Journal of Geographical Studies
Homepage: www.gathacognition.com/journal/gcj5
http://dx.doi.org/10.21523/gcj5

Original Research Paper

Quality of Housing in Native Ethnic Tribes of Cold Desert Leh-Ladakh

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Abstract

The present study was carried out to assess the quality of housing of native ethnic tribes of cold desert, Leh-Ladakh. These ethnic tribes being the inhabitants of remote areas of cold desert are lacking behind in almost all the basic facilities. The study reveals that 40% of households were having Kacha houses. Most of the houses (55.77%) had two rooms for human use. Nearly, 23.10% households were having the size of the rooms as less than 100 ft^2. The average number of persons sharing each room was less than the recommended standard. About 85.44% households have improper ventilation and 38.59% households have traditional/pit latrines and even 63.35% of households were having pit latrines inside the house. About 49.27% of households have a cowshed located inside the courtyard. Majority of households (96.36) were not satisfied with their housing conditions. Very high quality of housing has been reported in the urban area. Both high and medium quality of housing has been noted in five blocks each, and low/very low quality of housing has been reported also in five blocks. The improvement in housing will lead to better health conditions and overall quality of life.

Article History

Received: 05 February 2022
Revised: 23 April 2022
Accepted: 24 April 2022

Keywords

Cold Desert;
Ethnic Tribes;
Housing;
Ladakh;
Variables.

Editor(s)

M. A. Siddiqui
Vijay Bhagat

1 INTRODUCTION

Housing is not only an essential component of quality of life but also an essential human need as it is the house that reflects the values, aspirations, future expectations and social and cultural identity of its residents and also of society as a whole (Hamdi, 1990; Deheragoda, 2004). Housing environment includes housing conditions, household water supply conditions, indoor air pollution and indoor noise pollution (Rahman, 1998). Housing reflects the cultural, social and economic values of the society (Omole, 2010). The major determinants of environmental health conditions are the lack of access to clean water, inadequate sanitation, poor waste disposal, indoor air pollution and overcrowding in housing (Leukman *et al*., 2014) and one of the essential derivatives of defective or deteriorated housing is poor health (Smith, 1966). Fuel wood or biomass fuels used for cooking are major sources of indoor air pollutants, which negatively affect the health conditions especially of women (Singh *et al*., 1996). Traditional residential adjustment in response to harsh climatic conditions leads to various aspects of poor housing that in turn leads to poor health (Rather *et al*., 2017). There is strong relationship between poor housing and diseases (Park, 2015).

The Environmental Hygiene Committee, Ministry of Health, Government of India has recommended the following standards for housing of rural areas (Gilg, 1985) (Table 1). Some worth contributions on various aspects of housing made by scholars are Kulkarni (1998), Aderamo and Ayobolu (2010), Eja (2011), Angel and Bittschi (2014), Spellerberg *et al*. (2006), Streimikiene (2014), Wokekoro and Owei (2014), Keall (2010), Bennefoy, (2007), Leukman *et al*. (2014), Mudey *et al*. (2011), Park *et al*. (2002), Singh *et al*. (1996), Baba (2015) and Rather *et al*. (2017). The present study was an attempt to analyze the housing characteristics of ethnic populations in different blocks and come up with various levels of quality of housing. The study will help to improve the quality of housing in the area that will result in the improvement of health and overall quality of life in this tribal area.

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https://doi.org/10.21523/gcj5.22060102

2 STUDY AREA

The study area is located at an altitude of 2900 to 5900m and lies between 32º to 36ºN latitude and 72º to 80ºE longitude (Figure 1). This is the largest district of Ladakh Union Territory and covers an area of 45100 km^2. The area is mountainous throughout within three parallel ranges, the Zanskar, Ladakh, and Karakoram (Husain, 1984). Shayok, Indus, and Zanskar are the three main rivers. Majority of the population lives in river valleys. The main climatic features of the area are wide diurnal and seasonal fluctuation in temperature with -40°C in winter and 35°C in summer seasons (Sagwal, 1991). The annual range of temperature is about 25°C (Husain, 1984).

The study area has a total population of 133487 persons, out of these 87816 persons (65.78%) live in rural areas while as 45671 persons (34.22%) inhabit the urban areas of the district. The majority of the population 95763 (71.74%) is tribal (Census, 2011) and major ethnic tribes are, Bhots, Brokpas, Champas, Mons and Arghuns. They are the descendants of a blended race of Mons of North India, Dards of Baltistan and Mongols of Central Asia (Dewan, 2004).

Table 1. Recommended housing standards

Housing variable	Recommended standards
Site	Free from floods
Floor	Pacca
Water supply	Adequate and clean
Height of rooms	Not less than 10 feet
Floor space	100 sq. feet/person
Room sharing	1 for 2 persons 2 for 3 persons 3 for 5 persons
Set Bach	Open for sunlight and ventilation (3x3feet and in cross)
Cattle shed	Outside at >25 feet
Latrine if dry	Outside at >25 feet

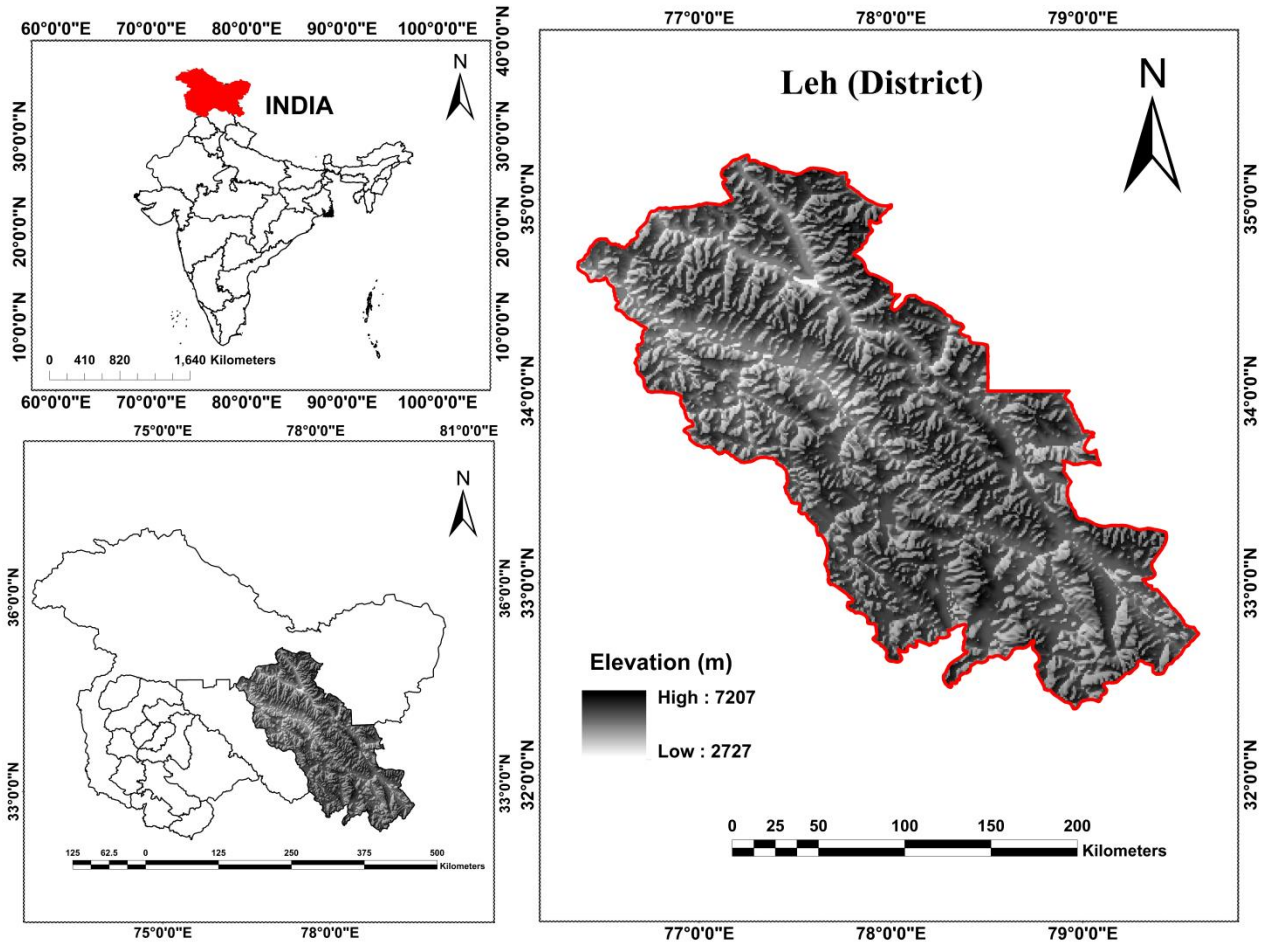

Figure 1. Study area: Leh district (India)

Table 2. Sampling framework

Adminis -trative Units	Blocks	Villages/ wards (no.)	Sampled villages/ wards	Sample villages/ wards (%)	Households (no.)	Sampled households (no.)
Leh	Leh	5	Saboo	20.00	259	26
	Nimmo	9	Nimoo	11.11	193	20
	Nyoma	5	Kuyol	20.00	115	12
	Rupsho	3	Karzok	33.33	253	26
	Chumamathang	9	Keray	11.11	60	06
	Durbok	6	Tagste	16.66	126	13
	Kharu	15	Shung	13.33	51+140= 191	12+9=21
	Chusot	6	Chusot-Gogma	16.66	368	37
	Thiksey	4	Shey	25.00	398	28
Khaltsi	Khaltsi	9	Khaltsi	11.11	156	16
	Saspool	6	Alchi	16.66	145	15
	Lingshet	4	Lingshet	25.00	116	12
	Skurbuchan	4	Dah	25.00	103	11
Nubra	Disket	17	Hundar Skanpok	11.76	269+93= 363	22+14= 36
	Turtuk	6	Taksi	16.66	112	12
	Panamic	5	Sumoor	20.00	164	17
Urban areas	Leh town	21	Wards: 9 and 21	14.28	141+91+45=277	50
	Choglamsar	01	Choglamsar	100	1931	50
Total	16	135	18			412

Source: Computed from SOI toposheets and census of India (2011)

3 DATABASE AND METHODOLOGY

Toposheets (Survey of India: 1961) on 1:50,000 scales were used to delineate the study area and to demarcate different blocks. Block was the unit of study in the present research. The present work was based on both primary and secondary data. Primary data was collected through household survey in order to collect the data regarding quality of heath of native ethnic tribes of cold desert Leh-Ladakh. A sample size of around 10% of sample villages (18) and 4 to 10% of sample households (412) were selected for the present study (Table 2). Field survey of 412 sample households in stratified sample of 18 villages and 2 urban wards and Choglamsar notified area was carried out with a structured questionnaire. Interview technique was used for data collection and the questionnaire/schedule was the tool. Head of the village were interviewed for information regarding housing conditions. Secondary data regarding demographic aspects was obtained from Department of Census and Directorate of Economics and Statistics. Secondary data regarding other aspects of quality of housing was also obtained from different departments.

For determining the quality of housing, 18 variables (Table 3) were selected. Composite score method was used for the measurement of quality of housing. Ranks were assigned according to the order of magnitude of the variables, that is 1 for very high, 2 for high, 3 for medium, 4 for low and 5 for very low (Table 4). In order to remove the biases of scale and with no weightage problem, percentage of variables were assigned ranks. Removal of tie, if any was carried out by taking the average of the ranks of the same values of different blocks. The final score of each variable was obtained by adding the different ranks and finally comparative analysis was done to show the quality of housing in different blocks (Jha and Tripathi, 2014).

4 RESULTS AND DISCUSSIONS

4.1 Housing Characteristics

4.1.1 Household Density and Households /House

There is uneven distribution of households in Leh-Ladakh. Average density of households is 93. Density of households ranges from 36 in Durbuk to 366 in Khaltsi. The number of households in a house indicates the internal living density as well as the condition of the housing facility. Out of 412 households surveyed 398

households were having only one household/ house while 10 households were living as 2 households/ house and even 4 households were living as more than 2 households /house (Table 4).

4.1.2 Type of Houses

Type of house in terms of construction is an important indicator of quality of housing and indicates affordable capacity of a household. So far as the type of houses in Leh-Ladakh is concerned there is wide variation at block level. The majority of households surveyed (161) comprising of 39.10% of total households surveyed were living in Pakka houses. Near about 138 households comprising around 33.50% were having concrete housing. However, 113 households (27.40%) were still living in Kacha houses. These sampled villages of some blocks are at far off distance where material for construction of pakka or concrete houses is very difficult to reach.

4.1.3 Room Occupancy Ratio

This indicator of room occupancy gives a better idea of the internal living density within the area. Analysis of the data reveals that near about 30.13% of households surveyed were having the room occupancy of one person per room and 55.77% households were having two persons per room. However, 14.10% households were having more than 2 persons per room.

4.1.4 Size of Room

The size of room in a house indicates the internal living condition of the house. The majority of household (76.90 %) were having size of room as per standards (100 feet^2). However, some households (23.10%) was having size of room less than the 100 ft^2.

4.1.5 Age of Houses

This indicator gives a better idea of the physical structure of the houses. The age of houses varies from Leh town to the outskirts. It is relatively more in the town than in the outside of the Leh town. Large number of houses (40.00%) was less than 15 years in age while as 55.20% of houses were varying in age from 16- 35 years. About 4.80% houses are more than 35 years of age (Table 4).

4.1.6 Ventilation of Houses

The majority of sampled households (85.44%) are lacking behind in terms of ventilation because of lack of knowledge of maintaining good health, poor housing and prolonged severe winter conditions.

4.1.7 Cowshed Location

The majority of the households have cowshed inside the house due to cold winter conditions for about six months. The cowshed location within house is observed in 49.27% (Table 4).

4.1.8 Latrine Location

The majority of the households (71.41%) have flush type of latrine. However, 38.59% household showed dry pit type latrine because of poverty and even about 63.35% of households were having pit latrine inside the house especially in rural areas while as 45.87% of households were having pit latrine outside the house (Table 4).

Table 3. Variable used for analysis

Variables
Y_1 House hold density
Y_2 Kacha house (%)
Y_3 Pakka house (%)
Y_4 Concrete house (%)
Y_5 Houses (%) with 1 household
Y_6 Houses (%) with 2 households
Y_7 Houses (%) with > 2 households
Y_8 Room share ratio with < 1person (%)
Y_9 Room share ratio with 1-2 persons (%)
Y_{10} Room share ratio with > 2 persons (%)
Y_{11} Size of room with >100 ft^2 (%)
Y_{12} Size of room with >100 ft^2 (%)
Y_{13} Houses aged <15 years (%)
Y_{14} Houses aged 16-35 years (%)
Y_{15} Houses aged > 35 years (%)
Y_{16} Ventilated houses (%)
Y_{17} Houses with cowshed inside house (%)
Y_{18} Houses with cowshed outside house <25feet (%)
Y_{19} Houses with flush inside house (%)
Y_{20} Houses with dry pit latrine inside house (%)
Y_{21} Houses with dry pit latrine outside house <25feet (%)
Y_{22} House with good neighborhood relations (%)
Y_{23} Housing satisfaction (%)

4.1.9 Housing Perception and Neighborhood Relations

It includes the overall satisfaction of the respondents related to their houses and neighborhood. The housing satisfaction decreases as we move towards the town. The people are living in miserable conditions in far-flung areas. Majority of households (96.36%) were not satisfied with their housing but very less percent of households were having bad neighborhoods (3.63%).

4.2 Quality of Housing

On the basis of composite score, the sample blocks and sample villages were categorized into different levels of quality of housing in Leh- Ladakh (Table 5; Figure 2).

4.2.1 Very High

Sampled blocks with lowest composite score of less than 60 are categorized under the category of very high quality of housing. Very high quality of education has been noted in the sampled village Saboo of Block Leh, and in urban wards 9 and 21 and in Choglamsar urban area due to good development especially in education sector.

Table 4. Housing characteristics and composite score

Villages	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}	Y_{11}	Y_{12}	Y_{13}	Y_{14}	Y_{15}	Y_{16}	Y_{17}	Y_{18}	Y_{19}	Y_{20}	Y_{21}	Y_{22}	Y_{23}	Scores
Saboo	98 (1)	23 (2)	38.5 (4)	38. 5(4)	88.5 (1)	11 (1)	0 (1)	50.0 (3)	42.3 (3)	7.7 (1)	34.6 (2)	65.4 (4)	26.9 (4)	61.5 (4)	11.5 (4)	84.6 (1)	92.3 (5)	23 7 (2)	57.1 (3)	80.8 (1)	26.9 (2)	53.8 (3)	46.2 (3)	58
Nimmo	48 (1)	10 (1)	40 (4)	50 (3)	90 (1)	10 (1)	0 (1)	35.0 (4)	45.0 (3)	20.0 (2)	40.0 (2)	60.0 (3)	80.0 (2)	20.0 (1)	0.0 (5)	100 (1)	100 (5)	30.0 (2)	50.0 (3)	90.0 (1)	10.0 (5)	90.0 (5)	20.0 (5)	61
Kuyol	45 (1)	50 (3)	16.7 (1)	33.3 (4)	100 (1)	0 (1)	0 (1)	33.3 (4)	66.7 (4)	0.0 (1)	16.7 (4)	83.3 (5)	33.3 (4)	66.7 (4)	0.0 (5)	50 (2)	50.0 (2)	33.3 (2)	50.0 (3)	66.7 (2)	50.0 (3)	66.7 (3)	50.0 (3)	63
Karzok	64 (1)	15.4 (1)	53.8 (3)	30.8 (4)	100 (1)	0 (1)	0 (1)	19.2 (5)	73.1 (4)	7.7 (1)	15.4 (4)	84.6 (5)	38.5 (4)	53.8 (3)	7.7 (5)	100 (1)	70.0 (4)	23.1 (2)	30.8 (2)	53.8 (3)	46.2 (3)	23.1 (2)	76.9 (4)	64
Kerrey	67 (1)	50 (3)	30 (4)	20 (5)	100 (1)	0 (1)	0 (1)	20.0 (5)	80.0 (4)	0.0 (1)	40.0 (2)	60.0 (3)	40.0 (4)	60.0 (3)	0.0 (5)	100 (1)	70.0 (5)	90.0 (5)	40.0 (2)	80.0 (2)	40.0 (2)	80.0 (4)	40.0 (2)	66
Tagste	36 (1)	0 (1)	46 (3)	54 (3)	100 (1)	0 (1)	0 (1)	38.5 (4)	61.5 (4)	0.0 (1)	23.1 (3)	76.9 (4)	30.8 (4)	69.2 (4)	0.0 (5)	100 (1)	100. (5)	90.0 (5)	46.2 (3)	100 (1)	23.1 (2)	76.9 (4)	23.1 (2)	63
Gia and Shang	48 (1)	42.9 (3)	23.8 (4)	33.3 (4)	100 (1)	0 (1)	0 (1)	66.7 (2)	19.0 (1)	14.3 (1)	42.8 (1)	57.2 (3)	47.6 (3)	52.4 (3)	0.0 (5)	100 (1)	90.5 (5)	80.5 (4)	57.1 (3)	71.5 (2)	17.2 (5)	61.9 (4)	14.3 (5)	63
Gogma	79 (1)	8.1 (1)	67.6 (2)	27.3 (4)	100 (1)	0 (1)	0 (1)	21.6 (4)	70.3 (4)	8.1 (1)	35.1 (2)	64.9 (4)	24.3 (4)	67.6 (4)	8.1 (5)	100 (1)	100 (5)	0.0 (1)	86.5 (5)	91.9 (1)	8.1 (5)	71.9 (4)	8.1 (5)	65
Shey	129 (2)	7.7 (1)	42.3 (3)	50 (3)	100 (1)	0 (1)	0 (1)	28.6 (4)	42.9 (3)	28.6 (2)	16.7 (4)	83.3 (5)	17.9 (5)	82.1 (4)	0.0 (5)	100 (1)	92.9 (5)	17.1 (1)	21.4 (2)	85.7 (1)	42.9 (3)	17.7 (1)	82.9 (3)	62
Khaltsi	125 (2)	0 (1)	50 (3)	50 (3)	100 (1)	0 (1)	0 (1)	37.5 (4)	37.5 (2)	25.0 (2)	12.5 (4)	87.5 (5)	37.5 (4)	50.0 (3)	12.5 (5)	100 (1)	100 (5)	12.5 (1)	75.0 (4)	62.5 (2)	62.5 (4)	75.0 (4)	50.0 (3)	63
Alchi	166 (2)	40 (2)	33.3 (4)	26.7 (4)	100 (1)	0 (1)	0 (1)	26.7 (4)	20.0 (1)	53.3 (3)	46.7 (1)	53.3 (3)	26.7 (4)	73.3 (4)	0.0 (5)	100 (1)	100 (5)	0.0 (1)	40.0 (2)	86.7 (1)	13.3 (5)	36.7 (4)	63.3 (4)	62
Lingshet	80 (1)	8.3 (1)	41.7 (3)	50 (3)	83.3 (1)	0 (1)	17 (1)	33.3 (4)	50.0 (3)	16.7 (1)	0.0 (5)	100 (5)	75.0 (2)	25.0 (2)	0.0 (5)	100 (1)	100 (5)	0.0 (1)	66.7 (4)	16.7 (5)	83.3 (5)	50 (3)	50.0 (3)	65
Dah	48 (1)	45.4 (3)	36.4 (4)	18.2 (5)	100 (1)	0 (1)	0 (1)	45.5 (3)	54.5 (3)	0.0 (1)	18.2 (4)	81.8 (5)	54.5 (3)	18.2 (1)	27.3 (2)	10.0 (5)	100 (5)	81.2 (5)	36.4 (2)	19.8 (5)	36.4 (2)	63.6 (4)	36.4 (2)	68
Hundar/ Skanpok	40 (1)	27.8 (2)	36.1 (4)	36.1 (4)	100 (1)	0 (1)	0 (1)	30.6 (4)	52.8 (3)	16.7 (1)	5.6 (5)	94.4 (5)	41.7 (3)	58.3 (3)	0.0 (5)	100 (1)	88.9 (5)	5.6 (1)	46.7 (3)	83.3 (1)	66.7 (4)	33.3 (2)	22.2 (2)	61
Taksi	52 (1)	0 (1)	50 (3)	50 (3)	100 (1)	0 (1)	0 (1)	0.0 (5)	100 (1)	0.0 (1)	0.0 (5)	100 (5)	50.0 (3)	50.0 (3)	0.0 (5)	100 (1)	100 (5)	66.0 (4)	33.3 (2)	50.0 (3)	50.0 (3)	33.3 (2)	66.7 (4)	63
Sumoor	63 (1)	23.5 (2)	11.8 (1)	64. 7(2)	88 (1)	12 (1)	0 (1)	23.5 (4)	76.5 (4)	0.0 (1)	11.8 (4)	88.2 (5)	29.4 (4)	70.6 (4)	0.0 (5)	100 (1)	100 (5)	23.5 (2)	76.5 (4)	64.7 (2)	35.3 (2)	52.9 (3)	58.8 (3)	62
Wards: 4, 9, 21 and Choglamsar	195 (2)	0 (1)	20 (4)	80 (1)	95 (1)	3 (1)	2 (1)	20.0 (5)	67.0 (4)	13.0 (1)	22.0 (3)	78.0 (4)	45.0 (3)	51.0 (3)	4.0 (5)	100 (1)	0.0 (5)	8.0 (1)	46.0 (3)	75.0 (2)	30.0 (2)	67.0 (4)	39.0 (2)	59

4.2.2 High

All the blocks with composite score of 60-62 are categorized under high quality of housing. This level of housing has been noted in the sample village Nimmo of block Nimmo, Hundar and Skanpok of block Disket, Alchi of block Saspool, Sumoor of block Panamic and Shey of block Thiksey.

4.2.3 Medium

This category of quality of housing has the composite score of 62-64 and comprises of sample village Kuyol of block Nyoma, Tagste of block Durbuk, Taksi of block Turtuk, Taksi of block Turtuk, Shang and Gia of block Kharu and village Khaltsi of block Khaltsi.

4.2.4 Low

Under this category of quality of housing all the blocks having composite score of 64-66 have been grouped. This category of quality of Housing has been reported in the sample village Keray of block Chumathang, h chachut Gogma of block Chachut, h Lingshet of block Lingshet and h Karzok of block Rupsho due to lacking of development.

4.2.5 Very Low

The sample blocks having a composite score of greater than 66 have been categorized under very low quality of housing. This category of quality of housing comprises of sample village Dah of block Skurbuchan due to lacking of housing facilities.

Table 5. Housing qualities

Housing qualities	Composite scores	Sample blocks	Sample villages
Very high	< 60	Leh, Urban Areas.	Saboo, urban ward 9, urban ward 21 and Choglamsar
High	60-62	Nimmo, Thiksey Disket, Saspool, Panamic	Nimmo, Shey, Hundar, Skanpok. Alchi and Sumoor
Medium	62- 64	Nyoma, Khaltsi, Durbuk, Turtuk, Kharu	Kuyol, Khaltsi, Tagste, Shang and Gia
Low	64- 66	Lingshet, Rupsho, Chachut Chumathang,	Lingshet, Karzok, chachut Gogma and Keray
Very low	>66	Skurbuchan,	Dah

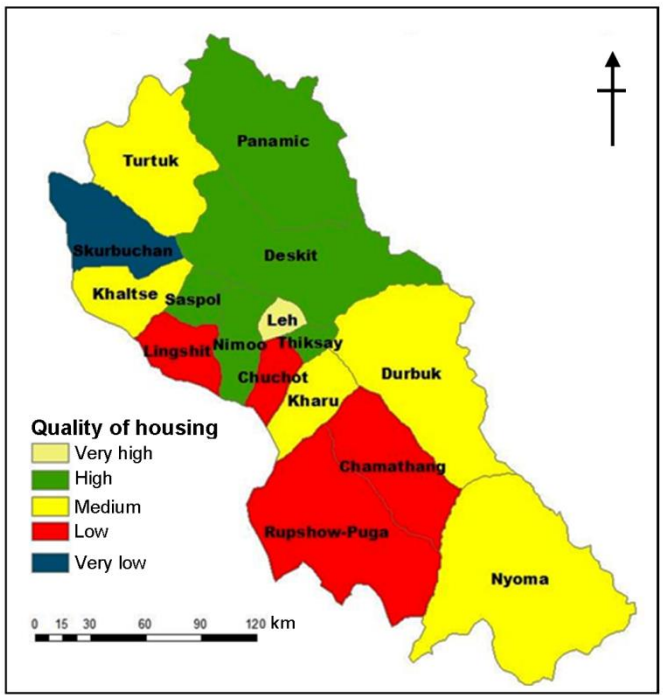

Figure 2. Quality of housing

5 CONCLUSION

The study leads to the conclusion that majority of households were having only one household. Majority of households in urban areas of Leh-Ladakh were living in Pakka house, however people in rural areas were still living in Kacha houses. The number of persons per room is more than recommended standard in majority of households and varies from block to block. Majority of household were having size of room not as per standard. Majority of the households have cowshed inside the house. The majority of the households were having flush type of latrine, however 39% households were having dry pit type latrine and 63% households were having pit latrine inside house especially in rural areas. Majority of households were not satisfied with their housing and very less number of households were having bad relations with their neighbors. Very high quality of housing has been noted in the block Leh, and in urban wards 9 and 21 and in Chuglamsar urban area. High quality of Housing has been noted in the blocks of Nimmo, Disket, Saspool, Panamic and Thiksey. Medium quality of housing has been reported in the blocks of Nyoma, Durbuk, Turtuk, Kharu and Khaltsi. Low quality of housing has been reported in the blocks of Chumathang, Chachut, Lingshet and Rupsho, while as very low quality of housing has been noted in the block Skurbuchan.

ACKNOWLEDGMENTS

Author is highly thankful to Indian Council for Social Science Research. The present research paper is a part of project entitled assessment of quality of life among native tribes of cold desert Leh-Ladakh, funded by ICSSR.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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