Owners' Perception towards Sustainable Housing Affordability in Kuching, Sarawak

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Since late 1980s, Malaysia has been experiencing accelerated development in its housing sector as a result of rapid urbanisation and economic growth. A similar trend has prevailed in Sarawak where housing has thrived owing to growing market and active supply-demand dynamics. However, the cosmic increase in housing prices since 2012 has raised serious concerns among researchers with regard to how sustainable housing is in this country. Price spiral has led to an acute shortage of housing affordable to the middle-income group. Therefore, alternatives for dealing with housing affordability have to be worked on in steering the future direction of housing in the country. In dealing with such issue, a set of criteria encompassing social, economic and environmental influences would need to be identified and evaluated to determine the best alternative or option available for any particular area. A study was conducted on the city of Kuching and its hinterland. COPRAS was used. The results indicate that an area with a high degree of utility conforms best to sustainable housing affordability while the area with a lower degree of utility performs poorly in this respect. The originality of this research has contributed to new literature in dealing with sustainable housing affordability in Malaysia, particularly in the state of Sarawak.

Keywords: *Sustainability, COPRAS, MCDM, sustainable housing, housing affordability*

1. INTRODUCTION

One of the principal aims of The National Malaysian Housing Policy is to provide housing that is affordable and of acceptable quality for each household. Laws relating to sustainable development through physical, economic, social and environmental well-being have been in existence to deal with housing development in Malaysia (Othman & Alias, 2011). As a concept, sustainable development is new to take hold in Malaysia and remains open to debate. However, this has not stopped housing developers from leveraging on the idea of sustainability when it comes to marketing their houses (Abidin, 2010). In order to harmonise the economic development, social integration and environmental protection, the authorities have put in place several initiatives to minimise the perverse effect of economic growth on the environment.

In the housing policy of any country, much attention has been focussed on housing affordability (Ankhi & Joy, 2013; Zyed *et al.*, 2016) and housing market (Majid and Said, 2013). Ankhi & Joy (2013) assessed variations in basic and composite housing affordability in India and called for immediate government intervention on both ownership and rental housing development to the low-to-middle income population. Locally, Zyed *et al.* (2016) found that young households often have to compete with other income groups for homeownership on account of very limited supply of housing affordable to them in the market. Majid and Said (2013) identified the impact of real estate cycle on houses priced beyond the affordable limit. However, none of the local studies has explicitly focussed on the sustainable aspect of housing affordability.

Thus the primary objective of this paper is to identify areas with existing affordable units at the time of purchase and affordable rent for the rental market that can sustain and enhance the quality of life as the area to live in or rent, respectively. For this purpose, the Multi-attribute Complex Proportional Assessment (COPRAS) method (one of the frameworks of Multi-Criteria Decision Making) will be employed by establishing a set of criteria for sustainable housing affordability. In order to gain further insight into sustainable housing affordability, this paper is organised as follows. First, relevant literature incorporates the concept of sustainability, sustainable housing affordability and factors influencing them. Then the discussion on the criteria of sustainable housing affordability and the tools used in assessing sustainability follows. Thereafter, analysis and conclusion of the paper are presented and discussed.

2. LITERATURE REVIEW

2.1 Defining Sustainability

The term sustainability has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1996). However, it can be interpreted in different ways. Debates among researchers in dealing with the vague definition of sustainability will impede the progress of making the concept of sustainability operational (Beck and Cummings, 1996). The uniqueness of terminology used by researchers has made this topic so much interesting. The lack of authoritative definition allows it to embody broad concepts which, in turn, bestow upon it the ability to be flexible. Therefore, the term sustainability can be adopted in any situation to suit local context.

In the most direct definition, sustainability can be referred to the observation of balancing between the three concepts namely economic development, social equity and environmental protection (Drexhage & Murphy, 2010; Said *et al*., 2016; Mohamad & Ahmad, 2016). In a broader aspect, sustainability would also include social (health and equity), human values (freedom, tolerance and respect for nature) and ecological (climate, air quality and land-use efficiency) attributes (Kates *et al.*, 2005; Islam, 1996; Van Vliet, 1996).

In dealing with the built environment, sustainability revolves around the idea of being the persistence of particular necessary and desired attributes of people, communities and organisation surrounding the eco-system (Hardi and Zidan, 1997). This idea expresses the interrelationship between people and their surroundings. In addition, sustainable building can be referred to as facilities formed by sustainable construction for the sole objective of enhancing health, improving resources efficiency and limiting the detrimental effect of the built environment on the ecological system (Kibert, 2004).

2.2 Defining Sustainable Housing Affordability

Medineckiene *et al.* ($2010_{a,b}$) considered the current economic, social and built environment situations in defining sustainable housing affordability. Maliene and Malys (2009) further elucidate sustainable housing as one that is well available, of high quality, economical, ecological, aesthetical in design, comfortable, and cosy. Sustainable housing should also consider cost-efficiency with good energy, waste, and water management.

The foundation of 'sustainable housing affordability' was introduced by Mulliner and Maliene (2011) where an initial system of criteria for sustainable housing affordability has been established. Mulliner and Maliene (2011) further argued that housing affordability should not be isolated from other criteria such as location, social, environment and economic sustainability of the housing. In addition, affordable housing is not merely about cheap homes, but must incorporate other factors as well (Mulliner and Maliene, 2011).

Mulliner *et al.* (2013) suggested that a low demand for housing units is partly due to the location that is not well connected to jobs, high-quality services and infrastructure. Therefore, a major backbone of housing design and a fundamental dimension of housing quality should deal with sustainability aspects of the units (Morgan & Talbot, 2001; Mohamad & Ahmad, 2016). Further pre-requisite for sustainable housing affordability include physical attributes, community involvement and the challenge of getting the right 'mix' (Turcu, 2012). Iman (2006) suggests similar view whereby sustainable housing must be environmentally appropriate, financially viable, socially acceptable and technically feasible. The term 'environmentally appropriate' refers to human or its inherent value (Payne and Raiborn, 2001).

2.3 Criteria for Sustainable Housing Affordability

Numerous researchers have discussed sustainable and affordable housing. The implementation of environmental sustainability in affordable housing goes against the primary objective of providing cheap houses (Yates, 2008). The high cost of implementing sustainability will usually be passed on into housing costs.

A framework for determining the criteria for sustainability has been developed by Pullen *et al.,* (2010). The sustainability criteria set by Pullen *et al.,* (2010) consist of nine essential elements and sub-elements. The essential elements are efficiency (energy, water), construction (materials, methods), procurement (government, private, public-private partnership), affordability (purchase or rent), desirability, dwelling sizes, appropriate density (low, medium, high), adaptability and social acceptability. Mcalpine & Birnie (2007) further introduce a 2-tier system of sustainability consisting of a headline and strategic indicators to monitor the quantifiable sustainability themes. The indicators include, among other things, the quality of housing, environmental quality, land use, household and commercial waste and local transportation.

This paper utilises a combination of literature review and semi-structured interviews to determine the relative importance of each criterion. The concept established in other countries may be ideal to be implemented in Malaysia althought they are different in culture, preferences and attitude. Using the work of Mulliner and Maliene (2011) as a base, this paper adds other criteria to firm up the study. The final list of 26 factors tailored to the study was developed (Table 1).

Table 1: Selected Criteria for Sustainable Housing Affordability in Malaysia

Sustainable Housing Affordability Factors		**Sources**
F1	House Price	(Aziz *et al.*, 2010; Burke *et al*., 2007; Mulliner & Maliene, 2011)
F2	House Type	(Hurtubia *et al.,* 2010; Mohamad & Ahmad, 2016))
F3	House Finishes	(Fierro *et al.,* 2009)
F4	House Design	(Fierro *et al.,* 2009; Mohamad & Ahmad, 2016)
F5	Position of the House in Layout Plan	(Hurtubia *et al.,* 2010)
F6	Size of Built-up Area	(Fierro *et al.,* 2009)
F7	Size of Land Area	(Fierro *et al.,* 2009)
F8	Age of the Unit	(Fierro *et al.,* 2009)
F9	Topography	(Fierro *et al.,* 2009)
F10	Property Interest	(Lu, 2002; Saunders, 1990)
F11	Near to Commercial Area	(Mulliner & Maliene, 2011; Samuels, 2004)
F12	Near to Hospitals	(Mulliner & Maliene, 2011; Zhu *et al.*,2006)
F13	Near to Post Office	(Said *et. al*, 2016)
F14	Near to Recreation Area & Public Space	(Isalou *et al*., 2014; Mulliner & Maliene, 2011; Yusuf & Resosurdarmo, 2009)
F15	Near to Transportation	(Australian Conservation Foundation, 2008; Mulliner & Maliene, 2011)
F16	Near to Education	(Clark *et al*., 2006; Mulliner & Maliene, 2011; Samuels, 2004)
F17	Near to Workplace	(King, 2008; Mulliner & Maliene, 2011)
F18	Environment Quality	(Cowan & Hill, 2005; Zhu *et al.,* 2006)
F19	Security	(Hipp, 2010; Samuels, 2004)
F20	Traffic Congestion	(Brownstone & Golob, 2009; Shen *et al.,* 2011)
F21	Density	(Brownstone & Golob, 2009; Samuels, 2004)
F22	View	(Zhu *et al.,* 2006)
F23	Exterior Condition	(Said *et. al*, 2016)
F24	Availability of Waste Management	(Hardi & Zidan, 1997; Joseph, 2006; Mulliner & Maliene, 2011)
F25	Safety Level	(Hipp, 2010; Samuels, 2004)
F26	Theme or Concept	(Said *et. al*, 2016)

2.4 Measuring Sustainable Housing Affordability

The assessment of the effectiveness of sustainability application can be a daunting task. Mulliner and Maliene (2011) propose a set of criteria and use a multi-criteria decision making (MCDM) technique to assess and rank the said criteria in determining the sustainable housing affordability (Mulliner *et al*., 2013). Some researchers assess sustainable housing affordability by focussing on the strengths and weaknesses of various criteria or factors (Hak *et al*., 2012; Hardi & Zidan, 1997; Mori & Christodoulou, 2012; Toman *et al.*,1998). In addition, most housing economists focus on housing price rather than holistic measures of the condition, locational attributes and neighbourhood characteristics (Bogdon & Can, 1997).

In the built environment, a Complex Proportional Assessment (COPRAS) method can be applied to the varieties of research. COPRAS is used as a tool to assess sustainable housing affordability based on factors or criteria systems. The method is suitable for cases where data are expressed in interval forms (Popović et al. ,2012) and used to determine the priority and the utility degree of alternatives (Zavadskas & Kaklauskas, 1996; Zavadskas *et al*., 2008).

COPRAS is one of the many MCDM techniques. MCDM has gained wide acceptance throughout different sectors due to its effectiveness and simple process. The technique is particularly useful in making a highly complex decision by applying weight or priorities (Aruldoss *et al*. (2013), involving a careful selection of resources to ensure the accuracy of criteria, alternatives or factors (Haarstrick & Lazarevska, 2009).

3. METHODOLOGY

Malaysia sits within the region of South East Asia and is made up of Peninsular Malaysia (West Malaysia) and East Malaysia (comprising Sabah and Sarawak). Because of population factor, housing development is currently more vigorous in West Malaysia than in East Malaysia. Sarawak is bordered by Sabah to the northeast and Kalimantan to the south and Brunei in the north. Its capital city, Kuching, was chosen as the geographical area of this study. Kuching is the economic centre and the most populous city in the state thus representing the most active area for housing development in Sarawak. It is the only city in Malaysia to be split into two – Kuching Utara and Kuching Selatan – each administered by its own mayor. In the city, the existing urbanisation process continues further, resulting in demand for housing.

The questionnaires were distributed to residents in both Kuching Utara and Kuching Selatan and surrounding areas including Samarahan which is administered by the Majlis Daerah Samarahan and Batu Kawa. These surrounding areas are categorised as *others* in the analysis. Table 2 shows the total population of key areas of study.

Table 2: Population by Local Authority Areas (2010)

Area	Local administration	Total population
Kuching Utara	Dewan Bandaraya Kuching Utara	165,642
Kuching Selatan	Majlis Bandaraya Kuching Selatan	159,490
Samarahan	Majlis Daerah Samarahan	87,923

Source: Department of Statistics Malaysia (2012)

The respondents must be from owner-occupied properties or the main renters (head lessor) in the study areas. They are considered as the stakeholders of the affordable units in the study area. Those not belonging to either of the two would be disqualified and terminated from further interview. The purpose of the questionnaires is to verify and elicit respondents' opinion on what criteria constitute sustainable housing affordability. Out of 600 distributed questionnaires, 471 were answered by valid respondents of which 55% were from Kuching Utara, 27% from Kuching Selatan and 18% from other nearby areas (Others).

The total of 26 criteria is considered to be relevant in assessing sustainable housing affordability (Table 3). Respondents distinguish each criterion based on its relative importance towards sustainable housing affordability. Responses are ranked on a five-point Likert Scale. Likert scale was used because of its simplicity in expressing respondents' level of agreement (Allen *et al*., 2007).

Table 3: Criteria for Sustainable Housing Affordability

No.	Criteria
1	Housing Price
2	Housing Type
3	Housing Finishes
4	Housing Design
5	Position of the unit in Layout Plan
6	Size of Built-up Area
7	Size of Land Area
8	Age of the Unit
9	Topography
10	Property Interest
11	Near to Commercial Area
12	Near to Hospitals
13	Near to Post Office
14	Near to Recreation Area & Public Space
15	Near to Transportation
16	Near to Education
17	Near to Workplace
18	Environmental Quality
19	Security
20	Traffic Congestion
21	Density
22	View
23	Exterior Condition
24	Availability Waste Management
25	Safety Level
26	Theme or Concept

3.1 Assessment of Sustainable Housing Affordability

The data was analysed using COPRAS method involving five main steps (Kaklauskas *et al.*, 2005, 2007$_{a\&b}$; Dey *et al.*, 2011; Mulliner *et al.*, 2013).

1. The listing and selection of various criteria and the normalisation of the decision-making matrix. The main purpose is to assess sustainable housing affordability in the chosen areas to create a ranking of alternatives. COPRAS can handle such problem involving both positive and negative factors that influence the decision making. The following formula is used by taking the overall mean score to allow direct comparison between all factors:

$$m_{pq} = \frac{\bar{\omega}_{pq}}{\sum_{q=1}^{n} x_{pq}} x_{pq}$$

Where x_{pq} is the value of the *p*-th criterion of the *q*-th options, and $\bar{w}_p$ is the weight of the *p*-th criterion.

Table 4 shows the overall mean score for the identified criteria. The highest score went to the ‘house price’, followed by ‘the safety level of development area’, which is the second most important criteria. The least important criteria go to ‘the theme or concept of development’ where most respondents did not find it significant as compared to the rest of the criteria

Table 4: Overall mean score and the weight of each criterion

Factors/Characteristics	N	Mean Score (overall)
House Price	470	4.4149
House Type	469	4.1130
House Finishes	469	3.9616
House Design	469	3.9616
Position House in Layout Plan	468	3.9658
Size of Built-up Area	469	4.0341

Size of Land Area	469	4.0362
Age of the House	468	4.0363
Topography	469	3.9339
Property Interest	463	3.9309
Near to Commercial Area	468	3.9915
Near to Hospitals	468	4.0769
Near to Post Office	468	3.9124
Near to Recreation Area, Public Space	468	3.9487
Near to Transportation	468	4.0171
Near to Education	467	4.0921
Near to Workplace	466	4.1760
Environmental Quality	467	4.1242
Security	468	4.1111
Traffic Congestion	468	4.0769
Density	468	4.1410
View	468	3.9402
Exterior Condition	467	4.0664
Availability of Waste Management	468	4.0427
Safety Level	468	4.2073
Theme or Concept	468	3.8868

Table 5 derives the relative weight for each factor, $\bar{\bar{w}}$ and an individual mean score of each alternative area, which is essential for the next step of using the COPRAS method.

Table 5: The weight and means score for each alternative area

Criteria	Weight, q	Kuching Utara	Kuching Selatan	Others
Housing Price	2.521	4.4218	4.4732	4.3133
Housing Type	2.349	4.1423	4.0268	4.1325
Housing Finishes	2.262	3.9453	4.0625	3.8795
Housing Design	2.262	3.9526	3.9821	3.9639
Position of the unit in Layout Plan	2.265	3.9158	4.0268	4.0482
Size of Built-up Area	2.304	4.0219	4.0625	4.0361
Size of Land Area	2.305	4.0438	4.0446	4.0000
Age of the Unit	2.305	3.9927	4.0901	4.1084
Topography	2.247	3.8723	4.0446	3.9880
Property Interest	2.245	3.9081	4.0275	3.8780
Near to Commercial Area	2.279	3.9963	4.0625	3.8795
Near to Hospitals	2.328	4.0842	4.1071	4.0120
Near to Post Office	2.234	3.9377	3.9911	3.7229
Near to Recreation Area, Public Space	2.255	3.9707	4.0357	3.7590
Near to Transportation	2.294	4.0476	4.0625	3.8554
Near to Education	2.337	4.1471	4.1071	3.8916
Near to Workplace	2.385	4.2206	4.1429	4.0732
Environmental Quality	2.355	4.1103	4.2054	4.0602
Security	2.348	4.1538	4.1429	3.9277
Traffic Congestion	2.328	4.0806	4.0893	4.0482
Density	2.365	4.0769	4.5089	3.8554
View	2.250	3.9560	4.0625	3.7229
Exterior Condition	2.322	4.1287	4.0536	3.8795
Availability of Waste Management	2.309	4.0330	4.0982	4.0000
Safety Level	2.403	4.2454	4.1875	4.1084
Theme or Concept	2.220	3.9158	4.0446	3.5783

2. The weight is summarised to normalise the decision-making matrix by calculating the sums of both positive and negative alternatives (Table 6). The sums of S_{+q} of attributes values which provide larger values are preferable (the direction of optimisation and maximisation) as

compared to other alternatives. The sums of S_{-q} of attributes values which constitute smaller values are preferable (the direction of optimisation and minimisation) as compared to other alternatives. For example, the lower the negative (minimisation) values for the house price, the better the sustainable housing affordability is. Likewise, the higher the positive (maximisation) values, the better it indicates. The formula to calculate the sums are as follows:

$$S_q^+ = \sum_{e_p = +} m_{pq}$$

$$S_q^- = \sum_{e_p = -} m_{pq}$$

Table 6 represents the normalised decision matrix for the three chosen areas in Kuching namely Kuching Utara, Kuching Selatan and other surrounding areas.

Table 6: Normalized decision matrix by alternative area

Factors/Characteristics	**Z**	**Kuching Utara**	**Kuching Selatan**	**Others**
House Price	-	0.844	0.854	0.823
House Type	+	0.791	0.769	0.789
House Finishes	+	0.751	0.773	0.738
House Design	+	0.751	0.757	0.754
Position House in Layout Plan	+	0.740	0.761	0.765
Size of Built-up Area	+	0.765	0.772	0.767
Size of Land Area	+	0.771	0.771	0.763
Age of the House	-	0.755	0.773	0.777
Topography	-	0.731	0.763	0.753
Property Interest	-	0.743	0.765	0.737
Near to Commercial Area	-	0.763	0.776	0.741
Near to Hospitals	-	0.779	0.784	0.765
Near to Post Office	-	0.755	0.765	0.714
Near to Recreation Area, Public Space	-	0.761	0.773	0.720
Near to Transportation	-	0.776	0.779	0.739
Near to Education	-	0.798	0.790	0.749
Near to Workplace	-	0.809	0.794	0.781
Environmental Quality	+	0.782	0.800	0.773
Security	+	0.798	0.796	0.754
Traffic Congestion	-	0.778	0.779	0.771
Density	-	0.775	0.857	0.733
View	+	0.758	0.778	0.713
Exterior Condition	+	0.795	0.780	0.747
Availability of Waste Management	+	0.768	0.780	0.761
Safety Level	+	0.813	0.802	0.787
Theme or Concept	+	0.753	0.778	0.688

3. The relative significance H_q of each option, based on positive (+) and negative (-), is calculated using the formula below:

$$H_q = S_q^+ + \frac{S_{min}^- \sum_{q=1}^{n} S_q^-}{S_q^- \sum_{q=1}^{n} \frac{S_{min}^-}{S_q^-}} = S_q^+ + \frac{\sum_{q=1}^{n} S_q^-}{S_q^- \sum_{q=1}^{n} \frac{1}{S_q^-}}$$

where the minimum values S_q^- are cancelled, the higher value corresponds to a more sustainable housing affordability.

4. In this stage, prioritisation is determined by the largest H_q. H_{max} is the optimal value and the best among alternatives. Options are ranked from highest to lowest of relative significance H_q.

5. The degree of utility is determined by comparing each option by the one option with $H_{max.}$ The area with the highest level of utility degree ($\check{u}_q$ = 100%) represents an area that most satisfies sustainable housing affordability. Other options will show utility values ranging from 0% -100% indicators of the worst to the best-case scenario (Table 7). The degree of utility $\check{u}_q$ of the options O_q is calculated by the following formula:

$$\check{u}_u = \frac{H_q}{H_{max}} 100\%$$

4. RESULTS & DISCUSSION

4.1 Demographic

Figure 1 shows the distribution of respondents in the study area (471 valid respondents). The majority of the valid respondents come from the area of Kuching Utara (55%), followed by Kuching Selatan (27%). As discussed, other areas (Others) represent respondents within the same locality but outside the two municipalities. It represents the smallest amount of the valid respondents (15%).

Figure 1: Distribution of valid respondents in the study area

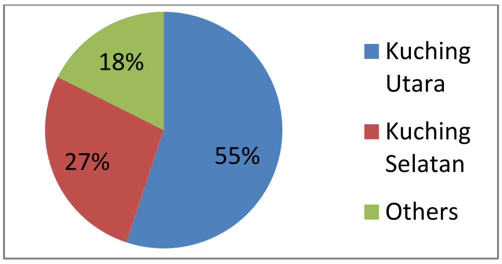


Figure 2 depicts the house ownership of respondents (either owner occupiers or renters). Out of the total valid respondents, 35.6% of them declared to be house owners whereas 64% are renters. Across the alternative areas, Kuching Utara recorded the number of respondents who are owner-occupiers or renters 30.1% and 69.9% respectively. Kuching Selatan also recorded more renters than house owners at 71.1% and 28.3% respectively. However, other areas (Others) recorded more owner-occupiers as compared to renters at 63.9% and 36.1% respectively.

Figure 2: Housing ownership in the study area

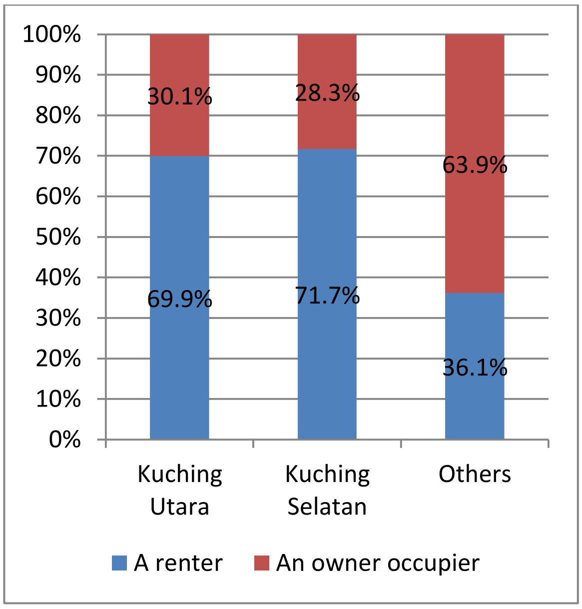
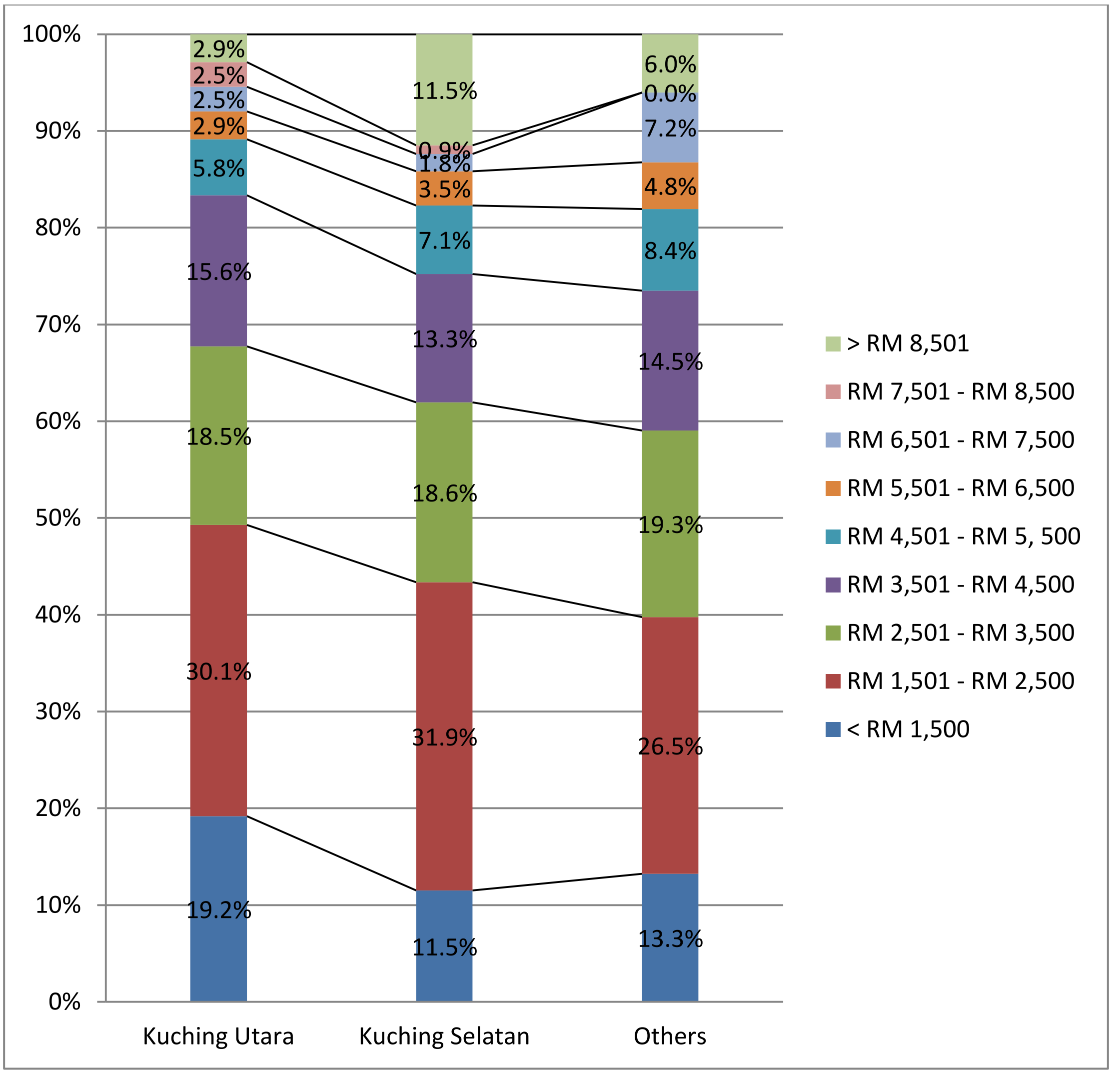


Figure 3 shows the monthly household income by area. The result indicates that Kuching Utara recorded the highest proportion of respondents with a monthly household income of less than RM1,500 at 19.2% as compared to Kuching Selatan at 11.5% and Others at 13.5%. Respondents in Kuching Selatan represent the majority who earned between RM 1,501 - RM2,500 (31.9%) as compared to other areas. There is an almost equal share of respondents who earned between RM2,501-RM3,500 across all alternative areas. Interestingly, Kuching Selatan represents the majority of respondents (11.5%) who earned more than RM 8,501

Figure 3: Monthly household income of respondents by alternative area



4.2 Sustainable Housing Affordability

The step-by-step procedure in COPRAS assessment (Section 3.1) produces the following results (Table 7).

Table 7: Sustainable Housing Affordability Factors

	Kuching Utara	Kuching Selatan	Others
S+	18.005	18.140	17.135
S-	15.343	15.885	15.492
H	33.809	33.405	32.787
Priority	1	2	3
ŭ(%)	100.00%	98.81%	96.98%

Table 7 shows the best performing area in relation to the predetermined factors of sustainable housing affordability. Therefore, the location that best describes the most sustainable housing affordability is Kuching Utara as reflected in utility degree of 100%. The second-best area is Kuching Selatan with a utility degree of 98.81%. The lowest rank is other areas (Others) with a utility degree of 96.98%. The results also show that the greatest concerns in Kuching are house price as well as other factors such as safety level and proximity to workplace (Table 6). Surprisingly, the respondents are not very sensitive to development theme or concept and the position of the unit in the layout plan.

Each of the three areas has almost equal utility degrees of between 97% to 100%. Evidence shows that the difference between the best option (Kuching Utara) and the worst (Others) is miniscule at 3.0%. This could be translated into layman terms as the advantages and disadvantages of both areas being almost equal and often interchangeable with one another, other factors offset thus the demand for housing is unintelligible. In other words, Kuching Utara proved to be sustainable in terms of housing affordability, and it is the best area to stay as compared to the rest of the alternatives. However, vast improvement can be done in the analysis by focusing on a smaller area, i.e. by zoning, precinct or section within the larger area. Therefore, COPRAS method has substantially demonstrated its effectiveness in assessing the sustainability of different areas by providing the utility degree of options. Its flexibility could be applied to any region and place, and the weight can be adjusted to suit any context.

5. CONCLUSION

Under the present market condition, the increasing value or rent of the housing unit coupled with the rising cost of living force people to find the best alternative area to live. Those on higher income would consider several factors in making their purchase or investment decision. Those who cannot afford to purchase would also consider factors that affect their monthly budget in determining the best area to stay. Over time, price and household income become paramount to their decision. Therefore, a wise purchaser or renter would consider the three sustainability factors namely social, economic and environment. Such consideration would force the market to discriminate in order to find the best alternative area to stay. This will become the most important decision to individual and/or society.

This paper has adequately demonstrated the necessity to shift from the common price-income-cost genre towards sustainability-quality-affordability value. The main concern of any government is to provide housing units that are affordable to their citizen. However, such concern cannot be solved individually by market players. Therefore, cooperation between all market players is crucial in providing housing units that are affordable to most people. The cooperation would help the market players to consider the relevance of factors that can sustain the affordable housing units rather than simply a housing cost. The government through its local authorities could adopt the same analysis for a proper planning of urban dwellings. Other market players such as property developers may utilise the results to find the best area to improve their future housing development. This would prove beneficial to all the market players including the purchasers or renters. The results and method could also be used by the housing purchasers or renters in deciding the best area to buy or rent in fulfilling their preferences.

ACKNOWLEDGEMENT

The authors would like to acknowledge with gratitude the funding received from the University of Malaya Research Grant (UMRG) for this research (Project No. RP007E-13SUS).

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