe the Modification Concept for Sustainable Housing in Urban Informal Settlements. This helps in collecting literature that supports a more inclusive and effective informal settlement modification concept method. The keywords used are "modification concept" or "modification design", "Sustainable House" and "Urban Informal Settlements" or "slum settlements".

Literature was obtained from the Google Scholar database using Publish or Perish. From the search using predetermined keywords, 200 articles were obtained. The articles used were limited to the period 2014-2024 so that the information obtained was the most recent and relevant. Furthermore, a classification was carried out which focused on the Modification Concept for Sustainable Houses in Urban Informal Settlements. The criteria used were to be able to answer the questions "What is the Modification Concept for Sustainable Houses in

Urban Informal Settlements?" and "What are the forms of Modification Concepts for Sustainable Houses in Urban Informal Settlements?"

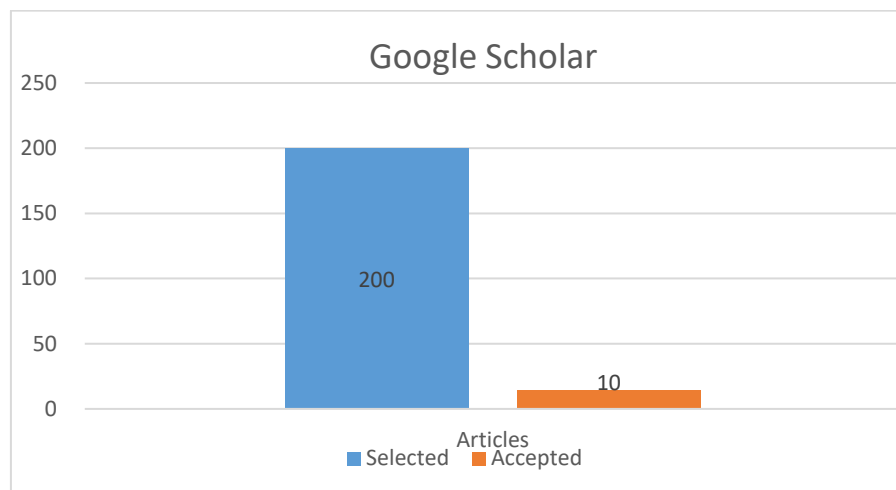


Table 1. Diagram of the Number of Selected Articles  
(Source: Parsifal)

### 3. RESULTS AND DISCUSSION

Furthermore, an analysis of 10 selected articles was conducted to obtain answers to the questions "What is the Modification Concept for Sustainable Houses in Urban Informal Settlements?" and "What are the forms of Modification Concepts for Sustainable Houses in Urban Informal Settlements?".

Table 1. Article Analysis

NO	Title and Author	Objective	Method	Research result
1.	Informal City: A New Paradigm Towards Inclusive and Sustainable Cities (Syahri Ramadhan et al, 2024)	The arrangement of informal settlements is homework for the government. The New Urban Agenda emphasizes the importance of urban development with a collaborative, integrated and sustainable structural approach.	This research method uses a qualitative research approach by conducting a literature review from various sources of scientific articles, books, journals, laws and regulations, and various other sources that are relevant to the topic of study discussed.	The informal city phenomenon is often considered a marginal area in urban planning and is seen as a direct result of rapid and irregular urbanization resulting in settlements without adequate/legal planning and often without legal land ownership.
2.	Factors Influencing Changes in Traditional Houses and Settlements in Indonesia (Imanda Amalia, 2024)	This study will discuss the factors that influence changes in traditional houses and settlements in Indonesia with a focus on the influence of the development of Indonesian society. Through this approach, it is hoped that a deeper understanding can be found regarding architectural adaptation as time goes by.	The research method used is a literature review in the form of a Systematic Literature Review (SLR) to discuss the factors that influence changes in traditional houses and settlements in Indonesia over time and to examine ongoing architectural adaptations.	From the results of the literature review, it can be concluded that changes in traditional houses and settlements in Indonesia are influenced by various factors, including increasing human needs, developing technology, changes in human knowledge, changes in ideology, and cultural acculturation. These changes include the transformation of layout, shape, and building materials that reflect the adaptation of society to the demands of an increasingly complex life.

NO	Title and Author	Objective	Method	Research result
3.	Sustainable Slum Management in Urban Areas (Wulfram I. Ervianto et al, 2019)	Based on Law Number 1 of 2011 concerning Housing and Residential Areas, it is explained that slums are settlements that are not habitable due to irregular buildings, high building density, and the quality of buildings and facilities and infrastructure that do not meet the requirements, while slum housing is housing that has experienced a decline in the quality of its function as a place of residence.	Settlements are part of the environment outside protected areas, whether urban or rural, which function as a place to live and a place for activities that support life and livelihood. While sustainable development is defined as development to meet current needs without reducing the ability of future generations to meet their needs. The definition of housing is a group of houses that function as a residential environment equipped with infrastructure and facilities.	Some important things that are recommended to solve the problem of slums in urban areas are as follows: First, implementing an approach based on the principle of sustainable development. Second, comprehensively accommodating land use. Third, managing population mobility that leads to equality between villages and cities. Fourth, optimal utilization of renewable energy. Fifth, initiating activities that have an impact on improving the urban economy. Sixth, designing the best scheme related to social aspects. Seventh, providing accessibility that reaches both rural and urban areas.
4.	Literature Review: Informality of Urban Informal Settlements (Andi Annisa Amalia & Ikaputra, 2024)	The significance of the study is that a literature review is still needed as an initial step in understanding the basic principles of informality in the growth mode of informal settlements. The context of urban informal settlement formation refers to the conditions and factors that influence the emergence of informal settlements in urban environments. In this context, understanding the principles of informality of urban informal settlements will provide valuable insights into the science of settlement architecture.	The research method applied to gain an understanding of informality in urban informal settlements is Literature Review (LR) through bibliometric analysis, State of The Art (STA) search, etymological and theoretical reviews of the principles of urban informal settlement development, and case studies in countries in the global south. This search also includes the process of informal settlement formation and formalization of interventions in handling it.	Urban informality emerges and grows through multiple generative processes of self-organization and incremental adaptation. While formal interventions often fail to end this type of resilient and complex informal urbanism. The process of informal settlement development in different countries, both as part of the product, urbanization mode, practices and processes. But in principle, urban informality is spontaneous, unregistered and illegal through generative processes and self-organization.
5.	Transformation of Social Housing and Sustainability of Housing in Perumnas Sendangmulyo (Nany Yuliastuti and Annisa Muawanah Sukmawati, 2016)	There needs to be research that examines the physical changes in buildings that often occur in residential areas. The construction and development of housing is not finished only when the housing complex is built, but also regarding the sustainability of housing. Houses will develop further according to the abilities, desires, and needs of each resident. This	The analysis method used is quantitative, which is descriptive in nature by creating tables or graphs, grouping and analyzing data based on the results of the questionnaire answers obtained. Data in the study were obtained from field surveys. The data needed in this study are primary data and secondary data.	Based on the analysis that has been done, it can be concluded that the aspects related to economic and social characteristics in quality of life are basically interrelated and influence respondents in making physical changes to the houses they own. These aspects are income level, education level, number of families and motivation. While the type of work aspect has very little influence or is

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		phenomenon is often found in housing with a simple house type, including in the Perumnas Sendangmulyo Housing which is classified as a large-scale housing. If this is not anticipated properly by the government, then the condition that often occurs is the existence of deviations related to the provisions and sustainability of housing.	Primary data in this study was conducted through observation, questionnaires, and interviews, while secondary data was obtained from sources relevant to the topic being studied, for example from related agencies, either directly or indirectly, for example in the form of area maps and others.	not related to the physical changes to the houses that occur in the housing. If sorted from the largest to the smallest level of influence on housing transformation are: [1] Motivation, [2] Number of families, [3] Income level, [4] Education level. The level of influence of physical changes is related to the transformation of the house that is carried out, such as changes in shape and space, changes in function and changes in elements of the house.
6.	Literature Study: Strategies for Handling Slums in Urban Areas (Kholisna Putri & Mohammad Agung Ridlo, 2023)	Urbanization events have an impact on the growth of settlements. The increase in population causes the need for residential space to increase. The light response from the local government regarding the needs of the community in this case the need for decent housing is considered to have a light capacity. This is what causes the emergence of urban slum areas. The emergence of slum areas is caused by one of the factors, namely rapid population growth and is not balanced by the provision of adequate facilities and infrastructure, so that if this event continues to occur, it can result in environmental degradation.	The method used in this is a qualitative method with a literature review study approach through a literature review. Literature review is done by reviewing previously existing scientific journals. This study was conducted to identify, analyze and conduct further evaluations related to the problems of handling slums in Semarang City, Jakarta City, Malang City, Depok City.	The realization of livable urban settlements begins with efforts to handle urban slums comprehensively and sustainably. Based on the results of a literature study on strategies for handling slums in urban areas, it can be concluded that the level of slums in urban areas is influenced by three factors, namely physical, social and economic factors. These three factors are parameters in determining the criteria for slums as well as the pattern of handling slums. Activities to improve the quality of slums begin with determining the location of slums.
7.	Strategy for Improving the Quality of the Village-City Environment in the Framework of Inclusive and Sustainable City Development: Lessons Learned from the Case of Bandung City (Iwan Kustiwan & Afrizal Ramadhan, 2019)	In order to realize inclusive (city) development, several efforts are needed as follows (Habitat III Report; chapter 1; 2016) including increasing participation and innovation. Several efforts made are implementing more inclusive city planning and environmentally friendly design that is sensitive to the needs of children, young people, women,	Based on its benefits, this research is categorized as applied research, namely research designed to provide practical answers to real problems or answer practical needs directly and specifically, in this context it is to answer the problem/handling of slum settlements (urban villages) through the formulation of	Villages in Indonesia have played an important role in the process of urban development. As one form of informal settlement, currently the village area is still a mainstay, especially for low-income communities in meeting housing needs. The existence of villages, especially in Bandung City, has historical value as the forerunner of the formation of urban space and has vital value for most of the

NO	Title and Author	Objective	Method	Research result
		families, the elderly and the disabled and strengthening the role of urban villages as informal business places for the people that are synergized with the formal city economy through market incentives and more inclusive urban economic policies for social groups that have so far received less opportunities.	strategies. Based on the purpose or nature of the problem, this research is categorized as descriptive research.	community so that it needs to be given attention in development and should not be marginalized in the context of urban spatial planning. This study has conducted an analysis of various approaches, both quantitative, qualitative and spatial approaches with two study areas, namely the macro study area (Bandung City) and the micro study area (case study of 3 urban villages in Bandung City).
8.	Concept of Slum Handling in Kotabaru Serang City, (Laily Kurniasari, Raldi Hendro Koestoer, & Emirhadi Suganda, 2018)	This study aims to analyze the level of slums in Kotabaru Village from the environmental, economic, and social aspects, and to be able to formulate a concept for handling slums in Kotabaru Village.	This research uses a quantitative approach. The research method is quantitative. This research is supported by quantitative data and qualitative data that are quantified. The population in this study is two, namely: (1) housing buildings and settlement infrastructure in the slums of Kotabaru Village (RW 1, 2, 3 and 5). The data collection method is carried out by combining observation results with secondary data.	Based on the analysis of the level of slums, the Kotabaru slums are categorized as severe slums and a small part of them occupy land with illegal status. The slum management pattern that can be done is rejuvenation, namely by carrying out a complete renovation and basic arrangement covering houses and infrastructure, facilities, and public utilities for housing and settlements. Rejuvenation is carried out to create better settlement conditions in order to protect the safety and security of residents and the surrounding community through complete demolition and arrangement of houses, infrastructure, facilities, and/or public utilities.
9.	Affordable modifications for sustainable houses in urban informal settlements: a case study of Bandung, Indonesia (Cristiana de Almeida Parisi, at al, 2021)	This research consists of two main parts: (I) understanding the current situation of the Kampung housing's physical conditions, along with the dweller's behaviours and how both can be related to health problems, focusing especially on respiratory diseases and (II) formulating solutions and actions to be taken to minimise the harmful effects the housing condition has on the health of the dwellers. Regarding the literature on the effectiveness of the KIPs, Santosa et al. (n.d.) investigated the benefits	The subjects investigated include 333 and 266 residents in dry and rainy seasons respectively for the interviews, a total of 102 samples were obtained for field measurement of air temperature (AT), relative humidity (RH) and mould risk, 38 houses were measured for TSP and PM2.5, and five houses for a detailed measurement and further modification plan. During part (I), the researchers conducted a	On account of such results, a modification plan based on possible actions that can remediate those was created and, consequently, a design modification matrix was created in order to assist in the decision-making process, showing which of the proposed alternatives are more suitable for the given context. It is possible to conclude that the best options would be the use of exhaust fans, together with the use of proper finishing materials, i.e. water-resistant materials and mould-resistant paint, the use of shading devices to improve the indoor comfort at hot

NO	Title and Author	Objective	Method	Research result
		and success of the comprehensive Kampung improvement programme (C-KIP) in 10 different Kampung in Surabaya, at the housing, infrastructure, community participation and economic levels. Although they assessed the nature of improvements done at the home and infrastructure improvement level, i.e. by renovating some parts of houses such as bathrooms and toilets, and connection to clean water for households, they do not specify how such improvements were conducted.	quantitative investigation using scientific measurements towards target settlement's sample units, as well as quantifying resident's health and behavioural data using Likert Scale questionnaires.	days, and the change of occupants' behaviour, so that the residents adopt more sustainable daily behaviour that can improve their health and living quality. This does not exclude other options, as they are all effective suggestions and can be more suitable for a specific house and family. It is important to underline that this is a simplified matrix, and for further research, a sensitivity analysis can be done, in which different weights are given to the options depending on the priorities of the main stakeholders
10.	Housing Quality in Informal Settlements on the Banks of the Mahakam River in the Samarinda Seberang Weaving Tourism Village, East Kalimantan (Iga Nur Ramdhani et al, 2022)	In East Kalimantan there are also informal settlements on riverbanks, one of which is in Samarinda Seberang on the banks of the Mahakam River. The Informal Settlement is the Tenun Tourism Village, which is one of the informal settlements that grew in Samarinda Seberang. The growth of this informal settlement was formed since the arrival of the Bugis Wajo migrants several centuries ago (Sarip & Nandini, 2021). The quality of the informal settlement of the Tenun Tourism Village seen from waste processing shows that the community produces a lot of waste every day. The majority of residents do not pay proper attention to waste starting from the method of temporary storage, collection, transportation, processing, to final disposal.	Housing quality includes many factors including the physical condition of the building and other facilities and services that make housing in an area conducive. This research examines the quality of housing in informal settlements on the banks of the Mahakam River in Kampung Wisata Tenun, Samarinda Seberang, East Kalimantan. This research uses a qualitative approach, where qualitative research is descriptive and discovery-based, obtained from observations of reality in the field, and is intended to understand social phenomena (Abdussamad, 2021). So that with a qualitative approach, it can show the real conditions that exist in social life in Kampung Wisata Tenun, and can describe narratively the activities and impacts that occur in their lives. The qualitative	In an effort to improve the quality of housing, it can be done through physical aspects, such as structural renovation and replacement of materials in houses that are no longer habitable. Then based on the analysis of the orientation of the building related to cleanliness, it is possible to improve the quality of housing by normalizing and cleaning up garbage on the banks of the Mahakam River, especially those caught under the houses. Then renovations need to be carried out such as providing septic tanks and trash bins. In addition, it is necessary to organize a proper waste processing and disposal system.



NO	Title and Author	Objective	Method	Research result
			approach in question will be seen from the quality of housing and environmental.	

### What is the Modification Concept for Sustainable Houses in Urban Informal Settlements?

From the analysis conducted by Syahri Ramadhan, et al (2024). The arrangement of informal settlements is homework for the government. The New Urban Agenda emphasizes the importance of urban development with a collaborative, integrated and sustainable structural approach. The New Urban Agenda aims to address the challenges of urban planning by prioritizing inclusive urban development, including improving the quality of informal settlements in order to improve the quality of life of the community in accordance with the 11th goal of the Sustainable Development Goals (SDGs). The New Urban Agenda strengthens the implementation of sustainable urban development and makes cities a place for their citizens to live and provides equal opportunities and opportunities (cities for all). The targets to achieve these goals are: 1) fulfilling the community's right to get decent housing and get quality urban infrastructure services; 2) creating an inclusive urban economy by developing the local economy; 3) involving the community to take part in the planning and development process and maintaining the quality of the environment.



Figure 1. Patterns of rooftop materiality can provide deeper insights into household connections to governance and political alliances. Image of kampung Lebak Siliwangi, Bandung Indonesia (Source: Dadi Rusdiana)

Secondly, according to Imanda Amalia Damayanti (2024) along with the development of the era, there has been an increase in globalization, rapid urbanization, advances in information technology, and economic challenges have become the main drivers of social and cultural change in Indonesia. In the midst of these changes, local communities in various regions are trying to adapt to the interaction between traditional values and new social dynamics. In the current era of globalization, the development of a region can be said to have begun to progress. Globalization is not only developing in urban areas, but has also penetrated rural areas. Expansive globalization is slowly eroding the cultural order of an ethnic group, so that their noble values are gradually replaced by new values that do not support the original culture they previously upheld. The meaning of traditional houses is inseparable from the changes and developments influenced by cultural evolution. Changes that occur in traditional houses are influenced by various factors.

Furthermore, according to Andi Annisa Amalia, et al (2024) the relationship between formality and informality can be seen in a historical context, where informality often appears before formality. The distinction between informal and formal settlements has been applied in relation to urban territories (slums and non-slums), groups (labor), and governance (monitoring, naming and intervention). Traditional settlements and medieval cities, for example, have urban morphologies that develop informally through micro-adaptations over time. Although often considered irregular, informal settlements are a form of urban design and planning that involves a series of complex logics that are poorly understood. Self-organizing cities as a result of community initiatives and cultural impulses are referred to as informal settlements. UN Habitat & Escap (2015) states that in the spatial dimension, these areas can be viewed as urban fragments, localities, or districts. Informal practices in urban areas lead to informal urbanization, where elite groups and underprivileged city dwellers occupy land without clear ownership rights. The term 'urban informality' refers to the lack of governance and unregulated use of space and individual activities in urban environments. The phenomenon of informal activity as a characteristic often found in urban areas is a by-product of rapid urbanization, influenced by changes in the economic and political fields, and connected to the processes of industrialization and globalization.

### **What is the Modification Concept for Sustainable Houses in Urban Informal Settlements?**

According to Kholisna Putri and Mohammad Agung Ridlo, urbanization events have an impact on the growth of settlements. The increase in population causes the need for residential space to increase. The light response from the local government regarding the needs of the community, in this case the need for decent housing, is relatively light in capacity. This is what causes the emergence of urban slum areas. The emergence of slum areas is caused by one of the factors of rapid population growth and is not balanced by the provision of adequate facilities and infrastructure so that if this event continues to occur, it can result in environmental degradation (Octavionesti & Mardiansjah, 2017). The rusunawa development program is one of the government's policies in providing decent housing for low-income people (MBR) in order to reduce the level of slums in urban areas while achieving the Slum-Free City program. The existence of this rusunawa development program has great potential in reducing poverty and slum areas in urban areas. The construction of rusunawa is directed towards urban development as a form of concern between fellow human beings as well as a solution in order to improve the quality of settlements by providing decent facilities and infrastructure. With the construction of rusunawa, it is expected to save people's daily expenses so that people can save and have the opportunity to own a legal residential building. The construction of rusunawa has great potential in building residential areas sustainably.

Iwan Kustiwan, et al (2019) explained about various potentials and constraints which are then known as strategic internal factors related to efforts or processes to improve environmental quality in urban village areas. In addition to internal factors, external factors are also studied in the form of opportunities and challenges, starting from aspects of government regulations, the existence of community roles, implementation of village improvement programs or handling of slum areas, and other things related to efforts to improve environmental quality in urban village areas. The data or information used is a combination of the results of interviews with the community, city government (DPKP3) and the KOTAKU program implementation team. Thus, the diversity of information sources is in line with the principle of 'triangulation' of information to complement the views of various actors so that it can improve the quality or level of validity, especially when formulating strategies to improve environmental quality and handling urban village areas Potential/Strengths:

- 1) The condition of the residents' houses is mostly permanent with clear land legality.
- 2) The culture of mutual cooperation is still maintained and the level of closeness between residents is very good, easy to work together.
- 3) Participation in community service is relatively good.
- 4) The majority of village residents are indigenous people, the sense of belonging to the residential environment is high.
- 5) Openness of entrepreneurial opportunities for local people (trade/services) amidst the dense population of the village area.
- 6) The level of security in the area is relatively good, not prone to social conflict

**Constraints/Weaknesses:**

- 1) High intensity (KDB) of house buildings, the majority do not have green space (KDH) for rainwater absorption.
- 2) The level of building regularity is low, the distance between buildings is very close and the direction of the building face is irregular.
- 3) There are still a number of houses that are in poor condition/less than adequate
- 4) There are a number of damaged environmental roads and do not comply with technical standards/provisions.



Figure 2. Co-Housing Concept: As a Solution to Housing Problems in Indonesia (Source: Annabel Noor Asyah)

Furthermore, according to Laily Kurniasari, et al (2018) analysis of the level of slums, the Kotabaru slum settlements are categorized as severe slums and a small part of them occupy land with illegal status. The slum management pattern that can be carried out is rejuvenation, namely by carrying out a complete renovation and basic arrangement covering houses and infrastructure, facilities, and public utilities for housing and settlements. Rejuvenation is carried out to create better settlement conditions in order to protect the safety and security of residents and the surrounding community through the demolition and complete arrangement of houses, infrastructure, facilities, and/or public utilities. Slum management is carried out by relocating settlement activities above the original location by arranging houses and settlement facilities and infrastructure.

Alternative concept of handling slum settlements with rejuvenation is done through Land Sharing Rejuvenation of slum settlements with Land Sharing is chosen because the level of land ownership is quite high as evidenced by the existence of a letter of ownership/control over the land they occupy legally with a limited area, and the layout of the settlement is not patterned. The concept of reorganization through land sharing, people who have a legal land ownership letter will get their land back by taking into account the need for public facilities

and infrastructure. The government will pay compensation for land owned by the community that is used for the addition of public facilities.

Sustainability has become a trend and a driving force in all aspects of development, along with the increasing complexity and magnitude of global problems. In spite of that, according to Sugiri (2009), sustainability is the main challenge for slum upgrading, as most of the improvement programmes do not consider the sustainable development of such areas and the dwellers are constantly deprived from their rights for equitable benefits from development. In addition, environmental sustainability has been neglected as most houses in Indonesia, which are improper for the local climate and energy consuming (Karyono, 2012).

#### 4. CONCLUSION

The concept of sustainable home modification in informal urban settlements is an approach to improve the quality of housing by considering environmental, social, and economic aspects. Applications that can be done: Use of Environmentally Friendly Materials, Energy Management, Water Management, Ventilation and Air Circulation, Modularity and Flexibility of Buildings, Integration with the Social Environment, Waste Management.

Provision of water-resistant building materials and mold-resistant paint, use of shading devices to improve indoor comfort on hot days, and changes in occupant behavior need to be implemented, so that occupants adopt more sustainable daily behaviors that can improve their health and quality of life. In addition, it can be used as input for the preparation of policies and planning, especially in the field of physical infrastructure and the environment.

Sustainable housing modification in informal settlements is necessary for a number of important reasons related to community well-being, the environment, and the sustainability of the city as a whole. With the following goals in informal settlements: Improving the Quality of Life of Residents, Reducing Environmental Impacts, Reducing Vulnerability to Disasters, Encouraging Self-Reliance and Empowerment of Residents, Supporting Inclusive and Resilient Cities, sustainable housing modification is not just about buildings, but also about social justice, environmental preservation, and long-term urban planning. It is an investment in a healthier, more equitable, and more resilient urban future.

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