

# Research Report

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**Title of Research:**

Toward sustainable low-cost housing in Indonesia: Exploring occupants' perception of sustainability of their extended core-houses. Case study: low-cost housing developed by Perumnas.

**Purpose of Research:**

The concept of sustainability brings a new perspective in implementing development which treats ecology, social and economic aspects as one comprehensive and balanced unity. Every notion of sustainability concept has the same objective of continuing life on earth for mankind as well as other living things, along with their development. It has been realized that this concept needs to be applied at many development scales and contexts. Housing becomes an appropriate start to implement this concept, because people can directly feel and be involved in various efforts implemented in this environment.

There is a vast need for housing in Indonesia. About 800,000 units need to be provided yearly to fulfill housing needs from the population growth, which demographically is dominated by middle and low income groups. The core-house is a house type to answer these needs. In Indonesia, the implementation of this concept has been conducted since the 1970s until now, and is mostly correlated with sites and services projects developed by the formal sector. The core-house is an embryo of a house which can be developed incrementally by the occupants to a complete and healthy house as they are able. It is meant to be a starter house with minimum standard of habitability and affordable for middle low income people.

Currently the developed core-houses have been adjusted physically in many forms. These adjustments were conducted by the occupants according to their desires and capabilities. This condition shows how they tried to sustain their life in their own living environment along with their desires and capabilities. Space and behaviour are interrelated, and occupants of low-cost housing have to cope with their limited physical setting in various ways. Observation in the bionomic process is needed in order to know whether housing is in a sustainable condition. Sustainability of a housing environment depends on how occupants interact with their spaces, and occupant's action within the bionomic process in their physical surrounding. These facts create a necessity to observe occupants' perception about sustainability condition of their adjusted core-houses.

The purpose of this research is to explore and comprehend the concept of a sustainable house for middle and low income people through studying occupants' perception of sustainability of their adjusted core-houses. It is hoped that the study results could have a benefit in elaborating the concept of sustainability which is mostly correlated with standards, and for designing and developing the next low-cost housing.

**Content/Methodology of Research:**

This research uses the qualitative method with case studies of core-houses in three low-cost housing development areas build by Perumnas (Indonesian Housing Development Agency) in Semarang City, Indonesia. The analysis strategy is quasi-qualitative, due to the consideration on: the nature of the concept of sustainability embraces vast aspects, as an effort in trying to give a comprehensive and balanced point of view about the sustainability condition, and there are no exact blue prints about sustainable housing. Literature study about sustainable house is conducted in the beginning to achieve a framework about points which should be considered in implementing a sustainable house. This framework is used to guide the researcher in the primary data collection about occupants' perception of the sustainability condition of their houses through developing the questions of the questionnaire and interview. Data is analysed through categorization and then the findings will be interpreted qualitatively. The categorization of data has been done since the beginning through developing a questionnaire with the Likert scale to provide easiness for the respondents to express their opinion. The questionnaire filling out process is conducted with assistance. The results then are observed through looking at the trend or tendency of respondents' answers for each question, thus the conclusion about sustainability of the adjusted core-houses could be made based on the occupants' perception. Quantitative data of average mean indexes will be use to help to distinct the description of findings. The sustainability mean index is also

developed to give a comprehensive point of view about the condition of sustainability. This index was developed based on three aspects, that is social, ecological, and economic. Each of the aspects main index itself was developed based on the related questions in the questionnaire. This is because of each of the questions in the questionnaire could have a relation with one or more of aspects. Observation method was also used to collect data about the current houses condition. For the secondary data, such as housing site plan, original core-house design, and demography condition, data collection is conducted through institutional survey and literature study. The sampling unit is a house. Houses and occupants which were taken as samples were determined by purposive random sampling, based on criteria of: core-house of 21 m<sup>2</sup> (the Indonesian Government standard floor plan of a core-house), and the occupants obtained the core-house in its original condition. There are three low-cost housing development locations as the case studies in Semarang City, with 50 samples from each location. Therefore total there are 150 samples. Semarang City has interesting characteristics as it has coastal area, downtown area, and upperland area, and it also one of the cities where the core-house concept has been implemented since its beginning in the 1970s until now. The case studies are Banyumanik housing, Bumi Tlogosari housing, and Bukit Beringin Lestari housing. These three housing developments were built in different years and different locations in Semarang City. Each of them is intended to become an urban growth center in a different part of the city. Semarang City as the capital of Central Java province also has a characteristic of trade and services city. Located on the Northern part of Java Island, this city has a tropical climate with the total area of 373.67 km<sup>2</sup>. Banyumanik housing was built in 1978 and located on the Southern part or the upper-land of Semarang. Three types of houses (21 m<sup>2</sup>, 33 m<sup>2</sup>, and 36 m<sup>2</sup>) with the total of 4,910 units were build by Perumnas on the 50.3 hectares land of Banyumanik housing. Bumi Tlogosari housing was built in 1986 and is located on a low-land area on the Eastern part of Semarang. On 161.95 hectares of land, Perumnas has build 9,036 houses of different types, ranging from 15 m<sup>2</sup>, 18 m<sup>2</sup>, 21 m<sup>2</sup>, to 70 m<sup>2</sup>, and also provides Ready to Build Plots. Bukit Beringin Lestari housing, built in 1994, is located on the Eastern part of Semarang upper land area. In this location, Perumnas plans to build 2,235 units of three types of houses (21 m<sup>2</sup>, 36 m<sup>2</sup>, 45 m<sup>2</sup>) on 64.3 hectares of land. The selection of these three locations for case studies is also intended to triangulate data collection in order to achieved a more valid result for this study.

## **Conclusion/Observation**

A sustainable house means the condition of a house that could fulfill its occupants needs without neglecting the capability of humans in other area and the next generation to fulfill their needs. The points that need to be considered in its implementation are: vitality, productivity, affordability, inclusivity, social cohesion, integration with surrounding, adaptability, self-sufficiency, accesibility, participation, durability, easiness in maintenance, character, conservation of energy and resources, minimized waste and pollution. These points are interconnected and need to be seen as a whole framework.

Based on the occupants' perceptions, a sustainable house doesn't necessary to be a good and luxurious house. Within the various forms of core-houses adjustments, the study shows that the current houses basically tend to be sustainable. This can be seen from the average value of responses to the provided questions and value of average index of sustainability of 3.7 from the scale 1 to 5. The highest responses are on feeling secure from eviction and inclusiveness, while the lowest are in the adequacy of rooms' size and types, and house condition that causes excessive energy use due to necessity for using artificial lighting and ventilation.

Social aspects received the highest responses. The study shows that the level of adequateness will continue to develop. The current houses still can't sufficiently act as a tool for the occupants to manifest them selves. Economic aspects had lower responses than social aspects. There are productive spaces created in some houses, but there are also conditions that cause a decrease in productivity. Ecological aspects received the lowest responses. Attention needs to be given especially related to the concern toward transgeneration. Although the occupants' perception tends to be good in the ecological aspect, their attention still seems to be minimal. Therefore there are less efforts supporting this matter. This condition is supposedly due to ignorance and lack of concern, supported by others precedents and weakness in supervision and regulation enforcement by related institutions. Motivation in conducting adjustments which are mainly motivated by social aspects needs fulfillment also has a role as push factor. This conditions seemingly become a familiar condition which occupants think is good enough for them, rather than something that should be avoided and receive more concern. Therefore the occupants' perception related toward this concern should be changed. The implementation of sustainable house should also be supported by external conditions, such as material availability and readiness of the broader infrastructures.