

**HOUSING CONSUMPTION AND HOUSING ADEQUACY IN
RURAL INDIA: THE TRENDS, PATTERN AND
DETERMINANTS**

Thesis Submitted to University of Calicut for the award of the degree of

DOCTOR OF PHILOSOPHY IN ECONOMICS

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CERTIFICATE

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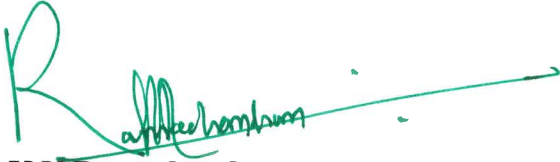
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DECLARATION

I hereby declare that the work presented in the thesis entitled “**Housing Consumption and Housing Adequacy in Rural India: The Trends, Pattern, and Determinants**” submitted to the University of Calicut for the award of the degree of Doctor of Philosophy in Economics is based on the original work done by me under the guidance of Dr. K V Ramachandran, Professor of Economics (Retd.), Department of Economics, Dr. John Matthai Centre, Aranattukara, Thrissur and Dr. Muneer Babu M, Assistant Professor, Dr. John Matthai Centre, Aranattukara, Thrissur and has not been included in any other thesis submitted previously for the award of any degree. The contents of the thesis are undergone plagiarism check using iThenticate software at C.H.M.K. Library, University of Calicut, and the similarity index found within the permissible limit. I also declare that the thesis is free from AI generated contents.



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Acknowledgement

At the outset, I'd like to express my sincere gratitude to Prof. (Dr.) K V Ramachandran, my Supervising Guide, for allowing me to do my research under his guidance, carefully monitoring my work progress, and extending invaluable direction, encouragement and whole hearted support, throughout my research work. He is a constant source of encouragement, guidance and inspiration, and is a great motivator, mentor, guide, guardian and visionary. I am extremely thankful to you sir for the patience and dedication extended to me to ensure my success. I am grateful to Dr. Muneer Babu M, my co-supervising guide for his guidance, support and instruction throughout my study especially during the later stages of my research work.

I am grateful to Dr. Rajula Helan K P, Head of the Department, Department of Economics, Dr. John Matthai Centre, Thrissur for her continuous encouragement, and support given to me during all stages of my study. I express my sincere thanks to Dr. Shyjan D, Dr. Zabeena Hameed P, Dr. Sanoop M S, Ms. Shejina B, Mr. M S Raunaq, Mr. Sheon Thomas and Dr. Priyanka Menon, the faculty members of Department of Economics, Dr. John Matthai Centre, Thrissur for their care and support during the period of my study. I'd like to add my sincere gratitude to all the supervising guides and the research scholars in this department for their support during my work.

I extend my sincere thanks to the SO and the office team, Dr. John Matthai Centre, Thrissur for their support. No research is possible without the Library, the centre of learning resources. I'd like to thank Mr. Hashiq P M, librarian, and Ms. Sreeja (former librarian) of Library, Dr. John Matthai Centre, Thrissur for their invaluable support and services extended to me during the course of my work. I take this opportunity to thank all the library staff of C.H.M.K. Library, University of Calicut for their services.

I am extremely grateful to Dr. K Baby my colleague and Head of the Department at the time of my service in Government College, Chittur, for inspiring me to join for research and extended her whole hearted support till the completion of the study. I also remember all the faculty members of Department of Economics, Government College Chittur for their support. I take this opportunity to thank Dr. P Noufal, Head of the Department, and the faculty members of Department of Economics, S.N. G.S College, Pattambi for the help extended to me in this journey during my service there. I'm extremely thankful to Dr. Shajila Beevi S, Principal, Mr. Santhosh T Varghese, Head of the Department, and the faculty

members in Department of Economics, in Maharaja's College Ernakulam where I'm presently working, for their love and support.

I am extremely thankful to my friend Ms. Krishna Mukundan who has immensely supported me especially at the time of data extraction. I'd also take this opportunity to remember Dr. Gopu Vijayan, SVTB College, Mannampatta, Dr. T D Simon, Sree Kerala Varma College, Thrissur and Mr. Rajesh, CDS, Thiruvananthapuram for their support and guidance at the time of data analysis. I extend my sincere thanks to my friend and colleague Mr. Georgekutty C, Maharaja's College, Ernakulam for his help and support at the final stage of report preparation of the study. I am immensely pleased with the printing and binding work of this thesis report. My sincere thanks to Dj Dot Net Café for providing services of printing and binding in time.

I am deeply indebted to my friends Sathyavathi and Sreeja Gopal for being with me whenever I need their help throughout this journey.

I'd like to thank my husband Mr. Sasikumaran who deserves my deep appreciation for his love and support throughout this process. Words are perhaps inadequate to express my heartfelt gratitude to my beloved children Devika and Sudeep for their unconditional love and support.

To conclude, I'd like to thank God, my parents, and my brothers and sisters, without their support it would be impossible to finish my study in time. My sincere thanks to all those who have either directly or indirectly supported me throughout this journey. Thank you all.

Jyothi K K

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Abstract

Housing, generally accepted as a cardinal requirement for the existence and development of mankind, is regarded as one of the central components of the quality of life and an important indicator of human welfare. It is also a symbol of dignity especially in rural areas. Being the largest and the most expensive consumption good, there exist significant variations in the level of housing consumption and housing adequacy among households especially in rural areas. The study titled “Housing Consumption and Housing Adequacy in Rural India: The Trends, Pattern and Determinants” focuses on rural housing consumption and its determinants with special attention on housing adequacy in rural India. The study used NSSO unit level data of 58th, 65th, 69th, and 76th rounds for rural India during the period from 2002 to 2018. For measuring housing consumption the study used variables such as floor area, number of rooms and number of living rooms both on household and on percapita basis. The results of the study indicate that there occurred significant changes in housing consumption from 2002 to 2018.

Utilising structural equation modelling techniques, the study found that gender, economic status, economic activity, usual principal status, household size, age of the head, educational status, number of married couples in the household, social group, religion etc. exerts significant influence on housing consumption of rural households in India. The study constructed a Housing Adequacy Index (HAI) using principal component analysis, based on NSSO 69th and 76th round data, by taking variables representing structural adequacy, sufficient area and living facilities, drinking water facilities, sanitation facilities etc. It was found that the level of housing adequacy has shown an improvement from 69th round to 76th round. The social group-wise analysis reveals that housing consumption and housing adequacy of SC/ST households stood below that of OBC/Others categories. It was found that both housing consumption and housing adequacy are positively correlated to economic status of the household. The analysis based on categories of economic activity reveals that the secondary sector stood at a lowest position in terms of both housing consumption and housing adequacy comparing to that of primary and tertiary sectors. State level analysis reveals that there exist huge inter-state variations in both housing consumption and housing adequacy. Kerala is one among the states occupying highest positions in housing consumption and housing adequacy. The study concludes that socio-economic, occupational and regional differences in housing consumption and housing adequacy may be given consideration in framing policies in the housing sector in general, and housing sector of rural areas in particular.

(Key words: rural housing, housing consumption, floor area, Structural adequacy, housing adequacy)

സംഗ്രഹം

മനുഷ്യരാശിയുടെ നിലനിൽപ്പിനും വികാസത്തിനും ഉള്ള ഒരു പ്രധാന ആവശ്യകതയായി പൊതുവേ അംഗീകരിക്കപ്പെടുന്ന ഭവനം ജീവിത നിലവാരത്തിന്റെ കേന്ദ്ര ഘടകങ്ങളിൽ ഒന്നായും മനുഷ്യക്ഷേമത്തിന്റെ ഒരു പ്രധാന സൂചകമായും കണക്കാക്കപ്പെടുന്നു. പ്രത്യേകിച്ചും ഗ്രാമപ്രദേശങ്ങളിൽ ഇത് അഭിമാനത്തിന്റെ പ്രതീകമാണ്. ഏറ്റവും വലുതും ചെലവേറിയതും ആയ ഉപഭോഗ വസ്തുവായതിനാൽ ഭവന ഉപഭോഗത്തിന്റെ തോതിലും വീടുകളുടെ പര്യാപ്തതയിലും പ്രത്യേകിച്ച് ഗ്രാമപ്രദേശങ്ങളിൽ കാര്യമായ വ്യത്യാസങ്ങളുണ്ട്. “ഗ്രാമീണ ഇന്ത്യയിലെ ഭവന ഉപഭോഗവും ഭവന പര്യാപ്തതയും: പ്രവണതകളും ക്രമവും നിർണായക ഘടകങ്ങളും” എന്ന ശീർഷകത്തിലുള്ള പഠനം ഗ്രാമീണ ഇന്ത്യയിലെ ഭവന ഉപഭോഗത്തിലും അതിന്റെ നിർണായക ഘടകങ്ങളിലും ഭവന പര്യാപ്തതയിലും ശ്രദ്ധ കേന്ദ്രീകരിക്കുന്നു. നാഷണൽ സാമ്പിൾ സർവ്വേ ഓർഗനൈസേഷന്റെ 2002 മുതൽ 2018 വരെ കാലയളവിൽ ഉള്ള സർവ്വേകളുടെ അടിസ്ഥാന വിവരങ്ങളാണ് പഠനം ഉപയോഗിച്ചത്. ഭവന ഉപഭോഗം വിലയിരുത്തുന്നതിനായി വീടുകളുടെ തറ വിസ്തീർണ്ണം, മുറികളുടെ എണ്ണം, സ്വീകരണ മുറികളുടെ എണ്ണം എന്നിങ്ങനെ ഗാർഹിക അടിസ്ഥാനത്തിലും ആജോഹരി അടിസ്ഥാനത്തിലും ചരങ്ങൾ ഉപയോഗിച്ചു. 2002 മുതൽ 2018 വരെ ഭവന ഉപഭോഗത്തിൽ കാര്യമായ മാറ്റങ്ങൾ ഉണ്ടായതായി പഠനഫലങ്ങൾ സൂചിപ്പിക്കുന്നു.

ലിംഗ ഭേദം, സാമ്പത്തികനില, സാമ്പത്തിക പ്രവർത്തനം, കുടുംബത്തിലെ അംഗങ്ങളുടെ എണ്ണം, കുടുംബനാഥന്റെ പ്രായം, വിദ്യാഭ്യാസ നിലവാരം, കുടുംബത്തിലെ വിവാഹിതരായ ദമ്പതികളുടെ എണ്ണം, സാമൂഹിക ഗ്രൂപ്പ് തുടങ്ങിയവ ഇന്ത്യയിലെ ഗ്രാമീണ കുടുംബങ്ങളുടെ ഭവന ഉപഭോഗത്തിൽ സ്വാധീനം ചെലുത്തുന്നുണ്ടെന്ന് പഠനം കണ്ടെത്തി. വീടുകളുടെ ഘടനാപരമായ പര്യാപ്തത, മതിയായ വിസ്തീർണ്ണം, ജീവിത സൗകര്യങ്ങൾ, കുടിവെള്ള സൗകര്യം, ശുചിത്വ സൗകര്യങ്ങൾ തുടങ്ങിയവയെ പ്രതിനിധീകരിക്കുന്ന ചരങ്ങൾ എടുത്ത് ഒരു ഭവന പര്യാപ്തത സൂചിക നിർമ്മിച്ചു. ഭവന പര്യാപ്തതയുടെ നിലവാരം 69 റൗണ്ട് കാലത്തിൽ നിന്നും 76 റൗണ്ട് ആയപ്പോഴേക്കും മെച്ചപ്പെട്ടതായി കണ്ടെത്തി. പട്ടികജാതി പട്ടികവർഗ്ഗ കുടുംബങ്ങളുടെ ഭവന ഉപഭോഗവും ഭവന പര്യാപ്തതയും ഒബിസി/മറ്റു വിഭാഗങ്ങളേക്കാൾ താഴെയാണെന്ന് സാമൂഹിക ഗ്രൂപ്പ് തിരിച്ചുള്ള വിശകലനം വെളിപ്പെടുത്തുന്നു. കുടുംബത്തിന്റെ സാമ്പത്തികനില ഭവന ഉപഭോഗത്തെയും ഭവനപര്യാപ്തതയേയും സ്വാധീനിക്കുന്നുണ്ട് എന്ന് പഠനം കണ്ടെത്തി. പ്രാഥമിക ത്രിതീയ മേഖലകളെ അപേക്ഷിച്ച് ദ്വിതീയ മേഖല ഭവന ഉപഭോഗത്തിലും ഭവന പര്യാപ്തതയിലും ഏറ്റവും താഴ്ന്ന നിലയിൽ ആണെന്ന് പഠനഫലങ്ങൾ തെളിയിക്കുന്നു. ഭവന ഉപഭോഗത്തിലും ഭവനപര്യാപ്തതയിലും അന്തർ സംസ്ഥാന വ്യതിയാനങ്ങൾ ഉണ്ടെന്ന് സംസ്ഥാനതല വിശകലനം വെളിപ്പെടുത്തുന്നു. ഭവന ഉപഭോഗത്തിലും ഭവനപര്യാപ്തതയിലും ഏറ്റവും ഉയർന്ന സ്ഥാനങ്ങൾ വഹിക്കുന്ന സംസ്ഥാനങ്ങളിൽ ഒന്നാണ് കേരളം എന്ന് പഠനം കണ്ടെത്തി. ഭവന ഉപഭോഗം, ഭവനപര്യാപ്തത എന്നിവയിലെ സാമൂഹികമായും സാമ്പത്തികമായും തൊഴിൽപരമായും പ്രാദേശികമായും ഉള്ള വ്യതിയാനങ്ങൾ ഭവനമേഖലയിൽ പൊതുവേയും ഗ്രാമപ്രദേശങ്ങളിലെ ഭവനമേഖലയിൽ പ്രത്യേകിച്ചും നയങ്ങൾ രൂപീകരിക്കുന്നതിന് പരിഗണിക്കാവുന്നതാണെന്ന് പഠനം നിഗമനം ചെയ്യുന്നു.

(പ്രധാന പദങ്ങൾ: ഗ്രാമീണ ഭവനം, ഭവന ഉപഭോഗം, തറ വിസ്തീർണ്ണം, ഘടനാപരമായ പര്യാപ്തത, ഭവന പര്യാപ്തത)

Chapter 1
INTRODUCTION

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1.1 Introduction:

Food, clothing and shelter are considered as the bare necessities of human life. Today we use the term ‘housing’ instead of ‘shelter’, which signifies the developments and changes occurred to the concept through different phases. Safe and comfortable housing environment can be considered as a cardinal requirement for the existence and development of mankind (Wennan, 1996). Housing has a great impact on human well-being, health, education and security as it protects the inhabitants from harmful natural and social elements (Filali, 2012). Filali remarked that housing ensures a platform for the members of the household to communicate, relax and renew their energy. The wellbeing of adults and children in a family depends on a decent, affordable housing which is a difficult goal for poor families to attain as they face many challenges to achieve it (Latimer & Woldoff, 2010). Socio-economic development of a country depends on improved living conditions. As family life develops in the house, every household must be provided with adequate housing facilities (Chandhoke, 1977). “Inadequate and inappropriate housing is a manifestation of deprivation and is important both as a factor in enhancing human development that would not only contribute to enhancing productivity and efficiency but also enhance social dignity”, (Kannan, Raveendran, Menon, Maria, & Dhanya, 2014). Access to shelter and adequate and affordable housing contribute to physical and material wellbeing of the population and enhances their quality of life (Kumar, 2014). It is paradoxical to state that despite spectacular progress in science and technology, the majority of the human race is still deprived of a minimum decent shelter—one of its all-time three basic needs (Chandhoke, 1977).

Housing is regarded as an important consumption good in households’ everyday life. It impacts living conditions through its intrinsic characteristics and location. From an economic point of view, housing has been described as having three important characteristics: durability, heterogeneity and fixed location (Gobillon & Nagot, 2018). Being a composite commodity, housing can fulfill not only dwelling needs, but it can also provide its members a social space to interact or to make them able to attain a desired level of social status (Vera-Toscano & Ateca-Amestoy, 2008). Vera-Toscano and Ateca-Amestoy, also pointed out that housing forms the largest item for both consumption and investment in their lifetime that is how it acts as an important component for better quality of life. It is generally

agreed that one of the most valuable aspects of human life which determines the material wellbeing and standard of living of the people is to acquire a satisfactory accommodation. Better housing conditions are treated as essential requirements for childhood development as well as health of the members of the family. Housing costs constitute a large share of the household budget and do act as the main component of household wealth. (Streimikiene, 2014).

Rural housing is generally treated as entirely different from urban housing in many respects. As rural areas are dominated by agriculture and allied activities, they have to accommodate not only human beings but livestock as well. Also, there need a separate place in order to be used as granaries and store houses. There also requires covered space for all kinds of occupations, including weaving, basket making, rope making, food drying and processing so on and so forth. The open large space surrounding the house is as important in rural areas as the house itself. It is used for cooking, storing, accommodating animals, poultry and the like (Dutt, 1999). In rural areas, the houses are generally big in size and financial values of them are quite disproportionately high as compared to the incomes of their owner households because, a house is constructed in stages spread over a long period of time, in some cases over a few generations (Chandhoke, 1977). Besides agriculture, most of the rural families do engage in ancillary occupations inherited from generation to generation which requires a different design and a large size of accommodation for meeting their occupational requirements (Chakravarty, 1999).

There are numerous problems associated to rural housing all over the world. In rural India, the so called low cost rural dwellings are usually very small and insanitary often in dilapidated conditions and are not in conformity with the norms of a healthy living of the rural masses (Chitagubbi, Pujar, Morab, & Mugalkhod, 2016). Overcrowding is recognised as a serious problem that harms both household's housing conditions and public health (Filali, 2012). Rural households are found to be seriously deprived in terms of available space in their dwellings. Richard SENDI pointed out that overcrowding may cause uneasiness, children's poor academic performance, tensions among household members and eventually potentially irreparable consequences (SENDI, 2013). Kirankumar and Ravindrakumar (2016) observed that a large number of people in rural area are living in congested or overcrowded and unhygienic conditions i.e. living without proper shelter and sanitation facilities. Traditional rural dwellings are found to be usually small, insanitary and are suffering from

the absence of many of the basic amenities of daily life (Ferdous, Kafy, Gafur, & Wakil, 2017).

Compared to urban areas, rural areas are suffering immensely from the concentration of deprivation regarding the level of housing and sanitation practices which was not at all good by any standard (Prajapati, Banker, & Chauhan, 2017). Thus the study of housing consumption in rural area deserve special attention. What are the changes occurred in the pattern of housing consumption in rural areas? Whether there exists disparities in housing consumption in rural areas on various dimensions? What are the determinants of housing consumption in rural areas? Whether the level of housing consumption is adequate with reasonable standards? These are the problems to be analysed and addressed both quantitatively and qualitatively. In this context the present study focuses on rural housing consumption with special attention on its determinants and housing adequacy in rural India.

1.2 Need and Significance of the Study:

Housing is generally recognised as one of the central components of the quality of life. (Ginsberg & Churchman, 1984). Housing is a primary human need and hence forms a priority for the Government. It is widely recognized that housing development plays an important role in economic development of a nation and is particularly relevant for a developing nation like India (James & Manoj, 2014). One of the basic aspects of human welfare is living in a suitable house which is satisfying and is in harmony with the conditions of natural environment, society, culture, economy and the functional situation of the rural settlements. (Sabet & Mirvahedi, 2017).

According to NSO (National Statistical Office),information in respect of the dwelling unit of the households like type of the dwelling unit, tenurial status of dwelling unit, structure of the dwelling unit, condition of the structure, floor area of the dwelling unit, age of the house owned by the household, etc. along with the facilities available to the households in respect of drinking water, sanitation etc. and micro environment surrounding the house like drainage system of the house, system of disposal of household waste water, system of disposal of household garbage, problems of flies and mosquitoes etc. are important determinants of overall quality of living condition of the household members(NSSO, 2019).

Kannan et.al. (2014) pointed out that housing can be treated as a crucial indicator of human welfare both for the individuals and for the communities. They also remarked that the health of the residents both physical and mental, which determines their ability to perform in

economic and social spheres of life, is affected by their housing conditions. Housing is also regarded as a symbol of dignity in socio-economic interactions which makes it a basic necessity (Kannan, Raveendran, Menon, Maria, & Dhanya, 2014). To sum up, housing is necessary, in the sense it satisfies a basic human need namely shelter; important as it is the most important item of consumption for most households; durable as it is the most durable of most of the commodities; and indivisible also in the sense that households do not mix parts of housing units (Filali, 2012). For most of the people, it is the most expensive item of consumption reflecting the position of the owner in the society he/she lives. In this context it is essential to study the pattern of housing consumption in rural areas with its determinants with special mention on housing adequacy which became the subject matter of the present study.

1.3 Research Gap:

There are various studies covering housing consumption, housing adequacy and housing quality which are reviewed here focussing on different dimensions of the concepts under study. Regarding housing consumption, various studies adopted variety of methods and principles to measure housing consumption. Some studies (for e.g. Chi, 1988; McLeod and Ellis, 1982) employed variables representing housing conditions to measure housing consumption while others (for e.g. Lim & Lee, 1993; Netherlands Central Bureau of Statistics, 1994; Philipson, 1937) used rent equivalence principle or the cost of using housing services as a proxy for housing consumption. Similarly some studies focused on household characteristics and family composition (for e.g. Chi, 1988) to explain variations in housing consumption while others (for e.g. Sullivan, 1994; Ahmad, 2015) used socio economic and demographic characteristics of the household. There are a few number of studies considering all the relevant variables to measure actual housing consumption and the variables that affect housing consumption in various dimensions. In this context, the present study attempts to follow a comprehensive method by reconciling all the relevant variables including floor area, number of rooms, number of living rooms, floor area per person, number of rooms per person and number of living rooms per person that can represent the concept of housing consumption and also those variables which can explain differences in housing consumption across various social, economic and occupational categories at the household level.

Regarding housing adequacy, the available literature constitute very few number of studies. Moreover, most of the studies (for e.g. Kutty, 1999; Bhattacharya et.al, 1987; Filali, 2012) cover physical or structural adequacy only. A few number of studies defined (for e.g.

Aizawa et.al. 2020) some criterion to assess housing adequacy which include structural adequacy, sufficient living area, drinking water and sanitation facilities while others (for e.g. Morton, Allen, & Li, 2004) give emphasis to space requirements in the dwellings only. The present study attempts to have a comprehensive methodology by including almost all the relevant criterion viz. structural adequacy, sufficient living facilities, drinking water facilities, sanitation facilities, waste management arrangements etc. as well as variables reflecting these criteria identified from the literature on housing adequacy as well as housing quality and also those given by UN (UN-Habitat, 2014) to study the problem of housing adequacy or inadequacy at household level on socio- economic, occupational and regional dimensions.

1.4 Statement of the Problem:

Housing and households play a dominant role in almost all the economies of the world. Shelter is one of the basic requirements for the very existence of human being. More than a roof over one's head, home symbolizes family, stability and wealth. Owning a home is one of the top priorities for most of the households regardless of their economic conditions. Housing is regarded as an engine of growth and can give a big push to the economy through its strong backward and forward linkages with other industries in a macro perspective (GoI, 2011). At the household level, housing and household amenities are major indicators to examine human well-being as far as an economy is concerned. Being the largest and the most expensive consumption good, there exist significant variations in the level of housing consumption among households especially in rural areas.

The level of housing consumption is not uniform across rural households from socio, economic and occupational perspectives. There are a number of factors that influences the level of housing consumption of rural households. In India both census reports and NSSO reports on housing on various rounds indicate that there exist considerable variations in the level of housing facilities available to households especially in rural areas on various grounds. A large portion of rural households are residing in overcrowded or congested dwellings and do not have access to adequate housing facilities. Of course there occurred changes in housing conditions over time both quantitatively and qualitatively. But these changes are not distributed uniformly across different social, economic and occupational groups. The poor households and households from socially deprived classes are unable to enjoy a high level of housing consumption and are suffering from low level of housing adequacy. There are regional differences too. The present study in this context attempt to find out the changes in pattern of housing consumption and housing adequacy over time

among rural households and also examines the factors responsible for variations in housing consumption on a micro perspective.

1.5 Objectives of the Study:

The present study is based on the following objectives:

➤ **To examine changes in housing consumption pattern of households in rural India**

This involves analysing changes in housing consumption variables such as floor area, number of rooms, number of living rooms, floor area per person, number of rooms per person and number of living rooms per person over time. This also examines changes in housing consumption across social groups, economic groups, and occupational groups and also changes across states to trace out regional differences in this regard.

➤ **To trace out the determinants of housing consumption in rural India**

Attempt is being made to explore the factors responsible for changes in housing consumption of rural Indian households by examining the effect of variables representing their social, demographic, economic and occupational background on housing consumption variables using SEM (Structural Equation Modelling) techniques thereby identifying the thrust areas for improvement in housing conditions.

➤ **To assess housing adequacy among households in rural India**

This examines level of housing adequacy among rural Indian households by analysing both housing services and housing stock quantitatively as well as qualitatively. A housing adequacy index being constructed by combining the variables measuring structural adequacy, living facilities, sufficient area, drinking water facilities, sanitation facilities so on and so forth. The index is then used to classify the rural households based on their housing adequacy to low, medium and high which facilitates comparison as well as policy formulation for corrections and improvements.

1.6 The Research Hypothesis:

There occurred significant changes in housing consumption and housing adequacy of rural households in India over time. Housing consumption depends on socio economic and occupational background of the households. Housing adequacy is not uniform across various social, economic and occupational groups. There also exists interstate variations in housing consumption and housing adequacy. Development in socio-economic and occupational status

and reduction in interstate disparities can improve housing consumption and housing adequacy of rural households in India.

1.7 Scope of the Study:

The present study focuses on housing consumption and housing adequacy of households in rural India. The study examines changes in housing consumption based solely on NSSO unit level data for households in rural India during 58th, 65th, 69th and 76th rounds. Also, housing consumption is measured using variables such as floor area, number of rooms, and number of living rooms on household and per capita basis. Other methods of measuring housing consumption are not employed in this study. The analysis on determinants of housing consumption is based on NSSO 76th round unit level data. Similarly, housing adequacy is assessed based on unit level data of NSSO 69th and 76th rounds only. Hence the entire analysis rests on the variables used in NSSO surveys mentioned earlier. The results of the study will be applicable only to the households of rural India.

1.8 Data Source and Methods:

1.8.1 Data Source:

For fulfilling the major objectives, the present study relies solely on secondary data sources. This section details the major secondary data sources used for the study. In order to develop an overview of housing conditions in rural India, the study mainly used Census figures on housing and household amenities for 2001 and 2011 and the figures on housing conditions estimated from unit level data of NSSO 58th, 65th, 69th and 76th rounds. For fulfilling the first objective set i.e. to examine the changes in housing consumption pattern of rural Indian households, the study used unit level data of four rounds of NSSO mentioned earlier. The NSSO 58th round, "Housing condition in India: Household amenities and other characteristics" were conducted during July 2002 to December 2002. The sample consists of 97882 households out of which 55966 were rural households and the remaining 41919 were urban households. The 65th round, "Housing conditions and amenities in India (2008-09)" were conducted during the period July 2003 to June 2009. This round surveyed 153518 households; 97144 households from rural India and 56374 from urban India. The NSSO 69th round, "Drinking water, Sanitation, Hygiene, and Housing condition in India" were conducted during July 2012 to December 2012. This round surveyed 95548 households at all India level out of which 53393 were from rural areas and 42155 from urban areas. The 76th round, "Drinking water, Sanitation, Hygiene, and Housing condition in India" were

conducted during July 2018 to December 2018. This round surveyed 106838 households at all India level, where 63736 were rural households while the remaining 43102 were urban households. For fulfilling the first objective of the study, the unit level data of rural households of these four rounds were extracted and analysed.

The second objective set was to trace out the determinants of housing consumption in rural India. For analysing this objective, the study uses NSSO 76th round data of rural households which contains data on all the socio economic demographic and occupational details of the households and also this is the latest round in this regard. The third objective were related to the assessment of housing adequacy of the households in rural India. For this, the study uses the latest two rounds of NSSO data i.e. 69th round and 76th round to make a comparative analysis in this regard. All the variables necessary to analyse housing adequacy based on structural adequacy, sufficient living area, drinking water and sanitation facilities, waste management, tenurial status so on and so forth were extracted and analysed.

1.8.2 NSSO and its Sampling Design:

The National Sample Survey Office (NSSO) which came into existence in the year 1950, is an office functioning under Ministry of Statistics and Programme Implementation (MOSPI) responsible for conducting all India level large scale sample surveys. This office collects primary data on various socio-economic subjects such as income, health, employment, expenditure, housing conditions etc. through nationwide household surveys. The NSSO publishes periodic reports based on the findings from the surveys conducted. These reports gives valuable insights on the socio-economic indicators helping in tracing out the challenges and opportunities faced by different sectors of the Indian economy. The NSSO have been conducting comprehensive and exploratory surveys on 'Housing Conditions and other Amenities' from its 7th round (October 1953 - March 1954) onwards thereby providing a broad idea on housing conditions at the national level. Comprehensive surveys being carried out by NSSO in its 28th round onwards using separate schedule 1.2. After that 44th round (July 1988 - June 1989), 49th round (January - June, 1993), 58th round (July - December, 2002), 65th round (July 2008 - June 2009) and 69th round (July - December, 2012) also details housing conditions and amenities in a comprehensive manner. The latest round of NSSO regarding housing conditions and its micro environment and amenities was its 76th round.

Villages and urban blocks are the smallest area units considered by the NSSO as the First stage Sampling Units (FSUs) in rural and urban areas respectively. The Second Stage Units (SSUs) or Ultimate Stage Units (USUs) are households for household based studies. A stratified multi-stage sampling technique is employed by NSSO for selecting ultimate sampling units which improves its survey design and ensure administrative as well as operational convenience. NSSO 76th round survey employed a stratified two stage design- First Stage Units (FSUs) comprises of villages, UFS blocks, and sub-units; and the Ultimate Stage Units (USUs) which include households from both rural and urban sectors. Two basic strata were formed from each district. All rural areas form the first stratum (i.e. rural stratum) and all urban areas form the second stratum (i.e. urban stratum) from each district. Similarly, two second stage strata were formed from each FSU, named SSS₁ and SSS₂, based on a cut-off point denoted as A by NSSO. Households with their monthly percapita expenditure (MPCE) $\geq A$ form SSS₁ and those with MPCE $< A$ form SSS₂. The cut-off point A is determined separately for both rural and urban areas. From each FSU, 2 households from SSS₁ and 10 households from SSS₂ were selected for collection of data (NSSO, Drinking water, Sanitation, Hygiene and Housing Condition in India, NSS 76th Round, 2019).

Table 1.1 Sampling Framework of NSSO:

Round	FSUs	Rural villages	UFS Blocks	No: of sample households	No: of rural households	No: of urban households
58 th	8338	4786	3552	97882	55966	41916
65 th	12865	8130	4735	153518	97144	56374
69 th	7997	4475	3522	95548	53393	42155
76 th	8992	5378	3614	106838	63736	43102

Source: NSSO reports-58th, 65th, 69th and 76th rounds

Table 1.1 summarises the sampling framework of NSSO used in its 58th, 65th, 69th and 76th rounds. The 58th round consists of 8338 FSUs; out of that 4786 were rural villages and the remaining 3552 were Urban Frame survey (UFS) blocks. In 65th round, there were 8130 rural villages and 4735 UFS blocks making a total of 12865 FSUs. Similarly, 69th round 7997 FSUs that include 4475 rural villages and 3522 UFS blocks. And, the 76th round included 8992 FSUs consisting of 5378 rural villages and 3614 UFS blocks. The Second Stage Units (SSUs) are households. NSSO 58th round surveyed 97882 households; of which 55966 are rural households and 41916 are urban households. The 65th round surveyed 97144 households from rural sector and 56374 households from urban sector making a total of 153518

households. The 69th round surveyed 95548 households in total; out of that 53393 were from rural areas and the remaining 42155 households from urban areas. Similarly, NSSO 76th round selected a sample of 106838 households; of which 63736 households were surveyed from rural sector and 43102 households from urban sector.

1.8.3 Research Methods:

The present study employs various statistical tools for fulfilling the objectives of the study. Frequency tables, means and standard deviations, bar graphs, pie diagram etc. were used for describing the variables of the study. The first objective was to examine the changes in housing consumption of rural households in India. To analyse this objective, means and standard deviations of housing consumption variables were computed in order to know the distribution and spread of the data. Moreover, the Kruskal Wallis H test (non-parametric ANOVA) is employed to test whether the changes occurred in housing consumption over time was statistically significant or not. As a post hoc analysis, pair wise comparisons of rounds were also done. As the data violates normality assumption, non-parametric tests were performed. The second objective was to trace out the determinants of housing consumption. For this, structural equation modelling approach is followed. Separate SEM models were fitted for analysing the influence of socio-economic and occupational background of the household on housing consumption. Also the model fit indices were estimated to ensure the fitness of these SEM models. The third objective was to assess the level of housing adequacy among rural households in India. For fulfilling this objective, a Housing Adequacy Index (HAI) was constructed by employing Principal Component Analysis (PCA). The study adapted the methodology followed by Tran, Nguyen, and Kervyn, (2017) for constructing a Household Vulnerability Index (HVI). The HAI were developed as a weighted average of the components derived from PCA, weight being the proportion of variance explained by each component to total variance explained by the retained components. Then HAI were normalised into the range 0 to 1. The HAI were categorised into low, medium and high based on 33rd and 66th percentile positions. This facilitated the comparison of level of housing adequacy across social groups, occupational groups, categories based on economic status of the household, and across states as well. To examine whether there exist significant difference in housing adequacy of rural households across 69th and 76th rounds, a Mann Whitney U test is used. Kruskal Wallis tests and chi square tests are used for examining whether the distribution of housing adequacy is uniform across various socio-economic and occupational groups and across states as well.

1.8.4 Concepts Used:

- **Housing Consumption:** Housing is an important consumption good and its consumption is measured using variables such as floor area, number of rooms, and number of living rooms on household and per capita basis.
- **Floor area:** The total area of the dwelling unit covered by floors measured in square feet.
- **Number of Living rooms:** According to NSSO 76th round definition of living room, a room with floor area (carpet area) of at least 4 square metres (i.e., approximately 43 square feet), a height of at least 2 metres (i.e., approximately 6.6 feet) from the floor to the highest point in the ceiling and used for living purposes was considered as a living room. Living rooms include rooms used as bedroom, sitting room, prayer room, dining room, servant's room - all were considered as living rooms provided they satisfied the size criterion (NSSO).
- **Number of Rooms:** Number of living rooms plus other rooms (which do not satisfy the size criterion as a living room).
- **Floor Area per Person:** Floor area of the dwelling divided by household size.
- **Number of Rooms per Person:** Number of rooms divided by household size
- **Number of Living Rooms per Person:** Number of living rooms divided by household size.
- **Economic Activity:** Economic activity of the household is categorised into primary, secondary, tertiary based on the National Industrial Classification (NIC) code provided in NSSO unit level data of the four rounds taken here.
- **Economic Status:** Economic status of the household is represented by monthly percapita consumption expenditure (MPCE). Four classes of economic status being defined based on quartiles of MPCE- lowest, medium lowest, medium highest and highest.
- **Housing Adequacy:** Housing adequacy is defined in terms of the criteria provided by UN-Habitat to have “adequate housing” which include security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location, cultural adequacy etc. (UN-Habitat, 2014).

1.9 Scheme of the Study:

The present study is organised under seven chapters. The first chapter provides a brief introduction about the research topic, need and significance of the study, statement of the research problem, objectives of the study with brief explanation, research hypothesis, scope of the study, data source and research methods, concepts used and scheme of the study. The second chapter portrays the developments in literature related to the research topic both theoretical and empirical literature. The third chapter provides an overview of the housing conditions in rural India based on the secondary sources of information especially census figures on housing for 2001 and 2011 and NSSO unit level data on housing conditions with respect to 58th, 65th, 69th and 76th rounds. The fourth, fifth and sixth chapters presents the data analysis and interpretation for fulfilling the set objectives of the study accordingly. The fourth chapter examines the recent changes occurred in housing consumption of rural households in India from 2002 to 2018 based on NSSO unit level data of four rounds which fall in the period mentioned earlier. The fifth chapter deals with the determinants of housing consumption which include variables representing socio, economic and occupational background of the households. Here NSSO 76th round unit level data which is the latest in this regard being used for fulfilling this objective. The sixth chapter presents the results of analysing the third objective of the study i.e. to assess the level of housing adequacy of households of rural India. This objective is accomplished by analysing unit level data of rural households from 69th and 76th rounds of NSSO. The seventh chapter summarises the procedures and major findings of the study. This also includes the policy implications, limitations and scope of future research in this area.

Chapter 2
DEVELOPMENTS IN LITERATURE

Chapter 2

DEVELOPMENTS IN LITERATURE

2.1 Introduction:

Housing satisfies numerous socio-economic, cultural and psychological needs along with the basic shelter needs. Quality housing is a prerequisite for quality of life (Rajovic & Bulatovic, 2013). Housing is one among man's primary needs, next only to food and clothing, which ensures a place to an individual not only in his family but, also in the community and society he belongs to (Chitagubbi, Pujar, Morab, & Mugalkhod, 2016)). The two largest assets for most of the individuals are constituted by human capital and the residential property owned and occupied by them (Kraft & Munk, 2011). Housing environment exerts significant influence on the overall development of a person. Neat and beautiful housing environment is an essential requirement for a person's life. All development is meant for the welfare of human beings where housing occupy the most significant place because a person spends two-thirds of his lifetime in the home (Wennan, 1996). Depending on way of living, profession, culture and tradition, there occurs individual differences in the concept of shelter. (Nair, Gopikuttan, Hendriks, & Fraaij, 2006). Availability of housing is affected by various factors like social, economic, occupational, climatic, and cultural and so on. Some people just imitate others in building houses. By doing so, they are actually sacrificing their family's aggregate welfare by getting trapped into a huge financial debt (Ramachandran, 2001).

The need for housing is not only one of the basic but also the indicator of standard of living of population (Henilane, 2016). Prabitha P K (2016) pointed out that a home is not just a roof over four walls. It is an extension of human personality which ensures a family life together with social and cultural life for the individual. C.A. Vapnarsky (1966) pointed out that in every society the ideal pattern of acceptable housing is always above a certain level of minimum conditions implied in the idea of what a house must be: a shelter, a physical structure which satisfies biological and social requirements of the family group. A housing unit can be thought of as a composite package of attributes for satisfying numerous dimensions of housing demand (Witte, Sumaka, & Erikson, 1979). Witte et.al, also stated that dwelling unit can be conceptualised as a homogeneous, composite good, but as a bundle of individual attributes, each of which contributes to the provision of one or more housing services. Housing is an important consumption good in households' day-to-day life. It has a

large impact on living conditions. From an economic perception, housing has three important characteristics: durability, heterogeneity and fixed location and at the macro level, housing durability indicates that housing units are built for a long period of time and keep the same characteristics even if economic conditions change. Again at the micro level, moving and transaction costs hinder households to adjust easily their housing consumption to their current economic and family conditions (Gobillon & Nagot, 2018). There are a number of studies carried out on the subject of housing the major concerns of which are organized under the following heads.

2.2 Theoretical Background of the Study:

As stated earlier, home is not just a roof over one's head, rather it has come to symbolize family, stability, wealth etc. The conception of house as a home which offers a place of comfort and security with so many other qualities can better be analysed with reference to Abraham Maslow's theory of human motivation. Maslow states that as people are motivated with a quest to satisfy their own needs, they will strive to achieve the highest possible levels of their capabilities (Maslow, 1943). Maslow has formed a hierarchy of human needs from the very basic psychological needs to the more creative needs which is termed as self-actualisation needs. Accordingly, this hierarchy consists of physiological, safety and security, love and belonging, self-esteem and self-actualization needs. The theory demands that one should fulfill the needs on the lower position of this hierarchy before focusing on fulfilling higher needs. Housing consumption needs of an individual can also be arranged in a hierarchy exactly with reference to the one developed by Maslow. Housing consumption needs of an individual also passes through such a hierarchy starting from the physiological needs which imply the basic shelter needs, safety and security needs satisfied by acquiring a good housing structure, then to love and belongingness needs that one can experience from a house with required infrastructure, then to self-esteem and self-actualization needs that is realized by his life time housing investment expenditure. As the theory suggests one has to move from the lower levels on this hierarchy to higher levels with respect to his growing capacity to achieve the goal.

The self-esteem and self-actualization needs, which can be considered as the higher level needs on this hierarchy with respect to housing consumption, can be better analysed by referring to the social identity theory which concludes that attributes of a house symbolize the owner's identity. The theory attempts to explain how people answer the question "who am I?" Sadalla, Venshore, and Burroughs (1987) pointed out that people use attributes of their

homes to communicate social identity. Self-esteem and self-actualisation needs are fulfilled when people define themselves through membership in social categories focusing on shared characteristics. Actually the observers made accurate inferences on the home owners based on the attributes or characteristics of the houses concerned. In short the observers' inferences also influence the fulfilment of self-esteem and self-actualisation needs with respect to housing.

The 'Preference Theory' which is a cognitive model of affective experience deals with how people make aesthetic choices. The theory concludes that people always tend to prefer what is typical and familiar to them (White Field, 1983). The theory was tested by Purcell, Peron, and Sanchez (1998) with reference to the affective experience from detached houses. It was observed that majority of people of Kerala live in detached houses surrounded by a fence or compound wall (Kurian & Thamburan, 2011). Hence the theory offers best explanation to different housing styles and structures preferred by the people for consumption.

Ownership model developed by White and Schollaert (1993) states that home ownership creates feelings of overall wellbeing. Home ownership produces a sense of permanency in owners which leads to psychological and economic investment in their neighbourhood. Home ownership creates a sense of safety and security along with love and belongingness for the family as a whole. For the vast majority of the common people, home ownership denotes fulfilment of a life-long dream for themselves, families, and the dear and near as a safe home ensures sound foundation for everything in their day to day life (James & Manoj, 2014). Ownership of a home also guarantees better quality family life, improved educational and health amenities. Chi (1988) analysed the relationship between family structure and housing consumption in terms of housing conditions which include ownership too. The study concluded that the extended families have the highest home ownership rate comparing to that of other family structures.

Home also stands as a physical asset for the individuals, which signifies their capabilities. Capabilities signifies the real freedoms which endows with them the necessary means that human beings enjoy in order to achieve their potential doings and beings (Kimur, 2020). Kimur who integrated Sen's capability approach to housing policy interprets that this real freedom is not a normal one that makes people to do something or to be something rather it gives them ample opportunities to achieve it. In this sense ownership of a home that

represents its owner's success in life truly reflects his capabilities as a consumer of housing services and as an investor of a physical asset (home) which has a crucial role in the life of an individual. Households will adjust their housing consumption whenever a gap arises either by improving or by moving depending on their capabilities.

As mentioned earlier the attributes of house that one possess and consumes determines his position and dignity in the society he lives. Therefore an individual is observing his housing attributes to ensure that it is in compliance with the norms of the society he or she lives. 'The theory of housing adjustment' developed by Morris and Winter (1975) deals with how households think and behave in moulding their housing consumption behaviour. If a household believes that its housing consumption is below the norms of the society, that household will get dissatisfied and strive to change its situation, as it is treated as a threat to respect. Morris and Winter also pointed out that households usually follow some remedial measures when it identifies a housing gap which include moving to another dwelling or modifying the current one which they referred to as housing adjustment; housing adaptation which signifies adjusting needs, eliminating constraints; and the third one, regeneration which implies reorganisation of the family (Morris & Winter, 1975). Seek (1983) observed that at some point in time, a household may desire some housing attributes which are not provided by the current dwelling, indicating a gap between the actual and the preferred level of housing consumption. As noted earlier, this gap is filled by taking decision on improving or moving the only ways to solve the problem.

The demand for housing can be studied using neo classical consumption theory which states that rational consumers strive to maximize their utility from different goods and services including housing that they are able to purchase subject to the constraints imposed by their income and prevailing market prices i.e., households choose between housing and non-housing commodities (Megbolugbe, Marks, & Schwartz, 1993). The demand equation defined by the households who maximize utility with respect to housing and non-housing goods is given as follows:

$$Q=q(Y, P_h, P_o, T)$$

Q = Housing consumption, Y = Household income, P_h = Relative price of housing, P_o = vector of prices for other commodities, T = vector of taste. Taste is determined by household characteristics. Hence, $T=t(H)$ where H=age, race, marital status, household composition etc. Then, $Q=q(Y, P_h, P_o, H)$

The demand for housing as a composite commodity can be analysed using Lancaster's approach to consumer demand. According to Lancaster, consumers demand the attributes or characteristics of goods rather than the goods themselves. This approach explicitly takes into account the quality and technology behind the attributes. And, these attributes form a part of the demand functions based upon which the theoretical model of demand rests rather than on the products themselves. Therefore the quality of housing can be assessed by analysing the quality of attributes it offers to the consumers which determines housing adequacy.

Different researchers considered a wide array of attributes for assessing housing quality from time to time. For example, Kurian and Thampuran (2011) gives a brief account of the indicators of housing quality which include location, infrastructure, design, aesthetics, materials and construction techniques, sustainability and concept of house. These can be treated as the attributes of a house for measuring housing quality. Maimon Ali et.al. (2018) considers social attributes (neighbourhood conditions), financial value of money (housing price), design quality (cost efficient), and life style (living environment) to assess housing quality in a micro perspective. Any how the quality of housing determines the level of housing adequacy felt by the residents from housing.

To sum up with the words of Filali, housing is necessary because it satisfies a basic human need namely shelter; it is the most important item of consumption for most households; it is the most durable of most of the commodities; and indivisible also as households do not mix parts of housing units (Filali, 2012). In general, it is the expensive item of consumption which also reflects position of the owner in the society he/she lives. In this context, the present study covers the recent trends and changes occurred in housing consumption pattern in rural India and attempts to trace out the determinants of housing consumption along with the extent of housing adequacy among households of rural India.

2.3 Developments in Empirical Literature:

The survey of empirical literature focused on housing consumption pattern and its determinants, disparities in housing consumption on various dimensions, housing quality and housing adequacy and related issues.

2.3.1 Housing Consumption: Definition and Measurement:

Housing consumption is defined and measured differently in different studies from time to time. Housing is an important consumption good in households' day-to-day life which has a large impact on living conditions through its intrinsic characteristics and location

(Gobillon & Nagot, 2018). Chi (1988) used housing conditions such as ownership, running water, and space (i.e. number of rooms and average living area) to compare housing consumption of single person, nuclear and extended families. Clark et.al. (1984) measured housing consumption in terms of number of rooms per person and m^2 per person. McLeod and Ellis (1982) used variables such as area, number of rooms and number of bedrooms on both a household and per-capita basis to measure housing consumption.

According to Lim & Lee, (1993) housing consumption include all housing services and housing stock consumed by individuals for a given period of time. Lim and Lee treated housing services in abstract terms which is the aggregate of all services a housing unit can generate including a comfortable living space, adequate basic facilities, privacy, and pleasure and so on. They also added that rent of a housing unit encompasses the sum of all housing services and the selling price of the unit or the fair market value represents the housing stock.

Statistics Netherlands (1994) defines housing consumption in a slightly different way i.e. in terms of the costs that a household need to pay for using the dwelling unit. This definition clearly interprets what housing consumption is for renters as well as for owners. Accordingly, for renters the basic rent, which include taxes, maintenance costs, depreciation and profit of the landlord that they have to pay for availing housing services operationalizes housing consumption while for owners, the term housing consumption is represented by rent equivalence concept which signifies the imputed rent (Netherlands-Central-Bureau-of-Statistics, 1994).

Every household can be thought of as either an owner or a renter whose utility functions differ in the sense that the former's utility function depends on consumption of housing services in comparison to minimum necessary consumption of these services, consumption of non-housing goods relative to minimum necessary consumption and wealth (Denton, Robb, & Spencer, 1993). Denton et.al also added that, a renter's utility is a function of consumption of rental housing services, non- housing services, the variable representing annuitized wealth and so on. Netherlands Central Bureau of Statistics (1994) treats the consumption of housing services as the value of the rents of rented dwellings and the imputed rent of owner-occupied dwellings.

Kaluzny (1979) pointed out that housing consumption, is operationally measured in two ways: as the probability of becoming a homeowner and as private monthly rent expenditure. Philipson (1937), pointed out that the physical characteristics of housing

consumption may only be expressed in terms of the production of housing utilities. Housing can be treated as products in terms of shelter, protection, privacy, and other related facilities that it can produce rather than treating it as physical dwelling structures (Philipson, 1937).

In brief, the term housing consumption is defined by different studies differently from time to time depending on the variables used to represent housing consumption. Some studies for e.g. Chi (1988); McLeod & Ellis 1982 etc. employed housing condition variables like number of rooms, floor area, number of bed rooms etc. to measure housing consumption. Some other studies (for e.g. (Lim & Lee, 1993); (Netherlands-Central-Bureau-of-Statistics, 1994); (Philipson, 1937)) used housing services (shelter, privacy, protection so on and so forth) as well as housing stock to study housing consumption and used cost of using dwelling units to represent housing consumption based on gross rent principle and rent equivalence. Also, the term housing consumption is defined in terms of probability of becoming a home owner (Kaluzni, 1979). However the present study follows those used by Chi (1988) and McLeod & Ellis (1982) in this regard with some modifications. The present study analyses NSSO unit level data of 58th, 65th, 69th and 76th rounds and employed floor area, number of living rooms (instead of number of bedrooms), and total number of rooms at the household level and percapita level being detailed in the fourth chapter of this study.

2.3.2 Determinants of Housing Consumption:

There are varying viewpoints regarding the determinants of housing consumption. Chi (1988) focussed on the relationship between family structure and housing consumption in a rapidly developing society and found that extended families consume more housing space, in terms of number of rooms and living area on the average, comparing to that of other types of households in Taiwan. Chi also cited large size of extended family, higher income level and cultural norms as the factors responsible for consumption of more space among extended families (Chi, 1988).

Similarly, Clark et.al (1984) focussed on the nature of housing consumption by tenure and life-cycle characteristics of households, and the impact of space requirements, measured in terms of number of rooms per person, on residential mobility. They found that single person households consume much greater amount of space in comparison to that of larger and older households. Also, the housing space consumption varies widely and consistently across the life cycle categories defined in terms of number of persons and age. Also, they noted that addition of a child exerts a significant impact on housing adjustment irrespective of whether

they belong to the categories of owners or renters either in public sector or in private sector (Clark, Deurloo, & Dieleman, 1984).

Age as a determinant of housing consumption was put forward by Clark and Deurloo (2006). They focussed on aging in societies and housing over consumption. They pointed out that the households with head or even all members over 65 occupying large houses have lower mobility rates than the households in general. Clark and Deurloo also documented a considerable increase in housing consumption with respect to aging and changes in the composition of household. Moreover, they found that, the older households tend to keep extra space in their dwelling units until they are forced to give it up especially on health grounds (Clark & Deurloo, 2006).

Clark et.al (2000) examined the relationship of housing consumption to income and the overall success of adjustment process using 'panel study of income dynamics' in U S. The study pointed out that the need and desire for additional space, as households increase in larger size through marriage, and additional children are important factors responsible for moving to larger houses. Moreover, the households tend to purchase more luxurious and spacious houses in accordance with progress in their careers. The study also found that there exist a positive correlation between housing consumption and the affluence of households which reveals that the demand for quality housing and space consumption tend to increase with increase in affluence of the households. The study also added that even if there is an increasing trend in housing over-consumption., the low income deciles still experiences room stress in significant numbers. The study concluded that the amount of space used by households reflects varying income levels (Clark, Deurloo, & Dieleman, 2000).

Shucksmith (1990) stated that ownership of capital and level of income are the most fundamental determinants of housing consumption. He pointed out that most of the home owners are well off despite the fact that there is an increasing trend in the proportion of home owners who are suffering from severe financial stringencies as their consumption possibilities are still higher. Shucksmith also noticed that the future housing consumption prospects are highly influenced by the existing tenure of a household. Regarding housing consumption opportunities, life cycle factors are playing a dominant role. Philipson (1937), states that the physical standards of consumption of housing are primarily depending on the existing supply of dwelling units which warrants that households have to adjust its desires and needs to the amenities and services generated by their current dwelling.

Lim and Lee (1993) examined the effect of social, political and economic factors on consumption of housing in urban China. The model was constructed in such a way that the variations in dependent variable housing consumption represented by rent or price is explained by variations in a set of independent variables such as price of housing services or housing stock, income, socio demographic attributes of the household etc. The study used income elasticities computed from time series and cross section analyses which were compared to that of other countries. The socio economic and demographic background of the household influences its access to housing in general and its type and qualities in particular (Sullivan, 1994). Sullivan also remarked that differences in terms of age, family status, gender, class, education, income, wealth, access to information etc. make the housing consumers relatively advantaged or disadvantaged. Ahmad (2015) estimated housing demand and the demand of housing attributes in urban Bangladesh, using Household Integrated Economic Survey (HIES) – 2010. According to him, the socio-economic characteristics of households determine housing consumption. The study found that housing demand was more responsive to the income of household than the price of dwelling.

Lakshmanan, Chatterjee and Kroll (1978) attempted to explore how housing demand vary among countries over time along with rising incomes and the changes in level of development. The study pointed out that a country's level of development is reflected in its changes in level of housing consumption. They noted lower income elasticities in housing consumption in early development followed by a rapid increase in income elasticities during middle levels of development and a decline at very high levels of development. They concluded that changes in proportional increases in housing consumption in a country leads to parallel changes in some other economic activities like construction, manufacturing etc. during course of development. Yang (2009) pointed out that households begin their economic lives without any housing stock. The households sacrifice their non-housing consumption for housing consumption in the earlier stages of their life cycle due to the existence of constraints in borrowing and also due to the role that housing play in the form of a collateral. Yang also noticed that there is a tendency to reduce non housing consumption by households in the later stages of life cycle on grounds of their time preference and increasing mortality rates along the life cycle. The study concluded that house is the single largest expenditure made by consumers over their life time and a median household has a house which is valued about twice their annual income (Yang, 2009).

Seek (1983) focused on adjustments in housing consumption by moving or improving stated that, many homeowners prefer improving rather than moving as a means of adjusting their housing consumption. The study noticed that after attaining home ownership, the homeowners of Australia tend to live in the same dwelling for long, make renovations whenever their demand for housing services changes along with socio economic background across the life cycle. Seek also noticed that those households with higher income brackets are more likely to reside in their improved dwellings in areas of high socio economic status. Kaluzny (1979) pointed out that the adjustments in housing consumption can be explicitly analysed by the relative importance of housing expenditures in the family budget. Housing and neighbourhood quality affect the health and welfare of the families; hence these changes become even more important. Clark et.al. (1984) highlighted that tenurial status, type of house, and the size available in the dwelling unit serves as the central components in making housing adjustments made by the households with changes in age and size.

Statistics Netherlands (1994) demonstrated that net income of the household is a crucial variable in explaining housing consumption and can be employed to estimate the fiscal effect of owned houses for calculating rent subsidies. Also, the study reported that housing consumption of household in owner occupied sector on the average exceeds that of households in the rented sector. But housing consumption of owner-occupiers and renters is somewhat similar if quality differences between the sectors are eliminated (Netherlands-Central-Bureau-of-Statistics, 1994). Berkovec (1989) developed an applied general equilibrium model for analysing the effects of tax policy on housing consumption and investment. Berkovec remarked that after tax returns from investments including housing capital influences the demand for owned houses to a great extent and that households in the owner occupied sector command a unique position because owned houses play a dual role both in consumption in the form of housing services and in investment in terms of housing stock (Berkovec, 1989). Similar viewpoint was held by Denton, Robb, and Spencer(1993) who analysed the demand for housing within the context of an overall household expenditure system in which housing is viewed as both a consumption good and an investment good.

Hooimeijer and Schutjens (1991) related changes in housing consumption to changes in lifestyle which include the age at which young people left their parental homes, the sudden drop in fertility rates, the rise in divorce rates, the growing tendency to live apart etc. The study demonstrated that changes in household development which also referred to as “lifestyle dynamics” results in corresponding changes in demand for housing to a certain

extent. These authors highlighted that demand for housing does not follow a stable pattern because households tend to move to new dwellings by spending a part of their rising incomes for improving their housing consumption and are likely to vacate their older houses they had at the time of entry to labour force or in other words at the beginning of their housing career. Also, this study noticed that these households tend to move to suburbs to have single family dwellings and leave their dwellings in urban areas in order to fulfill their desire to have a more spacious house accompanied by increase in the family sizes (Hooimeijer & Schutjens, 1991).

McLeod and Ellis (1982) observed that changes in financial position and location of the household across the family life cycle affects housing consumption significantly after their child rearing stage is completed. They highlighted that wealth and income of the household occupy a significant role in explaining the variations in their housing consumption than what the concept of family life cycle does. McLeod and Ellis also reported that in life cycle, two stages i.e. partnering and child rearing stage found to be highly significant in determining the pattern of housing consumption.

Prakash (1998) observed that the Gulf migration has helped the migrant households to attain higher levels of income, consumption and acquisition of assets in Kerala resulting in an increase in the demand of households for constructing new houses. This study reported that a major share of Gulf remittances (say 36%) was spent on constructing new better quality dwellings, renovation and repair of old houses, buildings and boundary walls, improving land and so on which have increased the demand for labour in the construction sector to a certain extent. Prakash concluded that Gulf boom has created a housing construction boom in Kerala as the lion share of these remittances were spent in the construction sector.

Ioannides and Zabel (2003) found evidence of both endogenous and contextual neighbourhood effects in housing consumption. This study defines endogenous effect as the effect of housing demand of one's neighbours on individual demand on the average. This concept is consistent with the concept of 'keeping up with the Joneses' and this can explain why households resort to take decisions on repair, addition and renovation, maintenance etc. of their dwelling units which actually means that a household's decision to improve their housing consumption is highly influenced by their neighbours decision on these matters. Ioannides and Zabel defines contextual effects as the influence of characteristics of neighbours on the individual demand for housing and can be regarded as a 'pure preference effect'. They concluded that both these effects have a central place in the model of housing

demand and which of these dominates is unpredictable; when one is strong, the other is weak (Ioannides & Zabel, 2003).

Different studies focussed on different variables that affect housing consumption from time to time. Family structure, type of family (nuclear, joint, extended etc.), income, socio economic political factors, marital status, age, migration, ownership of capital, life cycle factors, education and access to information, changes in level of development, improvement in dwellings, tenurial status, neighbourhood factors etc. were identified as the determinants of housing consumption from the literature survey. From the survey of literature, the present study attempted to include almost all the variables identified from the available literature as determinants of housing consumption as far as possible and the detailed discussion of the same being presented in the fifth chapter of this study.

2.3.3 Housing Adequacy: Definition and Measurement:

This section presents varying perceptions of researchers on housing adequacy from time to time. Housing adequacy is closely related to housing consumption and it considers both the quantity and quality of housing ranging from physical condition of the dwelling unit to housing investment and tenurial status. In its simple form, the term housing adequacy refers to quality of the housing unit along with its access to services and location. Adequate housing is an important determinant of human well-being and other core development outcomes, such as educational achievements (Aizawa, Helble, & Lee, 2020). As housing adequacy is a multi-dimensional concept, we must consider multiple housing characteristics (Chandrasekhar & Montgomery, What determines rents?, 2010). The socio-psychological needs of the individual which are often sought from a dwelling unit including some attributes such as 'personal satisfaction, feelings of self-worth, family-living interactions and provisions for socialization and privacy' can be measured by the concept of housing adequacy (Weber, Mccray, & Ha, 1993).

Chandhoke (1977) stated that housing is the provision of houses and not shelter. As family life is lived, develops and strengthens in the house every household must be provided with adequate housing facilities. Morton, Allen, and Li, (2004) stated that Housing adequacy is an important aspect of housing quality which is conceptually different from affordability and availability and social relations exert a significant influence on small rural communities. They developed an index of housing adequacy using indicators such as size of the dwelling unit, external physical conditions of dwelling, size of the yard and the adequacy of amenities

within the dwelling. For measuring overcrowding, the study used the size of the dwelling unit (Morton, Allen, & Li, 2004). Bhattacharya et.al (1987) analysed changes in level of living in rural West Bengal by analysing housing conditions using variables like number of rooms, area of rooms and type of structure. The study found that there occurred deterioration in the level of living of rural households over time with regard to availability of living space per household.

Kutty (1999) pointed out that the structural adequacy of housing being a characteristic of the physical structure of a dwelling can be regarded as an important indicator of housing quality and home values in a region and has a direct impact on the level of housing services a household can obtain from its housing stock. Kutty documented that the level of housing services (H) is highly influenced by the level of structural units (S), quality units (Q) and the neighbourhood characteristics(N) and can be expressed as $H = f(S, Q, N)$ (Kutty, 1999).

Sendi (2013), focussed on the quality of living in terms of adequate residential space standards in Slovenia's current housing stock. This study highlighted the need for making improvements in "residential space standard" which covers a broad spectrum of components indicating quality of residential units and is measured in terms of characteristics of housing structure, hygienic and sanitary conditions, location and housing environment along with space requirements and dwelling furnishings. Sendi concluded that residential space standard determines the quality of living space (Sendi, 2013)

Chandrasekhar and Montgomery (2010) discusses the difficulties in translating an assessment of the adequacy of housing into a monetary amount that can be incorporated into the poverty line. This study highlighted that individual and family welfare depend to a great extent on housing needs of the family which include security of tenure, structural quality of the dwelling unit, accessibility and sufficiency of drinking water, sanitation and drainage arrangements, risks associated to location of the dwelling-both social and environmental, and the access to employment.

Khan et.al. (2013) analysed inter district variations in housing status and housing conditions in Madhya Pradesh using Z-scores of variables like dwelling rooms, sanitation, source of drinking water, lighting, cooking fuel, and other household amenities and formed a composite score by taking the sum of all z-scores for all the districts and grouped these scores as very high, high, medium and low. Nayar (1997) analysed the housing conditions in terms of type of house, source of drinking water, distance from the source of drinking water,

availability of sanitary facilities and the type of lighting to analyse the impact of housing conditions on health status. The study implies that adequate housing do have an impact on health conditions of the households. Kumar (2014) estimated rural housing shortage in India by analysing housing adequacy using variables like type of house, predominant material of walls and roof, number of rooms, condition of structure, overcrowding in the dwelling and so on. Shamsheer Singh et.al (2013) attempted to examine the methodology used by the 'working group on rural housing for twelfth five year plan' to estimate the shortage of housing in rural India. Earlier, housing shortages were estimated by this work group by analysing the materials used for constructing wall and roof of the dwelling units. Based on this methodology the working group's estimate of housing shortage in rural India was about 43 million houses. Instead, Shamsheer Singh and his team used housing adequacy variables such as pucca roofs, walls and floors, two rooms, source of water, electricity, a functioning latrine etc., in the criteria and estimated the housing shortage in rural India as 140 million housing units.

Prajapati et.al (2017) focused on housing adequacy while studying the rural household condition regarding social, demographic, and housing conditions of rural Gujarat. The study found that almost 93.8% of population residing in their own houses and 66.2% have pucca houses. 54.4% houses have separate kitchen. The study concluded that compared to urban areas, rural areas suffer more from the concentration of deprivation (Prajapati, Banker, & Chauhan, 2017).

Filali (2012) pointed out that the notion of housing adequacy is usually used to express dwelling quality, both at the individual and national level. Housing adequacy is analysed by comparing the level of consumption of housings services with a 'satisfactory minimum standard'. This study highlighted that individual characteristics of dwelling will not provide a true picture of housing adequacy with respect to some household groups which demands aggregation. Based on dwelling characteristics and size of the household, Filali developed a single measure for assessing housing adequacy.

Shivana and Kadam(2018) in their study highlighted the severity or the problem of rural housing inadequacy in India. The study found that rural houses do not have separate arrangements for keeping animals. Rural houses involve high recurring costs which the poor residents cannot afford and are incapable of providing protection against natural calamities

like flood, cyclones etc. These houses also lack requirements for hygiene, sanitation, drinking water, light and fresh air etc.

From the discussion above, it is clear that housing adequacy is a multi-dimensional concept which examines a wide array of housing characteristics. Most of the studies like Kutty (1999); Bhattacharya et.al (1987) & Filali, (2012) focuses on physical or structural adequacy that examines quality of housing stock or its physical attributes. Some other studies such as Nayar, (1997); Shivana and Kadam(2018); Prajapati et.al (2017); Khan et. al. (2013) etc. considered housing conditions which include type of house, source of drinking water, distance from the source of drinking water, availability of sanitary facilities and the type of lighting etc., to describe housing adequacy. Authors like Kumar (2014); Shamsheer Singh et.al (2013) etc. examined housing adequacy to determine the shortage of houses in rural India by analysing both physical adequacy and housing conditions. There are some studies like Chandrasekhar & Montgomery (2010); Sendi (2013) etc. which included ownership of housing, including security of tenure, the physical conditions of the dwelling, whether the household has access to adequate drinking water, sanitation and drainage, the social and environmental risks presented by any given location and the access to employment it provides hygienic and sanitary aspects; locational, environmental and spatial characteristics; and housing furnishings etc. to study housing adequacy. However, the present study analyses housing adequacy in rural India by considering all the relevant criterion which include structural adequacy, living facilities and the micro environment of the dwelling and the related variables identified from current literature and a detailed discussion of the topic being presented in the sixth chapter of the study.

2.3.4 Determinants of Housing Adequacy:

Morton, Allen, and Li(2004) reported that perceptions of household on 'civic structure' can explain the variations in income, age, tenure and housing adequacy of the household to a great extent. That means the quality of housing in rural areas depends significantly on social and political environment. Aizawa, Helble, and Lee(2020) observed that housing adequacy is greatly influenced by economic status of the household and economic inequality leads to inequality in housing. For proving this, these authors performed a regression analysis to establish the relationship between economic capacity (measured by wealth of the household) and their housing adequacy with special focus on the role played by the spatial attributes such as size of population, economic inequality, and affordability of housing.

Kutty (1999) employed a logit model to determine the factors that influence the structural adequacy of dwellings using data from the American Housing Survey of Metropolitan Areas for seven areas. The study reveals that engineering and economic factors which include age of the dwelling unit, type of house, tenure, income of the residents, ownership of vehicle etc. do influence structural adequacy of dwellings. Kutty highlighted that age of the dwelling unit emerged as an important factor determining quality of the housing unit. The author also added that location of dwelling, quality of neighbourhood, and room density also affects structural quality to a certain extent.

Mundra and Sharma (2015) using data from the 2009 American Housing Survey and a logit model, found that there is a significant housing adequacy difference for blacks and Hispanics when compared to the whites in the U.S. The study found that the probability to have an adequate home is lower for the blacks and the Hispanics than that of the whites and more specifically, comparing to whites, the blacks have 31% and the Hispanics have 19% lower probability to have an adequate housing unit. Gender wise comparison reveals that the female headed households have 1.12 times greater probability to live in an adequate housing unit than that of their male counterparts (Mundra & Sharma, 2015).

Pal et.al (2015) argued that housing and basic amenities is unequally distributed and poor remain deprived of adequate housing facilities. They pointed out that housing conditions in India-both rural and urban- are determined to a great extent by the socio-economic background of the households. These authors also noticed that socially deprived classes (SC/ST) tend to have less likelihood of living in a quality house along with provision of basic facilities to ensure a better quality of life (Pal , Aneja, & Dhruv, 2015).

Das and Mistri (2013) analysed household quality of living in terms of three broad aspects-housing conditions, amenities and assets based on 2011 census data. The study found that there exist regional variations in housing and household quality of living. All the southern states and four northern states (Punjab, Himachal Pradesh, Haryana and Uttarakhand) were performing well and Eastern and north eastern states are lagging behind regarding housing and household quality of living. However, what is considered 'acceptable' or 'adequate' housing varies over time, across countries and along the changing general ideas of housing and housing quality (Mandic & Cirman, 2012).

Weber et.al. (1993) attempted to define a criteria for assessing physical environmental and socio-economic dimensions of adequate housing among rural households. The study

distinguishes between 'ideal home' and 'present home'. 'Ideal home' is defined by these authors as the totality of all characteristics, special requirements, and the desired level of amenities in the housing environment whereas the 'present home' depicts the combination of these features peculiar to the housing environment that the household live in. Using a 'congruence score', they checked the fit between ideal and actual housing situations and a 'quality score' was estimated by taking the difference between expected and actual level of housing conditions. Finally, this quality score was employed by them to evaluate socio-economic, cultural, life style, aesthetic, policy, technical, and structural components of housing condition which determines the housing satisfaction of rural households.

Even though the studies pertaining to housing adequacy and its determinants are few in number, they are helpful in identifying the variables that do affect housing adequacy at the household level. Different studies focus on different dimensions of housing adequacy and are confined to a specific set of factors that influence level of housing adequacy. For e.g. Weber et.al. (1993) focused on economic, socio-cultural, life-style, aesthetic, policy- technical and structural to examine housing adequacy. Authors like Morton, Allen, and Li (2004), Kutty (1999) examine civic structure, engineering and economic factors, such as age of the building, unit type, tenure, income of occupants, and vehicle ownership by occupants, location, neighbourhood quality, and room density etc. to explain variations in housing adequacy while Mundra and Sharma (2015) focused on racial differences in housing adequacy. The present study analyses variations in housing adequacy based on social, economic, regional, religious, and occupational background of rural households and is discussed in sixth chapter of the study.

2.3.5 Housing Quality: Definition, Measurement and Determinants:

Housing adequacy is actually related to housing quality. Housing adequacy depends on the quality of housing to a certain extent. Housing quality assessment provides necessary information on the current state of the housing stock, important information as an input for future projects, and insight into the current wishes and needs of its users (Brkanic, 2017). While examining the impact of housing boom on the housing related sectors of the State's economy and society, Gopikuttan (1990) reported that in Kerala, the quality of housing in terms of construction materials, amenities and space has been improved, resulting in an increase in the proportion of houses constructed with basically durable materials for structure. Most of the empirical studies concerning housing quality have employed a number of variables and developed so many indices for measuring quality of the dwelling unit.

Netherlands-Central-Bureau-of-Statistics (1994) pointed out that there exist quality differences among dwellings of owner occupied sector and rented sector where a greater proportion of detached and large houses with required amenities are found in owner occupied sector comparing to that of rented sector.

Fiadzo, Houston, & Godwin(2001) proposed a Housing Quality Index (HQI) comprised of structural quality and physical amenities, together with accessibility of location. The indicators used by them comprises of structural quality indicators measured by materials used for the construction of wall and roof; basic amenities which include fuel used for lighting and cooking, availability of drinking water, sanitation facilities etc.; and access to basic amenities represented by variables such as location of drinking water, proximity to markets, hospital, school, and transportation facilities (Fiadzo, Houston, & Godwin, 2001).

Son, Won, & Moon (2003) analysed the housing condition in Korea. By analysing the variables such as size of the house, floor area per person and per household, availability of rooms with basic facilities, sanitation facilities etc. They concluded that Korean housing condition have been improved quantitatively as well as qualitatively.

Keall, Baker, Howden, Cunningham, and Ormandy (2010)considered adequate structural soundness, water supply, sanitary areas and waste disposal, food preparation areas, safety from falls and injuries, warmth and dryness inside the house, protection from excess heat, sustainability in water use and waste disposal, adequate lighting and sunlight etc. for developing a housing quality-assessment tool.

Kurian and Thampuran (2011) analysed housing quality indicators using ANOVA technique. This study employed 47 factors on the basis of seven indicators which include concept, location, design and aesthetics of the dwelling unit, building materials and techniques of construction, infrastructural facilities, and sustainability component which were rated on a five point scale ranging from 'not important' to 'extremely important'. The results of the study indicates that the first factor in the order of importance as rated by the respondents is building materials and construction techniques followed by sustainability concept, aesthetics, concept, infrastructure, design and location (Kurian & Thamburan, 2011).

Osei-Wusu Adjei and Kyei(2013) analysed the housing conditions in rural Ghana using 'Cashpor Housing Index'. This index was used to rank the quality of housing in terms of its structural durability, and the quality of materials used for constructing wall and roof of the unit. Accordingly, the index ranked a dilapidated dwelling unit with walls made up of poor

quality materials as '0', those structural durability and roofing and wall materials having average quality as '2' and those with good conditions of structure with wall and roofing as '6' based on the standard values derived from this method (Osei-Wusu Adjei & Kyei, 2013).

Brkanic (2017) perceived housing quality as a broad term that encompasses many aspects and has both an objective and a subjective dimension. The author stated that type of dwelling, number of rooms, facilities in the dwelling, condition of the housing unit, form the objective dimension, while characteristics of users of the dwelling form the subjective dimension leading to needs, desires and expectations of the households. The study defines four groups of criteria used to assess housing quality which include apartment unit, apartment building, apartment neighbourhood, and socio-economic conditions of housing. Brkanic concluded that the commonly accepted criteria for assessing housing quality was apartment unit while the one with least importance was socio-economic conditions of housing.

Ren and Folmer (2017) focuses on housing quality which is a crucial determinant of subjective well-being. Considering housing quality as a latent variable, which can be measured using variables such as size of the dwelling unit, number of bedrooms, building materials used, water availability, toilet and kitchen facilities; and age of head of household, household income, communist party membership, social network, and construction material costs, human capital, region etc. as explanatory variables, Ren and Folmer constructed a structural equation model of housing quality and its determinants.

Rangacharayulu (1994) developed a housing index for the poorer sections of rural areas of different states in India by assessing the influence of income on housing status. He constructed housing indexes for 16 major states in India. Housing index is a numerical value ranging between a low of 1 point and a high of 9 points reflecting the housing status of a given group of households based on both the type of structure and the type of dwelling. The study noticed considerable differences in the housing indexes across the states.

Filali (2012) perceived housing quality as multidimensional as housing is highly heterogeneous and spatially fixed. Housing heterogeneity stems from structural and locational characteristics of the housing unit. Filali defined housing structure as the tangible attributes of housing, while location of housing integrates local amenities and neighbourhood externalities. This study concluded that the interaction of housing structure with other housing quality components generates housing utilities for the satisfaction of households' needs.

Jansen(2013) focused on residents' perceptions of residential quality concerning 23 different dwelling aspects hypothesised that residents who live according to their preferences give higher appreciation scores than residents who do not and this is applicable to low quality housing also. The study concluded that housing seems to be satisfactory as the gap between the desired and actual levels of housing is negligible which means that households have realistic aspirations regarding housing quality and are appreciating what they actually have irrespective of what actually they prefer.

Kannan et.al (2014) analysed the housing conditions in rural areas. They classified the condition of structure of a house based on quality as good which do not require immediate repairs, liveable which require immediate repairs but no major repair and dilapidated which require immediate major repairs. On the basis of the constructional characteristics of a house the study categorized the structure of a house into pucca, semi pucca and Katcha. The study found that 37.6% of households lived in houses with single living room in rural areas and also 24.7% lived in houses with Cement/RBC/RCC roofs.

Streimikiene and Romeris (2014) assessed the quality of life in Lithuania and other EU Member States in terms of housing quality which can be measured by housing indicators like quality of housing, quality of housing environment and housing cost burden indicators. They have measured housing quality using overcrowding rate, housing deprivation rate by number of items, and share of total population considering their dwelling as too dark. Housing environment being assessed by them considering indicators like occurrence of crime, violence or vandalism in the location of dwelling, disturbances in the form of noise from neighbours or from the street, pollution and other environmental issues. Housing expenditure burden is assessed by them using variables such as overburden of cost of housing, inability in paying utility bills, keeping warmth in home etc.

Emrath and Taylor (2012) investigates the issue of housing quality in a hedonic regression framework that estimates the effect of various housing characteristics and different definitions of inadequacy on the value of owner-occupied and cost (rent) of renter-occupied housing units based on data from the 2009 national AHS. The study used hedonic models for defining a new indicator to measure physical inadequacy of housing units which negatively affects housing value in the case of owner occupied sector and housing rent in the case of rented sector. The study noticed that neighbourhood characteristics have economically and

statistically significant impact on housing values in the owner occupied sector and the solutions for addressing these issues may be educational from a policy perspective.

Maimon Ali et.al (2018) focused on the effect of changes in lifestyles and standard of living on housing quality in Malaysia. This study defined housing quality in terms of internal, external and other attributes of the housing unit. The variables such as structural durability, size of the dwelling, physical quality, internal layout, adequate space, satisfaction from the dwelling unit, degree of sharing structure, ventilation of the dwelling unit etc. were used for measuring internal attributes; while, factors like location of the dwelling, its external outlook, environmental sustainability, neighbourhood quality, fresh air, disturbance due to noise, road facilities drainage arrangements, access to public facilities etc. were used for measuring external attributes by this study. Other attributes especially social attributes were measured using variables such as safety, security and privacy from the dwelling, general feeling on the location, exposure to crime, status, identity and lifestyle etc. and the study concluded that the totality of all these attributes portrays the overall quality of housing on a broader perspective (Ali, Rahman, & Ghani, 2018).

Chandrasekhar and Montgomery (2010) focussed on what determines rent using NSS 58th round housing survey. They considered variables such as year first rented, condition of dwelling, age of dwelling, and total area of rooms as the basic determinants of rent levels. They also analysed rent levels by settlement type and experience of flood in last five years. The study also included health related characteristics like access to drinking water, type of toilet, drainage, quality of ventilation etc. in assessing housing quality. Hedonic regressions were employed to assign values to the housing features where they considered only the characteristics of dwelling and its neighbourhood. They also estimated rent equivalents for home owners.

Bradley and Putnik(2012) examined home environment conditions which include housing quality, material resources, formal and informal learning materials and their relations with the Human Development Index (HDI) in 28 developing countries. They used variables such as drinking water, toilet facilities, household flooring, cooking, and refrigeration for measuring quality of housing. Higher scores on these five items signifies a healthier and safer home environment for children under 5. An index of quality of housing were generated by standardising and averaging these five items. The results of this study indicate that housing quality is greatly influenced by Gross Domestic Product (GDP) comparing to the effect of life

expectancy and educational status. Bradley and Putnik concluded that home environment quality is strongly related to health and competence of the children and their adaptive functioning.

Subhan & Ahmad, (2017) analysed the quality of housing among different households in urban areas, rural areas and in overall Pakistan based on micro-level household data of 2004-05 using Ordinary Least Square method. They used household characteristics as determinants of housing consumption decision. They employed six categories of independent variables which include marital status of the head, educational status, economic status, occupational status of the head, and location of the residence for assessing housing quality. For home owners, market rent of the house was taken as a measure of housing quality while for the renters, the actual rent paid on monthly basis was taken as a measure of housing quality by these authors. The study noticed that household size, age of the head, etc. exerts a positive influence on housing quality while marital status play a marginal role and occupation has an average role in determining housing quality.

Meng and Hall(2006) assessed housing quality in metropolitan Lima, Peru by developing a housing quality index using a multi-criteria analysis (MCA) of selected indicators. They defined housing quality as the level of acceptability of housing units and the related housing environment which include design and quality of the housing structures, construction material used, spatial requirements, housing utilities, and provision of essential services. The study has defined five classes of housing quality based on the values of HQI using 'quantile classification' that ranges from highly deficient to excellent. They observed that poor economic background of the households in the lower end of the HQI range act as a constraint for them to enter formal housing markets with good quality housing options.

Mukhopadhyay and Rajaraman(2012) examined evidence on rural housing from two recent NSS surveys of housing to understand housing quality transitions across the per capita consumption spectrum which has been divided into 4 quartiles. The study found that the proportion of katcha wall katcha roof combination is showing a declining trend across quartiles. They added that there is a high probability for katcha walls to have a non katcha roof even in the lowest quartile of percapita consumption expenditure; but their share is declining across quartiles. This study also highlighted that the share of pucca walls in lowest quartile seems puzzling. They concluded that variations in housing quality across quartiles is much lower than the variations in percapita consumption levels.

Gopikuttan (2006) while discussing the recent developments in the housing sector in Kerala remarked that there exist inequality between houses of the upper strata which were elegant and stylish and those of the lower strata which were shabby and deplorable. The study observed that households belong to lower castes used katcha materials for constructing their homes which leads to deterioration in the size and quality of the dwelling units as we move down to the caste scale. Since mid-1970s, there occurred an increasing trend in the growth of housing stock in terms of quantity and quality which lead to the application of modern building technology using high quality building materials irrespective of customs and traditions.

We have sufficient literature on housing quality on various dimensions using variety of tools and techniques. The literature survey on housing quality is essential to study housing adequacy as both are related. The quality of housing build the structural adequacy part of housing adequacy. Various studies employed variables like construction materials, physical amenities and space requirements, housing environment, structural quality indicators both in quantity and quality to assess housing quality which is being a component of housing adequacy. The present study considered housing quality variables too in the discussion of housing adequacy.

Chapter 3
AN OVERVIEW OF HOUSING CONDITIONS IN RURAL
INDIA

Chapter 3

AN OVERVIEW OF HOUSING CONDITIONS IN RURAL INDIA

3.1 Introduction:

Housing plays an important role in socio-economic development of country by creating an urge to improve living conditions. Housing is the provision of houses not shelters and cannot be considered as a mere 'roof over head' just for protecting human beings from crochets of nature. The term housing has new dimensions which have been acquired through efficiency and utility. The development of housing sector quantifies among other things, the standard of living of the people and the economic development of the region, which goes much beyond the building of four walls. (GoK, 2017). If family life is to be maintained with strength, every household should be provided with adequate housing facilities (Chandhoke, 1977). Adequate housing is regarded as a basic human right and an important determinant of environmental health (Early, Davis, & Arcury, 2006). Housing conditions reflect the most complex aggregate of all factors determining life conditions, because it closely intertwines economic opportunities and social priorities, personal well-being and budgetary limitations, individual preferences and government strategies, and private and public interests (Aizinova, 2007).

Housing environment condition encompasses the provision of basic amenities such as type and condition of house, sanitation facilities, availability of drinking water, fuel used for cooking etc. Sustainable Development Goal 6 pledges to guarantee the availability and accessibility of improved water, sanitation, and hygiene for all households (Brahmanandam, Nagarajan, & Goli, 2021). Hence, a housing unit should provide the essential requirements to its inhabitants for satisfying their physical as well as metaphysical needs. Also, a housing unit should ensure a conducive housing environment favourable for achieving physical and mental wellness along with its primary function of protection from vagaries of nature. Housing, which reflects the identity and social status of its owner, provides the basic foundation for employment, earning and satisfaction. Economic, social, cultural, political and environmental factors make the housing problem complex and multi- dimensional (GoK, 2017). This chapter provides an overview of housing conditions in rural India based on census data on house-listing and household amenities (Census 2001 & 2011) and NSSO unit level

data of various rounds from 2002 to 2018 and a brief overview of rural housing programmes implemented for providing quality housing environments to the rural households.

3.2 Housing Conditions in Rural India:

This section describes the housing conditions in rural India based on the indicators such as predominant material of roof, wall and floor, type of structure of the dwelling unit, condition of structure, source and availability of drinking water, electricity, source of lighting bathroom and sanitation facilities, waste management arrangements, drainage connectivity, approach road facility etc.

3.2.1 Predominant Material of Roof:

Census 2011 is the latest census regarding house listing and household amenities in India. Predominant material used for roof is an important determinant of structural durability of the dwelling unit. Census considers different types of building materials used for roofing as presented in table 3.1. The table reveals that according 2011 census figures, 20% of the rural households uses Grass/thatch/bamboo/wood/mud etc. for roofing; 18.3% of them have concrete roof for their dwellings; another 18.3% have hand-made tiles; 15.9% have GI/metal/asbestos sheets as the roof material, 10.4% use machine made tiles for roofing; 7.2% uses burnt brick as the roof material for their dwellings, and 8.9% use stone/slate as roof material. Also 0.6% of the households use plastic/polythene as the roof material for their houses. And the remaining 0.4% uses materials other than those mentioned earlier for their roofing.

Table 3.1 Distribution of Rural Households by Predominant Material of Roof:

SL	Roof material	Absolute number of households	Percentage
1	Grass/thatch/bamboo/wood/mud etc.	33484330	20.0
2	Plastic/polythene	1054830	0.6
3	Hand-made tiles	30778543	18.3
4	Machine-made tiles	17441452	10.4
5	Burnt brick	12111943	7.2
6	Stone/slate	14860863	8.9
7	GI/metal/asbestos sheets	26733862	15.9
8	Concrete	30746938	18.3
9	Any other material	613969	0.4
	Total number of rural households	167826730	100

Source: Census 2011

Table 3.2 examines the distribution of rural households by predominant material of roof in percentage with respect to 2001 and 2011 census figures. It can be noticed from table 3.2 that there occurred an increase in proportion of households with concrete roof from 11.0% in 2001 to 18.3% in 2011. Also, there recorded an increase in proportion of households with GI/metal/asbestos sheets as roofing material from 9.8% to 15.9%; the percentage of households with a roof of stone/slate from 7.3% to 8.9%; and those with a roof of burnt brick from 5.6% to 7.2% during the same period showing an improvement in the type of roof of rural dwellings. Other low quality roofing materials such as Grass/thatch/bamboo/wood/mud etc. and tiles showed a decline during the same period (see table 3.2).

Table 3.2 Distribution of Rural Households by Predominant Material of Roof (in percentage):

SL	Roof material	2001 Census	2011 census
1	Grass/thatch/bamboo/wood/mud etc.	27.7	20.0
2	Plastic/polythene	0.4	0.6
3	Tiles (Hand-made & machine made)	37.6	28.7
4	Burnt brick	5.6	7.2
5	Stone/slate	7.3	8.9
6	GI/metal/asbestos sheets	9.8	15.9
7	Concrete	11.0	18.3
8	Any other material	0.6	0.4
	Total number of rural households	100	100

Source: census 2001 and 2011

NSSO uses a slightly different classification for roof materials which can be broadly categorized as katcha materials and pucca materials. Katcha materials include grass/ straw/ leaves/ reeds/ bamboo etc., mud/unburnt brick, canvas/cloth, and other katcha whereas pucca materials include tiles/slate, burnt brick/stone/lime stone, iron/zinc/ other metal, cement/ RBC/ RCC and other pucca materials. Table 3.3 presents the details of rural households in India regarding the roofing materials from 2002 to 2018 with respect to the NSSO rounds data on housing during this period. It can be observed from the table that proportion of households with katcha roofing materials decreased from 2002 to 2018. The proportion of households with pucca roofing materials such as iron, zinc, other metal and cement/ RBC / RCC recorded an increase during the same period. The proportion households with roof their dwelling made up of tiles / slate, burnt brick / stone / lime stone and other pucca materials

showed a decline during the same period. The NSSO results shows more or less the same implications that we got from comparing census figures of 2001 and 2011 pertaining to roofing material. Hence it can be concluded that the type of roof of rural dwellings has been improved over time.

Table 3.3 Type of Roof of the Dwelling:

SL	Roof type	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	grass/ straw/ leaves/ reeds/ bamboo etc.	20.1	16.6	10.3	6.0
2	mud / unburnt brick	3.5	3.1	1.5	1.6
3	canvas / cloth	.2	.2	.2	.2
4	other katcha	1.8	1.6	.7	.5
5	tiles / slate	31.1	25.3	25.7	14.4
6	burnt brick / stone / lime stone	13.2	13.1	10.2	11.4
7	iron / zinc /other metal	10.4	13.9	17.8	21.9
8	cement / RBC / RCC	17.7	24.7	32.5	43.3
9	other pucca	2.0	1.5	1.1	.7
	Total	100.0	100.0	100.0	100.0

Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

3.2.2 Predominant Material of Wall:

Table 3.4 presents details regarding the predominant material of wall of the dwelling of rural households in India based on 2011 census figures. According to the census data 2011, majority of the households (40%) have burnt brick as the predominant material used for the construction of wall followed by mud/unburnt brick (30.5%). Still, 11.9% of the rural households used Grass/thatch/bamboo etc. for building wall. Stone packed with mortar being used by 10%. Another 3.6% used stone not packed with mortar for their wall construction.

Table 3.4 Distribution of Rural Households by Predominant Material of Wall:

SL	Wall material	Absolute number of rural households	Percentage
1	Grass/thatch/bamboo etc.	19967301	11.9
2	Plastic/polythene	558284	0.3
3	Mud/unburnt brick	51124075	30.5
4	Wood	1264619	0.8
5	Stone not packed with mortar	6105826	3.6
6	Stone packed with mortar	16862186	10.1
7	GI/metal/asbestos sheets	766882	0.5
8	Burnt brick	67205643	40.0
9	Concrete	2898697	1.7
10	Any other material	1073217	0.6
	Total number of rural households	167826730	100

Source: Census 2011

Table 3.5 Distribution of Rural households by Predominant Material of Wall (in percentage):

SL	Wall material	2001 census	2011 census
1	Grass/thatch/bamboo etc.	12.7	11.9
2	Plastic/polythene	0.3	0.3
3	Mud/unburnt brick	39.7	30.5
4	Wood	0.9	0.8
5	Stone not packed with mortar	10.5	3.6
6	Stone packed with mortar	-	10.1
7	GI/metal/asbestos sheets	0.4	0.5
8	Burnt brick	34.2	40.0
9	Concrete	1.2	1.7
10	Any other material	0.2	0.6
	Total	100	100

Source: census 2001 and 2011

Table 3.5 compares the census figures of 2001 and 2011 regarding the distribution of rural households based on the predominant material used for construction of walls of their houses. It can be observed from the table that the proportion of households using burnt brick which is a good quality wall material has increased from 34.2% in 2001 to 40.0% in 2011. Also there recorded a decline in those using grass/thatch/bamboo and mud/unburnt brick as their wall material.

Table 3.6 Type of Wall:

SL	Wall type	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	grass/straw/leaves/reeds/bamboo etc.	9.8	8.2	6.6	3.8
2	mud(with/without bamboo)/unburnt brick	36.3	30.7	23.9	15.9
3	canvas/cloth	.1	.1	.1	.1
4	other katcha	1.1	1.0	.5	1.1
5	timber	.4	.4	.3	.5
6	burnt brick/stone/lime stone	47.4	53.3	63.8	63.8
7	iron or other metal sheet	.2	.3	.5	1.3
8	cement/RBC/RCC	4.5	5.7	4.1	13.3
9	other pucca	.2	.3	.2	.2
	Total	100.0	100.0	100.0	100.0

Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

Table 3.6 portrays NSSO figures regarding the type of wall of the rural households in India. Here also we have a broad categorization of wall materials as in the case of roof materials as katcha and pucca. Katcha materials include grass, straw, leaves, reeds or bamboo, mud or unburnt brick, canvas or cloth, and other katcha materials. From table 3.6 it can be observed that the proportion of households with katcha wall materials were higher during earlier period; later showed a decreasing trend. The proportion of households with burnt brick/stone/lime stone as the wall material stood first in all the time and showed an increasing trend over time. One thing that need to be noted here is that a significant percentage of households used mud (with/without bamboo)/unburnt brick for wall construction even though their proportion shows a declining trend. As per the latest round

(76th round in 2018) also about 15.9% of the rural households used this for building their walls.

3.2.3 Predominant Material of Floor:

Floor material of the dwelling is highly important as far as the quality of a dwelling unit is concerned.

Table 3.7 Distribution of Rural Households by Predominant Material of Floor:

SL	Floor material	Absolute number of rural households	Percentage
1	Mud	105127968	62.6
2	Wood/bamboo	1250511	0.7
3	Burnt brick	3777971	2.3
4	Stone	10321350	6.2
5	Cement	40683037	24.2
6	Mosaic or floor tiles	6258076	3.7
7	Other materials	407817	0.2
	Total number of rural households	167826730	100

Source: Census 2011

Table 3.7 presents the distribution of rural households based on the predominant material used for flooring as per census 2011 figures. It can be seen from the table that majority of the rural households (62.6%) have mud as the flooring material. Cement was used for flooring by 24.2% of them. Another 6.25 used stone for their flooring and a 2.3% used burnt brick for the same. Mosaic/floor tiles were used by 3.7% of the rural households.

Table 3.8 guides us in comparing the proportion of rural households on the basis of floor material based on census 2001 with that of census 2011. It can be noticed from the table that the percentage of rural households using low quality flooring materials (mud, wood/bamboo etc.) has been decreased from 2001 to 2011. At the same time, usage of good quality flooring materials (cement, mosaic/floor tiles, stone etc.) has been increased during the same period. That is, the proportion of rural households with cement, mosaic/tiles, stone etc. has been improved during the same period (see table 3.8).

**Table 3.8 Distribution of Rural Households by Predominant Material of Floor
(percentage):**

SL	Floor material	2001 census	2011 census
1	Mud	72.3	62.6
2	Wood/bamboo	0.8	0.7
3	Burnt brick	2	2.3
4	Stone	4.5	6.2
5	Cement	18	24.2
6	Mosaic or floor tiles	2.2	3.7
7	Other materials	0.2	0.2
	Total	100	100

Source: census 2001 and 2011

Table 3.9 provides information on flooring materials of the rural households based on NSSO figures of various rounds conducted from 2002 to 2018. These figures also produces more or less the same results as per census 2011 figures in this regard. Mud as a floor material continues to be the predominant material for flooring even though the proportion of rural households use it goes on decreasing.

Table 3.9 Type of Floor:

SL	Floor type	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	mud	64.1	54.1	49.4	38.9
2	bamboo/log	.4	.5	0.3	.4
3	wood/plank	.4	.5	0.3	.4
4	brick/lime stone/stone	8.1	10.3	10.7	12.6
5	cement	24.0	30.9	32.9	38.9
6	mosaic/tiles	2.8	3.6	6.3	8.6
7	others	.2	.1	0.1	.2
	Total	100.0	100.0	100.0	100.0

Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

As per the latest round of NSSO (i.e. 76th round) 38.9% of the rural households live in mud floored houses. Another 38.9% live in houses with floor made up of cement. Brick/lime

stone/stone were used as flooring material by 12.6% of the households during the same round. It can also be observed from the table that the proportion of households using brick/lime stone/stone cement, and mosaic/tiles shows an increasing trend as per NSSO figures of the four rounds considered in this regard.

3.2.4 Type of Structure of the Dwelling Unit:

As per census 2001, houses can be classified as permanent, semi-permanent, temporary, and others based on the predominant material of wall and roof of the dwelling.

Table 3.10 Distribution of Rural Households by Type of Structure:

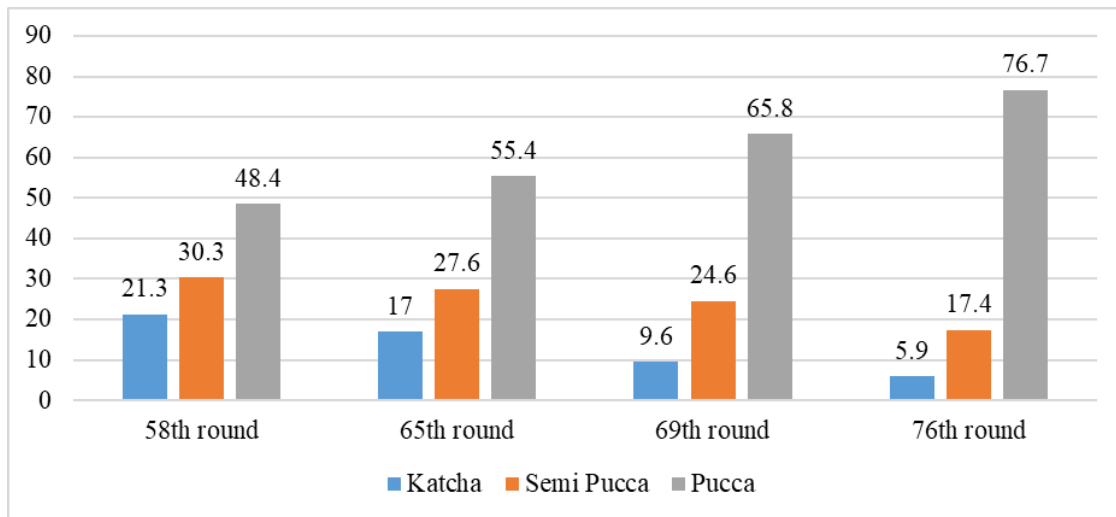
SL	Type of structure	Absolute number of households	percentage
1	Permanent	86232664	51.4
2	Semi-permanent	52817694	31.5
3	Temporary	27132753	16.2
4	Any other	1643619	1.0
	Total	167826730	100

Source: Census 2011

Permanent houses are characterised by both roof and floor made up of permanent material; houses in which either walls or the roof are made of permanent materials or the others made of temporary materials are called semi-permanent houses; and houses in which both walls and the roof are made of materials which have to be replaced frequently are called temporary houses (Census, 2001). When the same methodology is applied in census 2011 figures, we get the figures regarding the distribution of rural households based on type of structure presented in table 3.10. According to census 2011 figures, 51.4% of the households live in permanent houses; 31.5% live in semi-permanent houses; 16.2% live in temporary houses and remaining 1% live in other types of accommodation.

NSSO classifies the structure of dwelling units into Katcha, semi Pucca, and Pucca structures based on the materials used for wall and roof. The katcha structure includes dwelling with both walls and roof made up of katcha materials; pucca includes both walls and roof made up of pucca materials; and semi pucca structures being characterized by either the wall or roof being made up of katcha or pucca materials.

Figure 3.1 Type of Structure

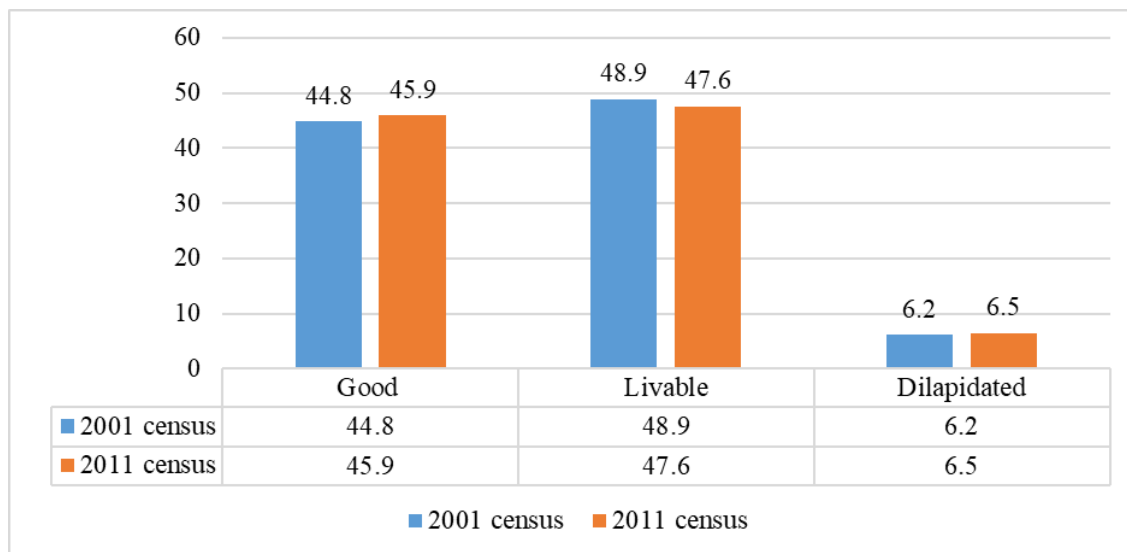


Source: Computed from NSSO unit level data- 58th, 65th, 69th& 76th rounds

The figure 3.1 portrays the composition of housing structure in rural India from 2002 to 2018 by comparing unit level data of four NSSO rounds on housing conditions conducted during this period. It can be noticed from the figure that there occurred an increase in the proportion of rural households with pucca dwelling units throughout the rounds. The proportion of households with katcha and semi-pucca structure showed a declining trend during the same period.

3.2.5 Condition of Rural Houses:

Figure 3.2 Condition of Houses

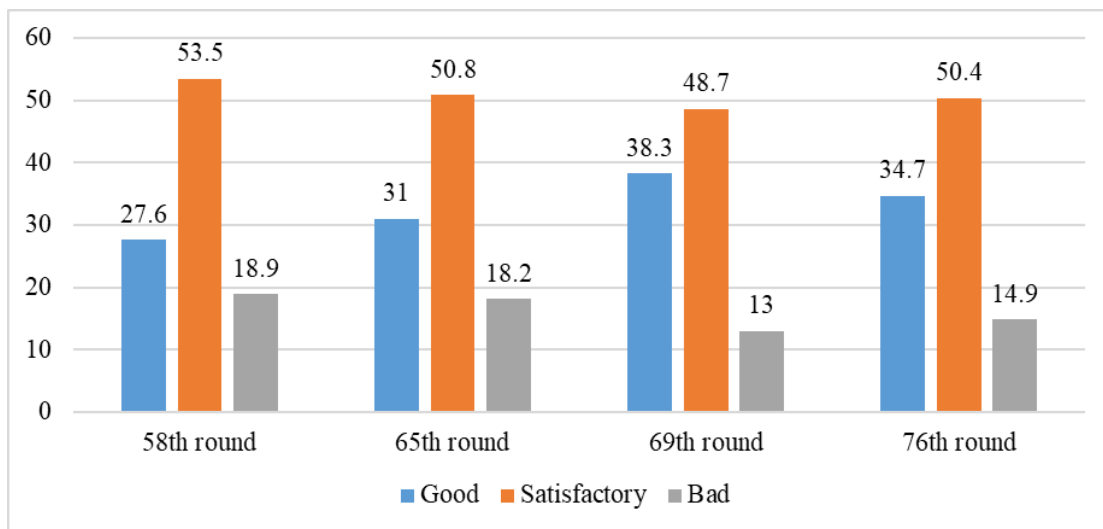


Source: Census 2001&2011

Census data categorizes the condition of houses into three categories based on the quality of structure as good, livable, and dilapidated whereas NSSO categorizes condition of structure as good, satisfactory and bad. The census figures show that there occurred a 1.1 percentage point increase in the proportion of good houses from 2001 to 2011 while there recorded a decrease of livable houses from 48.9% in 2001 to 47.6% in 2011 and an increase of dilapidated houses from 6.2% to 6.5% during the same period (see figure 3.2)

The figure 3.3 portrays the condition of structure of rural houses based on NSSO unit level data on housing from 2002 to 2018. The figure reveals that there occurred an increase in the proportion of rural households with good condition of dwelling structure throughout the four rounds analysed except during 76th round where the proportion of good houses showed a decline from 38.3% during 69th round to 34.7% during 76th round. Also those in bad conditions showed an increase during 76th round. The same is true in the case of satisfactory houses too.

Figure 3.3 Condition of Structure



Source: Computed from NSSO unit level data- 58th, 65th, 69th& 76th rounds

3.2.6 Plinth Level, Number of Rooms, and Floor area:

The table 3.11 describes the distribution of plinth level of the dwelling unit, number of living rooms and number of other rooms, and floor area on the average from 58th round to 76th round of NSSO. It can be observed from the table that the plinth level of the dwelling unit is showing an increasing trend across the rounds. Number of living rooms on the average shows an increasing trend except during 69th round where there recorded a decline in the average number of living rooms from 2.01 during 65th round to 1.98 during 69th round on the

average. Number of other rooms also shows an increasing trend. Average floor area of the dwelling unit increased from 411.41 sq. ft. during 58th round to 451.01 sq. ft. during 65th round; then decreased to 430.95 sq. ft. during 69th round; again increased to 501.20 sq. ft. during 76th round.

Table 3.11 Plinth Level, Number of Rooms, and Floor Area of Rural Dwellings:

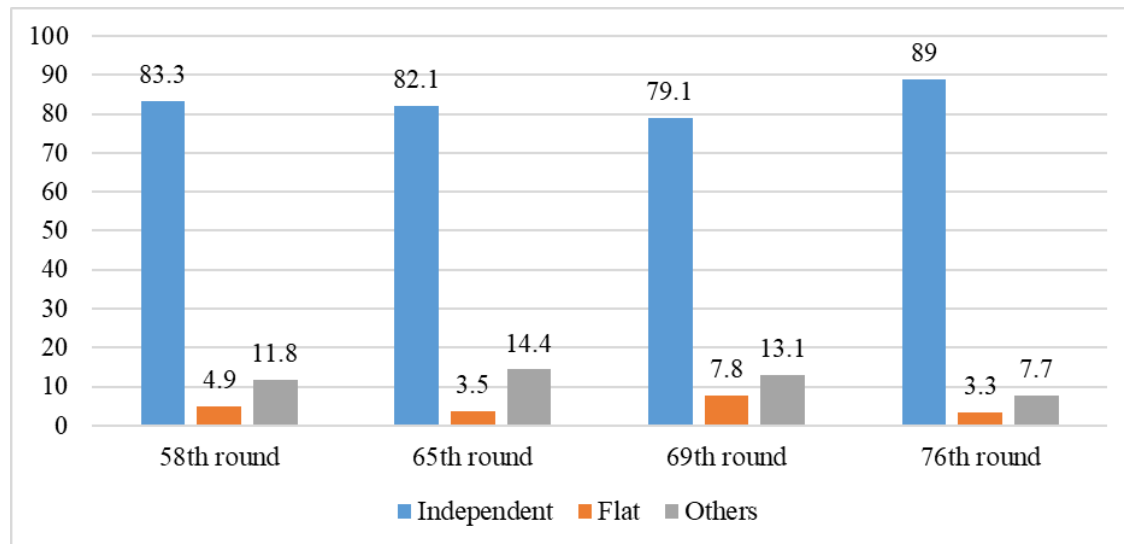
SL	Variable (Mean)	58 th round	65 th round	69 th round	76 th round
1	Plinth Level (in ft.)	1.05	1.08	1.15	1.18
2	Number of Living rooms	1.90	2.01	1.98	2.10
3	Number of Other rooms	1.45	1.10	1.40	1.63
4	Floor area (in sq. ft.)	411.41	451.03	430.95	501.20

Source: Computed from NSSO unit level data- 58th, 65th, 69th& 76th rounds

3.2.7 Type of Dwelling Unit:

NSSO classifies type of dwelling unit as independent, flat and others.

Figure 3.4 Type of Dwelling Unit



Source: Computed from NSSO unit level data- 58th, 65th, 69th& 76th rounds

The figure 3.4 reveals that rural areas are predominated by independent houses rather than flats or other forms of dwelling. NSSO 58th round figures reveals that 83.3% of the rural households live in independent houses; slightly decreased to 82.1% during 65th round; to 79.1 % during 69th round; again increased to 89% during 76th round. According to 76th round figures, 89% of the households live in independent houses while only 3.3% live in flats and the remaining 7.7% live in other types of accommodation in rural India.

3.2.8 Number of Dwelling/Living Rooms:

Number of rooms in the dwelling can be regarded as an indicator of level of congestion in the dwelling unit which is very important in determining the quality of housing. The census 2011 figures on dwelling rooms (see table 3.12) shows that there exist 4.3% of the rural households having no exclusive room in their dwelling. The table also reveals that 39.4% of the families have one dwelling room and 32.2% have two dwelling rooms. Another 12.7% have three dwelling rooms while the proportion of households with four or more dwelling rooms being comparatively low.

Table 3.12 Distribution of Rural Households by Number of Dwelling Rooms:

SL	Number of dwelling rooms	Absolute number of rural households	Percentage
1	No exclusive room	7211590	4.3
2	One room	66155450	39.4
3	Two rooms	53987801	32.2
4	Three rooms	21308634	12.7
5	Four rooms	11071009	6.6
6	Five rooms	3842346	2.3
7	Six rooms and above.	4249900	2.5
	Total number of rural households	167826730	100

Source: Census 2011

Unlike Census, NSSO uses the term living room instead of dwelling room but there exist not much differences between the two terms. According to NSSO, “a room with floor area (carpet area) of at least 4 square metres (i.e., approximately 43 square feet), a height of at least 2 metres (i.e., approximately 6.6 feet) from the floor to the highest point in the ceiling and used for living purposes was considered as a living room. Thus, rooms used as bedroom, sitting room, prayer room, dining room, servant’s room – all were considered as living rooms provided they satisfy the size criterion. Kitchen, bathroom, latrine, store, garage etc., were not considered as living rooms. A room used in common for living purpose and as kitchen or store was also considered as living room” (NSSO, 2019).

Table 3.13 analyses the number of living rooms available to rural households in India from 2002 to 2018 by examining the percentage households falling in each category given in the table. The figures presented in the table 3.13 leads to the same conclusions that we

reached from census figures on dwelling rooms. Here also we can see that majority of the rural households in all the four rounds data have one room or two rooms which is similar to census 2011 results on dwelling rooms (see table 3.12). Table 3.13 also reveals that there is an increasing trend in the number of dwelling rooms available to rural households because the proportion of households with two or more living rooms goes on increasing from 58th round to 76th round.

Table 3.13 Number of Living Rooms:

SL	Number of living rooms	Percentage (58 th round)	Percentage (65 th round)	Percentage (69 th round)	Percentage (76 th round)
1	No living room	0.2	0.3	1.3	0.9
2	One room	45.9	37.8	39.1	31.1
3	Two rooms	33.7	37.4	36.3	40.6
4	Three rooms	11.6	15.1	13.9	17.1
5	Four rooms	5.4	6.3	5.9	7.1
6	Five rooms	1.6	1.7	2.0	2.0
7	Six rooms and above.	1.6	1.4	1.5	1.2
	Total	100	100	100	100

Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

3.2.9 Kitchen Facilities:

Kitchen facilities are an inevitable part of quality of housing as well as quality of living. Census 2011 classifies kitchen facilities broadly into three-cooking inside house, cooking outside house, and no cooking. Table 3.14 presents details in this regard. From the table, it can be observed that 83.3% of the rural households have cooking inside their houses. Also 45.4% have kitchen inside while 37.9% were cooking inside but does not have kitchen. 16.4% of the rural households have cooking outside the house; in this 7.3% have kitchen outside while 9.1% does not have kitchen outside. There are 0.2% having no cooking arrangements.

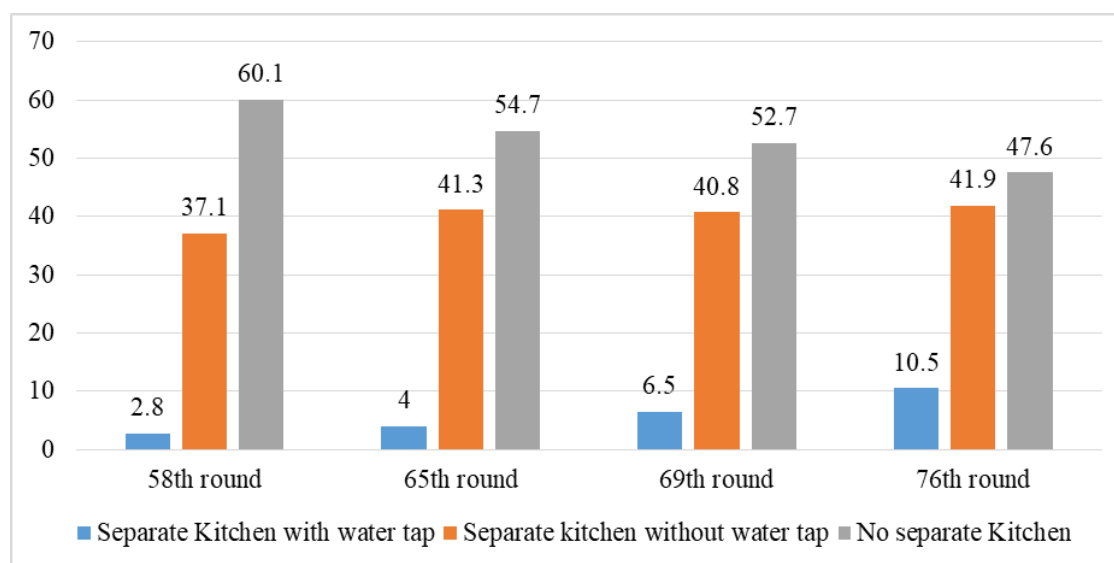
Table 3.14 Distribution of Rural Households by Kitchen Facility:

SL	Kitchen facility	Absolute number of rural households	Percentage
1	Cooking inside house	139853780	83.3
1.1	Has kitchen	76238077	45.4
1.2	Does not have kitchen	63615703	37.9
2	Cooking outside house	27578343	16.4
2.1	Has kitchen	12302453	7.3
2.2	No kitchen	15275890	9.1
3	No cooking	394607	0.2
	Total	167826730	100

Source: Census 2011

NSSO analyses kitchen facilities in a different manner. They classifies kitchen facilities into three categories-separate kitchen with water tap, separate kitchen without water tap and no separate kitchen.

Figure 3.5 Kitchen Facilities



Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

The figure 3.5 portrays facilities of kitchen among rural Indian households as per NSSO figures on kitchen facilities. The figure reveals that during 58th round, 60.1% of the rural households did not have any separate arrangement for cooking. Only 2.8% have separate kitchen with water tap while 37.1% have separate kitchen facilities without water

tap. The situation has improved from there and during 65th round the proportion of households having separate kitchen facilities with water tap increased to 4% and those without water tap increased to 41.2% and the proportion of households having no kitchen arrangements decreased to 54.7%. Again, during 69th round the figures showing kitchen facilities with water tap increased to 6.5% while those without water tap decreased to 40.8% and those without any kitchen arrangements decreased to 52.7%. And, during 76th round, the situation has again improved when there occurred an increase in the percentage of households having separate kitchen with water tap increased to 10.5% and those having kitchen facilities without water tap increased to 41.9%. Still there exist 47.6% of households having no separate arrangement for cooking.

3.2.10 Type of Fuel Used for Cooking:

Type of fuel used for cooking include firewood, crop residue, cow-dung cake, coal, lignite, charcoal, kerosene, LPG/PNG, electricity, biogas, etc. Table 3.15 portrays census 2011 figures on type of fuel used by the households in rural India both in absolute terms and in percentages. It can be noticed from the table that majority of the rural households (62.5%) use firewood for cooking. 12.3% used crop residue as their cooking fuel; 11.4% uses LPG/PNG for cooking and 10.9% uses cow-dung cake as cooking fuel.

Table 3.15 Distribution of Rural households by Fuel Used for Cooking:

SL	Type of Fuel	Absolute number of rural households	Percentage
1	Firewood	104963972	62.5
2	Crop residue	20696938	12.3
3	Cow-dung cake	18252466	10.9
4	Coal, lignite, charcoal	1298968	0.8
5	Kerosene	1229476	0.7
6	LPG/PNG	19137351	11.4
7	Electricity	118030	0.1
8	Biogas	694384	0.4
9	Any other	1040538	0.6
10	No cooking	394607	0.2
	Total number of rural households	167826730	100

Source: Census 2011

Table 3.16 allows comparison of 2001 and 2011 figures regarding the distribution of rural households based on the type of fuel they used for cooking. It can be observed from the table that the proportion of rural households who use firewood as cooking fuel decreased from 64.1% in 2001 to 62.5% in 2011; those using crop residue has fallen from 13.1% to 12.3%; and those using cow-dung cake from 12.8% to 10.9 during the same period. At the same time, there registered an increase in the proportion of rural families using LPG/PNG as their cooking fuel.

Table 3.16 Distribution of Rural Households by Fuel Used for Cooking (in percentages):

SL	Type of Fuel	2001 census	2011 census
1	Firewood	64.1	62.5
2	Crop residue	13.1	12.3
3	Cow-dung cake	12.8	10.9
4	Coal, lignite, charcoal	1.1	0.8
5	Kerosene	1.6	0.7
6	LPG/PNG	5.7	11.4
7	Electricity	0.1	0.1
8	Biogas	0.5	0.4
9	Any other	0.8	0.6
10	No cooking	0.2	0.2
	Total	100	100

Source: Census 2001&2011

Table 3.17 Type of Fuel Used by Households for Cooking:

SL	Type of fuel	Percentage
1	Firewood, chips & crop residue	44.5
2	LPG	48.3
3	Other natural gas	.1
4	Dung cake	5.5
5	Kerosene	.1
6	Coke / coal	.5
7	Gobar gas	.1
8	Biogas	.1
9	Charcoal	.0
10	Electricity	.0
11	No cooking arrangement	.6
12	Others	.2
	Total	100.0

Source: computed from NSSO unit level data 76th round.

Table 3.17 presents NSSO figures on the type of fuel used by rural households in India based on 76th round unit level data. The NSSO figures also says that as of 76th round, the proportion of households using LPG is 48.3% ; and those using firewood, chips and crop residue is 44.5%. Also, those using cow-dung cake is 5.5%.

3.2.11 Drinking Water Facilities:

Drinking water facilities are extremely important in quality of housing as well as quality of life. The principal source of drinking water facilities include tap water, covered /uncovered well, hand pump, tube well/borehole, spring, river/canal, tank, pond etc. according to census 2011 data, 43.6% of the rural households depend on hand pump for drinking water; 30.9% depend on tap water; 1.5% have covered well; 11.8% have uncovered well, and 8.3% depend on tube well/borehole for drinking water (see table 3.18.).

Table 3.18 Distribution of Rural households by Main Source of Drinking Water:

SL	Source of drinking water	Absolute number of rural households	Percentage
1	Tap water from treated source	29969145	17.9
2	Tap water from un-treated source	21736020	13.0
3	Covered well	2591028	1.5
4	Uncovered well	19742630	11.8
5	Hand pump	73245349	43.6
6	Tube well/borehole	13898837	8.3
7	Spring	1184498	0.7
8	River/canal	1412565	0.8
9	Tank/pond/lake	1771796	1.1
10	Other sources	2274862	1.4
	Total number of rural households	167826730	100

Source: Census 2011

Table 3.19 furnishes NSSO figures regarding principal source of drinking water. NSSO includes some more sources of drinking water than those given by census. A close look at the table reveals that majority of the households in rural India depend on tube well/borehole/hand pump for drinking water in all the rounds considered. It can also be noticed that the latest round i.e. 76th round provides for 16 sources of drinking water. The table reveals that the other principal sources of drinking water include bottled water (4.0%), piped water (22.6%),

public tap/stand pipe (10.3%), well (7.3%) etc. a smaller portion of households also use spring (.6%), rain water collection (0.2%) surface water (0.7%) also.

Table 3.19 Source of Drinking Water:

SL	Source of drinking water	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	bottled water	-	.5	1.6	4.0
2	piped water into dwelling	-	-	6.5	11.3
3	piped water to yard/plot	--	-	10.4	10.3
4	piped water from neighbour	-	-	-	1.0
5	public tap/standpipe	27.5	30.1	14.3	10.3
6	tube well/borehole/hand pump	51.3	54.7	52.4	53.8
7	well : protected	17.9	5.5	2.7	2.9
8	well : unprotected		6.3	9.0	4.3
9	tanker-truck: public	-	-	-	.1
10	tanker-truck: private	-	-	-	.4
11	spring : protected	0.8	0.7	0.4	.3
12	spring : unprotected			0.3	.3
13	rainwater collection	-	0.1	0.2	.2
14	surface water : tank/pond	0.8	1.1	0.5	.3
15	Other surface water (river, dam, stream, canal, lake etc.)	1.0	0.7	0.6	.3
16	others(tanker-truck, cart with small tank or drum, etc.	.7	0.3	1.1	.2
	Total	100	100	100	100.0

Source: estimated from NSSO unit level data- 58th, 65th 69th rounds

Table 3.20 examines households' accessibility to drinking water based on NSSO unit level data of 58th, 65th, 69th and 76th rounds. From the table it can be noticed that the proportion households with drinking water accessibility for household's exclusive use has increased from 25.4% during 58th round to 31.1% during 65th round; then to 33.7% during 69th round; again increased to 48.6% during 76th round. At the same time drinking water facilities for common use is showing a declining trend during the same period.

Table 3.20 Access to Drinking Water:

SL	Access to drinking water	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	household's exclusive use	25.4	31.1	33.7	48.6
2	common use of households in the building	9.0	8.3	10.7	9.2
3	Neighbour's source	-	-	4.8	4.0
4	community use	65.6	56.8	46.7	32.7
8	others	0	3.8	4.1	5.5
	Total		100	100.0	100.0

Source: estimated from NSSO unit level data- 58th, 65th 69throunds

Location of drinking water is analysed by NSSO by examining the distance of the principal source of drinking water from the household's dwelling. Table 3.21 details the same during the four rounds considered for the study. It can be observed from the table that the proportion households who have drinking water facility has been decreased from 18.0% during 58th round to 15.6% during 65th round; then increased to 16.5% during 69th round; again increased to 27.5% during 76th round. Similarly, percentage of households with source of drinking water outside the dwelling but within the premises also increased from 19.2% during 58th round to 24.9% during 65th round; to 29.8% during 69th round; and again to 30.7% during 76th round. In short, it can be concluded that there occurred an improvement in the availability of drinking water within the dwelling or within the dwelling premises.

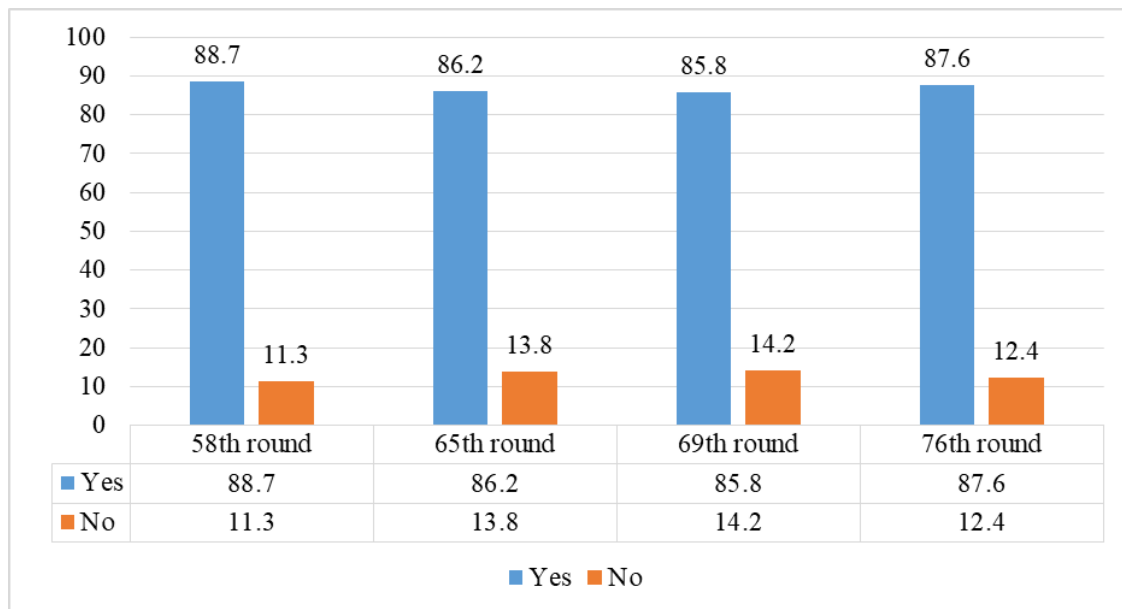
Table 3.21 Distance to the Dwelling Unit from the Principal Source of Drinking Water:

SL	Distance to the Dwelling Unit from the principal source of drinking water	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	within dwelling	18.1	15.6	16.5	27.5
2	outside dwelling but within the premises	19.2	24.9	29.8	30.7
3	outside premises :less than 0.2 k.m.	50.9	48.1	41.1	30.4
4	0.2 to 0.5 k.m.	9.0	9.2	9.3	8.4
5	0.5 to 1.0 k.m.	1.8	1.6	2.2	2.1
6	1.0 k.m. to 1.5 k.m.	0.4	.3	.7	.4
7	1.5 k.m. or more	0.6	.3	.4	.5
	Total	100.0	100.0	100.0	100.0

Source: estimated from NSSO unit level data- 58th, 65th 69throunds

Figure 3.6 examines drinking water sufficiency i.e. whether there is adequate supply of drinking water throughout the year. The figure portrays sufficiency of drinking water facilities for rural households in India from 58th round to 76th round. The figure reveals that the proportion of households with sufficient drinking water year round decreased from 88.7% during 58th round to 86.2% during 65th round and to 85.8% during 69th round. After that during 76th round the percentage has recorded an increase to 87.6%.

Figure 3.6 Sufficiency of Drinking Water



Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

3.2.12 Source of Lighting in the Dwelling:

The source of lighting includes electricity, kerosene, solar energy, other oil, any other etc. According to 2001 census figures, 43.5% of the rural households have electricity as a source of lighting which were increased to 55.3% in 2011. The proportion of households that use kerosene as a source of lighting decreased from 55.6% in 2001 to 43.2% in 2011. There occurred a small increase in the percentage of households using solar energy for lighting from 0.3% to 0.5% during the same period. According to 2011 census figures it is to be noticed that 0.5% of the households in rural India have no source of lighting or lighting arrangement in their dwelling units (see table 3.22).

Table 3.22 Distribution of Rural Households Based on Source of Lighting in the Dwelling:

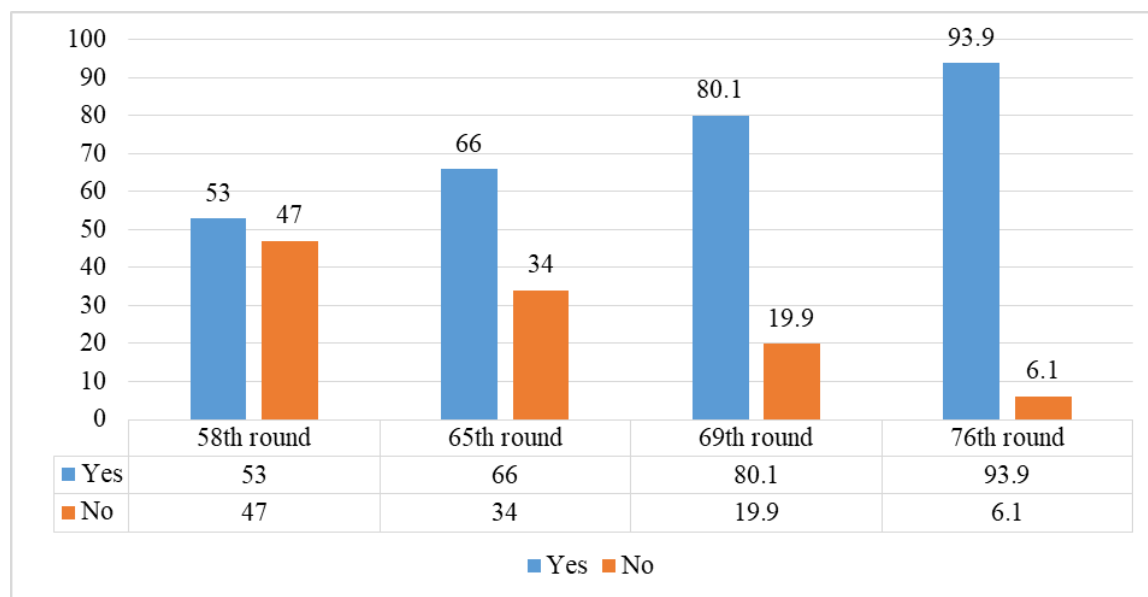
SL	Source of Lighting	2001 Census	2011 census
1	Electricity	43.5	55.3
2	Kerosene	55.6	43.2
3	Solar energy	0.3	0.5
4	Other oil	0.1	0.2
5	Any other	0.2	0.2
6	No lighting	0.3	0.5
	Total	100	100

Source: Census of India 2001 & 2011.

3.2.13 Availability of Electricity for Domestic Use:

The figure 3.7 portrays the availability of electricity for rural households in India. The proportion of households having electricity for domestic use were only 53% during 58th round which has increased to 66% during 65th round and to 80.1% during 69th round; and again to 93.9% during 76th round. As per 76th round figures there exist 6.1% of households without having accessibility to electricity for domestic use.

Figure 3.7 Electricity for Domestic Use



Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

3.2.14 Latrine Facilities:

Table 3.23 provides census figures regarding the distribution of rural households based on type of latrine facility available to them both in absolute terms and in percentages. It can be noticed from the table that about 50.2% of the rural households had latrine facility of one type or other and the remaining 48.2% did not have any type of latrine facility. About 36.4% have water closet; 9.4% uses pit latrine; another 1.1% uses other type of latrine arrangement and a 3.2% uses public latrine.

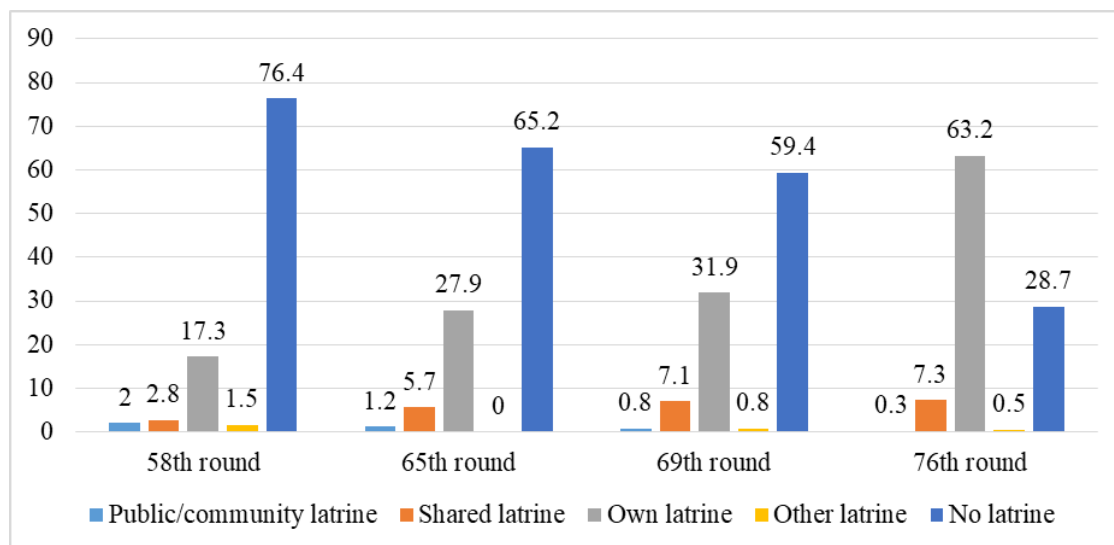
Table 3.23 Distribution of Rural Households by Latrine Facility:

SL	Type of latrine	Absolute number of rural households	Percentage
1	Water closet	32616824	36.4
2	Pit latrine	17681985	9.4
3	Other latrine	1276530	1.1
4	Public latrine	3253892	3.2
5	open	112997499	49.8
	Total number of rural households	167826730	100

Source: Census 2011

The figure 3.8 portrays the extent of latrine facilities available to rural households as per NSSO figures.

Figure 3.8 Type of Latrine



Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

During 58th round, 76.4% of the rural households did not have any kind of latrine facilities. From there this has been reduced to 65.2% during 65th round and to 59.4% during 69th round. 28.7% of them do not have latrine facilities as per the figures of 76th round. One thing here is to be noted that there occurred an increase in the percentage of households having own latrine facilities from 58th round to 76th round. The figures tell us that the proportion of households with own latrine has increased from 17.3% during 58th round to 63.2% during 76th round.

3.2.15 Bathing Facilities:

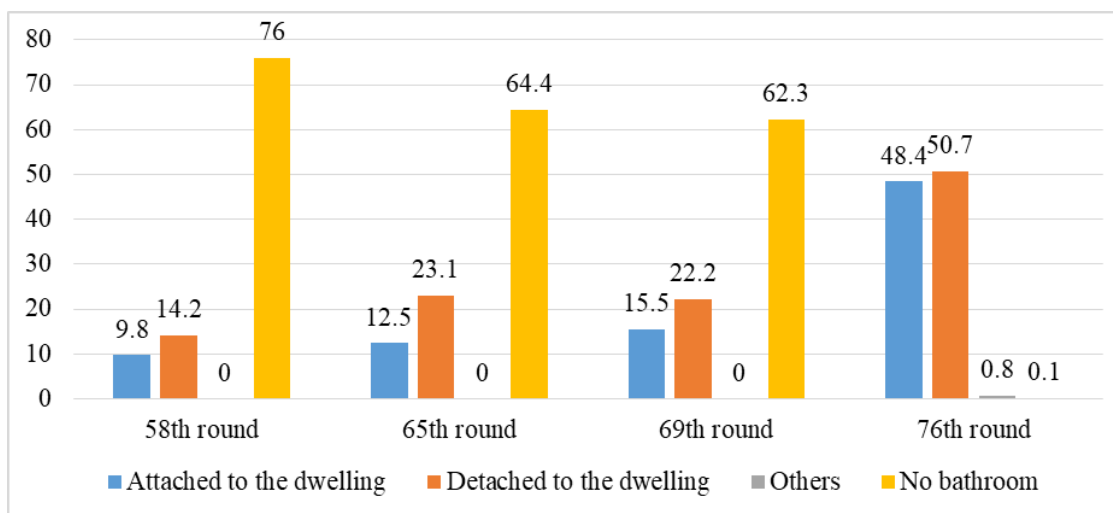
Bathroom facility being an ingredient of quality of housing as well as quality of living is discussed in table 3.24. According to 2011 census figures, 25.4% of the rural households have bathroom while 19.7% uses an enclosure without roof for bathing. Also, it is to be noted that 55% of them do not have any kind of bathroom facility.

Table 3.24 Distribution of Rural Households by Bathing Facility:

SL	Bathing facility	Absolute number of rural households	Percentage
1	Bathroom	42545003	25.4
2	Enclosure without roof	32984319	19.7
3	No bathroom	92297408	55.0
	Total number of rural households	167826730	100

Source: Census 2011

Figure 3. 9 Type of Bathroom



Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

The facility of bathroom for the household is analysed by NSSO by examining the type of bathroom the household possesses. The figure 3.9 reveals that there occurred considerable improvement in bathroom facilities in rural India. The percentage of households having attached bathrooms or detached bathrooms increased considerably throughout the rounds. As per the 76th round, 48.4% of the households in rural India have attached bath room facilities while 50.7% have detached bathrooms. It is to be noted that still a smaller proportion (0.1%) do not have bathroom facilities.

Table 3.25 analyses distance from bathing place of rural households based of NSSO data. The table reveals that according to 58th round NSSO figures, 63.2% of the rural households have bathroom within dwelling or within dwelling premises. This has increased to 76.2% during 65th round; again to 80.5% during 69th round; and again to 87.1% during 76th round. Also, there were 12.9% of rural households who have bathing facilities outside their dwelling premises.

Table 3.25 Location of Bathroom:

SL	Distance from the bathing place	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	within dwelling	63.2	30.2	29.2	38.8
2	outside dwelling but within the premises		46.0	51.3	48.3
3	outside premises : less than 0.2 km	26.3	17.6	13.4	8.2
4	0.2 to 0.5 km	8.5	4.7	4.3	3.2
5	0.5 to 1.0 km.	1.6	1.3	1.4	1.2
6	1.0 k.m. to 1.5 k.m.	0.3	.1	.2	.2
7	1.5 k.m. or more	0.1	.1	.2	.1
	Total	100.0	100.0	100.0	100.0

Source: Computed from NSSO unit level data- 58th, 65th, 69th& 76th rounds

3.2.16 Drainage Connectivity:

Drainage arrangement is inevitable to ensure clean and hygienic surroundings of the houses. According to census 2011 figures 5.7% of the rural households had closed drainage, 31.0% of them had open drainage while 63.2% do not have any drainage arrangement (see table 3.26).

Table 3.26 Distribution of Rural Households by Drainage Connectivity for Waste Water Outlet:

SL	Drainage	Absolute number of rural households	Percentage
1	Closed drainage	9645107	5.7
2	Open drainage	52035163	31.0
3	No drainage	106146460	63.2
	Total number of rural households	167826730	100

Source: Census 2011

Table 3.27 helps in comparing the distribution of rural households by drainage connectivity based on 2001 and 2011 census figures. The table reveals that the proportion of rural households with closed drainage system witnessed an increase from 3.9% in 2001 to 5.7% in 2011; and those having open drainage facility also registered an increase from 30.3% to 31.0% during the same period. The percentage of households having no drainage connectivity has been decreased from 65.8% in 2001 to 63.2% in 2011.

Table 3.27 Distribution of Rural Households by Drainage Connectivity for Waste Water Outlet (in percentages):

SL	Drainage	Census 2001	Census 2011
1	Closed drainage	3.9	5.7
2	Open drainage	30.3	31.0
3	No drainage	65.8	63.2
	Total number of rural households	100	100

Source: Census 2001 and 2011

NSSO uses a slightly different categorisation for drainage arrangement which is presented in table 3.28. The table reveals that there occurred an increase in the proportion of households having underground, covered pucca, and open pucca drainage systems in their houses. At the same time, the proportion of those having no drainage or kutchra drainage goes on decreasing over time. According to 76th round data, about 38.9% of the rural households did not have any kind of drainage arrangements that should be given attention.

Table 3.28 Drainage System of the Household:

SL	Drainage system of the household	Percent (58 th round)	Percent (65 th round)	Percent (69 th round)	Percent (76 th round)
1	underground	2.0	2.9	8.5	12.7
2	covered pucca	2.9	3.6	6.4	8.2
3	open pucca	13.0	18.1	16.8	20.3
4	open katcha	20.4	18.7	18.4	19.9
5	no drainage	61.7	56.7	49.9	38.9
	Total	100.0	100.0	100.0	100.0

Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

Both the census figures and the NSSO figures leads us to the conclusion that even though there occurred an increase in the drainage arrangements, the problem is not yet fully addressed.

3.2.17 System of Disposal of Household Waste Water:

The micro environment around dwelling unit should be hygienic to ensure better quality of life. In this context, it is necessary to examine how household waste water is disposed in rural areas.

Table 3.29 System of Disposal of Household Waste Water:

SL	System of disposal of household waste water	Percent (69 th round)	Percent (76 th round)
1	safe reuse after treatment	0.1	.2
2	Disposed to open low land areas without treatment	58.7	23.8
3	Disposed to ponds without treatment	7.3	48.1
4	Disposed to nearby river without treatment	1.5	5.8
5	Disposed to drainage system without treatment	17.4	9.3
6	not known	.4	.4
7	disposed off with or without treatment to other places	14.6	12.4
	Total	100.0	100.0

Source: Computed from NSSO unit level data- 69th & 76th rounds

The NSSO 69th and 76th rounds analyses waste water disposal the summary of which is presented in table 3.29. The waste water disposal mechanisms followed by the rural households include safe reuse after treatment, disposing off without treatment to: open and low land areas, ponds, nearby river, drainage systems and to other places.

Table 3.29 reveals that during 69th round, 0.1% of the households were following safe re-use of waste water after treatment; this has increased to 0.2% during 76th round. Disposing off wastewater without treatment to open low land areas, ponds, nearby rivers and drainage system is followed by majority of rural households (84.8% in 69th round and 87% in 76th round). In this context, it is to be suggested that proper waste water disposal mechanism to be practised in rural areas inorder to ensure quality of micro environment around the dwelling unit.

3.2.18 Household Garbage Disposal:

Housing environment quality also depends on household garbage disposal. NSSO 69th and 76th rounds investigated about means of household garbage disposal; the details of which is presented in table 3.30.

Table 3.30 Place of Disposal of Household Garbage:

SL	Place of disposal of household garbage	Percent (69 th round)	Percent (76 th round)
1	bio-gas plant or manure pit	9.7	5.4
2	Household's individual dumping spot(s)	45.1	33.4
3	Community dumping spot (vat, container, etc.)	6.2	6.5
4	common place other than community dumping spot (open area/street/open drain)	-	39.0
5	not known	3.5	.7
6	others	35.5	15.0
	Total	100.0	100.0

Source: Computed from NSSO unit level data- 69th & 76th rounds

During 69th round, about 9.7% of the households were dumping household garbage in biogas plant or manure pits. This has decreased to 5.4% during 76th round. About 45.1% were bumping garbage in individual dumping spots during 69th round which has decreased to 33.4% during 76th round. The proportion of households using community dumping spots has increased from 6.3% to 6.5%.

3.2.19 Approach Road Facility:

This section examines whether the household enjoys good quality roads to their dwelling unit.

Table 3.31 Approach Road/Lane/Constructed Path:

SL	Approach road/lane/constructed path	Percent (58 th round)	Percent 65 th round	Percent (69 th round)	Percent (76 th round)
1	Motorable road/lane/constructed path with street light	16.6	15.7	19.5	22.2
2	Motorable road/lane/constructed path without street light	13.2	18.6	25.5	27.4
3	other road/lane/constructed path with street light	8.2	7.6	6.5	6.5
4	other road/lane/constructed path without street light	40.9	40.4	33.9	31.0
5	no direct opening to road/lane/constructed path	21.1	17.7	14.6	12.9
	Total	100.0	100.0	100.0	100.0

Source: Computed from NSSO unit level data- 58th, 65th, 69th & 76th rounds

NSSO examines accessibility to road in five categories:

- i. Motorable road/lane/constructed path with street light
- ii. Motorable road/lane/constructed path without street light
- iii. other road/lane/constructed path with street light
- iv. other road/lane/constructed path without street light
- v. no direct opening to road/lane/constructed path

Table 3.31 presents the details of road accessibility for rural households during 58th, 65th, 69th and 76th rounds. The proportion of households having accessibility to Motorable road/lane/constructed path with street light were 16.6% during 58th round; this has decreased to 15.7% during 65th round; then increased to 19.5% during 69th round; again increased to 22.2% during 76th round.

The proportion of households who enjoy Motorable road/lane/constructed path without street light were 13.2% during 58th round; this figure has increased to 18.6% during 65th round; then to 25.5% during 69th round and; again increased to 27.4% during 76th round. The

proportion of households having other road/lane/constructed path with street light or without street light has recorded a decline during the same period. The proportion of households having no direct opening to road/lane/constructed path has registered a decline during the same period. But, still there exist 12.9% with no approach road facility as per 76th round figures.

3.3 An Overview of Rural Housing Programmes in India:

Rural areas are suffering from severe housing problems including shortage of housing units. There also exist problems related to quality of housing and housing environment such as condition of structure, availability of kitchen facilities, availability, accessibility and sufficiency of drinking water, sanitation facilities, approach road accessibility, electricity, etc. that we have discussed in detail in section 3.2. While addressing the issue of absolute housing shortage, it is the responsibility of the government to ensure that housing quality is not sacrificed. Usage of low quality materials hampers the durability of houses leading to recurring costs on repair and maintenance or sometimes may lead to a complete renovation. This will go on repeating itself as a cycle leading to enormous demand for investment in housing recurrently (Alam, Satpati, & Mandal, 2022). India, basically, being an agrarian economy supports approximately 70% of its population in rural areas has implemented various schemes for rural development including rural housing schemes from time to time. This section provides a brief overview of housing schemes implemented in Rural India.

3.3.1 Indira Awas Yojana:

Indira Awas Yojana (IAY) was launched as a sub-scheme of RLEGP (Rural Landless Employment Guarantee Programme) which was started in the early 1980s and later it was connected to JRY (Jawahar Rozgar Yojana). The programme was implemented under the Ministry of Rural Development in January 1996 with the aim of developing free houses to SC/ST families, families from non-SC/ST categories who are living below the poverty line, and the families having 'free bonded labourers'. The selection of beneficiaries were made on the basis of the Below Poverty Line (BPL) list approved by the Gram Sabha. Indira Awas Yojana was a centrally sponsored scheme, funded on a cost-sharing basis by the Government of India and the States in the ratio of 75:25. It means that 75 percent of the funds were provided by the Central Government while the State Government concerned provides 25 per cent of the funds. In the case of Union Territories, the Government of India provides 100 percent funding for the scheme. The IAY were implemented through the District Rural Development Agencies (DRDAs). Since inception of IAY, 351 lakhs dwelling units have been constructed (GOI, 2016).

IAY was suffering from serious shortcomings. The schemes meant for basic amenities were not interlinked with the IAY. The major problem was that the fund allocated were insufficient for constructing a decent and liveable house which has a negative impact on the beneficiaries as the repair costs made a massive financial burden on them. Moreover, due to diverse activities for livelihood in rural areas, the occupants needed more area for keeping their livestock, agricultural produce and so on (Kumar, Deka, & Sinha, 2016).

3.3.2 Pradhan Mantri Gramodaya Yojana (Gramin Awas):

Inorder to reduce housing shortage for families living below the poverty line in the rural areas and also to promote a healthy development of the habitat in these areas, PMGY was launched in 2000-01. The PMGY consists of five components in the beginning which include primary education, rural housing, primary health, nutrition and drinking water. The programme was based on the pattern of IAY. Beneficiaries for the programme were selected from households belong to SC/ST categories, 'freed bonded labourers' and members from non-SC/ST categories who are living below the poverty line. Houses sanctioned under this scheme were constructed on individual plots of the village having main habitation. The funds for the scheme have been provided to states/UTs in two instalments under the recommendation of Union ministry of rural development. PMGY was withdrawn with the implementation of Bharat Nirman (Kumar, Deka, & Sinha, 2016).

3.3.3 Bharat Nirman:

Bharat Nirman Programme was launched in 2005 inorder to boost infrastructure development in rural areas. The programme comprises of six components-rural infrastructure, irrigation, roads, housing, telecommunication, power and water supply. This programme, which began during the twelfth five year plan, received a budget allocation of 76435 crore rupees from planning commission in 2012. The scheme was immensely helpful for rural development. The major drawback was that it failed to sort out the loopholes within it. The programme was also not successful in suggesting a standard criterion for identifying the beneficiaries and failed to suggest any measures of coordination among the agencies involved in the associated services.

3.3.4 Pradhan Mantri Awas Yojana (Grameen):

Indira Awas Yojana was replaced by Pradhan Mantri Awas Yojana Gramin (PMAY-G) in March 2016 with the aim of improving convenience and affordability of housing for rural India. ThePrime Minister Narendra Modi has launched the programme from Agra (Uttar Pradesh) on 20th November 2016. This programme was a Government initiative intended to

ensure affordable housing to the weaker sections as a step towards attaining “Housing for All by 2022”. The target for the programme was to construct 1 crore pucca dwellings in rural areas by 31st March 2019. The beneficiaries of the programme were selected based on Socio-Economic and Caste Census (SECC) 2011 data. The cost of implementation of the programme was shared in the ratio 60:40 between Central and State Governments in plain areas whereas in North Eastern and hilly states, this sharing ratio was fixed at 90:10. Finance minister of India Nirmala Sitharaman has announced that two crore more houses will be built under PMAY-G in rural areas in the next five years (National Portal of India, 2021).

3.3.5 State-run Housing Schemes:

Besides the centrally sponsored housing schemes, some states have implemented a number of housing programmes for rural households. During the period 2001 to 2005, about 27 lakh houses were successfully constructed through state run programmes launched by governments of about 15 states/UTs. States which have their own schemes include Gujarat, Jammu & Kashmir, Himachal Pradesh, Daman & Diu, Pondicherry, Punjab, Sikkim, Jharkhand, Kerala etc. State run housing schemes are designed to provide affordable homes to the needy, targeting specific groups. Usually, these programmes involve either direct government subsidies or some kind of tax incentives to encourage construction of houses or purchase of houses (Alam, Satpati, & Mandal, 2022).

In Delhi, the state-run housing scheme is known as DDA Housing Scheme, in Haryana, HUDA Housing Scheme in Mumbai, MHADA Lottery Scheme while in Karnataka, it is known as Karnataka Housing Scheme. Similarly, Kerala housing department runs schemes and programmes for rural housing which include M.N. Laksham veedu punarnirmana padhathi, Innovative housing scheme, Suraksha housing scheme etc.((Alam, Satpati, & Mandal, 2022). The Kerala government launched the LIFE mission Kerala housing scheme in 2016 to provide free and affordable housing to homeless in the state (Economic Review, 2022).

3.4 Conclusion:

The discussion made in the above sections provides us an overview of housing conditions in rural areas of India and an outline of the important housing programmes implemented in rural areas in order to improve housing conditions of rural households. Several efforts were taken by both the central and state governments in this regard. The results showed that there occurred significant changes in housing conditions of rural households. In this context, the subject of housing is to be approached in quantitative as well

as qualitative manner. Hence, the present study considers housing conditions in rural areas in two broad perspectives. First, the study examines housing consumption of rural households in India in household terms and in percapita terms. This part of the study is quantitative and examines changes in housing consumption of rural households over time with respect to socio-economic and occupational background of the rural households. Interstate comparison of housing consumption is also made in order to find out regional variations in this regard. Second, the study assesses housing adequacy of rural households which focuses on the quantitative and qualitative requirements for decent housing.

Chapter 4
CHANGES IN PATTERN OF HOUSING CONSUMPTION IN
RURAL INDIA

Chapter 4

CHANGES IN PATTERN OF HOUSING CONSUMPTION IN RURAL INDIA

4.1 Introduction:

This section presents the changes in pattern of housing consumption in rural India from 2002 to 2018 by analysing the NSSO unit level data of 4 rounds during this period. Viz. NSSO 58th round (2002), 65th round (2008), 69th round (2012) and 76th round (2018). The data were analysed using statistical techniques such as averages, percentages, measures of dispersion like standard deviation etc. Inferential statistical tools, especially various non-parametric tests like Kruskal Wallis test, were also used to derive inferences on housing consumption pattern. The analysis and test results regarding changes in the housing consumption pattern is presented as follows.

4.2 Changes in Housing Consumption across Rounds:

Housing consumption is measured using variables such as floor area, number of rooms, and number of living rooms both in household terms and also on per-capita basis (adapted from P. B. McLeod and J. R. Ellis, 1982 with some modifications). This section examines changes in housing consumption pattern on the following dimensions.

- i. Changes in floor area across rounds
- ii. Changes in number of rooms across rounds
- iii. Changes in number of living rooms across rounds
- iv. Changes in floor area per person across rounds
- v. Changes in number of rooms per person across rounds
- vi. Changes in number of living rooms per person across rounds

4.2.1 Changes in Floor Area across Rounds:

NSSO defines floor area as the inside area of the floor excluding the area covered by the walls. The table 4.1 portrays the average floor area of rural houses during 58th, 65th, 69th and 76th rounds with respective standard deviations. It can be noticed that the mean floor area of the dwellings of rural households increased from 411.41 sq. ft. during 58th round to 451.03 sq. ft. during 65th round; then decreased to 430.95 sq. ft. during 69th round; again increased to 501.19 sq. ft. during 76th round.

Table 4.1 Floor Area (in Sq. ft.)

Round	Mean	Std. Deviation
58 th	411.41	346.311
65 th	451.03	348.272
69 th	430.95	317.875
76 th	501.19	310.584

Source: computed from NSSO Unit level Data- 58th, 65th, 69th and 76th rounds

In short, average floor area of rural dwellings keep on increasing throughout except in the 69th round where there recorded a decline from 451.03 sq. ft. during 65th round to 430.95 sq. ft. during 69th round.

To examine whether there exist significant differences in floor area across various rounds a Kruskal Wallis test is performed. As the data violates the assumption of normality, parametric tests could not be done. Therefore, non-parametric tests were used. The test results and interpretation of the results are presented in the table 4.2. The Kruskal Wallis H statistic is significant at 5% level of significance. Null hypothesis is rejected and it can be inferred that there exist significant differences in the floor area across rounds.

Table 4.2 Distribution of Floor Area-Kruskal Wallis Test Results

Null Hypothesis	Test Statistic	df	Sig.	Decision
The distribution of Floor area (sq.ft.) is the same across categories of Round.	7868.051	3	.000	Reject the null hypothesis.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The pairwise comparisons of the rounds (table 4.3) reveal that there exist statistically significant difference in the distribution of floor area between 58th and 65th, between 58th and 65, between 58th and 76th, between 69th and 65th, 69th and 76th and between 65th and 76th rounds.

Table 4.3 Pair wise Comparisons of Rounds with respect to Floor Area

Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
58-69	-7358.636	471.889	-15.594	.000	.000
58-65	-11199.290	413.964	-27.054	.000	.000
58-76	-37018.223	451.823	-81.931	.000	.000
69-65	3840.654	420.113	9.142	.000	.000
69-76	-29659.587	457.463	-64.835	.000	.000
65-76	-25818.933	397.442	-64.963	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Source: computed from NSSO Unit level Data- 58th, 65th, 69th and 76th rounds

4.2.2 Changes in Number of Rooms across Rounds:

Number of rooms is the sum of number of living rooms and number of other rooms. NSSO defines a living room as, “a room with a floor area (carpet area) of at least 4 square metres (i.e., approximately 43 square feet), a height of at least 2 metres (i.e., approximately 6.6 feet) from the floor to the highest point in the ceiling and used for living purposes. A room which did not satisfy the conditions of living room is referred to as other room” (NSSO, 2019).

The table 4.4 reveals that the number of rooms on the average increased from 2.81 during 58th round to 3.11 during 65th round, 3.38 during 69th round; again to 3.72 during 76th round. There is an increasing trend in the number of rooms across 4 rounds. Therefore we can see an increase in housing consumption in terms of number of rooms across the rounds.

Table 4.4 Number of Rooms

Round	Mean	Std. Deviation
58 th	2.81	2.604
65 th	3.11	1.857
69 th	3.38	2.144
76 th	3.72	1.845

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

To check whether there is significant difference in the number of rooms across rounds, a Kruskal Wallis test were run and the test results and inference is presented in the table 4.5. The table reveals that the Kruskal Wallis test statistic is significant at 5% level and hence the null hypothesis is rejected and it can be concluded that the distribution of number of rooms is not uniform across rounds.

Table 4.5 Distribution of Number of Rooms -Kruskal Wallis Test Results

Null Hypothesis	Test Statistic	df	Sig.	Decision
The distribution of Number of rooms is the same across categories of Round.	11714.411	3	.000	Reject the null hypothesis.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The pair wise comparison (see table 4.6) reveals that there exist statistically significant differences in the distribution of floor area among all the possible pairs of rounds.

Table 4.6 Pair wise Comparisons of Round with respect to Number of Rooms

Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
58-65	-10639.974	407.262	-26.126	.000	.000
58-69	-18464.441	464.264	-39.771	.000	.000
58-76	-44743.875	444.568	-100.646	.000	.000
65-69	-7824.468	413.441	-18.925	.000	.000
65-76	-34103.901	391.194	-87.179	.000	.000
69-76	-26279.433	450.235	-58.368	.000	.000
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

4.2.3 Changes in Number of Living Rooms across Rounds:

Living rooms include rooms used as bedroom, sitting room, prayer room, dining room, servant's room - all were considered as living rooms provided they satisfied the size criterion (NSSO).

Table 4.7 Number of Living Rooms

Round	Mean	Std. Deviation
58 th	1.89	1.592
65 th	2.01	1.192
69 th	1.98	1.366
76 th	2.09	1.108

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

From table 4.7, it can be observed that the average number of living rooms increased from 1.89 in 58th round to 2.01 in 65th round; then declined to 1.98 in 69th round; again increased to 2.09 in 76th round. Hence it can be noticed that there recorded an increase in the average number of living rooms available to rural households except in 69th round where a decline was recorded. The table portrays an increasing trend in housing consumption in terms of number of living rooms across rounds except during 69th round.

To examine whether there is significant difference in the distribution of living rooms across rounds, Kruskal Wallis test is applied and the test results and inference is presented in table 4.8.

Table 4.8 Distribution of Number of Living Rooms-Kruskal Wallis Test Results

Null Hypothesis	Test Statistic	df	Sig.	Decision
The distribution of No. of living rooms is the same across categories of Round.	2882.910	3	.000	Reject the null hypothesis.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The Kruskal Wallis H statistic is significant at 5% level. Hence the null hypothesis is rejected and it is inferred that there is significant difference in the distribution of living rooms across rounds.

The pairwise comparison (Table 4.9) reveals that the distribution of number of living rooms among all the possible pairs formed from the four rounds are not the same. That is, there exist statistically significant differences between all the pairs of rounds regarding living room distribution.

Table 4.9 Pair wise Comparisons of Rounds with respect to Number of Living Rooms

Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
58-69	-4279.506	447.514	-9.563	.000	.000
58-65	-7727.916	392.568	-19.686	.000	.000
58-76	-21476.907	428.528	-50.118	.000	.000
69-65	3448.410	398.524	8.653	.000	.000
69-76	-17197.401	433.991	-39.626	.000	.000
65-76	-13748.991	377.080	-36.462	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

4.2.4 Changes in Floor Area per Person across Rounds:

Floor area per person is obtained by dividing floor area by household size and can be used for measuring overcrowding in the dwelling. The percapita floor area increased from 93.88 sq. ft. during 58th round to 105.34 sq. ft. during 65th round; then to 106.62 sq. ft. during 69th round; again to 130.10 sq. ft. during 76th round. There is an increasing trend in the average floor area per person throughout the rounds.

Table 4.10 Floor Area per Person

Round	Mean	Std. Deviation
58 th	93.88	103.478
65 th	105.34	98.448
69 th	106.62	94.275
76 th	130.10	105.091

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

A Kruskal Wallis test is applied to examine whether there is significant difference in the distribution of floor area per person across rounds. The test results and inference is given in table 4.11.

It can be noticed from the table that the Kruskal Wallis H statistic is significant at 5% level of significance. The null hypothesis is rejected and it can be inferred that there is significant difference in the distribution of floor area per person across rounds.

Table 4.11 Distribution of Floor Area per Person-Kruskal Wallis Test Results

Null Hypothesis	Test Statistic	df	Sig.	Decision
The distribution of Floor area per person is the same across categories of Round.	13033.979	3	.000	Reject null hypothesis.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The pair wise comparison (Table 4.12) reveals that the distribution of floor area per person is not the same between all the possible pairs of rounds.

Table 4.12 Pair wise Comparisons of Rounds with respect to Floor Area per Person

Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
58-65	-15197.706	413.972	-36.712	.000	.000
58-69	-16952.403	471.898	-35.924	.000	.000
58-76	-49158.017	451.831	-108.797	.000	.000
65-69	-1754.697	420.121	-4.177	.000	.000
65-76	-33960.311	397.449	-85.446	.000	.000
69-76	-32205.613	457.472	-70.399	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

4.2.5 Changes in Number of Rooms per Person across Rounds:

Number of rooms per person is equal to the total number of rooms divided by the household size.

Table 4.13 Number of Rooms per Person

Round	Mean	Std. Deviation
58 th	.66	.720
65 th	.75	.604
69 th	.88	.754
76 th	1.00	.745

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The table 4.13 portrays an increasing trend in the housing consumption in terms of average number of rooms per person across all rounds. It can be observed that per capita number of rooms on the average increased from .66 during 58th round to .75 during 65th round; then to .88 during 69th round; again increased to 1.00 during 76th round.

In order to examine whether there is significant difference in the distribution of number of rooms per person, Kruskal Wallis test is applied the result of which is presented as follows.

Table 4.14 Distribution of Number of Rooms per Person-Kruskal Wallis Test Results

Null Hypothesis	Test Statistic	df	Sig.	Decision
The distribution of number of rooms per person is the same across categories of Round.	17046.513	3	.000	Reject the null hypothesis.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The table 4.14 shows that the Kruskal Wallis H statistic is significant at 5% level of significance. Therefore the null hypothesis is rejected and it is proved that there is significant difference in the number of rooms per person across rounds.

Table 4.15 Pair wise Comparisons of Rounds with respect to Number of Rooms per Person

Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
58-65	-14189.664	412.726	-34.380	.000	.000
58-69	-26916.735	470.493	-57.210	.000	.000
58-76	-54979.865	450.533	-122.033	.000	.000
65-69	-12727.071	418.988	-30.376	.000	.000
65-76	-40790.201	396.443	-102.890	.000	.000
69-76	-28063.129	456.276	-61.505	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The pairwise comparisons of rounds (Table 4.15) reveal that the distribution of number of rooms per person is not the same across all the possible pairs formed from the four rounds considered.

4.2.6 Changes in Number of Living Rooms per Person across Rounds:

Number of living rooms per person is obtained by dividing the number of living rooms by household size. This represents percapita housing consumption in terms of number of living rooms

Table 4.16 Number of Living Rooms per Person

Round	Mean	Std. Deviation
58 th	.44	.463
65 th	.48	.361
69 th	.49	.414
76 th	.54	.40

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

It can be noticed from table 4.16 that number of living rooms per person on the average increased from .44 during 58th round to .48 during 65th round; .49 during 69th round and .54 during 76th round. The table also shows that housing consumption in terms of number of living rooms per person is exhibiting an increasing trend across all the rounds.

Kruskal Wallis test is applied to examine whether there is significant difference in the distribution of living rooms per person across rounds. The test results and findings are given in table 4.17.

Table 4.17 Distribution of Number of Living Rooms per Person-Kruskal Wallis Test Results

Null Hypothesis	Test Statistic	df	Sig.	Decision
The distribution of number of living rooms per person is the same across categories of Round.	6299.010	3	.000	Reject the null hypothesis.

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

The test results indicate that the H statistic is statistically significant at 5% level. Hence, the null hypothesis is rejected, thereby proving that there exist significant difference in the distribution of living rooms per person across rounds.

The pair wise analysis as a post hoc to Kruskal Wallis test (Table 4.18) reveals that there is statistically significant differences in the distribution of living rooms per person across all the possible pairs formed from the four rounds under study.

Table 4.18 Pair wise Comparisons of Rounds with respect to Number of Living Rooms per Person

Sample 1- Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
58-65	-11980.697	411.874	-29.088	.000	.000
58-69	-14779.814	469.521	-31.478	.000	.000
58-76	-34607.624	449.602	-76.974	.000	.000
65-69	-2799.117	418.123	-6.694	.000	.000
65-76	-22626.928	395.624	-57.193	.000	.000
69-76	-19827.811	455.334	-43.546	.000	.000
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds

In brief in this section it can be concluded that there occurred significant changes in housing consumption variables from 2002 to 2016. Even though there occurred a decline in average floor area during 69th round, the floor area per person is increasing throughout the rounds. Number of rooms both at household level and per capita level is showing an increasing trend. But the number of living rooms as a housing consumption variable showed a decline at household level during 69th round while living rooms per person is showing an increasing trend throughout the rounds.

4.3 Changes in Housing Consumption across Social Groups:

This section presents the results and discussion on changes in housing consumption among various social groups in rural India. There are mainly four social groups: Scheduled Tribes (ST), scheduled caste (SC), other backward classes (OBC), and others (General). Here an attempt being made to examine the changes in housing consumption among social groups across rounds.

4.3.1 Distribution of Floor Area across Social Groups:

The table 4.19 contains information on housing consumption in terms of mean floor area among social groups from 58th round to 76th round. The floor area consumption of ST households in rural India increased from 375.83 sq. ft. during 58th round to 422.91 sq. ft. during 65th round; then decreased to 414.41 sq. ft. in 69th round; again increased to 459.42 sq. ft. in 76th round. Floor area consumption among ST households is showing an increasing trend throughout all the rounds except during 69th round.

Table 4.19 Distribution of Floor Area across Social Groups

Round	Scheduled Tribe	Scheduled Caste	Other Backward Class	Others
58 th	375.83 (304.835)	320.87 (258.899)	418.91 (351.680)	489.59 (394.193)
65 th	422.91 (278.115)	363.42 (270.281)	461.17 (356.584)	528.57 (403.542)
69 th	414.41 (312.624)	347.27 (249.014)	437.50 (326.982)	500.02 (338.839)
76 th	459.42 (276.151)	426.26 (257.481)	514.88 (307.380)	573.05 (361.117)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

The floor area consumption of SC households in rural India is the lowest among all other social groups in India. The table reveals that the floor area of SC families on the average increased from 320.87 sq. ft. in 58th round to 363.42 sq. ft. in 65th round; then decreased to 347.27 sq. ft. in 69th round; then increased to 426.26 sq. ft. in 76th round.

Regarding the average floor area of OBC households, it can be observed from the table that floor area increased from 418.91 sq. ft. during 58th round to 461.17 sq. ft. during 65th round; then decreased to 437.50 sq. ft. during 69th round; then increased to 514.88 sq. ft. during 76th round.

Floor area consumption of others i.e., General category (others) increased from 489.59 sq. ft. during 58th round to 528.57 sq. ft. during 65th round; then decreased to 500.02 sq. ft. during 69th round; then increased to 573.05 sq. ft. during 76th round. The average floor area of rural SC households is lowest among that of other social groups in all the rounds and the highest being the others (General).

4.3.2 Distribution of Number of Rooms across Social Groups:

The table 4.20 examines the distribution of number of rooms among different social groups across the rounds. It can be noticed that the number of rooms on the average is increasing for all the social groups throughout all the rounds.

Table 4.20 Distribution of Number of Rooms across Social Groups

Round	Scheduled Tribe	Scheduled Caste	Other Backward Class	Others
58 th	2.50 (2.164)	2.25 (2.052)	2.88 (3.055)	3.29 (2.299)
65 th	2.79 (1.550)	2.54 (1.443)	3.21 (1.896)	3.62 (2.078)
69 th	2.88 (1.650)	2.72 (1.642)	3.44 (2.286)	4.12 (2.222)
76 th	3.22 (1.519)	3.27 (1.632)	3.82 (1.843)	4.26 (2.035)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

More specifically, the average number of rooms for ST households in rural India increased from 2.50 during 58th round to 2.79 during 65th round; again to 2.88 during 69th round; then to 3.22 during 76th round. For SC households, the number of rooms on the average has increased from 2.25 during 58th round to 2.54 during 65th round; then to 2.72 during 69th round; again to 3.27 during 76th round. Regarding OBC households, the table reveals that the average number of rooms increased from 2.88 to 3.21 during 65th round; then to 3.44 during 69th round and to 3.82 during 76th round. For General category (others), the distribution of number of rooms is also showing an increasing trend throughout. During 58th round, the average number of rooms for general category was 3.29. Then it increased to 3.62 during 65th round; then increased to 4.12 during 69th round and to 4.26 during 76th round. The table shows that there is an increasing trend in the average number of rooms for all the social groups across the four rounds.

4.3.3 Distribution of Number of Living Rooms across Social Groups:

The table 4.21 gives details regarding the distribution of number of living rooms among social groups across rounds. The mean number of living rooms of ST Households of rural India has increased from 1.69 during 58th round to 1.85 during 65th round; then decreased to 1.79 during 69th round and increased to 1.84 during 76th round.

Table 4.21 Distribution of Number of Living Rooms across Social Groups

Round	Scheduled Tribe	Scheduled Caste	Other Backward Class	Others
58 th	1.69 (1.756)	1.59 (1.219)	1.94 (1.768)	2.15 (1.462)
65 th	1.85 (1.025)	1.71 (.918)	2.06 (1.240)	2.27 (1.329)
69 th	1.79 (1.056)	1.69 (.938)	2.02 (1.590)	2.24 (1.303)
76 th	1.84 (.995)	1.86 (.937)	2.14 (1.110)	2.36 (1.242)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

For SC households, there was an increase in number of living rooms on the average from 1.59 during 58th round to 1.71 during 65th round; then decreased to 1.69 during 69th round; then increased to 1.86 during 76th round. As far as the OBC households in rural India are concerned, the table reveals that there was an increase in the consumption of living rooms from 1.94 during 58th round to 2.06 during 65th round; then decreased to 2.02 during 69th round; then increased to 2.14 during 76th round. Coming to General category rural households, the table reveals that the average number of living rooms increased from 2.15 (58th round) to 2.27 (65th round); then show a decrease to 2.24 (69th round) then increased to 2.36 during 76th round.

The table portrays changes in average number of living rooms among social groups throughout the rounds. It can be observed that there occurred a decline in number of living rooms for all the social groups during 69th round. Also, the average number of living rooms for OBC and 'Others' were higher than that of SC/ST households during all the rounds considered. As per 76th round figures, ST households stood below SC households and both were below OBC and 'Others' in the case of average number of living rooms.

4.3.4 Distribution of Floor Area per Person across Social Groups:

The table 4.22 depicts the details regarding percapita floor area of different social groups with corresponding means and standard deviations. For ST households, the mean floor area per person increased from 90.12 Sq. ft. during 58th round to 99.88 sq. ft. during 65th round; then to 100.32 sq. ft. during 69th round and to 119.97 sq. ft. during 76th round. For SC households, the average floor area per person increased from 76.66 sq. ft. during 58th round to

87.16 sq. ft. during 65th round; then slightly decreased to 85.99 sq. ft. during 69th round and then increased to 111.06 sq. ft. during 76th round.

Table 4.22 Distribution of Floor Area per Person across Social Groups

Round	Scheduled Tribe	Scheduled Caste	Other Backward Class	Others
58 th	90.12 (137.995)	76.66 (72.864)	94.36 (95.486)	109.09 (102.713)
65 th	99.88 (92.309)	87.16 (87.658)	105.57 (90.579)	124.49 (118.262)
69 th	100.32 (79.331)	85.99 (69.822)	107.06 (95.892)	126.93 (110.815)
76 th	119.97 (93.135)	111.06 (84.125)	130.62 (100.003)	154.15 (132.494)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

OBC households in rural India also achieved an increase in the percapita floor area from 94.36 sq. ft. to 105.57 sq. ft. during 65th round. Then increased to 107.06 during 69th round; after that increased to 130.62 sq. ft. during 76th round. The rural households who belongs to ‘Others’ category showed an increase in average floor area per person across all the rounds (From 109.09 sq. ft. to 124.49 sq. ft. during 65th round; to 126.93 sq. ft. during 69th round; again to 154.15 sq. ft. during 76th round). The table clearly portrays the changes in average floor area per person across rounds. Here we can see that the floor area per person is lowest for SC/ST households while households belong to OBC and Others category enjoys a high position in terms of floor area per person in all the rounds considered.

4.3.5 Distribution of Number of rooms per Person across Social Groups:

The table 4.23 shows the distribution of number of rooms per person among different social groups across rounds. To start with, the mean number of rooms per person for rural households of all the social groups is showing an increasing trend throughout the rounds. The number of rooms per person on the average for ST households increased from .62 during 58th round to .68 during 69th round; again increased to .76 during 69th round and to .90 during 76th round. Regarding SC households, there also recorded an increase in the number of rooms per person during all the rounds considered but the distribution of the same stood at the lowest position comparing to that of other social groups.

Table 4.23 Distribution of Number of Rooms per Person across Social Groups

Round	Scheduled Tribe	Scheduled Caste	Other Backward Class	Others
58 th	.62 (.617)	.54 (.564)	.67 (.829)	.75 (.678)
65 th	.68 (.495)	.62 (.473)	.76 (.615)	.87 (.706)
69 th	.76 (.588)	.70 (.601)	.88 (.761)	1.09 (.871)
76 th	.90 (.673)	.88 (.624)	.99 (.720)	1.18 (.902)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

When the distribution of number of rooms per person among OBC and Others is analysed, it can be observed that they are achieving a high level of housing consumption in terms of number of rooms per person and also recorded an increase during all the rounds considered for the study. It can also be observed that the number of rooms per person for SC/ST households being the lowest and that of OBC and others (General) being the highest among all social groups. That means households belong to SC/ST category is moving behind the households from OBC and Others group.

4.3.6 Distribution of Number of Living Rooms per Person across Social Groups:

The table 4.24 shows the distribution of percapita number of living rooms among rural households of all the social groups in India. The percapita number of living rooms is showing an increasing trend for all the social groups while comparing the respective figures of all the four rounds. The table reveals that the households belong to SC/ST category stood in the lowest position comparing to that of OBC and Others even though the respective figures regarding living rooms per person for all the groups is showing an increasing trend.

Table 4.24 Distribution of Number of Living Rooms per Person across Social Groups.

Round	Scheduled Tribe	Scheduled Caste	Other Backward Class	Others
58 th	.42 (.384)	.39 (.318)	.45 (.565)	.49 (.414)
65 th	.44 (.299)	.42 (.296)	.48 (.357)	.54 (.431)
69 th	.45 (.321)	.43 (.301)	.50 (.450)	.57 (.456)
76 th	.47 (.343)	.49 (.327)	.54 (.384)	.64 (.500)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

4.4 Changes in Housing Consumption across Economic Status:

Economic status is represented by monthly percapita consumption expenditure (MPCE). MPCE is obtained by dividing the monthly consumption expenditure by household size. Then four classes of economic status being made on the basis of quartiles- lowest, medium lowest, medium highest and highest. The households with MPCE less than Q1 (first quartile) were classified as lowest economic status; those between Q1 and Q2 being the medium lowest; those between Q2 and Q3 being medium highest and those with MPCE above Q3 being the highest. The quartiles for each round is calculated separately and classified accordingly. This method being adapted from the method suggested by UN (2011) for classifying households based on their percapita monthly income based on quartiles.

4.4.1 Distribution of Floor Area Based on Economic Status of the Households:

The table 4.25 presents details regarding the distribution of floor area on the basis of economic status across rounds. It can be noticed that there is an increase in the average floor area of all the categories except during 69th round. During 69th round all the categories of economic status witnessed a decline in mean floor area.

Table 4.25 Distribution of Floor Area across Economic Status

Round	Lowest	Medium Lowest	Medium Highest	Highest
58 th	347.35 (278.378)	389.87 (321.417)	408.00 (334.775)	520.71 (429.663)
65 th	398.67 (275.075)	425.66 (288.703)	447.09 (321.120)	542.02 (470.257)
69 th	378.23 (251.021)	411.83 (332.372)	428.75 (240.871)	504.42 (370.556)
76 th	451.42 (263.563)	468.90 (273.632)	504.13 (297.763)	602.45 (389.945)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

The households belongs to highest economic status enjoys highest level of distribution of floor area. It can also be observed from the table that the lowest category of economic status has lowest level of floor area when comparing to other groups. So we can say that economic status and floor area consumption are positively correlated. As the economic status is higher, average level of floor area is also at a higher level.

4.4.2 Distribution of Number of Rooms Based on Economic Status of the Household:

The table 4.26 gives details regarding the distribution of number of rooms across categories of economic status during four rounds. The table reveals that there occurred an increase in housing consumption in terms of number of rooms among all categories of economic status across all the rounds concerned. The table also reveals that the distribution of average number of rooms among categories of economic status is in accordance with the level of economic status enjoyed by the households.

Table 4.26 Distribution of Number of Rooms across Economic Status

Round	Lowest	Medium Lowest	Medium Highest	Highest
58 th	2.41 (2.020)	2.65 (2.694)	2.82 (2.936)	3.50 (2.548)
65 th	2.68 (1.506)	2.87 (1.638)	3.13 (1.842)	3.82 (2.210)
69 th	2.74 (1.586)	3.11 (2.278)	3.40 (1.947)	4.28 (2.362)
76 th	3.18 (1.581)	3.43 (1.647)	3.88 (1.779)	4.60 (2.099)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

4.4.3 Distribution of Number of Living Rooms Based on Economic Status of the Household:

The table 4.27 presents the details regarding the distribution of living rooms based on economic status across rounds.

Table 4.27 Distribution of Number of Living Rooms across Economic Status

Round	Lowest	Medium Lowest	Medium Highest	Highest
58 th	1.74 (1.574)	1.83 (1.924)	1.86 (1.312)	2.18 (1.425)
65 th	1.87 (1.053)	1.91 (1.069)	2.00 (1.174)	2.29 (1.417)
69 th	1.81 (1.021)	1.91 (1.792)	1.96 (1.123)	2.23 (1.371)
76 th	1.95 (1.019)	1.97 (.991)	2.10 (1.097)	2.41 (1.285)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

The table reveals that there occurred a decline in average number of living rooms of all the categories of economic status only during 69th round. It can be noticed that average number of rooms differs according to the level of economic status enjoyed by the households with

lowest category having lowest level of number of living rooms and highest with highest level of number of living rooms.

4.4.4 Distribution of Floor Area per Person Based on Economic Status of the Household:

The distribution of floor area per person based on economic status is presented in the table 4.28.

Table 4.28 Distribution of Floor Area per Person across Economic Status

Round	Lowest	Medium Lowest	Medium Highest	Highest
58 th	61.72 (51.003)	78.51 (106.315)	96.78 (95.606)	149.12 (131.090)
65 th	72.15 (65.026)	89.08 (71.179)	103.66 (75.458)	162.34 (142.566)
69 th	69.39 (46.297)	89.26 (78.514)	106.80 (76.554)	160.59 (128.535)
76 th	94.39 (64.451)	112.03 (74.245)	133.43 (89.796)	195.22 (154.328)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

It can be observed that there occurred a decline in floor area per person of the lowest economic group during 69th round. From 71.78 sq. ft. during 65th round, it has decreased to 67.52 sq. ft. during 69th round. For all other economic groups, there occurred an increase in the average floor area per person across all rounds. The table also reveals that the floor area per person increases with economic status enjoyed by the household as we move from lowest economic status to the highest.

4.4.5 Distribution of Number of Rooms per Person Based on Economic Status of the Household:

The distribution of percapita number of rooms based on economic status is presented in the above table. The table 4.29 reveals that there occurred an increase in percapita number of rooms among all categories of economic status across all rounds. Number of rooms per person of the lowest category households has increased from .44 during 58th round to .50 during 65th round; then to .52 during 69th round and to .69 during 76th round. Similarly, for the medium lowest category, number of rooms per person has increased from .54 during 58th round to .61 during 65th round; then to .70 during 69th round and to .83 during 76th round. For

medium highest households, it has increased from .68 during 58th round to .75 during 65th round; then to .86 during 69th round and to 1.05 during 76th round. Finally, for highest economic status households, number of rooms per person has increased from 1.03 during 58th round to 1.18 during 65th round; to 1.42 during 69th round and then to 1.54 during 76th round. The mere inspection of the table 4.29 itself reveals that the distribution of percapita number of rooms is according to the order of economic status of the households.

Table 4.29 Distribution of Number of Rooms per Person across Economic Status

Round	Lowest	Medium Lowest	Medium Highest	Highest
58 th	.44 (.379)	.54 (.775)	.68 (.673)	1.03 (.858)
65 th	.50 (.315)	.61 (.392)	.75 (.500)	1.18 (.860)
69 th	.52 (.348)	.70 (.634)	.86 (.567)	1.42 (.977)
76 th	.69 (.460)	.83 (.516)	1.05 (.645)	1.54 (1.034)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

4.4.6 Distribution of Number of Living Rooms per Person Based on Economic Status of the Household:

Table 4.30 details the distribution of number of living rooms per person among categories of economic status across the four rounds considered here. Regarding the distribution of living rooms per person, it can be noticed from the table 4.30 that the figures are showing an increasing trend for all economic groups during all rounds except during 69th round where the number of living rooms per person among the lowest economic category on the average stood at .34 itself i.e. the same figure during 65th round. The table 4.30 clearly indicates that the distribution of percapita number of living rooms differs according to the economic status of the household.

Table 4.30 Distribution of Number of Living Rooms per Person across Economic Status

Round	Lowest	Medium Lowest	Medium Highest	Highest
58 th	.32 (.245)	.38 (.609)	.46 (.355)	.65 (.498)
65 th	.34 (.199)	.41 (.249)	.48 (.306)	.70 (.518)
69 th	.34 (.203)	.42 (.435)	.50 (.313)	.73 (.520)
76 th	.41 (.261)	.47 (.278)	.55 (.342)	.79 (.579)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

From the discussion above, it is clear that housing consumption and economic status are closely related. When one move from lower economic status to higher levels, it can be seen that all the housing consumption variables also moving to higher levels on the average. Therefore, housing consumption is positively correlated to economic status of the household.

4.5 Changes in Housing Consumption across Occupational Groups:

Occupational groups are identified on the basis of the economic activity of the household and is classified as primary secondary and tertiary according to the NIC code. The sample households of 58th round were classified on the basis of NIC 1998; those of 65th round on the basis of NIC 2004 and households of both 69th and 76th round on the basis of NIC 2008. In this section the analysis on changes in housing consumption is done on the basis of economic activity- primary, secondary, and tertiary. All the variables of housing consumption such as floor area, number of rooms, number of living rooms, floor area per person, number of rooms per person, and number of living rooms per person are analysed by making comparisons among primary, secondary and tertiary sectors.

4.5.1 Distribution of Floor Area Based on Economic Activity of the Household:

The table 4.31 contains information regarding the distribution of floor area based on the economic activity of the household across rounds. The average floor area of the rural households in primary sector has increased from 421.51 sq. ft. during 58th round to 465.04 sq. ft. during 65th round; then decreased to 445.89 sq. ft. during 69th round; and then increased to 508.12 sq. ft. during 76th round. For secondary sector, the average floor area shows an increasing trend throughout except during 69th round where it has declined. Tertiary sector

also witnessed an increase in the mean floor area across all the rounds except 69th round. It can be observed from the table that the average floor area for the secondary sector is the lowest among the three sectors during all the four rounds. Also, there occurred a decline in the mean floor area for all the three sectors during 69th round.

Table 4.31 Distribution of Floor Area across Economic Activity

Round	Primary	Secondary	Tertiary
58 th	421.51 (352.898)	354.27 (268.888)	428.75 (335.170)
65 th	465.04 (366.123)	379.32 (247.575)	477.62 (335.183)
69 th	445.89 (317.940)	368.99 (294.934)	473.77 (320.904)
76 th	508.12 (306.394)	438.28 (265.927)	532.57 (311.827)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

4.5.2 Distribution of Number of Rooms Based on Economic Activity of the Household:

The table 4.32 analyses the distribution of number of rooms among various sectors across rounds.

Table 4.32 Distribution of Number of Rooms across Economic Activity

Round	Primary	Secondary	Tertiary
58 th	2.81 (2.696)	2.58 (2.009)	3.09 (2.547)
65 th	3.09 (1.819)	2.81 (1.636)	3.55 (2.017)
69 th	3.29 (1.958)	3.10 (2.384)	4.00 (2.237)
76 th	3.69 (1.753)	3.29 (1.659)	4.07 (1.921)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

It can be noticed from the table that average number of rooms has increased during all the rounds for all sectors. It can also be observed that the average floor area of secondary sector is the smallest of all other sectors. Also, the distribution of number of rooms for the tertiary sector is the highest during all the rounds.

4.5.3 Distribution of Number of Living Rooms Based on Economic Activity of the Household:

Details regarding the distribution of number of living rooms among primary, secondary and tertiary sectors across the rounds is presented in table 4.33. It can be observed from the table that average number of living rooms for the primary sector showing an increasing trend except during 69th round where there was a decline in average number of living rooms. But, both the secondary sector and tertiary sector is showing an increasing trend in the distribution of number of living rooms during all the four rounds.

Table 4.33 Distribution of Number of Living Rooms across Economic Activity

Round	Primary	Secondary	Tertiary
58 th	1.91 (1.738)	1.74 (1.200)	1.99 (1.260)
65 th	2.03 (1.187)	1.83 (.999)	2.19 (1.286)
69 th	1.99 (1.153)	1.85 (1.881)	2.20 (1.326)
76 th	2.08 (1.055)	1.87 (.944)	2.24 (1.165)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

The table also indicates that the distribution of living rooms is the lowest for secondary sector and the highest for tertiary sector in all the rounds.

4.5.4 Distribution of Floor Area per Person Based on Economic Activity of the Household:

The table 4.34 contains information regarding the distribution of floor area per person among primary, secondary and tertiary sectors in rural India across rounds. The distribution of floor area per person is showing an increasing trend for all the three sectors across rounds. It can be concluded that average floor area per person is at the lowest level for secondary sector and the highest for tertiary sector for all rounds.

Table 4.34 Distribution of Floor Area per Person across Economic Activity

Round	Primary	Secondary	Tertiary
58 th	89.41 (83.572)	80.02 (75.766)	99.98 (91.041)
65 th	102.00 (87.795)	85.35 (62.295)	109.71 (88.095)
69 th	103.29 (84.253)	88.64 (80.016)	112.70 (89.243)
76 th	123.96 (91.302)	110.26 (84.218)	134.82 (94.427)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

4.5.5 Distribution of Number of Rooms per Person Based on Economic Activity of the Household:

The table 4.35 presents the distribution of number of rooms per person among primary, secondary and tertiary sectors across rounds. The table reveals that number of rooms per person is showing an increasing trend throughout all the four rounds for all sectors. It can be traced out from the table that average number of rooms per person is the lowest for secondary sector and the highest for tertiary sector during all the four rounds.

Table 4.35 Distribution of Number of Rooms per Person across Economic Activity

Round	Primary	Secondary	Tertiary
58 th	.61 (.685)	.60 (.628)	.73 (.674)
65 th	.69 (.528)	.65 (.479)	.83 (.613)
69 th	.78 (.611)	.77 (.722)	.98 (.728)
76 th	.92 (.626)	.84 (.589)	1.05 (.669)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

4.5.6 Distribution of Number of Living Rooms per Person Based on Economic Activity of the Household:

The distribution of number of living rooms per person among primary, secondary and tertiary sectors across round is presented in the table 4.36.

Table 4.36 Distribution of Number of Living Rooms per Person across Economic Activity

Round	Primary	Secondary	Tertiary
58 th	0.42 (.483)	0.40 (.285)	0.46 (.350)
65 th	0.45 (.328)	0.42 (.274)	0.51 (.352)
69 th	0.47 (.335)	0.45 (.504)	0.52 (.374)
76 th	0.51 (.339)	0.47 (.298)	0.56 (.348)

Source: computed from NSSO Data- 58th, 65th, 69th and 76th rounds (figures in brackets are standard deviations)

It can be observed from the table that number of living rooms per person on the average is showing an increasing trend across the rounds for all the three sectors. The table also indicates that the distribution of living rooms per person is at the lowest level for secondary sector and at the highest level for the tertiary sector during all the four rounds.

To conclude, the housing consumption of occupational groups based on economic activity reveals that the secondary sector stood at a lowest level comparing to primary and tertiary sectors regarding the distribution of housing consumption variables during all the four rounds analysed here. Tertiary sector secured the highest position in the distribution of all the housing consumption variables on the average. Primary sector stood in second position in this regard.

4.6 Changes in Pattern of Housing Consumption: A State Level Analysis:

In this section, a state level analysis is done in order to understand the inter-state disparities in housing consumption in rural India across the four rounds considered under study as the national level analysis being insufficient in this regard. In a large country like India there exists wide disparities in the distribution of housing consumption variables which

necessitates an analysis of regional disparities based on an interstate comparison approach. For simplifying the analysis, the present study uses the method of classification of states/UTs into “larger” and “smaller” states based on their share in the total population of the country by NIRD Hyderabad (2014). According to their methodology, states/UTs having the proportion of population exceeding 0.5% of all India total were classified as larger states and those which do not satisfy this criteria as smaller states (Kannan, Raveendran, Menon, Maria, & Dhanya, 2014). Here the analysis is made on the data of rural households in larger states only. The larger states include Uttar Pradesh, Maharashtra, Bihar, West Bengal, Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Rajasthan, Karnataka, Gujarat, Odisha, Kerala, Jharkhand, Assam, Punjab, Chhattisgarh, Haryana, Delhi, Jammu & Kashmir, Uttaranchal, Himachal Pradesh and Telangana.

Here the analysis being made on two dimensions-i) inter-state comparison of Housing consumption across rounds using NSSO 58th, 65th, 69th and 76th rounds and ii) inter-state comparison of housing consumption across social groups based on 76th round data which is the latest round in this regard.

4.6.1 Inter-State Comparison of Housing Consumption across Rounds:

Here, comparison of states being made based on the data of housing consumption variables of rural households during 58th, 65th, 69th and 76th rounds.

4.6.1.1 Changes in the Distribution of Floor Area across States:

The table 4.37 presents details of housing consumption in terms of floor area (in sq. ft.) of the rural households in larger states. The figures reveal that the states such as Punjab, Haryana, Chhattisgarh, Gujarat, and Kerala shows an increasing trend in the distribution of floor area across all the rounds and also their figures are above the national average in all the rounds considered. Jammu & Kashmir, Himachal Pradesh, Rajasthan, Assam, and Madhya Pradesh are the states having average floor area above national average but faced a decline either during 69th round or during 65th round. All other states have average floor area below the national average. According to the figures of 76th round which being the latest round in this regard, it can be observed that Punjab occupies the first position in average floor area (839.38 sq. ft.) followed by Kerala (816.98 sq. ft.) and Jammu & Kashmir (683.54 sq. ft.). The lowest position in this regard is hold by Andhra Pradesh (327.88 sq. ft.) followed by Odisha (339.26 sq. ft.) and West Bengal (349.15 sq. ft.).

Table 4.37 Distribution of Floor Area across States

States	58 th Round	65 th Round	69 th Round	76 th round
Jammu & Kashmir	732.03	710.06	603.69	683.54
Himachal Pradesh	584.09	541.63	647.40	656.79
Punjab	613.57	606.67	626.33	839.38
Uttaranchal	386.48	453.39	421.23	614.56
Haryana	533.90	542.07	584.98	647.29
Delhi	342.09	599.15	422.43	477.03
Rajasthan	423.26	502.59	459.76	574.60
Uttar Pradesh	462.20	489.13	439.99	498.49
Bihar	433.22	507.21	340.78	518.38
Assam	541.72	649.93	622.01	606.34
West Bengal	342.31	342.63	354.42	349.15
Jharkhand	401.12	470.48	433.26	499.91
Odisha	303.07	363.87	336.63	339.26
Chhattisgarh	504.07	513.58	581.35	570.78
Madhya Pradesh	454.60	513.08	454.90	502.24
Gujarat	478.38	482.62	521.02	572.20
Maharashtra	360.79	392.20	420.35	496.18
Andhra Pradesh	277.65	286.07	321.29	327.88
Karnataka	367.51	404.33	386.56	541.90
Kerala	583.27	636.60	689.03	816.98
Tamil Nadu	312.67	335.33	350.74	441.78
Telangana	-	-	-	386.80
All India	411.41	451.03	430.95	501.19

Source: computed from unit level data- NSSO 58th, 65th, 69th, & 76th rounds

4.6.1.2 Changes in the Distribution of Number of Rooms across States:

The table 4.38 portrays the distribution of number of rooms across states during the four rounds under discussion. The table 4.38 reveals that there exist huge variations in the distribution of number of rooms across states during the four rounds.

Table 4.38 Distribution of Number of Rooms across States

States	58 th Round	65 th Round	69 th Round	76 th round
Jammu & Kashmir	4.76	5.06	4.52	5.40
Himachal Pradesh	3.87	3.74	5.36	5.46
Punjab	3.79	3.76	4.87	5.26
Uttaranchal	3.48	3.95	4.72	5.06
Haryana	3.68	3.75	5.04	4.91
Delhi	1.99	3.06	4.71	3.79
Rajasthan	2.89	3.03	3.36	3.91
Uttar Pradesh	2.77	2.88	2.90	3.32
Bihar	2.77	3.00	2.76	3.41
Assam	3.97	4.20	4.45	4.38
West Bengal	2.51	2.61	3.12	3.09
Jharkhand	2.92	3.57	3.17	3.39
Odisha	2.56	2.78	2.79	2.71
Chhattisgarh	3.16	3.74	3.74	4.28
Madhya Pradesh	2.60	2.89	3.00	3.18
Gujarat	2.42	2.64	3.31	3.82
Maharashtra	2.25	2.72	3.23	3.70
Andhra Pradesh	2.24	2.47	3.05	3.41
Karnataka	3.00	3.67	3.58	4.29
Kerala	5.19	5.83	6.69	6.84
Tamil Nadu	2.44	2.86	3.19	3.87
Telangana	-	-	-	3.76
All India	2.81	3.11	3.38	3.72

Source: computed from unit level data- NSSO 58th, 65th, 69th, & 76th rounds

As per the figures of 76th round, Kerala (6.84) ranks first in terms of average number of rooms followed by Himachal Pradesh (5.46) and Jammu Kashmir (5.40). The lowest position is hold by Odisha (2.71), followed by West Bengal (3.09), and Madhya Pradesh (3.18). Also, the states like Andhra Pradesh, Maharashtra, Madhya Pradesh, Odisha, Jharkhand, West Bengal, Bihar and Uttar Pradesh stood below the national average as per 76th round figures.

4.6.1.3 Changes in the Distribution of Number of Living Rooms across States:

The distribution of living rooms across states during the four rounds being presented in table 4.39.

Table 4.39 Distribution of Living Rooms across States

States	58 th Round	65 th Round	69 th Round	76 th round
Jammu & Kashmir	3.23	3.40	2.82	3.15
Himachal Pradesh	2.56	2.61	3.00	3.06
Punjab	2.12	2.28	2.42	2.61
Uttaranchal	2.25	2.31	2.25	2.63
Haryana	2.31	2.15	2.50	2.64
Delhi	1.66	2.16	2.05	1.91
Rajasthan	2.04	2.15	2.07	2.27
Uttar Pradesh	2.06	2.06	1.95	2.02
Bihar	1.96	2.09	1.81	2.20
Assam	2.39	2.64	2.65	2.64
West Bengal	1.70	1.70	1.80	1.79
Jharkhand	2.20	2.49	2.13	2.17
Odisha	1.70	1.80	1.84	1.62
Chhattisgarh	2.16	2.31	2.25	2.33
Madhya Pradesh	1.84	1.98	1.93	1.86
Gujarat	1.58	1.72	1.75	1.86
Maharashtra	1.55	1.71	1.71	1.91
Andhra Pradesh	1.48	1.57	1.66	1.51
Karnataka	1.61	2.08	1.87	2.16
Kerala	3.17	3.35	3.44	3.83
Tamil Nadu	1.56	1.54	1.69	1.95
Telangana	-	-	-	1.87
All India	1.89	2.01	1.98	2.09

Source: Computed from unit level data- NSSO 58th, 65th, 69th & 76th rounds

The table shows that states like Jammu & Kashmir, Uttaraanchal, Delhi, Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, Madhya Pradesh, and Karnataka witnessed a decrease in number of living rooms on the average during 69th round. The all India average also experienced a decrease in this round. For Maharashtra, the number of living rooms stood

at the same figure as in 65th round. All the remaining states registered an increase in mean number of living rooms across all the rounds. During 58th and 65th rounds the first position in the distribution of number of living rooms were occupied by Jammu & Kashmir; but during 69th and 76th rounds the first position was achieved by Kerala. Andhra Pradesh continues to hold the lowest position in average number of living rooms during all the rounds except 65th round where the lowest position being occupied by Tamil Nadu. The 76th round figures says that Kerala occupies the first position in average number of living rooms (3.83) followed by Jammu & Kashmir (3.15) and Himachal Pradesh (3.06). And, the lowest position was hold by Andhra Pradesh (1.51), Odisha (1.62) and West Bengal (1.79).

4.6.1.4 Changes in the Distribution of Floor Area per Person across States:

The table 4.40 details the distribution of floor area per person across rural households of the states.

Table 4.40 Distribution of Floor Area per Person across States

States	58 th Round	65 th Round	69 th Round	76 th round
Jammu & Kashmir	131.14	127.70	128.21	148.38
Himachal Pradesh	151.61	151.23	195.12	184.88
Punjab	127.75	136.90	143.88	211.65
Uttaranchal	95.45	110.83	129.83	155.90
Haryana	106.36	117.16	126.62	153.81
Delhi	83.70	140.22	91.21	131.08
Rajasthan	84.05	109.17	105.43	131.59
Uttar Pradesh	92.31	99.06	92.40	112.04
Bihar	83.47	102.01	73.51	114.05
Assam	105.83	129.08	129.22	138.66
West Bengal	77.68	81.66	90.13	105.31
Jharkhand	93.95	91.79	95.89	118.02
Odisha	72.60	89.46	90.56	100.58
Chhattisgarh	127.98	114.09	137.38	144.47
Madhya Pradesh	91.51	112.36	105.56	123.53
Gujarat	106.55	119.08	126.69	145.35
Maharashtra	88.71	103.90	109.36	131.82
Andhra Pradesh	83.77	85.19	100.68	116.89
Karnataka	93.19	100.77	102.68	155.57
Kerala	152.92	184.46	206.41	256.67
Tamil Nadu	93.07	103.51	113.29	143.97
Telangana	-	-	-	122.34
All India	93.88	105.34	106.62	130.10

Source: Computed from unit level data- NSSO 58th, 65th, 69th & 76th rounds

It can be noticed from the table that floor area per person on the average is showing an increasing trend except for some states. States such as Rajasthan, Delhi, Uttar Pradesh, Bihar and Madhya Pradesh witnessed a decrease in floor area per person during 69th round. For all other states mean floor area per person is showing an increasing trend along with the national average in this regard. The table also reveals that Kerala continues to hold first position in average floor area per person during all the four rounds. According to the figures of 76th round, we can see that the first three positions are occupied by Kerala (256.67 sq. ft.), Punjab (211.65 sq. ft.) and Himachal Pradesh (184.88) respectively. The lowest three position being held by Odisha (100.58 sq. ft.), West Bengal (105.31sq. ft.) and Uttar Pradesh (112.04) respectively.

4.6.1.5 Changes in the Distribution of Number of Rooms per Person across States:

The table 4.41 presents details regarding the distribution of number of rooms per person across larger states. The number of rooms per person on the average recorded an increasing trend throughout the rounds for all the states except Bihar where it has decreased during 69th round. Rajasthan, Uttar Pradesh, Bihar, West Bengal, Jharkhand, Odisha, Madhya Pradesh and Maharashtra stood below the national average (<1.00) according to 76th round figures while the remaining states stood above the national average. The figures reveal that Kerala continues to occupy the first position regarding the distribution of number of rooms per person during all the four rounds and Himachal Pradesh in the second position. The 76th round figures placed Kerala (2.18), Himachal Pradesh (1.57) and Punjab (1.34) in the first three positions respectively whereas the lowest three positions being occupied by Uttar Pradesh (.75), Bihar (.75) and Madhya Pradesh (.79) respectively.

Table 4.41 Distribution of Number of Rooms per Person across States

States	58 th Round	65 th Round	69 th Round	76 th round
Jammu & Kashmir	0.85	0.92	0.97	1.18
Himachal Pradesh	1.02	1.10	1.64	1.57
Punjab	0.82	0.85	1.15	1.34
Uttaranchal	0.89	0.99	1.63	1.26
Haryana	0.75	0.83	1.15	1.17
Delhi	0.51	0.70	1.02	1.12
Rajasthan	0.59	0.66	0.81	0.89
Uttar Pradesh	0.56	0.58	0.61	0.75
Bihar	0.53	0.61	0.60	0.75
Assam	0.78	0.84	0.93	1.00
West Bengal	0.58	0.62	0.81	0.95
Jharkhand	0.70	0.70	0.71	0.80
Odisha	0.64	0.68	0.79	0.85
Chhattisgarh	0.77	0.86	0.94	1.10
Madhya Pradesh	0.54	0.66	0.71	0.79
Gujarat	0.56	0.65	0.83	1.02
Maharashtra	0.56	0.72	0.87	0.99
Andhra Pradesh	0.66	0.76	1.02	1.24
Karnataka	0.78	0.94	1.00	1.29
Kerala	1.36	1.69	2.03	2.18
Tamil Nadu	0.74	0.88	1.04	1.28
Telangana				1.21
All India	.66	.75	.88	1.00

Source: Computed from unit level data-NSSO 58th, 65th, 69th & 76th rounds

4.6.1.6 Changes in the Distribution of Number of Living Rooms per Person:

The table 4.42 presents the distribution of living rooms per person among rural households across states. Regarding the distribution of living rooms per person, the figures tell us that Kerala continues to be in the first position and Himachal Pradesh in the second position during all the four rounds under study. The 76th round figures reveal that the first three higher positions in the distribution of living rooms per person being occupied by Kerala

(1.21), Himachal Pradesh (.85) and Jammu & Kashmir (.68) respectively and are above the national average. The first three lower positions being filled by Uttar Pradesh (.45), Madhya Pradesh (.46) and Odisha (.47) respectively which are below the national average (.54).

Table 4.42 Distribution of Living Rooms per Person across States

States	58 th Round	65 th Round	69 th Round	76 th round
Jammu & Kashmir	0.57	0.61	0.59	0.68
Himachal Pradesh	0.67	0.74	0.89	0.85
Punjab	0.46	0.52	0.56	0.66
Uttaranchal	0.56	0.59	0.69	0.66
Haryana	0.48	0.47	0.55	0.63
Delhi	0.45	0.48	0.45	0.54
Rajasthan	0.41	0.47	0.48	0.51
Uttar Pradesh	0.42	0.42	0.41	0.45
Bihar	0.38	0.42	0.39	0.48
Assam	0.46	0.52	0.55	0.59
West Bengal	0.39	0.41	0.46	0.53
Jharkhand	0.50	0.49	0.47	0.51
Odisha	0.43	0.44	0.50	0.47
Chhattisgarh	0.53	0.53	0.56	0.58
Madhya Pradesh	0.39	0.45	0.45	0.46
Gujarat	0.37	0.42	0.42	0.48
Maharashtra	0.39	0.45	0.45	0.50
Andhra Pradesh	0.46	0.47	0.53	0.53
Karnataka	0.42	0.52	0.51	0.62
Kerala	0.82	0.97	1.02	1.21
Tamil Nadu	0.47	0.48	0.55	0.64
Telangana	-	-	-	0.59
All India	.44	.48	.49	.54

Source: Computed from unit level data-NSSO 58th, 65th, 69th & 76th rounds

In brief, we can conclude here that there exist huge inter-state variations in the distribution of housing consumption variables across rounds. Kerala is one among the states occupying highest positions in housing consumption variables during all the rounds

considered here. Besides Kerala states like, Punjab, Himachal Pradesh, and Jammu & Kashmir also occupy highest positions in the distribution of housing consumption variables and were also standing above the national average. The states like Odisha, Madhya Pradesh, West Bengal, Bihar, Andhra Pradesh etc., were lagging behind other states and were also standing below the national average in the distribution of most of the housing consumption variables analysed in this section.

4.6.2 Interstate Comparisons of Housing Consumption across Social Groups.

In this section the study compares the level of housing consumption of social groups in each state. That is we are comparing the distribution of all the housing consumption variables among social groups in all the larger states based on the data of rural households from 76th round.

4.6.2.1 Inter-State Comparison of Distribution of Floor Area across Social Groups:

The table 4.43 presents floor area distribution of the rural households on the basis of social groups across states during 76th round. First of all, it can be noticed that in all the states the average floor area of SC/ST households lags behind that of OBC/Others except Chhattisgarh. In states such as Himachal Pradesh, Punjab, Haryana, Bihar West Bengal, Odisha, Madhya Pradesh, Gujarat, Maharashtra and Tamil Nadu average floor area of ST households is slightly higher than that of SC households. In the remaining states, ST households hold the lowest position in terms of average floor area.

The highest position in terms of mean floor area enjoyed by ST households being occupied by Punjab (679.19 sq. ft.) followed by Himachal Pradesh (616.99 sq. ft.) and Jammu & Kashmir (608.52 sq. ft.). For SC households the highest mean floor area is in Chhattisgarh (731.94 sq. ft.) followed by Jammu& Kashmir (660.31 sq. ft.) and Punjab (651.28 sq. ft.). For OBC households the highest mean floor area is recorded in Punjab (883.08 sq. ft.) followed by Kerala (814.02 sq. ft.) regarding the social group 'Others', the highest being recorded in Punjab (1033.74 sq. ft.) followed by Kerala (938.88 sq. ft.) and Haryana (769.11 sq. ft.).

Regarding the lowest position in terms of average floor area, it can be observed from the table that for ST households, Andhra Pradesh (260.25 sq. ft.), Telangana (264.39 sq. ft.), and Odisha (329.84 sq. ft.) respectively occupies the lowest three positions. Among SC households, the lowest mean floor area being recorded in Andhra Pradesh (275.62 sq. ft.) followed by Odisha (313.68 sq. ft.) and West Bengal (328.84 sq. ft.). the lowest mean floor area for OBC category is recorded in Andhra Pradesh (338.29 sq. ft.) followed by Odisha

(350.62 sq. ft.) and West Bengal (354.95 sq. ft.). Again, for ‘Others’, the lowest position being occupied by West Bengal (361.72 sq. ft.), Odisha (361.82 sq. ft.) and Andhra Pradesh (390.04 sq. ft.).

Table 4.43 Social Group-Wise Distribution of Floor Area across States

States	ST	SC	OBC	Others
Jammu & Kashmir	608.52	660.31	675.15	698.93
Himachal Pradesh	616.99	499.91	733.26	705.93
Punjab	679.19	651.28	883.08	1033.74
Uttaranchal	478.84	514.19	688.20	637.68
Haryana	481.35	429.22	722.11	769.11
Delhi	441.94	459.59	586.18	421.89
Rajasthan	507.61	515.84	603.81	664.53
Uttar Pradesh	385.51	420.00	514.99	598.59
Bihar	511.14	435.47	522.40	637.31
Assam	608.41	614.69	612.89	600.15
West Bengal	335.28	328.84	354.95	361.72
Jharkhand	463.38	506.82	516.08	574.20
Odisha	329.84	313.68	350.62	361.82
Chhattisgarh	491.81	731.94	576.72	644.71
Madhya Pradesh	460.18	437.15	531.02	583.19
Gujarat	592.54	505.31	534.23	655.34
Maharashtra	463.62	412.77	488.48	554.64
Andhra Pradesh	260.25	275.62	338.29	390.04
Karnataka	455.59	478.58	552.71	611.44
Kerala	515.88	557.23	814.02	938.88
Tamil Nadu	401.29	369.31	477.39	737.50
Telangana	264.39	346.53	389.21	561.58
All India	459.42	426.26	514.88	573.05

Source: Computed from unit level data-NSSO76th round

4.6.2.2 Inter-State Comparison of Distribution of Number of Rooms across Social Groups:

Table 4.44 makes a comparison on the distribution of total number of rooms across states based on social group.

Table 4.44 Social Group-wise Distribution of Number of Rooms across States

States	ST	SC	OBC	Others
Jammu & Kashmir	4.52	4.78	6.06	5.45
Himachal Pradesh	4.73	5.00	5.25	5.90
Punjab	4.35	4.54	5.17	6.09
Uttaranchal	4.64	4.70	5.16	5.25
Haryana	3.36	4.03	4.93	5.77
Delhi	3.72	3.69	3.92	3.77
Rajasthan	2.62	3.83	4.25	4.70
Uttar Pradesh	3.06	2.84	3.38	4.01
Bihar	3.38	2.88	3.46	4.11
Assam	4.33	4.08	4.37	4.43
West Bengal	2.89	2.98	3.16	3.16
Jharkhand	3.25	3.12	3.51	3.87
Odisha	2.58	2.51	2.85	2.91
Chhattisgarh	3.81	4.43	4.58	5.02
Madhya Pradesh	2.98	2.84	3.33	3.53
Gujarat	3.34	3.71	3.72	4.69
Maharashtra	2.96	3.34	3.73	4.16
Andhra Pradesh	3.03	2.98	3.46	3.93
Karnataka	3.41	3.87	4.55	4.37
Kerala	5.29	5.26	6.99	7.30
Tamil Nadu	3.31	3.36	4.14	5.30
Telangana	2.83	3.61	3.80	4.62
All India	3.22	3.27	3.82	4.26

Source: Computed from unit level data- NSSO 76th round

To start with, let's take the case of ST category. The average number of rooms for ST households is the highest in Kerala (5.29) followed by Himachal Pradesh (4.73) and

Uttaranchal (4.64). And, the lowest being recorded in Odisha (2.58), Rajasthan (2.62) and Telangana (2.83) respectively. As far as the SC households are concerned, the highest three positions being occupied by Kerala (5.26), Himachal Pradesh (5.00) and Jammu & Kashmir (4.78) respectively. The lowest positions being recorded in Odisha (2.51), Uttar Pradesh (2.84) and Madhya Pradesh (2.84) respectively. For OBC households, the highest three positions being occupied by Kerala (6.99), Jammu & Kashmir (6.06), and Himachal Pradesh (5.25) respectively. The lowest being secured by Odisha (2.85), West Bengal (3.16) and Madhya Pradesh (3.33). Others category being the highest among all other social groups recorded the highest number of rooms on the average in Kerala (7.30) followed by Punjab (6.09) and Himachal Pradesh (5.90). The lowest position in this category being occupied by Odisha (2.91), West Bengal (3.16), and Madhya Pradesh (3.53). It can be concluded that Kerala state occupies the highest position in number of rooms across all the social groups. It can be observed that Odisha is in the lowest position in mean number of rooms among all categories of social group.

4.6.2.3 Inter-State Comparison of Distribution of Living Rooms across Social Groups:

The table 4.45 describes the distribution of average number of living rooms across social groups in larger states. First of all, it can be observed from the table that there exist variations in the distribution of living rooms across social groups in different states. More specifically, the SC/ST households lag behind households from OBC/Others category in the case of average number of living rooms. There exists inter-state variations in the distribution of living rooms across social groups. While states like Kerala, Jammu Kashmir, and Himachal Pradesh etc. hold highest position among all the social groups, the states like Andhra Pradesh, Odisha, etc., were lagging behind in terms average number of living rooms among all social groups.

Analysing each social group separately across the states reveals that for ST households, the highest position in average number of living rooms being secured by Kerala (3.15), Himachal Pradesh (2.63) and Jammu & Kashmir (2.61) respectively and the lowest three positions being occupied by Andhra Pradesh (1.06), Madhya Pradesh (1.39) and Odisha (2.06) respectively. Among SC households, the highest three positions being recorded in Kerala (3.04), Jammu Kashmir (2.75) and Himachal Pradesh (2.72) while the lowest three positions being hold by Andhra Pradesh (1.36), Odisha (1.58) and Madhya Pradesh (1.64). Kerala (3.93), Jammu & Kashmir(3.42), and Himachal Pradesh (2.87) occupy the highest three positions for OBC households in average number of living rooms whereas Andhra Pradesh (1.56), Odisha (1.76) and West Bengal (1.83) stood in the lowest three positions in

this regard. Kerala achieved the highest position in mean number of living rooms for ‘Others’ category (4.02) followed by Himachal Pradesh (3.39) and Jammu & Kashmir (3.21). The lowest three positions in this regard were secured by Andhra Pradesh (1.76), West Bengal (1.82) and Odisha (1.83).

Table 4.45 Social Group-wise Distribution of Living Rooms across States

States	ST	SC	OBC	Others
Jammu & Kashmir	2.61	2.75	3.42	3.21
Himachal Pradesh	2.63	2.72	2.87	3.39
Punjab	2.32	2.27	2.71	2.96
Uttaranchal	2.14	2.38	2.69	2.77
Haryana	1.62	2.19	2.59	3.16
Delhi	2.02	1.93	1.95	1.87
Rajasthan	1.86	2.13	2.41	2.59
Uttar Pradesh	1.93	1.78	2.06	2.34
Bihar	2.25	1.96	2.20	2.60
Assam	2.55	2.45	2.68	2.67
West Bengal	1.79	1.70	1.83	1.82
Jharkhand	2.02	1.99	2.30	2.46
Odisha	1.39	1.58	1.76	1.83
Chhattisgarh	2.06	2.47	2.47	2.78
Madhya Pradesh	1.81	1.64	1.95	2.00
Gujarat	1.47	1.78	1.89	2.35
Maharashtra	1.67	1.69	1.92	2.09
Andhra Pradesh	1.06	1.36	1.56	1.76
Karnataka	1.82	1.90	2.27	2.26
Kerala	3.15	3.04	3.93	4.02
Tamil Nadu	1.84	1.78	2.02	2.88
Telangana	1.50	1.81	1.91	2.13
All India	1.84	1.86	2.14	2.36

Source: computed from unit level data-NSSO 76th round

4.6.2.4 Inter-State Comparison of Floor Area per Person across Social Groups:

The distribution of floor area per person across states based on social groups being presented in the table 4.46. The table indicates that there exist inter-state variations in average floor area per person across social groups. Also, within the state itself, there exists differences among different social groups regarding the same.

Table 4.46 Social Group-wise Distribution of Floor Area per Person across States

States	ST	SC	OBC	Others
Jammu & Kashmir	137.95	147.29	135.55	153.13
Himachal Pradesh	151.89	145.15	198.05	203.52
Punjab	228.32	152.41	208.22	278.07
Uttaranchal	97.35	115.02	161.58	179.88
Haryana	203.87	110.35	166.30	174.62
Delhi	112.75	113.91	144.95	132.70
Rajasthan	121.52	114.11	134.38	166.03
Uttar Pradesh	93.84	99.22	112.90	134.77
Bihar	114.06	95.84	114.11	143.29
Assam	137.79	153.07	147.59	131.29
West Bengal	97.75	95.24	97.43	114.92
Jharkhand	116.85	117.82	116.71	135.58
Odisha	102.07	90.31	101.64	106.99
Chhattisgarh	124.98	180.93	144.68	204.00
Madhya Pradesh	114.60	110.93	128.54	143.37
Gujarat	139.68	143.17	128.62	187.84
Maharashtra	120.43	117.76	130.19	144.71
Andhra Pradesh	108.09	94.45	115.66	148.52
Karnataka	129.43	135.84	159.44	175.57
Kerala	177.66	200.74	236.40	314.40
Tamil Nadu	134.64	118.07	156.10	308.49
Telangana	86.87	103.73	124.42	177.94
All India	119.97	111.06	130.62	154.15

Source: computed from unit level data-NSSO 76th round

Starting with ST households, it can be seen that the first three positions regarding the average floor area per person being occupied by Punjab (228.32 sq. ft.), Haryana (203.87 sq. ft.) and Kerala (177.66 sq. ft.). The lowest three positions from this category being hold by Telangana (86.87 sq. ft.), Uttar Pradesh (93.84 sq. ft.) and Uttaranchal (97.35 sq. ft.). In the case of SC households, the highest three positions being occupied by Kerala (200.74 sq. ft.), Chhattisgarh (180.93 sq. ft.) and Assam (153.07 sq. ft.) and the lowest three being Odisha (90.31 sq. ft.), Andhra Pradesh (94.45 sq. ft.) and West Bengal (95.24 sq. ft.). The figures for OBC households reveal that the highest position with respect to average floor area per person being recorded in Kerala (236.40 sq. ft.), followed by Punjab (208.22 sq. ft.) and Himachal Pradesh (198.05 sq. ft.) and the lowest being occurred in West Bengal (97.43 sq. ft.), followed by Odisha (101.64 sq. ft.) and Uttar Pradesh (112.90 sq. ft.).

Others as a social category comparatively performs better than that of other social groups in terms average floor area per person. The highest three positions in terms of floor area per person being occupied by Kerala (314.40 sq. ft.), Tamil Nadu (308.40 sq. ft.) and Punjab (278.07 sq. ft.) and the lowest three positions being recorded in Odisha (106.99 sq. ft.), West Bengal (114.92 sq. ft.) and Assam (131.29 sq. ft.).

4.6.2.5 Inter-State Comparison of Number of Rooms per Person across Social Groups:

The distribution of number of rooms per person among social groups across states being presented in the table 4.47. To begin with, let's take the case of rural households from ST category. It can be observed from the table that there exist inter-state variations regarding the distribution of number of rooms per person of ST households. The highest three positions in average number of rooms per person being held by Kerala (1.85), Punjab (1.49) and Andhra Pradesh (1.42) and the lowest three states in this regard include Rajasthan (.43), Uttar Pradesh (.73) and Bihar (.73). For SC category, the highest three positions being occupied by Kerala (1.90), Himachal Pradesh (1.43), and Karnataka (1.14) whereas the lowest positions in this regard were secured by Bihar (.63), Uttar Pradesh (.67) and Odisha (.72). As far as the OBC category is concerned the figures reveal that Kerala (2.07), Karnataka (1.37) and Tamil Nadu (1.37) stood in highest positions while, Uttar Pradesh, Bihar, Jharkhand stood in lowest positions. Others as a social group occupy the highest position in housing consumption in terms of number of rooms per person comparing to that of other categories. More specifically, the data reveals that Kerala (2.46), Tamil Nadu (2.26) and Himachal Pradesh (1.75) stood in the highest three positions while Madhya Pradesh (.86), Odisha (.87),

Jharkhand (.92), Bihar (.92), and Uttar Pradesh (.92) secured the lowest three positions in this regard.

Table 4.47 Social Group-wise Distribution of Number of Rooms per Person across States

States	ST	SC	OBC	Others
Jammu & Kashmir	0.99	1.04	1.25	1.20
Himachal Pradesh	1.20	1.43	1.45	1.75
Punjab	1.49	1.09	1.25	1.66
Uttaranchal	0.92	1.07	1.14	1.47
Haryana	1.31	1.02	1.12	1.34
Delhi	0.94	0.93	1.00	1.29
Rajasthan	0.63	0.85	0.94	1.14
Uttar Pradesh	0.73	0.67	0.74	0.92
Bihar	0.73	0.63	0.75	0.92
Assam	1.00	1.02	1.04	0.97
West Bengal	0.86	0.88	0.87	1.02
Jharkhand	0.81	0.73	0.80	0.92
Odisha	0.94	0.72	0.83	0.87
Chhattisgarh	1.01	1.10	1.17	1.50
Madhya Pradesh	0.75	0.74	0.82	0.86
Gujarat	0.88	1.05	0.94	1.36
Maharashtra	0.79	0.97	0.99	1.09
Andhra Pradesh	1.42	1.05	1.18	1.51
Karnataka	0.99	1.14	1.37	1.36
Kerala	1.85	1.90	2.07	2.46
Tamil Nadu	1.20	1.07	1.37	2.26
Telangana	0.94	1.11	1.22	1.58
All India	.90	.88	.99	1.18

Source: computed from unit level data-NSSO 76th round

4.6.2.6 Interstate Comparison of Living Rooms per Person across Social Groups:

The table 4.48 contains the details regarding the distribution of living rooms per person across states based on social group.

Table 4.48 Social Group-wise Distribution of Living Rooms per Person across States

States	ST	SC	OBC	Others
Jammu & Kashmir	0.58	0.62	0.70	0.70
Himachal Pradesh	0.67	0.76	0.78	0.95
Punjab	0.76	0.54	0.66	0.80
Uttaranchal	0.42	0.53	0.59	0.78
Haryana	0.68	0.57	0.59	0.72
Delhi	0.51	0.48	0.51	0.59
Rajasthan	0.45	0.46	0.52	0.62
Uttar Pradesh	0.46	0.42	0.45	0.53
Bihar	0.49	0.43	0.47	0.58
Assam	0.58	0.60	0.63	0.57
West Bengal	0.52	0.49	0.50	0.57
Jharkhand	0.50	0.47	0.52	0.58
Odisha	0.41	0.44	0.51	0.54
Chhattisgarh	0.51	0.61	0.62	0.84
Madhya Pradesh	0.45	0.42	0.47	0.48
Gujarat	0.36	0.51	0.46	0.66
Maharashtra	0.44	0.48	0.50	0.54
Andhra Pradesh	0.37	0.46	0.53	0.68
Karnataka	0.52	0.53	0.66	0.66
Kerala	1.05	1.07	1.15	1.35
Tamil Nadu	0.66	0.57	0.67	1.27
Telangana	0.49	0.55	0.60	0.73
All India	.47	.49	.54	.64

Source: computed from unit level data- NSSO 76th round

The average number of living rooms per person for households from ST category is the highest in Kerala (1.05) followed by Punjab (.76) and Haryana (.68) and the lowest three positions in this regard being secured by Gujarat (.36), Andhra Pradesh (.37) and Odisha (.41). The respective figures for SC households reveal that the highest three positions in average number of living rooms per persons being held by Kerala (1.07), Himachal Pradesh (0.76) and Jammu & Kashmir (0.62) and the lowest positions in this regard were secured by Madhya Pradesh (.42), Uttar Pradesh (.42), and Bihar (.43). For OBC households, Kerala (1.15) stood in the first position followed by Himachal Pradesh (.78) and Jammu & Kashmir (.70) and the lowest in this regard being recorded in Uttar Pradesh (.45) followed by Gujarat (.46), Madhya Pradesh (.47) and Bihar (.47). For 'Others', the highest three positions being occupied by Kerala (1.35), Tamil Nadu (1.27) and Himachal Pradesh (.95) and the lowest

three positions in this regard being secured by Madhya Pradesh (.48), Uttar Pradesh (.53), Maharashtra (.54) and Odisha (.54).

In short, it can be inferred from the above discussion that the rural households belong to SC/ST categories lagging behind OBC/Others categories in the distribution of housing consumption variables on the average. Also, there exists huge inter-state variations in the distribution of housing consumption variables within each group. Kerala is performing better in the distribution of all the housing consumption variables and stood above the national average. Still, there exists huge variations in the average values of housing consumption variables between the social groups in Kerala too.

4.7 Conclusion:

From the discussion above it is clear that there occurred changes in the pattern of housing consumption in rural India during the period from 2002 to 2018 by analysing the unit level NSSO data of the four rounds considered during this period. All the housing consumption variables were showing an increasing trend across the rounds except floor area and number of living rooms. There occurred significant changes in the level of housing consumption across social groups too. The others (General) and OBC categories stood in the highest position and the Scheduled caste and Scheduled tribes in the lowest position regarding the distribution of all the housing consumption variables during all the four rounds under study. Also the study reveals that there exists a positive relationship between economic status and level of housing consumption. Even though there is an increasing trend in housing consumption among primary, secondary and tertiary economic activities, there exists significant differences regarding the distribution of housing consumption variables among these categories across rounds. Tertiary sector stood in the first position regarding the distribution of all the housing consumption variables during all the four rounds while secondary sector occupied the lowest position. There exist inter-state differences in the distribution of housing consumption variables across the rounds. Also, there exist inter-state variations in the distribution of housing consumption variables across social groups. In this context, it is necessary to find out the determinants of housing consumption which is being discussed in the next chapter.

Chapter 5
DETERMINANTS OF HOUSING CONSUMPTION IN RURAL
INDIA

Chapter 5

DETERMINANTS OF HOUSING CONSUMPTION IN RURAL INDIA

5.1 Introduction:

In this section, analysis being made to trace out the determinants of housing consumption. The housing consumption variables include floor area, number of rooms, number of living rooms, floor area per person, number of rooms per person, and number of living rooms per person. The independent variables collected from the survey of literature include socio economic and demographic variables such as gender of the head, education of the head, marital status, age of the head, extent of land possessed, household size, monthly consumption expenditure, religion, social group, and economic activity (i.e., primary, secondary, and tertiary). The NSSO unit level data of 76th round (2018) were used for analyzing the determinants of housing consumption.

5.2 Description of Dependent Variables:

The table 5.1 describes the variables taken as dependent variables representing housing consumption by means and standard deviations.

Table 5.1 Description of Dependent Variables:

Variables	Mean	Std. Deviation
Floor Area (in sq. ft.)	501.19	310.584
Number of rooms	3.72	1.845
Number of living rooms	2.09	1.108
Floor area per person (in sq.ft.)	130.10	105.091
Number of rooms per person	1.00	0.747
Living rooms per person	0.54	0.400

Source: Computed from NSSO unit level data-76th round

The average floor area during 76th round were 501.19 sq. ft. with a SD of 310.584; average number of rooms were 3.72 with a SD of 1.845; and the average number of living rooms were 2.09 with SD 1.108 while in per capita terms, i.e., floor area per person were 130.10 sq. ft. with a SD of 105.091; number of rooms per person were 1.00 on the average with a SD of 0.747; and number of living rooms per person were 0.54 with a SD of 0.400.

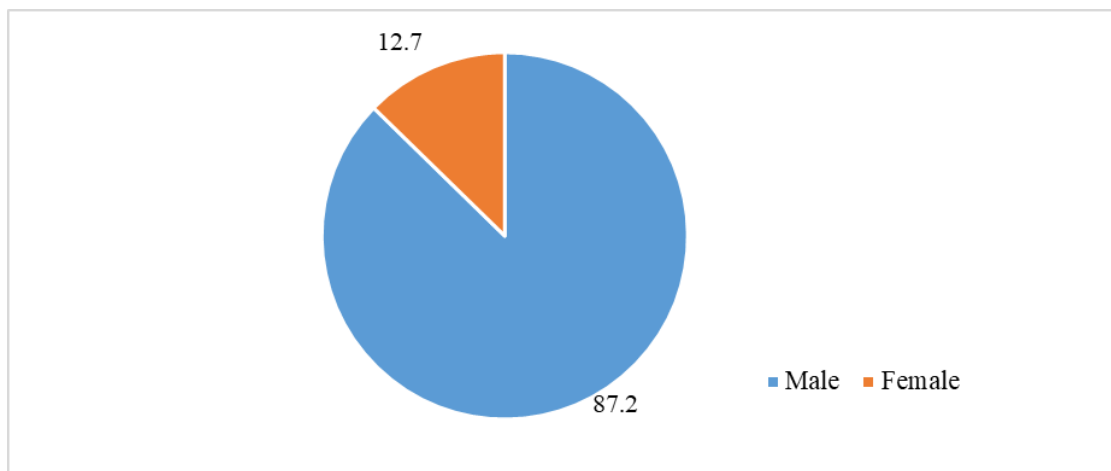
5.3 Description of Independent Variables:

This section describes the independent variables that affect housing consumption variables.

5.3.1 Gender of the Head:

The following pie diagram describes gender of the head of the household. The figure reveals that 87.2% of the household heads being males and remaining 12.7% being females. The proportion of female headed households are less compared to that of male headed households.

Figure 5.1 Gender of the Head

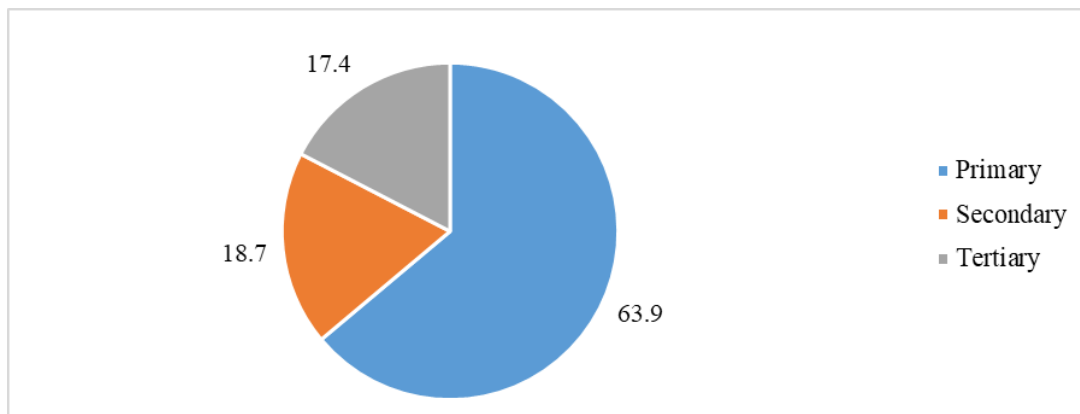


Source: Computed from NSSO unit level data-76th round

5.3.2 Economic Activity:

The pie diagram shows the economic activity of the household.

Figure 5.2 Economic Activity



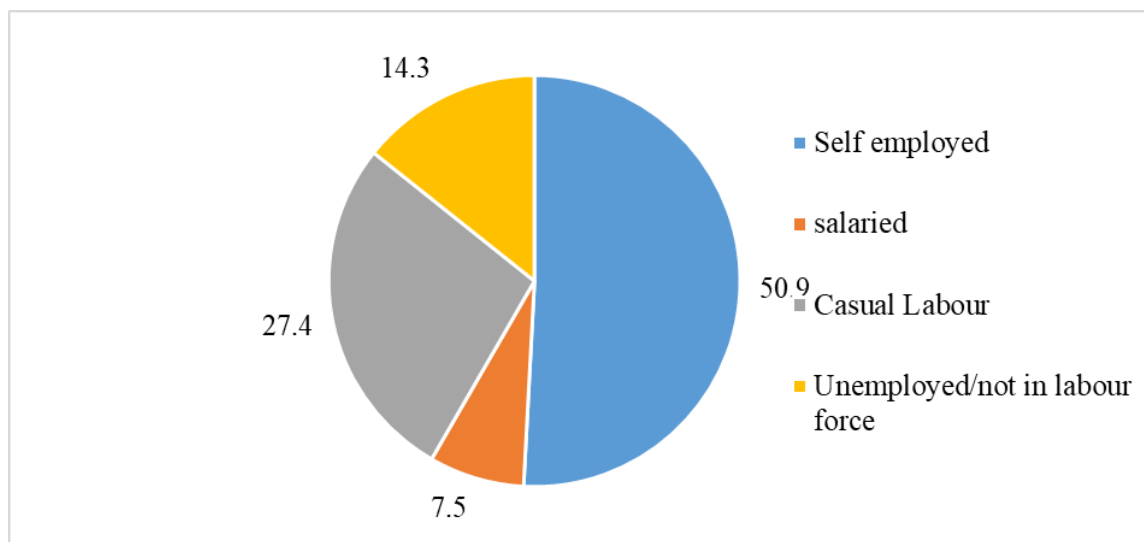
Source: Computed from NSSO unit level data-76th round

The figure reveals that 63.9% of the households were engaged in primary sector, 18.7% in secondary sector and 17.4% in tertiary sector.

5.3.3 Usual Principal Status:

Based on usual principal status, the households are classified into four categories- Self-employed, salaried, casual labour and unemployed/not in labour force. The figure 5. 5 depicts the composition of households based on usual principal status of the head.

Figure 5.3 Usual Principal Status



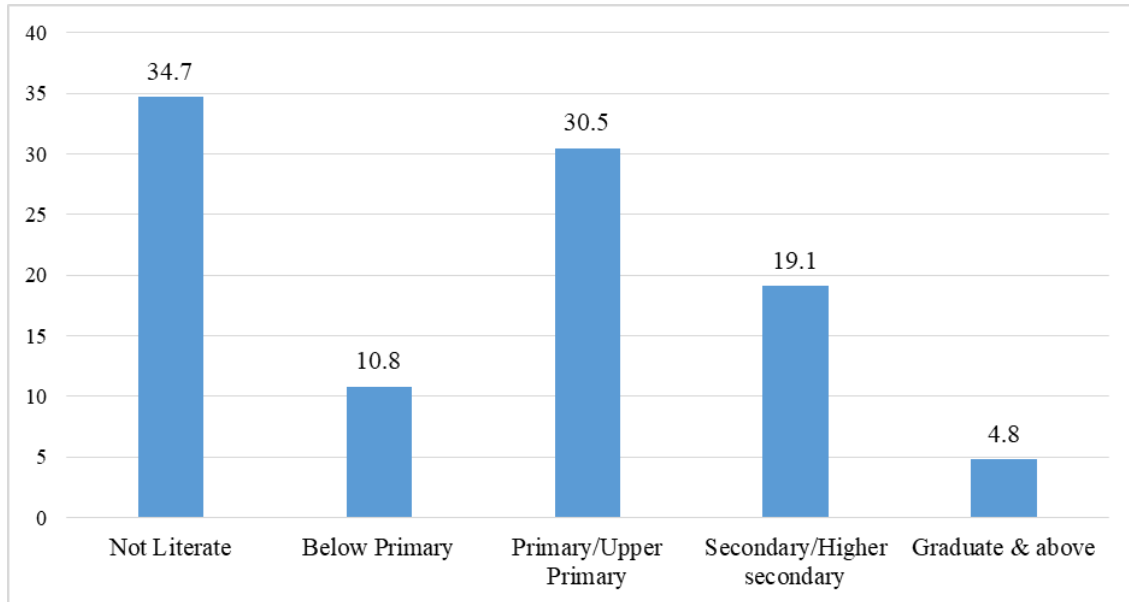
Source: Computed from NSSO unit level data-76th round

As the figure portrays, it can be observed that 50.9% of the households belong to self-employed category; 7.5 belong to salaried; 27.4% belong to casual labour and the remaining 14.3% belong to unemployed/ not in labour force. Here the analysis is confined to three groups-self-employed, salaried and casual labour.

5.3.4 Educational Status:

Educational status of the household head is depicted in the figure 5.6. The figure reveals that 34.7% of household heads in rural India were illiterate; 10.8% were below primary; 30.5% were primary/upper primary; 19.1% were secondary/higher secondary including diploma holders at secondary/higher secondary level and 4.8% were qualified as graduate or above including diploma holders at graduate level.

Figure 5.4 Educational Status

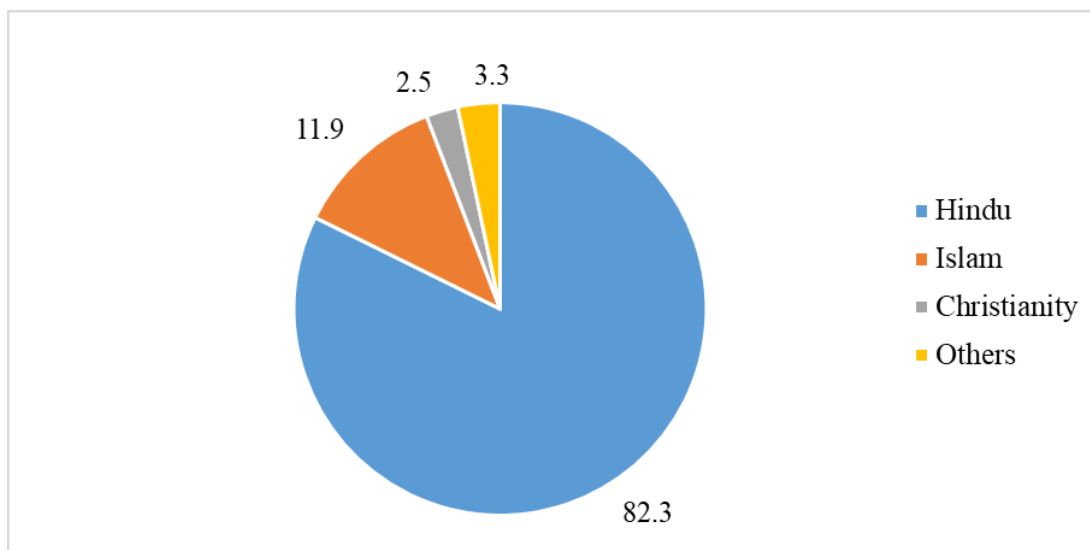


Source: Computed from NSSO unit level data-76th round

5.3.5 Religion:

The following pie diagram depicts the religion of households in rural India. It can be observed from the figure that majority of the households (82.3%) belong to Hinduism, while 11.9% belong to Islam, another 2.5% belong to Christianity; and the remaining 3.3% belong to other religions such as Jainism, Buddhism, Zoroastrianism etc.

Figure 5.5 Religion

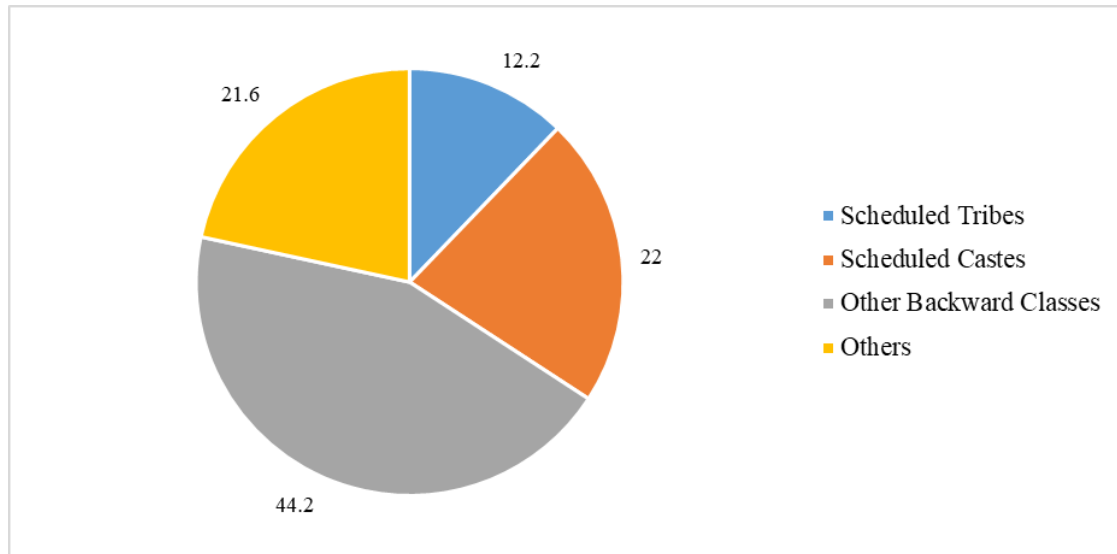


Source: Computed from NSSO unit level data-76th round

5.3.6 Social Group:

The following pie diagram shows the composition of households based on social group they belong to.

Figure 5.6 Social Group



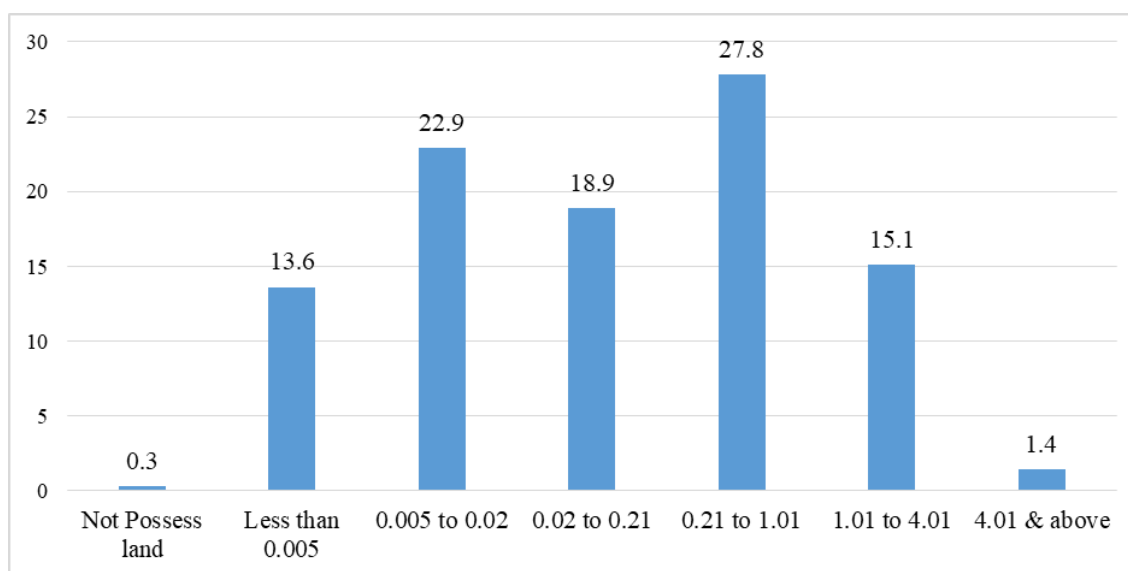
Source: Computed from NSSO unit level data-76th round

The figure 5.7 shows that 12.2% of rural households in India belong to Scheduled Tribes, 22% belong to Scheduled Castes, another 44.2% belong to Other Backward Classes and the remaining 21.6% belong to ‘Others’.

5.3.7 Land Possessed:

The figure 5.3 depicts the extent of land owned by the households in rural India in hectares. It can be noticed that 0.3% of the households did not possess any land; 13.6% of them have less than .005 hectares; 22.9% have 0.005 to 0.02 hectares of land; 18.9% have 0.02 to 0.21 hectares of land; 27.8% have 0.21 to 1.01 hectares of land being the highest proportion in this regard; 15.1% have 1.01 to 4.01 hectares of land; and 1.4% possess 4.01 or above hectares of land. Therefore, for convenience the effect of land possessed on housing consumption is analysed by using two broad categories- those with up to 0.21 hectares of land and those having above 0.21 hectares of land.

Figure 5.7 Land Possessed



Source: Computed from NSSO unit level data-76th round

5.3.8 Age, Household Size, Monthly Consumption Expenditure and Number of Married Couples in the Household:

The table 5.2 describes average age of the household, average monthly consumption expenditure of the household, average household size and average number of married couples and their respective standard deviations.

Table 5. 2 Age, Household Size, Usual Monthly Consumption Expenditure and Number of Married Couples in the Household:

Variables	Mean	Std. Deviation
Age	47.3	13.44
Household size	4.5	2.12
Usual monthly consumer expenditure	8013.5	4526.56
Total number of married couples in the household	1.1	0.64

Source: Computed from NSSO unit level data-76th round

The average age of the head of the household were 47.3 with SD 13.44; average household size were 4.5 with a SD 2.12; average monthly consumption expenditure of the household were Rs.8013.47 with SD Rs.4526.56 and total number of married couples on the average being 1.08 with SD 0.64.

5.4 Determinants of Housing Consumption: Structural Equation Modelling

Approach:

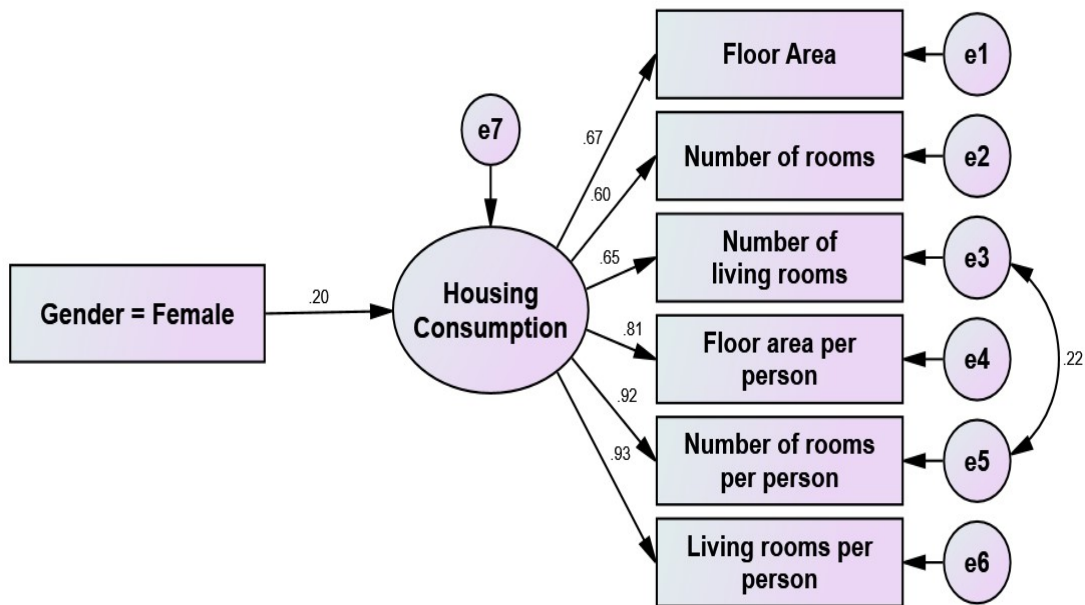
In this section, separate Structural Equation Models (SEM) have been formulated for each of the independent variables described above with housing consumption variables in order to find out their impact on overall housing consumption.

5.4.1 Gender and Housing Consumption:

Here, the impact of gender on housing consumption being examined by fitting a structural equation model. There are two categories of gender-males and females. Male category is taken here as the reference category. The hypothesis set is presented below.

H1: Gender of the respondents exerts a significant impact on their housing consumption

Figure 5.8 Structural Equation Model on the Impact of Gender on Housing Consumption:



The model indicates that there exist a positive difference in housing consumption of female category in comparison to that of males as the coefficient showing the influence of female category being positive (.20) which is significant at 1% level.

The table 5.3 indicates that the variable gender has statistically significant influence on housing consumption as the P value is less than .001 indicating that the coefficient (0.204) is significant at 1% level. Hence the hypothesis H1 is supported.

Table 5.3 Gender and Housing Consumption - Variables in the SEM Analysis

Factors		Estimate	C.R	P	Decision
Gender = Female	→	Housing Consumption 0.204	45.029	<0.001 **	H ₁ Supported

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

The table 5.4 presents details regarding the model fit indices that has to be satisfied by the model. The fit criteria to be satisfied with reference is given in the third column. CMIN/DF index for the model is 2.125 and satisfies the threshold limit of less than 5. Also, GFI, AGFI, NFI, CFI, RMR, RMSEA all satisfies the prescribed fit criteria. Hence the model is fit.

Table 5.4 Gender and Housing Consumption - Model Fit Indices

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	2.125	< 5
2	Goodness of Fit Index (GFI)	0.985	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.912	> 0.90
4	Normal Fit index (NFI)	0.943	> 0.90
5	Comparative Fit Index (CFI)	0.946	> 0.90
6	Root Mean Square Residual (RMR)	0.031	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.063	< 0.08

Source: Computed from NSSO unit level data-76th round

5.4.2 Economic Activity and Housing Consumption:

Economic activity is categorised into primary, secondary, and tertiary. Inorder to examine whether economic activity of the household influence housing consumption, a structural equation model being set by taking primary sector as the reference category. The model, the hypothesis and the results are presented as follows.

H₂: Economic activity of the respondents exerts a significant impact on their housing consumption

The model presented in figure 5.9 indicates that economic activity of the household influences housing consumption.

Figure 5.9 Structural Equation Model on the Impact of Economic Activity on Housing Consumption:

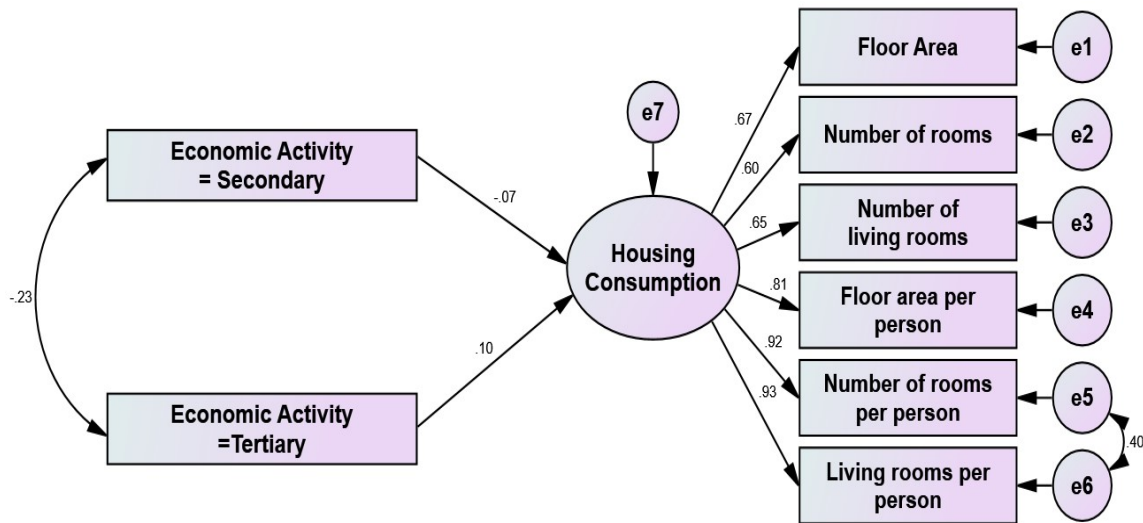


Table 5.5 Economic activity and Housing Consumption - Variables in the SEM Analysis

Factors		Estimate	C.R	P	Decision	
Economic Activity: Secondary	→	Housing Consumption	-0.070	-15.319	<0.001**	H ₂ Supported
Economic Activity: Tertiary	→	Housing Consumption	0.102	22.023	<0.001**	

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

The table 5.5 presents the model estimates obtained with P values. It can be noticed from the table that comparing to primary sector, secondary sector enjoys a low level of housing consumption as the estimate of coefficient for secondary sector is negative (-0.070) which is significant at 1% level indicating that this sector enjoys a low level of housing consumption comparing to that of primary sector. Also, the tertiary sector enjoys a high level of housing consumption relative to that of primary sector as the coefficient showing the same is positive (0.102) and is significant at 1% level. Hence, the hypothesis H₂ is supported indicating economic activity as a determinant of housing consumption.

Table 5.6 indicates that CMIN/DF ratio is 3.077 which is less than 5, GFI= 0.980 which is greater than 0.90; AGFI= 0.922 which is greater than 0.90; NFI=0.961 which is greater than 0.90; CFI=0.982 which is greater than 0.90; RMR=0.016 which is less than 0.08;

and RMSEA=0.051 which is less than 0.08. Hence it can be concluded that the model set to examine the influence of economic activity on housing consumption is fit.

Table 5.6 Economic Activity and Housing Consumption - Model Fit Indices

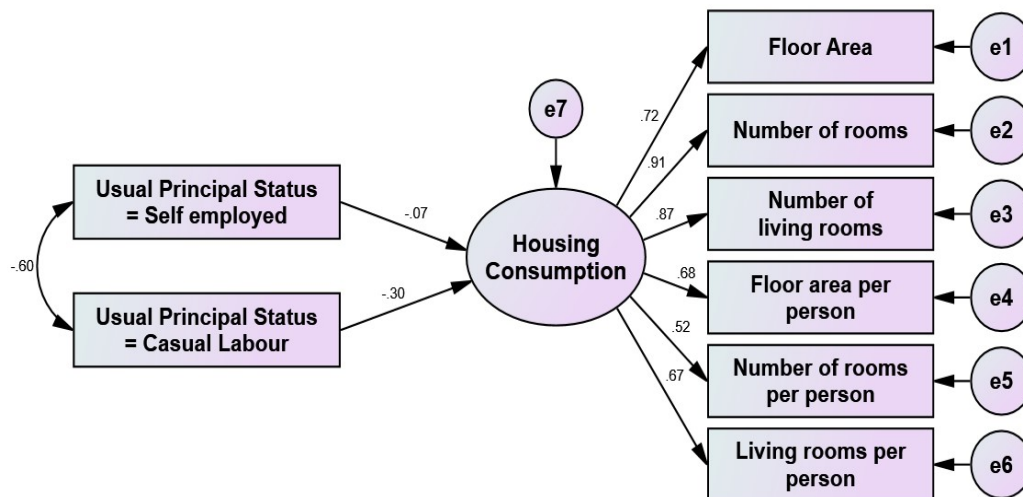
SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	3.077	< 5
2	Goodness of Fit Index (GFI)	0.980	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.922	> 0.90
4	Normal Fit index (NFI)	0.961	> 0.90
5	Comparative Fit Index (CFI)	0.982	> 0.90
6	Root Mean Square Residual (RMR)	0.016	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.051	< 0.08

Source: Computed from NSSO unit level data-76th round

5.4.3 Usual Principal Status and Housing Consumption:

To examine the influence of occupational background of the household on housing consumption three broad categories have been considered based on the usual principal status of the head of the household as Salaried, Self-employed, and Casual labour. Figure 5.10 portrays the model set for this purpose.

Figure 5. 10 Structural Equation Model on the Impact of Usual Principal Status on Housing Consumption:



The following hypothesis were set in order to examine the influence of usual principal status of the households on their housing consumption.

H3: Usual Principal Status of the respondents exerts a significant impact on their housing consumption

Table 5.7 Usual Principal Status and Housing Consumption - Variables in the SEM

Analysis:

Factors		Estimate	C.R	P	Decision	
Usual Principal Status = Self Employed	→	Housing Consumption	-0.067	-13.375	<0.001* *	H3 Supported
Usual Principal Status = Casual Labour	→	Housing Consumption	-0.300	-58.058	<0.001* *	

** Significant at 1% level

Source: computed from NSSO unit level data-76th round

Table 5.7 provides the estimates of the SEM fitted between Usual Principal status and housing consumption. Here the category ‘salaried’ has been taken as the base category. The value of the estimates are negative reflecting the fact that self-employed and casual labour categories enjoy a low level of housing consumption relative to that of salaried category. Also it can be inferred that the casual labour occupies the lowest position in housing consumption. The estimates given in the table are statistically significant at 1% level.

Table 5.8 Usual Principal Status and Housing Consumption - Model Fit Indices:

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	2.822	< 5
2	Goodness of Fit Index (GFI)	0.964	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.913	> 0.90
4	Normal Fit index (NFI)	0.928	> 0.90
5	Comparative Fit Index (CFI)	0.920	> 0.90
6	Root Mean Square Residual (RMR)	0.031	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.068	< 0.08

Source: Computed from NSSO unit level data-76th round

Table 5.8 provides the details regarding the model fit indices and the fit criteria for the model to become best fit. It can be observed from the table that CMIN/DF, GFI, AGFI, NFI, CFI, RMR, and RMSEA all satisfy the fit criteria given in third column of the table. Hence the model is significant.

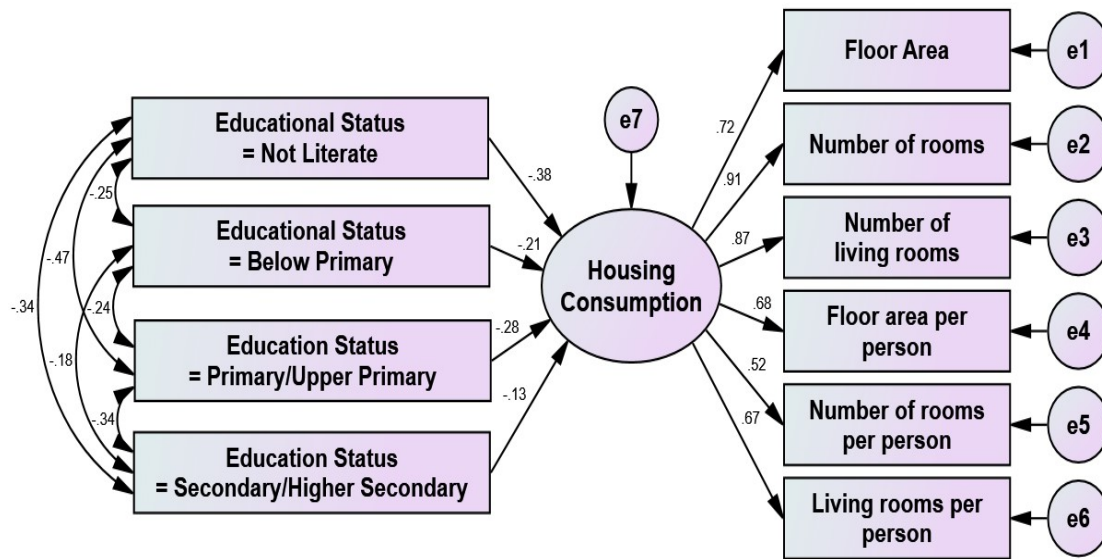
5.4.4 Educational Status and Housing Consumption:

To examine the impact of educational status on housing consumption, the following hypothesis have been set.

H4: Educational Status of the respondents exerts a significant impact on their housing consumption

The Structural Equation Model for educational status and housing consumption being presented in the figure 5.11. The educational status of the household head is broadly categorised into five: Not literate, below primary, Primary/upper primary, secondary/higher secondary and graduate or above. Here, graduate or above is taken as the reference category.

Figure 5.11 Structural Equation Model on the Impact of Educational Status on Housing Consumption:



The table 5.9 presents the estimates of coefficients showing the impact of each category of educational status on housing consumption in comparison to graduates or above. That means all these categories enjoy a low level of housing consumption relative to that of graduates or above indicating that educational status of the respondents positively influences their housing consumption. Because, we can see that all the coefficients are negative in comparison to graduates or above indicating that the housing consumption enjoyed by the lower categories are low and this difference decreases when moving to higher levels of educational status. Hence the hypothesis H4 is supported indicating that the educational status exerts a positive influence on level of housing consumption.

Table 5.9 Educational Status and Housing Consumption - Variables in the SEM

Analysis:

Factors			Estimate	C.R	P	Decision
Educational Status: Not Literate	→	Housing Consumption	-0.379	-41.754	<0.001**	H ₄ Supported
Below Primary	→	Housing Consumption	-0.207	-30.223	<0.001**	
Primary/Upper Primary	→	Housing Consumption	-0.284	-31.608	<0.001**	
Secondary/Higher Secondary	→	Housing Consumption	-0.131	-16.369	<0.001**	

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

Table 5.10 presents the model fit indices and the related criteria to be satisfied by the fitted model with reference to these indices. It can be noticed from the table that all the model fit indices given in the first column of the table are satisfied by the model as the estimated values for all these indices are within the prescribed limit set by the fit criteria.

Table 5.10 Educational Status and Housing Consumption - Model Fit Indices

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	2.087	< 5
2	Goodness of Fit Index (GFI)	0.987	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.907	> 0.90
4	Normal Fit index (NFI)	0.921	> 0.90
5	Comparative Fit Index (CFI)	0.923	> 0.90
6	Root Mean Square Residual (RMR)	0.018	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.056	< 0.08

Source: Computed from NSSO unit level data-76th round

5.4.5 Religion and Housing Consumption:

In this section, a structural equation model has been formulated between categories of religion and housing consumption. The hypothesis set for the same is presented as follows.

H₅: Religion of the respondents exerts a significant impact on their housing consumption

Figure 5.12 illustrates the SEM fitted on religion and housing consumption. The major categories of religion include Hindu, Islam, Christianity and others (Sikhs, Buddhism, Jainism, Zoroastrianism etc.) here we have taken Hindu as the base. Figure 5.11 portrays the model.

Figure 5.12 Structural Equation Model on the Impact of Religion on Housing Consumption:

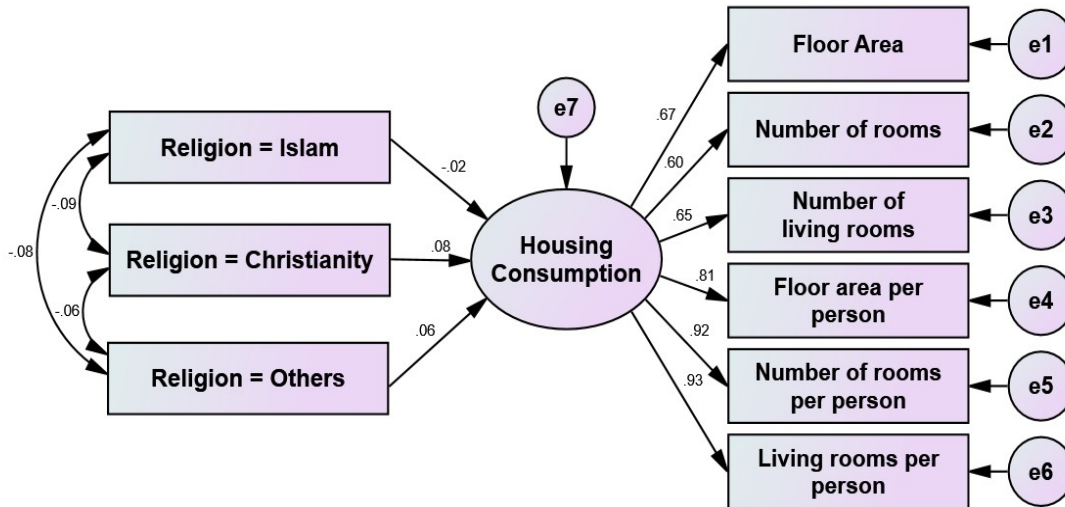


Table 5.11 Religion and Housing Consumption - Variables in the SEM Analysis

Factors		Estimate	C.R	P	Decision	
Religion: Islam	→	Housing Consumption	-0.023	-5.575	<0.001**	H ₅ Supported
Christianity	→	Housing Consumption	0.084	20.091	<0.001**	
Others	→	Housing Consumption	0.061	14.688	<0.001**	

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

The table 5.11 represents the model estimates showing the influence of different religions on housing consumption. The estimate for Islam category is -0.023 which indicates that Islam households enjoy a low level of housing consumption relative to that of Hindu households while Christian households and households from other religions enjoy a higher

level of housing consumption in comparison to that of Hindu households because the coefficient estimate for these two categories are positive. All the coefficient estimates are statistically significant at 1% level thereby supporting the hypothesis set and it can be concluded that religion of the households influences housing consumption.

Table 5.12 reveals that all the required criteria to be satisfied by the model are accomplished as the values of the indices obtained falls in the prescribed limit. Hence the model fitted on religion and housing consumption is significant.

Table 5.12 Religion and Housing Consumption - Model Fit Indices:

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	2.488	< 5
2	Goodness of Fit Index (GFI)	0.989	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.942	> 0.90
4	Normal Fit index (NFI)	0.982	> 0.90
5	Comparative Fit Index (CFI)	0.985	> 0.90
6	Root Mean Square Residual (RMR)	0.021	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.066	< 0.08

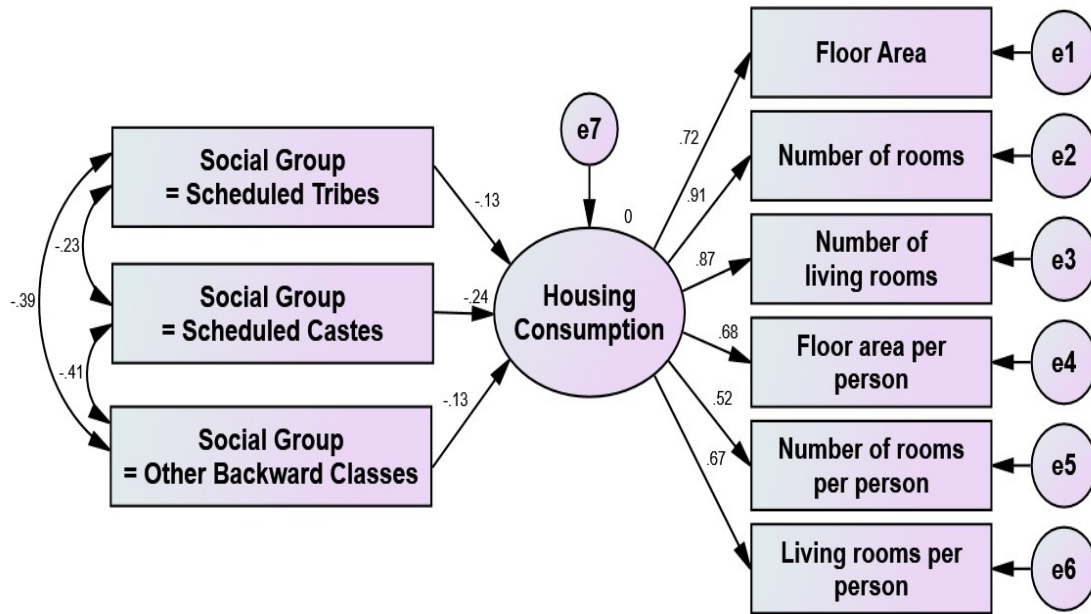
Source: Computed from NSSO unit level data-76th round

5.4.6 Social Group and Housing Consumption:

Figure 5.13 portrays the SEM fitted between social group and housing consumption. The social groups include Scheduled Tribes, Scheduled Castes, Other Backward Classes, and others (General). Here the study has taken ‘Others’ (General) as the base category. The following hypothesis have been formulated in order to examine the influence of various social groups on housing consumption.

H6: Social group of the respondents exerts a significant impact on their housing consumption

Figure 5.13 Structural Equation Model on the Impact of Social Group on Housing Consumption:



The table 5.13 presents the estimates of coefficients for all the three social groups relative to General (others) category with their P values.

Table 5.13 Social Group and Housing Consumption - Variables in the SEM Analysis

Factors		Estimate	C.R	P	Decision	
Scheduled Tribes	→	Housing Consumption	-0.130	-25.976	<0.001**	H ₆ Supported
Scheduled Castes	→	Housing Consumption	-0.235	-46.003	<0.001**	
Other Backward Classes	→	Housing Consumption	-0.125	-23.512	<0.001**	

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

It can be observed from the table that the coefficients for scheduled tribes, scheduled castes and other backward classes relative to General (others) category were negative showing that these groups enjoy a lower level of housing consumption relative to General category households. All these coefficients are statistically significant at 1% level thereby supporting our hypothesis that social group of the household influences their housing consumption.

Table 5.14 Social Group and Housing Consumption - Model Fit Indices

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	3.246	< 5
2	Goodness of Fit Index (GFI)	0.974	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.922	> 0.90
4	Normal Fit Index (NFI)	0.960	> 0.90
5	Comparative Fit Index (CFI)	0.966	> 0.90
6	Root Mean Square Residual (RMR)	0.034	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.059	< 0.08

Source: Computed from NSSO unit level data-76th round

From table 5.14, it can be observed that the model fit indices CMIN/DF= 3.246 (<5); GFI =0.974 (>.90); AGFI = 0.922 (>0.90); CFI =0.966 (>0.90); RMR = 0.034 (<0.08) and RMSEA =0.059 (<0.08). Hence, it can be concluded that the model fitted is significant.

5.4.7 Number of Married Couple in the Household and Housing Consumption:

In this section, the influence of number of married couple in housing consumption being examined by setting the following hypothesis.

H7: Number of Married Couple in the Household of the respondents exerts a significant impact on their housing consumption

Figure 5.14 Structural Equation Model on the Impact of Number of Married Couple in the Family on Housing Consumption:

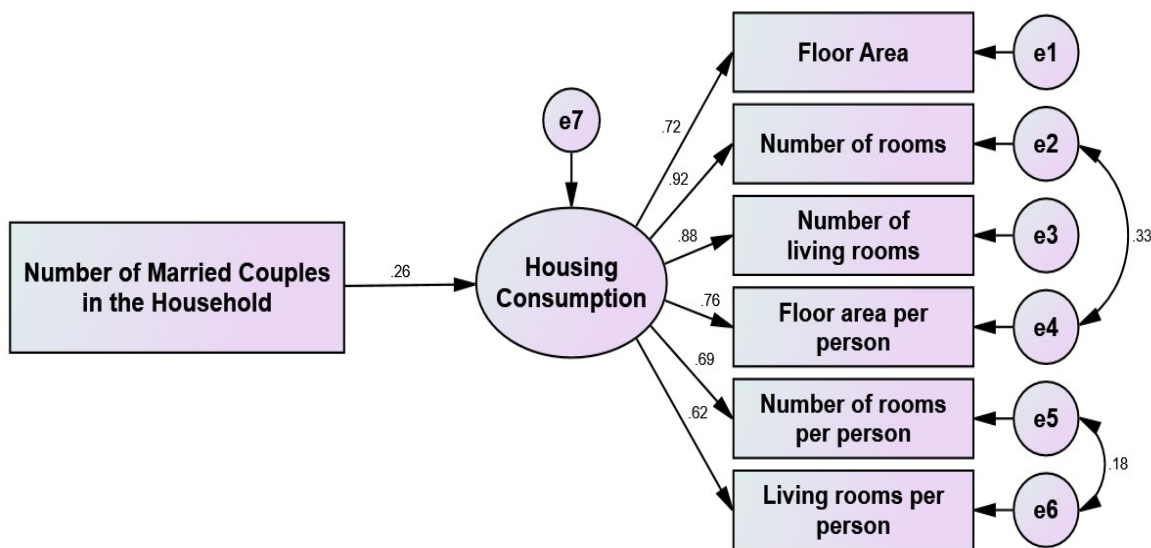


Figure 5.15 portrays the SEM showing the impact of number of married couple in the household on housing consumption

Table 5.15 Number of Married Couple in the Family and Housing Consumption - Variables in the SEM Analysis

Factors		Estimate	C.R	P	Decision
Number of Married Couple in the Household	→	Housing Consumption 0.257	62.272	<0.001**	H7 Supported

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

The table 5.15 reveals that number of married couples in the household exerts a positive impact on housing consumption as the estimate from the model is positive and is significant at 1% level.

Table 5.16 gives information regarding the values of model fit indices and fit criteria. It can be observed from the table that values of CMIN/DF ratio, GFI, AGFI, NFI, CFI, RMR, and RMSEA satisfy the fit criteria given in the third column of the table and it can be concluded that the model is significant and a good fit.

Table 5.16 Number of Married Couples in the Household and Housing Consumption - Model Fit Indices

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	4.035	< 5
2	Goodness of Fit Index (GFI)	0.970	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.944	> 0.90
4	Normal Fit index (NFI)	0.943	> 0.90
5	Comparative Fit Index (CFI)	0.956	> 0.90
6	Root Mean Square Residual (RMR)	0.041	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.072	< 0.08

Source: Computed from NSSO unit level data-76th round

5.4.8 Monthly consumption expenditure and housing consumption:

Monthly consumption expenditure represents the economic status of the households. Inorder to examine the influence of monthly consumption expenditure on housing consumption, the following hypothesis were set.

H8: Monthly Consumption Expenditure of the respondents exerts a significant impact on their housing consumption.

Figure 5.15 Structural Equation Model on the Impact of Monthly Consumption Expenditure on Housing Consumption

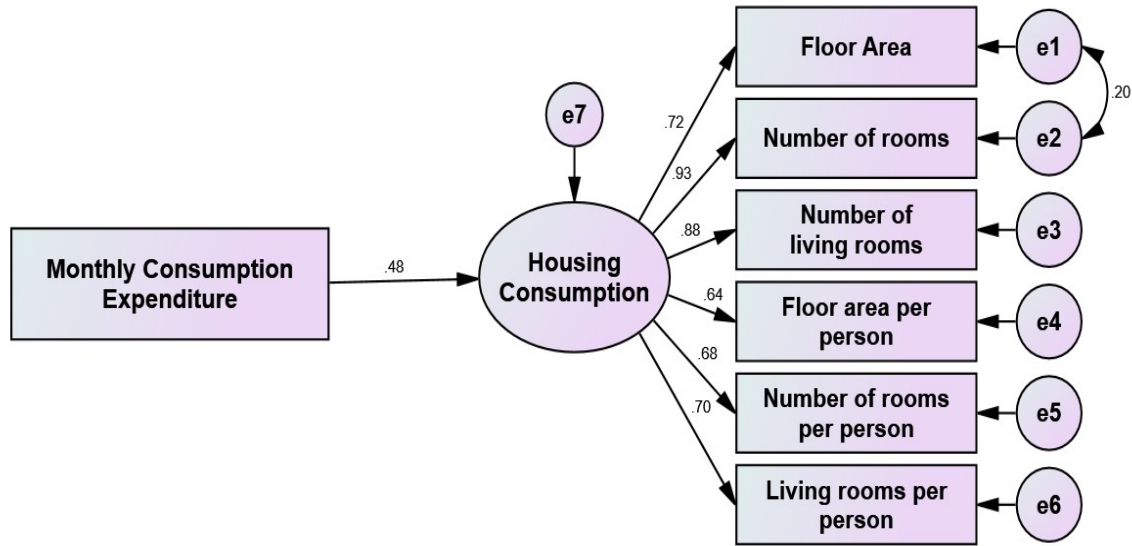


Figure 5.15 illustrates the SEM showing the influence of monthly consumption expenditure on housing consumption.

The table 5.17 reveals that monthly consumption expenditure has a positive influence on housing consumption as the coefficient is positive (0.482) and is significant at 1% level. Hence the hypothesis that monthly consumption expenditure exerts significant impact on housing consumption is supported.

Table 5.17 Monthly Consumption Expenditure and Housing Consumption - Variables in the SEM Analysis:

Factors		Estimate	C.R	P	Decision
Monthly Consumption Expenditure	→	Housing Consumption 0.482	117.700	<0.001**	H8 Supported

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

The table 5.18 provides the details regarding the values of model fit indices and fit criteria to be satisfied by the model. The values of the model fit indices are within the limit

prescribed by the fit criteria and it can be concluded that monthly consumption expenditure positively influences housing consumption and that the model fitted is significant.

Table 5.18 Monthly Consumption Expenditure and Housing Consumption - Model Fit Indices:

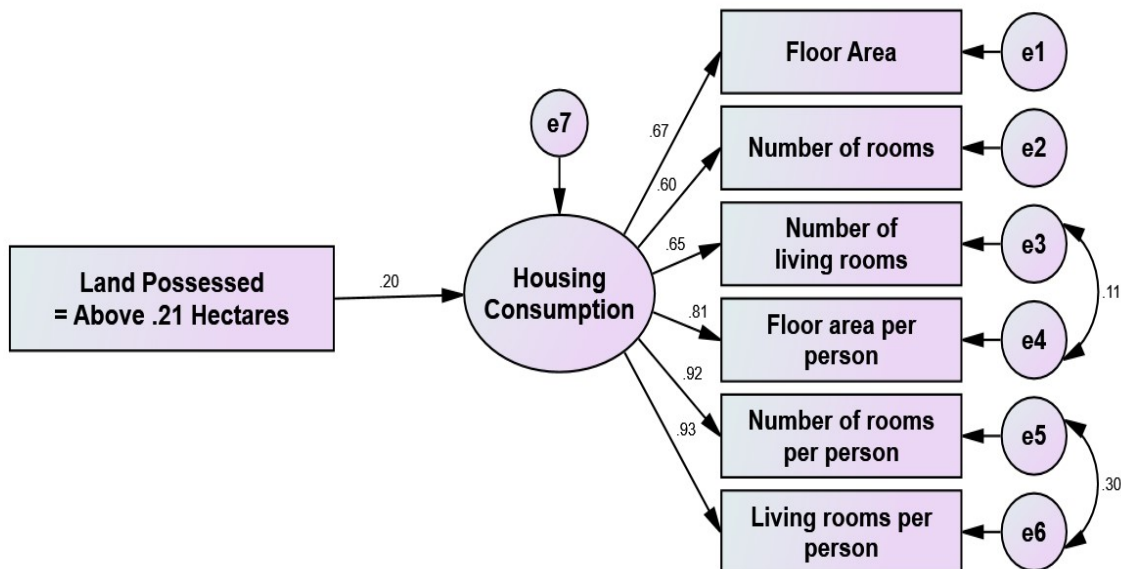
SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	1.697	< 5
2	Goodness of Fit Index (GFI)	0.988	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.976	> 0.90
4	Normal Fit index (NFI)	0.978	> 0.90
5	Comparative Fit Index (CFI)	0.991	> 0.90
6	Root Mean Square Residual (RMR)	0.022	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.048	< 0.08

Source: Computed from NSSO unit level data-76th round

5.4.9 Land Possessed and Housing Consumption:

Land possessed no doubt, adds to the wealth of the household. Here we have taken two broad categories representing the extent of land possessed by rural households.

Figure 5.16 Structural Equation Model on the Impact of Land Possessed on Housing Consumption:



The first category includes households having land up to .21 hectares and is taken as the reference category and the second category represents the households with possession of land above 0.21 hectares.

The model is illustrated in figure 5.16. The following hypothesis were formulated in this regard.

H₉: Land Possessed of the respondents exerts a significant impact on their housing consumption

Table 5.19 reveals that the extent of land possessed by the household have a positive impact on housing consumption as the estimate of the coefficient (0.196) is significant at 1% level thereby supporting our hypothesis that land possessed exerts significant influence on housing consumption.

Table 5.19 Land Possessed and Housing Consumption - Variables in the SEM Analysis

Factors		Estimate	C.R	P	Decision
Land Possessed = Above .21 Hectares	→	Housing Consumption 0.196	43.557	<0.001**	H ₉ Supported

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

Table 5.20 presents the model fit indices with the criteria to be satisfied by the model to become significant. It can be noticed that all the model fit indices are within the limit set by the fit criteria showing that the fitted model is statistically significant.

Table 5.20 Land Possessed and Housing Consumption - Model Fit Indices:

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	2.050	< 5
2	Goodness of Fit Index (GFI)	0.972	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.929	> 0.90
4	Normal Fit index (NFI)	0.934	> 0.90
5	Comparative Fit Index (CFI)	0.943	> 0.90
6	Root Mean Square Residual (RMR)	0.037	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.058	< 0.08

Source: Computed from NSSO unit level data-76th round

5.4.10 Age of the Head and Housing Consumption:

The following hypothesis being formulated in order to examine the influence of age of the head and housing consumption.

H₁₀: Age of the Head in the Family of the respondents exerts a significant impact on their housing consumption

Figure 5.17 Structural Equation Model on the Impact of Age of the Head on Housing Consumption

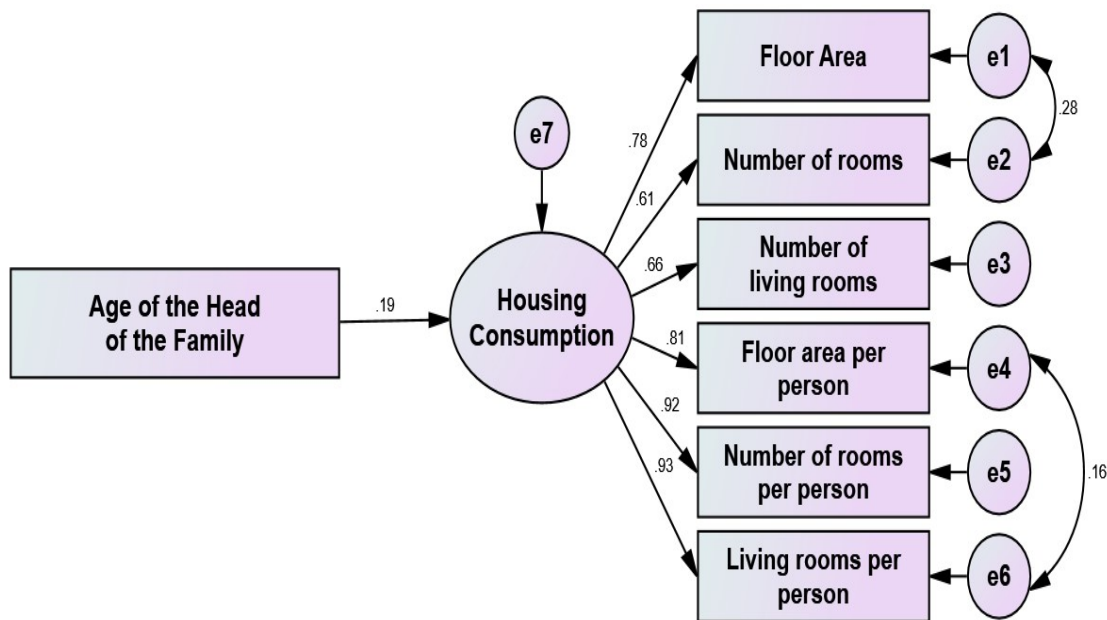


Figure 5.17 illustrate the structural equation model fitted for analysing the influence of age of the head on housing consumption.

Table 5.21 Age of the Head and Housing Consumption - Variables in the SEM Analysis

Factors		Estimate	C.R	P	Decision	
Age of the Head	→	Housing Consumption	0.190	42.532	<0.001**	H ₁₀ Supported

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

Table 5.21 presents the estimates of coefficient derived from performing SEM on age of the head and housing consumption. It can be observed that the age of the head exerts a positive influence on housing consumption. The estimate of the coefficient showing the same

is positive (0.190) and is significant at 1% level. Table 5.22 reveals that the model is best fit as all the criteria CMIN/DF, GFI, AGFI, NFI, CFI, RMR and RMSEA being satisfied by the model.

Table 5.22 Age of the Head and Housing Consumption - Model Fit Indices:

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	3.244	< 5
2	Goodness of Fit Index (GFI)	0.961	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.931	> 0.90
4	Normal Fit index (NFI)	0.925	> 0.90
5	Comparative Fit Index (CFI)	0.939	> 0.90
6	Root Mean Square Residual (RMR)	0.030	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.063	< 0.08

Source: Computed from NSSO unit level data-76th round

5.4.11 Household Size and Housing Consumption:

In order to examine the influence of household size on housing consumption, the following hypothesis is set.

H₁₁: Household Size of the respondents exerts a significant impact on their housing consumption.

Figure 5.18 Structural Equation Model on the Impact of Household Size on Housing Consumption

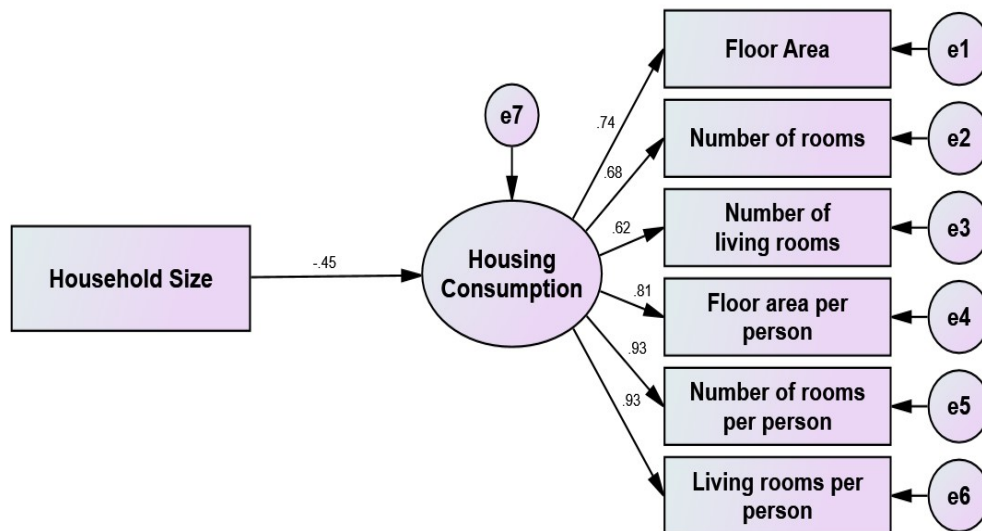


Figure 5.18 illustrates the structural equation model on household size and housing consumption.

Table 5.23 indicates that as household size increases, the housing consumption on the average decreases. There exist an inverse relationship between household size and housing consumption as the estimate of the coefficient is negative (-0.449) and is statistically significant at 1% level.

Table 5.23 Household Size and Housing Consumption - Variables in the SEM Analysis:

Factors		Estimate	C.R	P	Decision	
Household Size	→	Housing Consumption	-0.449	-72.290	<0.001**	H ₁₁ Supported

** Significant at 1% level

Source: Computed from NSSO unit level data-76th round

Table 5.24 examines whether the model satisfies the model fit criteria. The table reveals that all the indices viz. CMIN/DF, GFI, AGFI, NFI, RMR, RMSEA etc. satisfy the model fit criteria. Therefore, it can be concluded that the model set on household size and housing consumption is best fit.

Table 5.24 Household Size and Housing Consumption - Model Fit Indices:

SL	Fit Indices	Value	Fit Criteria
1	CMIN/DF	2.962	< 5
2	Goodness of Fit Index (GFI)	0.979	> 0.90
3	Adjusted of Goodness of Fit Index (AGFI)	0.958	> 0.90
4	Normal Fit index (NFI)	0.961	> 0.90
5	Comparative Fit Index (CFI)	0.973	> 0.90
6	Root Mean Square Residual (RMR)	0.051	< 0.08
7	Root Mean Square Error of Approximation (RMSEA)	0.062	< 0.08

Source: Computed from NSSO unit level data-76th round

5.5 Conclusion:

Housing conditions and living facilities are central to the overall development of the members of the household. From the discussion above, it is clear that housing consumption is influenced by socio economic, demographic and occupational background of the household. The structural equation models fitted for all the independent variables with housing consumption proved to be statistically significant and satisfies the required criteria to become

best fit. The study could prove that social group the household belong to affect their housing consumption. The ST, SC and OBC households enjoy a low level of housing consumption in comparison to that of the others or the unreserved categories. There also exists occupation-wise differences in housing consumption as our SEM analysis proves that casual labour and self-employed category enjoys a low level of housing consumption comparing to that of salaried category. Our analysis also proved that educational status of the household have a positive effect on housing consumption. religion-wise analysis of housing consumption reveals that Islam households enjoy a low level of housing consumption relative to Hindu households while Christian households and households from other religion enjoys a relatively higher level of housing consumption. Gender-wise analysis proved that the male headed households enjoy relatively lower level of housing consumption than that of female headed households. This may be due to the larger size of the male headed households. It was revealed from our analysis that household size negatively influences housing consumption. Monthly consumption expenditure and extent of land possessed positively influences housing consumption. Hence we can conclude that economic background of the household positively influences housing consumption. Age of the head positively influences housing consumption reflecting the fact that the adequate or desired level of housing is achieved through the life cycle. The number of married couples in the household positively influences housing consumption. The analysis based on the economic activity of the household reveals that secondary sector enjoys relatively lower level of housing consumption while tertiary sector enjoys relatively higher level of housing consumption in comparison to that of the primary sector. In this context, it can be concluded that socio economic demographic and occupational background determines or influences housing consumption of the rural households.

Chapter 6
HOUSING ADEQUACY AMONG HOUSEHOLDS IN RURAL
INDIA

Chapter 6

HOUSING ADEQUACY AMONG HOUSEHOLDS IN RURAL INDIA

6.1 Introduction:

International human rights law admits everyone's right to have adequate standard of living, which include adequate housing also. Even though this right occupies a central position within the so called 'global legal system', unfortunately, more than a billion people are not adequately housed across the world. UN-Habitat requires that many conditions must be fulfilled in order to consider particular forms of shelter to constitute "adequate housing". Security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location, cultural adequacy etc. constitutes the criteria to be met to have adequate housing (UN-Habitat, 2014). NSSO unit level data of rural India were extracted from NSSO 69th and 76th rounds to analyse housing adequacy of rural Indian households.

6.2 Description of Housing Adequacy Variables:

The following variables were identified from literature survey as well as from the researcher's intuition to study housing adequacy in rural India:

6.2.1 Plinth Level of the House and Floor Area:

The plinth level basically means the distance from the original ground level and the finished floor level of a building which helps in transferring the superstructure's load to the foundation. The importance of plinth level lies in preventing the entry of rain water and storm water into the building thereby improving the quality of the structure and is regarded as a component of housing adequacy.

Table 6.1 Plinth Level of the House and Floor Area

Variable	69th round		76th round	
	Mean	SD	Mean	SD
Plinth Level of the House (in ft.)	1.15	1.023	1.18	1.052
Floor Area (in sq. ft.)	430.95	317.875	501.20	310.584

Source: Computed from NSSO unit level data 69th and 76th rounds

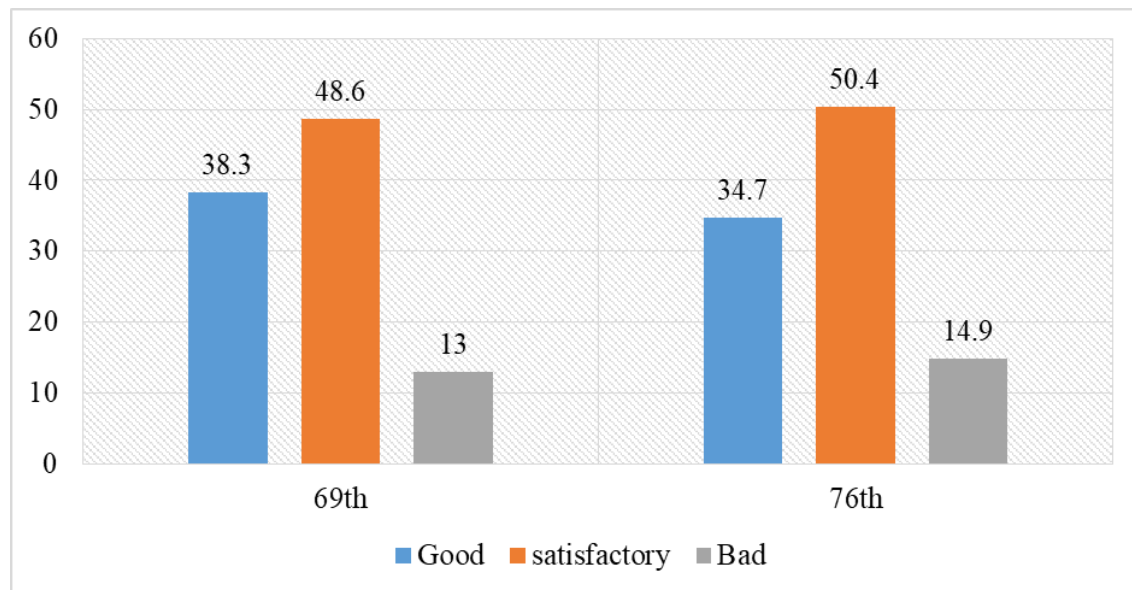
It can be observed from table 6.1 that there occurred an increase in plinth level of rural houses on the average from 1.15 ft. with SD 1.023 during 69th round to 1.18 ft. with SD 1.052 during 76th round.

Floor area can be regarded as one of the important components of housing adequacy which represents space requirements of the family. From the table, it can be observed that floor area of rural houses on the average has increased from 430.95 sq. ft. during 69th round to 501.20 sq. ft. during 76th round.

6.2.2 Condition of Housing Structure:

Condition of housing structure is rated as good, satisfactory and bad by NSSO which is explained in detail in chapter 3. The figure 6.1 portrays condition of structure during 69th and 76th rounds. The figure reveals that from 38.3% during 69th round, the housing structures in good condition has decreased to 34.7% during 76th round while those with satisfactory condition increased from 48.6% during 69th round to 50.4% during 76th round. It can also be noticed that the proportion of rural housing structures in bad condition has increased from 13% during 69th round to 14.9% during 76th round.

Figure 6.1 Condition of Structure

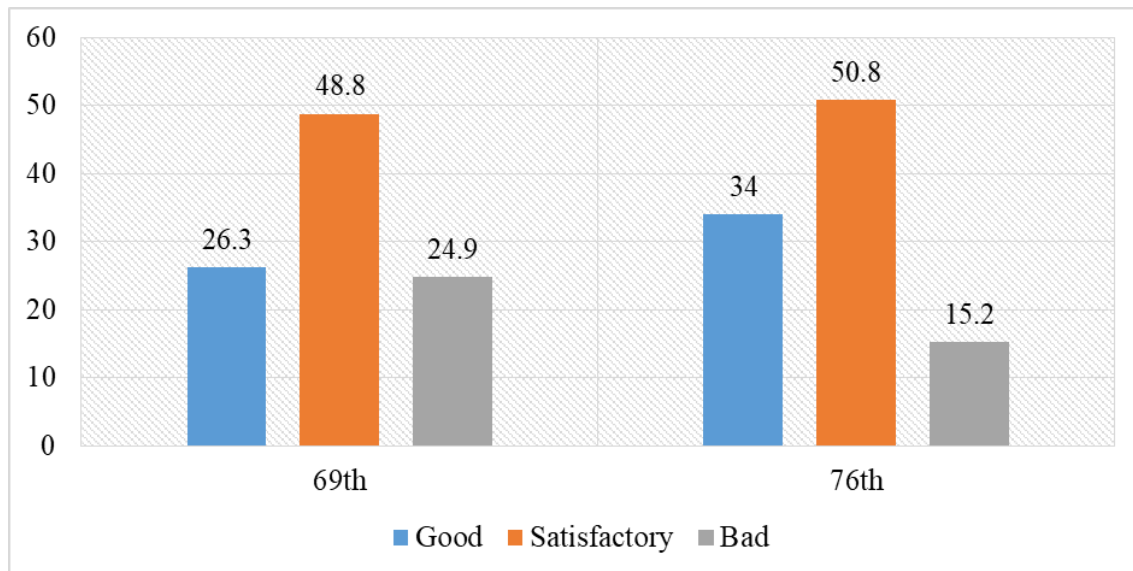


Source: Computed from NSSO unit level data 69th and 76th rounds

6.2.3 Ventilation of the Dwelling Unit:

The condition of ventilation is also rated on a three point scale as good, satisfactory, and bad. It can be noticed from figure 6.2 that the proportion of dwelling units with good ventilation has increased from 26.3% during 69th round to 34% during 76th round. The percentage of satisfactorily ventilated dwelling units also increased from 48.8% to 50.8% during the same period while that of dwelling units with bad ventilation showed a decrease (from 24.9% to 15.2%) during the same period.

Figure 6.2 Ventilation of the Dwelling Unit



Source: Computed from NSSO 69th and 76th rounds

6.2.4 Type of Structure:

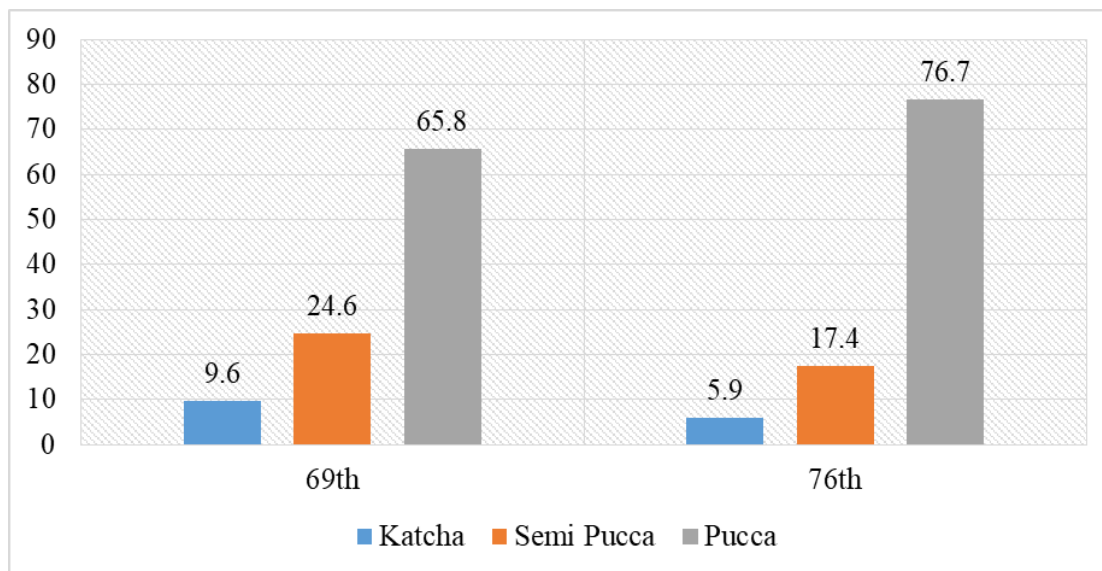
Type of structure of the dwelling unit is defined by NSSO based on the materials used for the construction of walls and roof. The wall materials were categorized as grass/ straw/ leaves/ reeds/ bamboo, etc., mud (with / without bamboo) / unburnt brick , canvas / cloth , other katcha , timber , burnt brick /stone/ lime stone , iron or other metal sheet , cement / RBC / RCC, other pucca by NSSO (NSSO, 2019). The present study broadly classify the type of wall into katcha and pucca by including grass, straw, leaves, reeds, bamboo, etc., mud or unburnt brick, canvas or cloth , and other katcha in Katcha category and the remaining wall materials in pucca category.

Roof materials include grass/ straw/ leaves/ reeds/ bamboo etc., mud / unburnt brick , canvas / cloth, other katcha, tiles / slate, burnt brick / stone / lime stone, iron / zinc /other metal sheet /asbestos sheet, cement / RBC / RCC , and other pucca(NSSO, 2019). A broad

classification of roof type as Katcha and pucca being made by including grass, straw, leaves, reeds, bamboo etc., mud or unburnt brick , canvas or cloth, and other katcha into katcha category and the remaining roof materials into pucca category.

Now, on the basis of type of roof and wall the dwelling units are classified as-Katcha structure, semi pucca structure and pucca structure. Pucca structure was defined by NSSO as a structure whose walls and roofs were constructed using pucca materials; a structure which had both walls and roof built with non-pucca materials was considered as a katcha structure and structure that cannot be classified as a pucca or a katcha structure was referred to as semi-pucca structure(NSSO, 2019).

Figure 6.3 Type of Structure



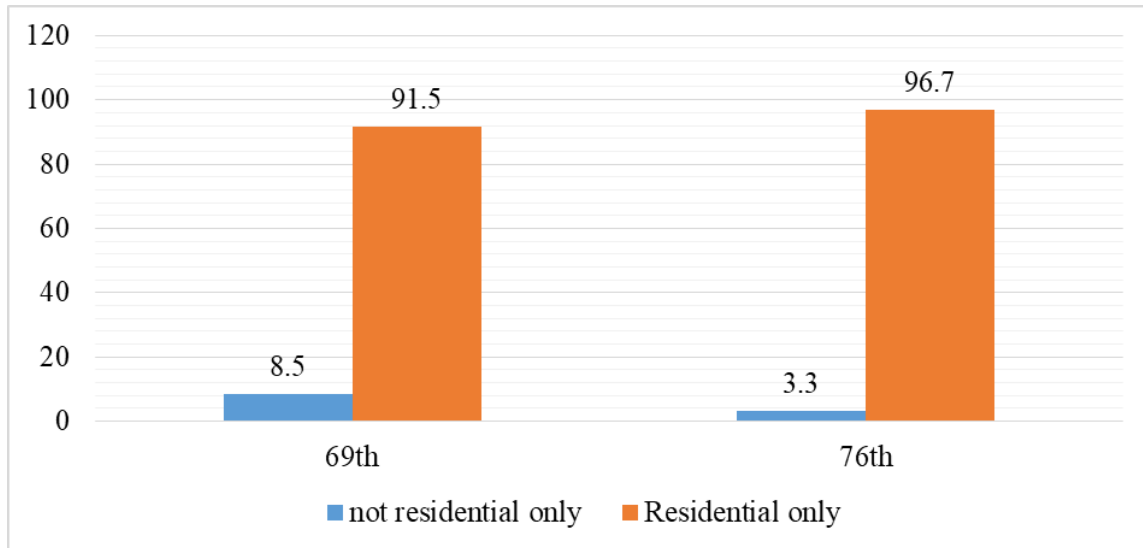
Source: Computed from NSSO unit level data-69th and 76th rounds

The figure 6.3 reveals that the proportion of rural Indian households with pucca structure has increased from 65.8% during 69th round to 76.7% during 76th round. Also, the proportion of households living in katcha and semi pucca structure has been decreased during the same period.

6.2.5 Use of the House:

According to NSSO, use of the house includes residential only, residential-cum-commercial, and residential-cum-others. The present study have broadly categorised the dwelling units as those used for residential purpose only and those used as not residential only. The figure 6.4 reveals that the proportion residential only houses has increased from 91.5% during 69th round to 96.7% during 76th round.

Figure 6.4 Use of the House

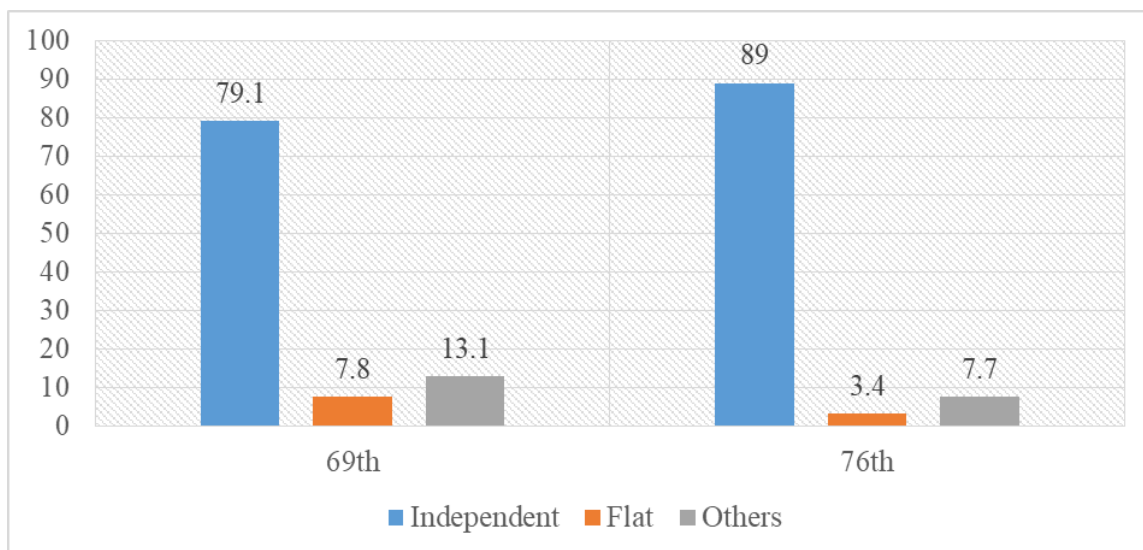


Source: Computed from NSSO unit level data 69th and 76th rounds

6.2.6 Type of Dwelling Unit:

Dwelling type is classified as independent, flat and others by NSSO. The figure 6.5 reveals that majority of the rural dwellings are independent. Also, there occurred an increase in the percentage of independent dwellings from 79.1% during 69th round to 89% during 76th round while that of flat and other types of dwelling showed a decrease during the same period.

Figure 6.5 Type of Dwelling

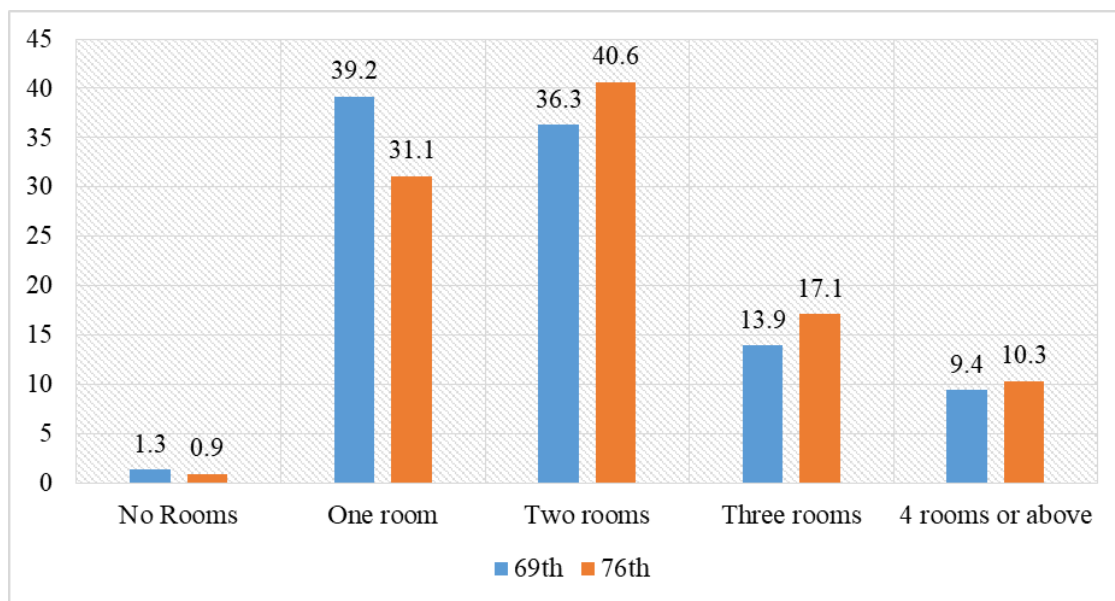


Source: Computed from NSSO unit level data 69th and 76th rounds

6.2.7 Number of Living rooms:

Figure 6.6 presents the distribution of number of living rooms among rural households in India which definitely represents one of the requirements for adequate housing. It can be observed from the figure that there occurred a decline in the proportion of rural households with no room in the dwelling from 1.3% during 69th round to 0.9% during 76th round. And, those with one room has declined from 39.2% to 31.1% during the same period. Also, it is to be noticed that there achieved an increase in the proportion of households with two rooms, three rooms and four rooms or above (see figure 6.8)

Figure 6.6 Number of Living Rooms:

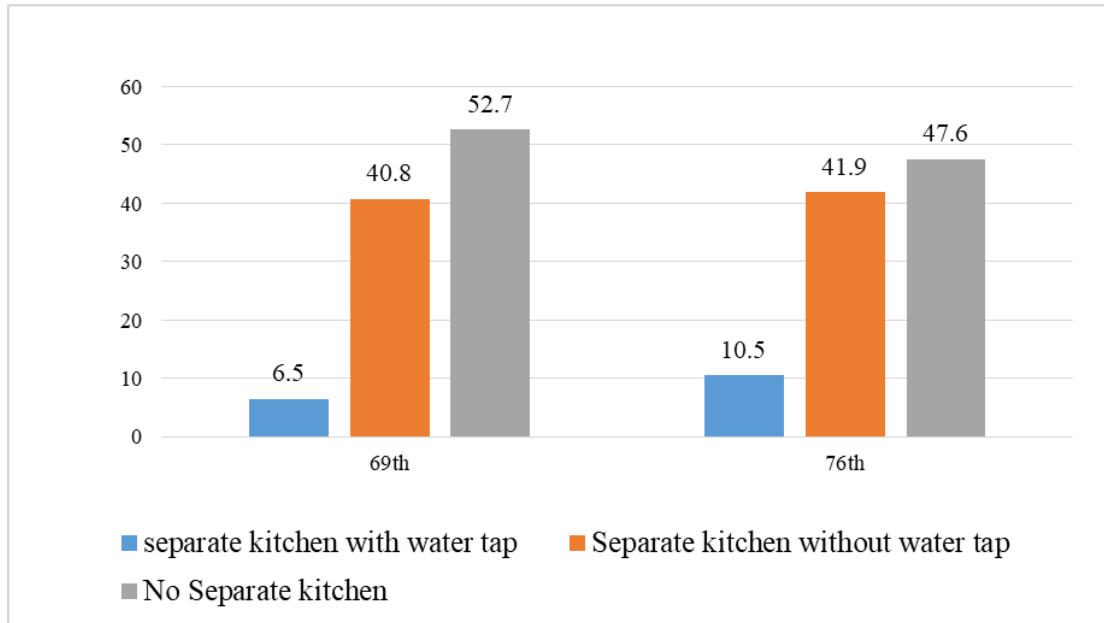


Source: Computed from NSSO unit level data 69th and 76th rounds

6.2.8 Type of Kitchen:

Kitchen facilities are analysed using three categories- separate kitchen with water tap, separate kitchen without water tap, and no separate kitchen (NSSO, 2019). Figure 6.7 reveals that only 6.5% of the rural households were having separate kitchen with water tap during 69th round. It has increased to 10.5% during 76th round. Again, the percentage of households having separate kitchen without water tap increased from 40.8% during 69th round to 41.9% during 76th round. There are households who have no separate kitchen facilities in their dwelling units. Their proportion decreased from 52.7% to 47.6% during the same period.

Figure 6.7 Type of Kitchen

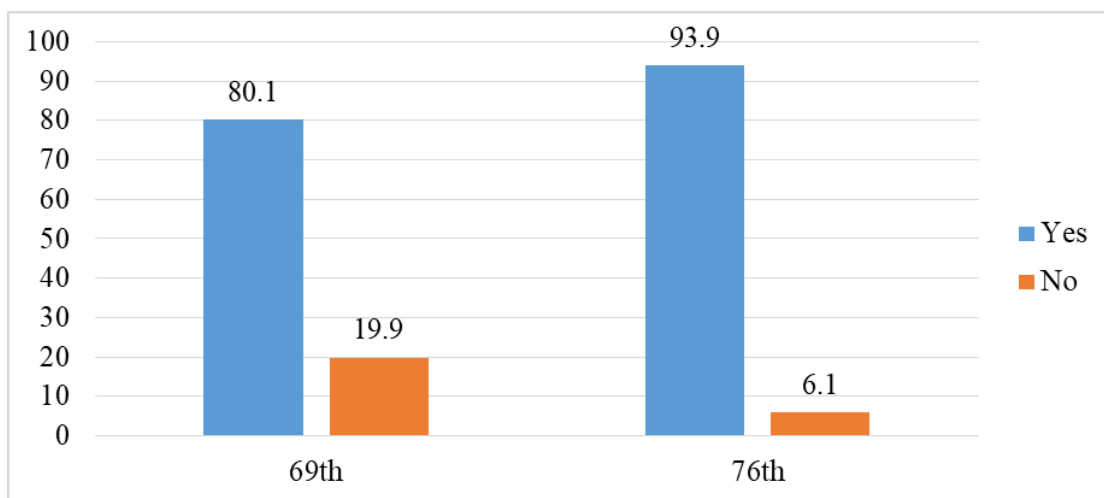


Source: Computed from NSSO unit level data 69th and 76th rounds

6.2.9 Electricity for Domestic Use:

Electricity for domestic use is an essential requirement to have adequate housing. The figure 6.8 reveals that 80.1% of the rural households had electricity for lighting purposes during 69th round which increased to 93.9% during 76th round.

Figure 6.8 Electricity for Domestic Use

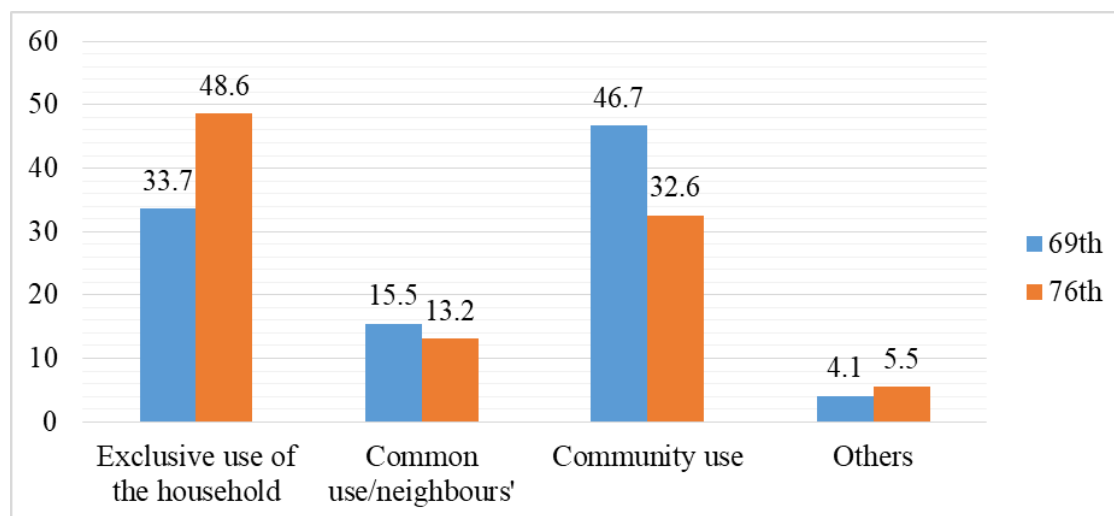


Source: Computed from NSSO unit level data 69th and 76th rounds

6.2.10 Accessibility to Drinking Water:

Figure 6.9 portrays accessibility of the household to principal source of drinking water.

Figure 6.9 Access to Drinking Water



Source: Computed from NSSO unit level data 69th and 76th rounds

The figure shows that 33.7% of the rural households possess exclusive use of the principal source during 69th round which has increased to 48.6% during 76th round.

6.2.11 Location of Drinking Water:

The table 6.2 explains the distance to principal source of drinking water for rural Indian households.

Table 6.2 Location of Drinking Water:

Location	Proportion of households (69 th round)	Proportion of households (76 th round)
Within the dwelling	16.5%	27.5%
Outside dwelling but within the premises	29.8%	30.7%
Outside premises: < 0.2km	41.1%	30.4%
outside premises: >0.2 km	12.6%	11.4%

Source: Computed from NSSO unit level data 69th and 76th rounds

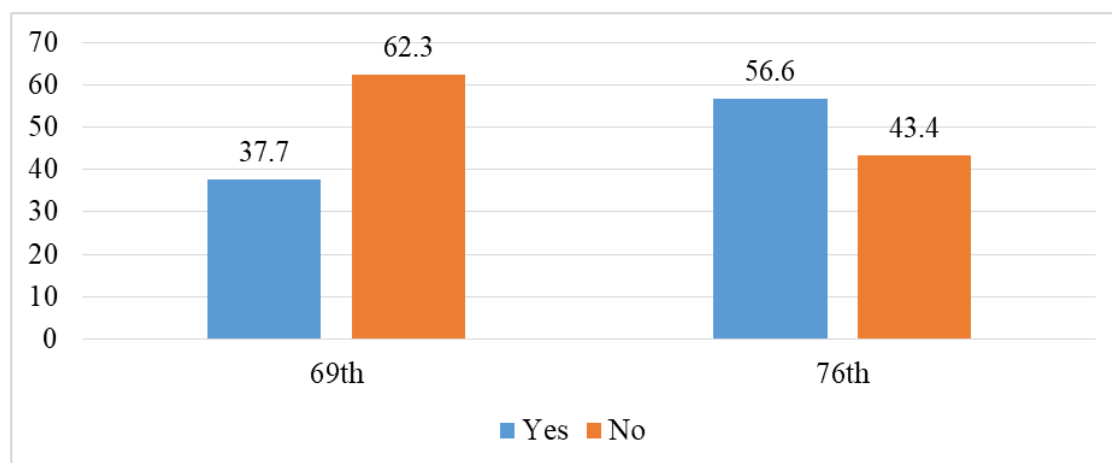
The table reveals that majority of the households have drinking water source outside the premises with a distance less than 0.2km (30.7% during 76th round) even if there recorded

a decrease for the same from 41.1% during 69th round to 30.4% during 76th round. Also, the proportion of households having drinking water source within the dwelling has recorded an increase from 16.5% to 27.5% during the same period.

6.2.12 Bathroom Facility:

The figure 6.10 portrays the extent of bathroom facility that households in rural India possesses during 69th and 76th rounds.

Figure 6.10 Bathroom Facility



Source: Computed from NSSO unit level data-69th and 76th rounds

The figure reveals that the percentage of households having bathroom facility has increased from 37.7% during 69th round to 56.6% during 76th round.

6.2.13 Latrine Facility:

The latrine facility is analysed based on accessibility to latrine which include: latrine which is for the exclusive use of the household, common use of the households in the building, public/community latrine with or without payment, other latrine and no latrine (NSSO, 2019).

Table 6.3 Latrine Facility:

Latrine facility	69 th round	76 th round
Exclusive use of the household	31.9%	63.2%
Common use of the households in the building	7.1%	7.3%
Community use	0.8%	0.3%
Others	0.8%	0.5%
No latrine	59.4%	28.7%

Source: Computed from NSSO unit level data-69th and 76th rounds

It can be understood from table 6.3 that the proportion of rural households having own latrine facilities has considerably increased from 31.9% during 69th round to 63.2% during 76th round. Also the percentage of households without any latrine facility has considerably decreased from 59.4% to 28.7% during the same period.

6.2.14 System of Disposal of Waste Water:

Details regarding the system of disposal of waste water by the households in rural India is presented in the following table.

Table 6.4 System of Disposal of Waste Water:

Disposal of Waste water	69 th Round	76 th Round
Safe re-use after treatment	0.1%	0.2%
Disposed off without treatment to drainage system	17.4%	10.5%
Disposed off without treatment to open low land area/ponds/rivers	67.4%	76.5%
Disposed off with/without treatment to other places	14.6%	12.4%
Not known	0.5%	0.4%

Source: Computed from NSSO unit level data 69th and 76th rounds

Unfortunately only 0.2% of the rural households were practicing safe re-use of the household waste water after the treatment during 76th round which was only 0.1% during the 69th round. Majority of the rural households were disposing off waste water to open low land area, ponds and rivers during both the rounds (69th round: 67.4%; 76th round: 76.5%).

6.2.15 Disposal of Garbage:

The place of disposal of household garbage include biogas plant/manure pit, community/individual/common dumping spots and other places.

Table 6.5 Place of Garbage Disposal:

Place of garbage disposal	69 th round	76 th round
Biogas plant/ manure pit	9.7%	5.4%
community/individual/common dumping spot	51.3%	78.9%
others	35.5%	15%
not known	3.5%	0.7%

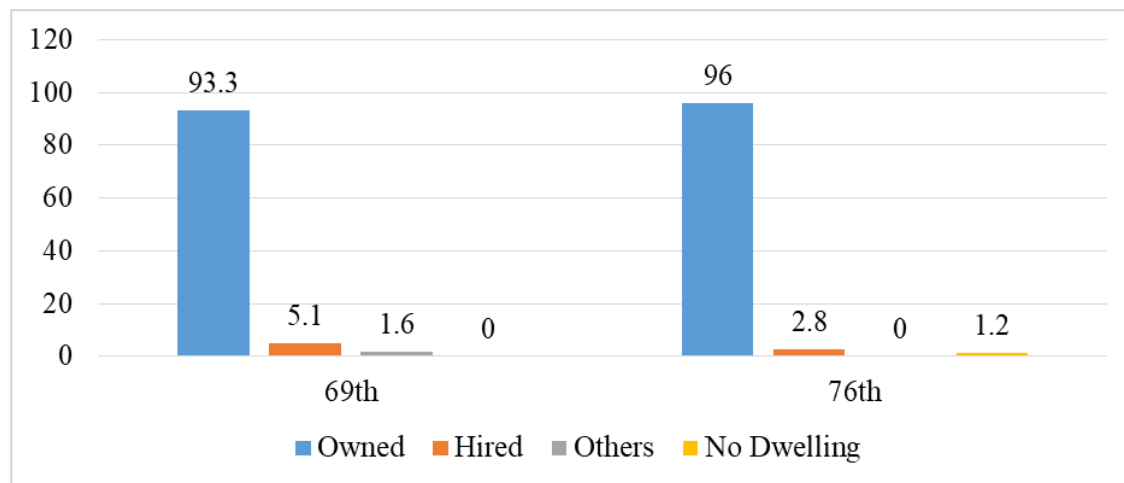
Source: Computed from NSSO unit level data 69th and 76th rounds

It can be noticed from table 6.5 that majority of the rural households in India dump their garbage in community dumping spots or individual/common dumping spots during both the rounds. Only 5.4% were using biogas plant/ manure pit for disposing household garbage during 76th round where their proportion was 9.7% during 69th round.

6.2.16 Tenurial Status of the Household:

Security of tenure is also a requirement for housing adequacy. The following figure depicts the tenurial status of the households in rural India.

Figure 6.11 Tenurial Status



Source: Computed from NSSO unit level data 69th and 76th rounds

Tenurial status is broadly classified as owned which include freehold and leasehold, hired consisting of employer quarter, hired dwelling unit with written contract, and hired dwelling unit without written contract and others (NSSO, 2019). It can be observed from the figure that majority of the households (93.3% in 69th round and 96% in 76th round) have own houses in rural India.

6.3 Construction of Housing Adequacy Index:

The variables described in section 6.2 were combined to construct a Housing Adequacy Index (HAI) to examine housing adequacy of households in rural India. The study employed principal component analysis (PCA) for developing a Housing Adequacy Index (HAI) which being similar to the one adopted by Tran H et.al. (2017) for constructing Household Vulnerability Index (HVI). A total of 17 variables described earlier were identified as the housing adequacy variables by surveying the available literature. These variables were selected for constructing Housing Adequacy Index on the basis of some criteria which

include structural durability of the dwelling, sufficient area and living facilities in the dwelling, drinking water facilities, sanitation facilities, tenurial status, waste management etc. The variables selected include nominal, ordinal and scale variables. Therefore, all the variables were transformed into z-scores before performing PCA. Varimax rotation was employed in order to maximise the each variable' loading on a single component. Kaiser criterion were applied to select the factors or principal components having Eigen value greater than one.

Table 6.6 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.812
Bartlett's Test of Sphericity	Approx. Chi-Square	482808.728
	df	136
	Sig.	.000

Source: Computed from NSSO unit level data 69th and 76th rounds

The table 6.6 presents the KMO and Bartlett's test results. The sampling adequacy measure obtained from KMO and Bartlett's test is 0.812. And, Bartlett's test of sphericity is significant at 5% level which suggests that the sample is capable for performing PCA.

Table 6.7 Total Variance Explained by PCA

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.323	25.432	25.432	4.323	25.432	25.432	2.590	15.238	15.238
2	1.491	8.770	34.202	1.491	8.770	34.202	2.252	13.248	28.486
3	1.331	7.832	42.034	1.331	7.832	42.034	1.803	10.604	39.090
4	1.132	6.659	48.693	1.132	6.659	48.693	1.507	8.866	47.956
5	1.027	6.043	54.736	1.027	6.043	54.736	1.141	6.711	54.666
6	1.013	5.956	60.692	1.013	5.956	60.692	1.024	6.026	60.692
Extraction Method: Principal Component Analysis.									

Source: Computed from NSSO unit level data 69th and 76th rounds

The table 6.7 explains the variance explained by the components derived from PCA with corresponding Eigen values. A total of 6 components whose Eigen value greater than

one which together accounts for 60.69% of variation within the dataset of 17 chosen variables were derived from PCA using Kaiser Criterion and varimax rotation.

Then the aggregated Housing Adequacy Index as a weighted average was developed as:

$$AI = W_1 \times F_1 + W_2 \times F_2 + W_3 \times F_3 + \dots + W_n \times F_n$$

Or

$$AI = \sum_{i=1}^n W_i \cdot F_i$$

Where,

AI=non-normalised adequacy index

$W_1, W_2, W_3, \dots, W_n$ = Weights

$F_1, F_2, F_3, \dots, F_n$ = Factors or principal components

Here AI is the non-normalised adequacy Index which is the weighted sum of the factors or components derived.

There are 6 factors or principal components here being derived by performing PCA. The weights used here is the proportion variance explained by the component to total variance present in the retained components (Here $W_1= 0.25, W_2= 0.22, W_3= 0.17, W_4= 0.15, W_5= 0.11, W_6= 0.10$ and $\sum W_i = 1$)

Then, the obtained AI values for all the households were ‘normalized’ into the range 0 to 1 for generating a Housing Adequacy Index as a normalized HAI. Afterwards, for classifying the households into three groups based on their housing adequacy, cut-off points were defined based on the 33rd and 66th percentile positions of this index and using these cut-off points, households were classified according to their housing adequacy level as low, medium and high.

6.3.1 Summary of the Factors that Retained after PCA Constituting HAI:

The table 6.8 provides a summary of the components of housing adequacy extracted from the data by using PCA with their Eigen values and percentage of variance explained by each component. The last column shows the variables that constitute the component derived with their loadings.

It can be noticed from the table that 15.238% of variation being explained by Sufficient number of rooms and living facilities in the dwelling followed by Structural

adequacy (13.248%), Drinking water facilities (10.604%), Type of dwelling and Tenorial status and floor area of the household (8.866%), waste management (6.711%), and use of the house (6.026%). In total, 60.692% of the total variation being explained by these six components together.

Table 6.8 Summary of the Factors that Retained after PCA Constituting HAI:

Components with description	Eigen Value	% of Variance Explained	Representing Variables with loadings
PC1: Sufficient number of rooms And Living Facilities	2.590	15.238	Latrine facility (.762) Bathroom facility (.734) Type of Kitchen (.610) Number of living rooms (.527) Electricity for domestic use (.498)
PC2: Structural Adequacy	2.252	13.248	Condition of structure (.820) Ventilation (.749) Type of structure (.679) Plinth level (.511)
PC3: Drinking water facilities	1.803	10.604	Access to drinking water (.919) Location of principal source of drinking water (.918)
PC4: Dwelling type, floor area and Tenorial status	1.507	8.866	Tenorial status (.693) Type of dwelling (.614) Floor area (.527)
PC5: Waste management	1.141	6.711	System of disposal of waste water (.711) Disposal of garbage (.690)
PC6: Use of the house	1.024	6.026	Use of the house (.923)

Source: Computed from NSSO unit level data 69th and 76th rounds

6.3.2 Comparison of Housing Adequacy Index across Rounds:

To examine whether there exists statistically significant differences in the distribution of HAI across 69th and 76th rounds, a Mann Whiney U test was performed. The test results of the same being illustrated in table 6.9 and 6.10.

Table 6.9 Independent-Samples Mann-Whitney U Test Summary

Null Hypothesis	Test Statistic	Sig.	Decision
The distribution of HAI is the same across 69 th and 76 th rounds	2350725538.000	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.			

Source: computed from NSSO unit level data 69th and 76th rounds

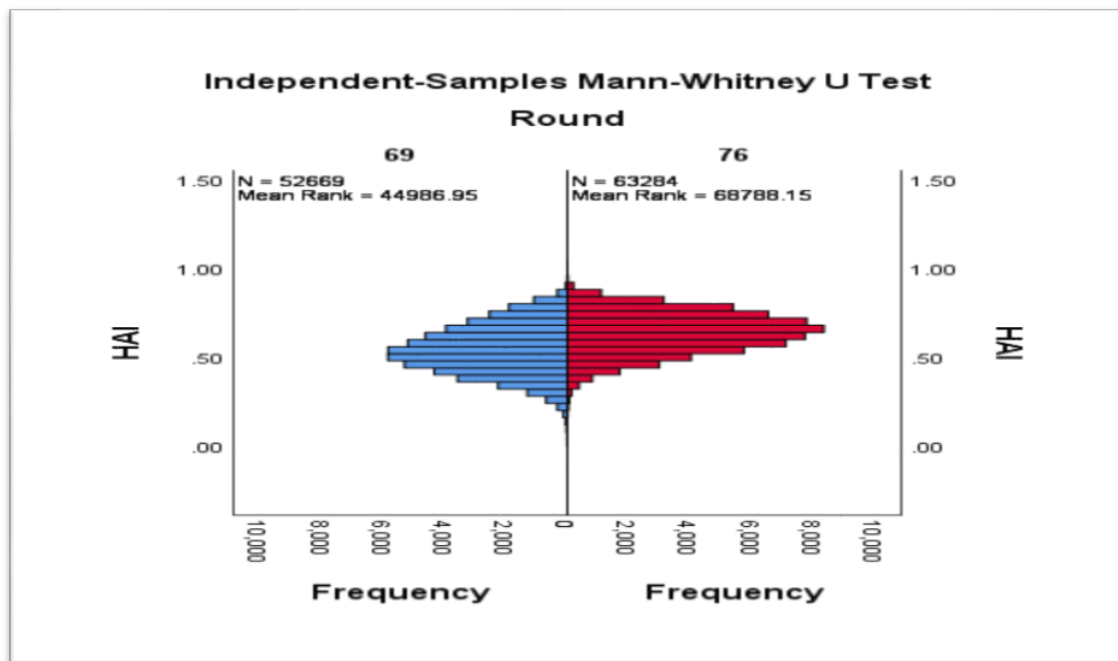
Table 6.10 Independent-Samples Mann-Whitney U Test: Mean rank and sum of ranks

Round	Mean Rank	Sum of Ranks
69	44986.95	2369417573.00
76	68788.15	4353189508.00

Source: Computed from NSSO unit level data 69th and 76th rounds

The test results indicate that the Mann Whitney U statistic is significant at 5% level thereby rejecting the null hypothesis that there exists no significant difference in the distribution of HAI across rounds. Also, the mean rank for housing adequacy is higher for 76th round than that of 69th round indicating housing adequacy being improved over time.

Figure 6.12 Mann-Whitney U Test:



Source: computed from NSSO unit level data 69th and 76th rounds

6.3.3 Level of Housing Adequacy across Rounds:

Here a comparison is made on level of housing adequacy across rounds. Housing adequacy index is categorised according to the 33rd and 66th percentile positions as Low, Medium and High ($P_{33}=.53$ and $P_{66}=.66$).

It can be observed from the figure 6.13 that the proportion of rural households with low level of housing adequacy has decreased from 43.6% during 69th round to 20.1% during 76th round. At the same time, percentage of households having medium and high level of housing adequacy recorded an increase during the same period. The proportion of households with high level of housing adequacy has increased from 22.4% to 42.3% during the same period.

Figure 6.13 Level of Housing Adequacy across Rounds



Source: Computed from NSSO 69th and 76th rounds

The chi square test results indicates that there exist significant difference in the level of housing adequacy between 69th and 76th rounds.

Table 6.11 Level of Housing Adequacy across Rounds-Chi-Square Tests

	Test Value	Df.	Sig. (2-sided)
Pearson Chi-Square	13304.351 ^a	2	.000
Likelihood Ratio	13593.645	2	.000
Linear-by-Linear Association	12671.271	1	.000

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16813.22.

Source: computed from NSSO unit level data 69th and 76th rounds

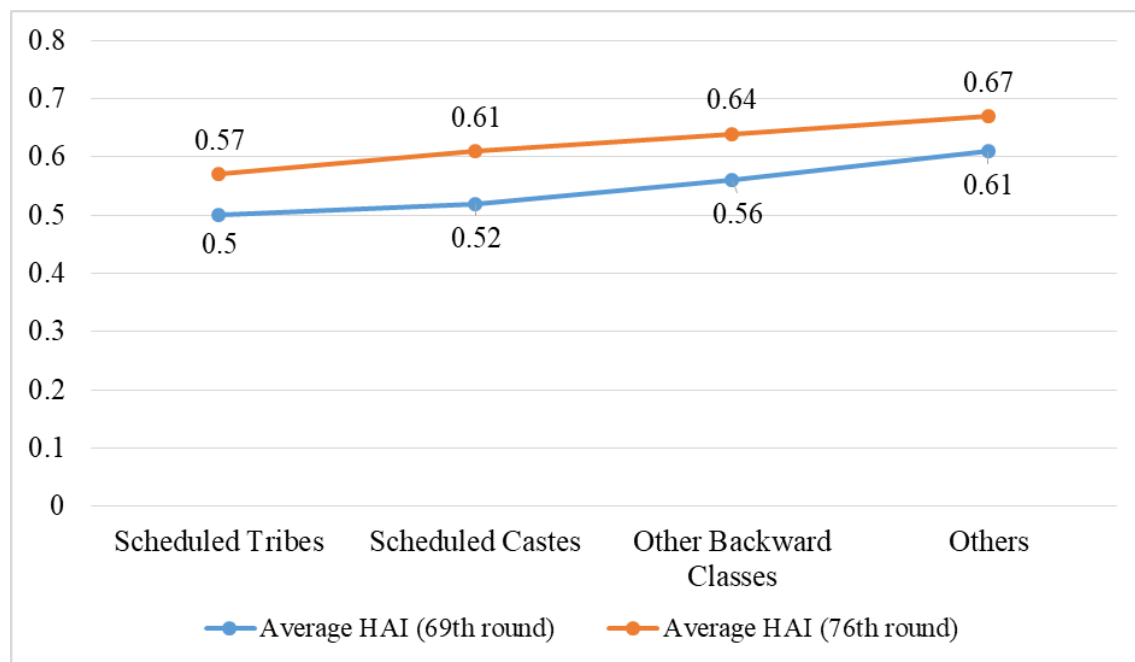
6.3.4 Social Group and Housing Adequacy:

In this section, comparison of housing adequacy is made among the social groups with respect to both Housing Adequacy Index and its levels-Low, Medium and high.

6.3.4.1 Distribution of HAI across Social Groups:

The figure 6.17 depicts distribution of HAI across different social groups during 69th and 76th rounds. The figure reveals that there occurred an increase in average HAI for all the social groups from 69th round to 76th round. But it can also be observed from the figure that the average HAI for ST households being the lowest followed by SC households comparing to that of rural households from OBC and Others categories during both the rounds considered.

Figure 6.14 Social Groups and HAI



Source: Computed from NSSO unit level data 69th and 76th rounds

Table 6.12 presents the details regarding the Kruskal Wallis test performed on 76th round data in order to find out whether there exist significant difference across social groups regarding the distribution of HAI. The test results indicate that the null hypothesis is rejected at 5% level of significance which means that there exist significant differences regarding the distribution of HAI across social groups.

Table 6.12 Social Groups and HAI-Kruskal Wallis Test Results:

Null Hypothesis	Test Statistic	df	Sig	Decision
The distribution of HAI is the same across categories of Social group	2958.266	3	.000	Reject the null hypothesis.

Source: Computed from NSSO unit level data 76th round

As a part of Kruskal Wallis tests, a pairwise comparison of social groups regarding the distribution of HAI is done. The results indicates that there exists significant differences between all the possible pairs of social groups i.e. between SC and ST, between OBC and ST, between ST and General (Others), between OBC and SC and between SC and others and also between OBC and Others regarding the distribution of HAI as the p value for each pair is less than 0.05.

Table 6.13 Pair wise Comparisons of Social Group with respect to HAI

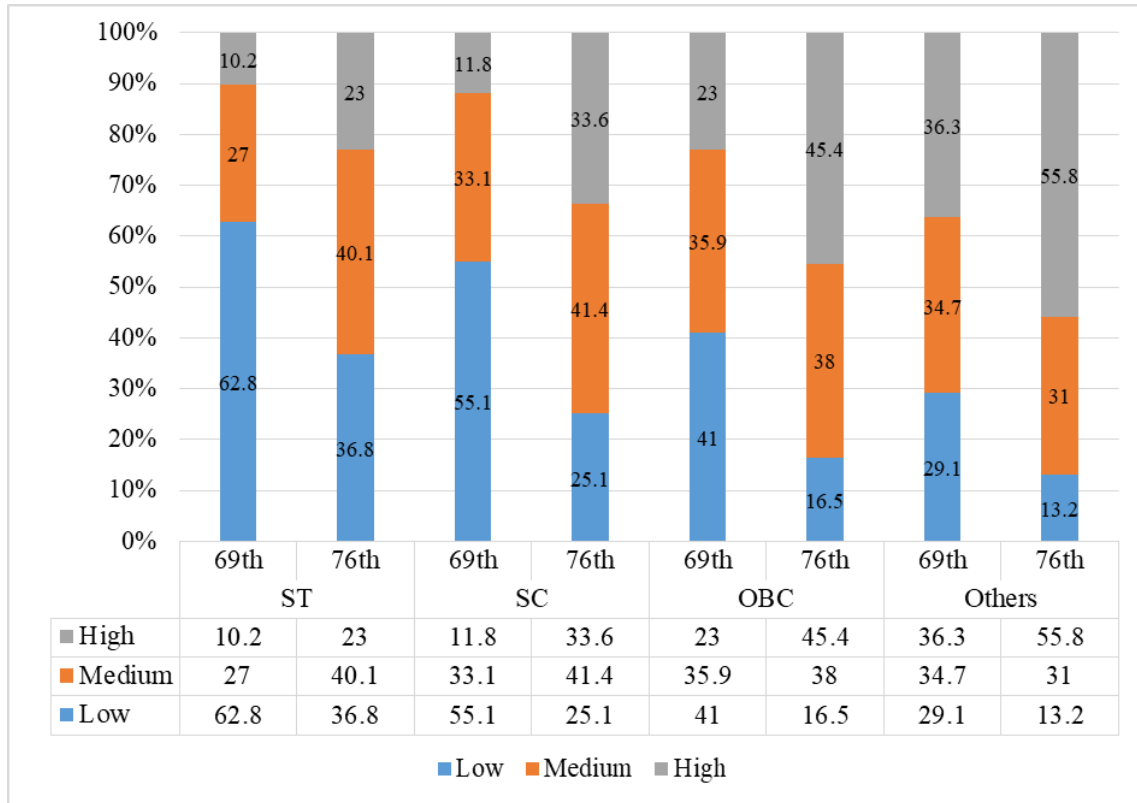
Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Scheduled Tribes-Scheduled Castes	-757.355	239.240	-3.166	.002	.009
Scheduled Tribes-Other Backward Classes	-6572.395	207.306	-31.704	.000	.000
Scheduled Tribes-Others	-10541.546	232.814	-45.279	.000	.000
Scheduled Castes-Other Backward Classes	-5815.040	199.787	-29.106	.000	.000
Scheduled Castes-Others	-9784.191	226.144	-43.265	.000	.000
Other Backward Classes-Others	-3969.151	192.044	-20.668	.000	.000
Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.					
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.					

Source: computed from NSSO unit level data 76th round

6.3.4.2 Level of Housing Adequacy across Social Groups:

The figure 6.15 compares social groups and level of housing adequacy across 69th and 76th rounds.

Figure 6.15 Social Group and Level of Housing Adequacy



Source: Computed from NSSO unit level data 69th and 76th rounds

The figure reveals that the level of housing adequacy of ST households being the lowest among all social groups even if there occurred an increase in the proportion of households with high level of housing adequacy from 69th round (10.2%) to 76th round (23%). For SC households, the percentage of households with high level of housing adequacy showed an increase from 11.8% to 33.6% during the same period. The figure also reveals that there occurred an increase in the proportion of households with medium and high levels of housing adequacy; still the level of housing adequacy of SC/ST households being the lowest of all across the two rounds under study.

The Chi Square test results indicates that there exists statistically significant difference in the level of housing adequacy across social groups during both the rounds at 5% level of significance (see table 6.14).

Table 6.14 Social Group and Level of Housing Adequacy-The Chi Square test results:

Round	Test	Value	Df.	Sig (2-sided)
69	Pearson Chi-Square	2483.942	6	.000
	Likelihood Ratio	2499.307	6	.000
	Linear-by-Linear Association	1908.697	1	.000
76	Pearson Chi-Square	2401.289	6	.000
	Likelihood Ratio	2399.705	6	.000
	Linear-by-Linear Association	1647.776	1	.000

Source: Computed from NSSO unit level data 69th and 76th rounds

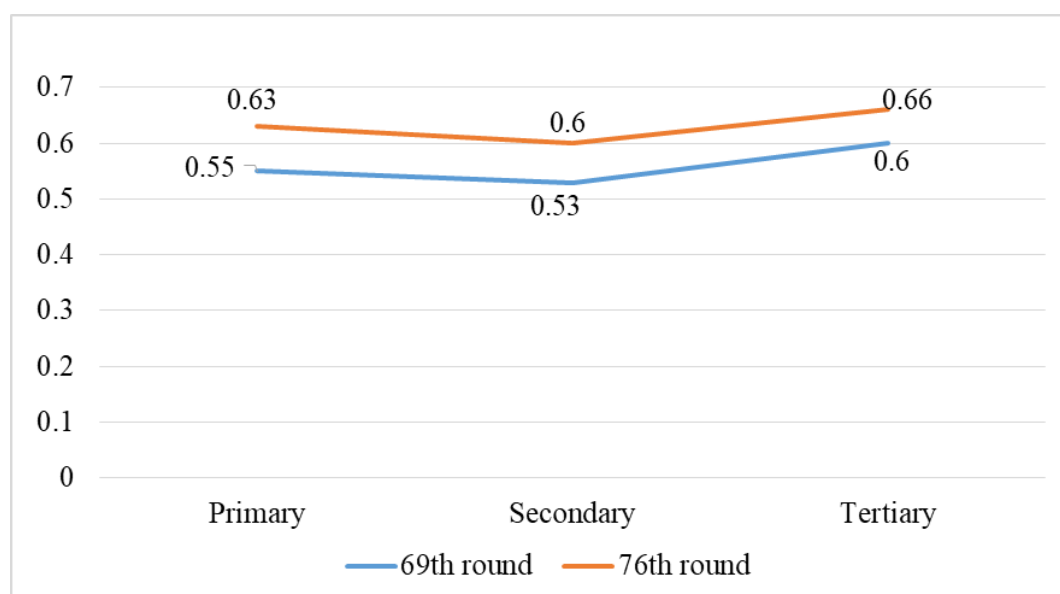
6.3.5 Economic Activity and Housing Adequacy:

In this section housing adequacy of rural households being compared across their occupational categories based on economic activity-Primary, secondary, and tertiary.

6.3.5.1 Distribution of HAI across Categories of Economic Activity:

The figure 6.19 portrays distribution of HAI across categories of economic activity which suggests that the average HAI has increased for all the sectors from 69th round to 76th round.

Figure 6.16 Economic activity and HAI



Source: Computed from NSSO unit level data 69th and 76th rounds

The HAI for primary sector households has increased from 0.55 during 69th round to 0.63 during 76th round while that of secondary sector registered an increase from 0.53 to 0.6

and for tertiary sector from 0.6 to 0.66 during the same period. HAI is the lowest for secondary sector and the highest for tertiary sector for both the rounds considered here.

The table 6.15 reveals that the Kruskal Wallis test performed for examining whether the distribution of HAI is same across categories based on economic activity, is significant at 5% level, indicating significant differences in HAI across primary, secondary and tertiary sectors.

Table 6.15 Economic Activity and HAI-Kruskal Wallis Test Results:

Null Hypothesis	Test Statistic	df	Sig.	Decision
The distribution of HAI is the same across categories of Economic activity.	1356.658	2	.000	Reject the null hypothesis

Source: Computed from NSSO unit level data 76th round

Table 6.16 details the results of pairwise comparison done as a subsequent analysis of Kruskal Wallis test. The pairwise comparison shows that there exists statistically significant differences in the distribution of HAI between all the pairs of economic activity as can be observed from the table.

Table 6.16 Pairwise Comparisons of Economic Activity with respect to HAI

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Secondary-Primary	3561.839	180.189	19.767	.000	.000
Secondary-Tertiary	-8140.393	222.522	-36.582	.000	.000
Primary-Tertiary	-4578.554	177.096	-25.854	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

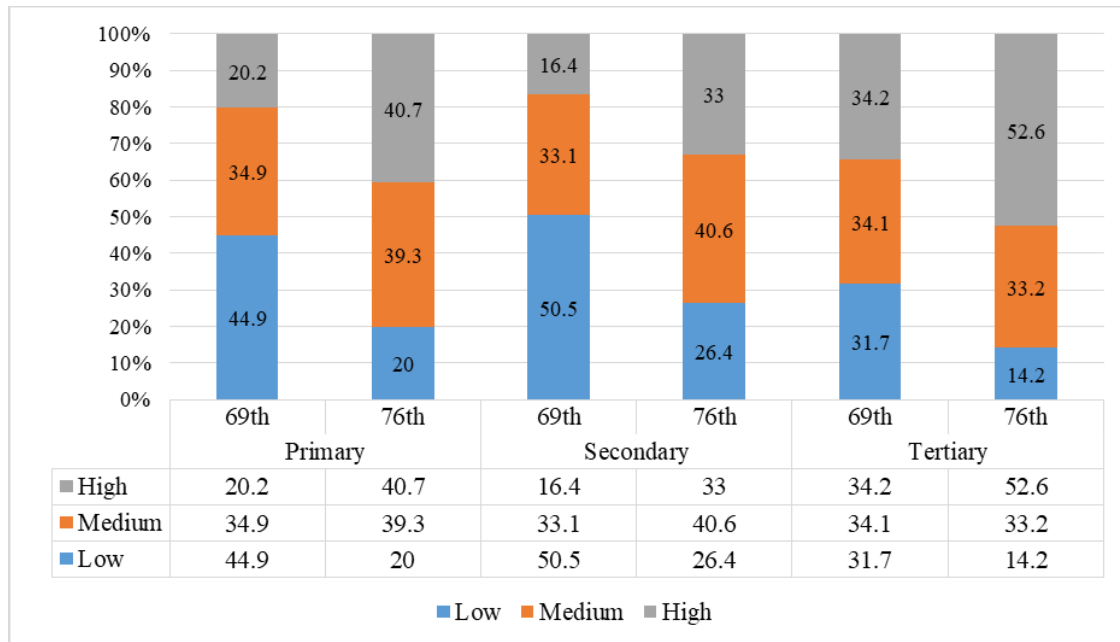
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Source: Computed from NSSO unit level data 76th round

6.3.5.2 Level of Housing Adequacy across Categories of Economic Activity:

Here the level of housing adequacy of the two rounds being compared based on the economic activity of the household. Figure 6.20 portrays the level of housing adequacy across economic activity based on 69th and 76th rounds.

Figure 6.17 Economic Activity and Level of Housing Adequacy



Source: Computed from NSSO unit level data 69th and 76th rounds

First of all, it can be observed from the figure that there occurred an improvement in the level of housing adequacy of households from all the sectors across rounds as there recorded an increase in the proportion of households with high level of housing adequacy. Secondly, the figure reveals that the level of housing adequacy is comparatively low for households from secondary sector. Thirdly, highest position regarding the proportion of households with high level of housing adequacy being occupied by the households from tertiary sector; the second place in this regard being secured by the primary sector during both the rounds considered.

Table 6.17 Economic Activity and Level of Housing Adequacy-The Chi Square Test Results:

Round	Tests	Value	df	Sig (2-sided)
69	Pearson Chi-Square	2054.195	4	.000
	Likelihood Ratio	1977.975	4	.000
	Linear-by-Linear Association	1031.388	1	.000
76	Pearson Chi-Square	1071.029	4	.000
	Likelihood Ratio	1067.847	4	.000
	Linear-by-Linear Association	218.485	1	.000

Source: Computed from NSSO unit level data 69th and 76th rounds

The chi square test result indicates that there exists statistically significant differences in the levels of housing adequacy among categories of economic activity during both the rounds at 5% level of significance.

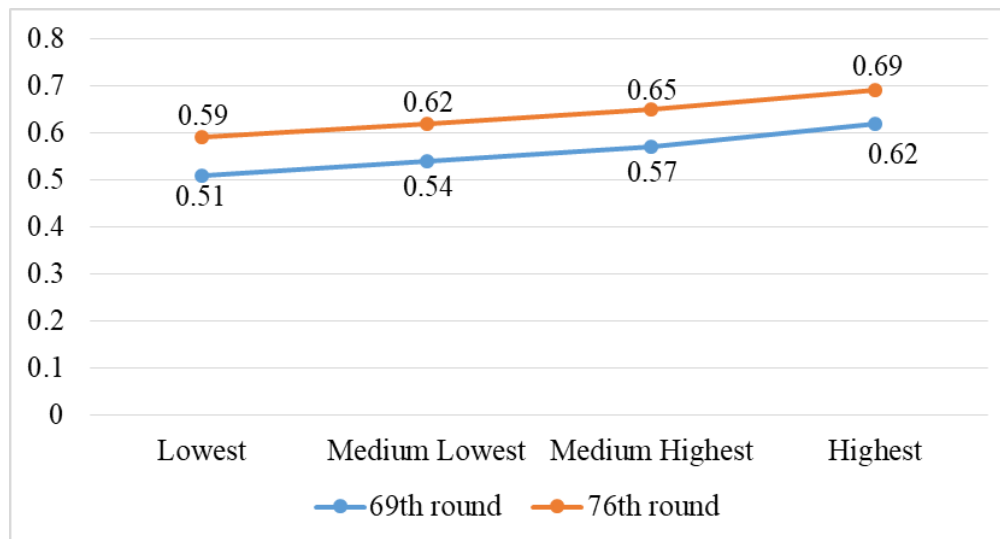
6.3.6 Economic Status and Level of Housing Adequacy:

This section examines the distribution of HAI across different household groups based on economic status-Lowest, medium lowest, medium highest and highest and compares the level of housing adequacy across these groups.

6.3.6.1 Distribution of HAI across Economic Status:

The figure 6.18 clearly portrays the distribution of HAI across categories of economic status based on 69th and 76th rounds.

Figure 6.18 Economic Status and HAI



Source: Computed from NSSO unit level data 69th and 76th rounds

For the households with lowest economic status, the HAI has increased from 0.51 during 69th round to 0.59 during 76th round. For medium lowest category households, it has increased from 0.54 to 0.62; for medium highest, these figures showed an increase from 0.57 to 0.65; and for the households with highest economic status, it has increased from 0.62 to 0.69 during the same period. It can be noticed that when the economic status of the household increases, the average HAI also increases for both the rounds. Hence it can be concluded that Economic status of the household positively influences housing adequacy.

Table 6.18 presents the test results of Kruskal Wallis test applied to examine whether there exists significant difference in the distribution of HAI across categories of economic

status which reveal that the test statistic is statistically significant at 5% level indicating that the distribution of HAI is not the same across categories of Economic status.

Table 6.18 Economic Status and HAI- the Kruskal Wallis Test Results:

Null Hypothesis	Test Statistic	df	Sig	Decision
The distribution of HAI is the same across categories of Economic status.	6725.204	3	.000	Reject the null hypothesis

Source: Computed from NSSO unit level data 76th round

Table 6.19 presents the results of pairwise comparisons of categories based on economic status regarding the distribution of HAI.

Table 6.19 Pairwise Comparisons of Economic Status with respect to HAI

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Lowest-Medium Lowest	-4747.869	204.917	-23.170	.000	.000
Lowest-Medium Highest	-9635.964	205.361	-46.922	.000	.000
Lowest-Highest	-16086.154	205.518	-78.271	.000	.000
Medium Lowest-Medium Highest	-4888.095	205.290	-23.811	.000	.000
Medium Lowest-Highest	-11338.285	205.448	-55.188	.000	.000
Medium Highest-Highest	-6450.191	205.891	-31.328	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

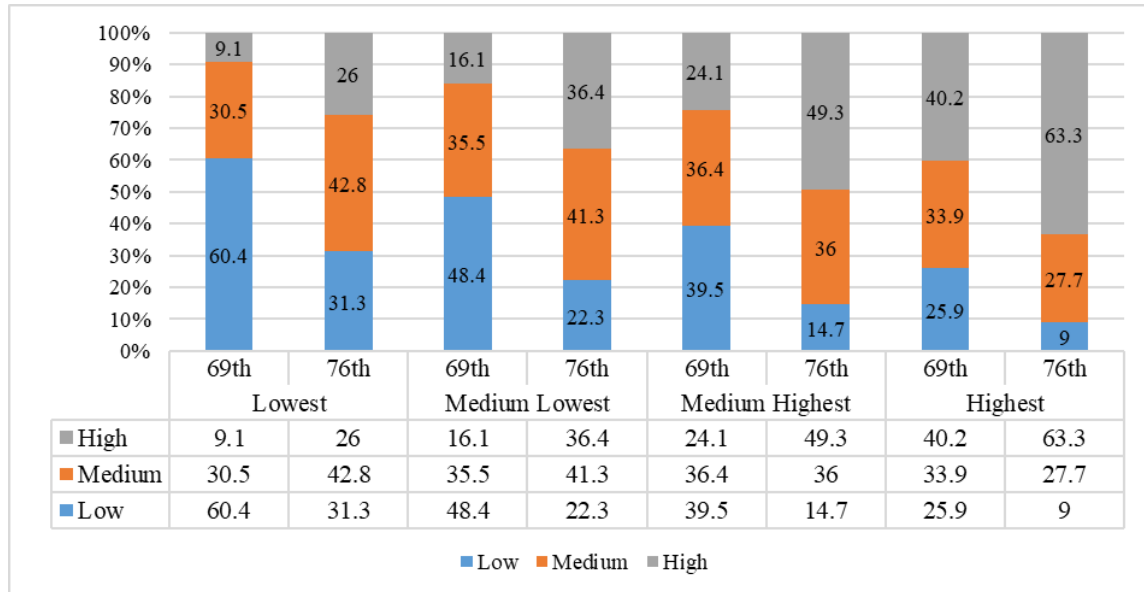
Source: computed from NSSO unit level data 76th round

Pairwise comparisons as a post hoc analysis to Kruskal Wallis test indicates that there exist statistically significant difference in the distribution of HAI across all the possible pairs formed from the categories of economic status. The difference is the highest for households from lowest and highest categories of economic status.

6.3.6.2 Level of Housing Adequacy across Economic Status:

The following figure depicts the level of housing adequacy across economic status during the two rounds.

Figure 6.19 Economic Status and Level of Housing Adequacy



Source: Computed from NSSO unit level data 69th and 76th rounds

The level of housing adequacy being improved for all the categories of economic status when we compare the respective figures of both the rounds. Still, it can be observed from the figure that the level of housing adequacy goes on increasing when we move from lowest economic status to the highest irrespective of the rounds. as per 76th round data which being the latest round in this regard, 26% of the households with lowest economic status, 36.4% from medium lowest, 49.3% of medium highest and 63.3% of the highest economic status households enjoy a high level of housing adequacy.

The table 6.20 provides chi square test results conducted to examine whether there exist significant differences in the level of housing adequacy across categories of economic status.

Table 6.20 Economic Status and Housing Adequacy-The Chi Square Test Results:

Round	Test	Value	df	Sig (2-sided)
69	Pearson Chi-Square	5296.161	6	.000
	Likelihood Ratio	5333.195	6	.000
	Linear-by-Linear Association	5023.414	1	.000
76	Pearson Chi-Square	5373.400	6	.000
	Likelihood Ratio	5458.229	6	.000
	Linear-by-Linear Association	5158.109	1	.000

Source: Computed from NSSO unit level data 69th and 76th rounds

It can be observed from the table that the Pearson Chi-Square statistic is significant at 5% level for both the rounds indicating that there exist statistically significant difference in level of housing adequacy across economic status.

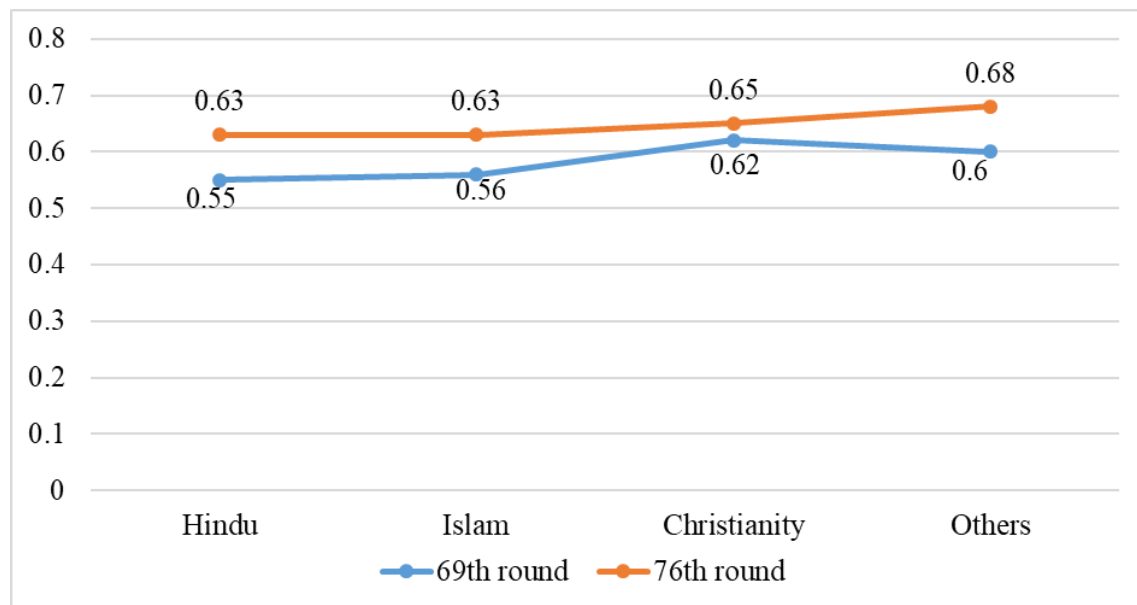
6.3.7 Religion and Housing Adequacy:

In this section, analysis being made on housing adequacy across major religions of India. Here comparison of housing adequacy being made among Hindu, Islam, Christianity, and others (Sikhism, Jainism, Buddhism, Zoroastrianism etc.) across two rounds.

6.3.7.1 Distribution of HAI across Religion:

The figure presents the distribution of HAI across different religions during 69th and 76th rounds for rural India. The figure reveals that there occurred an increase in the average HAI from 69th round to 76th round for all religious groups even though there exists differences in HAI figures for each group.

Figure 6.20 Religion and HAI



Source: Computed from NSSO unit level data 69th and 76th rounds

A Kruskal Wallis test was applied in order to examine whether there exist statistically significant differences in the distribution of HAI across groups based on religion based on 76th round data the results of which is presented in table 6.21. The test results reveals that the distribution of HAI is not the same across categories of religion indicating that there exists statistically significant differences in the HAI of religious groups.

Table 6.21 Religion and HAI-Kruskal Wallis Test Results:

Null Hypothesis	Test Statistic	df	Sig	Decision
The distribution of HAI is the same across categories of Religion.	669.079	3	.000	Reject the null hypothesis

Source: Computed from NSSO 76th round unit level data

The pairwise comparisons given in table 6.22 reveal that there exists statistically significant difference in the distribution of HAI between Hindu and Islam households; between Hindu and Christianity; and between Islam and Christianity. And, the difference is lowest for Hindu and Islam relative to Hindu and Christianity.

Table 6.22 Pairwise Comparisons of Religion with respect to HAI

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
Hindu-Islam	-1500.380	228.763	-6.559	.000	.000
Hindu-Christianity	-3832.873	304.484	-12.588	.000	.000
Hindu-Others	-8092.619	350.929	-23.061	.000	.000
Islam-Christianity	-2332.492	362.599	-6.433	.000	.000
Islam-Others	-6592.239	402.390	-16.383	.000	.000
Christianity-Others	-4259.747	449.773	-9.471	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

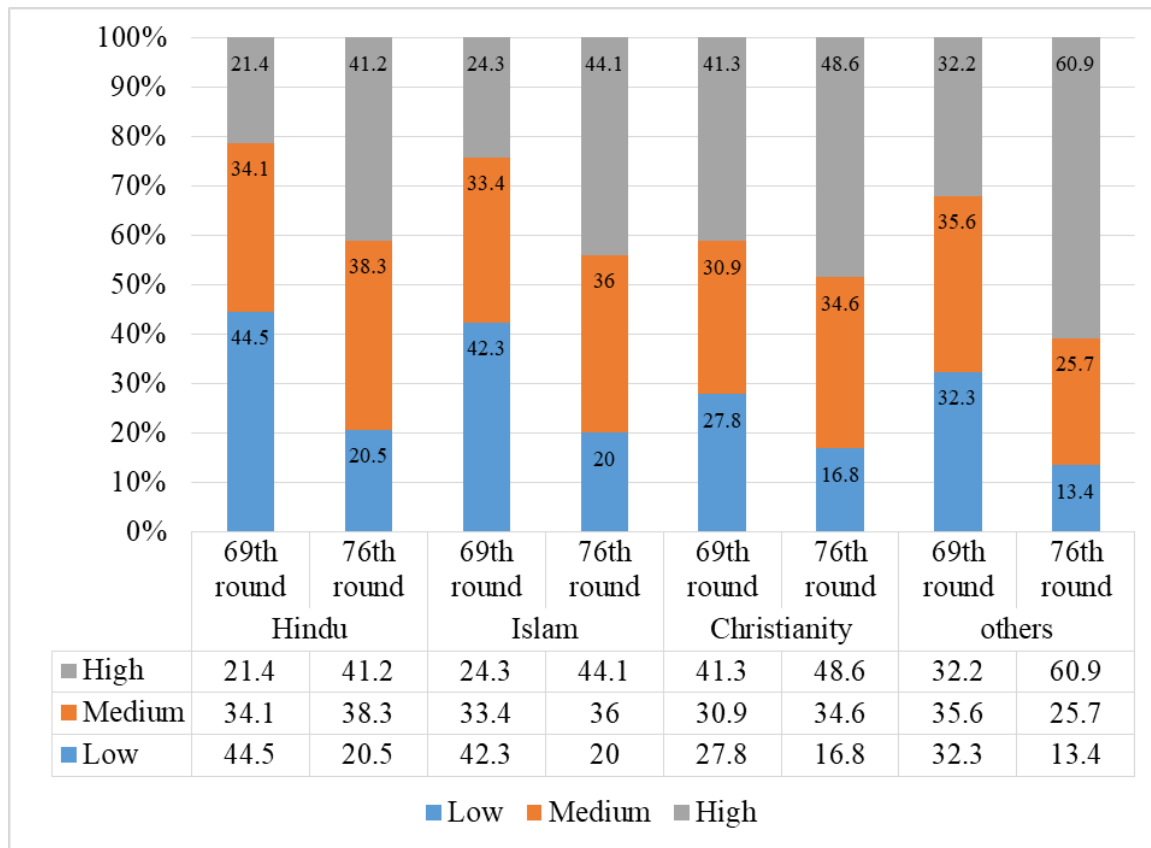
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Source: Computed from NSSO 76th round unit level data

6.3.7.2 Level of Housing Adequacy across Religion:

The figure reveals that the proportion of households having high level of housing adequacy has increased for all the religious groups from 69th round to 76th round. Also the proportion of households with low level of housing adequacy has declined for all the categories of religion.

Figure 6.21 Religion and Level of Housing Adequacy



Source: Computed from NSSO unit level data 69th and 76th rounds

When comparison is made among Hindu and Islamic households, Hindu households have proportion of households enjoying high level of housing adequacy (41.2%) less than that of Islamic households (44.1%). Also, the Christian households enjoy a high level of housing adequacy (48.6%) comparing to that of Hindu and Islam households.

Table 6.23 Religion and Level of Housing Adequacy-The Chi Square Test Results:

Round	Test	Value	df	Sig(2-sided)
69	Pearson Chi-Square	1025.146	6	.000
	Likelihood Ratio	1025.537	6	.000
	Linear-by-Linear Association	851.845	1	.000
76	Pearson Chi-Square	532.829	6	.000
	Likelihood Ratio	550.961	6	.000
	Linear-by-Linear Association	458.222	1	.000

Source: Computed from NSSO unit level data 69th and 76th rounds

The table 6.23 presents the chi square test results conducted to examine whether there exists significant differences in the level of housing adequacy across religious groups. The test results indicate that the Pearson Chi square value is significant at 5% level for both the rounds implying that the level of housing adequacy is statistically different across religious groups irrespective of time period (denoted by the two rounds).

6.3.8 Interstate Comparison of Housing Adequacy:

This section examines the interstate variations in average HAI as well as in level of housing adequacy based on 69th and 76th rounds unit level data of large states.

6.3.8.1 Interstate Distribution of HAI:

The table 6.24 depicts average HAI for large states during 69th and 76th rounds for rural India.

Table 6.24 Inter-State Distribution of HAI:

State	HAI (69 th round)	HAI (76 th round)
Jammu & Kashmir	.61	.71
Himachal Pradesh	.63	.71
Punjab	.64	.75
Uttaranchal	.62	.69
Haryana	.63	.71
Delhi	.67	.65
Rajasthan	.53	.65
Uttar Pradesh	.54	.61
Bihar	.52	.64
Assam	.62	.67
West Bengal	.52	.58
Jharkhand	.48	.56
Odisha	.48	.53
Chhattisgarh	.55	.62
Madhya Pradesh	.53	.60
Gujarat	.59	.67
Maharashtra	.59	.66
Andhra Pradesh	.56	.60
Karnataka	.58	.67
Kerala	.70	.75
Tamil Nadu	.56	.65
Telangana	-	.64
All India	.56	.63

Source: Computed from NSSO unit level data 69th and 76th rounds

It can be observed from the table that the all India average HAI has increased from .56 during 69th round to .63 during 76th round. It can be noticed that the states such as Andhra

Pradesh, Madhya Pradesh, Chhattisgarh, Odisha, Jharkhand, Uttar Pradesh, and West Bengal have their average HAI below the national average. Bihar and Rajasthan were below the national average during 69th round and have improved their HAI above the national average during 76th round. Average HAI were the lowest for Odisha (.48) and Jharkhand (.48) while the highest HAI were achieved by Kerala (.70) as per 69th round figures. HAI is the lowest for Odisha (.53) and the highest for Kerala (.75) according to 76th round figures.

In order to examine whether the distribution of HAI is uniform across states, Kruskal Wallis test was utilized and results of the test reveal that there exists significant differences in the distribution of housing adequacy across the large states as the test statistic is significant at 5% level (see table 6.25).

Table 6.25 Inter-state Distribution of HAI -Kruskal-Wallis Test Results

Null Hypothesis	Test statistic	Df	Sig.	Decision
The distribution of HAI is the same across States.	9244.703	21	.000	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .050.				

Source: computed from NSSO 76th round unit level data

6.3.8.2 Interstate Comparison of Level of Housing Adequacy:

The table 6.27 presents details regarding level of housing adequacy across ‘large states’ based on NSSO 76th round data. First of all, it can be seen from the table that there exists wide variations in the level of housing adequacy across states. When we compare the proportion of households having ‘high’ level of housing adequacy, we can see that Kerala stood first (86.7%) in this regard followed by Punjab (84.3%), and Jammu Kashmir (75.3%). The lowest position in this regard being secured by Odisha (10.9%) followed by Jharkhand (18%) and West Bengal (25.7%). Also, the states such as Odisha, Jharkhand, West Bengal, Andhra Pradesh, Madhya Pradesh, Chhattisgarh, and Uttar Pradesh stood below the national average (42.3%) regarding the proportion of households with high level of housing adequacy.

Table 6.26 Interstate Comparison of Level of Housing Adequacy

States	Level of Housing adequacy (%)			Total (%)
	Low	Medium	High	
Jammu & Kashmir	11.0	13.7	75.3	100
Himachal Pradesh	6.2	22.1	71.7	100
Punjab	2.3	13.4	84.3	100
Uttaranchal	10.8	23.7	65.5	100
Haryana	2.9	26.6	70.6	100
Delhi	21.4	28.8	49.8	100
Rajasthan	19.3	30.7	50.0	100
Uttar Pradesh	22.5	43.0	34.5	100
Bihar	18.5	37.1	44.4	100
Assam	4.1	35.2	60.7	100
West Bengal	35.5	38.7	25.7	100
Jharkhand	42.4	39.6	18.0	100
Odisha	53.7	35.4	10.9	100
Chhattisgarh	19.1	45.2	35.8	100
Madhya Pradesh	23.3	50.6	26.1	100
Gujarat	9.6	30.5	59.9	100
Maharashtra	12.7	35.5	51.8	100
Andhra Pradesh	22.7	45.2	32.1	100
Karnataka	10.1	35.1	54.8	100
Kerala	2.0	11.3	86.7	100
Tamil Nadu	11.5	41.8	46.7	100
Telangana	14.7	40.9	44.4	100
All India	20.1	37.5	42.3	100

Source: computed from NSSO 76th round unit level data

To inspect whether there exist interstate variations in the distribution of level of housing adequacy, a chi square test was utilized; the results of which is presented in table 6.27. The table reveals that the Pearson chi square quantity is significant at 5% level indicating that there exist statistically significant difference in the level of housing adequacy among larger states.

Table 6.27 Interstate Comparison of Level of Housing Adequacy-Chi-Square Tests

Chi Square Tests	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8671.002 ^a	42	.000
Likelihood Ratio	8757.018	42	.000
Linear-by-Linear Association	7.134	1	.008
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 50.11.			

Source: Computed from NSSO 76th round unit level data

6.4 Conclusion:

From the discussion above, it is clear that the level of housing adequacy has been improved for rural Indian households on the average when we compare NSSO 69th and 76th unit level data. But there exists wide variations regarding the distribution of housing adequacy variables from various dimensions. Housing Adequacy index (HAI) as a single measure to represent housing adequacy definitely simplify our analysis and makes comparisons easier. The classification of HAI into categories such as Low, Medium and High facilitates comparison of social, economic, occupational and religious groups convenient and meaningful. The social group-wise comparison indicates that the households belong to SC/ST categories enjoy a low level of housing adequacy comparing to that of OBC/Others categories. Comparison based on economic status reveal that both economic status and housing adequacy move in the same direction. Households with lower economic status enjoy low level of housing adequacy and those with higher economic status enjoy high level of housing adequacy. From the point of view of economic activity of the rural households, the discussion reveals that there exist significant variations in the distribution of housing adequacy based on economic activity. The tertiary sector enjoys a high level of housing adequacy comparing to that of primary and secondary sectors. The secondary sector stood in the lowest position in terms of housing adequacy. The comparison across religious groups reveal that even though level of housing adequacy is showing an improvement across the rounds for all the religious groups, there exists variations in the distribution of housing adequacy across these groups. The interstate comparison of housing adequacy reveals that there exists regional variations in the level of housing adequacy. The states like Odisha, Jharkhand, West Bengal, Madhya Pradesh, Andhra Pradesh, Uttar Pradesh, and Chhattisgarh were performing below the national average with respect to level of housing adequacy. Kerala state stood first in the level of housing adequacy followed by Punjab and Jammu Kashmir. The three states those stood in the lowest position in this regard being Odisha,

Jharkhand and West Bengal respectively. Hence it can be concluded that even if there achieved an improvement in the level of housing adequacy in rural India as a whole, the challenge now is to address the deviations and inequalities in housing adequacy from socio economic, religious, regional, and occupational perspectives.

Chapter 7
SUMMARY OF FINDINGS, IMPLICATIONS AND
CONCLUSION

Chapter 7

SUMMARY OF FINDINGS, IMPLICATIONS AND CONCLUSION

7.1 Introduction:

The study focuses on housing consumption pattern and housing adequacy of rural households in India. The quality of life of a household depends to a great extent on the quality of housing environment it lives in. Shelter is one of the basic needs along with food and clothing and can be considered as a human right. Now-a-days, providing adequate housing is a social responsibility of the governments today and is a new global agenda. It can no longer be considered as a mere roof over the head to protect the people who resides there from the vagaries of nature; rather it goes much beyond the construction of four walls. It can be thought of as an indicator of standard of living of the people and the economic development of the nation. Housing can be regarded as the largest consumption good as far as a household is concerned. Inadequate and inappropriate housing is a manifestation of deprivation. In India, majority of the population reside in rural areas. Most of the rural houses in India are found inadequate in various ways (Kumar & Kumar, 2023). In this context, a study on housing consumption and housing adequacy of the rural households is highly relevant especially in a country like India.

7.2 Summary of Procedure:

Housing consumption is defined and measured differently by different researchers in literature. The present study adapts similar to the one proposed by McLeod & Ellis(1982) in their study on housing consumption over the family life cycle. They used area, number of rooms and number of bedrooms on both a household and per-capita basis to measure housing consumption (McLeod & Ellis, 1982). The present study used number of living rooms instead of bed rooms. The reason is that NSSO unit level data which is used for fulfilling the objectives of the study do not provide data on number of bed rooms rather it gives data on living rooms. Therefore, the study uses number of living rooms as a proxy for bedrooms as the former includes the latter in compliance to the definition provided by NSSO on living room. The factors influencing housing consumption include socio-economic and occupational background of the households. The variables that affect housing consumption include social group, economic status, economic activity (primary, secondary, and tertiary), religion, marital

status, number of married couples in the household, educational status and so on. Housing adequacy is analysed using variables based on certain criteria adapted from the relevant literature which include structural adequacy of the dwelling unit, living facilities, bathroom and sanitation facilities, drinking water facilities, drainage and waste management arrangements and the like.

The first objective set for the study was to examine the changing pattern of housing consumption among rural households in India. The study extracted unit level data of NSSO 58th round (2002), 65th round (2008), 69th round (2012) and 76th round (2018) for accomplishing this objective. The variables used to analyse this objective include floor area of the dwelling unit, number of rooms, number of living rooms, floor area per person, number of rooms per person and number of living rooms per person. The means and standard deviations of these variables were calculated to know the distribution and spread of the variables concerned across the four rounds taken for the study, across social groups, across occupational groups, across economic status (represented by groups based on quartiles of MPCE), across states, and across religion. As the data violates the assumption of normality, as proved by KS test, nonparametric tests were applied as inferential tools for analysing the data. To know whether there exist statistically significant differences in the distribution of housing consumption variables across rounds, nonparametric ANOVA i.e. Kruskal Wallis test were performed and as a post hoc analysis pairwise comparisons of rounds being made. The details of the same were given in fourth chapter of the study.

The second objective was to trace out the determinants of housing consumption in rural India. NSSO 76th round unit level data of rural households were used for analysing this objective. Here the dependent variable housing consumption is measured by six variables such as floor area, number of rooms, number of living rooms, floor area per person, number of rooms per person and number of living rooms per person. The independent variables include, gender, age of the head, education of the head, economic activity, usual principal status of the head, monthly consumption expenditure of the household, number of married couples in the household, land possessed by the household, social group, religion, household size etc. Inorder to have a deep knowledge of the influence of these factors on housing consumption, separate structural equation models were fitted for each factor on housing consumption. The model fit indices were also checked to ensure goodness of fit of the models. The detailing of this being given in fifth chapter of this study.

The third objective set was to assess the housing adequacy of households in rural India. For accomplishing this objective, the study used 69th and 76th rounds NSSO unit level data. The

variables selected for analysing this objective include plinth level, floor area, number of rooms, condition of structure, kitchen facilities, ventilation of the dwelling unit, bathroom and latrine facilities, availability and accessibility of drinking water, drainage and waste management, tenorial status, type of structure, electricity for domestic use, type of floor etc. All the variables after properly ranking if needed were converted into z scores and principal component analysis were carried out. A total of 6 components whose Eigen value greater than one which together accounts for 60.692% of variation within the dataset of 21 chosen variables were derived from PCA using Kaiser Criterion and varimax rotation. Using these components, a housing adequacy index were developed as a weighted average; weight being the proportion of variance explained by each component and were normalised into the range 0 to 1. Again the Index were classified into low, medium, high based on 33rd and 66th percentile positions to make the comparisons easier. A Mann Whitney U test was utilised in order to examine whether the distribution of HAI is uniform across 69th and 76th rounds. Afterwards comparison of HAI being made among social groups, categories of economic status, economic activity, religion and also across states using Kruskal Wallis and chi square tests.

7.3 Summary of Findings:

This section incorporates the major findings of the study which is organized into three subsections. Section 7.3.1 presents the major findings on changing pattern of housing consumption across various NSSO rounds, social groups, economic groups, occupational groups and also across states. Section 7.3.2 summarizes the findings on the determinants of housing consumption. Section 7.3.3 details the findings on the analysis of housing adequacy of rural households in India.

7.3.1 Findings on Changes in Pattern of Housing Consumption in Rural India:

The results of the study indicates that there occurred significant changes in housing consumption across the rounds. The average floor area, number of living rooms, and number of living rooms per person has shown an increasing trend throughout except during 69th round. The study found that there occurred an increase in average number of rooms, floor area per person, and number of rooms per person across rounds. The Kruskal Wallis test results indicate that all these changes were statistically significant.

The social group-wise analysis of housing consumption reveals that there is an increasing trend in average floor area, and number of living rooms, of rural households from ST, SC, OBC and others except during 69th round. Number of rooms, number of rooms per person

and number of living rooms per person on the average showed an increasing trend for all the social groups. Floor area per person showed an increasing trend throughout except for SC households; for them it has decreased during 69th round. The study found that SC/ST households stood in the lowest position comparing to OBC/Others regarding the distribution of all the housing consumption variables during all the four rounds considered here.

The economic status based on MPCE of the household and their housing consumption was compared. Households were classified into four groups based on economic status as the lowest, medium lowest, medium highest, and the highest. The study found that economic status and housing consumption move in the same direction. As the economic status is higher, average level of floor area, number of rooms, number of living rooms both at household level and at percapita level is also at a higher level. It was observed that there occurred a decline in average floor area and number of living rooms and number of living rooms per person of all the categories of economic status only during 69th round. The results of the study reveals that there occurred an increase in housing consumption in terms of number of rooms, and percapita number of rooms among all categories of economic status across all the rounds considered. Floor area per person at the same time showed an increasing trend for the medium lowest and medium highest categories during all the rounds; but showed a declining trend during 69th round for the lowest and the highest categories.

Occupation-wise analysis of housing consumption across rounds were done based on the economic activity (i.e. primary, secondary, and tertiary). The study noticed an increasing trend in average floor area and number of living rooms of the households from all occupational groups over time except during 69th round. At the same time number of rooms, floor area per person, number of rooms per person and number of living rooms per person showed an increasing trend for all the occupational groups across all the four rounds considered. Also, the study noticed that tertiary sector stood at the first position in housing consumption comparing to primary and secondary sectors with respect to all the variables of housing consumption analysed here.

Interstate comparison of changes in housing consumption were done on two dimensions. Firstly, the changes in housing consumption variables across the states were analysed based on 58th, 65th, 69th and 76th NSSO rounds. Secondly, an inter-state comparison of housing consumption across social groups were done based on 76th round data which is the latest round in this regard.

The interstate analysis of housing consumption reveals that the changes in housing consumption were not uniform across the states. The results of the study reveal that the states

such as Punjab, Haryana, Chhattisgarh, Gujarat, and Kerala shows an increasing trend in the distribution of floor area across all the rounds and also their figures are above the national average in all the rounds considered. Jammu & Kashmir, Himachal Pradesh, Rajasthan, Assam, and Madhya Pradesh are the states having average floor area above national average but faced a decline either during 69th round or during 65th round. All other states have average floor area below the national average. The study noticed that Punjab, Kerala, and Jammu & Kashmir occupy the first three positions respectively with regard to average floor area. Andhra Pradesh, Odisha and West Bengal stood at the lowest positions in this regard. There exist huge variations in the distribution of number of rooms across states during the four rounds. Kerala, Himachal Pradesh and Jammu Kashmir stood at the first three position regarding the distribution of number of rooms while the lowest three positions being held by Odisha, West Bengal, and Madhya Pradesh as per the latest figures.

Interstate comparison of number of living rooms indicate that during 58th and 65th rounds the first position in the distribution of number of living rooms were occupied by Jammu & Kashmir; but during 69th and 76th rounds the first position was achieved by Kerala. Andhra Pradesh continues to hold the lowest position in average number of living rooms during all the rounds except 65th round where the lowest position were occupied by Tamil Nadu. The first three positions in average number of living rooms as per 76th round data were hold by Kerala, Jammu Kashmir and Himachal Pradesh while the lowest three positions were hold by Andhra Pradesh, Odisha and West Bengal. The interstate comparison of housing consumption reveals that Kerala continues to hold the first position in terms of floor area per person, number of rooms per person and number of living rooms per person. Along with Kerala, the states such as Punjab, Himachal Pradesh, and Jammu & Kashmir also occupy highest positions in the distribution of housing consumption variables and were also standing above the national average. The states like Odisha, Madhya Pradesh, West Bengal, Bihar, Andhra Pradesh etc., were lagging behind other states and were also standing below the national average in the distribution of most of the housing consumption variables.

Social group-wise comparison housing consumption across the states based on 76th round NSS data reveals that in all the states the average floor area of SC/ST households lags behind that of OBC/Others except Chhattisgarh. In states such as Himachal Pradesh, Punjab, Haryana, Bihar West Bengal, Odisha, Madhya Pradesh, Gujarat, Maharashtra and Tamil Nadu average floor area of ST households is slightly higher than that of SC households. In the remaining states, ST households hold the lowest position in terms of average floor area. It can be concluded that Kerala state occupies the highest position in number of rooms across

all the social groups. It can be observed that Odisha occupies the lowest position in mean number of rooms among all categories of social group. The study found that there exists inter-state variations in the distribution of living rooms across social groups. While states like Kerala, Jammu Kashmir, and Himachal Pradesh etc. hold highest position among all the social groups, the states like Andhra Pradesh, Odisha, etc., were lagging behind in terms average number of living rooms among all social groups.

The results of the study indicates that the OBC/Others category households perform better than that of SC/ST households in terms average floor area per person, number of rooms per person and number of living rooms per person. In short, it can concluded that the rural households belong to SC/ST categories lagging behind OBC/Others categories in the distribution of housing consumption variables on the average. Also, there exists huge inter-state variations in the distribution of housing consumption variables within each group. Kerala is performing better in the distribution of all the housing consumption variables and stood above the national average. Still, there exists huge variations in the average values of housing consumption variables between the social groups in Kerala too.

7.3.2 Findings on Determinants of Housing Consumption in Rural India:

The structural Equation Modelling approach were followed in order to trace out the determinants of housing consumption. The SEM on the influence of gender on housing consumption proved that there is a positive difference in housing consumption of female headed households in comparison to that of male headed households. The model built on economic activity and housing consumption indicate that the secondary sector households enjoy a low level of housing consumption and the tertiary sector households enjoys a high level of housing consumption comparing to that of households from primary sector. Usual principal status of the household head which is also one of the variables that determine occupational background of the household like economic activity reveals that the self-employed and the casual labour category enjoys a low level of housing consumption relative to that of salaried category.

The model built on educational status and housing consumption reveals that that educational status of the respondents positively influences their housing consumption. Taking Hindus as the base category the model built between religion and housing consumption observed that the Islam households enjoy a low level of housing consumption while the Christian and others enjoy a high level of housing consumption. The social group of the household influences their housing consumption. The study revealed that comparing to 'Others'

(General) category, ST, SC and OBC households have a low level of housing consumption. Also, the number of married couples in the household exerts a positive influence on housing consumption. Similarly, monthly consumption expenditure which signifies the economic status of the household exerts a positive influence on housing consumption. Extent of land possessed by the household that adds to economic background positively influences housing consumption. Age of the head positively influences housing consumption while household size has a negative impact on it. Hence it can be concluded that socio-economic and occupational background of the household determines their housing consumption.

7.3.3 Findings on Housing Adequacy of Households in Rural India:

In order to examine housing adequacy of the rural households, the present study constructed a housing adequacy index using principal component analysis based on structural adequacy, sufficient living facilities, drinking water facilities, waste management arrangements, tenurial status and type of dwelling with floor area, use of the house etc. The index were normalized into the range of 0 to 1. Also, the index were categorized as low, medium and high based on 33rd and 66th percentile positions which make the comparisons from various dimensions easier. The comparison of HAI of 69th and 76th round indicate that there is statistically significant differences in the HAI of these two rounds. The analysis of level of adequacy across 69th and 76th rounds reveals that the proportion of rural households with low level of housing adequacy has declined while that of medium and high level has registered an increase.

Social group-wise analysis of housing adequacy noticed that the housing adequacy of all the social groups have been improved from 69th round to 76th round. But the level of housing adequacy for SC/ST households is lower comparing to that of OBC/others. The Kruskal Wallis test and Chi square test performed for this purpose were significant indicating that there exist significant differences in the level of housing adequacy across social groups. The study noticed improvement in housing adequacy across occupational groups too. It was found that tertiary sector households enjoy a high level of housing adequacy in comparison to that of households from primary and secondary sectors.

Housing adequacy was assessed across categories of economic status which revealed that economic status and housing adequacy move in the same direction signifying that households with lowest economic status enjoys a comparatively lower level of housing adequacy and those with highest economic status enjoy high level of housing adequacy. The study found

that housing adequacy has improved across all categories of economic status even though there exist significant differences in the distribution of HAI among different economic groups. It was also observed that there exist significant differences in housing adequacy of various religious groups even if there occurred an increase in average HAI of all the religious groups. It was found that households from Islam and Christianity enjoys comparatively a higher level of housing adequacy relative to that of Hindu households. But there occurred an increase in HAI of all the religious groups from 69th round to 76th round.

Interstate comparison of housing adequacy revealed that the HAI for all the states showed an improvement in HAI during 76th round from their 69th round figures. But there exist significant differences in the distribution of housing adequacy across states. Kerala stood in the first position regarding the HAI where about 86.7% of the rural households enjoy a high level of housing adequacy during both the rounds considered here. Punjab and Jammu Kashmir followed Kerala in the proportion of households with high level of housing adequacy. The three states those stood in the lowest position in this regard being Odisha, Jharkhand and West Bengal respectively. Hence it can be concluded that even if there achieved an improvement in the level of housing adequacy in rural India as a whole, still there exists wide disparities in terms of housing adequacy from socio economic, religious, regional, and occupational perspectives.

7.4 Conclusion:

From the above findings, the study concludes that there occurred significant changes in housing consumption both at the household level and at the percapita level in rural India from 2002 to 2018. The change is common among all the social groups, economic groups and occupational groups and across the states as well. Still there exists huge variations in housing consumption of the households belong to these groups. Housing adequacy which covers the housing environment the household live in was thoroughly analysed in this study. The study concluded that the housing consumption and housing adequacy of SC/ST households is far below comparing to that of households from OBC/Others categories. Similarly, primary/secondary sector households lag behind the households from tertiary sector in this regard. Economic status of the household is a crucial determinant of both housing consumption and housing adequacy. Moreover, the study found interstate variations in housing consumption and housing adequacy which signifies that some states stood below the national average and some of them stood above that national average. States such as Odisha, Jharkhand, West Bengal, Madhya Pradesh, Andhra Pradesh, Uttar Pradesh, and Chhattisgarh

remains backward comparing to states like Kerala, Punjab, Jammu & Kashmir etc. In this context the study concludes that even though housing consumption and housing adequacy has been improved in rural India, such changes were not uniform from socio-economic, occupational and regional dimensions.

7.5 Policy Implications:

The present study found that there occurred changes in the pattern of housing consumption in rural India during the period from 2002 to 2018 based on the analysis of the unit level NSSO data of the four rounds considered during this period. All the housing consumption variables were showing an increasing trend across the rounds. As stated earlier, there occurred significant changes in the level of housing consumption across social groups, economic groups, and occupational groups and also across the states too. There exists huge variations in housing consumption of different socio-economic and occupational groups. Also, variations were observed across the states too. The study found that socio economic demographic and occupational background determines or influences housing consumption of the rural households. The analysis on housing adequacy revealed that housing adequacy of the households in Rural India have been improved over time across socio-economic and occupational categories. But, there exist wide variations in level of housing adequacy within the groups and also among the states too. In the light of these findings, the study highlights that these situations i.e. socio-economic, occupational and regional differences in housing consumption and housing adequacy to be incorporated into the future policies and approaches that will be framed in the housing sector in general and rural areas in particular.

7.6 Limitations and Areas of Further Research:

The present study analysed the changes in housing consumption and housing adequacy of households in rural India only. The scope of the study can be broadened by incorporating urban areas too in order to have a rural urban comparison in this regard. Moreover the study considered variables representing socio-economic and occupational background of the household as the determinants of housing consumption. The technological factors also affect housing consumption and hence can also be considered as important analytical additions for future research. Moreover the study analysed housing consumption and housing adequacy at the household level only. Therefore more research should be done in this topic by considering both the demand and supply side of housing in question.

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