



Assessment of housing conditions using socio-economic status (SES) indicators in coastal settlements: A case of Karumkulam Grama Panchayat, Thiruvananthapuram

^[1]Sandra Sreekant, ^[2]Anukrishnan A S, ^[3]Liya Paul, ^[4]Anurup K

^[1]Post Graduate Student, ^[2]Post Graduate Student, ^[3]Post Graduate Student, ^[4]Assistant Professor, College of Engineering Trivandrum, Thiruvananthapuram, Kerala, India

^[1]sandrasreekant1998@gmail.com, ^[2]anukrishnan914@gmail.com, ^[3]liyapaulvt@gmail.com, ^[4]anurup@cet.ac.in

Abstract— Housing is a concrete manifestation of socioeconomic conditions, and has an important part to play in the holistic development of the population in a region. This paper attempts to evaluate the socio economic status of the inhabitants and its subsequent relation with the existing housing conditions and quality of life. A coastal settlement located in the capital city of Kerala, Thiruvananthapuram, is chosen for the study. Several researches and reports by global agencies under the United Nations such as the World Health Organization (WHO) list out a set of socio-economic status (SES) indicators, on the basis of their impact on housing conditions in a community. An expert opinion survey is carried out, to rank the SES indicators. To ensure the validity of the survey, Cronbach's alpha test is carried out using SPSS. Based on the results obtained from survey analysis, it could be inferred that employment and education has the highest impact on housing quality and conditions. The paper then proceeds further with respect to these indicators. These SES indicators are studied in detail via a random sample household survey administered to the inhabitants of the selected coastal settlement. Further analysis is conducted to ascertain its correlation with their existing housing conditions. The paper concludes that a significant correlation exists between employment and education, and the quality of housing and habitat in a coastal settlement. Therefore, improving the socio-economic conditions can substantially augment the housing conditions of the resident population.

Index Terms— Coastal settlement, Housing, Employment, Education, Socio-economic status

I. INTRODUCTION & METHODOLOGY

The primary goal of this research paper is to evaluate the socio-economic (SES) indicators that affect housing conditions. It also aims to determine the indicators of highest weightage and its impact on housing. Subsequently, the correlation between these indicators and the housing conditions in the selected coastal settlement and its inhabitants is also studied.

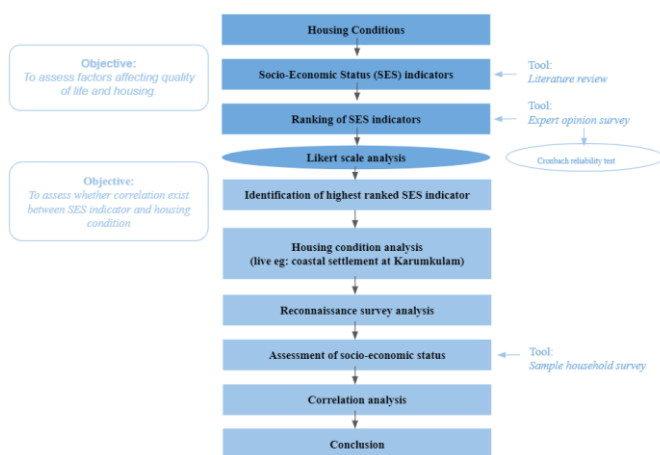


Figure 1- Methodology Flow Chart (Source: Author)

II. LITERATURE REVIEW

This study attempts to analyze how socio economic status of the inhabitants is correlated to the quality of housing and habitat in a region. To understand the key indicators of socio-economic profile of a community, a study on various literature sources was conducted. Official reports published by global agencies such as the United Nations and WHO, list out several such indicators in direct relation with housing conditions. A thorough analysis of the various parameters was carried out and from the analysis, the most relevant indicators were chosen for further study. These are listed as follows -

A. Number of residents in a household

The number of people living as an economic unit (regardless of age) is indicated by household size. It is a significant determinant of housing conditions since the number of residents indicate crowding rate in a dwelling unit. Household overcrowding is an alternative measurement of living space that accounts for household composition. A crucial aspect of housing quality is living space. Based on the age and gender distribution of the household, this indicator takes various living space requirements into account. A household is considered to be overcrowded if it has less than one room available for each of the following groups: every couple, every adult who is single and over the age of 18, every adult

who is single and between the ages of 12 and 17, all pairs of children under the age of 12, every adult who is single and between the ages of 12 and 17, and every adult who is between the ages of 12 and 17. The calculation of this index is based on household surveys [1].

B. Household type

The distinction between households based on whether they are census family households or non-census family households is known as household type. Households with at least one census family are known as census family households. Non-census-family households might consist of a single individual living alone or a group of two or more people sharing a home but not making up a census family. Depending on whether there are other people living there, census family households can be distinguished; that is, persons not in a census family [2].

C. Highest Education

Aside from its apparent correctness, there are two important justifications for using education as a category to determine socioeconomic class. First, people who complete additional years of education may receive a variety of good consequences throughout their [3]. They might have higher earnings, easier access to employment, and better health care. The dedication of people and society to education is also likely to have repercussions on the family and culture [3]. In other words, higher levels of education are directly related to other types of socioeconomic factors.

D. Number of household members aged between 18-59 and having full time work

The percentage of workers in relation to the total population is known as the work participation rate abbreviated as WPR [1]. Dependency ratio is another key indicator of household income which subsequently creates an impact on the living conditions. The dependency ratio is an age-population ratio between those who are normally in the labor force and people who are typically not. The pressure on the productive population is measured using this method.

E. Employment

In a broad sense, an employment or occupation is any ongoing activity that a person enjoys or finds satisfying in order to live happily as a contributing member of society [4]. Both directly and indirectly, a person's socioeconomic status and occupation are related. The empirical data shows a strong correlation between household size, composition and household income. The number of dependents per household and household size both decrease with per capita income. In addition to other characteristics, it is discovered that household members' education has a beneficial impact on household income.

F. Age (Number of members aged 60 and above)

The notion of whether married, high-earning individuals had a higher likelihood of living in acceptable housing than an equivalent single, low-earning individual have been examined by several researchers. The findings indicate that married high earners had better housing conditions than their single counterparts. The findings demonstrated that several variables, including age, gender, and the number of children, have an impact on married people's likelihood of sustaining decent living conditions as opposed to unmarried people.

G. Size of dwelling units in square meters

Livable space within a dwelling unit is a significant determinant of the quality of housing conditions. It is also directly related with the phenomenon of household crowding which has several implications on the health conditions of inhabitants. The concept of household overcrowding occurs when the number of people exceeds the capacity of the available living space, whether defined in terms of rooms, bedrooms, or floor area, with detrimental effects on both physical and mental health [5]. Crowding results from a mismatch between the dwelling and the household. The number of people living in close quarters is determined by the size and layout of the home, notably the size of the rooms, as well as the kind, size, and demands of the family, including any extended visits [5].

H. Number of rooms in the dwelling unit

Number of rooms is also a determinant of the degree of crowding in a dwelling unit. To avoid being in cold or uninhabitable areas of the house, or to reduce heating and other costs, people may gather in certain rooms of their homes [5]. Both the conditions of the habitation and the space it provides have an impact on crowding. A residence may be considered crowded if two adults share a bedroom; however, if the two people are married, the home is not regarded as crowded [5]. Numerous studies have shown a connection between overcrowding and negative health effects. Additionally, scholars have linked *inadequate educational attainment* to overcrowding. Crowding is frequently considered a sign of *poverty and social deprivation* all around the world. People may be forced to live in homes with insufficient rooms due to financial restrictions.

III. PRIMARY STUDY - EXPERT OPINION SURVEY

An expert opinion survey using a likert scale (10 point) questionnaire was conducted in order to determine which among the listed SES (Socio-economic status) indicators has the highest impact on housing conditions and quality of life in a given settlement. Sample group was constituted by experts from a diverse set of fields including practicing architects, housing and habitat experts, urban planners and urban designers. Total number of respondents in the survey was 12.

Table I – Cronbach’s Alpha: Calculation of Variance (Source: Author)

Sl.No.	No. of residents in a household	House hold type	Highest education.	Work Force Participation	Status of Employment	No. Of members aged 60 and above.	Size of dwelling in square meters	No. of rooms in the dwelling unit	Total (Σ Xi)
1	10	9	9	9	8	8	8	8	69
2	4	4	7	6	7	2	9	3	42
3	4	3	8	9	9	6	8	7	54
4	10	9	8	9	9	7	10	10	72
5	6	5	6	4	4	7	4	4	40
6	8	8	8	9	10	7	9	8	67
7	8	6	7	9	9	9	4	4	56
8	4	2	9	2	3	1	6	3	30
9	4	4	7	7	6	3	6	4	41
10	9	9	5	8	7	7	7	8	60
11	10	10	9	10	10	10	10	10	79
12	5	10	10	8	10	8	10	10	71
Variance	6.13888889	7.743055556	1.854166667	5.25	5.055555556	7.1875	4.409722222	7.243055556	222.1875

The reliability of the expert opinion survey is initially assessed using Cronbach's alpha test, which is performed using SPSS statistics. Lee Cronbach created Cronbach's alpha (also known as the coefficient alpha) in 1951 to measure reliability or internal consistency. Consistency is another word for reliability. Multiple-question Likert scale surveys are put through Cronbach's alpha tests to determine their reliability. These inquiries gauge latent variables, or concealed or imperceptible characteristics, such as a person's conscientiousness, neurosis, or openness. These are very difficult to measure in real life [6].

In order to obtain the value of alpha coefficient, the variance is computed and applied in the mathematical formula for alpha. The calculated alpha value is 0.91, indicating that the survey's internal consistency and dependability are both very high. Hence, result analysis can be carried out with respect to the same.

Table II - Cronbach’s Alpha Test Results (Source: Author)

VARIABLES	DESCRIPTION	VALUES	INTERNAL CONSISTENCY
K	No. of items	8	Excellent
Σ S ² Y	Sum of the item variance	44.8829444	
S ² X	Variance of Total score	222.1875	
α	Cronbach’s Alpha	0.91	

Table III – Range of Internal consistency in Cronbach’s alpha test; Source : [7]

CRONBACH'S α	INTERNAL CONSISTENCY	$\alpha = \frac{K}{K-1} \left[1 - \frac{\sum S^2y}{S^2x} \right]$
0.90 and above	Excellent	
0.80 - 0.89	Good	
0.70 - 0.79	Acceptable	
0.60 - 0.69	Questionable	
0.50 - 0.59	Poor	
Below 0.50	Unacceptable	

Survey result analysis is then carried out by computing the total frequency of each point within the range of the Likert scale, following which the mean and standard deviation are also computed. Employment and education receive the highest mean value and standard deviation. The SES indicators used for analysis in the expert opinion survey was shortlisted from a wide range of SES indicators. This was obtained from the detailed literature review conducted in the preliminary stage of the study. Therefore, it could be concluded that two of these SES indicators has the largest impact on housing conditions. Second stage of the study proceeds with the ascertaining of the theoretical results in a practical context.

Table IV – Calculation of Mean score of Likert Scale to rank SES indicators (Source: Author)

SES INDICATORS- LIKERT SCALE ANALYSIS													
LIKERT SCALE VALUES	1	2	3	4	5	6	7	8	9	10	TOTAL	MEAN	SD
1. Number of residents in a household.	0	0	0	4	1	1	0	2	1	3	12	82	23.49468025
2. Household type	0	1	1	2	1	1	0	1	3	2	12	79	23.10844002
3. Highest education.	0	0	0	0	1	1	3	3	3	1	12	93	25.49509757
4. Number of household members aged between 18-59 and having full time work (Work Force Participation)	0	1	0	1	0	1	1	2	5	1	12	90	25.45584412
5. Number of full time job hold by all household members (Status of Employment)	0	0	1	1	0	1	2	1	3	3	12	92	25.96150997
6. Number of members aged 60 and above.	1	1	1	0	0	1	4	2	1	1	12	75	21.9089023
7. Size of dwelling in square meters	0	0	0	2	0	2	1	2	2	3	12	91	25.53429067
8. Number of rooms in the dwelling unit	0	0	2	3	0	0	1	3	0	3	12	79	22.97825059

IV. OVERVIEW OF HOUSING CONDITIONS IN KARUMKULAM COASTAL VILLAGE

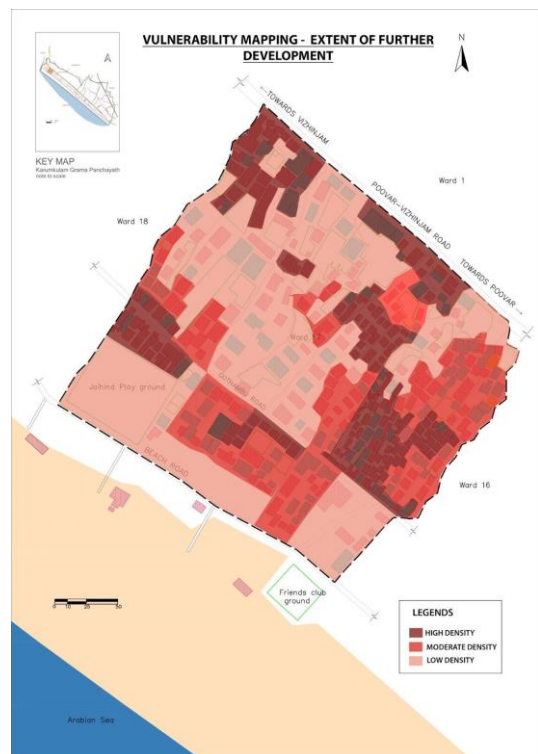


Figure 2-Vulnerability mapping of coastal settlement of Karumkulam (Source: Author)

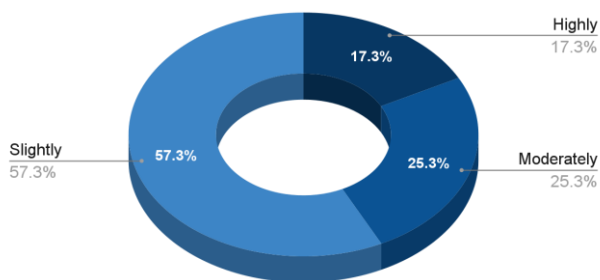


Figure 3 – Extent of vulnerability of dwelling units wrt residential density (Source: Author)

In Karumkulam Panchayat (Ward 17), fishing is the most common occupation. Most fishermen have their own dwelling units wherein there is kutcha housing (5.2%), semi-pucca (14.2 %), and pucca housing: 80.6%. The majority of the houses are Pucca houses, according to the statistics, although these houses suffer from other issues such as lack of maintenance, poor construction, improper sanitation facilities, overcrowding and close proximity to open drains.

The total area of ward 17 is 0.075sq.km. The highly congested areas lack setbacks, proper boundaries and dedicated open space. Thus, these areas are under risk for any further development. The moderately congested areas have proper boundaries and sufficient land area for the household activities. The slightly congested areas have proper setbacks, boundaries and vacant lands (privately owned).

According to the preliminary study, several of the dwellings have inadequate facilities, poor spatial quality and indoor ventilation, along with poor light quality. Some of the houses are constructed with thatched roofs, asbestos sheets and straw coverings. Although the majority of dwellings are constructed of concrete, their state is inequitable and deplorable. Houses near the beach road stretch have no barrier or compound wall, they directly face the roadside, due to which they lack visual privacy. Water logging is another prominent issue. There is also no proper waste management. Housing conditions and issues can hence, be concluded as follows i.e. there is no proper sanction and guidelines followed, high housing congestion, presence of housing stress, unavailability of land, land fragmentation etc. are the major issues. Other issues are-

- Improper and unplanned drainage systems
- Issues of accessibility
- Unauthorized land ownership
- Poor spatial, air, ventilation and light quality
- Lack of parking spaces
- Lack of escape routes during hazards and emergency
- Improper waste management and exposed drains
- Unhygienic living conditions resulting in health issues



Figure 4 – Housing conditions in the coastal settlement of Karumkulam: Zone 1 (Source: Author; Reconnaissance survey conducted on December 2021)



Figure 5- Housing conditions in the coastal settlement of Karumkulam: Zone 2 (Source: Author; Reconnaissance survey conducted on December 2021)

V. SAMPLE HOUSEHOLD SURVEY TO ASSESS SOCIO-ECONOMIC STATUS

A household survey using the random sampling method was conducted among the inhabitants of the coastal settlement to assess various parameters including the family members' age, gender, educational qualifications, status of employment, annual income, household expenditure, number of rooms per dwelling unit, size or area of dwelling unit and number of people per house.

Around 10% of the total number of households was surveyed to obtain the results. Focus area of the survey was directed towards the two SES indicators concluded from the preliminary section of the research namely, education and occupation.

Educational Qualifications - As per the survey conducted among 34 households, the majority of the population have an educational qualification below SSLC i.e. around 33%. The next biggest proportion of individuals has a qualification of

SSLC alone. Only a very small proportion is degree or postgraduate holders. Hence educational qualifications are comparatively low.

Employment Status - As per the survey, around 78.4 % of the sample population are involved in the fisheries sector involved in different activities including fish auction, drying, selling, allied activities etc. The next biggest proportion is employed abroad. Only a very small percentage of the populations possess white collar jobs in the private sector. A small proportion is involved in daily wage working. Hence economic conditions require improvement.

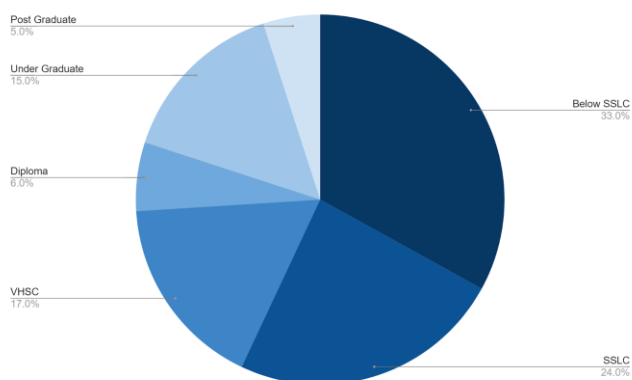


Figure 6- Status of Education of the fisher folk in Karumkulam Grama Panchayat (Source: Household survey conducted by the authors, February 2022)

From the household survey results, it could be concluded that the housing conditions and quality of life was the most weak in households wherein majority of the family members had low status of education or lacked employment in the formal sector. The correlation between the various housing conditions such as housing stress, household overcrowding etc. with the SES indicators i.e. education and employment, is yet to be established in the research and can be considered in the further stages. Hence the relation between the SES indicators and housing conditions is only proved qualitatively in this paper.

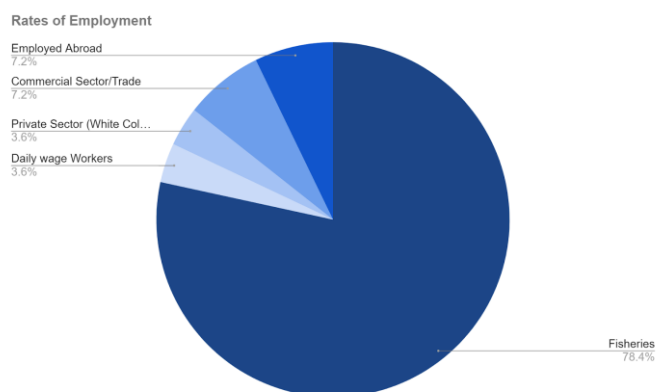


Figure 7 - Status of Employment of the fisher folk in Karumkulam Grama Panchayat (Source: Household survey conducted by the authors, February 2022)

VI. CORRELATION BETWEEN EMPLOYMENT STATUS & EDUCATIONAL QUALIFICATIONS

As per the survey results, the relation between employment rates and educational qualification is direct but not proportionate i.e. non-linear correlation. As the number of educationally qualified people decreases, the proportion working in the private sector also decreases. Similarly, since the majority of the population does not have basic education, a large proportion is involved in the fisheries sector. This is seen in the increasing trends in employment rates in the fisheries sector and the proportionate increase in the number of uneducated population. There are around half of the resident population involved in income generation during particular events or festivals in the Ward 17.

As per the survey results, most of the residents are involved in the informal sector with only meager profits and unsteady income. This is depicted in the employment trends of the residents. Educational qualifications also indicate the same wherein only a very small proportion is graduates among the resident population. It could be observed that most of the residents employed in the fisheries or other informal sectors lived in inadequate housing conditions. Similar is the case of the people who lack basic education.

VII. INFERENCES & KEY FINDINGS

From this study, it could be inferred that employment and educational qualifications are key SES indicators with the highest degree of impact on housing conditions and quality of life of residents in coastal settlements. The study also demonstrated that socio-economic factors considerably affect housing conditions, and that the only socio-economic factors that significantly affect housing conditions are lack of education and the high dependence on informal sector employment i.e. fisheries in this case. Occupation has a positive and significant correlation with housing circumstances, as per the results from the research. The concerned authorities must take action to reduce the high-income inequality and unemployment rates, especially in the case of the coastal settlements as the residents are in a highly vulnerable state as inferred from the reconnaissance survey because poor housing conditions are closely related to and even influence poverty which in turn is directly determined by the status of occupation of residents. By fostering job opportunities and top-notch education, organized private sectors should help small-scale enterprises and institutions in order to enhance the economic and social well-being of the local population and households.

VIII. CONCLUSION

This paper concludes that, employment and education being socio economic status indicators are also major driving factors that influence the housing conditions and quality of life of the residents in a settlement. This was proven in the context of a coastal settlement; hence these can be concluded as prime SES indicators among the fisher folk population and key determinants of their housing conditions. Therefore, it can be understood that, improving the economic status of

fisher folk shall subsequently enhance the livability quotient and ensure better habitat for the residents. Economical opportunities overlook the potential areas to produce local economy using available resources and skills. Fisher folk possess the required skills but lack the knowledge about marketing these skills. Some of the techniques that can be implemented to improve their economic opportunities are to provide specific skill training which can be in the form of following; training of boats and net making for catching fish, training for environment-friendly fishing, training of fish processing into certain food and finding markets to sell their traditional cuisine, training for operating fish processors obtained from aid. Apart from these, training for disaster management during off-shore fishing can also be a possible opportunity. From the results of the paper, it can be concluded that improving the economic opportunities and social status of the fisher folk, can substantially improves their overall habitat and living conditions.

IX. REFERENCES

- [1] OECD, "Housing overcrowding (indicator)," 2022. [Online]. Available: <https://data.oecd.org/inequality/housing-overcrowding.htm>. [Accessed 7th August 2022].
- [2] Statistics Canada, "Household type of private household," 29 September 2021. [Online]. Available: <https://www23.statcan.gc.ca/imdb/p3Var.pl?Function=DEC&Id=251053>. [Accessed 7 August 2022].
- [3] S. J. Kayode, M. S. Muhammad and M. U. Bello, "Effect of Socio-Economic Characteristics of Households on Housing Condition in Bauchi Metropolis, Bauchi State, Nigeria," *Path of Science*, pp. Vol 7, No 7, 2021.
- [4] A. Ghosh, O. Mallick, S. Chattopadhyay and B. Basu, "Strata-based quantification of distributional uncertainty in socio-economic indicators: A comparative study of Indian states," *Socio-Economic Planning Sciences*, p. Vol 81, June 2022.
- [5] WHO, WHO Housing & Health Guidelines, Geneva: World Health Organization, 2018.
- [6] S. Glen, "Cronbach's Alpha: Definition, Interpretation, SPSS," 2022. [Online]. Available: <https://www.statisticshowto.com/probability-and-statistics/statistics-definitions/cronbachs-alpha-spss/>. [Accessed 7 August 2022].
- [7] M. Tavakol and R. Dennick, "Making Sense of Cronbach's Alpha," *International Journal of Medical Education*, pp. 53-55, 2011.