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**ACRONYMS**

AMIS	:	Agriculture Management Information System
ASC	:	Agriculture Sub Centre
BRCH	:	Building Resilience to Climate Related Hazards
CBO	:	Community Based Organizations
DADO	:	District Agricultural Development Office
DLSO	:	District Livestock Service Office
EWS	:	Early Warning System
FFS	:	Farmers Field School
FGD	:	Focus Group Discussion
INGO	:	International Non-Government Organization
KII	:	Key Informants Interview
LSC	:	Livestock Service Centre
MoAD	:	Ministry of Agriculture Development
NARC	:	Nepal Agricultural Research Council
NGO	:	Non-Government Organization
PMU	:	Project Management Unit
PPCR	:	Pilot Program for Climate Resilience
VDC	:	Village Development Committee
WUG	:	Water User's Group

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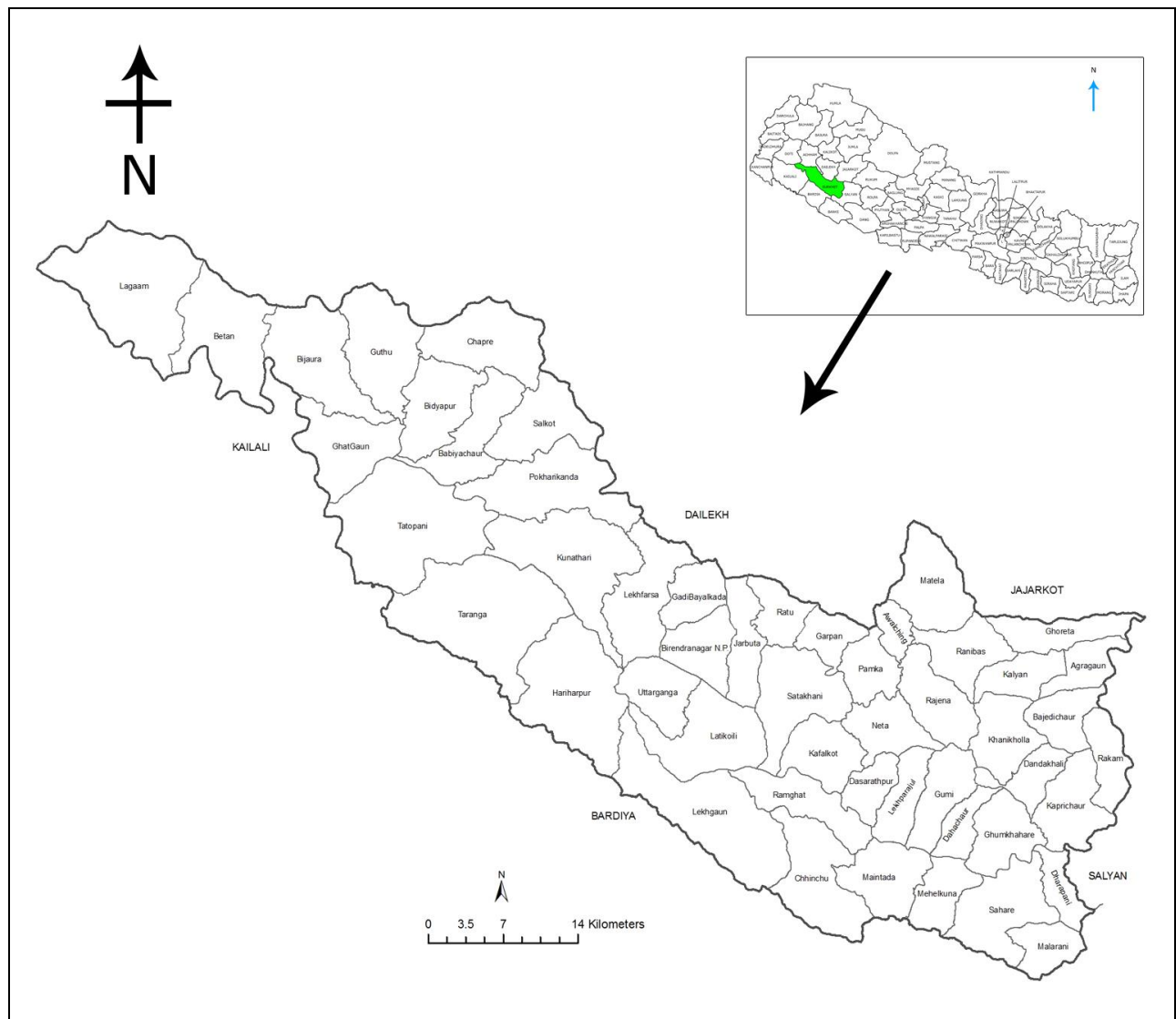
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## CHAPTER I:INTRODUCTION

### 1.1 General Information

Surkhet is one of the hilly district of 25 pilot districts of Building Resilience to Climate Related Hazards Project (BRCH), situated in Bheri zone of Mid-Western Development Region (MWDR). The district is located in the latitude of 28° 20' to 28° 58' N and the longitude of 80° 59' to 82° 2' E (Figure 1). The district administrates 44 Village Development Committees (VDCs) and 1 Municipality. Surkhet Valley is one of the Inner Terai Valleys of Nepal. Bordering districts are Jajarkot, Dailekh, and Achham to the north, Bardiya and Kailali to the south, Salyan district to the east, and Doti to the west. Birendranagar is the district headquarters.



**Figure 1: Location Map of Surkhet District**

The topography of the district is almost same as other hilly districts. It lies on the lap of Mahabharata Hill. Hilly portion covers 84 % and valley covers 16%. The district can be divided into 3 geographical regions.

#### 1. Mahabharata Range:

About 43% land of the district belongs to this region above 1000 msl in northern parts of the district.

## 2. Middle plain valleys and hills:

This lies between 250 msl to 1000 msl and covers about 42% land area of the district.

## 3. Churia range:

Located in southern part of the district lies between 1000 msl to 1500 msl. About 13% of the land area of the district lies in this region.

## 1.2 Land Utilization

The district's area is 2,451 km<sup>2</sup>. It had 288,527 population in 2001 and 350,804 in 2011. There are 35 Village Development Committees (VDCs) and one Municipality. The total cultivable area of the district is 40,723 ha out of which 8,660 ha is paddy land and 32,063 ha is upland where mainly maize based cropping system is followed (DADO, 2014). The district had 36,383 ha forest area, 220 ha pasture land, and rivers, and bushy rocky area of 11,442 ha. Approximately, only 44 percent of the total technically and economically feasible area for irrigation is being irrigated. Of the total cultivated land, irrigated land constituted 7,700 ha.

## 1.3 Climate

Unlike the cold weather of the Karnali mountain region and hot weather of the outer Terai region, Surkhet has a more moderate climate. Winter temperatures drop to about 5°C and in summer it goes up to 38°C. Monsoon brings sufficient rainfall during the rainy season. The records have been tabulated in the Annex 1.

## CHAPTER II: DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

This section focuses on the demographic and socio-economic characteristic like age and sex distribution of the HH heads, literacy and education, marital status, occupation, ethnicity, migration, ownership of the HH, sources of energy, toilet and health institution, income and expenditure, capital information, insurance etc.

**Table 1.1: Summary statistics of demographic and other household characteristics**

Description	CBS, 2011	Base line survey, 2015
Sex ratio (number of males per 100 females)	93.4	103.87
Dependency ratio	.....	46.6
Household(HH) size	4.81	4.95
Percent of female headed households	29.91	8.52
HH (%) who own their housing unit	90.80	99.03
HH (%) with piped drinking water	60.93	77.98
HH (%) with access to electricity	43.54	71.2
HH (%) with access to Telephone/Mobile	64.76	90.24
HH (%) with toilet	71.36	98.84
HH (%) using fire wood for cooking	85.92	82.58
Literacy rate	74.0	93.05

### 2.1 Population by age group and sex

The following table presents information on the distribution of population by age group and sex of the household members. The male population of 50.95 percent is higher than 49.05 percent of female population giving sex ratio of 103.87 in the district. About 31.79 percent of population were under 15 years and 7.61 percent were of 60 years or more old. Thus majority of population (68.21%) were from age group 15-59 years (Table 1.2). The survey data revealed that the overall dependency ratio is 46.6 percent. Regarding the HH size, the average HH size of the district is found to be 4.95 compared to 4.81 as of 2011 census.

**Table 1.2: Distribution of population by age and sex**

Age Group	Gender				Total	
	Male		Female		No.	%
	No.	%	No.	%		
1-4 Years	9311	2.58	6989	1.94	16300	4.52
5-9 Years	15834	4.39	12711	3.52	28545	7.91
10-14 Years	21681	6.01	20676	5.73	42357	11.74
15-19 Years	21014	5.83	23862	6.62	44876	12.44
20-24 Years	21954	6.09	22534	6.25	44488	12.33
25-29 Years	16964	4.70	17027	4.72	33991	9.42
30-34 Years	14641	4.06	14063	3.90	28704	7.96
35-39 Years	10251	2.84	13754	3.81	24005	6.65
40-44 Years	12172	3.37	12507	3.47	24679	6.84
45-49 Years	10485	2.91	11939	3.31	22424	6.22
50-54 Years	10358	2.87	5196	1.44	15554	4.31
55-59 Years	4086	1.13	3242	0.90	7328	2.03
60-64 Years	6654	1.84	5101	1.41	11755	3.26
65+ Years	8395	2.33	7316	2.03	15711	4.36
<b>Total</b>	<b>183800</b>	<b>50.95</b>	<b>176917</b>	<b>49.05</b>	<b>360717</b>	<b>100.0</b>

Source: Annex Table 1

## 2.2 Household head and members

Son/daughter constituted largest percentage (41.51%) of household members followed by household heads which constituted 20.19 percent and husband/wife (18.09%) of the population (Table 1.3).

**Table 1.3: Percentage of population by relation to HH head and gender**

Relation to HH Head	Gender				Total	
	Male		Female		Total	
	No.	%	No.	%	No.	%
Head	66624	18.47	6209	1.72	72833	20.19
Husband/wife	876	0.24	64364	17.84	65240	18.09
Son/daughter	95324	26.43	54411	15.09	149735	41.51
Grand children	15728	4.36	15885	4.40	31613	8.76
Son/daughter in law	1415	0.39	31105	8.62	32520	9.02
Daughter/son in law	538	0.15	845	0.23	1383	0.38
Parent	1352	0.37	2535	0.70	3887	1.08
Father/mother in law	338	0.09	-	-	338	0.09
Brother/sister in law	538	0.15	169	0.05	707	0.20
Household widow	-	-	-	-	-	-
Others	1045	0.29	1383	0.38	2428	0.67
<b>Total</b>	<b>183778</b>	<b>50.95</b>	<b>176906</b>	<b>49.05</b>	<b>360684</b>	<b>100.00</b>

Source: Annex Table 2

From the Table 1.3, it is seen that out of 20.19 percent household heads, female formed 1.72 percent of heads in comparison to 18.47 percent of male members who were household heads thus giving overall female household head percentage as 8.52 percent.

## 2.3 Marital Status of head of households

A total of 63.23 percent of HH members were married. Widow members of the household constituted 3.6 percent of the population. A total of 17.11 percent of population were unmarried male whereas unmarried female population accounted for 15.84 percent of total population. Female gender had higher percentage of widow (2.45%) than male gender (1.15%).

**Table 1.4: Population by marital status and gender in pilot districts**

Marital Status	Gender				Total	
	Male		Female		Total	
	Number	%	Number	%	Number	%
Married	100602	31.85	99112	31.38	199714	63.23
Divorced	-	-	-	-	-	-
Separate	338	0.11	338	0.11	676	0.21
Widow/widower	3643	1.15	7730	2.45	11373	3.60
Unmarried	54051	17.11	50028	15.84	104079	32.95
<b>Total</b>	<b>158634</b>	<b>50.23</b>	<b>157208</b>	<b>49.77</b>	<b>315842</b>	<b>100.00</b>

Source: Annex Table 3

## 2.4 Educational status, distance and time spent for schooling

According to 1991 census, literacy was defined as the “ability to read and write in any language with understanding and the ability to do simple arithmetic calculations”. The same definition was used in the censuses of 2001 and 2011.

The literacy rate of the district of age 5 and above is found to be 93.05 percent compared to 74 percent in 2011 census showing that the literacy rate has been increased over the period of time. As regards to the educational status, the share of those who can read and write is high at 24.14 percent, is followed by lower secondary level education (17.88%), primary level (17.29%), secondary (12.36%), inter/equivalent (7.75%) and SLC/equivalent (7.51%). People having graduated and above graduate level are found low at 4.21 percent. Following tables presents the educational status of the population of the district.

**Table 1.5 Percentage of population by education level and gender**

Education Level	Gender				Total	
	Male		Female		No.	%
	No.	%	No.	%		
Cannot read and write	16180	4.70	7760	2.25	23940	6.95
Can read and write	32076	9.31	51055	14.83	83131	24.14
Beginners	2936	0.85	3643	1.06	6579	1.91
Primary (1-5)	31643	9.19	27897	8.10	59540	17.29
L. Secondary (6-8)	33046	9.60	28519	8.28	61565	17.88
Secondary (9-10)	20382	5.92	22194	6.44	42576	12.36
SLC/Equivalent	15749	4.57	10124	2.94	25873	7.51
Inter/Equivalent	14660	4.26	12013	3.49	26673	7.75
Grad/Equivalent	4656	1.35	4825	1.40	9481	2.75
PG/Equi/above	3136	0.91	1890	0.55	5026	1.46
<b>Total</b>	<b>174464</b>	<b>50.66</b>	<b>169920</b>	<b>49.34</b>	<b>344384</b>	<b>100.00</b>

Source: Annex Table 4

## 2.5 Accessibility to Educational Institutions in terms of Distance and Time Spent

Currently 32.46 percent of the family members of age 5 and above are going to educational institutions. Survey data showed that proportion of them is higher in case of male than female, which constituted 16.5 percent and 15.96 percent of the population respectively.

**Table 1.6: Population by going to school (>5 years)**

Going to School	Gender					
	Male		Female		Total	
	No.	%	No.	%	No.	%
Yes	56757	16.50	54907	15.96	111664	32.46
No	117541	34.16	114843	33.38	232384	67.54
<b>Total</b>	<b>174298</b>	<b>50.66</b>	<b>169750</b>	<b>49.34</b>	<b>344048</b>	<b>100.00</b>

As regards to the accessibility to educational institutions in terms of time, 86.71 percent of the respondents have reported that distance to reach is less than 1 km, whereas 6.21 percent reported distance of 1-5 km and only 2.38 percent reported distance of 5-10 km (Table 1.7).



**Table 1.7 Population by distance to education institution (>5 years)**

Distance	Gender				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Less than 1km	49504	44.33	47326	42.38	96830	86.71
1-5 km	2967	2.66	3970	3.56	6937	6.21
5-10 km	1415	1.27	1246	1.12	2661	2.38
Greater than 10 km	2873	2.57	2366	2.12	5239	4.69
<b>Total</b>	<b>56759</b>	<b>50.83</b>	<b>54908</b>	<b>49.17</b>	<b>111667</b>	<b>100.00</b>

Source: Annex Table 6

Accessibility to educational institution by gender shows that that 91.84 percent of the respondents have reported that institutions can be reached within less than 1 hour (Table 1.8). Also comparatively fewer female (1.82%) than male (2.88%) travelled for more than 2 hours to reach the educational institution.

**Table 1.8 Population by time taken to education institution (>5 years)**

Time taken	Gender				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Less than 1 hour	51626	46.23	50926	45.61	102552	91.84
1-2 hours	1922	1.72	1953	1.75	3875	3.47
More than 2 hours	3211	2.88	2028	1.82	5239	4.69
<b>Total</b>	<b>56759</b>	<b>50.83</b>	<b>54907</b>	<b>49.17</b>	<b>111666</b>	<b>100.00</b>

Source: Annex Table 7

Regarding mode of transport, 90.30 percent of the educational institution going population reported travelling on foot and only 6.04 percent reported using vehicles like school bus (Table 1.9)

**Table 1.9: Population by mode of transportation to education institution (>5 years)**

Mode of transport	Gender				Total	
	Male		Female			
	No.	%	No.	%	No.	%
On foot	50581	89.12	50253	45.00	100834	90.30
Bus	3105	5.47	3642	3.26	6747	6.04
Bicycle	1214	2.14	507	0.45	1721	1.54
Foot and bus	1182	2.08	338	0.30	1520	1.36
Other	676	1.19	169	0.15	845	0.76
<b>Total</b>	<b>56758</b>	<b>100.00</b>	<b>54909</b>	<b>49.17</b>	<b>111667</b>	<b>100.00</b>

Source: Annex Table 8

## 2.6 Occupation

As revealed from the table 1.10, among various types of occupations adopted by the people, 28.24 percent of the population has adopted their main occupation as agriculture in their own land, and few segment of the population have adopted their main occupation as agriculture in the basis of salary/wage worker, which accounted for only 1.02 percent of the population. Student as their occupation accounting for 27.07 percent is followed by household work as their occupation accounting for 16.69 percent. About 15.35 percent of the population was engaged in non-agricultural salaried work, is followed by external jobs in abroad accounting for 4.08 percent. Occupational pattern is more or less same in case of male and female except in case of salaried non agriculture occupation and abroad external job where female

participation is quite low i.e. only 2.49 and 0.33 percent in comparison to 12.86 and 3.75 percent reported by male. However, more female (14.72%) involved household work than male (1.98%).

**Table 1.10: Distribution of population by types of occupation**

Main Occupation	Gender				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Own agriculture	42075	13.32	47120	14.92	89195	28.24
Salaried/wage agriculture	2492	0.79	739	0.23	3231	1.02
Non agriculture salary	40616	12.86	7855	2.49	48471	15.35
Own enterprises	1753	0.55	1246	0.39	2999	0.95
Abroad external job	11855	3.75	1045	0.33	12900	4.08
Household work	6241	1.98	46485	14.72	52726	16.69
Student	42473	13.45	43041	13.63	85514	27.07
No work	3579	1.13	4625	1.46	8204	2.60
Other	7560	2.39	5057	1.60	12617	3.99
<b>Total</b>	<b>158644</b>	<b>50.23</b>	<b>157213</b>	<b>49.77</b>	<b>315857</b>	<b>100.00</b>

Source: Annex Table 9

## 2.7 Migration

Among the migrated population, only 63.25 percent of household were found migrated for family reason followed by education/training and looking for work (0.67%).

**Table 1.11: Reasons of migration of the HH's members**

Reason for Migration	HH	
	No	%
Family reason	64089	63.25
Education/training	6418	6.33
Natural disaster	-	-
Looking for work	676	0.67
Easier lifestyle	-	-
No migration	30145	29.75
Other reason	-	-
<b>Total</b>	<b>101328</b>	<b>100.00</b>

Source: Annex Table 12

## 2.8 Alignment of HH Members with Institutions

For facilitating the transaction or to get knowledge about something, different people get associated in different institutions. Among the people who are associated with various institutions, 2.93 percent of the persons are associated with agricultural cooperatives followed by saving and credit cooperative (2.64%). Association with the institutions such as, water user group, commercial crop production group, agriculture marketing group, seed production is almost negligible. However, other than the above mentioned institutions, their associations in category 'others' are found high at 20.83 percent.

**Table 1.12: Members of the households (>=10 years) associated with different institutions**

Types of organizations	Gender				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Farmers Field School	538	0.17	876	0.28	1414	0.45
Vegetable	169	0.05	707	0.22	876	0.28
Water Users Group	338	0.11	-	-	338	0.11
Commercial Crop Production	-	-	507	0.16	507	0.16

Saving credit co-operative	3242	1.03	5101	1.62	8343	2.64
Agricultural co-op group	3950	1.25	5290	1.67	9240	2.93
Agriculture marketing	-	-	169	0.05	169	0.05
Seed production	-	-	369	0.12	369	0.12
Other	58556	18.54	7223	2.29	65779	20.83
Not in Group	91841	29.08	136975	43.37	228816	72.44
<b>Total</b>	<b>158634</b>	<b>50.22</b>	<b>157217</b>	<b>49.78</b>	<b>315851</b>	<b>100.00</b>

Source: Annex Table 10

## 2.9 Ethnicity

As per the table 1.13, the distribution of population by ethnicity revealed that majority of the population residing in the district constituted Brahmin/Chhetri, which accounted for 49.03 percent of the total population, followed by Adibasi/Janajati (27.12%), and Dalit (23.86%).

**Table 1.13: Distribution of population by ethnicity**

Ethnicity	Gender				Total	
	Male		Female		No.	%
	No.	%	No.	%		
Adibasi/Janajati	49546	13.74	48258	13.38	97804	27.12
Brahman/Chhetri	91270	25.30	85561	23.72	176831	49.03
Dalit	42960	11.91	43087	11.95	86047	23.86
Madhesi	-	-	-	-	-	-
Others	-	-	-	-	-	-
<b>Total</b>	<b>183776</b>	<b>50.95</b>	<b>176906</b>	<b>49.05</b>	<b>360682</b>	<b>100.00</b>

Source: Annex Table 11

## 2.10 Housing Ownership

Pakki house is defined as a house built with both walls and roof made from permanent materials like cement, concrete and bricks. Semi-Pakki is house with either wall or roof constructed by temporary materials like tin/tile/slate roofing and bamboo. Kachchi house is a house with both walls and roof made from temporary material such as mud, straw, bamboo and other endurable materials such as straw, plastics etc.

Regarding the ownership of the houses, almost all the HH (99.03%) reported that they have their own houses. Very insignificant number of HH is found to have rented or lived in relative's house or lived in land owner's house. Among those, who have owned house, 50.1 percent of the HH were found to have lived in Semi-pakki houses, 32.24 percent in kacchi/thatch roofed houses and 17.42 percent of the respondents are found to have lived in concrete roof/pakki houses.

**Table 1.14: Distribution of ownership of houses by types of houses**

Types of house ownership	HH	
	No.	%
Own house	72125	99.03
Rented house	200	0.27
Relative's house	338	0.46
Land owner's house (included in rented land)	169	0.23
Institutional house	-	-
<b>Total</b>	<b>72832</b>	<b>100.00</b>

Source: Annex Table 13

**Table 1.15: Distribution of houses by types of houses**

Type of residential house	HH	
	No.	%
Concrete roof/pakki/cemented	12689	17.42
Semi-pakki (tin/tile/slate roof)	36492	50.10
Kacchi- thatched roof	23482	32.24
Others	169	0.23
<b>Total</b>	<b>72832</b>	<b>100.00</b>

Source: Annex Table 14

## 2.11 Households Asset

The most common assets owned by the people are found to be telephones/mobile phones reportedly constituting 51.06 percent of household items followed by assets including fan/heater, TV and jewellery constituting 13.87, 10.57, and 10.36 percent of the asset items. An attempt has been made to calculate the salvage value of the assets owned by the HH in the current market value. Assets including jewelleryes formed largest (54.81%) portion of the net value of the all the assets owned by the households followed by motorcycle/scooter (12.26%), telephone/mobile (10.73%) and bus/truck (9.13%) of the net value of the assets. Insignificant proportion of the net value was represented by the assets like radio/ cd player, mill/ghatta/turbine, sewing machine refrigerator, washing machine etc.

**Table 1.16: Distribution of different type of assets and their value**

Types of assets	Items		Approximate current value	
	No.	%	(Rs)	%
Radio/ cd player	15885	5.50	11511050	0.26
Cycles	8053	2.79	14230973	0.32
Motorcycle/scooter	6301	2.18	549015620	12.26
Car/jeep	-	-	-	-
Bus/truck	676	0.23	408713800	9.13
Telephone/mobile	147421	51.06	480429684	10.73
Washing machine	-	-	-	-
Refrigerator	169	0.06	185779	0.004
Sewing machine	4518	1.56	18113967	0.40
Fan/heater	40044	13.87	7010274	0.16
TV	30524	10.57	300672561	6.71
Assets including Jewelries	29902	10.36	2454564810	54.81
Tractor/power tiller	338	0.12	76000500	1.70
Thresher/pump set/sprayers	-	-	-	-
Mill/Ghatta/turbine	338	0.12	33778000	0.75
Others	4581	1.59	123977170	2.77
<b>Total</b>	<b>288749</b>	<b>100.00</b>	<b>4478204189</b>	<b>100.00</b>

Source: Annex Table 15

## 2.12 Food Security Status

Sufficiency of food and its security to the farmers from their farm is an important indicator of economic status of the farmers. In this regards, only 9.26 percent of the respondent HH have reported they have food sufficiency for 12 or more months. 14.49 % of the HH have reported that food is sufficient for 9 to 12 months. Majority of the respondents, 33.81 percent and 32.2 percent of the household reported food sufficiency is only for 3-6 months and 6-9 months, indicating that overwhelming majority of the HH have food deficiency.

**Table 1.17: Food sufficiency of the HH by duration**

Food sufficiency level	HH	
	No.	%
Less than 3 months	23453	32.20
3 to less than 6 months	24624	33.81
6 to less than 9 months	7454	10.23
9 to less than 12 months	10556	14.49
12 months or surplus	6747	9.26
<b>Total</b>	<b>72834</b>	<b>100.00</b>

Source: Annex Table 16

### 2.13 Source of Energy

As regards to the source of energy for lighting, majority the households (71.2%) have electricity followed by solar (22.54%), only 1.62 percent households have used kerosene for lighting.

Among various sources of energy for cooking, firewood remained main fuel for cooking, accounting for 82.58 percent of the total households. 16.49 percent of the households have used gas cylinder for cooking. The high use of firewood is the major cause of deforestation affecting the recent widespread damage in different parts of the district due to floods and landslides. Though, most of the households have access to electricity, they could not use electricity for cooking due to limited power supplied.

**Table 1.18: Distribution of HH by sources of fuel for lighting and cooking**

Purpose	Main source of energy	HH	
		No.	%
<b>Light</b>	Electricity	51856	71.20
	Biogas	338	0.46
	Solar	16414	22.54
	Kerosene	1183	1.62
	Other	3041	4.18
	<b>Total</b>	<b>72832</b>	<b>100.00</b>
<b>Cooking fuel</b>	Timber/ firewood	60144	82.58
	Cow dung cake	-	-
	Straw/ dry grass/ eaves/rubbish	-	-
	Cylinder gas	12011	16.49
	Biogas	676	0.93
	Kerosene	-	-
	Other	-	-
	<b>Total</b>	<b>72831</b>	<b>100.00</b>

Source: Annex Table 17 and 18

### 2.14 Source of Drinking water

Source of drinking water refers to the place from where households draw water for drinking and cooking foods for household members. Piped water as a source of drinking water was reported by 77.98% of the HH, followed by Open well water (9.96%), Spring water (4.41%), River water (3.41%) and Hand pump/tube-well (3.02%) of households. Thus it can be inferred that substantial percent of HH (77.98%) have access to safe drinking water.

**Table 1.19: Distribution of HH reporting different sources of drinking water**

Source	HH	
	No	%
Piped water	56797	77.98

Covered well	676	0.93
Hand pump/tube-well	2196	3.02
Open well	7252	9.96
Spring water	3209	4.41
River	2703	3.71
Other	-	-
<b>Total</b>	<b>72833</b>	<b>100.00</b>

Source: Annex Table 19

## 2.15 Toilet Facility

In view of health and healthy environment sanitation is an integral part of life. As revealed from the survey data, there has been significant improvement in the accessibility of toilet in both rural and urban area. Majority of HH (98.84%) have access to toilet in their HH indicating wide spread effect of recent campaigns on making districts open defecation free. Majority (74.17%) of the HH have reported that they have toilet without flush followed by toilet with flush, but connected to safety tank (23.51%). Insignificant percentage (0.7%) of people have toilet with flush connected to sewer.

**Table 1.20: Distribution of HH using different type of toilets**

Types of toilet used	HH	
	No.	%
Toilet with flush (connected to sewer)	507	0.70
Toilet with flush (connected to safety tank)	17119	23.51
Toilet without flush	54019	74.17
Public toilet	338	0.46
No toilet	845	1.16
<b>Total</b>	<b>72828</b>	<b>100.00</b>

Source: Annex Table 20

## 2.16 Households Consulting Health Institutions

There are various kinds of health institutions prevailing in the district. Among all, Government health post/PHC caters substantial percentage of HH (41.45%), followed by district hospital (26.78%), Private hospital (17.48%), and private pharmacy/clinic (13.83%), and negligible percentages of the HH go to other health service centers. Ayurveda center were cited by none of the households.

**Table 1.21: Distribution of HH consulting different health institution**

Health service provider	HH	
	No.	%
Government health post/PHC	30190	41.45
Government district hospital	19505	26.78
Government mobile clinic	169	0.23
Government Ayurveda center	-	-
Government other institution	-	-
Private hospital	12731	17.48
Private pharmacy/clinic	10070	13.83
Private health worker's home	-	-
Private others	169	0.23
<b>Total</b>	<b>72834</b>	<b>100.00</b>

Source: Annex Table 21

## 2.17 Households Income and Expenditure

Income and expenditure measure the status of the living of any HH. Excess in income than expenditure brings the lively whereas excess in expenditure drives one to debt making life hard. Thus HH's income and expenditure are two major indicators to measure how and where he stands.

Expenditure can be considered as the ability to expend to some extent for better livelihood in accordance to one's income. The survey result showed that food constituted highest part of expenditure with 28.09% followed by 20.28% expenses on education, 14.78% in health and 13.35% in apparel and personal items.

**Table 1.22: Expenditure distribution of HH by different items**

Items of expenditure	HH (No.)	Total expenditure		Average expenditure/HH (Rs)
		Rs	%	
Food	72154	2690686305	28.09	37291
Fuel	25036	333131061	3.48	13306
Apparel and personal items	71890	1279281167	13.35	17795
Social and religious activities/donation/charity	48289	367151101	3.83	7603
Insurances and taxes	27517	196733097	2.05	7150
Repair and maintenance of house, vehicles, equipment	10449	313644407	3.27	30016
Transportation	66803	509538650	5.32	7628
Newspaper/communication	65177	103445282.00	1.08	1587
Disaster related expenses	3304	25144070	0.26	7611
Input cost for agriculture/livestock/other	22873	372370257	3.89	16280
Health	62348	1416165690	14.78	22714
Education	57007	1942902826	20.28	34082
Cash losses	1245	29987070	0.31	24078
Other	-	-	-	-
<b>Total</b>	<b>n=72833</b>	<b>9580180982</b>	<b>100.00</b>	<b>131536</b>

Source: Annex Table 22

As regards to the income of the HH in the district, non-agricultural wage and salary was found to be major contributor to total annual income, which accounted for 41.59 percent followed by remittances (17.66%) and sale of livestock/fisheries (6.86%). Combining the income from different heading as given in the following table the average income is found to Rs. 205993.

**Table 1.23: Income distribution of HH by different sources**

Major source of household income	HH (No.)	Total income		Average income/HH (Rs)
		Rs	%	
Agricultural wages/labor	19337	844468545	5.63	43670
Nonagricultural wages/salary	37807	6240462880	41.59	165061
Sale of agricultural products	13985	503305985	3.35	35989
Livestock/fisheries sale	28825	1028857874	6.86	35693
Milk and milk product sale	11927	702663712	4.68	58915
Remittances	10904	2649243690	17.66	242967
Occupational work (tailoring, black smithy, carpentry etc)	2058	217539900	1.45	105691
Forestry related products sale	200	24057600	0.16	120000
Pension	3473	369947854	2.47	106534
Own enterprise	4750	527630030	3.52	111090

Others	10893	1894945422	12.63	173963
<b>Total</b>	<b>72833</b>	<b>15003123492</b>	<b>100.00</b>	<b>205993</b>

Source: Annex Table 23

From the analysis of income and expenditure, it can be concluded that on an average there is a per annum surplus of income by Rs.74457 per household showing that the livelihood is not so hard.

## 2.18 Credit Situation

Credit is one of the important economic indicators, which is taken either to sustain the present status of life or to invest on something else in order to take benefit from the investment. In this regards, a total of 46.87 percent of households have taken loan during the last 12 months.

**Table1.24: Frequency and percentage of HH taking loan**

Loan taken	HH	
	No.	%
Yes	34135	46.87
No	38692	53.13
<b>Total</b>	<b>72827</b>	<b>100.00</b>

Source: Annex Table 24

## 2.19 Agricultural Insurance for Protecting Risks on Crops and Livestock

It is evident that climate change is becoming alarming to the survival and there is a growing threat of climate and weather related risks on crop and livestock. A total of 75.51 percent of the households have reported that there is presence of climate and weather related risks on crops and livestock production.

**Table1.25: Distribution of HH reporting presence of climatic and weather related risks in agriculture**

Possibility of risks on crop/livestock	HH	
	No.	%
Yes	54989	75.51
No	17838	24.49
<b>Total</b>	<b>72827</b>	<b>100.00</b>

Source: Annex Table 25

Among the households reporting presence of climate and weather related risks, 38.46 percent to 49.03 percent oversee the risk of diseases on the major crops and vegetables. Similarly drought was found to be reported by 34.23 percent to 45.81 percent households as risk on crops and vegetables respectively. Likewise risk on flood, hail and others are reported by some proportion of the respondents.

**Table 1.26: Distribution of HH reporting high risks in various crops/livestock due to climatic hazards**

Crop/livestock	HH (%)					
	Disease pest	Drought	Flood	Hail stone	All	Others
Rice	38.46	34.23	18.10	6.89	2.03	0.28
Wheat	39.37	35.44	6.76	15.03	3.08	0.32
Maize	38.63	34.38	15.43	9.04	1.96	0.57
Mustard	49.03	45.81	1.93	3.22	-	-
Vegetable	47.23	39.74	7.66	3.37	2.00	-



Potato	48.58	34.03	6.19	6.19	5.00	-
Cow	93.90	5.08	1.02	-	-	-
Buffalo	95.66	1.45	-	-	1.45	1.45
Sheep	100.00	-	-	-	-	-
Goat	97.78	1.48	-	-	-	0.74
Chyangra	100.00	-	-	-	-	-
Chicken	97.34	2.66	-	-	-	-
Duck	100.00	-	-	-	-	-
Other	92.31	3.85	-	3.85	-	-
<b>Total (n=54989)</b>						

Source: Annex Table 26 (Figures in the above table is multiple answer does not match with 100%)

Regarding the risk on livestock species, all species are reported to be vulnerable to risks of diseases and pests as well as risk of drought to some extent. As high as 100 percent of the household have reported that sheep, chyangra and duck were more prone to risks due to diseases and pests followed by goat (97.78%), buffalo (95.66%) and cow (93.9%). Drought effects were reported by only 5.08 percent in cow and 1.45 percent in case of buffalo.

In order to protect from the risk of damage of valuable property insurance is a means of reimbursement of one's property. There are number of insurance companies actively working in this field. In regards to it, an enquiry into the knowledge on insurance companies and schemes, it is interesting to note that only 7.64% of the HH are found to have known about it, but none of the respondents had insured the crop and livestock..

**Table 1.27: Frequency and percentage of households having knowledge of insurance**

Knowledge on crop/ livestock insurance	HH	
	No.	%
Yes	5564	7.64
No	67267	92.36
<b>Total</b>	<b>72831</b>	<b>100.00</b>

Source: Annex Table 27

## 2.20 Reasons for Non-Insuring

Though there were so many types of hazards likely to occur due to climate change in crops and livestock, none of the HH are found to have insured their crops and livestock. Some people might not be willing to insure and pay the premium and some people might not know about insurance and its policy. However, an enquiry on it revealed all of the respondents reported that lack of the information (100%), was the major reason for non-insuring.

**Table 1.28: Frequency and percentage of household reporting reason for not doing insurance**

Reason for not doing insurance	HH	
	No.	%
Lack of information	1013	100.00
High premium rate	-	-
No access to the service	-	-
Poor insurance service	-	-
Problem in getting back the insured amount	-	-
Others	-	-
<b>Total</b>	<b>1013</b>	<b>100.00</b>

Source: Annex Table 29

Leader farmer/neighbor/relative and TV/Radio were reported as major sources of information on agriculture insurance. Among the respondent who knows about the insurance, 1446 households (81.05%) reported having knowledge about 75 percent subsidy on agriculture insurance.

**Table 1.29: Frequency and percentage of households reporting 75% subsidy on agricultural insurance premium**

<b>Response</b>	<b>No.</b>	<b>%</b>
Yes	1446	81.05
No	338	18.95
<b>Total</b>	<b>1784</b>	<b>100.00</b>

Source: Annex Table 33

## CHAPTER III: AGRICULTURE AND AGRICULTURE RELATED PRODUCTION AND PRODUCTIVITY

### 3.1 Land Holding

In this regards, almost all the households (87.93%) in the district have owned their land.

### 3.2 Use of Land by Type

Usually, in hill and mountain area of Nepal, land use in general can be classified into six categories viz. (i) Temporary crops (ii) Temporary meadow (iii) Temporary fallow (iv) Permanent crops (v) Permanent meadow and (vi) Appropriate for forest and (vii) Appropriate for fishery. Temporary crop was grown with average area of 0.005 ha/HH and overall irrigated land is 0.0008 ha/HH with average number of parcel land is 1.18. Use of temporary fallow is also very low with average area 0.0020 ha/HH. The use of land for permanent crops is also low, the average area covered is 0.0906 ha/HH with average irrigated area of 0.0317 ha. The land use for permanent meadow is also very low, the average area of which is 0.0016.

**Table 2.11: Distribution of HH using land by type**

Type of land	HH(no.)	Ave. area (ha)	Ave. no. of parcel	Ave. irrigated (ha)
Temporary crop	62696	.0050	1.18	.0008
Temporary graze land	6756	.0001	2.00	-
Temporary fallow	22162	.0020	1.54	0.0001
Permanent crops	72829	.0906	1.76	.0317
Permanent graze land	20267	.0016	1.50	.0009
Appropriate for forest	6756	.0008	1.00	-
Appropriate for fishery	-	-	-	-
<b>Total</b>				<b>n=72829</b>

Source: Annex Table 35

### 3.3 Source of Irrigation:

Out of 2703 respondents, who have managed to irrigate in their field with different sources of irrigations for temporary crops, majority (93.75%) of the HH have reported that their source of irrigation was continuous flow canal. Similarly continuous flow canal was reported as source by 43.08 percent respondents in case of temporary fallow.

**Table 2.2: Distribution of HH by sources of irrigation in the district**

Sources of irrigation	Temporary crops		Temporary Fallow land		Temp Graze		App. forest	
	No.	%	No.	%	No.	%	No.	%
Tube well, boring	-	-	169	0.33	-	-	-	-
Continuous flow canal	2534	93.75	22314	43.08	-	-	-	-
Natural flow canal	-	-	2830	5.46	-	-	-	-
Pond/ well	-	-	507	0.98	-	-	-	-
Mixed	-	-	908	1.75	338	100	-	-
Others	169	6.25	25071	48.40	-	-	-	-
<b>Total</b>	<b>2703</b>	<b>100.00</b>	<b>51799</b>	<b>100.00</b>	<b>338</b>	<b>100.00</b>	-	-

Source: Annex Table 36, 37, and 38

## Leased land

Only 1.99 percent of population have given land to others on lease and the average holding of leased out land is 0.0002 ha/household.

**Table 2.3: Frequency and percentage of households reporting leased out land and holding seize**

Leased out land			HH	
	Area (ha)	Mean (ha/HH)	No.	%
Khet	33.93	.0005	1446	1.99
Bari	-	-		
<b>Total</b>	<b>33.93</b>	<b>.0002</b>		

Source: Annex Table 41 and 42

A total of 2197 households (3.02%) had owned land on lease from others.

**Table 2.4: Frequency and percentage of households reporting leased out land and holding seize**

Leased in land	HH	
	No.	%
Yes	2197	3.02
No	70636	96.98
<b>Total</b>	<b>72833</b>	<b>100.00</b>

Source: Annex Table 43

Out of 110.26 ha leased in land, major portion i.e. 57.46 ha or 51.94 percent of land are found to have leased on crop sharing basis.

**Table 2.5: HH reporting leasing land by type of land tenure system**

Type of land tenure system	Particulars	Khet (ha)	Bari	Orchard	Pond	Total
Contract (cash)	Sum (ha)	18.80(16.99%)	-	-	-	18.795
	Mean (ha/HH)	.0003	-	-	--	0.00
Contract (kind)	Sum (ha)	25.78(23.30%)	-	-	-	25.776
	Mean (ha/HH)	.0004	-	-	-	0.000
Crop sharing	Sum (ha)	57.46(51.94%)	-	-	-	57.459
	Mean (ha/HH)	.0008(7.7%)	-	-	-	0.001
Exchange for service	Sum (ha)	8.59	-	-	-	8.592
	Mean (ha/HH)	.0001	-	-	-	0.001
Mortgage	Sum (ha)	-	-	-	-	-
	Mean (ha/HH)	-	-	-	-	-
Others	Sum (ha)	-	-	-	-	-
	Mean (ha/HH)	-	-	-	-	-

Source: Annex Table 44

## 3.4 Cropping Patterns and Cropped Area

Rice-Wheat-maize and Rice-Wheat-Fallow were major cropping pattern of Khet (rain fed low land) followed by 24.06 and 23.52 percent of the HH respectively with mean land holding of 0.0193 and 0.0189 ha/HH.

**Table 2.6: Cropping patterns in Khet (Rain fed low land) and mean land holdings area**

Type of cropping pattern	Total area (ha)	Percentage of total land area (%)	Mean (ha/HH)
Rice-Rice-Wheat	928.75	15.88	.0128
Rice-Wheat-Fallow	1375.19	23.52	.0189

Rice-Wheat-Maize	1407.14	24.06	.0193
Rice-Wheat-Vegetable	35.24	0.60	.0005
Rice-Pulses-Fallow	31.88	0.55	.0004
Rice-Wheat-Moong (green gram)	11.81	0.20	.0002
Rice-Wheat-Dhaincha (Sun hemp)	0.00	0.00	0.0000
Rice-Potato-Fallow	53.27	0.91	.0007
Rice-Maize-Fallow	379.46	6.49	.0052
Rice-Fallow-Fallow	397.66	6.80	.0055
Rice-Barley-Fallow	0.00	0.00	0.0000
Rice-Millet-Fallow	9.26	0.16	.0001
Other	1217.78	20.83	.0167
<b>Total (n=71829)</b>	<b>5847.45</b>	<b>100.00</b>	<b>.0803</b>

Source: Annex Table 45

Maize/upland rice-Fallow was major cropping pattern in Bari land as reported by 23.99 percent of HH whereas 23.04 percent reported Maize/Millet -Wheat pattern. Upland rice-fallow-fallow was another important cropping followed by 13.06 percent of HH.

**Table 2.72: Cropping patterns in Bari (rain fed upland) and mean land area**

Type of cropping pattern	Total area (ha)	Percentage of total land area (%)	Mean ( ha/HH)
Maize/Upland rice-Fallow	347.17	23.99	.0048
Maize/Millet-Fallow	10.20	0.71	.0001
Maize/Millet-Wheat	333.40	23.04	.0046
Upland rice-Fallow-fallow	189.03	13.06	.0026
Maize-Tori-Fallow	48.87	3.38	.0007
Maize- Rice-Wheat	7.52	0.52	.0001
Maize-Barley	45.11	3.12	.0006
Jute-Tori-Fallow	0.00	0.00	0.0000
Jute-Wheat- Fallow	0.00	0.00	0.0000
Vegetable-Vegetable	38.23	2.64	.0005
Vegetable-Maize	2.15	0.15	.0000
Off season vegetable	0.00	0.00	0.0000
Others	425.21	29.39	.0058
<b>Total (n=72829)</b>	<b>1446.88</b>	<b>100.00</b>	<b>.0199</b>

Source: Annex Table 46

### 3.5 Use of improved seeds

Less than one tenths (8.71%) of the HHs reported to have used improved seeds. Among this 77.61 percent households were using improved seeds of rice followed by maize (27.35%) and wheat (13.68%).

**Table 2.8: HH using improved seeds (%)**

Use of improved seeds	HH	
	No.	%
Yes	6346	8.71
No	66486	91.29
<b>Total</b>	<b>72832</b>	<b>100.00</b>

Source: Annex Table 47

**Table 2.9: HH using different kinds of seeds (%)**

Commodity	HH	
	Nos	%
Rice	4792	77.61
Wheat	844	13.68
Maize	1689	27.35
Oilseed		0.00
Pulses	169	2.74
Vegetables	200	3.25
Potato	169	2.74
Sugarcane		0.00
Other		0.00
<b>Total</b>	<b>6175</b>	<b>100.00</b>

Source: Annex Table 48

### 3.6 Marketing of Farm Product

Following table presents the distribution of HH selling their farm product in different places. Farm gate is found to be the major place where all of the of households sell their products.

**Table 2.10: Frequency and percentage of HH selling produce at different places**

Place of sale	HH	
	No.	%
Farm gate	14345	100.00
Rural haat bazar	-	-
District market	-	-
Vendor	-	-
Cooperatives	-	-
Sell centers	-	-
Others	-	-
<b>Total</b>	<b>14345</b>	<b>100.00</b>

Source: Annex table 49

### 3.7 Use of Chemical Fertilizers and Pesticides

As regards to the use of pesticides , 23125 HHs (31.75%) of the households have used chemical fertilizers and pesticides.

**Table 2.10: Use of fertilizer and pesticides by the households**

Use of chemical fertilizer and pesticides	HH	
	No	%
Yes	23125	31.75
No	49703	68.25
<b>Total</b>	<b>72828</b>	<b>100.00</b>

Source: Annex Table 50

As has been reported by DADO office the farmers have used following amount of Nitrogen, Phosphate and Potash in their farm in different varieties of crops, which is given in the following table which is quite low than the recommended doses.

**Table 2.11: Amount of fertilizer nutrients used by HH in different crops (kg/ha)**

Nitrogen	Phosphate	Potash
12	7	2

Source: DADO (2015)

From the following table, it is clear that out of 23128 households using fertilizers and pesticides, 88.63 percent of households reported that fertilizers and pesticides were available as and when needed.

**Table 2.12: Frequency and percentage of households reporting availability of chemical fertilizer and pesticides**

Response	HH	
	No.	%
Yes	20499	88.63
No	2629	11.37
<b>Total</b>	<b>23128</b>	<b>100.00</b>

Source: Annex Table 51

### 3.8 Sources of Fertilizers/Pesticides

There are various sources of buying fertilizers/pesticides for the use of agricultural purposes. Among them co-operatives are the main sources, from where 73.69 percent of the HH buy them, followed by Agro vets from where 24.28 percent buy them.

**Table 2.13: HH buying fertilizers/pesticides from different sources (%)**

Source	HH	
	No.	%
Cooperatives	14514	73.69
Agro vets	4781	24.28
DADOs/ASCS	401	2.04
Neighbor farmers	-	-
Relatives	-	-
Others	-	-
<b>Total</b>	<b>19696</b>	<b>100.00</b>

Source: Annex Table 52

A total of 9141 household reported source of information on safe use of fertilizer and pesticides. Among this 57.58 percent of HH receive the information for safe use of fertilizers and pesticides from purchasing shop followed by neighboring farmer 24.24 percent and extension services 12.12 percent.

**Table 2.14: Frequency of households reporting source of information for safe use of fertilizer and pesticides**

Source	HH	
	No.	%
From Purchasing Shop	3641	52.91
Extension Service	676	9.82
Neighboring Farmers	338	4.91
Friends	169	2.45
Relatives	1383	20.09
Own Experience	676	9.82
Other	-	-
<b>Total</b>	<b>6882</b>	<b>100.00</b>

Source: Annex Table 53

### 3.9 Reason for Low Use of Fertilizers/Pesticides:

An enquiry into the reason for inadequate use of fertilizer nutrients/pesticides by the farmers, non-availability in time is reported by 28.64 percentage of HH and lack of money was reported by 24.57 percent households.

**Table 2.15: HH reporting reasons for low use of fertilizers/pesticides**

Reason	HH	
	No.	%
Not available	14989	28.64
No money	12858	24.57
Other	24488	46.79
<b>Total</b>	<b>52335</b>	<b>100.00</b>

Source: Annex Table 54

There is very low existence of advice on safe use of fertilizer and pesticides as only 10.42 percent of households reported its existence.

**Table 2.16: HH reporting on advisory on safe use of fertilizer and pesticides**

Response	HH	
	No.	%
Yes	7591	10.42
No	65241	89.58
<b>Total</b>	<b>72832</b>	<b>100.00</b>

Source: Annex Table 55

### 3.10 Livestock Production

Livestock is closely associated with agricultural occupation of the population, hence is an integral part of agriculture for their livelihood. Those who have adopted agriculture as their main occupation, used to hold the livestock as well, as such 77.47 percent of the households have held livestock.

**Table 2.17: Frequency and percentages of households raising livestock**

Response	HH	
	No.	%
Yes	56418	77.47
No	16412	22.53
<b>Total</b>	<b>72830</b>	<b>100.00</b>

Source: Annex Table 56

The distribution of types of breeds of livestock owned by the HH is presented in the following table. As revealed from the same table majority of the HH have raised local breeds of all kinds of livestock such as cattle, buffaloes, sheep, goats, and pigs and only few proportion of household raised improved breeds of cattle, goat, sheep and pigs. Among all kinds of livestock raising, majority (68.29%) of the HH have raised goat followed by cattle (51.94%), buffalo (29.05%), and pig (15.75%). Other livestock such as rabbit and horse/mule are raised by very few proportion of the HH.

**Table 2.183: Types of breeds of livestock owned**

Animal	Type	HH	HH (%)	Animal (no.)	Mean (Animal/HH)
Cattle	Local	29302	51.94	66309	2.26
	Improved	1815	3.22	2322	1.28
Buffalo	Local	16392	29.05	25945	1.58
	Improved	1277	2.26	1477	1.16
Yak	-	-	-	-	-
Goat	Local	38526	68.29	189447	4.92
	Improved	3166	5.61	12476	3.94
Sheep	Local	2196	3.89	5236	2.38



Pig	Local	8887	15.75	16116	1.81
	Improved	2185	3.87	4675	2.14
Rabbit	Local	507	0.90	844	1.67
	Improved	369	0.65	538	1.46
Horse/Mule	Local	0	0.00	0	0
Others	Local	13712	24.30	32184	2.35
<b>Total</b>					<b>n=56418</b>

Source: Annex Table 57 (Note: Total of the percentage will not match with 100 as it is multiple answers)

### 3.12 Livestock Housing and Feeding

Regarding the livestock housing and feeding 89.46 percent of the households have reared their livestock in the shed separately. Likewise 7.24 percent of the households reared in the residential house.

**Table 2.19: Place of housing of livestock**

Place of housing livestock	HH	
	No.	%
In the shed separately	50473	89.46
In the residential house	4086	7.24
Both	1859	3.30
<b>Total</b>	<b>56418</b>	<b>100.00</b>

Source: Annex Table 58

### 3.13 Milk and Milk Products

Among those HH who have raised livestock, only 17.08 percent have reported that they sell milk and milk products. The amount of milk sold per annum was found to be 1311 litres per household

**Table 2.20: Milk and milk products production and sale**

Response	HH		Average milk sold/year (liter)
	No.	%	
Yes	9638	17.08	1311
No	46778	82.91	
<b>Total</b>	<b>56416</b>	<b>100.00</b>	

Source: Annex Table 59 and 60

Large percentage (53.03%) of the HH sold their milk at collection center followed by 36.12 percent in home, whereas 8.37 percent HH sold milk in hotels.

**Table 2.21: HH selling milk at different places**

Different Place to sell Milk	HH	
	No.	%
Home	2459	36.12
Collection center	3610	53.03
Village	-	-
Neighbor	338	4.96
District headquarter	-	-
Hotel	570	8.37
Others	-	-
<b>Total</b>	<b>6808</b>	<b>100.00</b>

Source: Annex Table 61

### 3.14 Feeds and feeding

Regarding the type of feeding for the livestock, stall feeding was practiced by 44.32 percent household while feeding in pasture land was reported by 30.14 percent. Stall feeding as well as feeding in pasture land both was reported by 25.54 percent households.

**Table 2.22: HH with different type of feeding**

Type of feeding	HH	
	No.	%
Stall feeding	25004	44.32
Feeding in pasture land	17005	30.14
Both	14407	25.54
<b>Total</b>	<b>56416</b>	<b>100.00</b>

Source: Annex Table 62

Regarding the type of feeds given to the livestock, fodder/straw mixed feed were fed by 46.38 percent of HH. Mixed feed also constituted major portion of livestock feed as it was fed by 44.69 percent of households followed by 38.03 percent who fed green grasses and by 23.89 percent who fed concentrates.

**Table 2.23: Livestock feeds and feeding types**

Types of Feeds	HH	
	No.	(%)
Fodder/straw	16825	46.38
Green Grasses	13796	38.03
Forage	1077	2.97
Concentrates	8666	23.89
Mixed	16212	44.69
Other	-	-
<b>Total</b>	<b>36277</b>	<b>100.00</b>

Source: Annex Table 63

### 3.15 Poultry

Poultry was raised by 42.56 percent of the households in the district.

**Table 2.24: Households raising poultry**

Rearing of poultry	HH	
	No.	%
Yes	30997	42.56
No	41828	57.44
<b>Total</b>	<b>72825</b>	<b>100.00</b>

Source: Annex Table 64

Of the total birds, local birds were raised by all of the households and near about 7.93 percent of households raised improved breeds of poultry. Improved breeds were being raised only in case of poultry. Those who have raised poultry in the farm, the average number of improved broiler per farm is found to be 216.11. On the other hand, the average number of local chicks and local cocks is found to be 8.63 and 2.75 respectively. Similarly the average number of ducks per HH was found to be 1.00 for local hen.

**Table 2.25: Average number of improved and local poultry breed reared**

Type of birds	Nos of HHs	%	Sum	Mean
Poultry				
Local Chick	20551	66.30	177320	8.63
Local Cock	19970	64.43	54824	2.75
Local Hen	26114	84.25	71184	2.73
Local dry	5024	16.21	10449	2.08
Improved Broiler	1784	5.75	385471	216.11
Improved Layer	676	2.18	2196	3.25
Duck				
Local Chick	-	-	-	-
Local Cock	-	-	-	-
Local Hen	169	0.54	169	1.00
Local Dry	169	0.54	169	1.00
Pigeon				
Local Chick	-	-	-	-
Local Cock	-	-	--	-
Local Hen	-	-	-	-
Local Dry	-	-	-	-
<b>Total</b>	<b>(n=30997)</b>			

Source: Annex Table 66

### 3.16 Fishery

As the nature of the district is mountainous, fishery is one of the unfamiliar components of agriculture, the number of HH involved in this field is found to be nil.

### 3.17 Forest

As regards to the HH involving in forest land, a total of 7114 (49.74%) of the HH were found to be involved in compact forest with the average holding 0.004 ha /HH. Similarly, 19.85, 12.98 and 11.45 percent of HH have reported involvement in scatter, NTFP, and community forest area with average holding of 0.010, 0.029 and 5.00 ha/HH respectively. In other types of forest land the involvement of HH are found to be 11.81 percent.

**Table 2.26: Frequency and percentage of HH having different forest area**

Different forest area	No of HHs	% of HHs	Total area (ropani)	Mean
Compact Forest	7114	49.74	507	0.004
Scatter Forest	1689	11.81	337.78	0.010
NTFP Area	1182	8.27	675.56	0.029
Community Forestry	2628	18.38	263283.26	5.009
Other Forest Area	1689	11.81	1351.12	0.040
<b>Total</b>	<b>n=14302</b>			

Source: Annex Table 68

## CHAPTER IV: CLIMATE CHANGE, AGRO-ADVISORY & AGRO-MET ADVISORY

One of the major components of BRCH project is to provide timely and proper use of weather forecasts, agro-advisory and agro-met advisory operations in order to increase production and productivity of commodities through proper use of introduced agricultural management information system. By the impact of climate change, environment relating to eco-systems become more vulnerable to natural hazards, which need to be adjusted in existing practices, processes or structures in order to counter potential future disasters. Through the warnings and advisory services, it is expected that BRCH project might benefit the people residing in the study districts and climate-vulnerable communities in particular.

### 4.1 Climatic Hazards, their Occurrence and Support

The survey result about the experience on climate change by the community revealed that the HH experiencing climate change was during the last one year is reported by 68.88 percent of the HH out of 72829 households. In case of climatic hazards, 96.88 percent of the HH who have experienced climate change reported *drought* which is followed by experience on extreme high temperature (92.39%), *flood hazard* (87.59%), *hail storm* (32.88%), and *extreme frost* (14.35%).

**Table 3.1: Experience on different kinds of climatic hazards (extreme events) during last one year**

Experiencing climate change	HH	
	No.	%
Climate change	50167	68.88
<b>Experiencing Climatic Hazards</b>		
Hail Storm	16329	32.88
Extreme high temperature	45882	92.39
Extreme cold	6344	12.77
Extreme Frost	7125	14.35
Floods	43497	87.59
Drought	48109	96.88
Others	1953	3.93
<b>Total</b>	<b>49661</b>	<b>100.00</b>

Source: Annex Table 69 and 70 (Note: Total of the percentage will not match with 100 as it is multiple answers)

At the time of occurrence of hazards, it is natural and obvious to seek support from the government as well as from the NGOs/INGO. In this regard, out of 31158 households who got support, 80.93 percent reporting family support as main support followed by 70.56 percent who reported support from own savings. Support from either own assets or from government was reported by 42.41 and 18.83 percent of the households.

**Table 3.2: Households reporting support from different agencies during climatic hazards**

Agencies	HH	
	No.	%
Government support	5869	18.83
Family support	25216	80.93
INGO	3272	10.50
Saving	21986	70.56
Asset	13215	42.41

Friend/relative	7895	25.34
Others	-	-
<b>Total</b>	<b>31158</b>	<b>100.00</b>

Source: Annex Table 71

At the time of occurrence of hazards, it is the responsibility of the people to protect their life and their goods, agricultural crops, livestock etc. provided that if the people have knowledge and experience about the reduction of hazard due to climate change. All of the households reported taking measures to protect their lives at the time of occurrence of hazards followed by 78.68 percent households who reported taking measures to protect their household goods.

**Table 3.3: Households taking measures to mitigate climatic hazards**

Measures	HH	
	No.	%
Protect lives	36099	100.00
Protect household goods	28404	78.68
Protect agriculture	20277	56.17
Protect livestock	21596	59.82
Protect others	538	1.49
<b>Total</b>	<b>36099</b>	<b>100.00</b>

Source: Annex Table 72

## 4.2 Experience on different types Climatic Extremes in different Seasons

During last 15 years, 85.95 percent of the households reported experiencing change in climate.

**Table 3.4: Households experiencing climate change in last 10 - 15 years**

Response	HH	
	No.	%
Yes	62599	85.95
No	10230	14.05
<b>Total</b>	<b>72829</b>	<b>100.00</b>

Source: Annex Table 73

Among HH who had experienced change in climate, 94.62, 31.38, and 48.09 percent of the HH reported low rainfall during dry, rainy, and winter season. Frequent floods and droughts were reported by 15.43 and 30.84 percent of the households in rainy season. Increased temperature was reported by 56.10, 31.73, and 20.57 percent households during dry, rainy and winter season while 12.51 reported more cold spells or foggy days during winter season. Frequent hail storm was reported by 11.58, 3.07, and 9.86 percent of the households during dry, rainy, and winter season.

**Table 3.5: HH experiencing different types of climatic extremes (%)**

Types of Climatic Extreme	Dry Season (Jan-April)		Rainy Season (May-August)		Winter Season (September-December)	
	No.	%	No.	%	No.	%
Less overall rainfall	59234	94.62	19642	31.38	30102	48.09
More overall rainfall	2354	3.76	59234	94.62	4729	7.55
More frequent drought	56025	89.50	19304	30.84	31760	50.74
More frequent flood	4222	6.74	9658	15.43	1383	2.21
Strong wind	10228	16.34	4222	6.74	1583	2.53
More cold spells or foggy days	8677	13.86	844	1.35	7832	12.51
Higher temperature	35116	56.10	19865	31.73	12877	20.57
Frequent hailstorm	7251	11.58	1921	3.07	6175	9.86
Lower ground water table	28319	45.24	1013	1.62	7114	11.36

<b>Total</b>	<b>n=62599</b>
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Source: Annex Table 74 (Note: Total of the percentage will not match with 100 as it is multiple answers)

### 4.3 Early Warning Messages

Though there are some services of early warning messages through various organizations, these messages were not being implemented by the community as they have less capacity to cope with disaster. They are more dependent on natural on natural resources for their livelihoods. In this regards, the survey result shows that the awareness on early warning message about climate/weather hazards were reported by only 13.71 percent of the households in the district.

**Table 3.6: Households reporting receipt of early warning messages**

Response	HH	
	No.	%
Yes	9985	13.71
No	62843	86.29
<b>Total</b>	<b>72828</b>	<b>100.00</b>

Source: Annex Table 75

Among various sources of early warning messages, majority of HHs (92.972%) have reported about the early warning was received from Radio/TV followed by bulletin/newspaper (60.70%), siren (29.09%) and telephone (21.73%).

**Table 3.7: Households reporting receipt of early warning from different sources**

Sources	HH	
	No.	%
Telephone	2090	21.73
Radio/TV	8940	92.97
Siren	2797	29.09
Colorful flag	844	8.78
Hand mike	507	5.27
Bulletin/newspaper	5837	60.70
Others	169	1.76
<b>Total</b>	<b>9616</b>	<b>100.00</b>

Source: Annex Table 76

#### 4.3.1 Perception about the Need of Types of Communication Media for Early Warning

Communication plays an important role for the development of any region or place. When asked about the early warning system from various communication media, 85.48 percent of HH preferred FM Radio/TV, SMS on mobile (76.42%), and digital display board (60.44%) and siren (55.12%) as medium for delivery of early information. Likewise telephone and internet are preferred by 36.39 and 11.02 percent of the households respectively.

**Table 3.8: Households (%) selecting suitable EWS and agricultural information medium**

Medium for delivery of Early information	HH	
	No.	%
Telephone	26060	36.39
SMS on mobile	54728	76.42
Siren	39475	55.12
FM Radio/TV	61218	85.48
Newspaper	34672	48.41
Digital display board	43286	60.44
Internet	8022	11.20

Others	707	0.99
<b>Total</b>	<b>71615</b>	<b>100.00</b>

Source: Annex Table 77

When asked about the location for fixing the digital display board, DADO/DLSO offices was given the highest priority for placing the digital display board by 32.90 percent of the households followed by agro-vet (28.86%) , and VDC/DDC offices (18.79%).

**Table 3.9: Priority of location suitable for Digital Display Board**

Location	HH	
	No.	%
DADO/DLSO offices	23840	32.90
Agriculture/Livestock Sub Center	8636	11.92
VDC/DDC offices	13617	18.79
Markets	5458	7.53
Agro Vet	20909	28.86
Other place	-	-
<b>Total</b>	<b>72460</b>	<b>100.00</b>

Source: Annex Table 78

### 4.3.2 Accessibility to Agricultural Advice and Sources

There are various sources of agro and agro-met advisory service providers in the district such as District Agriculture Development Office (DADO), Livestock Service Centre (LSC), Agricultural Research Farm, NGOs/INGOs, and Agro Vets etc. in the district. However, the survey result shows that only 0.74 percent of the HH are found to have received agro advisory service during the last 12 months, which can be counted in the finger. A total of 200 households reported DADO as source of agro advisories (Annex Table 79 and 80).

### 4.3.3 Need for Agro Advisory

At present thought overwhelming majority of the respondents are found to have not taken advisory, they were interested to have advice from the service providers. In this regards, 97.87 percent of the HH have preferred mobile service, 73.61 percent toll free, and 64.26 percent digital display board.

**Table 3.10: HH preferring advisory services by type**

Types of advisory	HH	
	No.	%
Mobile service	69926	97.87
Telephone	22355	31.29
Newspaper/Bulletin	34641	48.48
Toll free	52595	73.61
Internet service	8391	11.74
Digital display board	45914	64.26
Others	844	1.18
<b>Total</b>	<b>71446</b>	<b>100.00</b>

Source: Annex Table 81

### 4.3.4 Communication and Media for Agricultural Program

For the development of any region or place communication plays an important role. There are number of communication media such as FM radio, television, newspaper etc., through which agriculture

programmes are being broadcasted in order to make farmers aware of adopting farming system and disseminating information on pre-warning of climate and weather. However, from the survey it is observed that the percentage of HH listening agriculture programme on radio is found to be 3.61 percent of the households regularly listened. Only 5.65 percent of the household reported watching agricultural program in television and 13.74 percent of the HH read newspapers and magazines. (Annex Tables 82,.83, and 84)



**Annex 1****Average Maximum and Minimum Temperature and Rainfall, Surkhet**

<b>Month</b>	<b>Maximum Temperature ( °C)</b>	<b>Minimum Temperature ( °C)</b>	<b>Rainfall (mm)</b>	<b>No. of Rainy days</b>
January	21.6	6.9	44.8	4
February	24.7	8.7	39.7	3
March	29.6	12.1	23.8	1
April	35.5	16.6	4.70	1
May	38.1	22.6	18.8	4
June	36.2	25.7	303.4	9
July	34.0	25.7	474.9	22
August	33.4	25.2	859.8	24
September	32.8	23.8	431.2	15
October	32.0	19.2	166.5	4
November	27.9	11.4	-	-
December	24.2	7.50	-	-