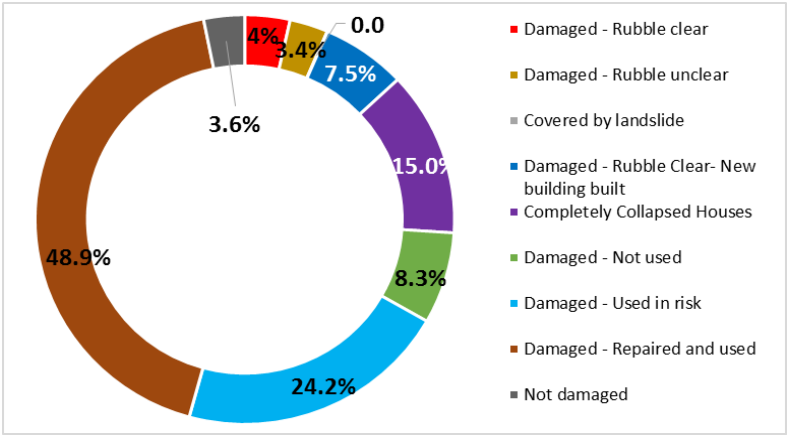
Key Findings of Household Registration for Housing Reconstruction Survey in 17 Districts



Central Bureau of Statistics

Ramshahpath, Kathmandu, Nepal

4 Key Findings of the Survey (Third Phase) in 17 districts

4.1 Houses, Households and Population

The major objective of the Household Registration for Housing Reconstruction Survey (Beneficiary Survey) is to assess the damage of the residential houses by the earthquake and to collect socio-economic and demographic information of the people living in those affected houses. In this regard, the registration program performed detailed damage assessment of about 1 million houses with the implementation of the program in 31 districts in three phases. The full report covering 31 districts can be found as a separate document.

The third or last phase of the program was lauched in 17 affected districts namely **Dhankuta, Sankhuwasabha, Bhojpur, Solukhumbu, Khotang, Chitwan, Lamjung, Tanahu, Syangja, Kaski, Myagdi, Parbat, Baglung, Gulmi, Palpa, Nawalparasi** and **Arghakhanchi** where the impact of the earthquake was assumed relatively lesser than in the 14 most affected districts.

The third phase of program performed detailed assessment of damages caused by the earthquake in **1,76,428** houses of 17 affected districts and collected socio-economic and demographic data from **1,71,231** households and **7,19,603** usually residing population in those surveyed houses.

Among the 17 surveyed districts, the largest number of houses surveyed was in **Tanahu** with 25,536 houses surveyed followed by Lamjung and Solukhumbu with 22361 and 17460 houses surveyed respectively. In terms of number of surveyed houses, the top five districts namely Tanahu, Lamjung, Solukhumbu, Syangja and Chitwan constitutes more than half (54.8%) of the total surveyed houses in 17 districts. **Nawalparasi** is the smallest district with only 984 houses surveyed followed by Myagdi (1413) and Arghakhachi (1648) which consists of less than one percent of the total surveyed houses in 17 districts (Table 4.1). The lowest five districts namely Nawalparasi, Myagdi, Arghakhanchi, Baglung and Dhankuta constitutes only 7.1 percent of the total surveyed houses in 17 districts.

In terms of earthquake affected population, **Tanahu** comes in the first position with total usually residing population of 96,927 in the surveyed houses. Lamjung and Chitwan are the second and third largest district in terms of usually residing population in the surveyed houses among the 17 surveyed districts. **Nawalparasi** comes as the smallest district with population of 5,406 followed by Myagdi (5,818) and Arghakhachi (6,403).

Table 4.1: Houses, Households, Population and HH Size in 17 affected districts

SN	District Code	Number of Houses	No of Households	Sex of HH Head				Population (Usual Place of Residence)	HH Size
				Male	Female	Others	Total		
1	Dhankuta	4,561	4,448	3,471	977	0	4,448	20,598	4.6
2	Sankhuwasabha	5,169	4,878	3,258	1,620	0	4,878	22,017	4.5
3	Bhojpur	9,379	9,159	6,600	2,559	0	9,159	40,205	4.4
4	Solukhumbu	17,460	16,852	12,255	4,597	0	16,852	68,962	4.1
5	Khotang	12,899	12,642	9,758	2,884	0	12,642	57,179	4.5
6	Chitwan	15,269	15,038	10,227	4,811	0	15,038	70,053	4.7
7	Lamjung	22,361	21,791	13,489	8,300	2	21,791	85,359	3.9
8	Tanahu	25,536	24,475	15,127	9,348	0	24,475	96,927	4.0
9	Syangja	16,111	15,910	10,225	5,684	1	15,910	67,548	4.2
10	Kaski	11,074	10,410	6,088	4,322	0	10,410	40,054	3.8
11	Myagdi	1,413	1,346	813	533	0	1,346	5,818	4.3
12	Parbat	10,940	10,947	6,821	4,126	0	10,947	44,113	4.0
13	Baglung	3,847	3,701	2,028	1,673	0	3,701	16,070	4.3
14	Gulmi	7,050	6,883	4,270	2,613	0	6,883	29,118	4.2
15	Palpa	10,727	10,172	6,120	4,052	0	10,172	43,773	4.3
16	Nawalparasi	984	992	786	206	0	992	5,406	5.4
17	Arghakhanchi	1,648	1,587	976	611	0	1,587	6,403	4.0
Total		176,428	171,231	112,312	58,916	3	171,231	719,603	4.2

4.2 Ownership of the Houses by Sex

More than three-fourth (76.2 percent) of the total surveyed houses were male-owned whereas the female ownership of the houses accounts for only 23.8 percent. The highest proportion of female-owned houses are in **Parbat** with 31.8 percent of the surveyed houses followed by Lamjung (29.5 Percent) and Baglung (27.8 percent) whereas lowest percentage of houses surveyed is owned by female is in Nawalparasi (12.2 Percent) followed by Dhankuta (12.7 percent) and Bhojpur (15.8 percent). (Table 4.2)

Table 4.2: Sex of House-owner of Surveyed Houses in 17 Affected Districts

SN	District	Sex of the House Owner						Total
		Male	Percent	Female	Percent	Others	Percent	
1	Dhankuta	3,927	87.3	571	12.7	0	0.0	4,498
2	Sankhuwasabha	4,218	83.9	809	16.1	0	0.0	5,027
3	Bhojpur	7,807	84.2	1,467	15.8	0	0.0	9,274
4	Solukhumbu	13,363	78.3	3,711	21.7	0	0.0	17,074
5	Khotang	10,405	81.8	2,313	18.2	1	0.0	12,719
6	Chitwan	11,705	77.0	3,504	23.0	0	0.0	15,209
7	Lamjung	15,618	70.5	6,533	29.5	2	0.0	22,153

8	Tanahu	19,049	74.9	6,388	25.1	0	0.0	25,437
9	Syangja	11,674	72.9	4,346	27.1	0	0.0	16,020
10	Kaski	8,139	75.1	2,697	24.9	0	0.0	10,836
11	Myagdi	1,038	76.3	322	23.7	0	0.0	1,360
12	Parbat	7,461	68.2	3,486	31.8	0	0.0	10,947
13	Baglung	2,769	72.2	1,067	27.8	0	0.0	3,836
14	Gulmi	5,476	79.1	1,451	20.9	0	0.0	6,927
15	Palpa	8,180	78.2	2,283	21.8	0	0.0	10,463
16	Nawalparasi	872	87.8	121	12.2	0	0.0	993
17	Arghakhanchi	1,278	77.8	365	22.2	0	0.0	1,643
	Total	132,979	76.2	41,434	23.8	3	0.0	174,416

4.3 Legal Ownership of Land

Considering legal ownership of land as an important factor for reconstruction, the survey collected the information on the legal ownership of the land of the surveyed houses in 17 districts. In this regard, it has been found that most of the houses surveyed (98.1 percent) were built on the personally owned private land whereas houses built on the institutional (Guthi), government/public and other types of land constitute only 0.3 percent, 1.3 percent and 0.3 percent respectively.

Table 4.3: Legal ownership of House-Land in Affected 17 Districts

SN	District	Legal Ownership of House-Land								Total
		Private		Institutional/Guthi		Government/Public		Others		
		No	%	No	%	No	%	No	%	
1	Dhankuta	4,391	96.3	166	3.6	2	0.0	2	0.0	4,561
2	Sankhuwasabha	5,052	97.7	32	0.6	0	0.0	85	1.6	5,169
3	Bhojpur	9,340	99.6	4	0.0	1	0.0	34	0.4	9,379
4	Solukhumbu	17,422	99.8	3	0.0	3	0.0	32	0.2	17,460
5	Khotang	12,882	99.9	0	0.0	0	0.0	17	0.1	12,899
6	Chitwan	13,647	89.4	43	0.3	1,452	9.5	127	0.8	15,269
7	Lamjung	22,203	99.3	15	0.1	112	0.5	31	0.1	22,361
8	Tanahu	24,754	96.9	105	0.4	605	2.4	72	0.3	25,536
9	Syangja	16,094	99.9	1	0.0	12	0.1	4	0.0	16,111
10	Kaski	10,894	98.4	13	0.1	121	1.1	46	0.4	11,074
11	Myagdi	1,406	99.5	1	0.1	3	0.2	3	0.2	1,413
12	Parbat	10,924	99.9	3	0.0	5	0.0	8	0.1	10,940
13	Baglung	3,842	99.9	0	0.0	4	0.1	1	0.0	3,847
14	Gulmi	6,996	99.2	7	0.1	6	0.1	41	0.6	7,050
15	Palpa	10,603	98.8	92	0.9	25	0.2	7	0.1	10,727
16	Nawalparasi	983	99.9	0	0.0	0	0.0	1	0.1	984

17	Arghakhanchi	1,644	99.8	3	0.2	0	0.0	1	0.1	1,648
	Total	173,077	98.1	488	0.3	2,351	1.3	512	0.3	176,428

Among the 17 surveyed districts, Chitwan has the largest number of houses built on "Government/ Public" land followed by Tanahu and Kaski, though the number of such houses are very few.

4.4 Current Status of Houses

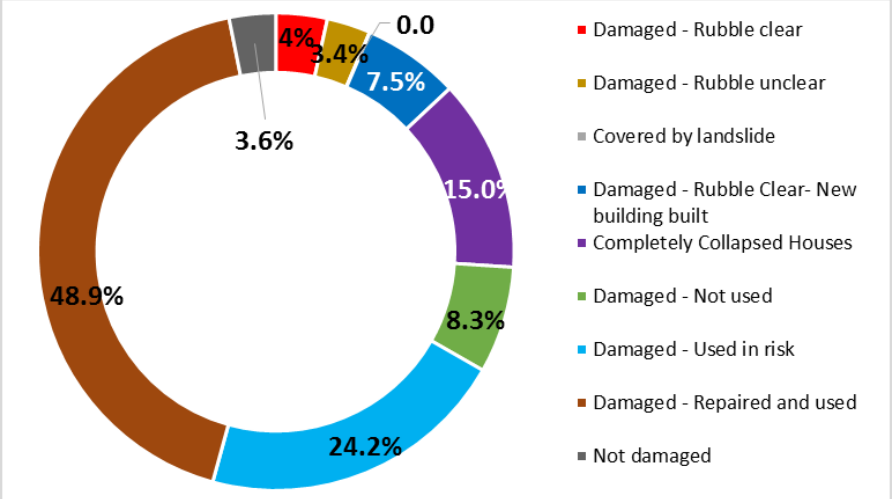
The registration program in 17 districts was conducted about 20 months after the major earthquake in April 2015 and the current status of surveyed houses were collected based on the eight categories namely (i) *House is completely damaged and rubble is cleared* (ii) *House is completely damaged but rubble is not cleared* (iii) *the house is covered by the landslide* (iv) *the house is completely damaged, rubble cleared and new house has built* (v) *the house is damaged and nobody stays in the house* (vi) *the house is damaged and using by the households under risk* (vii) *the house was damaged but repaired and occupied by the household* (viii) *the house is not damaged*.

Among the 176,428 houses being surveyed in 17 districts, 96.4 percent (170,017) of the houses were found damaged by the earthquake to some extent and only 3.6 percent (6411) houses were not damaged by the major earthquake in April 2015.

The categories (i), (ii), (iii) and (iv) as mentioned above can be broadly categorized as "the completely collapsed or not standing houses". The number of completely collapsed houses in 17 districts totalled 26,407 which accounts to 15 percent of the total surveyed houses. The highest number of completely collapsed houses were found in Solukhumbu (3,673) followed by Tanahu (3,177) and Lamjung (2,894).

The number of reconstructed houses which comes under the category (iv) equals 13300 houses which accounts to more than half (50.4 percent) of the completely collapsed houses in 17 districts.

The survey has found that almost half (48.9%) of the total surveyed houses in 17 districts have been repaired and are using the repaired shelter by the households. However, about one-fourth (24.2 %) of the surveyed houses are currently using at risk by the households without the houses whereas 8.3 percent of the surveyed houses were abandoned (damaged and not used) by the house-owners. Likewise, 15 percent of the surveyed houses were completely collapsed. About half of the completely collapsed (7.5% of the total surveyed) houses has already been rebuilt. The

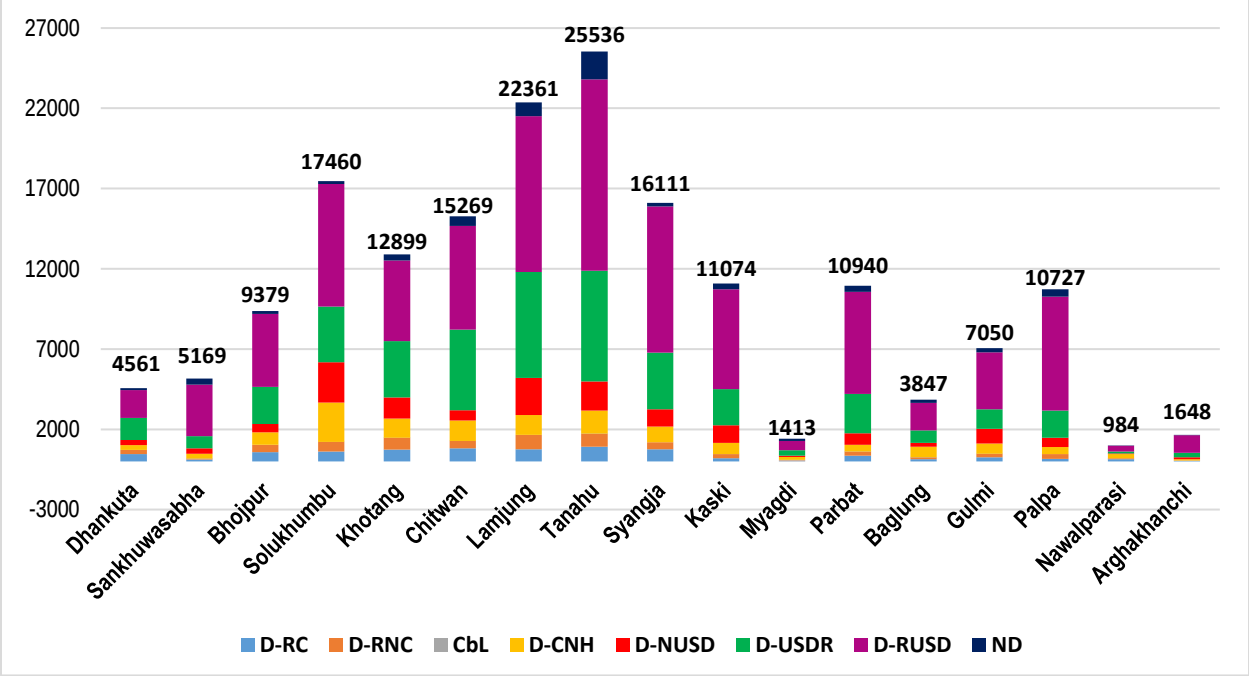


number of completely collapsed houses with the rubble being removed and yet to remove constitutes four and 3.4 percent respectively. The reconstructed houses in 17 districts constitutes 7.5 percent of the surveyed houses. (See Annex Table 2).

4.4.1 Damaged Houses with Rubble Cleared/ Not Cleared

The completely collapsed houses with "Rubble not yet cleared" numbered 6009 which accounts to 3.4% of the total surveyed houses in 17 districts. The highest number of such houses are found in **Lamjung** (883) followed by Tanahu (823) and Khotang (731). The lowest number of damaged houses under this category are found in Arghakhachi (34) followed by Myagdi (37) and Nawalparasi (50). However, the rubble from 7051 completely damaged houses has been cleared from the site in 17 districts. The highest number of rubble-cleared from completely collapsed houses has been found in **Tanahu** (908) followed by Chitwan (815) and Lamjung (763).

Figure 4.4.1: Status of the damaged-houses by district



D-RC: Damaged-Rubble Cleared; D-RNC- Damaged, Rubble Not Cleared; CbL- Covered by Land; D-CNH-Damaged, Constructed New House; D-NUSD- Damaged, Not Used; D-USDR- Damaged, Used in Risk; D-RUSD- Damaged, Repaired and Used; ND- Not Damaged

4.4.2 Reconstructed New Houses

The survey found that 13,300 new houses have been reconstructed in the 17 districts which accounts to half of the total number of completely collapsed houses in 17 districts. Among the 17 districts, the highest number of the new houses (2453) have been rebuilt in Solukhumbu districts which accounts to two-third (66.8%) of the total number of completely collapsed houses in that district. The other districts with the larger number of new houses reconstructed are Tanahu (3177) and Chitwan (2547) with the proportion of reconstructed houses account to 45.5 percent 50 percent of the total number of completely collapsed houses in those districts respectively.

4.4.3 Houses repaired

Almost half of the surveyed houses (48.9%) have been repaired and currently using by the households. Arghakhanchi, Palpa and Sankhuwasabha have almost two-third of the surveyed houses in the corresponding districts that have been repaired and currently using by the households where as Nawalparasi and Dhankuta has slightly more than one-third of the surveyed houses in that category.

Tanahu has the highest number (11919) of damaged houses repaired and currently using by the households among the 17 districts which accounts to 47 percent of the total surveyed houses in that district. Likewise, Lamjung and Syangja follows Tanahu with 9702 (43.1 percent) and 9108 (45.5%) damaged houses were occupied after repairing the houses.

4.4.4 Damaged Not Used/ Used in Risk

The survey found that the proportion of damaged houses not being used by the households (or abandoned) are 8.3 percent (14,661) with the highest number of damaged houses in such category are in Solukhumbu (2509) and Lamjung (2315) whereas Nawalparasi (50) and Myagdi (90) has the lowest number of damaged houses under that category.

There are about one-fourth (24.2 percent) of the total surveyed houses that are "damaged but using in risk" without repairing. The highest number of such houses are found in Tanahu (6906) followed by Lamjung (6595) and Chitwan (5041) where families staying in such houses in risk without repairing possibly because of not having other alternative shelters and couldn't repair the house. Nawalparasi and Arghakhanchi have the lowest number of damaged houses under this category with 115 and 263 houses respectively.

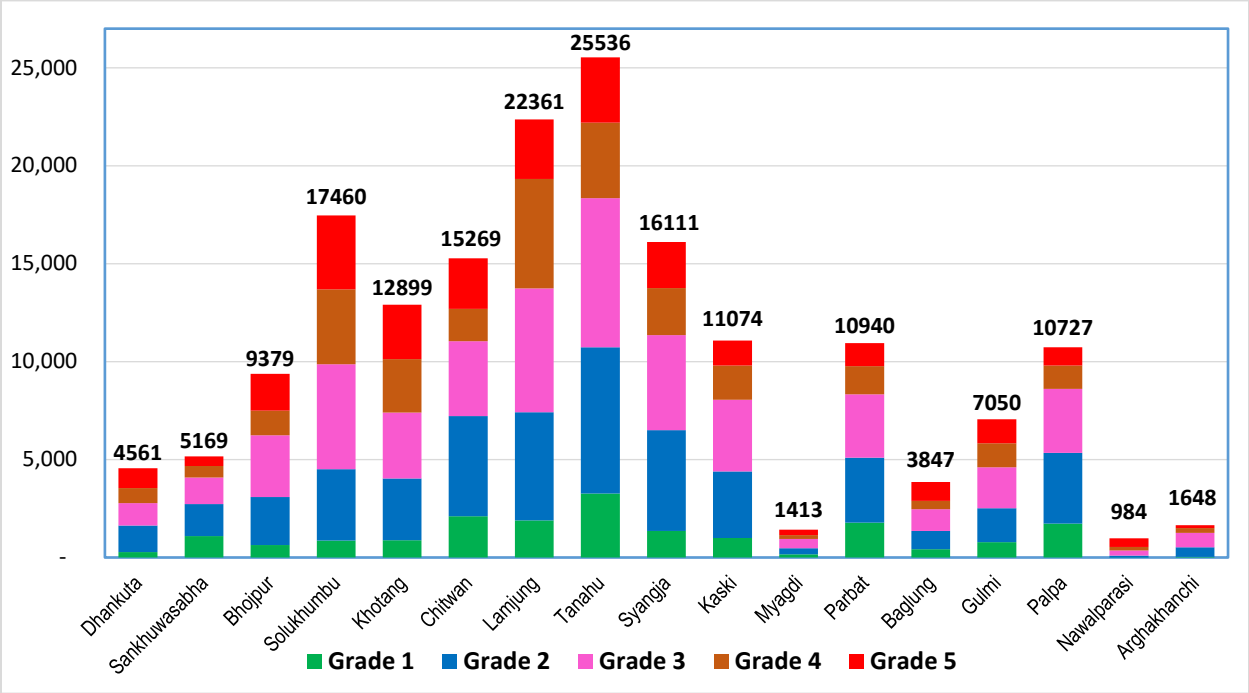
4.5 Houses by Damage Grade

The survey categorized the level of damage of the residential private houses into five grades depending on the severity of the damage. The survey manual which was used for providing training to the surveyor-engineers mentions that

Table 4.5: Damage Grading followed in the survey in 14 districts

Grade 1	Hairline to thin cracks in plaster on few walls, falling of plaster bits in limited parts, fall of loose stone from upper part of building in few cases, only architectural repairs needed.
Grade 2	Cracks in many walls, falling of plaster in last bits over large area, damage to non-structural parts like chimney, projecting cornices. The load carrying capacity is not reduced appreciably.
Grade 3	Large and extensive cracks in most walls, collapse of small portion non-load bearing walls, roof tiles detach, tilting or falling of chimneys, failure of individual non-structural elements such as partition/gable walls, delamination of stone/adobe walls, load carrying capacity of structure is partially reduced. Significant structural repair required
Grade 4	Large gaps occur in walls, walls collapse, partial structural failure of floor/ roof, building takes a dangers state.
Grade 5	Total or near total collapse

Figure 4.5: EQ Affected Houses by Damage Grade in 17 Districts



With the above categorization for the severity of damage caused by the EQ, the survey found that about one-third (32.3 percent) of the surveyed houses were damaged to the grade level 4 or 5 whereas more than one-third (38.4 percent) of the surveyed houses were found with damage grade of 1 and 2 (See Annex Table 1).

Among the 17 districts, Lamjung and Solukhumbu was found hardest hit by the earthquake with highest number of houses damaged to the grade of 4 or 5. Lamjung and Solukhumbu have 8629 and 7588 houses which accounts to 38.6 percent and 43.5 percent of the total surveyed houses respectively that were damaged to the grade of 4 or 5.

Myagdi and Arghakhachi has only 390 and 472 houses that were damaged to the grade level of 4 or 5 which is the lowest number among the 17 districts. (See Annex Table 1).

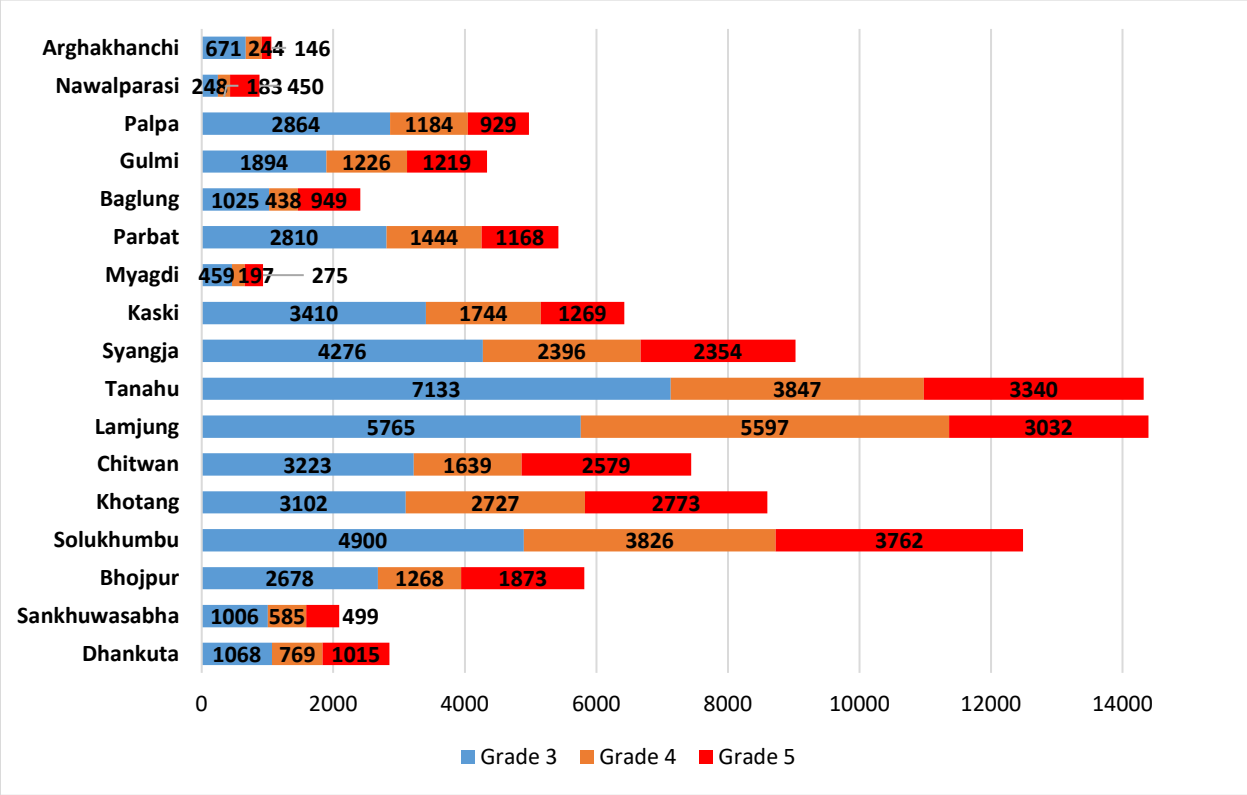
4.6 Severely Damaged Houses (SDH)

For the analysis of severity of damage by the earthquake, the houses with damage level grade 5, grade 4 and grade 3 (with Technical solution of “Major repair”) are labeled as “Severely damaged houses”. The survey found that about 94 percent of the total surveyed houses i.e. 165,809 houses were damaged by the earthquake to some extent (Table 3.6.1) and severly damaged houses (SDH) accounts to 1,03,478 houses which is 58.7 percent of the total surveyed houses.

Table 4.6.1 Technical Solution of the Surveyed Houses in 17 Affected Districts

Damage Grade		Technical Solution of the Surveyed Houses				Total
		No need	Minor repair	Major repair	Reconstruction	
Grade 1	No	9491	8818	0	0	18309
	%	51.8%	48.2%	0.0%	0.0%	100.0%
Grade 2	No	1128	48226	0	0	49354
	%	2.3%	97.7%	0.0%	0.0%	100.0%
Grade 3	No	0	5287	43955	2577	51819
	%	0.0%	10.2%	84.8%	5.0%	100.0%
Grade 4	No	0	0	4563	24751	29314
	%	0.0%	0.0%	15.6%	84.4%	100.0%
Grade 5	No	0	0	0	27632	27632
	%	0.0%	0.0%	0.0%	100.0%	100.0%
Total	No	10619	62331	48518	54960	176428
	%	6.0%	35.3%	27.5%	31.2%	100.0%

Figure 4.6: Severely Damaged Houses in 17 Affected Districts



Among the 17 districts, Tanahu has the largest number (7133) of SDHs with damage grade 3 and "major repair" as technical solution followed by Lamjung and Solukhumbu with 5765 and 4900 number of SDH houses with damage grade 3.

In terms of largest number of SDH with damage grade 5, Solukhumbu district comes at the top with 3762 houses followed by Tanahu and Lamjung with 3340 and 3032 houses respectively

Table 4.6.2: Number and Percentage of Severely Damaged Houses by Damage Grade in 17 districts

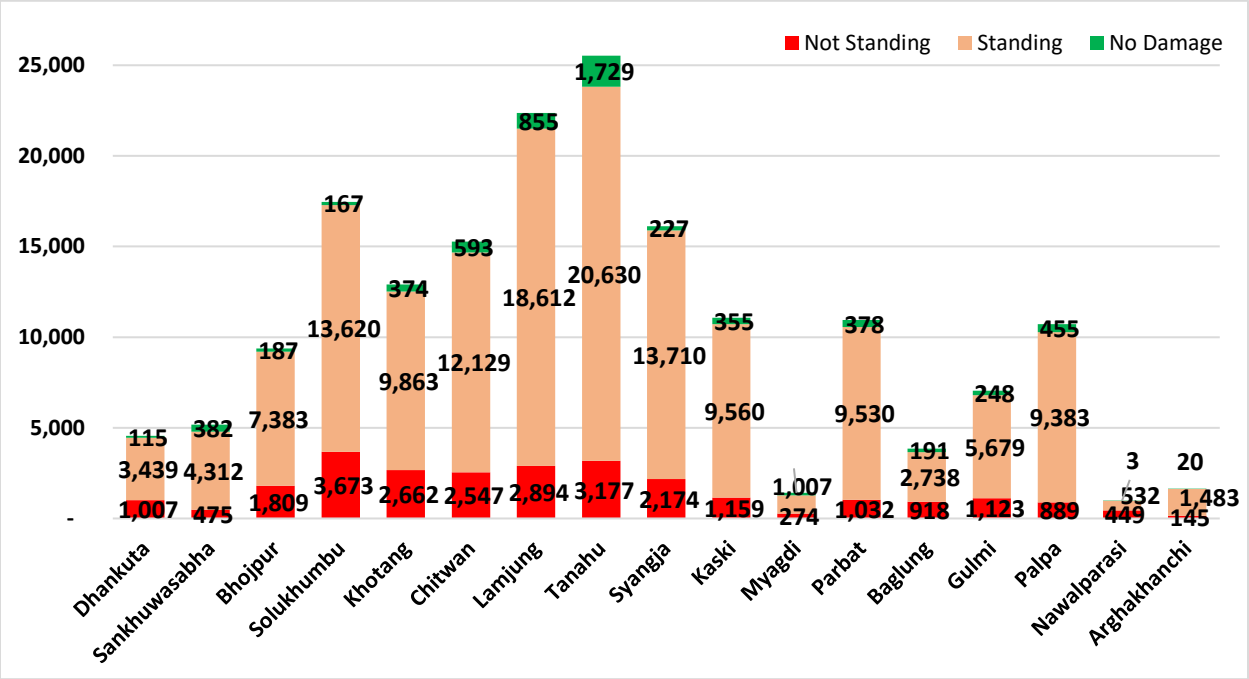
SN	District	Total Surveyed Houses	Severely Damaged Houses		Damge grade of house					
					Grade 3		Grade 4		Grade 5	
			No	%	No	%	No	%	No	%
1	Dhankuta	4,561	2,852	2.8	1,068	37.4	769	27.0	1,015	35.6
2	Sankhuwasabha	5,169	2,090	2.0	1,006	48.1	585	28.0	499	23.9
3	Bhojpur	9,379	5,819	5.6	2,678	46.0	1,268	21.8	1,873	32.2
4	Solukhumbu	17,460	12,488	12.1	4,900	39.2	3,826	30.6	3,762	30.1
5	Khotang	12,899	8,602	8.3	3,102	36.1	2,727	31.7	2,773	32.2
6	Chitwan	15,269	7,441	7.2	3,223	43.3	1,639	22.0	2,579	34.7
7	Lamjung	22,361	14,394	13.9	5,765	40.1	5,597	38.9	3,032	21.1
8	Tanahu	25,536	14,320	13.8	7,133	49.8	3,847	26.9	3,340	23.3
9	Syangja	16,111	9,026	8.7	4,276	47.4	2,396	26.5	2,354	26.1
10	Kaski	11,074	6,423	6.2	3,410	53.1	1,744	27.2	1,269	19.8
11	Myagdi	1,413	931	0.9	459	49.3	197	21.2	275	29.5
12	Parbat	10,940	5,422	5.2	2,810	51.8	1,444	26.6	1,168	21.5
13	Baglung	3,847	2,412	2.3	1,025	42.5	438	18.2	949	39.3
14	Gulmi	7,050	4,339	4.2	1,894	43.7	1,226	28.3	1,219	28.1
15	Palpa	10,727	4,977	4.8	2,864	57.5	1,184	23.8	929	18.7
16	Nawalparasi	984	881	0.9	248	28.1	183	20.8	450	51.1
17	Arghakhanchi	1,648	1,061	1.0	671	63.2	244	23.0	146	13.8
Total		176,428	103,478	100	46,532	45.0	29,314	28.3	27,632	26.7

Among the 17 districts, **Lamjung** has the largest number (14394) and highest proportion (13.9 percent) of severely damaged houses followed by **Tanahu** (14320) and **Solukhumbu** (12488) (Table 4.6.2) that constitutes 13.8 and 12.1 percent of the total number of SDH respectively. Nawalparasi and Myagdi have only 881 and 931 number of SDH which is the lowest number among the 17 districts. However, in terms of the proportion of SDH wihin the district, more than 90 percent of the total surveyed houses were severely damaged in Nawalparasi followed by Solukhumbu (71.5%) and Khotang (66.7%).

4.7 Standing and Not-Standing Houses

The eight categories of “current status of houses” mentioned above can be re-classified as houses (i) Not-Standing (ii) Standing and (iii) Not damaged. Categories under the current status of (a), (b), (c) and (d) are “Not-Standing” or completely collapsed houses whereas categories under the status of (e), (f) and (g) are “Standing” houses.

Figure 4.7: Damaged Houses Categorized with the Position “Standing” or “Not Standing”



The survey found that two-third (81.4%) of the surveyed houses in 17 districts are damaged but "standing” whereas completely collapsed or "Not Standing" houses constitutes only 15 percent of the surveyed houses. There are only 3.6 percent of the surveyed houses that are found "Not damaged" by the earthquakes. (Table 4.7).

Table 4.7: Current Status of Surveyed Houses in 17 districts

SN	District	Completely Collapsed		Damaged/ Standing		No Damage		Total
		Number	Percent	Number	Percent	Number	Percent	
1	Dhankuta	1,007	22.1	3,439	75.4	115	2.5	4,561
2	Sankhuwasabha	475	9.2	4,312	83.4	382	7.4	5,169
3	Bhojpur	1,809	19.3	7,383	78.7	187	2.0	9,379
4	Solukhumbu	3,673	21.0	13,620	78.0	167	1.0	17,460
5	Khotang	2,662	20.6	9,863	76.5	374	2.9	12,899
6	Chitwan	2,547	16.7	12,129	79.4	593	3.9	15,269
7	Lamjung	2,894	12.9	18,612	83.2	855	3.8	22,361
8	Tanahu	3,177	12.4	20,630	80.8	1,729	6.8	25,536
9	Syangja	2,174	13.5	13,710	85.1	227	1.4	16,111
10	Kaski	1,159	10.5	9,560	86.3	355	3.2	11,074
11	Myagdi	274	19.4	1,007	71.3	132	9.3	1,413
12	Parbat	1,032	9.4	9,530	87.1	378	3.5	10,940
13	Baglung	918	23.9	2,738	71.2	191	5.0	3,847
14	Gulmi	1,123	15.9	5,679	80.6	248	3.5	7,050
15	Palpa	889	8.3	9,383	87.5	455	4.2	10,727
16	Nawalparasi	449	45.6	532	54.1	3	0.3	984
17	Arghakhanchi	145	8.8	1,483	90.0	20	1.2	1,648
Total		26,407	15.0	143,610	81.4	6,411	3.6	176,428

The top three districts among the 17 districts with the highest number of completely collapsed or "Not-Standing" houses are (i) Solukhumbu (3,673) (ii) Tanahu (3,177) and (iii) Lamjung (2,894) where as Arghakhanchi (145) and Myagdi (274) have the lowest number of "completely collapsed" houses among the 17 districts.

Likewise, the three districts with the highest number of "Standing" damaged houses are (i) Tanahu (20,630) (ii) Lamjung (18,612) and (iii) Syangja (13,710).

4.8 Age of the Houses

Considering the possible linkage between the age of houses and capacity of seismic resistance, the survey collected the age of houses in 17 affected districts. The survey found that the age of more than half (52.7 percent) of the surveyed houses are less than 20 years old whereas more than one-third (35 percent) of the surveyed houses are 20 to 40 years old. There are only 11.3 percent houses that are older than 40 years (Table 4.8.1).

Table 4.8.1: Severely Damaged Houses by Age of Houses in 17 Districts

Age of House	Surveyed Houses		Severely Damaged Houses	
	Number	Percent	Number	Percent
0-20 yrs	92913	52.7	50478	48.8
20-40 yrs	61756	35.0	38788	37.5
40-60 yrs	14815	8.4	9950	9.6
60-80 yrs	3572	2.0	2419	2.3

80+ yrs	1617	.9	1068	1.0
Total	174673	99.0	102703	99.3
Missing System	1755	1.0	775	.7
Total	176428	100.0	103478	100.0

Nearly half (48.8%) of the severely damaged houses were built less than 20 years ago whereas the the SDH built 20-40 years ago constitutes more than one-third (37.5%) of the SDHs.

The proportion of SDH is lowest among the newly built houses. Only 46 percent of the houses that were built less than 5 years ago were severely damaged where as 67.3 percent of the houses 20-50 years older were severely damaged. The proportion of damaged houses increases with the increase in the age of the houses irrespective of the types of foundation and building.

Table 1.8.2 shows that only 5918 houses or 5.8 percent of the total SDHs that were built less than five years ago were severely damaged. The SDH that were built 5-20 years ago constitutes 43.4 percent of total number of SDHs and almost equal proportion of SDHs were built 20-50 years ago which shows the increasing seismic resistance by the newly built houses.

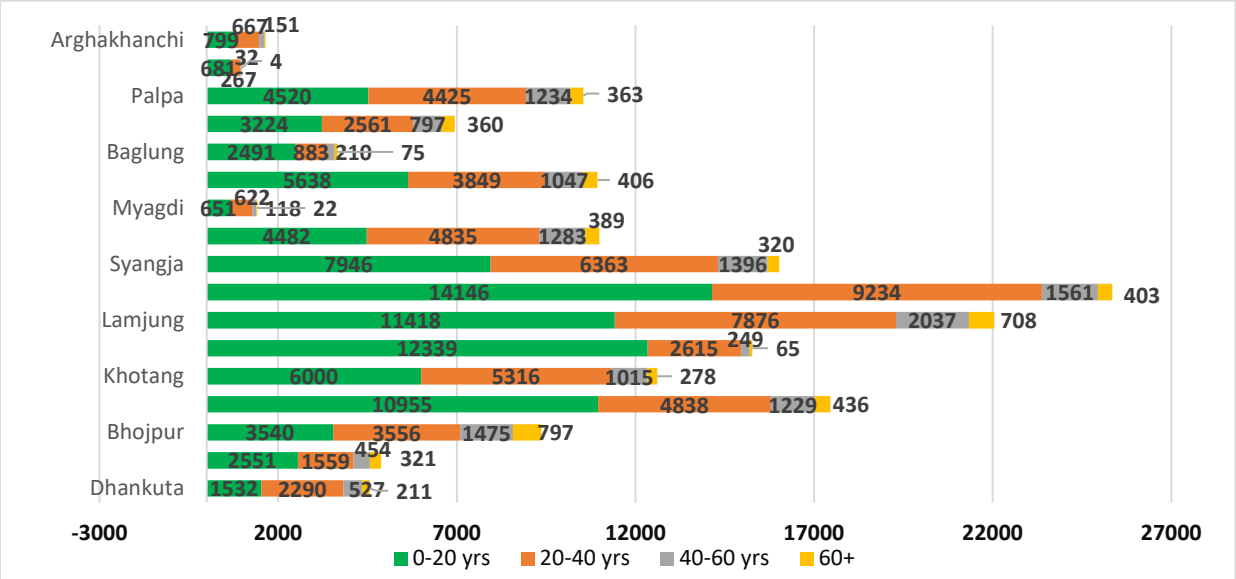
Table 4.8.2: Number of Surveyed Houses by Age of Houses and Damage Grade in 17 Affected Districts

Age Group		Damge Grade of the Surveyed Houses					Total	Severely Damaged Houses	Proportion of SDH to Total Surveyed Houses
		Grade 1	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**			
0-5 yrs	No	2,777	3,792	2,906	1,413	1,991	12,879	5,918	46%
	%	21.6%	29.4%	22.6%	11.0%	15.5%	100.0%	5.8%	
5-20 yrs	No	9,040	24,050	22,797	11,912	12,235	80,034	44,560	55.7%
	%	11.3%	30.0%	28.5%	14.9%	15.3%	100.0%	43.4%	
20-50 yrs	No	5,486	18,612	22,390	13,616	11,606	71,710	45,455	63.4%
	%	7.7%	26.0%	31.2%	19.0%	16.2%	100.0%	44.3%	
50+ yrs	No	663	2,298	3,316	2,161	1,612	10,050	6,770	67.3
	%	6.6%	22.9%	33.0%	21.5%	16.0%	100.0%	6.6%	
Total	No	17,966	48,752	51,409	29,102	27,444	174,673	102,703	58.8%
	%	10.3%	27.9%	29.4%	16.7%	15.7%	100.0%	100%	

Among the 17 surveyed districts, Chitwan has more than three-fourth (80.8 percent) of houses that were built less than 20 years older followed by Nawalparasi and Baglung where the proportion is 69.2 and 68.1 percent respectively. Chitwan and Nawalparasi districts have relatively higher proportion of houses that constitutes 66 percent and 54 percent of the surveyed houses that are built more than 20 years ago. (See Annex Table 4). Likewise Tanahu and Lamjung districts which have largest number of surveyed houses constitutes 43 percent and 50 percent of the surveyed

houses that were less than 20 years of age. About half of the surveyed houses that were severely damaged in Tanahu and Lamjung by the earthquake were older than 20 years of age.

Figure 4.8 : Number of Surveyed Houses by age in 17 districts



4.9 Houses by Type of Foundation

The severity of damage caused by the earthquake on the residential houses may vary depending on the type of foundation, floor, roof, superstructure, position and shape of houses. In this regard, this survey has gathered related information from the surveyed houses in 17 districts.

The survey found that about 89 percent (1,56,757) of the surveyed houses in 17 districts are built on the foundation with “Mud-mortar with Stones/Bricks” whereas 6 percent (10,563) of the houses have the foundation on “Cement- Stone/Brick”. The proportion of houses built on the foundation of “Reinforced Concrete” and "Bamboo/ Timber" constitutes only 3.1 and 1.6 percent respectively. (Table 4.9.1).

Table 4.9.1 Severely Damaged Houses by Types of Foundation in 17 most affected districts

Foundation of House	Saverely Damaged Houses		Minor/ No Damage Houses		Total	Percent
	Number	Percent	Number	Percent		
Mud mortar - Stone/Brick	96,883	61.8	59,874	38.2	156,757	88.9
Cement - Stone/Brick	4,061	38.4	6,502	61.6	10,563	6.0
RC	568	10.4	4,914	89.6	5,482	3.1
Bamboo/Timber	1,560	55.4	1,255	44.6	2,815	1.6
Other	406	50.1	405	49.9	811	0.5
Total	103,478	100	72,950	100	176,428	100

Most of the surveyed houses in 17 districts were built on the foundation of “Mud-mortar with Stone/Brick”. The houses built on the foundation of “Mud-mortar with Stone/Brick” seems more

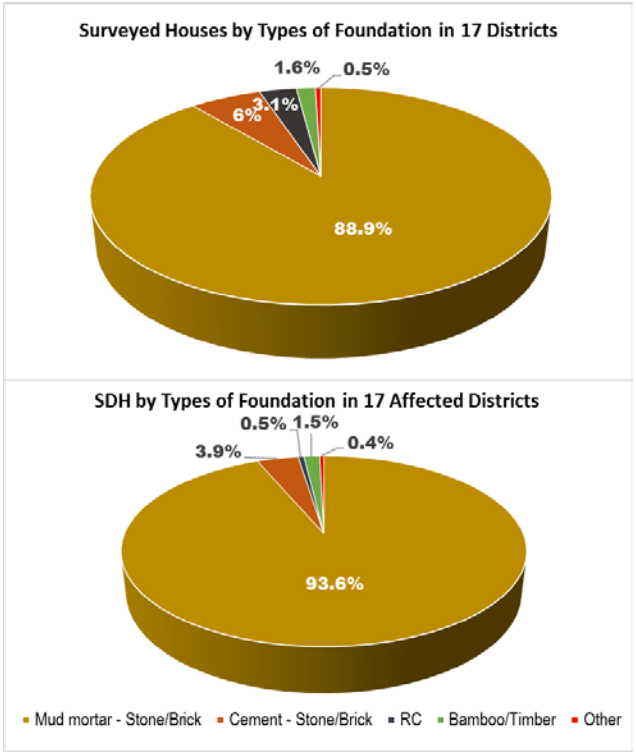
vulnerable to sustain the seismic effect as about 62 percent of SDHs were built on the foundation of "Mud-mortar with Stone/Brick" in 17 districts. Likewise, 38.4 percent of the surveyed houses that were built on the foundation of “Cement –Stone/Brick” were severely damaged. Slightly more than half of the saverely houses built on the foundation of “Bamboo/Timber” were also severely damaged. The houses that were built on the foundation of “Reinforced Concrete” seems sustained during the earthquake as about 90 percent of the surveyed houses that were built on the foundation of "Reinforced Concrete" were found with minor or no damages at all.

Table 4.9.2: SDHs of Age less than 5 years by Type of Foundations in 17 Affected Districts

SN	Foundation	Saverely Damaged Houses		Minor/ No Damage Houses		Total
		Number	Percent	Number	Percent	
1	Mud mortar - Stone/Brick	5333	55.3	4319	44.7	9652
2	Cement - Stone/Brick	373	24.7	1136	75.3	1509
3	RC	59	4.5	1254	95.5	1313
4	Bamboo/Timber	138	39.1	215	60.9	353
5	Other	15	28.8	37	71.2	52
Total		5918	46.0	6961	54.0	12879

The severity of damage due to earthquake may vary with the age of house. In this regard, Table 4.9.2 shows the severity of damage in houses aged less than 5 years of age by the earthquake. The severity of damage is highest in houses built on the foundation of “Mud mortar – Stone/Brick” compared to the houses built on foundation with “Cement – Stone/Brick” or “Bamboo/Timber” or other types of foundation even though the houses are not too old. Again,, the damage caused by the earthquake is least in houses built on “Reinforced Concrete” foundation as only 4.5 percent of such houses were severely damaged. Around one-fourth (25 percent) of houses built during the last five years and on “Cement – Stone/Brick” foundation were severely damaged by the earthquake.

Figure 4.9.1: Surveyed Houses and SDHs by Types of Foundation in 17 Districts



Mud-Mortar with Stone/Bricks

As mentioned previously, the number of surveyed houses built on the foundation of "Mud-mortar with stone/bricks" constitutes almost 89 percent of the total surveyed houses. And 93,6 percent of the SDHs were built on the foundation of "Mud-mortar with stone/bricks" in 17 districts (Figure 4.9.1). The proportion of houses built on the foundation of "Mud-mortar with stone/bricks" in 17 districts are around or more than 90 percent except in Chitwan district where the proportion is only 48 percent.

Khotang has the highest proportion (almost 99 percent) of the surveyed houses that were built on the foundation of "Mud-mortar with stone/bricks" where as Chitwan has the least proportion (49 percent) of the surveyed houses. The SDHs in Khotang and Chitwan constitutes 66.7 and 48.7 percent of the surveyed houses respectively (Annex Table 3) .

4.9.1 Cement – Stone/Brick

The survey found that only six percent of the surveyed houses were built on the foundation of “Cement – Stone/Brick”. The largest number (4441 houses) of surveyed houses built on the foundation of “Cement – Stone/Brick” were found in Chitwan which constitutes 29.1 percent of the total surveyed houses in that district. Likewise, Tanahu and Lamjung has 6.4 and 4.8 percent of the surveyed houses that were built on the foundation of “Cement – Stone/Brick”.

Chitwan has the highest proportion of the surveyed houses built on the foundation of "Cement – Stone/Bricks" and the proportion of SDHs in Chitwan is around 49 percent of the total surveyed houses. The SDHs in Tanahu and Lamjung constitutes 56.1 and 64.4 percent of the total surveyed houses respectively.

4.9.2 Reinforced Concrete

Very few surveyed houses were found built on the foundation of "Reinforced Concrete" in 17 districts. The number of surveyed houses built on the foundation of "Reinforced Concrete" constitutes only 3.1 percent of the total surveyed houses.

Chitwan has the highest number (2415) of surveyed houses that were built on the foundation of "Reinforced Concrete" that constitutes about 16 percent of the total surveyed houses in that district. Lamjung and Tanahu have 4.8 and 3.4 percent of the surveyd houses built on the foundation of "Reinforced Concrete".

As mentioned earlier, Chitwan has 48.7 percent of the total surveyed houses severely damaged by the earthquake which is one of the lowest among the 17 districts.

4.9.3 Bamboo Timber

The proportion of surveyed houses built on the foundation of "Bamboo/ Timber" constitutes 1.6 percent of the total surveyed houses in 17 districts. Highest number of such houses were found in Chitwan, Syangja and Lamjung that constitutes 6.5, 3.8, 1.9 percent of the total surveyed houses in those districts. The survey found that 55.4 percent of the surveyed houses built on the foundation of "Bamboo/ Timber" were severely damaged in 17 districts.

4.10 Surface of the Land

Surface of the land where the houses were built are also considered important factor while considering the level of damage by the earthquake. It is considered that the houses built on the steep land are more vulnerable to the severe damage than the houses built on the flat land.

The survey found that 81.5 percent of the total surveyed houses were built on the flat land whereas 15.1 percent and 3.4 percent houses were built on the land that are “moderate slope” and “Steep” respectively.

Table 4.10: SDH by Type of Land Surface in 17 districts

SN	Land Surface	SDHs		Minor/ No Damage Houses		Total	
		Number	Percent	Number	Percent	Number	Percent
1	Flat	82477	57.4	61300	42.6	143777	81.5
2	Moderate slope	17109	64	9606	36	26715	15.1
3	Steep slope	3892	65.6	2044	34.4	5936	3.4
Total		103478	100.0	72950	100	176428	100

The survey found that extent of damage of houses built on “Steep” or “Moderate Slope” is higher than the damage on houses built on “Flat” houses in 17 districts. More than half of the surveyed houses built on "Flat" land were severely damaged whereas nearly two-third of the surveyed houses built on the land that are "Moderate slope" or "Steep slope" were severely damaged (Table 4.10)

4.11 Damage in Houses with Side Attachment

The position of the surveyed houses, i.e. attached to other adjacent houses is important factor to assess the damage of the houses caused by the earthquake. Houses attached to other houses are considered as more vulnerable to damage than the stand-alone houses.

The position of about 89 percent of the total surveyed houses were stand-along or "not attached" to adjacent houses whereas houses attached to "one-side" and "two-side" constitutes 8.6 and 2.3 percent respectively.

Table 4.11 (a): Number of Houses by Type of Foundation and Position of House in 17 districts

SN	Position of House		Foundation of house					Total
			Mud mortar - Stone/Brick	Cement - Stone/Brick	RC	Bamboo/ Timber	Other	
1	Not attached to Adjacent Houses	Number	142,047	8,337	3,325	2,475	657	156,841
		Percent	90.6%	5.3%	2.1%	1.6%	0.4%	100%
2	Attached - 1 side to Adjacent House	Number	12,035	1,522	1,240	269	85	15,151
		Percent	79.4%	10.0%	8.2%	1.8%	0.6%	100%
3	Attached - 2 side to Adjacent House	Number	2,495	615	828	62	68	4,068
		Percent	61.3%	15.1%	20.4%	1.5%	1.7%	100%
4	Attached - 3 side to Adjacent House	Number	180	89	89	9	1	368
		Percent	48.9%	24.2%	24.2%	2.4%	0.3%	100%
Total		Number	156,757	10,563	5,482	2,815	811	176,428
		Percent	100%	100%	100%	100%	100%	100%

Looking at the damage caused by the earthquake based on the type of foundation, the proportion of SDH built on the "Mud-mortar Stone/Brick" increases with the higher number of sides of the house that were attached to adjacent houses. On the contrary, the proportion of SDH houses built on the foundation of "Cement Stone/Bricks" or "Reinforced Concrete" increases in houses that were attached to more sides of the adjacent houses. two-sides attached to another houses suffered less than other categories of houses (in terms of side-attachment of the house). In case of houses built on the foundation of "Bamboo/Timber" foundation, the effect of earthquake is somehow mixed. (Table 4.11b).

Table 4.11(b): Proportion of SDH by the Type of Foundation and Position of House (Side-Attachment) in 17 districts

SN	Position of House		Foundation of Surveyed Houses					Total	% of total surveyed houses
			Mud mortar - Stone/Brick	Cement - Stone/Brick	RC	Bamboo/ Timber	Other		
1	Not attached	No.	88,191	3,250	341	1,357	318	93,457	59.6%
		%	94.4	3.5	0.4	1.5	0.3	90.3%	
2	Attached - 1 side	No.	7,155	553	115	163	40	8,026	53%
		%	89.1	6.9	1.4	2.0	0.5	7.8%	
3		No.	1,435	222	100	35	48	1,840	45.2%

	Attached - 2 side	%	78.0	12.1	5.4	1.9	2.6	1.8%	
4	Attached - 3 side	No.	102	36	12	5	-	155	42.1%
		%	65.8	23.2	7.7	3.2	0.0	.1%	
Total		No.	No.	4,061	568	1,560	406	103,478	100%
		%	%	100%	100%	100%	100%	100%	

4.12 Houses by Shape of the Foundation

About 97 percent of the surveyed houses in 17 districts were built on the foundation that are “Rectangular” shaped. The houses built on “Square” shaped foundation is only 1.5 percent. More than half of the surveyed houses that were built on the foundation of any shape were severely damaged except the houses built on the foundation that are shaped E-shaped or H-shaped (Table 4.12).

4.12 Number and Percentage of Houses built by Shape of Foundation in 17 districts.

SN	Plan of House	Saverely damaged Houses		Minor/ No damaged Houses		Total	
		Number	Percent	Number	Percent	Number	Percent
1	Square	55.2	1.5	1,223	44.8	2,727	1.5
2	Rectangular	58.8	97.1	70,424	41.2	170,864	96.8
3	T-shape	56.1	0.1	75	43.9	171	0.1
4	L-shape	52.4	1.0	926	47.6	1,947	1.1
5	U-shape	60.6	0.0	28	39.4	71	0.0
6	E-shape	36.4	0.0	7	63.6	11	0.0
7	H-shape	42.9	0.0	4	57.1	7	0.0
8	Multi-projected	52.3	0.1	103	47.7	216	0.1
9	Building with Central Courtyard	68.8	0.0	10	31.3	32	0.0
10	Others	60.7	0.2	150	39.3	382	0.2
Total		103,478	58.7	72,950	41.3	41.3	100

4.13 Secondary Use of Houses

Among the 176428 houses surveyed in 17 districts, only 8.7 percent has reported the secondary use of houses such as having "Stable/ Agriculture Storage", Hotel/Restaurants/Shops, Residential rental. More than half of such houses reported that their houses were used for "Stable/ Agriculture Storage" or related activites whereas about 37 percent of such houses reported of having Hotel/Restaurant/Shop.

The extent of damage in the houses that have secondary use of "Stable/Agriculture storage" suffered severe damage by the earthquake. About 63 percent of such houses suffered with severe damage during the earthquake whereas the severity of damage was relatively lower in houses which have "Hotel/Restaurant/Shop". Likewise, the impact of earthquake on houses that have schools, government offices were relatively severe as more than half of such houses were found severely damaged by the earthquake (Table 4.13).

Table 4.13: Number of Surveyed Houses by Secondary Use of Houses in 17 Districts

SN	Secondary Use of House	Saverely Damaged Houses		Minor/ No Damaged Houses		Total	
		Number	Percent	Number	Percent	Number	Percent
1	Stable/Agriculture	4,990	63.4	2,880	36.6	7,870	51.4
2	Hotel/Restaurant/Shop	2,469	43.8	3,167	56.2	5,636	36.8
3	Rental	288	33.9	561	66.1	849	5.5
4	Institution	26	29.9	61	70.1	87	0.6
5	School	9	52.9	8	47.1	17	0.1
6	Industry	13	31.7	28	68.3	41	0.3
7	Health Post	11	42.3	15	57.7	26	0.2
8	Government Office	11	68.8	5	31.3	16	0.1
9	Police Station	4	50.0	4	50.0	8	0.1
10	Other	404	53.1	357	46.9	761	5.0
Total		8,225	53.7	7,086	46.3	15,311	100.0

4.14 Types of Geo-Technical Hazards

Considering the geotechnical hazards could cause damage or threaten safety of building structures, the survey gathered information categorizing the hazards as (i) Ground settlement (ii) Fault crack (Ground fissures) (iii) Soil liquefaction (iv) Slope movement / Landslide (v) Rock falls (vi) Flood (v) others

Figure : Ground Fissures at Kaushaltar, Bhaktapur, 2015

The vast majority of the surveyed houses (almost 93%) in 17 districts did not reported occurrence of any kind of geo-technical hazards. However, 8.2 percent of the surveyed houses reported that there were occurrences of geo-technical hazards in or nearby houses (Table 3.14). Around half of those houses reported the occurrence of "Landslide" after the earthquake. Tanahu, Lamjung and Solukhumbu constitutes the highest number of surveyed houses that reported "Landslide" in or nearby the surveyed houses.

Table 4.14: Number of Survey Houses with Geo-technical Hazards in 17 Districts

SN	Geo-Tech Hazard	Number	Percent
1	Land settlement	4,592	2.6
2	Fault crack	1,354	0.8
3	Liqufaction	56	0.0
4	Landslide	7,236	4.1
5	Rock fall	776	0.4
6	Flood	318	0.2
7	Other	199	0.1
8	Nothing	161,897	92.8
Total		176,428	101.1

Similarly, 31.6 percent of the surveyed houses that reported occurrence of geo-technical hazards reported of "Land Settlement". The highest number of surveyed houses in Lamjung, Khotang and Tanahu reported the "Land Settlement" due to the earthquake. Likewise, “Fault crack”and “Rock falls” were reported by 9.3 and 5.3 percent of the surveyed houses that reported occurrence of geo-technical hazards in 17 districts (Annex Table 4).

Annex

Table 1: Number of Surveyed Houses with Damage Grade in 17 Districts

SN	District		Damge Grade of Surveyed Houses					Total
			Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	
1	Dhankuta	No	285	1350	1142	769	1015	4561
		%	6.2%	29.6%	25.0%	16.9%	22.3%	100.0%
2	Sankhuwasabha	No	1092	1637	1356	585	499	5169
		%	21.1%	31.7%	26.2%	11.3%	9.7%	100.0%
3	Bhojpur	No	638	2457	3143	1268	1873	9379
		%	6.8%	26.2%	33.5%	13.5%	20.0%	100.0%
4	Solukhumbu	No	867	3644	5361	3826	3762	17460
		%	5.0%	20.9%	30.7%	21.9%	21.5%	100.0%
5	Khotang	No	880	3154	3365	2727	2773	12899
		%	6.8%	24.5%	26.1%	21.1%	21.5%	100.0%
6	Chitwan	No	2100	5117	3834	1639	2579	15269
		%	13.8%	33.5%	25.1%	10.7%	16.9%	100.0%
7	Lamjung	No	1895	5521	6316	5597	3032	22361
		%	8.5%	24.7%	28.2%	25.0%	13.6%	100.0%
8	Tanahu	No	3272	7467	7610	3847	3340	25536
		%	12.8%	29.2%	29.8%	15.1%	13.1%	100.0%
9	Syangja	No	1358	5143	4860	2396	2354	16111
		%	8.4%	31.9%	30.2%	14.9%	14.6%	100.0%
10	Kaski	No	994	3404	3663	1744	1269	11074
		%	9.0%	30.7%	33.1%	15.7%	11.5%	100.0%
11	Myagdi	No	163	308	470	197	275	1413
		%	11.5%	21.8%	33.3%	13.9%	19.5%	100.0%
12	Parbat	No	1786	3309	3233	1444	1168	10940
		%	16.3%	30.2%	29.6%	13.2%	10.7%	100.0%
13	Baglung	No	418	934	1108	438	949	3847
		%	10.9%	24.3%	28.8%	11.4%	24.7%	100.0%
14	Gulmi	No	782	1726	2097	1226	1219	7050
		%	11.1%	24.5%	29.7%	17.4%	17.3%	100.0%
15	Palpa	No	1739	3608	3267	1184	929	10727
		%	16.2%	33.6%	30.5%	11.0%	8.7%	100.0%
16	Nawalparasi	No	5	90	256	183	450	984
		%	.5%	9.1%	26.0%	18.6%	45.7%	100.0%
17	Arghakhanchi	No	35	485	738	244	146	1648
		%	2.1%	29.4%	44.8%	14.8%	8.9%	100.0%
Total		No	18309	49354	51819	29314	27632	176428
		%	10.4%	28.0%	29.4%	16.6%	15.7%	100.0%

Table 2: Current Status of Surveyed Houses in Affected 17 districts

SN	Districts		Condition of house after earthquake								Total
			Damaged - Rubble clear	Damaged - Rubble unclear	Covered by landslide	Damaged - Rubble Clear- New building built	Damaged - Not used	Damaged - Used in risk	Damaged - Repaired and used	Not damaged	
1	Dhankuta	No	455	258	0	294	331	1381	1727	115	4561
		%	10.0%	5.7%	0.0%	6.4%	7.3%	30.3%	37.9%	2.5%	100.0%
2	Sankhuwasabha	No	118	60	3	294	347	748	3217	382	5169
		%	2.3%	1.2%	.1%	5.7%	6.7%	14.5%	62.2%	7.4%	100.0%
3	Bhojpur	No	585	455	0	769	514	2327	4542	187	9379
		%	6.2%	4.9%	0.0%	8.2%	5.5%	24.8%	48.4%	2.0%	100.0%
4	Solukhumbu	No	612	604	4	2453	2509	3473	7638	167	17460
		%	3.5%	3.5%	.0%	14.0%	14.4%	19.9%	43.7%	1.0%	100.0%
5	Khotang	No	733	731	4	1194	1325	3498	5040	374	12899
		%	5.7%	5.7%	.0%	9.3%	10.3%	27.1%	39.1%	2.9%	100.0%
6	Chitwan	No	815	459	1	1272	634	5041	6454	593	15269
		%	5.3%	3.0%	.0%	8.3%	4.2%	33.0%	42.3%	3.9%	100.0%
7	Lamjung	No	763	883	0	1248	2315	6595	9702	855	22361
		%	3.4%	3.9%	0.0%	5.6%	10.4%	29.5%	43.4%	3.8%	100.0%
8	Tanahu	No	908	823	2	1444	1805	6906	11919	1729	25536
		%	3.6%	3.2%	.0%	5.7%	7.1%	27.0%	46.7%	6.8%	100.0%
9	Syangja	No	747	456	0	971	1076	3526	9108	227	16111
		%	4.6%	2.8%	0.0%	6.0%	6.7%	21.9%	56.5%	1.4%	100.0%
10	Kaski	No	203	251	3	702	1085	2270	6205	355	11074
		%	1.8%	2.3%	.0%	6.3%	9.8%	20.5%	56.0%	3.2%	100.0%
11	Myagdi	No	27	37	27	183	90	341	576	132	1413
		%	1.9%	2.6%	1.9%	13.0%	6.4%	24.1%	40.8%	9.3%	100.0%
12	Parbat	No	352	261	1	418	724	2450	6356	378	10940
		%	3.2%	2.4%	.0%	3.8%	6.6%	22.4%	58.1%	3.5%	100.0%
13	Baglung	No	140	121	1	656	236	783	1719	191	3847
		%	3.6%	3.1%	.0%	17.1%	6.1%	20.4%	44.7%	5.0%	100.0%
14	Gulmi	No	254	228	1	640	904	1217	3558	248	7050
		%	3.6%	3.2%	.0%	9.1%	12.8%	17.3%	50.5%	3.5%	100.0%
15	Palpa	No	165	298	0	426	594	1682	7107	455	10727
		%	1.5%	2.8%	0.0%	4.0%	5.5%	15.7%	66.3%	4.2%	100.0%
16	Nawalparasi	No	141	50	0	258	50	115	367	3	984
		%	14.3%	5.1%	0.0%	26.2%	5.1%	11.7%	37.3%	.3%	100.0%
17	Arghakhanchi	No	33	34	0	78	122	263	1098	20	1648
		%	2.0%	2.1%	0.0%	4.7%	7.4%	16.0%	66.6%	1.2%	100.0%
Total		No	7051	6009	47	13300	14661	42616	86333	6411	176428
		%	4.0%	3.4%	.0%	7.5%	8.3%	24.2%	48.9%	3.6%	100.0%

Table 3: SDHs by Types of Foundation in 17 Affected Districts

SN	District		Foundation of house					Total
			Mud mortar - Stone/ Brick	Cement - Stone/ Brick	Reinforced Concrete	Bamboo/ Timber	Other	
1	Dhankuta	Number	2,770	62	4	16	-	2,852
		Percent	97.1%	2.2%	.1%	.6%	0.0%	100.0%
2	Sankhuwasabha	Number	2,017	48	-	24	1	2,090
		Percent	96.5%	2.3%	0.0%	1.1%	.0%	100.0%
3	Bhojpur	Number	5,399	84	-	30	306	5,819
		Percent	92.8%	1.4%	0.0%	.5%	5.3%	100.0%
4	Solukhumbu	Number	12,115	295	7	42	29	12,488
		Percent	97.0%	2.4%	.1%	.3%	.2%	100.0%
5	Khotang	Number	8,494	86	1	20	1	8,602
		Percent	98.7%	1.0%	.0%	.2%	.0%	100.0%
6	Chitwan	Number	5,241	1,379	250	540	31	7,441
		Percent	70.4%	18.5%	3.4%	7.3%	.4%	100.0%
7	Lamjung	Number	13,613	497	77	200	7	14,394
		Percent	94.6%	3.5%	.5%	1.4%	.0%	100.0%
8	Tanahu	Number	13,512	643	70	85	10	14,320
		Percent	94.4%	4.5%	.5%	.6%	.1%	100.0%
9	Syangja	Number	8,181	304	56	479	6	9,026
		Percent	90.6%	3.4%	.6%	5.3%	.1%	100.0%
10	Kaski	Number	6,182	201	33	2	5	6,423
		Percent	96.2%	3.1%	.5%	.0%	.1%	100.0%
11	Myagdi	Number	893	33	3	1	1	931
		Percent	95.9%	3.5%	.3%	.1%	.1%	100.0%
12	Parbat	Number	5,209	91	18	102	2	5,422
		Percent	96.1%	1.7%	.3%	1.9%	.0%	100.0%
13	Baglung	Number	2,341	67	2	1	1	2,412
		Percent	97.1%	2.8%	.1%	.0%	.0%	100.0%
14	Gulmi	Number	4,204	100	23	10	2	4,339
		Percent	96.9%	2.3%	.5%	.2%	.0%	100.0%
15	Palpa	Number	4,831	120	19	4	3	4,977
		Percent	97.1%	2.4%	.4%	.1%	.1%	100.0%
16	Nawalparasi	Number	854	18	4	4	1	881
		Percent	96.9%	2.0%	.5%	.5%	.1%	100.0%
17	Arghakhanchi	Number	1,027	33	1	-	-	1,061
		Percent	96.8%	3.1%	.1%	0.0%	0.0%	100.0%
Total		Number	96,883	4,061	568	1,560	406	103,478
		Percent	93.6%	3.9%	.5%	1.5%	.4%	100.0%

Table 4: Number of Houses with Geo-Technical Hazards in 17 districts

SN	District		Number of Houses with Geo-Technical Hazards							Total
			Land settlement	Fault crack	Liqufaction	Landslide	Rock fall	Flood	Other	
1	Dhankuta	No	251	7	0	70	13	0	0	341
		%	73.6%	2.1%	0.0%	20.5%	3.8%	0.0%	0.0%	100%
2	Sankhuwasabha	No	117	50	1	99	13	1	1	282
		%	41.5%	17.7%	.4%	35.1%	4.6%	.4%	.4%	100%
3	Bhojpur	No	291	122	1	677	40	1	7	1,139
		%	0	0	0	1	0	0	0	1
4	Solukhumbu	No	303	206	24	911	271	5	2	1,722
		%	17.6%	12.0%	1.4%	52.9%	15.7%	.3%	.1%	100%
5	Khotang	No	766	36	3	463	22	4	1	1,295
		%	59.2%	2.8%	.2%	35.8%	1.7%	.3%	.1%	100%
6	Chitwan	No	239	138	1	420	100	105	2	1,005
		%	23.8%	13.7%	.1%	41.8%	10.0%	10.4%	.2%	100%
7	Lamjung	No	1,417	368	5	918	98	58	17	2,881
		%	49.2%	12.8%	.2%	31.9%	3.4%	2.0%	.6%	100%
8	Tanahu	No	625	174	5	1104	94	17	13	2,032
		%	30.8%	8.6%	.2%	54.3%	4.6%	.8%	.6%	100%
9	Syangja	No	225	67	4	608	8	20	5	937
		%	24.0%	7.2%	.4%	64.9%	.9%	2.1%	.5%	100%
10	Kaski	No	171	52	7	568	7	58	7	870
		%	19.7%	6.0%	.8%	65.3%	.8%	6.7%	.8%	100%
11	Myagdi	No	3	0	0	106	4	3	0	116
		%	2.6%	0.0%	0.0%	91.4%	3.4%	2.6%	0.0%	100%
12	Parbat	No	43	16	3	649	57	10	8	786
		%	5.5%	2.0%	.4%	82.6%	7.3%	1.3%	1.0%	100%
13	Baglung	No	4	1	0	97	4	2	0	108
		%	3.7%	.9%	0.0%	89.8%	3.7%	1.9%	0.0%	100%
14	Gulmi	No	58	68	2	188	21	27	3	367
		%	15.8%	18.5%	.5%	51.2%	5.7%	7.4%	.8%	100%
15	Palpa	No	67	46	-	352	22	7	133	627
		%	10.7%	7.3%	0.0%	56.1%	3.5%	1.1%	21.2%	100%
16	Nawalparasi	No	8	2	-	6	2	-	-	18
		%	44.4%	11.1%	0.0%	33.3%	11.1%	0.0%	0.0%	100%
17	Arghakhanchi	No	4	1	-	-	-	-	-	5
		%	80.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Total		No	4,592	1,354	56	7,236	776	318	199	14,531
		%	31.6%	9.3%	.4%	49.8%	5.3%	2.2%	1.4%	100%