



# Measuring Sustainability Elements in PR1MA Affordable Housing

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**Abstract:** Housing has become a vital instrument in daily life, not because of the cost and function's only but housing can provide other attributes of a feasible urban life. Thus, Malaysia's government has struggled to cater affordable housing to counter economic concerns and adopt a sustainable housing development aspect for a better quality of life. However, even the housing affordability of low and middle-income earners has been improved, but some of them are remains in debating. The objective of this paper is to measure the sustainability element in PR1MA affordable projects in Malaysia as well as to determine the satisfaction level of sustainable affordable housing practice among PR1MA residents. The data were collected from 97 survey forms distributed amongst PR1MA residents through Google form and self-administered and were considered as useful data for further analysis. The results show that only social and environmental elements were determined as sustainability elements in PR1MA affordable housing in selected PR1MA projects in Malaysia. Moreover, the results revealed that majority respondents have low satisfaction level on economic sustainability in sustainable affordable housing practice within their residential area. Thus, this result has a significant contribution to the stakeholders who are directly or indirectly participated in affordable housing development and specifically PR1MA projects. This result also helps the policy makers and practitioner for emphasizing several important elements for developing affordable housing in future.

**Keywords:** Affordable housing, PR1MA, satisfaction level, sustainability

## 1. Introduction

Housing is an essential social condition that defines the quality of people's wellbeing. Urbanization and rising living standards have posed challenges to the low- and middle-income groups especially in home ownership matters. Alternatively, the government initiates many affordable housing policies to counter these issues. Apparently, even the home ownership issues have been improved, but housing affordability issues is remains in debating amongst end users.

In Malaysia, housing is developed and sold in the open market. The ability to own the property is closely related to household income and expenses. According to (Jabatan Perumahan Negara, 2019), the ability to buy a house is measured by the ability to buy in the open market or with assistance from the government. To date, many home ownership programs have been implemented by the government as home ownership initiatives for the community including PR1MA, RUMAWIP and My First Home Scheme.

In this study, PR1MA is chosen as a case study as it helps to determine the significant element in sustainable affordable housing using suitable attributes as have many claimed that this housing are secure and able to ensure the security and safety of all the residents, and have areas where they can do gathering socially through recreational locations. PR1MA was first launched in July 2011 under PR1MA Act 2012 for the purpose to plan, develop, construct and maintain high-quality housing with a lifestyle concept for middle-income households in the central business district.

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The issue of affordable housing has been lasting for quite some time, whether for low or middle-income earners, and this has sparked the government initiative to provide a house within household affordability. As highlighted by Said et al. (2011), housing developers and planners should build, maintain, and manage their housing estates more efficiently to manage natural resources to achieve environmental sustainability efficiently. Said et al. (2011) emphasized efficiency in planning, construction, management and maintenance of housing areas should be taken into consideration by housing developers to maintain the sustainability of natural resources and the environment. Alternatively, integration of Transit Oriented Development and multiple transportation accessibility within development projects are important to achieve economic sustainability.

The home ownership issues among Malaysia become major challenges to the government and industry players. With the population of 32.37 million, Malaysia, through the Ministry of Housing and Local Government (MHLG), with their best effort, tried to provide the standard community quality of housing based on the specific income groups. Even with the government's effort to ensure the affordable housing program economic success, some, however, neglected the sustainability of affordable housing. Many researchers recently have started to focus on sustainability in affordable housing as this concept itself is still recent in the world (see for example: Pullen et al., 2010; Bujang et al., 2017).

However, some academician believes that many different projects that are practicing under this title by housing developer cannot be expected to provide a more quality housing because their selling point is without referring to the fact or published index (Bakhtyar et al., 2012). It is been said by numerous media that many middle earners are paying high rental costs or housing prices for low-quality housing. However, these statements contradict with Malaysia's focus on quality of life which is centered on Malaysia's three strategic thrusts namely developing an environment that enhances life quality, moving towards full social-economic development and creating conducive environment for unleashing economic growth.

Furthermore, previous study on housing matters have focused more on economic indicators as a reflection on housing policy improvements (Stone, 2011). Real estate industry players only focus on price affordability as a challenge to low demand and an abandoned housing under the provision of affordable housing (Chan and Adabre, 2019). However, social and environmental measures should also be considered as essential aspects for a housing area to achieve the sustainability. Without any of those three aspects, the house will be abandoned and would create a more severe problem and take a lot of government financial aid in recovering such occurrence. In fact, most affordable houses in Malaysia are left unsold even though they are built specifically for the low- and middle-income groups. Chan and Adabre (2019) see this situation is influenced by several criteria other than price affordability. Hence, it is important to determine sustainability elements in PR1MA affordable housing for future improvements.

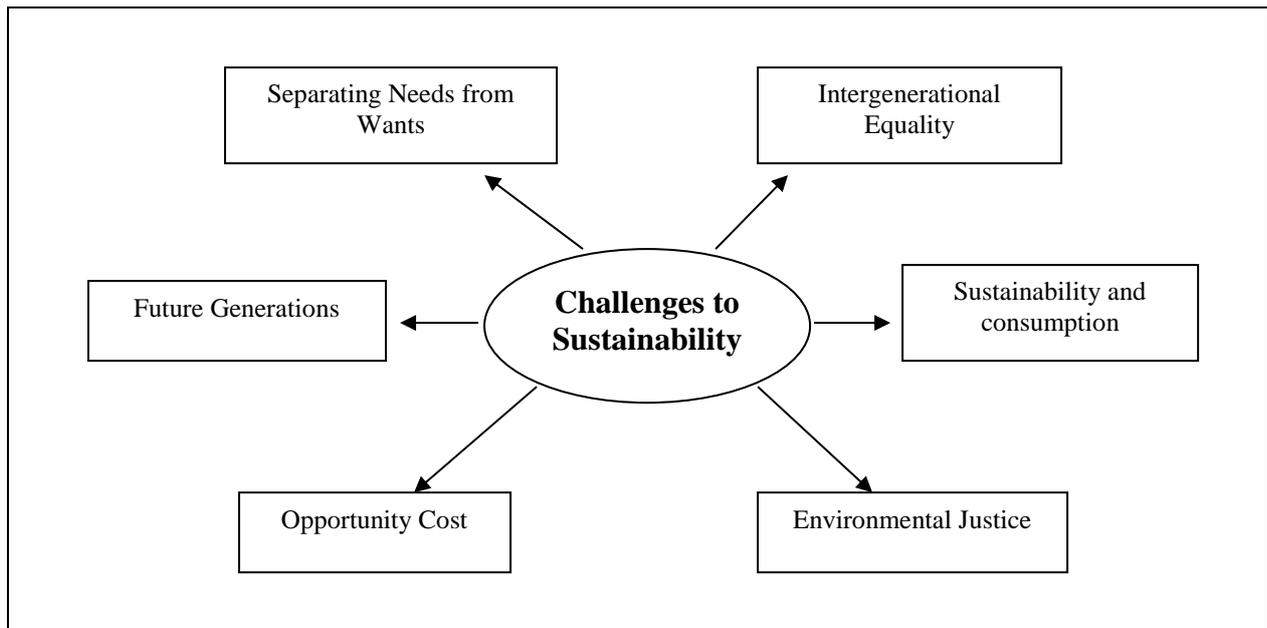
## **2. Literature Review**

### **2.1 Sustainability and Housing Sustainability**

The word sustainability is commonly used to refer with the ability to sustain at a certain level for future use. Within the development context, sustainability is refers to the new development to meet present and future needs (WCED, 1987). Apparently, the ability to sustain and meet the needs of future generations is examined through balancing economic, social and environmental aspect (Golubchikov and Badyina, 2012; Lin and Lin, 2015). However, the main challenge is how the implementation of sustainability concept can really meet their aims (Brandon and Lombardi's (2005. In this study, sustainability is specifically refers to the affordable housing development to satisfy the needs of the middle -income group and the ability to sustain for future generations (Gan et al., 2016).

### **2.2 Challenges to Sustainability**

Figure 1 below addressed several challenges that constraints in achieving sustainability in development project, are as follows:-



**Fig. 1 - Challenges to sustainability in development project**

Generally, needs is refers to the something that people must have to live, while wants indicates something that people wish to have in life. In short, needs and wants represent necessities and desires. In larger context in human life, Littig and Griessler (2005) divided need into two categories namely material basis components and non-material components that people needs in life. The material basis components include food, house, water, and healthcare, while non-material components include education, social relationship and recreation). Separating needs and wants is identified as the real challenges in achieving sustainability in the development project, due to the difficulty in differentiate between needs and wants amongst individual. Moreover, even impossible to forecast the needs of future generations (Payne and Raiborn, 2001), but Sen (2005) emphasizes that sustainability for human welfare should be maintained especially in economic issues to enhance a good quality of life for future generation.

Reflecting to the sustainability and consumption, the market must be more sensitive to the society's demand for goods and services for livelihood. Therefore, improving and enhancing businesses performance by adopting sustainable process in production is significant for sustaining quality of life (Payne and Raiborn, 2001). In the context of housing development, best selection of location and size is important in determining the sustainability of space consumption efficiently. However, housing affordability became the serious issues within the current sustainability issue in development.

Another challenge in achieving sustainability in development is environmental justice. Balancing economic and social aspects with the need to preserve the environmental is the big challenge in achieving sustainability in development. Pellow and Brulle (2005) emphasized the need to integrate environmental needs in the population social needs.

Future generations were examined as the challenges to sustainability in development. The concept of sustainability is emphasizes the need to sacrifice in the present nature for future well -being. By using the resources with ethical manners will sustain the resources for the future usage. This process will be continued to allow the future generation to be enjoyed all the advantageous from development (Neumayer, 2003). In term of home ownership, encouraging developers to develop more affordable housing complimentary with sustainable concept is compulsory for the beneficial of both present and future generation.

The implementation of the sustainability concept in housing development will be able to create the opportunity costs, whereby an economic value will be created as a return from the adaptation of the sustainability concept (Figge and Hahn, 2005). Basically, the opportunity cost is the loss of the benefit that could have been enjoyed if the best alternative choice were chosen instead. For example, by adopting the concept of sustainability in residential development requires the incorporation of technologies such as rainwater harvesting and subsequently this action will increased the maintenance costs as compared to conventional methods.

In addition, Intergenerational equality is also identified as a challenge in achieving sustainability in development. Neumayer (2004) sees satisfaction with utility, well -being and lifestyle should be treated equally by each generation. In the context of sustainable development, the capacity to maintain the performance for the sake of the future generations needs is important. However, the integration between sustainability and affordable housing remains a challenge in the context of sustainable development.

### 2.3 Affordable Housing

Throughout the globe, there were several differing opinions on what is housing affordability means. In Malaysia context, affordability is mainly defined by the relationship between household’s housing expenditure and income (Wan Abd Aziz et al., 2011). Moreover, affordability is also perceived as related to incomes, housing costs, housing availability, employment, maintenance of the existing affordable housing stock, and patterns of new construction.

Moreover, Mostafa et al. (2006) defined housing affordability as a person ability to save the income for the consumption not only for housing but for other expenditure. In the context of housing, affordability is best described as a person capability to buy or own the house (Giuseppe, 2011). More specific definition by Quan and Hill (2008), the theory of housing affordability can be view from three different perspectives namely purchasing affordability; repayment affordability; and income affordability.

Unlike market-oriented development, affordable housing is considered a long-term public investment. It is not driven by the need for a quick return on investment and thus, should include sustainability considerations (Fuhry and Wells, 2013). Although the initial cost may be relatively higher, the life cycle cost and performance may be improve from time to time. For example, Coimbra and Almeida (2013) suggested that by integrating sustainable construction into affordable housing programs, the cost would only be increased by 4.2%.

By contrast, various life cycle benefits, such as reduced maintenance cost and reduced energy bills, can be expected. Also, affordable housing programs can attract and maintain the needed human resources for essential services (Gurstein, 2012). Therefore, it is crucial to integrate sustainability into housing planning and construction in affordable housing programs (Golubchikov and Badyina, 2012).

### 2.4 Criteria that Influence the Sustainability of Affordable Housing

Mulliner et al. (2011) discovered seventeen (17) criteria influencing sustainable housing affordability which were identified from his research. In order to apply sustainability in Malaysia’s construction and housing management, these criterias provide a critical point for sustainable affordable housing. A summary of each identified criteria are listing as in Table 2 below:-

**Table 2 - Criteria for sustainable of affordable housing**

<b>AFOORDABLE SUSTAINABLE HOUSING CRITERIA</b>	<b>DETAILS</b>
1. House prices	<ul style="list-style-type: none"> <li>• Ability to buy house is reflecting from housing expenditure and household income.</li> </ul>
2. Rental value	<ul style="list-style-type: none"> <li>• Higher income will directly accessible to the area with higher house price (rental value).</li> </ul>
3. Rate of interest and mortgage opportunity	<ul style="list-style-type: none"> <li>• Accessible to mortgage facilities with minimal interest rates can directly impact a household’s expenditure for home ownership / consumption - this is important for household expenditure budget.</li> </ul>
4. Rental availability	<ul style="list-style-type: none"> <li>• Providing sufficient numbers of affordable housing with diverse and sufficient range of prices in the market. The provision of adequate affordable housing will strengthen social cohesion and community sustainability</li> </ul>
5. Affordable home ownership products availability	<ul style="list-style-type: none"> <li>• High crime levels may negatively impact on affordability, whereby household need to spend on security and safety.</li> </ul>
6. Safety and conducive area	<ul style="list-style-type: none"> <li>• Sustainable housing must be located in a safe residential environment.</li> </ul>
7. Job opportunity	<ul style="list-style-type: none"> <li>• Accessibility to job area has significant contribution to household income, and the income decreased for each decreasing of accessibility to job area.</li> </ul>
8. Transportation and logistics services	<ul style="list-style-type: none"> <li>• Good accessibility to transportation services directly create demand for housing and consequently increased housing ownership by community (Winston 2010).</li> </ul>
9. Education facilities	<ul style="list-style-type: none"> <li>• Good access to education facilities can change to better quality of life among community.</li> </ul>
10. Wet and dry market services	<ul style="list-style-type: none"> <li>• Close to market area create more attractiveness to housing area.</li> </ul>
11. Health care services	<ul style="list-style-type: none"> <li>• Good access to health care provider creates more livable living area and develops sustainable communities.</li> </ul>
12. Child care services	<ul style="list-style-type: none"> <li>• Excellent access to child care services provider can increase</li> </ul>

	parents' ability to work, and subsequently increase household affordability.
13. Recreational facilities	<ul style="list-style-type: none"> <li>Excellent access to indoor and outdoor leisure facilities can improve social interaction among families and communities as well as create healthy lifestyle.</li> </ul>
14. Open green public space	<ul style="list-style-type: none"> <li>A good quality public area including green spaces is important for household for relaxing and interaction.</li> </ul>
15. Quality of housing	<ul style="list-style-type: none"> <li>Using high quality of construction material has resulted good quality of life, and create sustainable housing.</li> </ul>
16. Energy efficiency of housing	<ul style="list-style-type: none"> <li>Affordable housing must meet certain sustainability criteria such as energy efficiency - provide ongoing economic benefits for lower-income households</li> </ul>
17. Solid waste management facilities	<ul style="list-style-type: none"> <li>Good access to waste management facilities can improve sustainable communities.</li> </ul>

Source: Mulliner and Maliene (2011)

### 3. Methodology

In this study, a quantitative research strategy has been adopted along the research process. The results from this research were based on the 144 questionnaires which were distributed amongst PR1MA residents through Google form and self administered. The research was carried out within PR1MA development projects located in Johore, or particularly in Bandar Layangkasa, Pasir Gudang, Johor.

## 4. Results and Discussion

### 4.1 Response Rate

From 144 questionnaires were distributed to the respondents through Google Form and self-administered within several months, only 97 survey forms were returned and considered as useful data for further analysis. However, there are 3 questionnaires set unable to be analysed due to the incomplete survey answer. The total set of questionnaire were answered by the respondent is 97 survey forms equivalent to 67.36%. This comply with the research requirement considering the normal respond rate is approximately 60% for most research (Draugalis, 2008). Table 3 below shows the respondents' profile according to the percentage of the overall number of respondents.

**Table 3 - Respondents' profile**

Demographic	Frequency (n=97)	Percentage (%)
<b>Gender:</b>		
Male	60	62
Female	37	38
<b>Age:</b>		
Below 25 Years old	19	20
25 to 34 Years old	22	23
35 to 44 Years old	18	19
45 to 54 Years old	27	28
Above 55 Years old	11	11
<b>Employment status:</b>		
Public sector	27	28
Private sector	34	35
Own Business	14	14
Student	14	14
Retiree	4	4
Unemployed	4	4
<b>Percentage of house price/rental expenditure:</b>		
Below 30%	44	45.4
30% - 50%	51	52.6
Above 50%	2	2.0

#### 4.2 Sustainability Elements in PR1MA Affordable Housing

The results for this objectives were based on the seventeen (17) criteria for affordable sustainable by Mulliner and Maliene (2011) and has been stated in the National Affordable Housing Policy (NAHP) that provide guidelines and attributes for sustainable development in affordable housing. Many research acknowledge economic sustainability as the only element used in assessing the performance of affordable housing. However, there were other two elements that been recognized as to provide significant influence in the quality of life, namely social sustainability and environment sustainability. Thus, three pillars of sustainability were created followed by derivation of the criteria listed. Based on the analysis done, it was ascertain that the criteria of social sustainability and environmental sustainability do heavily influence the sustainability of affordable housing in Malaysia. Given on the significant value obtained for each criteria, it shows that the significant relationship between affordable housing and sustainable criteria, except for the economic sustainability criteria's. Table 4 below presents criteria of sustainable in affordable housing.

**Table 4 - Sustainable elements in affordable housing**

Sustainable Elements	Sustainable affordable housing criteria
<b>Economic Sustainability</b>	<ul style="list-style-type: none"> <li>• House prices.</li> <li>• Rental value.</li> <li>• Interest rates and mortgage availability.</li> <li>• Rental availability.</li> <li>• Affordable housing products availability</li> </ul>
<b>Social Sustainability</b>	<ul style="list-style-type: none"> <li>• Safety and conducive area</li> <li>• Job opportunity.</li> <li>• Transportation and logistics services.</li> <li>• Education facilities.</li> <li>• Wet and dry market.</li> <li>• Access to health care services.</li> <li>• Child care services.</li> <li>• Recreational facilities.</li> <li>• Open green public space.</li> </ul>
<b>Environment Sustainability</b>	<ul style="list-style-type: none"> <li>• Quality of housing.</li> <li>• Energy efficiency of housing.</li> <li>• Solid waste management facilities.</li> </ul>

According to Karji et al. (2019), the government plays an important role in ensuring sustainability in community and urban development. Hence, an element of sustainability must be included in construction development project. In addition, Saberi et al (2017) highlighted if transportation costs are taken into account in the house prices, affordability to own the house will be decreased due to rising house prices.

Thus, increasing of transportation costs will be directly creating unsustainable affordable housing. In the context of environmental sustainability, basic principles to energy efficiency need to be applied as an alternative to minimize energy consumption without compromising the communities' comfortably and quality of life (Chan and Adabre, 2019). Therefore, in order to achieve sustainable housing, saving housing operational cost and energy need to be considered for the benefit of the household and the environment.

#### 4.3 Satisfaction Level of PR1MA Residents' Toward the Sustainable Practice in Affordable Housing

The main focus of this objective was to assess the resident's satisfaction level on sustainable attributes for affordable housing. From the results, 17 criteria used to measure the level of satisfaction were grouped into three pillar of sustainable namely, social sustainability; economic sustainability and environment sustainability. The results show that the residents' satisfaction on environment sustainability and social sustainability are significant with the p-value 0.010 and 0.000 respectively. The p-value of economic sustainability proved that the resident's satisfaction was not significant (p-value = 0.057).

The findings were supported with the theory of social sustainability namely the quality of life. Life's quality was influenced by two concepts namely satisfaction of quality of life and environmental quality, which involve several elements such as housing, transportation, security and health services (Mulliner and Maliene, 2011; Porio, 2014). Thus, the results confirmed that affordable housing in Malaysia met the social sustainability and environmental sustainability elements amongst the residents', except for economic sustainability elements.

## 5. Conclusion

This paper aims to determine significant elements of sustainable affordable housing, and the satisfaction level of sustainable elements in affordable housing. By adopting quantitative approach, and focusing amongst PRIMA resident, the objectives for this research were established. The results revealed seventeen criteria for sustainable affordable housing were grouped into three sustainable elements or pillar namely, social sustainability, economic sustainability and environment sustainability. However, the results confirmed only social sustainability and environment sustainability has significant influence towards affordable housing in Malaysia. In regards to the residents satisfaction towards sustainable in affordable housing, the results also confirmed that economic sustainability doesn't have indicated significant satisfaction level as compared to another two elements social sustainability and environment sustainability. Hence, this result is important to give an overview to the property developers, and specifically to all stakeholders participated in affordable housing development, to enhance the quality of the development project as well as to maximize the economic value of the development in future.

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