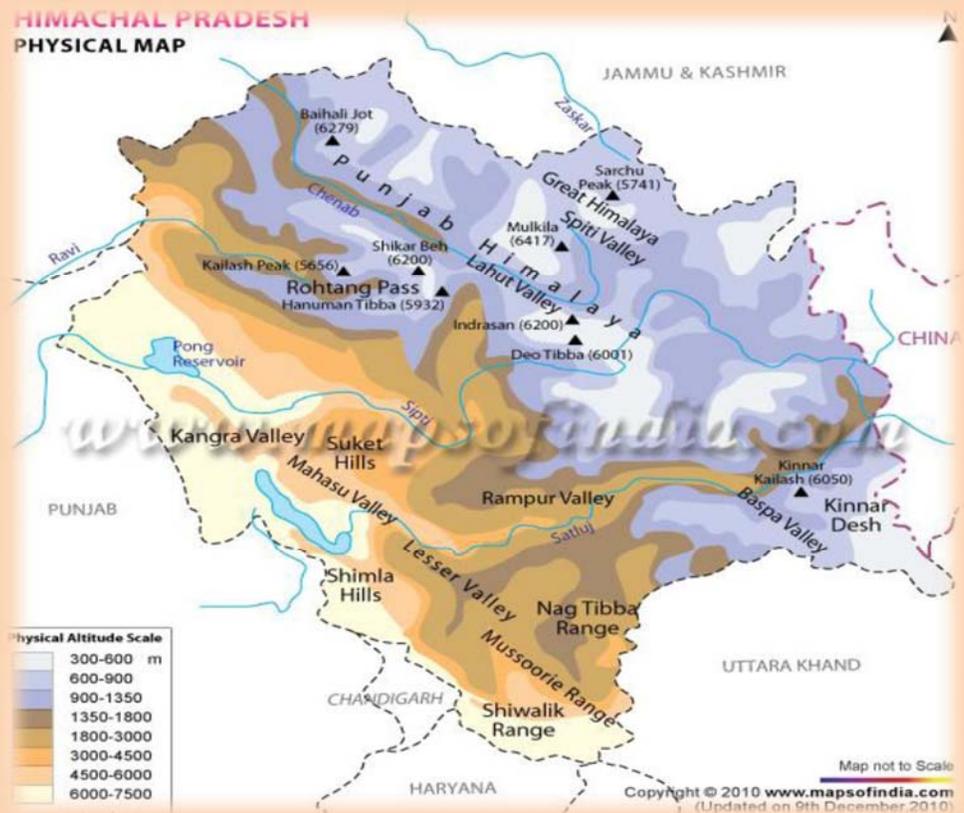




2012

Baseline Survey on Assessment of Existing Knowledge Level, Awareness and Preventive Practices of Disaster Management in Himachal Pradesh  
Draft Report



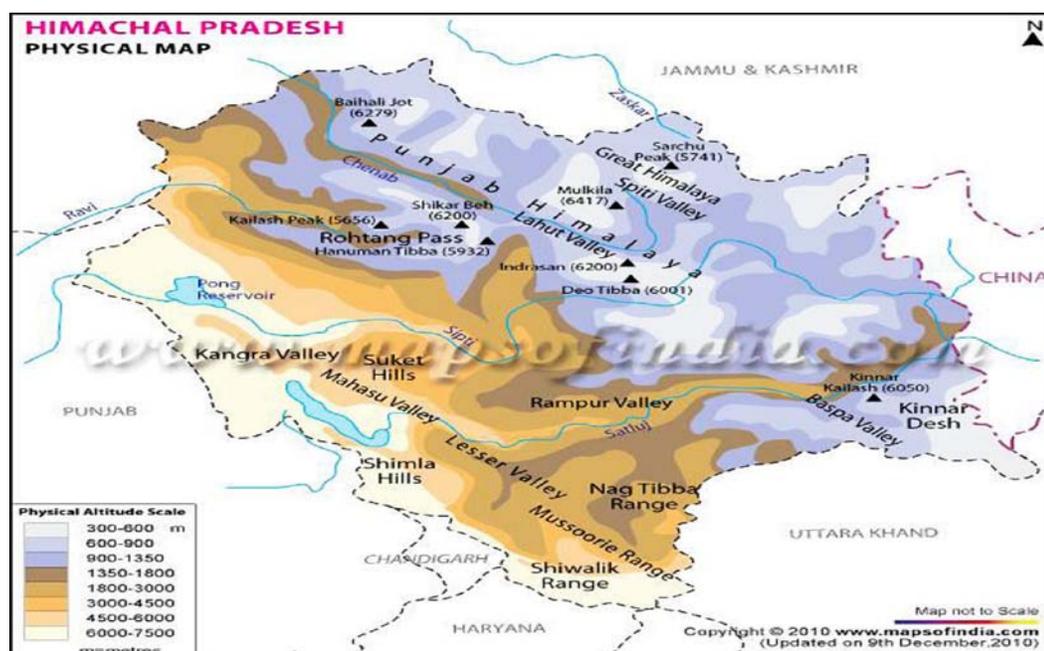
**Department of Economics & Statistics  
Government of Himachal Pradesh**







## *Baseline Survey on Assessment of Existing Knowledge Level, Awareness and Preventive Practices of Disaster Management in Himachal Pradesh*



**Economics & Statistics Department  
Himachal Pradesh**

# CONTENTS

SR.NO.	CHAPTER	PP
	Preface	
	Executive Summary	i-vii
<b>1</b>	<b>Introduction</b>	<b>1-10</b>
1.1	Background	1-2
1.2	Basic Demographic profile of Himachal Pradesh	3-7
1.3	Hazard Profile of the State	8-10
<b>2</b>	<b>Research Methodology</b>	<b>11-18</b>
2.1	Need and Scope	12
2.2	Objective of Study	13
2.3	Methodology	13-14
2.4	Research approach & research design	14
2.5	Coverage/Sample design	15
2.6	Sample and Sampling Technique	18
	Situation Analysis	19-196
<b>3</b>	<b>General Population</b>	
<b>3.1</b>	<b>Profile of Respondents</b>	<b>19-24</b>
3.1.1	<i>Socio-economic and demographic Profile of the respondents</i>	19
3.1.2	<i>Sex wise distribution of Sample respondents</i>	19
3.1.3	<i>Age wise distribution of Sample respondents</i>	20
3.1.4	<i>Marital Status wise distribution of Sample respondents</i>	21
3.1.5	<i>Religion wise distribution of Sample respondents</i>	21
3.1.6	<i>Educational Level wise distribution of Sample respondents</i>	22
<b>3.2</b>	<b>Knowledge / Awareness/ Practice of Respondents</b>	<b>29-88</b>
3.2.1	<i>Awareness/attitude regarding Disasters</i>	24-44
3.2.2	<i>Awareness regarding disaster management plan</i>	45-59
3.2.3	<i>Training</i>	59-68
<b>4</b>	<b>Rural Population</b>	<b>69-103</b>
<b>4.1</b>	<b>Profile of Respondents</b>	<b>69-73</b>
4.1.1	<i>Socio-economic and demographic Profile of the respondents</i>	69
4.1.2	<i>Sex wise distribution of Sample respondents</i>	69
4.1.3	<i>Age wise distribution of Sample respondents</i>	70
4.1.4	<i>Marital Status wise distribution of Sample respondents</i>	71
4.1.5	<i>Religion wise distribution of Sample respondents</i>	72
4.1.6	<i>Educational Level wise distribution of Sample respondents</i>	72
4.1.7	<i>Social Status wise distribution of Sample respondents</i>	73

SR.NO.	CHAPTER	PP
<b>4.2</b>	<b>Knowledge/ Awareness/ Practices of Respondents</b>	<b>74-103</b>
4.2.1	Attitude regarding Disasters	74-103
<b>5.</b>	<b>District Administration</b>	<b>104-128</b>
5.1	District Disaster Management Authority (DDMA)	104
5.2	Local Authorities	105
5.3	Awarenes	106-113
5.4	Preparedness of District Administration	114-125
5.5	Social Obligations of DM	126
5.6	Role of line departments on DM	127-128
<b>6</b>	<b>Engineers &amp; Architects</b>	<b>129-155</b>
6.1	Housing Vulnerability	<b>129</b>
6.2	House types and Risk	131-133
6.3	Knowledge Awareness	133-155
<b>7</b>	<b>School Safety</b>	<b>156-172</b>
7.1	Awareness regarding School Safety	157
7.2	Meaning of School safety	157-158
7.3	Importance of School Safety	159-160
7.4	Responsibility of School Safety	161
7.5	Steps taken for school safety	162
7.6	Inclusion in School Syllabus	163
7.7	Increase in the content of disaster management in school syllabus	164
7.8	Opinion about the vulnerable part of school Building	165
7.9	Assurances of School Safety during the disaster	166
7.10	Requirement of training on disaster management	167-168
7.11	Ranking of the vulnerability of school	169
7.12	Mechanism of contacting parents/ guardians in emergency	170
7.13	Integration of disaster issues in regular subjects like Geography, History, Language and Science	171
7.14	Social value of school disaster management plan	172
<b>8</b>	<b>Medical Professionals</b>	<b>173-196</b>
8.1	Duties of a doctor in a mass casualty situation	174
8.2	Definition of Triage	175
8.3	Action of Physicians	176
8.4	Bioterrorism Attack	177
8.5	Most common initial response during any disaster	178
8.6	Methods for preservation of dead bodies	179
8.7	Primary Methods used for identification of dead bodies	180
8.8	Aim for Hospital disaster management plan	181

SR.NO.	CHAPTER	PP
8.9	Requirements of a referral-level facility for comprehensive emergency obstetric care	182
8.10	Requirement for infection control	183
8.11	Leadership of Hospital disaster management plan	184
8.12	Cases for which Post-exposure Prophylaxis is administered	185-186
8.13	Ranking of the Hazards in relation to health services	187
8.14	Whether Hospital is adequately equipped and prepared to face the hazards	188
8.15	Training of the medical professional	188
8.16	Vulnerable part of hospital	189
8.17	Networking of hospital for referral services	190
8.18	Bed capacity of hospital in case of emergencies:	191-192
8.19	Emergency plan in hospitals	193
8.20	Trauma management Plan	194
8.21	Managing Post Trauma Stress Disorder	194
8.22	Standard Operating Procedures (SOPs) for operationalize DM plan	195
8.23	Training on Disaster management plan	195
	<b>Abbreviations</b>	
	Glossary of terms	
	<b>Annexures (Questionnaires)</b>	<b>I-LVIII</b>
	<b>1) Urban</b>	I-XIV
	<b>2) Rural</b>	XV-XXVII
	<b>3) District Administration</b>	XXIX-XXXVI
	<b>4) Engineers &amp; Architects</b>	XXXVII-XLIII
	<b>5) School Safety</b>	XLIV-L
	<b>6) Medical Professionals</b>	LI-LVIII



## **PREFACE**

The prevention of loss to life and property due to natural calamities is being viewed very seriously by the Government of Himachal Pradesh. In the past the main role played by the Government in the case of various disasters was confined mainly to post-disaster activities that included providing relief and organizing rehabilitation.

The implementation of Disaster Management Plans are crucial from the point of view of show-casing Himachal's achievements and successes in putting in place an appropriate institutional, policy and legal framework for Disaster Management, risk identification, assessment, monitoring and early warning, knowledge management, innovation and education for building a culture of safety and resilience, reducing the underlying risk factors for minimization of vulnerabilities and preparedness for effective response.

The Disaster management Plan on disaster reduction is going to be a watershed event at the state level and is likely to significantly influence and determine the course of thinking, strategization and action for ensuing disaster preparedness. Himachal Pradesh needs to position itself prominently to take full advantage from the scheme of things likely to emerge from this.

The findings of this report addresses to evaluate the data gaps in preparedness and awareness level of the stakeholders to meet the challenges posed in managing pre and post disasters and provide information to strengthen the capacity and capability of various organizations of the state

government and other stakeholders entrusted with the responsibility of implementing Disaster Management Plan.

We express our deep gratitude to all agencies for their co-operation and assistance in providing the required data and supported our efforts to bring out the publication in its present form. We hope to continue to get the same support of all the agencies in the future too. Comments and suggestions towards improving future reports would be greatly appreciated.

*Pradeep Chauhan  
Economic Adviser*

*Shimla*

*December, 2012*

## Executive Summary

---

Disasters disrupt progress and destroy the hard-earned fruits of painstaking developmental effort, often pushing nations, in quest for progress, back by several decades. Thus, efficient management of disasters, rather than mere response to their occurrence, has in recent times received increased attention both within India and abroad. This is as much a result of the recognition of the increasing frequency and intensity of disasters, as it is an acknowledgement that good governance in a caring and civilized society, needs to deal efficiently with the devastating impact of disaster.

Seismically, the State lies in the great Alpine- Himalayan seismic belt running from Alps mountains through Yugoslavia, Turkey, Iran, Afghanistan, Pakistan, India, Nepal, Bhutan and Burma. The State has not only been shaken by earthquake occurring in its territory but also in the neighbouring areas of J&K in the North, Tibet in the East and Uttrakhand hills in the South East. A number of damaging earthquakes have occurred in the HP territory during 20th century for which information is well recorded. Information about earthquake occurrence before the famous 1905 Kangra earthquake is not, however, available and is a matter of research through historical and archival records. Large earthquakes have occurred in all parts of Himachal Pradesh, the biggest being the Kangra Earthquake of 1905. There were two more big quakes, but they were not nearly as powerful as the 1905 jolt. The first was in 1906, a 6.4 near Kullu and the second was a 6.8 in Lahaul-Kinnaur Spiti in 1975 along the Indo-China Border. There are 250 earthquakes of Magnitude 4.0 and more including more than 60 with Magnitude 5.0 or more, which have rocked the state of HP and adjoining areas of J&K or Uttrakhand in the last about 90 years.

State of Himachal is prone to various hazards both natural and manmade. Main hazards consist of earthquakes, landslides, flash floods, snow storms and avalanches, draughts, dam failures, fires - domestic and wild, accidents - road, rail, air, stampedes, boat capsizing, biological,

industrial and hazardous chemicals etc. The hazard which however, poses biggest threat to the State is the earthquake hazard. The State has been shaken by more than 80 times by earthquakes having a magnitude of 4 and above on the Richter scale as per the recorded history of earthquakes. As per the BIS seismic zoning map five districts of the State, namely Chamba (53.2%) Hamirpur (90.9%), Kangra (98.6%), Kullu (53.1%), Mandi (97.4%) have 53 to 98.6 per cent of their area liable to the severest design intensity of MSK IX or more, the remaining area of these districts being liable to the next severe intensity VIII. Two districts, Bilaspur (25.3%) and Una (37.0%) also have substantial area in MSK IX and rest in MSK VIII. The remaining districts also are liable to intensity VIII

On 23rd December, 2005, the Government of India took a defining step by enacting the Disaster Management Act, 2005, which envisaged creation of the National Disaster Management Authority (NDMA) headed by the Prime Minister, State Disaster Management Authorities (SDMA) headed by the Chief Ministers, and District Disaster Management Authorities (DDMA) headed by the District Magistrates or Deputy Commissioners as the case may be, to spearhead and adopt a holistic and integrated approach to disaster management (DM). There will be a paradigm shift, from the erstwhile relief-centric response to a proactive prevention, mitigation and preparedness-driven approach for conserving development gains and to minimize loss of life, livelihood and property.

The Present study on *on Assessment of Existing Knowledge Level, Awareness and Preventive Practices of Disaster Management in Himachal Pradesh* is carried out to assess the Awareness regarding Definition and kind of disasters possible in the state, ascertaining the current status of awareness and preparedness, Delineation of major gaps requiring attention at different levels and specifically w.r.t. improving knowledge aptitude and awareness and identification of training needs for all stakeholders at all levels which could serve as education diagnosis and form a basis for developing and tailoring training modules for addressing the identified gaps.

Given this context, appropriate and suitable methodology in terms of quantitative and qualitative (IDIS, FGD and other techniques) methods was applied. The baseline survey of KAP instrument was developed in English and Hindi, The written questions were composed in a brief, simple language to avoid problems of formality. The research teams of trained survey researchers were especially sensitive to the need to avoid “translating,” or elaborating on the written questions, during dealing with illiterate respondents.

The present study was based on intensive fieldwork approach. The data collection was carried out in two phases. In the first phase, secondary data was collected that facilitated finalization of the sample population (i.e. Rural, Urban, district administration, medical professionals, engineers & architect and schools) In the second and final phase, primary data was collected from all stakeholders i.e. (i.e. Rural, Urban, district administration, medical professionals, engineers & architect and schools. Primary data was collected using structured questionnaires for different stakeholders. Quantitative data has been analyzed by using SPSS software.

The opinions and observations of all stakeholders i.e. Rural, Urban, district administration, medical professionals, engineers & architect and schools reflects that Disaster Management plan will play an important part in handling pre and post disaster both natural and manmade.

- ❖ Out of total respondents 98.01 per cent of the population canvassed were aware of the term disaster, while only 1.98% said that they were not aware of the term disaster.
- ❖ 90 per cent of the respondents have claimed to have faced, seen or heard about any disaster

- ❖ 92 per cent of the sample population have read/heard/watched any disaster management program in newspapers/magazines/radio/television
- ❖ 79 per cent of the general population revealed that disaster management is a topic discussed among the family members
- ❖ About 49 per cent of the sample population considers Himachal Pradesh to be very sensitive to earthquakes since it lies in zone 4 & 5
- ❖ Seventy per cent of the sample population is not aware of any early warning system
- ❖ 92 per cent of the sample population has not received any kind of information on early warning related to disasters
- ❖ The state is prepared to handle accidents, fires and landslides while it is least prepared to handle chemical hazards
- ❖ Fifty one per cent of the sample population has adequate knowledge about earthquake hazards
- ❖ Fifty three per cent of the sample population has adequate knowledge about fire hazards
- ❖ Only fifty four per cent of the respondents do not know how to operate the fire equipment's
- ❖ Only eleven per cent of the sample population has adequate knowledge about flash floods
- ❖ Only thirty nine per cent of the sample population has adequate knowledge about accidents

- ❖ 84 per cent of the general population were not aware of any disaster management plan prepared by any body
- ❖ 71 per cent of the general population are not aware about disaster management Act
- ❖ 69 per cent of the general population are not aware about Disaster management authority.
- ❖ To delegate the disaster management procedure to lower level staff member, 51 per cent said yes while 49 per cent felt that Disaster management procedure should never be delegated to lower level staff members
- ❖ It was found that only 14 per cent of the respondents have resource list ready, 86 per cent of the respondents admitted that they don't have any resource list ready.
- ❖ Responses were recorded on a hypothetical question if any natural disaster occurring right now do the respondents have the statistics of their village /panchayat/ block/tehsil/ district like the number of HHS/ population/livestock/infrastructure etc. with them, as many as 75 per cent of the respondents revealed that they don't have such type of ready information, only 25 per cent of the respondents said yes they have statistics/information regarding their village/panchayat/ block/tehsil/district about the number of HHS/ population/livestock/infrastructure etc.
- ❖ It has often been debated that who are most vulnerable in natural disaster. Thirteen per cent of the respondents opined that disabled persons are most vulnerable in natural disasters, 12 per cent stated children, 5 per cent stated livestock, 6 per cent state poor people, and 5 per cent stated that women are most vulnerable during natural disasters.

- ❖ Education has been voted to be the best way to protect from the disaster, as 83 per cent reported that education/training is the best way to protect vulnerable section of the society from natural disasters, 15 per cent revealed that capacity building is the way to protect vulnerable section of the society from natural disasters.
- ❖ The results showed that only 31 per cent of the respondents were aware of National Disaster Management Authority, 69 per cent of the respondents were not aware about this Act.
- ❖ Only 13 per cent of the respondents were aware about India Disaster Resource Network and for 87 per cent of the respondents IDRN is unknown.
- ❖ It is found that more than seventy per cent of the sample population (i.e. 77 per cent) is not aware of any Agency/Authority responsible for disaster management in Himachal Pradesh, only 23 per cent were aware regarding institution responsible for disaster management in Himachal Pradesh
- ❖ The popular opinion among the respondents is that buildings are not being constructed according to the building codes with about 83 per cent of them voting against it
- ❖ 91 per cent of the general population were not aware at all about the concept of retrofitting, none of them even seemed to have heard about this concept
- ❖ The respondents were also asked about the relationship between disaster and development. Around 72 per cent of the sample population said that there is strong relationship between disaster and development, and developmental choices has greater impact on disasters, while 20 per cent have no knowledge about the relation of

disaster and development, rest have denied the existence of a relationship between disaster and development

- ❖ 71 per cent of the sample population has revealed that Disaster can turn the development clock backward, 22 per cent of the respondents feel that disasters diverts the development funds for relief operations, 5 per cent stated that disasters bring more funds for development, 3 per cent thought that disasters are generally local phenomenon and don't do much harm
- ❖ 83 per cent of the general sample population has not received any kind of training to deal with disaster
- ❖ 86 per cent of the sample population revealed that they have never taken part in any sort of mock drill
- ❖ The results showed that a majority of 12 per cent of the rural population canvassed believe that the hazards which poses biggest threat to the/state is earthquake, closely followed by 11 per cent who believe that road accidents, monkey menace and cloud bursts are hazards threat they are facing, 9 per cent believe that fire and draught are the biggest threat while 8 per cent each believe that landslides, lightening, hail Storms are the biggest hazards threat.
- ❖ The perception of the rural respondents is that earthquake poses the biggest threat to the state.
- ❖ Sample rural population has pointed out that deforestation is a major reason for disaster and ranked it first. It is interesting to note that a lot of the respondents believe wrath of gods and lack of faith in god contributes to be cause of disasters and ranked it second. Setting of the power projects in the state seems to have contributed the least to disasters and was ranked 13<sup>th</sup>.
- ❖ Only 21 per cent of the rural sample population are aware of seismic zones.

- ❖ To assess the awareness level the respondents regarding the earthquake zones India . Only 20 per cent of the sample population could give the correct answer.
- ❖ In case of emergency whom you will contact, 71 per cent of the sample population said they would call number 108 which connects directly to ambulance services. 19 per cent revealed that they would call 100 which is directly connected to the police emergency room, and 2 per cent preferred that they would call 1077 i.e. district control room
- ❖ 79 per cent of the sample population have never been trained only 21 per cent of the sample population ever discussed this or have been trained for this.
- ❖ Twenty eight per cent of the rural population still believes that religious rites and rituals can be of help to reduce the effect of disasters while 25 per cent of them are not sure. 47 per cent have clearly stated that they do not believe that religious rite and rituals can be of any help to cope with disasters.
- ❖ Most of the rural population believes that the whole society is affected by disasters, but out of the options economically weaker persons in the society & female and children are considered to be affected most by any disaster.
- ❖ Most of the rural population (78 per cent) was not aware about any kind of NGO working for relief works during disasters.
- ❖ Nearly 53 per cent of the respondents feel that disasters occurs suddenly, therefore it is highly necessary to prepare a disaster management plan.

- ❖ 29 per cent each of the respondents stated that they themselves along with head mistry (mason & carpenter) would decide on the design of the house.
- ❖ 23 per cent of the rural population opined that available medical facilities are absolutely not capable of dealing with disasters in their villages.
- ❖ Twenty eight per cent of the rural population still believes that religious rites and rituals can be of help to reduce the effect of disasters.
- ❖ 29 per cent of the rural population believe that destruction caused by monkey is the most prominent form of disasters as compared to other disasters in the rural areas of Himachal Pradesh
- ❖ Eighty three per cent of the officers of district administration were aware of disaster management setup in their districts while surprisingly 19 per cent of the officers were not aware of this.
- ❖ 52 per cent of the officers of district administration felt that the existing setup of disaster management is somewhat adequate but requires strengthening while 22 per cent felt that the present setup was adequate. 16 per cent of the respondents felt that the present setup is highly inadequate and requires a lot of strengthening while 9 per cent of the respondents felt that the present setup was totally inadequate and requires total change
- ❖ Only 40 per cent officers of district administration stated that they have prepared an inventory of resources available within their district that can be deployed at the time of crisis
- ❖ 80 per cent of the officers of district administration are not aware of the existence of Regional Response Centre for dealing with disasters which are located in Himachal and her neighbourhood

- ❖ Since a uniform plan needs to be formulated in tackling disasters it was asked as to who should prepare disaster management plan for your district. A majority of 43 per cent of the respondents wanted The State Disaster Management Authority to prepare disaster management plan for their district while 23 per cent wanted the district administration with technical assistance of an expert to prepare the DM plan for their district. 15 per cent wanted that the district administration should make the DM plan by involving all stakeholders while 10 per cent wanted that some technical institution of the Government should make DM plan
- ❖ 23 per cent respondents opined that IMD is responsible for weather hazards and forecasts, 16 per cent believe that Power project authorities are responsible for river basins, 15 per cent thought that SASE is responsible for avalanches, 14 per cent opined that CWC is responsible for floods and 11 per cent believe that IPH is responsible for issuing early warning for GLOF and snow storms
- ❖ **Unfortunately only half the district administrators were familiar with the modalities of requisitioning assistance from Armed Forces.**
- ❖ The district administrators have given a mandate that PRI should be given a proactive role in DM. 39 per cent of the respondents were of the opinion that the community kitchen, damage assessment and identification of beneficiaries should be handled by panchayats. 26 per cent of the respondents wanted that identification of the beneficiaries should be handled by panchayats while 23 per cent of the respondents wanted to panchayats to handle community kitchen
- ❖ 33 per cent of the respondents felt that DRR can be integrated in construction while 32 per cent felt that DRR should be integrated in education. Similarly 21 per cent believed that DRR can be integrated in the on-going poverty alleviation programmes and 14 felt that DRR

needs to be addressed separately and can't be integrated into existing schemes, programmes and education

- ❖ 57 per cent of the respondents felt that all Line Departments in the district should prepare their own DM plans while 43 per cent were of the opinion that there should only be district disaster management plan
- ❖ Sixty six per cent respondents stated that all are responsible for school safety, 22 per cent respondent stated that District administration and school administration are responsible for school safety, 5 per cent respondent stated that society is responsible for school safety, 4 per cent students and 3 per cent teachers responsible for school safety
- ❖ In order to assess awareness level of the target group in inclusion of disaster management plan in school syllabus at various levels, 45 per cent respondents stated that it should be included at higher secondary level, 32 per cent respondents stated that disaster management it should be included at Senior Secondary Level, 20 per cent respondents stated that it should be included in Middle Standard Level, 3 per cent respondents stated that it should be included in Primary Standard Level
- ❖ Regular conduct of mock drills was ranked 1<sup>st</sup>, followed by awareness raising, the 3<sup>rd</sup> spot was for preparation of emergency.
- ❖ In order to assess the mechanism of contacting parents/guardians in case of emergency, 37 per cent of the respondents felt that they have a mechanism to inform district administration, 28 per cent stated that they have prepared the directories of contact numbers, 16 per cent stated that they would only be able to intimate SMC and PTA, 12 per cent stated that they would be only able to intimate the local panchayats.

- ❖ While enquiring from the medical professional about the duties of a doctor in mass causality situation, 19 per cent of medical professional stated that firstly they will treat the victims, Secondly they will assess the disability of the victims 15 per cent, 14per cent stated that they dispose off the dead bodies, 11 per cent medical professional stated that they certify the cause of death, 11 per cent medical professional stated they preserve the evidences, 11 per cent medical professional stated they record chronology of the events, 10 per cent medical professional stated they preserve the records, and 9 per cent medical professional stated they will conduct the post mortem examination
  
- ❖ To know about the concept of “*bioterrorism attack*”, a majority of 82 per cent rightly felt that the “deliberately release of viruses, bacteria, or other germs (agents) used to cause illness or death in people and animals”, 9 per cent stated that attack launched by terrorist using ammunition made from ingredients derived from biological agents and herbs, 4 per cent stated that attack made by using explosive and ammunitions, 4 per cent stated that weapons based on bio-fuels
  
- ❖ In a disaster situation medical professional play a very important role, to assess their preparedness 29 per cent stated that their initial response would be fear, 17 per cent of medical professional stated that their initial response would be to helpfulness to other disasters victims, 14 per cent medical professional feel that difficulty in making decision about the disaster, 12 per cent stated the need for information about the disaster, 11 per cent medical professional stated that seeking help for yourself and your family, 9 per cent stated that they feel disorientation & numbing, 5per cent stated that reluctance to abandon property, 2 per cent medical professional feel disbelief during disaster

- ❖ 32 per cent of the medical professional stated that providing prompt and effective medical care to maximum possible victims is the aim of the hospital disaster management plan, 30 per cent stated that minimizing morbidity and mortality resulting from the mass causality incident, 21 per cent stated that soliciting help from outside in a optimal way, 9 per cent addressing only mass casualties which may result from mass causality incident that has occurred away from hospital, 9 per cent Medical professional addressing structurally vulnerable element of hospital
- ❖ 22 per cent stated that head of the hospital should be head of hospital disaster management plan, 17 per cent Stated that Chief Nursing Superintendent/matron , 16 per cent stated that Chief of the security of hospital, 19 per cent stated that sanitation server should head the hospital disaster management plan, 10 per cent stated that hospital union should be head of the Hospital disaster management plan, 9 per cent stated that finance officer of the hospital should be head of the hospital disaster management plan, 8 per cent stated that hospital kitchen / dietary server should be head of the hospital disaster management plan
- ❖ *67 per cent of the medical professional unfortunately stated that they are not prepared and are inadequately equipped to face any sort of disasters.*
- ❖ Bed capacity in hospital should be increased in case of emergencies, on the whole 52 per cent stated that all the above situations bed capacity of the hospital should be increased, 15 per cent stated that bed capacity can be increased in emergency by Discharge the elective cases, 14 per cent stated that bed capacity can be increased in not admitting non-emergency patients, 11 per cent stated that bed capacity can be increased by converting waiting/non-patient areas into makeshift words, 8 per cent stated that bed capacity can be increased by discharging stable recovering patients

- ❖ 32 per cent medical professional stated that reception and triage area can be prepared for hospital emergency plan, 25 per cent medical professional, 17 per cent medical professional stated that mortuary area we can prepared hospital emergency plan, 15 per cent medical professional stated that decontamination area can be prepared for hospital emergency plan, 11 per cent medical professional stated that areas for holding media briefings can also be prepared hospital emergency plan
  
- ❖ For the standard operating procedure to operationalize DM plan of institution, the 44 per cent of medical professionals stated that they are unaware about the standard operating procedure, 38 per cent stated that they do not know about standard operating procedure, 18 per cent said yes for standard operating procedure to operationalize DM plan.

## Chapter-1 Introduction

---

### 1.1 Background

Natural and human Induced disaster have been causing unimaginable loss of life and property and damages to public and private infrastructure, eroding gains of hard earned development and resulting in mounting expenses on relief and rehabilitation. Natural disasters mainly consist of earthquakes, landslides, cyclones, etc. while manmade disaster are of the type of chemical/industrial disaster, nuclear disaster, accident related disasters, biological disasters etc. Human activities such as industrial development, economic development, deforestation and human settlements etc., are the main causes of rapid build-up of greenhouse gases which are leading to global warming and major changes in climatic conditions.

There are projections that disasters would be on the rise due to climate change, unplanned human settlements, unsafe building practices and other factors. Climate change causes geophysical effects such as more intense precipitation events; higher maximum temperatures, hot days/heat waves; higher minimum temperatures, fewer cold days/frost days/cold waves; increase summer drying and associated risk of drought etc. There is broad scientific consensus that more intense precipitation leads to increased flood, landslides, avalanche and mud slide damage, increased soil erosion, increased flood run off and increased recharge of floodplain aquifers. Higher maximum temperature caused by global warming results in accelerated sea level rises threatening many low lying islands and coastal zones. It also causes displacement of people and increased deaths and serious illness in older age groups and urban poor, increased heat stress in livestock and wild life, and increased risk of damage to a number of crops. Higher minimum temperature results in decreased CO<sub>2</sub>-related human morbidity and mortality. It also causes damage to a number of crops and extended range and activity of pests and disease vectors. Increased summer drying results in

decreased crop yields, decreased water resource quantity and quality and increased risk of forest fires. The geophysical effects of climate change individually and collectively result in increase in flood and drought, decreased agricultural productivity in drought and flood prone regions, increased risk to human life and risk of infectious diseases and epidemics, increased coastal erosion and damage to coastal buildings and infrastructure. Major health impacts of climate change can be changes in the pattern of vector borne viral diseases

All these developments have led to a paradigm shift in disaster management from one of post disaster relief and reconstruction to holistic management of disasters encompassing *pre-disasters prevention*, mitigation, preparedness, *on-disaster* response and *post disaster* relief, reconstruction and recovery. Globally this shift is reflected in the adoption of Yokohama Strategy of safer World in 1994 and Hyogo Framework of Action in 2005.

In India the shift is articulated in the development of National Disaster Management Framework and re enforced through the enactment of Disaster Management Act, constitution of National Disaster Management Authority and setting up of National Institute of Disaster Management .The holistic management of disasters requires analytical data on hazards, risks and vulnerabilities of different natural and human induced disasters at all levels. At present raw data on different aspects of disasters are collected by various agencies, but mostly these remain confined in newspapers reports or official files. Sometimes periodical bulletins and reports are published by some agencies, but there is no systems to collect, compile, validate and publish such data in one place on regular basis for the use of policy makers, analysts, disaster manager and other users. Therefore , a need has been felt for the development of a comprehensive national data base as well as state level data base on disasters which would facilitate formulation of area specific disasters risk profile ,assessment of long term impacts of disasters ,development of policies ,strategies and frameworks, preparation of proper planning for disasters preparedness and allocation of adequate funds for the prevention and mitigation of disasters etc.

## 1.2 Basic Demographic Profile of Himachal Pradesh

Before presenting the survey results, the basic demographic features of the state are presented here.

### 1.2.1 Historical Background:

Himachal Pradesh came into being on 15<sup>th</sup> April, 1948 as a centrally administered territory by the integration of 30 erstwhile princely States. At that time the State had four districts viz. Chamba, Mahasu, Mandi and Sirmaur and its area was 25,839 sq. kms.

Later in 1951, it became a part “C” State under a Governor with a 36 Member Legislative Assembly and a three member cabinet. In 1954, Bilaspur, another part ‘C’ State was merged with Himachal Pradesh thereby adding one more district with an area of 1,168 sq. kms. and the strength of its Assembly was raised to 41.

In 1956, despite the majority recommendations of the State Reorganisation Commission for its merger with Punjab, Himachal Pradesh retained its separate entity. On November 1, 1956 it again became a Union Territory under an Administrator designated as Lieutenant Governor and its Assembly was abolished. In 1960, a new border district of Kinnaur was carved out of Mahasu district. Then in 1963, Assembly was revived and a popular Ministry was formed. Till October, 1966 the old Himachal Pradesh comprised the six hill districts of Bilaspur, Chamba, Kinnaur, Mahasu, Mandi and Sirmaur with an area of 27,007 sq. kms. having a population of 13,51,144 persons(1951 Census).

On 1<sup>st</sup> November, 1966, it was enlarged by merging the district of Kangra, Shimla, Kullu, Lahaul-Spiti, the Nalagarh tehsil of Ambala district, some parts of Una tehsil of Hoshiarpur district and Dalhousie of Gurdaspur district of the then Punjab State. With this merger the total area of Himachal Pradesh increased to 55,673 sq. kms. and its population to 28,12,463(1961 Census). Now it comprised

the Districts of Bilaspur, Chamba, Kangra, Kinnaur, Kullu, Lahaul-Spiti, Mahasu, Mandi, Shimla and Sirmaur. On 25<sup>th</sup> January, 1971, Himachal Pradesh attained Statehood.

Reorganisation of the districts took place on 1<sup>st</sup> September, 1972 as a consequence whereof two more new districts namely Una and Hamirpur were created mainly as a result of trifurcation of the erstwhile Kangra district. Also from the then existing districts of Mahasu and Shimla, new districts of Shimla and Solan were formed by reorganising the boundaries of old districts.

### **1.2.2 Physical Features:**

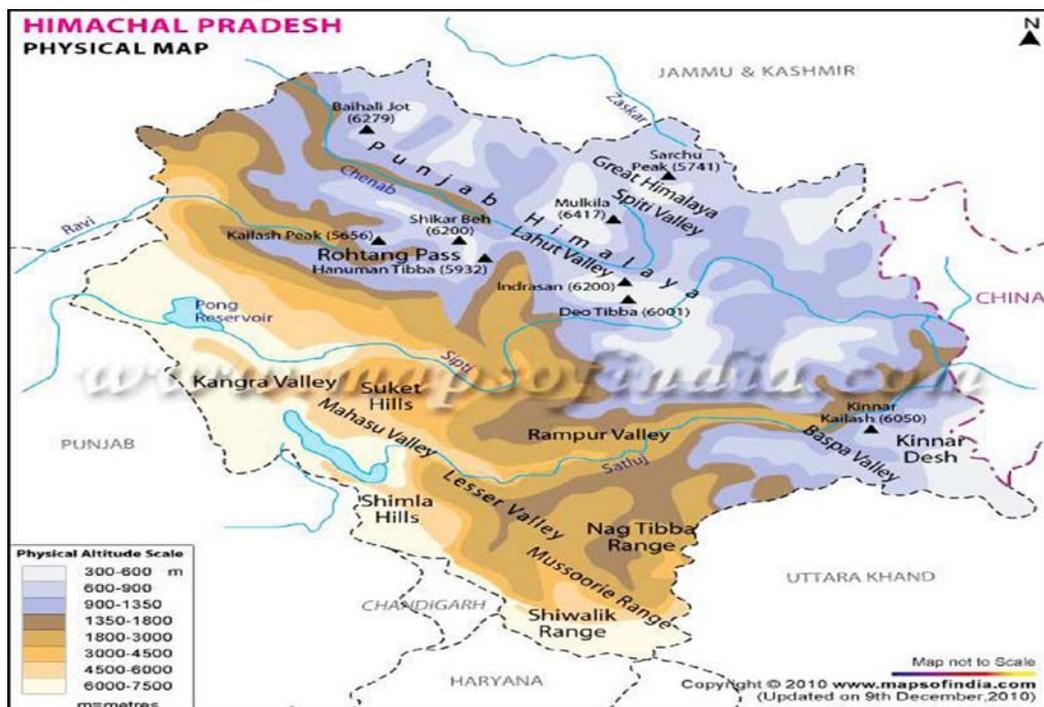
Himachal Pradesh is almost wholly mountainous with altitudes ranging from 350 metres to 6,975 metres above the mean sea level. Its location is between Latitude 30° 22'40" N to 33° 12'40" N and Longitude 75° 45'55"E to 79° 04'20" E. It has deeply dissected topography complex geological structure and a rich temperate flora in the sub-tropical latitudes. Physiographically, the State can be divided in to five zones-viz. (i) Wet Sub-temperate zone,(ii) humid sub-temperate zone, (iii) dry temperate-alpine high lands, (iv) humid sub-tropical zone, and(v) sub-humid sub-tropical zone.

Wet sub-temperate zone comprises Palampur and Dharamshala of Kangra district, Jogindernagar area of Mandi district and Dalhousie area of Chamba district, humid sub-temperate zone comprises the district of Kullu, Shimla, parts of Mandi, Solan, Chamba, Kangra and Sirmaur, Dry temperate-Alpine High lands include major parts of Lahaul-Spiti, Pnagi and Kinnaur, humid sub-tropical zone consists of Bilaspur, Bhattiyat valley of District Chamba, Nalagarh area of District Solan, Dehragopipur and Nurpur areas of district Kangra and sub-humid tropical zone comprises of District Una, Paonta-Sahib area of District Sirmaour, and Indora area of District Kangra.

Himachal Pradesh is situated in the Western Himalayas latitude 30o 22' 40" N to 33o 12' 40" N and longitude 75o 45' 55" E to 79o 04' 20" E covering an area of

55,673 kilometres Himachal Pradesh is a mountainous state with elevation ranging from about 350 metres (1,148 ft) to 6,000 metres (19,685 ft) above the sea level. The drainage system of Himachal is composed both of rivers and glaciers. Himalayan rivers criss-cross the entire mountain chain. In fact the rivers are older than the mountain system.

Himachal Pradesh provides water to both the Indus and Ganges basins. The drainage systems of the region are the Chandra Bhaga or the Chenab, the Ravi, the Beas, the Sutlej and the Yamuna. These rivers are perennial and are fed by snow and rainfall. They are protected by an extensive cover of natural vegetation.



There is great variation in the climatic conditions of Himachal due to extreme variation in elevation. The climate varies from hot and sub-humid tropical in the southern tracts to cold, alpine and glacial in the northern and eastern mountain ranges with more elevation. The state has areas like Dharamsala that receive very heavy rainfall, as well as those like Lahaul and Spiti that are cold and almost rainless. Broadly Himachal experience three seasons; hot

weather season, cold weather season and rainy season. Summer lasts from mid April till the end of June and most parts become very hot (except in alpine zone which experience mild summer) with the average temperature ranging from 28 °C (82 °F) to 32 °C (90 °F). Winter lasts from late November till mid March. Snowfall is common in alpine tracts (generally above 2,200 metres (7,218 ft) i.e. in the Higher and Trans-Himalayan region).

Agriculture contributes over 16.2% to the net state domestic product. It is the main source of income and employment in Himachal. Over 69% of the population in Himachal depend directly upon agriculture which provides direct employment to 3.1 % of its people. The main cereals grown are wheat, maize, rice and barley. Himachal is extremely rich in hydroelectric resources. The state has about 25% of the national potential in this respect. It has been estimated that about 20,300MW of hydroelectric power can be generated in the State by constructing various major, medium, small and mini/micro hydel projects on the five river basins. The state is also the first state in India to achieve the goal of having a bank account for every family. As per the current prices, the total GDP was estimated at Rs. 54695 crore during 2010-11. The gross domestic product of the State at current prices is Rs. 63084 million (year 2011-12). Per Capita Income in 2011-12 is Rs. 73608.

The population of Himachal in 2011 stood at 6,856,509 as per the provisional results of the Census of India 2011. Of which the urban population is 688704 persons and rural population is 6167805 persons. In terms of population it holds the same position (twenty first) among States and Union territories as at the previous census. The population of the State rose by 12.81% between 2001-2011. The sex ratio (i.e., the number of females per thousand males) of population was recorded as 974, which has increased from 900 in the previous census. Total literacy of the State rose to 83.78 % from 77.13 % in 2001. Himachal Pradesh has a Total Fertility Rate of 1.9, one of the lowest in India, and below the TFR, of 2.1, required to maintain a stable population. Population density (per Sq. Km.) [2011] of the State was 123.

The frail ecology of the mountain areas are especially vulnerable to natural disasters where the development interventions made over the years has further accentuated the problem by upsetting the natural balance of various physical processes operating in mountain eco-system. The increased pressure on the mountain environment has contributed in some measure to environmental problems such as heavy snowfall, floods, landslides, land subsidence, removal of vegetation and soil erosion. According to one estimate about 58.36 % of the land is subjected to intense soil erosion and majority of which is located in the Himalayas. An estimation of the sedimentation rate of the major river systems of the area depicts the seriousness of the erosion. According to one estimate, the Satluj watershed produces an average silt of 6 million ton, which has an average increase rate of about 40% every five years, and the Beas catchment has an average annual silt production rate of 19.35 million ton, with an increase rate of 46% in five years. However on an average about 28t/ha/yr of soil is removed in Himachal Pradesh.

### **1.2.3 Climate:**

Himachal Pradesh lies in the lap of Himalayas. Its climate is largely conditioned by that single factor. It varies from mild to cold with area under snowing winters. The normal rainfall is 1278 mm. The maximum rainfall is in Kangra district.

### **1.2.4 Population:**

Himachal Pradesh extends over an area of 55,673 sq. kms. According to 2001 census, the total population of the state is 60, 77,900 with a density of 109 persons. The highest density 369 is in Hamirpur district and the lowest in 2 in Lahaul-Spiti district. About 90.2 per cent of the population lives in rural areas. According to 2001 census, per centage of total workers to total population was 49.2 per cent, and number of females per thousand males was 968. The decennial growth rate was 17.54 per cent during 1991-2001

### 1.3 Hazard Profile of the State

The State of Himachal is prone to various hazards both natural and manmade and exposed to various concrete realities. Main hazards consist of earthquakes, landslides, flash floods, snow storms and avalanches, draughts, dam failures, fires - domestic and wild, accidents - road, rail, air, stampedes, boat capsizing, biological, industrial and hazardous chemicals etc. The hazard which however, poses biggest threat to the State is the earthquake hazard. The State has been shaken by more than 80 times by earthquakes having a magnitude of 4 and above on the Richter scale as per the recorded history of earthquakes. As per the BIS seismic zoning map five districts of the State, namely Chamba (53.2%) Hamirpur (90.9%), Kangra (98.6%), Kullu (53.1%), Mandi (97.4%) have 53 to 98.6 percent of their area liable to the severest design intensity of MSK IX or more, the remaining area of these districts being liable to the next severe intensity VIII. Two districts, Bilaspur (25.3%) and Una (37.0%) also have substantial area in MSK IX and rest in MSK VIII. The remaining districts also are liable to intensity VIII.

Unfortunately, in spite of the probable maximum seismic intensities being high, the house types mostly fall under Category A, consisting of walls of clay mud, unburnt bricks or random rubble masonry without any earthquake resisting features. Now all such houses are liable to total collapse if intensity IX or more actually occurs in future and will have severe damage called "destruction" with very large cracks and partial collapses even in Intensity VIII areas. Also, the burnt-brick houses, classified as Category B, as built in Himachal Pradesh do not have the earthquake resisting features, namely good cement mortar seismic bands and roof typing etc. therefore, they will also be liable to severe damage under intensity IX as well as in VIII when ever such an earthquake would occur. This became quite evident even in M 5.7 Dharamshala earthquake of 1986.

Another form of the natural hazards in the state is the frequent occurrences of landslides and snow avalanches during rains and winter respectively. The hills and mountains of Himachal Pradesh are liable to suffer

landslides during monsoons and also in high intensity earthquakes. The vulnerability of the geologically young and not so stable steep slopes in various Himalayan ranges, has been increasing at a rapid rate in the recent decade due to inappropriate human activity like deforestation, road cutting, terracing and changes in agriculture crops requiring more intense watering etc. Although widespread floods problems do not exist in the state because of topographical nature, continuing attention is necessary to reduce flood hazards in the state, more particularly the flash flood hazard the incidences of which are increasing causing large scale damage. The communication through roads which are the lifeline of the state repeatedly blocked damages or water washed by one or other act of nature. Besides, with the increase of road connectivity and number of vehicles plying on these roads in the State, the number of road accidents and loss of precious human lives is increasing day by day.

The forests of Himachal Pradesh are rich in vascular flora, which forms the conspicuous vegetation cover. Out of total 45,000 species of plants found in the country as many as 3,295 species (7.32%) are reported in the State. More than 95% of species are endemic to Himachal and characteristic of Western Himalayan flora, while about 5% (150 species) are exotic introduced over the last 150 years. Over the years the forest wealth of the State is being destroyed by the incidences of fire attributed to both anthropogenic and other reasons. The destruction of rich flora and fauna of the State due to forest fires will have serious repercussions on the ecological balance of the State. Besides, domestic fire incidents cause loss of property every day.

The State is known as land of Gods. Many famous temples are located in the State such as Sri Naina Devi, Baba Balak Nath, Sri Chintpurni, Ma Jawalaji, Ma Braheswari and Sri Chamunda Nandikeshwari Dham to name a few. Large number of devotees throngs these places every year. A human stampede at the temple of Naina Devi occurred on 3 August 2008. 162 people died when they were crushed, trampled, or forced over the side of a ravine by the movement of a large

panicking crowd. Possibility of such instances is always there if there is any laxity on the part of the management.

The State has two airports and more than 120 helipads/helicopter landing sites in the State. Punjab governor Surendra Nath and nine members of his family were killed when the government's Super-King aircraft crashed into high mountains in bad weather on July 9, 1994 in Himachal Pradesh. Mr. Nath was then acting Himachal governor also. Himachal has also one ropeway near Parwanoo which witnessed accidents few years back. More ropeways are in the offing in the state. Besides, paragliding activities also take place in Bir Billing every year. Accidents have also taken place during this activity.

Hundreds of people are killed and many more injured in road accidents every year. Few parts of State have rail network also. That makes the state prone to rail accidents too. Pong, Bhakara and Chamera are the three large water reservoirs in the State. These reservoirs besides other river courses are used in the state for transportation purpose also. There is always possibility of boat capsizing during these transport activities. The cases of drowning and washing away in rivers/stream flash floods, heavy rains are very common in the State. Besides, these states also suffer loss of public and property due to excessive rains, hailstorms or draught every year. Cases of snakebite and electrocution are significant during monsoon season.

## Chapter-II Research Methodology

---

The prevention of loss to life and property due to natural calamities is being viewed very seriously by the Government of India. In the past, the main role played by the Government in the case of various disasters was confined mainly to post-disaster activities that included providing relief and organising rehabilitation. The Uttarkashi Earthquake of 1991, Killari Earthquake of 1993 and the devastating Malpa landslide along the Kailash-Mansarovar route in 1998 acted as an eye-opener for the Government. The need was felt for a proactive approach rather than waiting for a disaster to occur. It was however the Kutch Earthquake of 26 January 2001 that led to a paradigm shift in the policies of the Government. A review of the disaster management mechanism was carried out by the Government in June 2002 and the subject of disaster management was shifted from the Ministry of Agriculture to the Ministry of Home Affairs. The latter was declared as the nodal ministry for coordination of relief and response and overall disaster management.

Subsequently, the Geological Survey of India was declared the nodal agency for landslides by the Government in January 2004. The responsibilities of the Ministry of Mines/Geological Survey of India as the nodal ministry/agency include coordinating all the activities related to landslide hazard mitigation, and monitoring the occurrence of landslides in the country. *The Disaster Management Act, 2005, was enacted on 23 December 2005 and the National Disaster Management Authority, a statutory body under the chairmanship of the Prime Minister as provided for in this Act, was set up.* As per the Disaster Management Act, the responsibility to cope with natural disasters is essentially that of state governments and the role of the central government is a supportive one in terms of Supplementing physical and financial resources. At the state level, each state government is to set up a state disaster management authority under the chairpersonship of the Chief Minister. At the district level, the collector/district magistrate/deputy commissioner is the chairperson of the district disaster management authority and directs, coordinates and supervises disaster

management activities. The role of communities and individual families in taking appropriate action to mitigate the impacts of disasters has been emphasized to the local government. The increased occurrence of small and medium scale disasters has resulted in the concept of Community Based Disaster Management which is a new approach to manage disasters through people's participation. Under the Government of India's Disaster Risk Management Program and National Disaster Management Act many awareness and preparedness programmes has been launched in the country as well as in the states the present study is to assess the effectiveness of awareness program on disaster preparedness among the various stakeholders in Himachal Pradesh with the objective to assess the current knowledge, the disaster preparedness, to identify the trainings needs of stakeholders and develop an awareness program.

### *2.1 Scope & Need of the study:*

The state of Himachal Pradesh is highly vulnerable to different kinds of natural disasters. The prominent natural disasters are earthquakes, landslides, flash floods, avalanches, forest fires etc. The State experiences fury of the multiple of disaster every year. Earthquake in particular poses a threat to the state of Himachal Pradesh, as major part of the state falls in two top high risks seismic zones. Losses from disasters have increased dramatically over the past few decades. The loss of population and property is always on the rise. This is because of changes in pattern of hazard occurrence and from increased vulnerability of a growing population. With greater pressure to exploit marginal lands and accommodate more people in urban areas, the potential for future disasters continues to expand. Government of India's Disaster Risk Management Program includes a community-based initiative for preventing and handling disasters through participation of communities and the local government. The thematic focus of Government of India's Disaster Risk Management Program is to generating awareness, education, training and capacity development for mitigation leading to better preparation in terms of disaster risk management and recovery at community levels. The government of Himachal Pradesh is contemplating to

undertake a massive capacity building derive to respond to the disaster preparedness requirements and aspirations of different stakeholders.

## *2.2 Objectives of the study*

- ❖ Awareness regarding Definition and kind of disasters possible in the state
- ❖ Assessing and ascertaining the current status of awareness and preparedness.
- ❖ Delineation of major gaps requiring attention at different levels and specifically w.r.t. improving knowledge aptitude and awareness
- ❖ Identification of training needs for all stakeholders at all levels which could serve as education diagnosis and form a basis for developing and tailoring training modules for addressing the identified gaps.
- ❖ To define the environment in which awareness and education process be initiated for different levels of stakeholders

## **2.3 Methodology**

Given this context, appropriate and suitable methodology in terms of quantitative and qualitative (IDIS, FGD and other techniques) methods was applied.

The baseline survey of KABBP instrument was developed in English and Hindi, The written questions were composed in a brief, simple language to avoid problems of formality. The research teams of trained survey researchers were especially sensitive to the need to avoid “translating,” or elaborating on the written questions, during dealing with illiterate respondents.

The research team utilized “semi-open” questions by which respondents were asked to volunteer examples or instances in the order that came to mind, while the researcher prompted the respondent to give more examples. These replies were

pre-coded and entered by the researcher on the questionnaire. The pre-codes were generated by means of an extensive pretest of the instrument.

Representative quota samples were constructed as far as possible on the basis of the Demographic data, using categories of gender, age and rural /urban and applied to the sample in each district selected for study. The sample was obtained from a randomly selected commune by random household calls in rural areas as well as from various sampling points in public urban space, especially markets.

To form the sample size of the study it is necessary to draw the list of stakeholders, after that sampling procedure could be followed for each type of stakeholders.

## 2.4 Research approach & research design

In view of the nature of the problem under the study and to accomplish the objectives of the study Quasi experimental approach has been adopted and various statistical tools and techniques has been used to analyze and report the data in systematic manner. Firstly the list of stakeholders was had drawn which appended below for each district.

Administration Sample	Rural Sample	Urban Sample	Association Sample	Private Sample
	Group-1	Group-1		
1. District Administration	1. Panchyat Representatives	1. ULB's Representatives	1. Red Cross Societies	1. Hospitals
2. PWD	2. knowledgeable persons	2. knowledgeable persons	2. Rotary Clubs	2. Builders/Contractors
3. IPH	Group-2	Group-2	3. Lions Clubs	3. Petrol Pump Owners
4. Health	1. Teachers	1. Teachers	4. Engineers	4. Hoteliers
5. Education	2. Anganwadi Workers	2. MPWs	5. Architect	5. Truck & Taxi Union Operators
6. Transport	3. MPWs	3. others workers	6. Bar Associations	6. Telecom Service Providers
7. RD & Panchyati Raj	4. Panchyat workers	Group-3	7. Industrialists	
8. Food & Civil Supplies	Group-3	1. School Children		
9. Agriculture	1. School Children	2. College Students		
10. Horticulture	2. College Students	Group-4		
11. Pollution	Group-4	1. Eco-Clubs		

Control Board				
12. Industries	3. Eco-Clubs	2. NSS Members		
13. Town & Country Planning	4. NSS Members	3. Scouts and Guides Members		
14. Urban Development	5. Scouts and Guides Members	Group-5		
15. Police	Group-5	1. NGO's and other public		
16. Home Guard	1. Mahila Mandals	Group-6		
17. Fire	2. Yuvak Mandals	1. Skilled Workers (Masons, Carpenters Etc.)		
18. HPSEB	Group-6			
19. MPP & POWER	1. NGO's and other public			
20. Art Language & Culture	Group-7			
21. Revenue	2. Skilled Workers (Masons, Carpenters Etc.)			
22. BSNL				
23. Tourism				
24. Railways				
25. Airport authorities				
26. Army				
27. BRO				
28. ITBP				

## 2.5 Coverage/Sample design:

### 2.5.1 Rural sample

- ❖ District was form as first stage stratum and at the second stage all 77 blocks were formed second strata and from each block 2 Panchayats were selected by using random sampling technique
- ❖ From each selected panchayats 2 sample villages has been selected randomly, one roadside village and one moderate assessable with area sampling methods.
- ❖ From the selected villages 30 key informants (4 from each group) has been selected purposely to fill the questionnaire by the investigator.
- ❖ Primary data was collected from these individuals from all twelve districts.

- Coverage = inhabited
- No. of Districts = 12
- No. of Blocks = 77
- No. of Panchayats = 154 (2 Panchayats per block)
- No. of Villages = 308 (2 villages per Panchayat)
- No. of respondents = 30 per village

### 2.5.2 Urban sample

- ❖ From each town 50 key informants were selected purposely from the list of stakeholders which was linked to the population of the towns. Equal representation was given to the each group to fill the questionnaire by the investigator

- Coverage = All towns
- No. of total towns = 56
- No. of respondents = minimum 50 per town

### 2.5.3 Administration sample

- ❖ From each district all the stakeholder department was selected;
- ❖ From these departments minimum 1 key person was selected from the list of stakeholders purposely to fill the questionnaire by the investigator/himself.
  - ❑ Coverage = All the Secretaries, HOD's, DC's, ADC's, ADM's, SDM,s, BDO's Tehsildhar's, Naib Tehsildhar's, & Himachal Institute of Public Administration.

#### 2.5.3.1 Engineers and Architects sample

- ❖ From stakeholders departments at least 5 persons per engineering department were selected purposely to fill the questionnaire by the investigator.

- ❑ Coverage = HIMUDA, PWD, HPSEB, RD, CPWD,IPH & other engineering departments

#### 2.5.3.2 *Medical Professionals sample*

- ❖ From stakeholders departments at least 5 doctors has been selected purposely to fill the questionnaire by the investigator

- ❑ Coverage = Health department, health training institute, medical colleges etc.

#### 2.5.3.3 *Teachers sample*

- ❖ Principals; Headmasters and teachers have been investigated separately by the investigator to get the views on school safety norms

- ❑ Coverage = Primary; Middle; High And Senior Secondary Schools,

#### 2.5.3.4 *Association Sample*

- ❖ From each town at least 1 person each from the list of stakeholders i.e. members of *Red Cross Societies; Rotary Clubs; Lions Clubs; Engineers; Architect Bar Associations; Industrialists* has been interviewed.

- ❑ Coverage = all towns

#### 2.5.3.5 *Private Sample*

- ❖ From each town at least 3 person each from the list of stakeholders i.e. private *Hospitals owners; Builders/Contractors; Petrol Pump Owners; Hoteliers; Truck & Taxi Union Operators; Telecom service providers* has been interviewed.

- ❑ Coverage =all towns

## *2.6 Sample and Sampling Technique:*

A structured interview schedule has been used to assess the knowledge regarding disaster and disaster preparedness and observational checklist will be developed. The structured interview schedule was included the demographic data, knowledge questions regarding disaster and knowledge regarding disaster preparedness and family disaster preparedness.

To produce the output *of these results* *Statistical Package for Social Science (SPSS)* for Windows was used to analyse the data with various tests.

To assess the statistical significance of cross tabulated variables, statistical tests were used.

## Chapter-III

### Situation analysis

---

It is important to know the present status of knowledge and awareness about various key aspects of Disaster and related issues for policy intervention. By keeping these things under consideration various relevant queries i.e. what is disaster, what is the terminology, awareness about the impact of disasters on society, which form of natural disaster do you reckon are likely to affect us the most, knowledge about Earthquake hazards and related issues, etc. has been asked from the various target groups to assess the knowledge and awareness level among the society. The detailed analysis has been presented below:

### 3. General Population

#### 3.1 Profile of Respondents:

##### 3.1.1 Socio-economic and demographic Profile of the respondents

Himachal Pradesh is a somewhat stratified Society both socially and economically. All Major religions are found here including its community/ cast categories. The diversity in terms of educational attainment, occupation, class, etc. is minifies in Himachal Pradesh. An ideal sample should be representative of the larger society in all respects. It should be large enough to include the microcosm and extensive enough to include all geographical regions of Himachal Pradesh. This study satisfies this requirement in both ways.

##### 3.1.2 Sex wise distribution of Sample respondents

A sample of all stakeholders which includes urban, rural, administration, PRIs etc. from across Himachal Pradesh were interviewed using a structure questionnaire/Schedule. The questionnaire was designed in such way that a comprehensive understanding about the *Existing Knowledge Level, Awareness and Preventive Practices (KAP) of Disaster Management in Himachal Pradesh* is obtained. Of the total population canvassed the gender composition of the sample shows 81 per cent were males and 19 per cent females.

**Table-3.1**  
**Sex wise distribution of Sample respondents**

S.N.	Districs	Sex		
		Male	Female	Total
1	Bilaspur	84	16	100
2	Chamba	79	21	100
3	Hamirpur	75	25	100
4	Kangra	75	25	100
5	Kinnaur	90	10	100
6	Kullu	86	14	100
7	L&S	83	18	100
8	Mandi	82	18	100
9	Shimla	88	12	100
10	Sirmour	83	17	100
11	Solan	77	23	100
12	Una	73	27	100
	<i>Total</i>	81	19	100

### 3.1.3 Age wise distribution of Sample respondents

Age wise distribution of respondents shows in all 23 per cent of the population canvassed were between the age group of 18-25, 25-45 were constituted 34 per cent, and while the remaining were in the age group of 45+

**Table-3.2**  
**Age wise distribution of Sample respondents**

S.N.	Districts	Age (in years)						Total
		18-25	25-35	35-45	45-55	55-65	65+	
1	Bilaspur	25	15	16	11	8	25	100
2	Chamba	19	21	21	16	12	13	100
3	Hamirpur	25	14	19	8	11	25	100
4	Kangra	24	16	15	13	9	23	100
5	Kinnaur	24	14	19	24	7	12	100
6	Kullu	25	13	15	14	8	25	100
7	L&S	25	18	18	13	3	25	100
8	Mandi	20	22	17	12	10	19	100
9	Shimla	24	15	20	13	10	18	100
10	Sirmour	25	17	15	13	7	24	100
11	Solan	25	16	15	11	10	24	100
12	Una	21	18	17	13	12	21	100
	<i>Total</i>	23	17	17	12	10	21	100

### 3.1.4 Marital Status wise distribution of Sample respondents

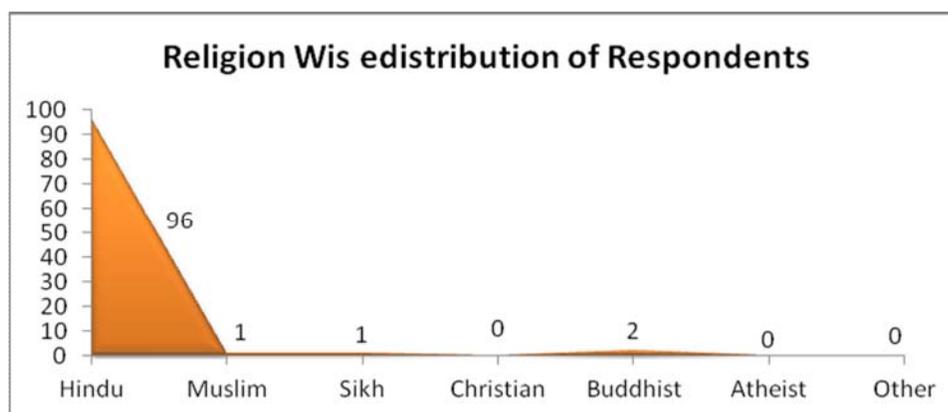
Out of the total sample, 79 per cent are married and 18 per cent are unmarried and the rest is composed of widows, single and divorce etc.

**Table-3.3**  
**Marital Status wise distribution of Sample respondents**

S.N.	Districts	Marital Status					Total
		Unmarried	Married	Divorce	Widowed	Single	
1	Bilaspur	18	80	0	2	0	100
2	Chamba	31	68	2	0	0	100
3	Hamirpur	9	90	0	0	0	100
4	Kangra	16	82	2	0	0	100
5	Kinnaur	13	84	1	1	1	100
6	Kullu	11	86	0	2	1	100
7	L&S	18	83	0	0	0	100
8	Mandi	24	75	0	0	0	100
9	Shimla	21	77	0	0	2	100
10	Sirmour	18	80	1	0	1	100
11	Solan	22	76	0	0	1	100
12	Una	20	77	1	2	0	100
	<i>Total</i>	19	79	1	1	1	100

### 3.1.5 Religion wise distribution of Sample respondents

Religious affiliation of respondents shows that Hindu are a majority (96 per cent) followed by Buddhists' Muslims; and others.

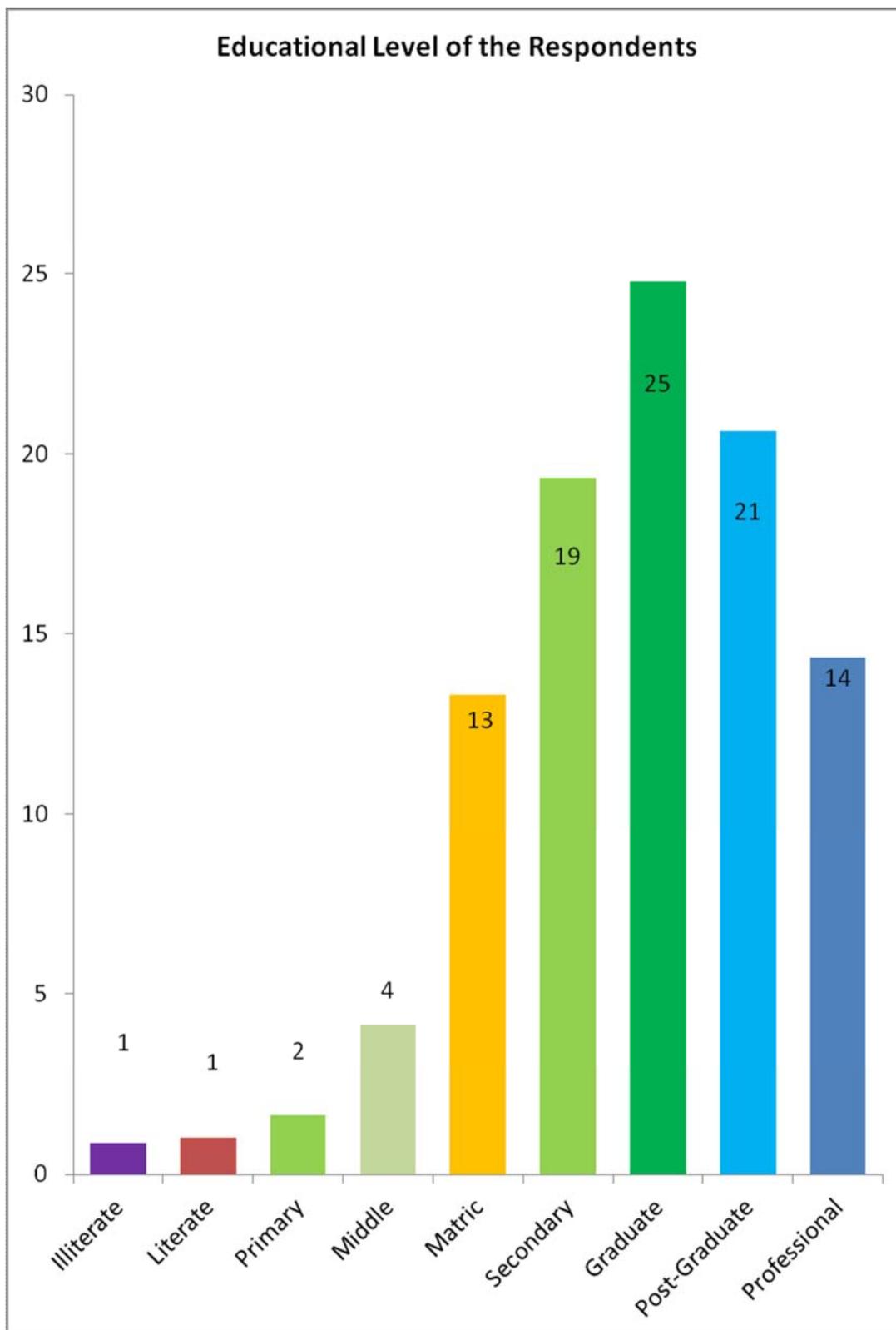


**Table-3.4**  
**Religion wise distribution of Sample respondents**

S.N.	Districts	Religion							Total
		Hindu	Muslim	Sikh	Christian	Buddhist	Atheist	Other	
1	Bilaspur	98	2	1	0	0	0	0	100
2	Chamba	96	2	1	1	1	1	0	100
3	Hamirpur	99	0	0	0	0	0	0	100
4	Kangra	99	0	1	0	0	0	0	100
5	Kinnaur	89	0	2	0	7	2	0	100
6	Kullu	92	1	1	0	5	0	1	100
7	L&S	53	0	0	0	48	0	0	100
8	Mandi	99	0	1	0	0	0	0	100
9	Shimla	98	1	1	0	0	0	0	100
10	Sirmour	96	3	2	0	0	0	0	100
11	Solan	94	2	4	0	0	0	0	100
12	Una	95	1	4	0	0	0	0	100
	<b>Total</b>	96	1	1	0	2	0	0	100

### 3.1.6 Educational Level wise distribution of Sample respondents

The educational status of the respondents' shows that majority of the respondents (25 per cent) have Graduate level education followed by Post-Graduation (21 per cent), secondary (19 per cent), Professional education 14 per cent and metric (13 per cent). Overall 80 per cent of the population canvassed were literate i.e. Metric, while 20 per cent were illiterate.



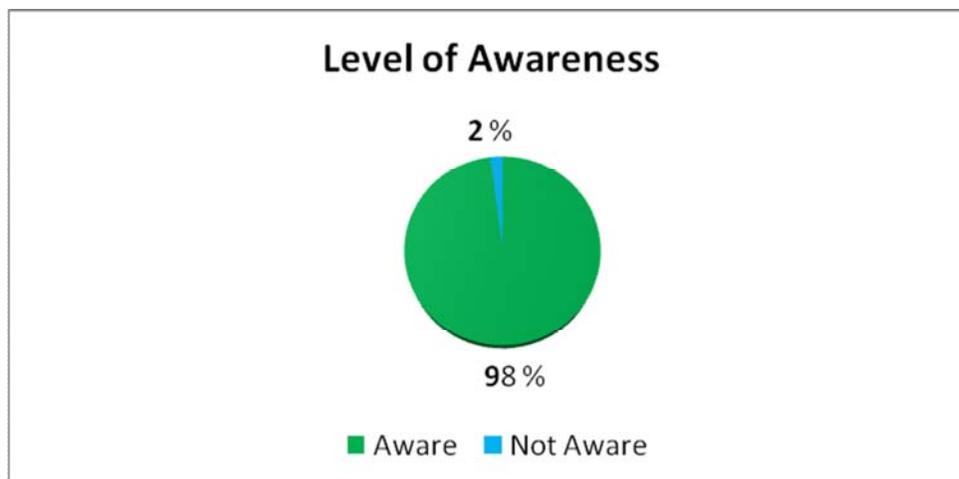
**Table-3.5**  
**Educational Level wise distribution of Sample respondents**

S.N.	Districts	Educational Status									Total
		Illiterate	Literate	Primary	Middle	Matric	Secondary	Graduate	Post-Graduate	Professional	
1	Bilaspur	0	1	1	2	14	16	22	24	21	100
2	Chamba	3	2	1	1	20	23	20	21	9	100
3	Hamirpur	0	0	1	2	12	17	19	26	22	100
4	Kangra	0	1	2	8	11	23	27	14	13	100
5	Kinnaur	2	3	0	1	6	10	38	22	19	100
6	Kullu	1	1	1	8	9	17	19	17	29	100
7	L&S	0	3	0	3	5	13	25	18	35	100
8	Mandi	2	1	0	7	9	21	23	22	14	100
9	Shimla	1	1	2	4	19	20	26	22	6	100
10	Sirmour	0	0	1	3	8	20	28	22	17	100
11	Solan	0	2	4	4	17	17	27	21	8	100
12	Una	2	0	1	1	18	22	23	20	12	100
	<i>Total</i>	1	1	2	4	13	19	25	21	14	100

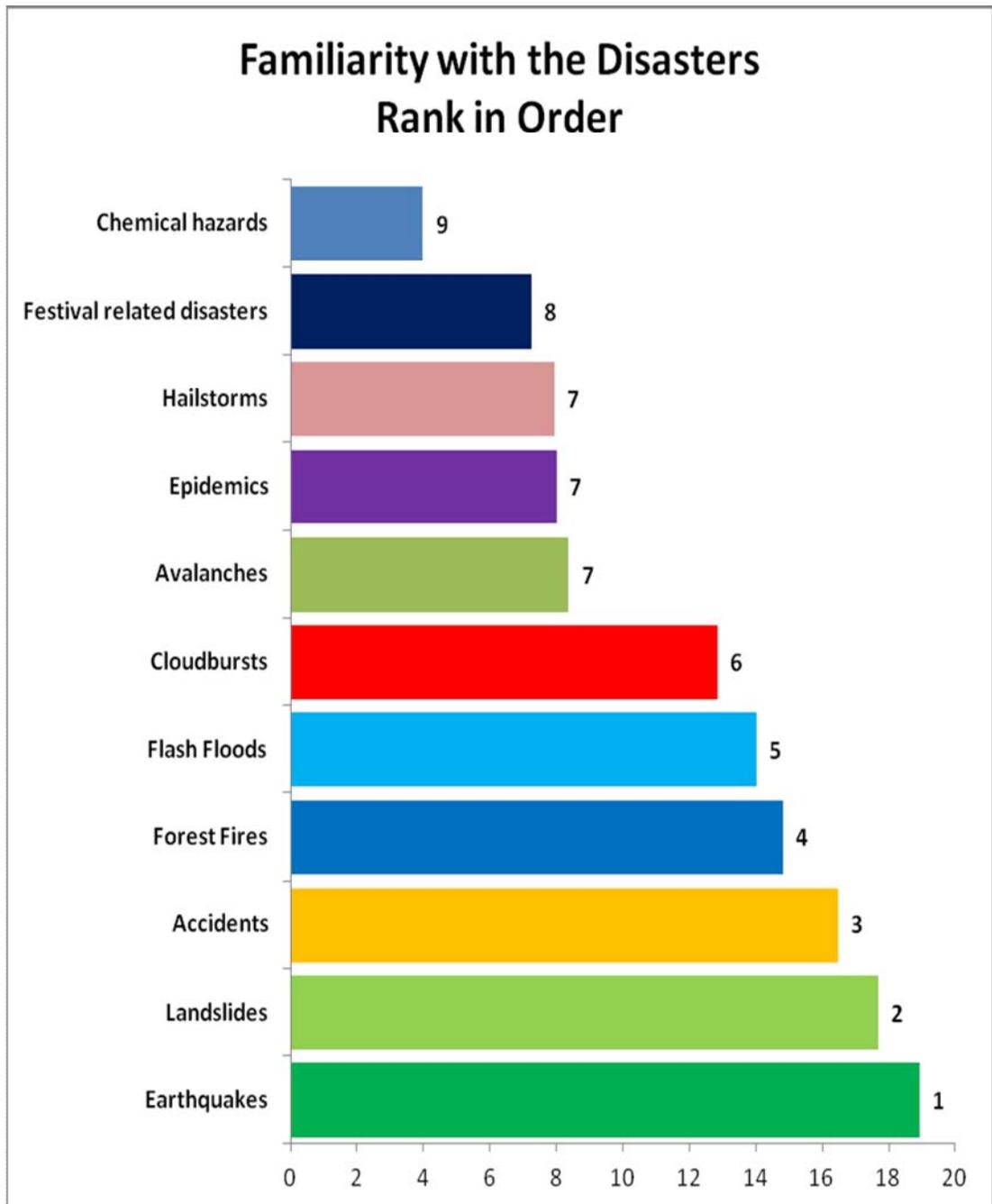
### 3.2 Knowledge/ Awareness/ Practices of Respondents

#### 3.2.1 Awareness/attitude regarding Disasters:

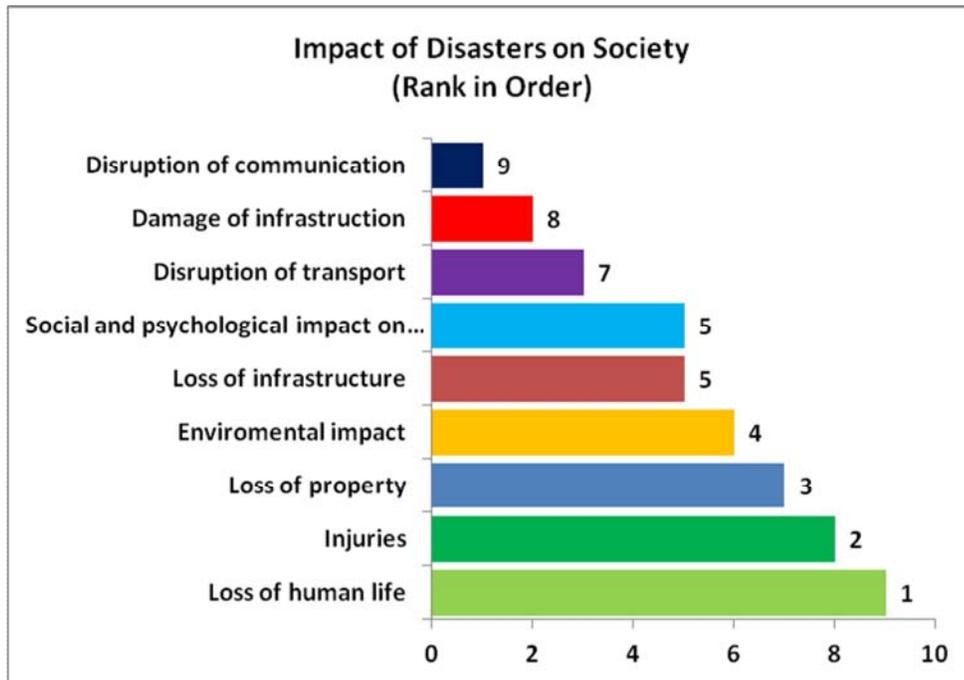
- Out of a total of 2359 respondents 2267 (98.01 per cent) of the population canvassed were aware of the term disaster, while only 48 (1.98%) said that they were not aware of the term disaster.



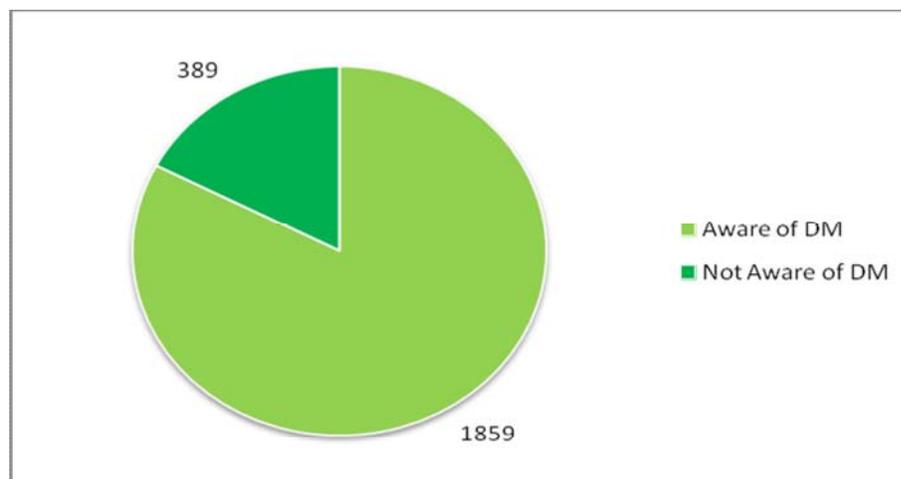
- ❑ It is found in almost all of the sample population that people are aware of the term disaster. Earthquake is the most familiar disaster among the sample population followed by accidents, landslides and forest fires. People are least familiar with chemical hazard and festival related hazard.



- ❑ Loss of human life, injuries and loss of property are the most prominent impact of disaster on society or common man while environmental impact and social and psychological impact on community would be less than the others



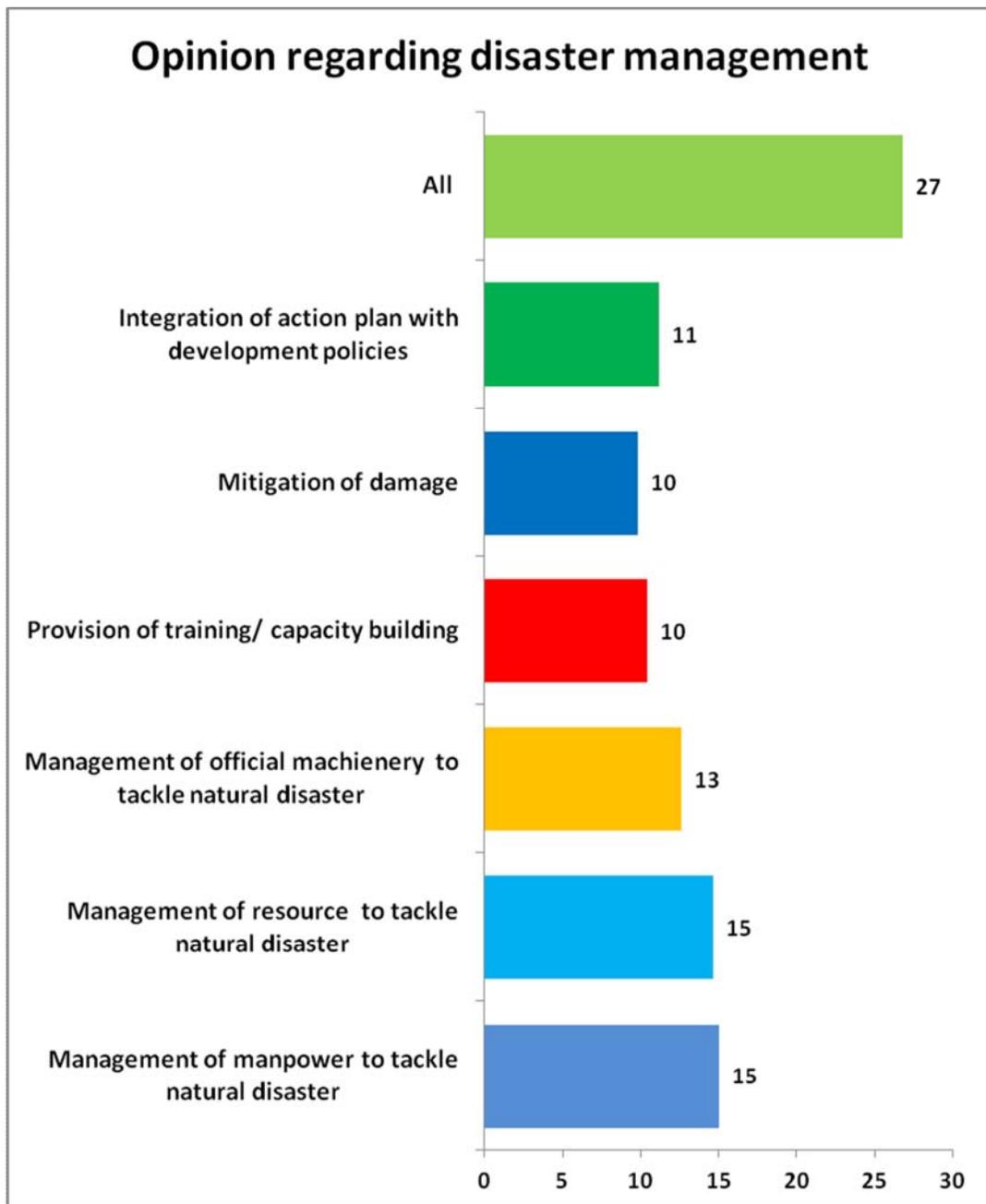
- ❑ 90 per cent of the respondents have claimed to have faced, seen or heard about any disaster while 10 per cent said otherwise. While most of the respondents are aware of the term disaster only 83% said that they were aware of disaster management.



**Table-3.6**  
**Awareness Regarding the Term Disaster Management**

S.N.	Districts	Yes	No	Total
1	Bilaspur	80	20	100
2	Chamba	91	9	100
3	Hamirpur	91	9	100
4	Kangra	60	40	100
5	Kinnaur	96	4	100
6	Kullu	75	25	100
7	L&S	100	0	100
8	Mandi	82	18	100
9	Shimla	79	21	100
10	Sirmour	93	7	100
11	Solan	87	13	100
12	Una	78	22	100
	Total	81	19	100

- The districts wise results showed that 100 per cent of the population canvassed in L&S were aware of term disaster management, followed by district Kinnaur (96 per cent), Sirmour (93 per cent), on the other hand 40 per cent of the population in District Kangra, 25 per cent in district Kullu and 22 per cent in district Una were not aware regarding the term disaster management (**Table-3.6**).
- It was further probed about the opinion of respondents that what is disaster management from among the given options
- Management of manpower to tackle natural disasters
  - Management of resource to tackle natural disasters
  - Management of official machinery to tackle natural disasters
  - Provision for training/capacity building
  - Mitigation of damage
  - Integration of action plan with development policies



- 27 per cent of the respondents have chosen all of the above to be true while 15 per cent each thought that disaster management is Management of manpower to tackle natural disasters and Management of resource to tackle natural disasters, according to 13 per cent it is management of official machinery to tackle natural disasters and 11 per cent have chosen Integration of action plan with development policies to be singly true.

- ❑ 92 per cent of the sample population have read/heard/watched any disaster management program in newspapers/magazines/radio/television, eight per cent of the respondents revealed that they have never read/heard/watched any disaster related material in newspapers/magazines/radio/television. **(Table 3.7).**
- ❑ Districts wise results showed that in district Knagra (98 per cent), shimla (95 per cent), Kinnaur (95 per cent), Chamba (94 per cent) and Mandi (94 per cent) of the population canvassed revealed that they have read/heard/watched any disaster management program in newspapers/magazines/radio/television **(Table-3.7).**

**Table-3.7**  
**Percentage distribution of the respondents who have heard/read/ watched any disaster management Programme in news paper / magazine/ radio/television**

S.N.	Districts	Yes	No	Total
1	Bilaspur	87	13	100
2	Chamba	94	6	100
3	Hamirpur	89	11	100
4	Kangra	98	2	100
5	Kinnaur	95	5	100
6	Kullu	84	16	100
7	L&S	93	8	100
8	Mandi	94	6	100
9	Shimla	95	5	100
10	Sirmour	90	10	100
11	Solan	88	12	100
12	Una	94	6	100
	<i>Total</i>	92	8	100

- ❑ While only 35 per cent of them have ever attended any program/conference/seminar on disaster management organized by government/NGO and 65 per cent of the respondents never attended such type of workshop/seminar/conference etc. **(Table 3.8).**

**Table-3.8**  
**Percentage distribution of the respondents who had Ever attended any programme/conference/seminar on disaster management organized by government/NGO**

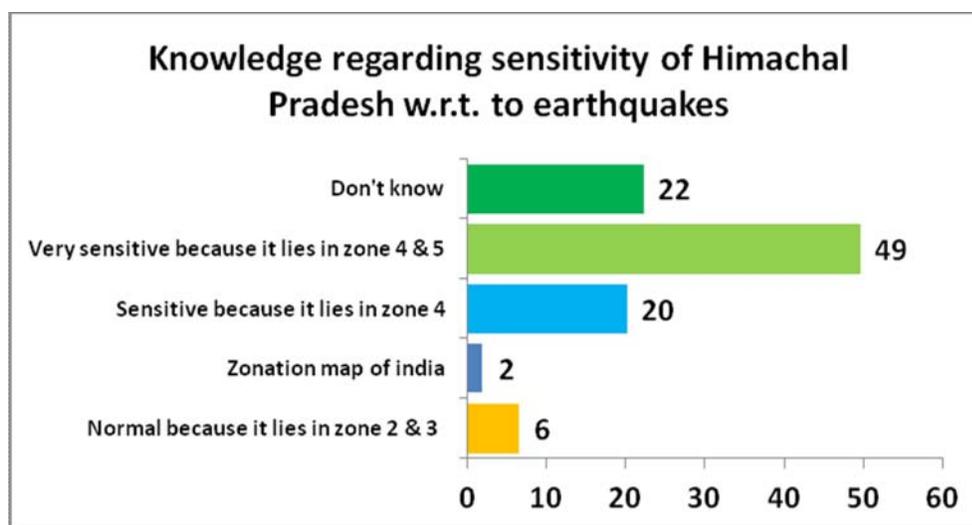
S.N.	Districts	Yes	No	total
1	Bilaspur	38	62	100
2	Chamba	32	68	100
3	Hamirpur	30	70	100
4	Kangra	17	83	100
5	Kinnaur	50	50	100
6	Kullu	34	66	100
7	L&S	63	38	100
8	Mandi	28	72	100
9	Shimla	53	47	100
10	Sirmour	37	63	100
11	Solan	25	75	100
12	Una	44	56	100
	<i>Total</i>	35	65	100

- 79 per cent of the sample revealed that disaster management is a topic discussed among the family members (**Table-3.9**)

**Table-3.9**  
**Percentage distribution of the respondents who discussed the subject disaster management with children & other family members**

S.N.	Districts	Yes	No	Total
1	Bilaspur	71	29	100
2	Chamba	80	20	100
3	Hamirpur	72	28	100
4	Kangra	89	11	100
5	Kinnaur	81	19	100
6	Kullu	86	14	100
7	L&S	75	25	100
8	Mandi	75	25	100
9	Shimla	77	23	100
10	Sirmour	67	33	100
11	Solan	85	15	100
12	Una	77	23	100
	<b>Total</b>	<b>79</b>	<b>21</b>	100

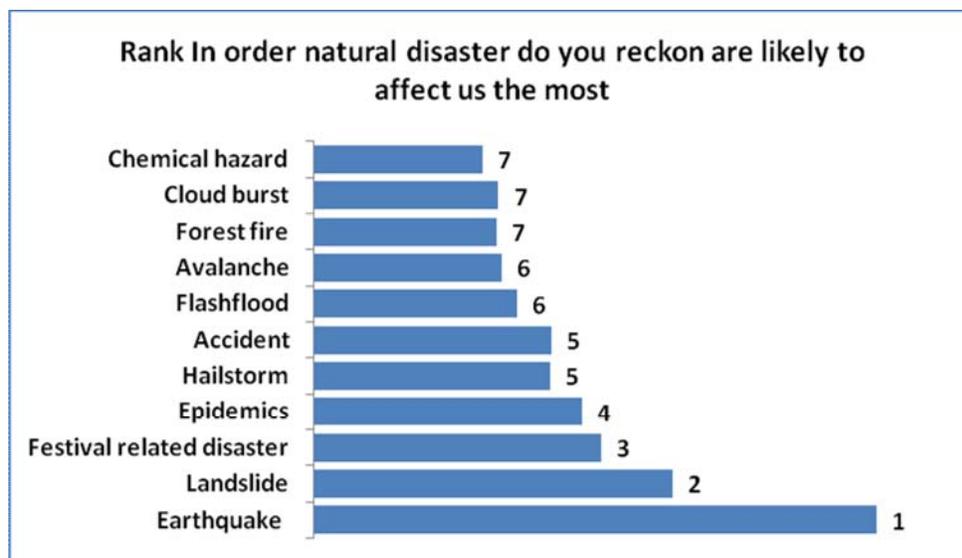
- About 49 per cent of the sample population considers Himachal Pradesh to be very sensitive to earthquakes since it lies in zone 4 & 5, while 20 per cent said that the state lies in zone 4, also about 22 per cent don't know about sensitivity of the state towards earthquakes.



**Table-3.10**  
**Sensitivity of Himachal Pradesh w.r.t. to Earthquakes**

S.N.	Districts	Normal because it lies in zone 2 & 3	Zonation map of india	Sensitive because it lies in zone 4	Sensitive because it lies in zone 4&5	Don't know	Total
1	Bilaspur	2	0	21	50	28	100
2	Chamba	5	5	17	54	20	100
3	Hamirpur	4	5	12	59	19	100
4	Kangra	3	0	27	43	27	100
5	Kinnaur	6	1	23	65	6	100
6	Kullu	7	2	13	49	29	100
7	L&S	3	5	28	55	10	100
8	Mandi	4	1	23	55	17	100
9	Shimla	20	5	20	36	20	100
10	Sirmour	5	0	17	49	28	100
11	Solan	6	0	24	37	33	100
12	Una	4	1	15	67	13	100
	<i>Total</i>	6	2	20	49	22	100

- ❑ In Himachal Pradesh Earthquakes, landslides, Festival related disasters, and accidents are the natural disasters which are most likely to affect the state. Flash Flood, Forest fires, Chemical Hazards, hailstorms and cloudbursts form second tier in the natural disasters which are most likely to affect the state.



- ❑ Seventy per cent of the sample population is not aware of any early warning system related to their own area of operation.

**Table-3.11**  
**Awareness regarding early warning system**

S.N.	Districts	Yes	No	Total
1	Bilaspur	46	54	100
2	Chamba	33	67	100
3	Hamirpur	35	65	100
4	Kangra	13	87	100
5	Kinnaur	61	39	100
6	Kullu	35	65	100
7	L&S	40	60	100
8	Mandi	30	70	100
9	Shimla	24	76	100
10	Sirmour	33	67	100
11	Solan	30	70	100
12	Una	20	80	100
	<i>Total</i>	30	70	100

- From those who are aware about early warning system further probed as who deals with this system. The survey results reveal that 26 per cent of the respondents stated that district administration are responsible for this, while 23 per cent revealed that police, and only 17 per cent stated Met Data office deals with early warning system (Table-3.12).

**Table-3.12**  
**Respondents choice with Early Warning System**

S.N.	Districts	Met data office	CWC	Army	GSI	Police	District administration	Any other	Total
1	Bilaspur	18	6	7	1	17	28	22	100
2	Chamba	16	3	30	13	15	15	8	100
3	Hamirpur	16	1	9	4	34	26	10	100
4	Kangra	28	9	14	2	12	26	9	100
5	Kinnaur	4	3	15	4	24	48	1	100
6	Kullu	21	2	19	6	13	32	6	100
7	L&S	19	0	13	31	19	13	6	100
8	Mandi	10	1	19	6	24	30	10	100
9	Shimla	25	8	5	7	25	19	11	100
10	Sirmour	25	12	10	0	12	18	23	100
11	Solan	11	3	7	8	47	20	5	100
12	Una	14	5	19	2	26	24	10	100
	<i>Total</i>	17	5	13	6	23	26	11	100

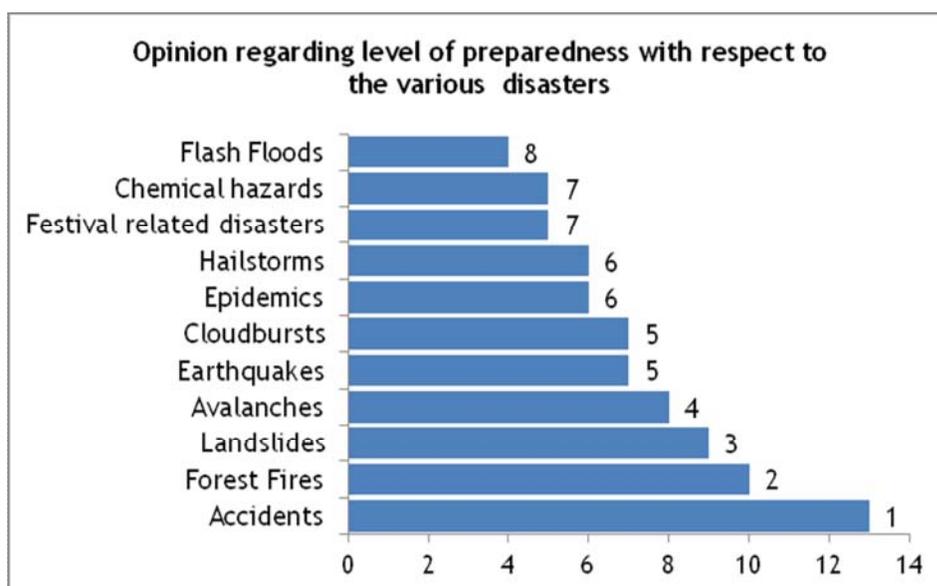
- 92 per cent of the sample population has not received any kind of early warning related to disasters, while 8 per cent of the respondents admitted that they have received early warning related to disasters.
- Similarly district wise analysis showed that only in district Kinnaur, Bilaspur, L&S and Shimla respondents has received early warning related to disasters to some extent (Table-3.13).

**Table-3.13**  
**Respondent's choice on early**  
**Warning pertaining to any disaster**

S.N.	Districts	Yes	No	Total
1	Bilaspur	21	79	100
2	Chamba	8	92	100
3	Hamirpur	6	94	100
4	Kangra	2	98	100
5	Kinnaur	27	73	100
6	Kullu	8	92	100
7	L&S	15	85	100
8	Mandi	6	94	100
9	Shimla	10	90	100
10	Sirmour	5	95	100
11	Solan	8	92	100
12	Una	2	98	100
	<i>Total</i>	8	92	100

**Opinion regarding Knowledge/Practices for Disaster**

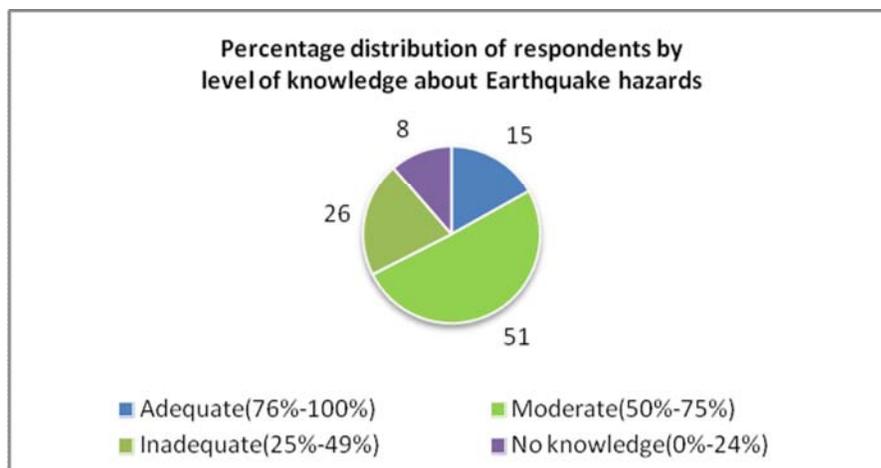
- With regard to level of preparedness of the state for disasters, it has been pointed out that state is prepared to handle accidents, fires and landslides while it is least prepared to handle chemical hazards.



- Fifty one per cent of the sample population has adequate knowledge about earthquake hazards. Twenty six per cent of the respondents were having inadequate knowledge regarding earthquake hazards and 15 per cent of the sample population has adequate knowledge while 8 per cent of the respondents had no knowledge about earthquake hazards.

**Table-3.14**  
**Percentage distribution of respondents by level of knowledge about Earthquake hazards**

S.N.	Districts	Adequate (76%-100%)	Moderate (50%-75%)	Inadequate (25%-49%)	No knowledge (0%-24%)	Total
1	Bilaspur	12	46	24	18	100
2	Chamba	13	38	46	3	100
3	Hamirpur	19	39	34	8	100
4	Kangra	12	63	17	7	100
5	Kinnaur	14	43	39	4	100
6	Kullu	23	48	19	10	100
7	L&S	28	38	25	10	100
8	Mandi	15	57	20	8	100
9	Shimla	16	45	26	12	100
10	Sirmour	10	51	34	5	100
11	Solan	20	50	21	9	100
12	Una	10	70	14	6	100
	<i>Total</i>	15	51	26	8	100



- Fifty four per cent of the respondents who have reported inadequate knowledge regarding **Earthquake hazards** revealed that they need training on safe construction techniques, 26 per cent stated that they need knowledge on do's & don'ts of the earthquake and 18 per cent required knowledge on buildings codes (**Table-3.15**).

**Table-3.15**  
Percentage distribution of respondents for Knowledge requirement

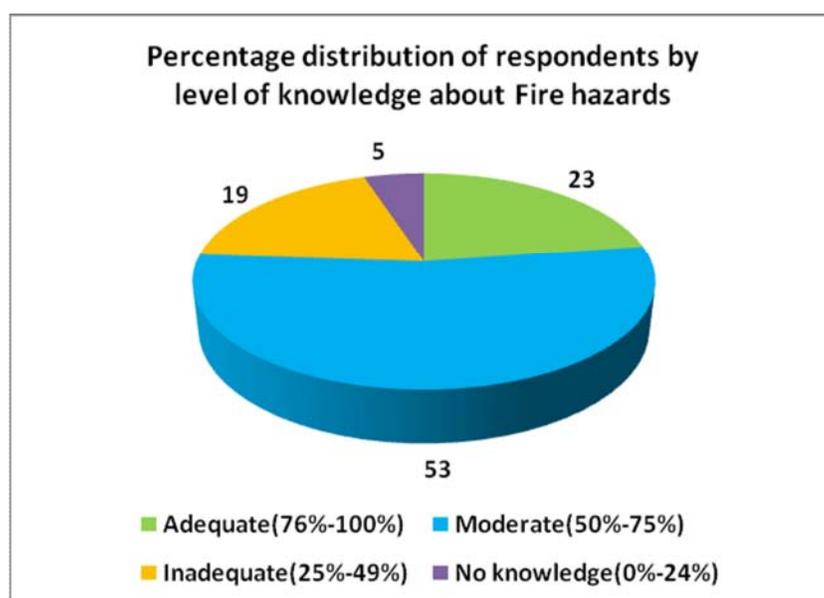
S.N.	Districts	Safe construction techniques	Do's & Don'ts of the earthquake	Knowledge about building codes	Any other please specify	Total
1	Bilaspur	39	34	23	4	100
2	Chamba	49	32	18	1	100
3	Hamirpur	47	24	28	1	100
4	Kangra	79	21	0	0	100
5	Kinnaur	37	36	26	0	100
6	Kullu	48	31	19	2	100
7	L&S	56	25	19	0	100
8	Mandi	54	24	19	3	100
9	Shimla	65	23	12	1	100
10	Sirmour	71	20	8	1	100
11	Solan	63	19	14	4	100
12	Una	36	40	21	3	100
	<i>Total</i>	54	26	18	2	100

- Operations of fire safety equipment, various type of fire, protection of fire are the most important fields which require more knowledge.
- Fifty three per cent of the sample population has adequate knowledge about fire hazards. Nineteen per cent of the respondents were having inadequate knowledge regarding fire hazards and 23 per cent of the sample population has

adequate knowledge while 5 per cent of the respondents had no knowledge about fire hazards (Table-3.16).

**Table-3.16**  
**Percentage distribution of respondents by level of knowledge about Fire hazards**

S.N.	Districts	Adequate (76%-100%)	Moderate (50%-75%)	Inadequate (25%-49%)	No knowledge (0%-24%)	Total
1	Bilaspur	17	49	29	4	100
2	Chamba	35	49	15	1	100
3	Hamirpur	23	47	27	2	100
4	Kangra	18	64	12	6	100
5	Kinnaur	17	35	44	4	100
6	Kullu	16	54	20	10	100
7	L&S	33	35	28	5	100
8	Mandi	24	63	10	2	100
9	Shimla	27	52	14	8	100
10	Sirmour	8	52	34	5	100
11	Solan	31	46	15	8	100
12	Una	23	64	9	4	100
	<i>Total</i>	23	53	19	5	100



- Twenty two per cent each of the respondents who have reported inadequate knowledge regarding **fire hazards** revealed that they need training on **on various types of fires** and **on protection of fire**, 19 per cent stated that they need knowledge on **operation of fire safety equipment**, 16 per cent required knowledge on **short circuits** (Table-3.17).

**Table-3.17**  
Percentage distribution of respondents for Knowledge requirement

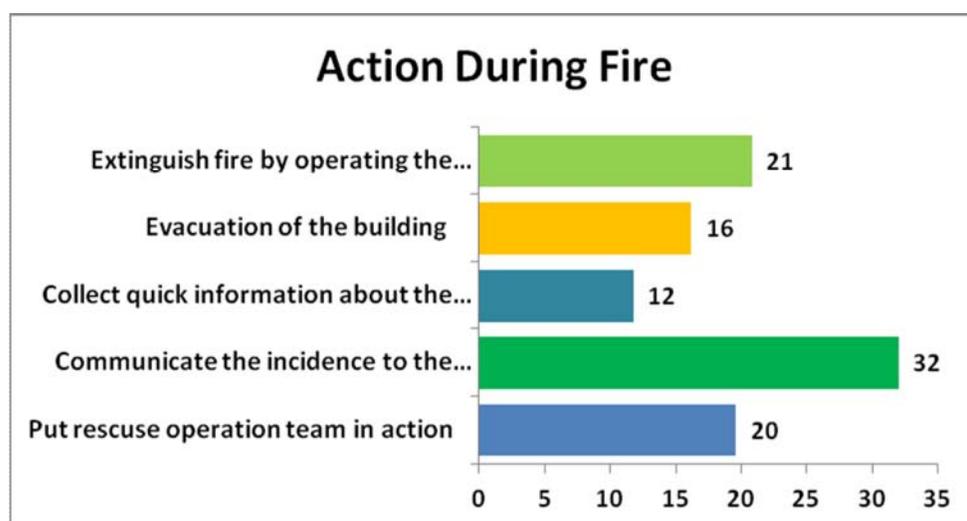
S.N.	Districts	On short circuits	On various types of fires	On reasons of fires	On protection of fire	Operation of fire safety equipment	Dealing with electrical fires	Total
1	Bilaspur	16	19	14	17	20	14	<b>100</b>
2	Chamba	19	16	18	15	16	15	<b>100</b>
3	Hamirpur	21	18	9	17	18	17	<b>100</b>
4	Kangra	64	36	0	0	0	0	<b>100</b>
5	Kinnaur	13	18	14	21	20	14	<b>100</b>
6	Kullu	12	23	13	19	16	16	<b>100</b>
7	L&S	24	13	13	16	18	16	<b>100</b>
8	Mandi	8	15	15	22	32	8	<b>100</b>
9	Shimla	29	42	7	9	10	4	<b>100</b>
10	Sirmour	11	20	10	19	34	6	<b>100</b>
11	Solan	7	13	14	54	10	2	<b>100</b>
12	Una	2	39	7	9	11	31	<b>100</b>
	<i>Total</i>	<b>16</b>	<b>22</b>	<b>12</b>	<b>22</b>	<b>19</b>	<b>10</b>	<b>100</b>

- Fifty four per cent each of the respondents does not know how to operate the fire equipments, only forty six per cent of the respondents revealed that they know how to operate fire equipments (Table-3.18).

**Table-3.18**  
**Percentage distribution of respondents regarding operation of fire equipments**

S.N.	Districts	Yes	No	Total
1	Bilaspur	47	53	100
2	Chamba	57	43	100
3	Hamirpur	49	51	100
4	Kangra	31	69	100
5	Kinnaur	48	52	100
6	Kullu	44	56	100
7	L&S	40	60	100
8	Mandi	48	52	100
9	Shimla	48	52	100
10	Sirmour	45	55	100
11	Solan	41	59	100
12	Una	56	44	100
	<i>Total</i>	46	54	100

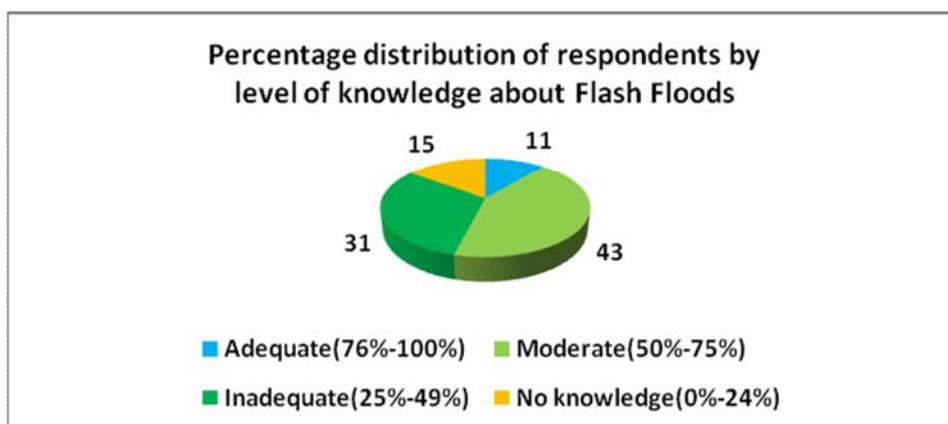
□ On further probing as in case of fire what action will you take 32 per cent of the respondents reported that they will communicate the incidence to the fire station, 21 per cent shared that they will extinguish fire by operating the nearby equipment, 20 per cent reported that they will put rescue operation team in action and 16 per cent revealed that they will collect quick information about the humans in the building



- Eleven per cent of the sample population has adequate knowledge about flash floods. Forty three per cent of the respondents were having moderate knowledge regarding flash floods and 31 per cent of the sample population has inadequate knowledge, while 15 per cent of the respondents had no knowledge about flash floods (Table-3.19).

**Table-3.19**  
**Percentage distribution of respondents by level of knowledge about flash floods**

S.N.	Districts	Adequate (76%-100%)	Moderate (50%-75%)	Inadequate (25%-49%)	No knowledge (0%-24%)	Total
1	Bilaspur	11	34	30	26	100
2	Chamba	12	47	31	10	100
3	Hamirpur	12	37	40	11	100
4	Kangra	6	51	30	12	100
5	Kinnaur	15	36	46	4	100
6	Kullu	10	40	31	19	100
7	L&S	25	28	28	20	100
8	Mandi	13	58	22	8	100
9	Shimla	19	35	30	16	100
10	Sirmour	4	36	52	8	100
11	Solan	10	30	29	31	100
12	Una	9	65	15	11	100
	<i>Total</i>	<i>11</i>	<i>43</i>	<i>31</i>	<i>15</i>	<i>100</i>



- Twenty four per cent of the respondents who have reported inadequate knowledge regarding **flash floods** revealed that they need training on **how to deal with flash floods**, 21 per cent stated that they need knowledge on **rescue operation**, 18 per cent mentioned that they need training on do's & don'ts of flash floods, 17 per cent on **Early warning system** and 13 per cent required knowledge on *the causes and concept of flash floods* (Table-3.20).

**Table-3.20**  
Percentage distribution of respondents Knowledge/Action required for Flash Floods

S.N.	Districts	The causes and concept of flash floods	How to deal with flash floods	Do's & don'ts of flash floods	Early warning system	Rescue operation	Response mechanism	Total
1	Bilaspur	15	23	18	17	19	8	100
2	Chamba	13	32	18	15	13	10	100
3	Hamirpur	10	24	12	29	19	6	100
4	Kangra	9	22	29	15	15	10	100
5	Kinnaur	12	29	22	15	14	9	100
6	Kullu	16	22	24	15	14	8	100
7	L&S	15	15	18	15	27	11	100
8	Mandi	11	22	12	17	34	4	100
9	Shimla	20	24	25	14	10	8	100
10	Sirmour	12	16	20	14	37	1	100
11	Solan	10	34	10	17	27	3	100
12	Una	18	21	15	18	16	12	100
	<i>Total</i>	13	24	18	17	21	7	100

- No clear consensus has been shown in the area which requires more knowledge to deal with flash flood, with knowledge on how to deal with flash flood having marginally higher percentage.

- On further probing as in case of flash flood occurs the 31 per cent of the respondents reported that they will *raise the alarm*, 30 per cent shared that they *put rescue operation team in action*, 27 per cent reported that they will *evacuate victims* and 10 per cent revealed that they will *organize shelter homes*.

**Table-3.21**  
**Percentage distribution of respondents Knowledge/Action required for flash floods**

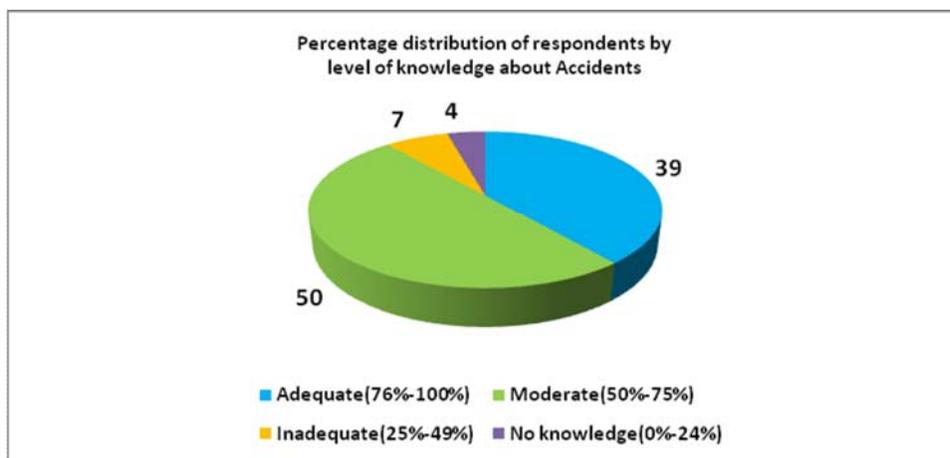
S.N.	Districts	To raise the alarm	To put rescue operation team in action	Evacuate victims	Organize shelter homes	Any other please specify	Total
1	Bilaspur	24	33	29	13	1	100
2	Chamba	19	37	26	12	5	100
3	Hamirpur	25	29	33	13	0	100
4	Kangra	31	29	28	12	0	100
5	Kinnaur	40	25	23	13	0	100
6	Kullu	33	25	32	10	1	100
7	L&S	37	31	22	9	0	100
8	Mandi	33	27	33	5	2	100
9	Shimla	32	36	19	13	0	100
10	Sirmour	54	24	14	4	3	100
11	Solan	35	22	34	9	1	100
12	Una	19	34	29	9	9	100
	<i>Total</i>	<i>31</i>	<i>30</i>	<i>27</i>	<i>10</i>	<i>2</i>	<i>100</i>

- In case of flash flood the raise alarm, to put rescue team in action followed by evacuate victims. The sample population has moderate to adequate level of knowledge with respect to accidents.

□ Thirty nine per cent of the sample population has adequate knowledge about accidents. Fifty per cent of the respondents were having moderate knowledge regarding accidents and 7 per cent of the sample population has inadequate knowledge while, 4 per cent of the respondents had no knowledge about accidents (Table 3.22).

**Table-3.22**  
**Percentage distribution of respondents by level of knowledge about accidents**

S.N.	Districts	Adequate (76%-100%)	Moderate (50%-75%)	Inadequate (25%-49%)	No knowledge (0%-24%)	Total
1	Bilaspur	31	57	6	6	100
2	Chamba	50	41	8	1	100
3	Hamirpur	41	53	4	3	100
4	Kangra	39	57	3	1	100
5	Kinnaur	33	56	10	1	100
6	Kullu	25	44	15	16	100
7	L&S	36	51	10	3	100
8	Mandi	44	48	7	1	100
9	Shimla	46	38	6	9	100
10	Sirmour	24	58	12	5	100
11	Solan	43	51	6	1	100
12	Una	38	52	7	3	100
	<i>Total</i>	39	50	7	4	100



- In case of accidents what action will you take, 28 per cent of the respondents reported that they will try to give first aid, 26 per cent shared that they will call ambulance, 15 per cent reported that they will rush to the site of accident, 12 per cent reported that they will evacuate the victims and 18 per cent revealed that they will *Move the injured to hospital* (Table-3.23)

**Table-3.23**  
Percentage distribution of respondent's Knowledge required for accidents

S.N.	Districts	Rush to the site of accident	Try to give first aid	Call for ambulance	Evacuate victims	Move the injured to hospital	Total
1	Bilaspur	19	22	22	14	23	100
2	Chamba	16	26	30	12	15	100
3	Hamirpur	11	24	32	12	21	100
4	Kangra	15	23	29	17	17	100
5	Kinnaur	23	28	18	13	18	100
6	Kullu	12	29	34	10	14	100
7	L&S	22	31	22	13	12	100
8	Mandi	10	42	20	10	18	100
9	Shimla	17	34	26	11	12	100
10	Sirmour	16	31	23	9	20	100
11	Solan	12	27	35	6	20	100
12	Una	15	27	19	11	28	100
	<i>Total</i>	15	28	26	12	18	100

### 3.2.2 Awareness regarding disaster management plan:

- On probing the results showed that 84 per cent of the populations canvassed were not aware of any disaster management plan prepared by any body, on the other hand only 16 per cent of the respondents were aware of disaster management plan (*Table-3.24*).

**Table-3.24**  
**Awareness regarding disaster management plan**

S.N.	Districts	Yes	No	Total
1	Bilaspur	18	82	100
2	Chamba	15	85	100
3	Hamirpur	25	75	100
4	Kangra	8	92	100
5	Kinnaur	32	68	100
6	Kullu	17	83	100
7	L&S	15	85	100
8	Mandi	11	89	100
9	Shimla	22	78	100
10	Sirmour	10	90	100
11	Solan	12	88	100
12	Una	16	84	100
	<i>Total</i>	16	84	100

- On further probing a direct question was asked from the respondents who were aware regarding the format of disaster management plan, 34 per cent revealed that the disaster management plan is existed in shape of file, 10 per cent revealed that it is in form of loose papers, 20 per cent revealed that it is in form of soft copy, while 29 per cent reported that it is in both in form of file as well as soft copy.

**Table-3.25**  
**Respondents' choice on existed format of Disaster management plan**

S.N.	Districts	In shape of file	Loose paper	Soft copy	Both a and c	Other (specify )	Total
1	Bilaspur	6	16	16	56	6	100
2	Chamba	43	7	21	21	7	100
3	Hamirpur	30	8	20	36	6	100
4	Kangra	30	7	19	37	7	100
5	Kinnaur	40	0	20	31	9	100
6	Kullu	27	18	23	23	9	100
7	L&S	50	33	17	0	0	100
8	Mandi	36	24	20	12	8	100
9	Shimla	52	1	30	16	0	100
10	Sirmour	28	33	17	22	0	100
11	Solan	20	10	23	23	23	100
12	Una	35	3	6	50	6	100
	<i>Total</i>	34	10	20	29	7	100

- When asked a specific question as to whether the disaster management procedure being delegated to lower level staff member, 51 per cent said yes while 49 per cent felt that Disaster management procedure never being delegated to lower level staff members (Table-3.26).

**Table-3.26**  
**Respondents' choice on delegation of Disaster management procedure**

S.N.	Districts	Yes	No	Total
1	Bilaspur	43	57	100
2	Chamba	58	42	100
3	Hamirpur	58	42	100
4	Kangra	37	63	100
5	Kinnaur	57	43	100
6	Kullu	65	35	100
7	L&S	28	73	100
8	Mandi	44	56	100
9	Shimla	49	51	100
10	Sirmour	57	43	100
11	Solan	66	34	100
12	Una	43	57	100
	<i>Total</i>	51	49	100

- ❑ In order to get a deeper insight, it was asked if they have any plan in place for immediate relief work. Altogether a whopping 87 per cent responded said no, only 13 per cent said yes.

**Table-3.27**  
**Plan for Immediate Relief work**

S.N.	Districts	Yes	No	Total
1	Bilaspur	19	81	100
2	Chamba	19	81	100
3	Hamirpur	14	86	100
4	Kangra	7	93	100
5	Kinnaur	23	77	100
6	Kullu	20	80	100
7	L&S	10	90	100
8	Mandi	11	89	100
9	Shimla	9	91	100
10	Sirmour	12	88	100
11	Solan	12	88	100
12	Una	13	87	100
	<i>Total</i>	13	87	100

- ❑ It was found that only 14 per cent of the respondents have resource list ready, 86 per cent of the respondents canvassed admitted that they don't have any resource list ready.

**Table-3.28**  
**Percentage respondents' choice on availability of resource list**

S.N.	Districts	Yes	No	Total
1	Bilaspur	16	84	100
2	Chamba	13	87	100
3	Hamirpur	16	84	100
4	Kangra	6	94	100
5	Kinnaur	26	74	100
6	Kullu	14	86	100
7	L&S	3	98	100
8	Mandi	21	79	100
9	Shimla	7	93	100
10	Sirmour	18	82	100
11	Solan	10	90	100
12	Una	27	73	100
	<i>Total</i>	14	86	100

- ❑ A hypothetical question of any natural disaster occurring right now the respondents were asked that if they have the statistics of their village /panchayat/ block/tehsil/ district like the number of HHS/ population/livestock/infrastructure etc. with them, as many as 75 per cent of the respondents revealed that they don't have such type of information, only 25 per cent of the respondents said yes they have statistics/information regarding their village/panchayat/ block/tehsil/district about the number of HHS/ population/livestock/infrastructure etc

**Table-3.29**  
**Respondents' awareness about basic information around them**

S.N.	Districts	Yes	No	Total
1	Bilaspur	21	79	100
2	Chamba	27	73	100
3	Hamirpur	47	53	100
4	Kangra	7	93	100
5	Kinnaur	47	53	100
6	Kullu	23	77	100
7	L&S	28	73	100
8	Mandi	31	69	100
9	Shimla	23	77	100
10	Sirmour	23	77	100
11	Solan	24	76	100
12	Una	20	80	100
	<i>Total</i>	25	75	100

- ❑ From the respondents who have statistics/information regarding their village/panchayat/ block/tehsil/district about the number of HHS/ population/livestock/infrastructure etc were further

probed to find out the status of information, it was found that 45 per cent of the respondents stated that the information is in public domain, 16 per cent revealed that it is only confined to them, and 45 per cent stated that this information is in public domain as well as confined to themselves (Table-3.30).

**Table-3.30**  
**Respondents view on Status of Basic Information**

S.N.	Districts	In public Domain	Confined to me only	Both (a) and (b)	Total
1	Bilaspur	43	16	41	100
2	Chamba	31	4	65	100
3	Hamirpur	56	6	37	100
4	Kangra	43	17	39	100
5	Kinnaur	59	14	27	100
6	Kullu	42	26	32	100
7	L&S	27	18	55	100
8	Mandi	26	25	49	100
9	Shimla	32	15	52	100
10	Sirmour	47	14	40	100
11	Solan	28	32	40	100
12	Una	18	14	68	100
	<i>Total</i>	39	16	45	100

- It has often been debated that who are most vulnerable in natural disaster. To evaluate this, a direct question was asked from the respondents that in your opinion who are

most vulnerable in natural disaster. Thirteen per cent of the respondents opined that disabled persons are most vulnerable in natural disasters, 12 per cent stated children, 5 per cent stated livestock, 6 per cent state poor people, and 5 per cent stated that women are most vulnerable during natural disasters.

**Table-3.31**  
**Most Vulnerable Strata of Society during natural disaster**

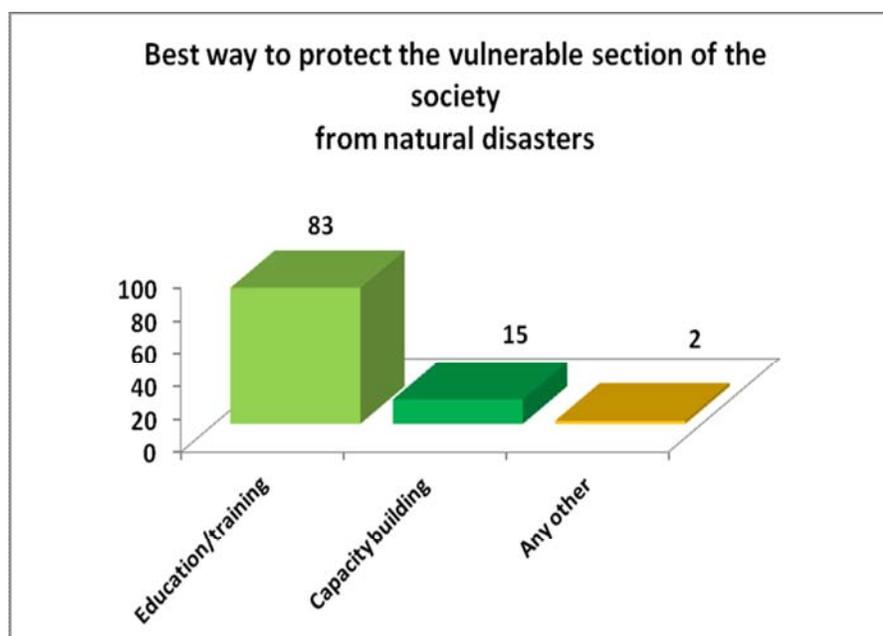
S.N.	Districts	Disabled persons	Children	Livestock	Poor people	Women	all above	Total
1	Bilaspur	15	16	8	7	4	49	100
2	Chamba	8	5	1	7	4	75	100
3	Hamirpur	9	8	3	2	3	74	100
4	Kangra	16	13	7	2	4	57	100
5	Kinnaur	10	4	0	3	2	82	100
6	Kullu	14	14	8	20	5	38	100
7	L&S	18	8	5	8	5	58	100
8	Mandi	16	8	1	3	5	67	100
9	Shimla	26	25	11	10	12	16	100
10	Sirmour	9	11	9	9	9	54	100
11	Solan	4	6	2	5	4	80	100
12	Una	11	9	4	6	3	67	100
	<i>Total</i>	13	12	5	6	5	58	100

- Education has been voted to be the best way to protect the above, as 83 per cent reported that education/training is the best way to protect vulnerable section of the society from

natural disasters, 15 per cent revealed that capacity building is the way to protect vulnerable section of the society from natural disasters (Table-3.32).

**Table-3.32**  
**Respondents' choice on way to protect the vulnerable section of the society from natural disasters**

S.N.	Districts	Education/ training	Capacity building	Any other	Total
1	Bilaspur	70	28	2	100
2	Chamba	90	9	1	100
3	Hamirpur	85	14	0	100
4	Kangra	95	5	0	100
5	Kinnaur	73	27	0	100
6	Kullu	82	14	4	100
7	L&S	80	18	3	100
8	Mandi	90	9	2	100
9	Shimla	79	20	2	100
10	Sirmour	90	9	1	100
11	Solan	73	20	8	100
12	Una	81	16	2	100
	<i>Total</i>	83	15	2	100



- ❑ Only 29 per cent of the respondents canvassed were aware of disaster management Act, 71 per cent of the respondents were not aware about this Act (Table-3.33).

**Table-3.33**  
**Percentage Distribution of respondents regarding awareness about disaster management Act.**

S.N.	Districts	Yes	No	total
1	Bilaspur	24	76	100
2	Chamba	34	66	100
3	Hamirpur	30	70	100
4	Kangra	15	85	100
5	Kinnaur	42	58	100
6	Kullu	29	71	100
7	L&S	30	70	100
8	Mandi	20	80	100
9	Shimla	37	63	100
10	Sirmour	53	47	100
11	Solan	25	75	100
12	Una	27	73	100
	<i>Total</i>	29	71	100



- On proving the results showed that only 31 per cent of the respondents canvassed were aware of National Disaster Management Authority, 69 per cent of the respondents were not aware about this Act (**Table-3.34**).

**Table-3.34**  
**Percentage Distribution of respondents regarding Awareness about National Disaster Management Authority**

S.N.	Districts	Yes	No	Total
1	Bilaspur	27	73	100
2	Chamba	31	69	100
3	Hamirpur	36	64	100
4	Kangra	15	85	100
5	Kinnaur	55	45	100
6	Kullu	39	61	100
7	L&S	28	73	100
8	Mandi	24	76	100
9	Shimla	36	64	100
10	Sirmour	42	58	100
11	Solan	31	69	100
12	Una	28	72	100
	<i>Total</i>	31	69	100



- ❑ Similarly only 25 per cent of the respondents are aware of National Institute of Disaster Management, while 75 per cent of the respondents were not aware about National Institute of Disaster Management (**Table-3.35**).
- ❑ Hence, it can be seen that the knowledge of the general populace about legal matters regarding Disaster Management is quite low.

**Table-3.35**  
**Percentage Distribution of respondents regarding Awareness about National Institute of Disaster Management**

S.N.	Districts	Yes	No	Total
1	Bilaspur	18	82	100
2	Chamba	22	78	100
3	Hamirpur	32	68	100
4	Kangra	14	86	100
5	Kinnaur	33	67	100
6	Kullu	27	73	100
7	L&S	20	80	100
8	Mandi	23	77	100
9	Shimla	35	65	100
10	Sirmour	34	66	100
11	Solan	24	76	100
12	Una	22	78	100
	<i>Total</i>	25	75	100

- ❑ On further probing it has been observed that only 13 per cent of the respondents were aware about India Disaster Resource Network and for 87 per cent of the respondents IDRN is unknown. (**Table-3.36**).

**Table-3.36**  
**Percentage Distribution of respondents regarding Awareness about India Disaster Resource Network (IDRN)**

S.N.	Districts	Yes	No	Total
1	Bilaspur	9	91	100
2	Chamba	14	86	100
3	Hamirpur	16	84	100
4	Kangra	8	92	100
5	Kinnaur	14	86	100
6	Kullu	8	92	100
7	L&S	13	88	100
8	Mandi	12	88	100
9	Shimla	22	78	100
10	Sirmour	16	84	100
11	Solan	13	87	100
12	Una	12	88	100
	<i>Total</i>	13	87	100

- IDRN is a nation-wide electronic inventory of resources that enlists equipments and human resources, collated from district, state and national level Government line departments and agencies. The inventory also has informative details of NGOs and private sector including around 5000 corporate members registered with Confederation of Indian Industry and 33000 builders, contractors and construction companies registered with Builder’s Association of India and other public sector undertakings. To assess the knowledge level a question was asked from the respondents that where IDRN list is available, 93 per cent of the respondents were not aware about this, only 7 per cent of the respondents were aware (**Table-3.37**).

**Table-3.37**  
**Percentage Distribution of respondents regarding awareness about the availability of India Disaster Resource Network (IDRN) list**

S.N.	Districts	Yes	No	Total
1	Bilaspur	5	95	100
2	Chamba	8	92	100
3	Hamirpur	9	91	100
4	Kangra	4	96	100
5	Kinnaur	9	91	100
6	Kullu	4	96	100
7	L&S	8	93	100
8	Mandi	8	92	100
9	Shimla	6	94	100
10	Sirmour	11	89	100
11	Solan	8	92	100
12	Una	7	93	100
	<i>Total</i>	7	93	100

- It is found that more than seventy per cent of the sample population (i.e. 77 per cent) is not aware of any Agency/Authority responsible for disaster management in Himachal Pradesh; only 23 per cent were aware regarding institution responsible for disaster management in Himachal Pradesh (**Table-3.38**).

**Table-3.38**  
**Awareness regarding the Agency/Authority responsible for disaster management in Himachal Pradesh**

S.N.	Districts	Yes	No	Total
1	Bilaspur	34	66	100
2	Chamba	17	83	100
3	Hamirpur	20	80	100
4	Kangra	6	94	100
5	Kinnaur	28	72	100
6	Kullu	35	65	100
7	L&S	5	95	100
8	Mandi	23	77	100
9	Shimla	27	73	100
10	Sirmour	32	68	100
11	Solan	29	71	100
12	Una	25	75	100
	<i>Total</i>	23	77	100

- ❑ Out of all the respondents only 41 per cent have confirmed to be associated with building construction, 59 per cent of the respondents revealed that they were never associated with building construction in any way (Table-3.39).

**Table-3.39**  
**Respondents choice Involving in building construction**

S.N.	Districts	Yes	No	Total
1	Bilaspur	48	52	100
2	Chamba	38	62	100
3	Hamirpur	25	75	100
4	Kangra	27	73	100
5	Kinnaur	44	56	100
6	Kullu	42	58	100
7	L&S	53	48	100
8	Mandi	58	42	100
9	Shimla	56	44	100
10	Sirmour	26	74	100
11	Solan	52	48	100
12	Una	29	71	100
	<i>Total</i>	41	59	100

- ❑ The popular opinion among the respondents is that buildings are not being constructed according to the building codes with about 83 per cent of them **voting against it**.

**Table-3.40**  
**Percentage of respondents' choice on building being constructed according to the building codes**

S.N.	Districts	Yes	No	Total
1	Bilaspur	15	85	100
2	Chamba	16	84	100
3	Hamirpur	12	88	100
4	Kangra	29	71	100
5	Kinnaur	24	76	100
6	Kullu	14	86	100
7	L&S	5	95	100
8	Mandi	9	91	100
9	Shimla	20	80	100
10	Sirmour	18	82	100
11	Solan	12	88	100
12	Una	13	87	100
	<i>Total</i>	17	83	100

- ❑ Respondents have not been able to specify a particular building code under which the building construction should be done with opinion varying even within those who claim to be associated to construction of buildings. Also only about 9 per cent of the respondents were familiar with the concept of retrofitting, 91 per cent of the respondents were not aware at all about the concept of retrofitting, none of them even heard about this concept.
- ❑ Respondents who are aware of the concept of retrofitting have given fairly different modes of retrofitting.

**Table-3.41**  
**Familiarity with the concept of retrofitting**

S.N.	Districts	Yes	No	Total
1	Bilaspur	8	92	100
2	Chamba	3	97	100
3	Hamirpur	6	94	100
4	Kangra	5	95	100
5	Kinnaur	7	93	100
6	Kullu	8	92	100
7	L&S	0	100	100
8	Mandi	12	88	100
9	Shimla	21	79	100
10	Sirmour	12	88	100
11	Solan	5	95	100
12	Una	5	95	100
	<i>Total</i>	9	91	100

- ❑ Forty three per cent of the respondents have claimed that the existing practices related to building construction are proper and safe with respect to earthquakes, while 57 per cent of the respondents revealed that current practices of building construction are not proper and safe with respect to earthquakes (**Table-3.42**).

**Table-3.42**  
Opinion regarding current practices of building construction

S.N.	Districts	Yes	No	Total
1	Bilaspur	29	71	100
2	Chamba	50	50	100
3	Hamirpur	65	35	100
4	Kangra	55	45	100
5	Kinnaur	39	61	100
6	Kullu	23	77	100
7	L&S	50	50	100
8	Mandi	17	83	100
9	Shimla	50	50	100
10	Sirmour	45	55	100
11	Solan	45	55	100
12	Una	40	60	100
	<i>Total</i>	43	57	100

### 3.2.3 Training

- The respondents were asked that they have received any training to deal with disaster, 83 per cent of the sample population has not received any kind of training to deal with disaster. Only seventeen per cent have received training (Table-3.43)



**Table-3.43**  
**Training receive to deal with disasters**

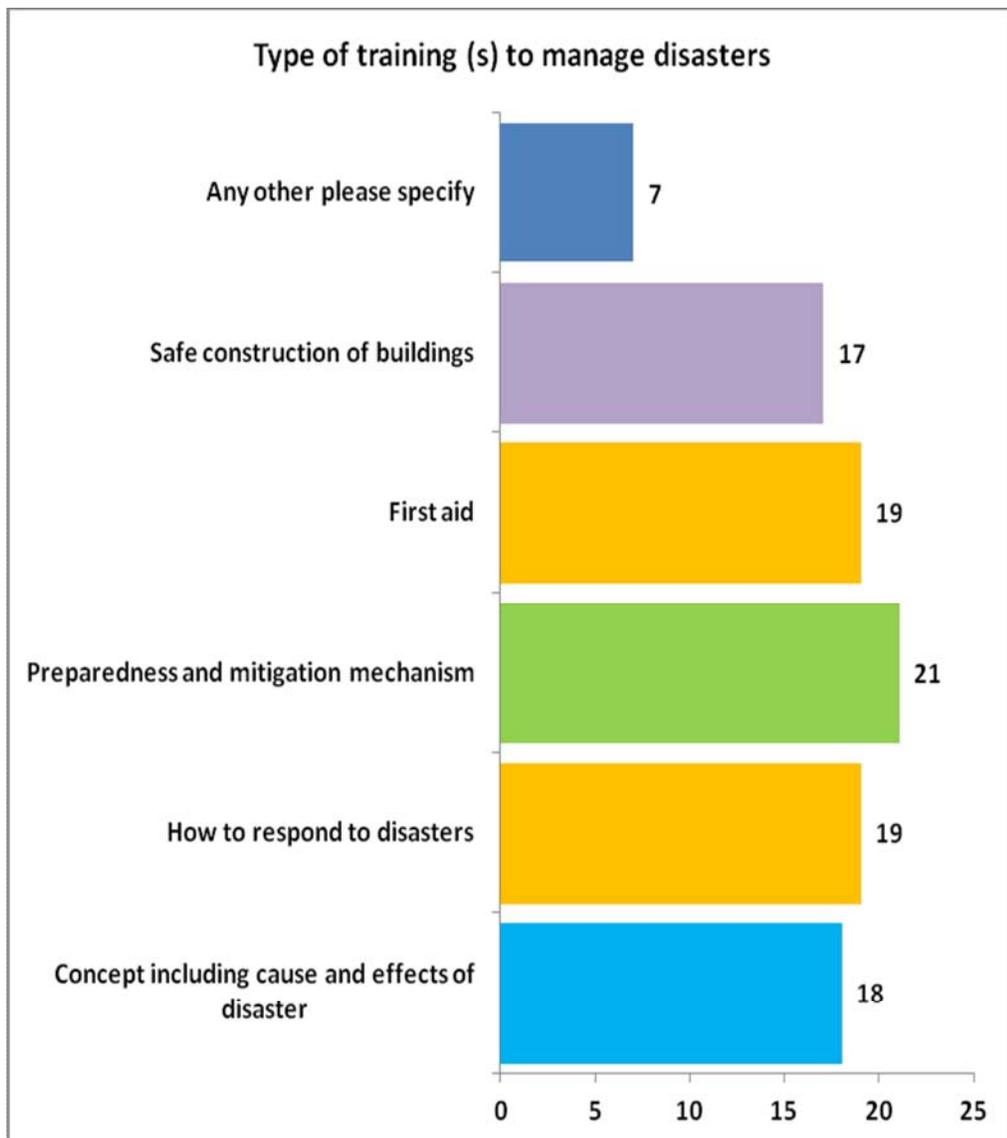
S.N.	Districts	Yes	No	Total
1	Bilaspur	16	84	100
2	Chamba	17	83	100
3	Hamirpur	11	89	100
4	Kangra	9	91	100
5	Kinnaur	27	73	100
6	Kullu	17	83	100
7	L&S	63	38	100
8	Mandi	15	85	100
9	Shimla	26	74	100
10	Sirmour	14	86	100
11	Solan	16	84	100
12	Una	15	85	100
	<i>Total</i>	17	83	100

- The respondents were also asked that they have ever participated in any mock drills related to your area of operation. In this regard 86 per cent of the sample population revealed that they have never taken part in any sort of mock drill related to their area of operation (**Table-3.44**).

**Table-3.44**  
**Participation in Mock Drills**

S.N.	Districts	Yes	No	Total
1	Bilaspur	16	84	100
2	Chamba	14	86	100
3	Hamirpur	11	89	100
4	Kangra	8	92	100
5	Kinnaur	10	90	100
6	Kullu	18	82	100
7	L&S	23	78	100
8	Mandi	9	91	100
9	Shimla	20	80	100
10	Sirmour	11	89	100
11	Solan	11	89	100
12	Una	20	80	100
	<i>Total</i>	14	86	100

❑ On further probing from the respondents that in your view what kind of training(s) should provided to manage disaster. Twenty one per cent of the respondents state that training should be provided on preparedness and mitigation mechanism, 19 per cent each stated that it should be on first aid and response mechanism, 18 per cent revealed that it should be on cause and effects of disaster and 17 per cent state that training should be provided on safe construction of buildings to manage disasters (Table-3.45).

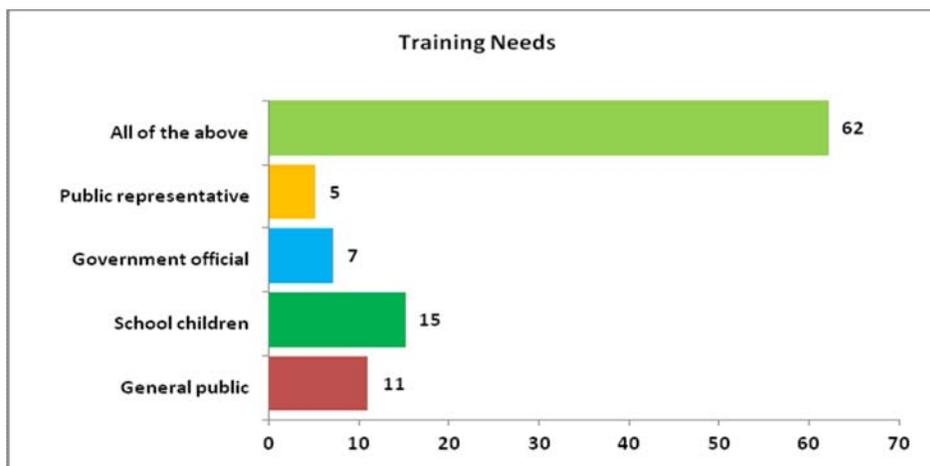


**Table-3.45**  
**Kind of Training needed to be provided to manage disasters**

S.N.	Districts	Concept including cause and effects of disaster	How to respond to disasters	Preparedness and mitigation mechanism	First aid	Safe construction of buildings	Any other please specify	Total
1	Bilaspur	19	18	31	19	9	4	100
2	Chamba	22	25	22	14	11	5	100
3	Hamirpur	22	17	22	22	4	11	100
4	Kangra	17	20	13	12	34	4	100
5	Kinnaur	17	17	27	17	14	9	100
6	Kullu	19	26	19	21	11	5	100
7	L&S	30	25	25	15	3	3	100
8	Mandi	11	15	21	19	25	9	100
9	Shimla	14	10	15	36	13	12	100
10	Sirmour	19	19	14	12	34	2	100
11	Solan	17	21	25	18	17	2	100
12	Una	25	21	29	12	5	8	100
	<b>Total</b>	18	19	21	19	17	7	100

- ❑ It has been further probed that to whom training should be provided. For providing training all the given options are chosen to be in need of training according to the respondents. The given options were school children, general public, government official and public representative. Overall 62 per

cent of the respondents opined that training should be provided to all the stakeholders, i.e. school children, general public, government officials and public representatives (Table-3.46).



**Table-3.46**  
**Training to Stakeholders**

S.N.	Districts	General public	School children	Government official	Public representative	All of the above	Total
1	Bilaspur	17	8	8	7	61	100
2	Chamba	7	6	5	4	78	100
3	Hamirpur	5	47	11	3	35	100
4	Kangra	15	16	7	5	59	100
5	Kinnaur	4	4	2	3	87	100
6	Kullu	14	8	7	8	63	100
7	L&S	21	6	4	4	64	100
8	Mandi	13	9	4	3	71	100
9	Shimla	15	15	11	10	49	100
10	Sirmour	8	5	5	5	76	100
11	Solan	15	5	4	3	74	100
12	Una	8	5	4	7	76	100
	<i>Total</i>	11	15	7	5	62	100

- The respondents were also asked about the relationship between disaster and development. Around 72 per cent of the sample population said that there is strong relationship between disaster and development, and **developmental choices** has greater **impact on disasters**, while 20 per cent have no knowledge about the relation of disaster and development, rest have denied the existence of a relationship between disaster and development (**Table-3.47**).

**Table-3.47**  
**Respondents' choice in relation to development and disaster**

S.N.	Districts	Yes, developmental choices affect impact of disasters	No, there is no link between development and disasters	I don't know	Total
1	Bilaspur	79	4	17	100
2	Chamba	67	4	30	100
3	Hamirpur	88	3	9	100
4	Kangra	58	9	33	100
5	Kinnaur	87	4	9	100
6	Kullu	74	2	23	100
7	L&S	95	3	3	100
8	Mandi	81	3	16	100
9	Shimla	63	25	12	100
10	Sirmour	89	3	8	100
11	Solan	62	6	32	100
12	Una	67	11	22	100
	<b>Total</b>	72	8	20	100

- ❑ 54 per cent of the sample population has revealed that Development which is not hazard resistant increases disaster risk. 25 per cent of the respondents feel that development always adds to disasters, 14 per cent stated that development always decreases disaster risk and 8 per cent thought that there is no relation of development and disaster (Table-3.48).

**Table-3.48**  
**Respondents' choice on the Impact of Disaster on Development**

S.N.	Districts	Development which is not hazard resistant increases disaster risk	Development always add to the disasters	Development always decreases disaster risk	There is no relation of development and disaster	Total
1	Bilaspur	54	28	11	8	100
2	Chamba	41	21	32	7	100
3	Hamirpur	63	15	15	6	100
4	Kangra	52	25	18	4	100
5	Kinnaur	70	17	9	5	100
6	Kullu	65	20	7	8	100
7	L&S	63	28	8	3	100
8	Mandi	53	30	13	4	100
9	Shimla	37	34	16	14	100
10	Sirmour	44	41	10	5	100
11	Solan	67	21	1	12	100
12	Una	59	11	16	14	100
	<i>Total</i>	54	25	14	8	100

- ❑ Further 71 per cent of the sample population has revealed that Disaster can turn the development clock backward, 22 per cent of the respondents feel that disasters diverts the development funds for relief operations, 5 per cent stated that disasters bring more funds for development, 3 per cent thought that disasters are generally local phenomenon and don't do much harm (Table-3.49).

**Table-3.49**  
**Negative impact of disaster on development**

S.N.	Districts	Disaster can turn the development clock back	Disasters diver the development funds for relief operations	Disasters bring more funds for development	Disasters are generally local phenomenon and don't do much harm	Total
1	Bilaspur	53	38	7	2	100
2	Chamba	70	23	4	2	100
3	Hamirpur	74	20	2	3	100
4	Kangra	73	20	4	3	100
5	Kinnaur	68	29	1	2	100
6	Kullu	62	31	5	2	100
7	L&S	65	28	8	0	100
8	Mandi	66	22	7	5	100
9	Shimla	75	19	5	2	100
10	Sirmour	66	23	10	1	100
11	Solan	84	10	2	4	100
12	Una	74	20	3	2	100
	<i>Total</i>	<i>71</i>	<i>22</i>	<i>5</i>	<i>3</i>	<i>100</i>

- ❑ Seventy per cent of the sample population has said that disasters can be reduced with mitigation and preparedness, while 30 per cent believe that disasters are natural phenomenon and they can't be stopped (Table-3.50).

**Table-3.50**  
**Respondents' choice on possibility to reduce disasters**

S.N.	Districts	Disaster are natural phenomenon and they can't be stopped	Disaster can be reduced with mitigation and preparedness	total
1	Bilaspur	19	81	100
2	Chamba	30	70	100
3	Hamirpur	10	90	100
4	Kangra	40	60	100
5	Kinnaur	14	86	100
6	Kullu	15	85	100
7	L&S	33	68	100
8	Mandi	27	73	100
9	Shimla	63	37	100
10	Sirmour	14	86	100
11	Solan	39	61	100
12	Una	16	84	100
	<i>Total</i>	30	70	100

- ❑ On further probing it has been found that 22 per cent of the respondents feels that mainstreaming of disaster risk reduction in development can play important role in managing disasters, 16 per cent opined that Women empowerment, 9 per cent Gender Mainstreaming, 8 per cent Child Protection and 35 per cent thought all the mentioned options are important for disaster management.

**Table-3.51**  
**Respondents views on preventive measure for disaster management**

S.N.	Districts	Women empowerment	Gender Mainstreaming	Mainstreaming of Disaster risk Reduction in development	Child Protection	Only B and C	All of the above	None of the above	Total
1	Bilaspur	14	17	26	5	7	29	2	100
2	Chamba	15	10	10	13	6	42	5	100
3	Hamirpur	6	5	19	7	3	57	3	100
4	Kangra	16	16	17	21	15	11	4	100
5	Kinnaur	6	7	27	6	16	36	2	100
6	Kullu	15	8	26	11	4	35	1	100
7	L&S	6	8	42	6	0	36	2	100
8	Mandi	81	3	16	0	0	0	0	100
9	Shimla	8	8	35	6	10	32	0	100
10	Sirmour	8	9	18	8	13	44	0	100
11	Solan	8	6	23	8	8	47	0	100
12	Una	10	10	13	6	4	56	1	100
	<i>Total</i>	16	9	22	8	8	35	2	100

## Chapter-IV

### 4. Rural Population

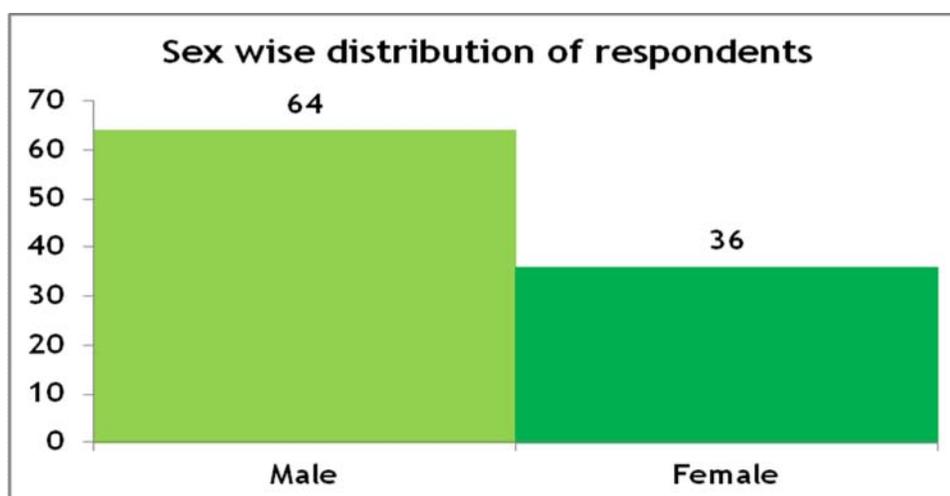
#### 4.1 Profile of Respondents:

##### 4.1.1 Socio-economic and demographic Profile of the respondents

Himachal Pradesh is a somewhat stratified Society both socially and economically. All Major religious are found here including its community/ cast categories. The diversity in terms of educational attainment, occupation, class, etc. is minifies in Himachal Pradesh. An ideal sample should be representative of the larger society in all respects. It should be large enough to include the microcosm and extensive enough to include all geographical regions of Himachal Pradesh. This study satisfies this requirement in both ways.

##### 4.1.2 Sex wise distribution of Sample respondents

A total of 4476 respondents from across the rural part of Himachal Pradesh were interviewed using a structure questionnaire/Schedule. The questionnaire was designed in such way that a comprehensive understanding about the *Existing Knowledge Level, Awareness and Preventive Practices (KAP) of Disaster Management in Himachal Pradesh* is obtained. Of the total rural population canvassed the gender composition of the sample shows 64 per cent were males and 36 per cent females.



**Table-4.1**  
**Sex wise distribution of Sample respondents**

S.N.	Districs	Sex		
		Male	Female	Total
1	Bilaspur	61	39	100
2	Chamba	73	27	100
3	Hamirpur	63	37	100
4	Kangra	78	22	100
5	Kinnaur	69	31	100
6	Kullu	74	26	100
7	L&S	62	38	100
8	Mandi	31	69	100
9	Shimla	71	29	100
10	Sirmour	57	43	100
11	Solan	68	32	100
12	Una	67	33	100
	<i>Total</i>	<i>64</i>	<i>36</i>	<i>100</i>

#### 4.1.3 Age wise distribution of Sample respondents

Age wise distribution of respondents shows that in all 16 per cent of the population canvassed were between the age group of 18-25, 25-45 were constituted 20 per cent, 28 per cent were in the age group of 35-45, 19 per cent were in 45-55 age group, 12 per cent were in 55-65 age group and while the remaining were in the age group of 65 +

**Table-4.2**  
Age wise distribution of Sample respondents

S.N.	Districts	Age (in years)						Total
		18-25	25-35	35-45	45-55	55-65	65+	
1	Bilaspur	21	25	29	18	4	3	100
2	Chamba	25	31	19	15	9	1	100
3	Hamirpur	22	16	27	22	8	6	100
4	Kangra	9	13	25	21	21	10	100
5	Kinnaur	16	29	24	19	7	4	100
6	Kullu	11	21	30	24	14	2	100
7	L&S	10	12	32	18	15	13	100
8	Mandi	25	22	30	14	7	3	100
9	Shimla	18	22	33	16	8	4	100
10	Sirmour	11	28	29	20	8	3	100
11	Solan	15	14	31	23	13	5	100
12	Una	17	19	23	21	13	7	100
	<b>Total</b>	16	20	28	19	12	5	100

#### 4.1.4 Marital Status wise distribution of Sample respondents

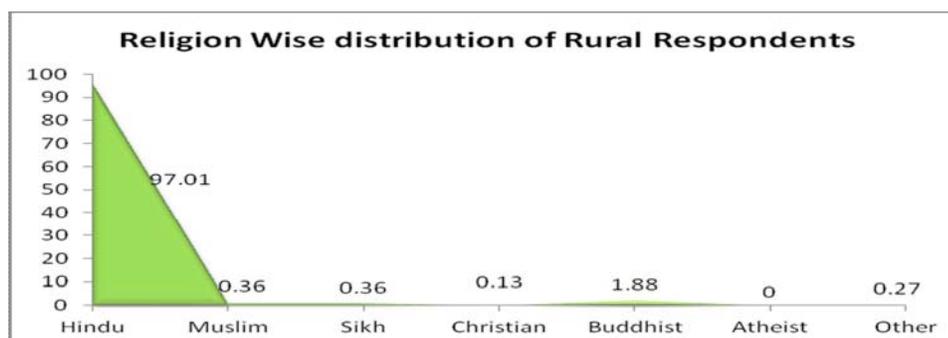
Out of the total sample, 77 per cent are married and 19 per cent are unmarried and the rest is composed of widows, single and divorce etc.

**Table-4.3**  
Marital Status wise distribution of Sample respondents

S.N.	Districts	Marital Status					Total
		Unmarried	Married	Divorce	Widowed	Single	
1	Bilaspur	18	78	2	2	0	100
2	Chamba	27	70	1	0	1	100
3	Hamirpur	21	74	1	2	2	100
4	Kangra	9	86	0	4	0	100
5	Kinnaur	23	76	0	1	0	100
6	Kullu	10	85	0	4	0	100
7	L&S	27	73	0	0	0	100
8	Mandi	25	73	1	1	0	100
9	Shimla	18	79	0	1	3	100
10	Sirmour	12	87	0	0	1	100
11	Solan	42	45	0	0	13	100
12	Una	19	74	1	5	1	100
	<b>Total</b>	19	77	0	2	2	100

#### 4.1.5 Religion wise distribution of Sample respondents

Religious affiliation of respondents shows that Hindu are a majority (97 per cent) followed by Buddhists' Muslims; and others.



**Table-4.4**  
Religion wise distribution of Sample respondents

S.N.	Districts	Religion							Total
		Hindu	Muslim	Sikh	Christian	Buddhist	Atheist	Other	
1	Bilaspur	99	0	0	1	0	0	0	100
2	Chamba	98	1	0	0	0	0	0	100
3	Hamirpur	100	0	0	0	0	0	0	100
4	Kangra	100	0	0	0	0	0	0	100
5	Kinnaur	69	0	0	1	30	0	1	100
6	Kullu	97	0	0	0	0	0	2	100
7	L&S	55	0	0	2	43	0	0	100
8	Mandi	100	0	0	0	0	0	0	100
9	Shimla	99	0	0	0	0	0	0	100
10	Sirmour	97	0	3	0	0	0	0	100
11	Solan	98	1	0	0	0	0	0	100
12	Una	98	1	1	0	0	0	0	100
	<b>Total</b>	97.01	0.36	0.36	0.13	1.88	0	0.27	100

#### 4.1.6 Educational Level wise distribution of Sample respondents

The educational status of the respondents' shows that majority of the respondents (37 per cent) have metric level education followed by middle (20 per cent), secondary (16 per cent), and primary education 12 per cent. Overall

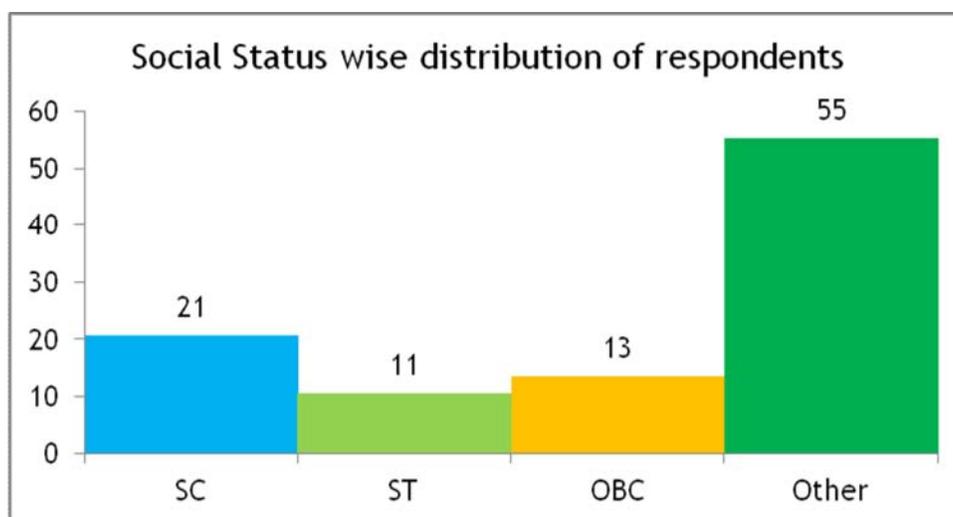
94 per cent of the population canvassed was literate, while 6 per cent were illiterate.

**Table-4.5**  
**Educational Level wise distribution of Sample respondents**

S.N.	Districts	Educational Status						Total
		Illiterate	Primary	Middle	Matric	Secondary	other	
1	Bilaspur	2	10	13	22	30	22	100
2	Chamba	8	13	22	25	22	10	100
3	Hamirpur	4	5	12	34	29	16	100
4	Kangra	8	12	34	33	10	3	100
5	Kinnaur	1	14	12	34	23	16	100
6	Kullu	9	26	20	20	12	14	100
7	L&S	12	12	7	40	15	15	100
8	Mandi	3	7	13	76	0	0	100
9	Shimla	5	13	19	44	16	3	100
10	Sirmour	9	18	18	31	14	11	100
11	Solan	3	17	10	20	28	22	100
12	Una	5	7	23	34	18	13	100
	<i>Total</i>	6	12	20	37	16	9	100

**4.1.7 Social Status wise distribution of Sample respondents**

According to the survey, 21 per cent of the respondents were of SCs, 11 per cent were STs, 13 per cent were OBCs and 55 per cent were of general category.



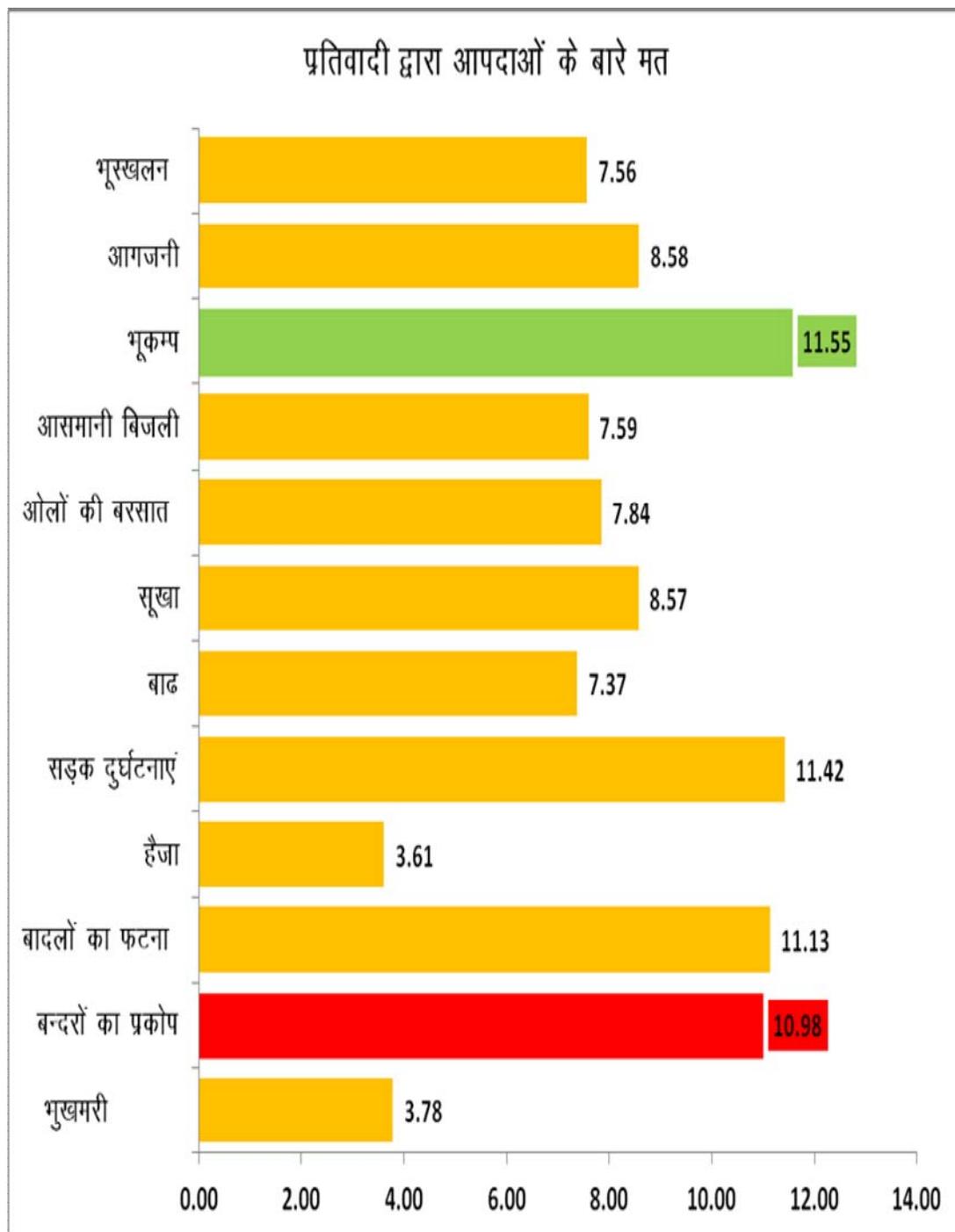
**Table-4.6**  
**Social Status wise distribution of Sample respondents**

S.N.	Districts	Social Status				
		SC	ST	OBC	other	Total
1	Bilaspur	20	0	2	78	100
2	Chamba	11	42	3	44	100
3	Hamirpur	23	1	7	68	100
4	Kangra	18	7	37	38	100
5	Kinnaur	8	86	1	6	100
6	Kullu	45	4	3	48	100
7	L&S	2	97	2	0	100
8	Mandi	14	2	8	76	100
9	Shimla	23	1	0	76	100
10	Sirmour	24	1	18	58	100
11	Solan	34	2	5	59	100
12	Una	16	2	28	54	100
	<i>Total</i>	<i>21</i>	<i>11</i>	<i>13</i>	<i>55</i>	<i>100</i>

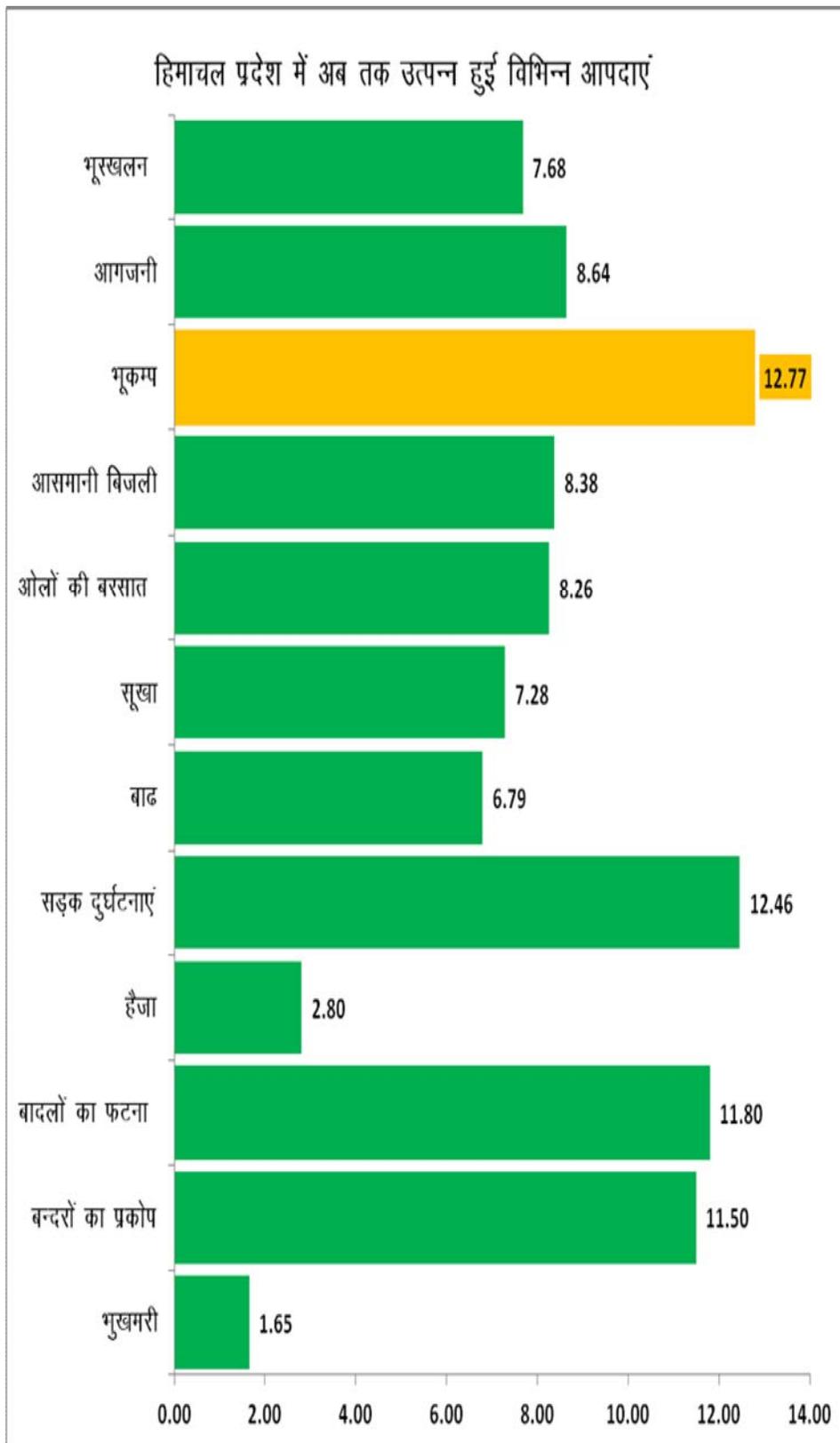
## 4.2 Knowledge/ Awareness/ Practices of Respondents

### 4.2.1 Attitude regarding Disasters:

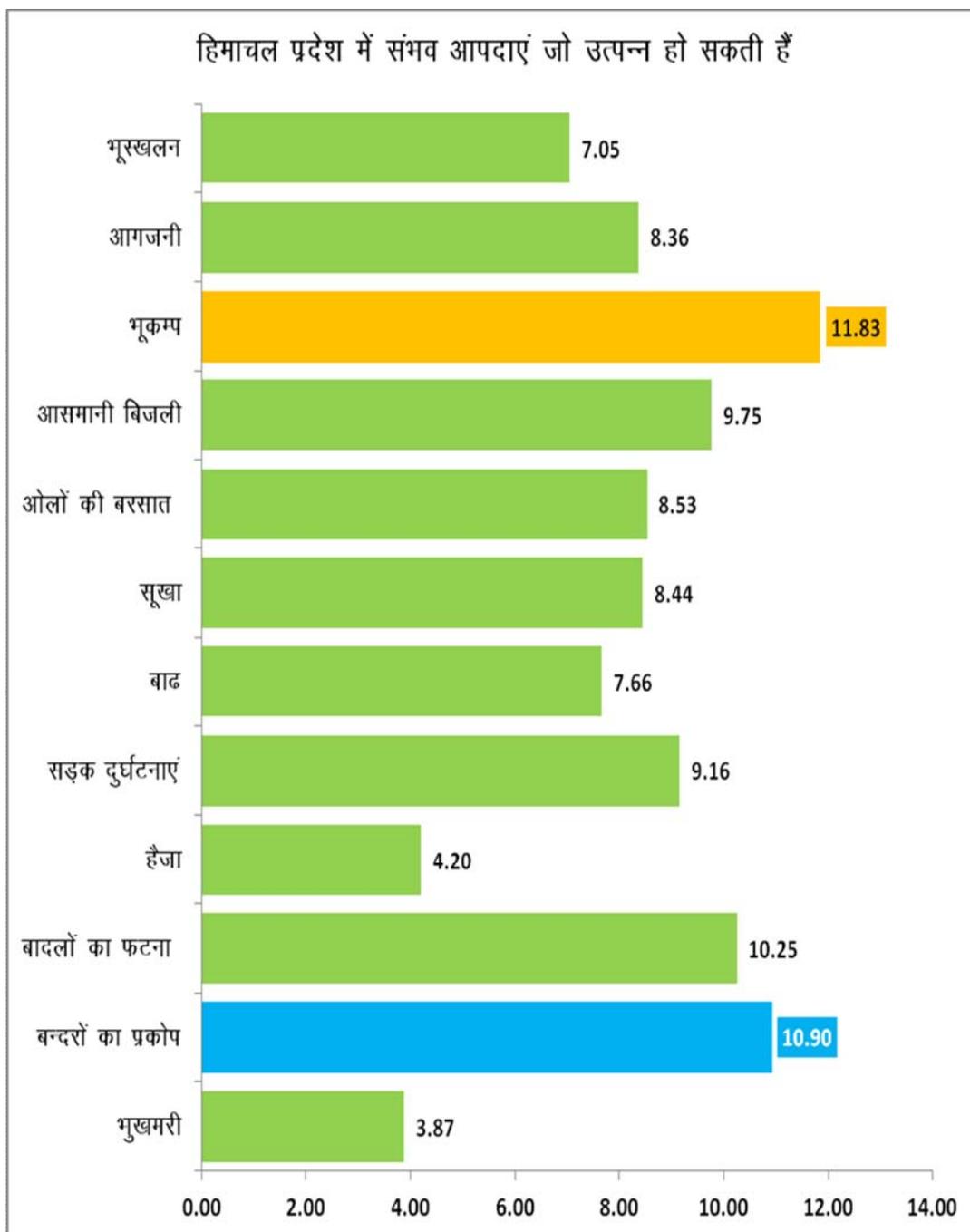
- On probing the results showed that out of a total of 4476 respondents a majority of 12 per cent of the population canvassed believe that the hazards which poses biggest threat to then/state is earthquake, closely followed by 11 per cent who believe that road accidents, monkey menace and cloud bursts are hazards threat they are facing, 9 per cent believe that fire and draught are the biggest threat while 8 per cent each believe that landslides, lightening, hail Storms are the biggest hazards.



- Nearly all the below mentioned hazards have in some way affected Himachal Pradesh at one time or another. Earthquakes seems to have remained in the mind of the majority 12.77 per cent followed by road accidents, monkey menace and cloud bursts.



- A question was put to the respondents as to what major threats/hazards they feared would impact their lives in the near future. Monkey menace seems to be the immediate hazards likely to affect their lives followed by earthquakes and cloud bursts.



- There is clearly a marked difference between the population who have heard and those who have faced a disaster. More than half of the sample population seems to have faced some sort of hazards in their lives.

**Table-4.7**

जिला	gka	ugha	; kn ugha	tKM+
बिलासपुर	17	81	2	100
चम्बा	66	20	14	100
हमीरपुर	67	33	0	100
कांगड़ा	55	25	20	100
किन्नौर	95	5	1	100
कुल्लू	66	28	7	100
लाहौल स्पिति	90	10	0	100
मण्डी	39	56	5	100
शिमला	53	42	5	100
सिरमौर	51	43	6	100
सोलन	14	86	0	100
उना	72	21	7	100
tKM+	54	38	8	100

- 60 per cent of the sample population seems to have faced the hazards happening in front of their eyes.

**Table-4.8**

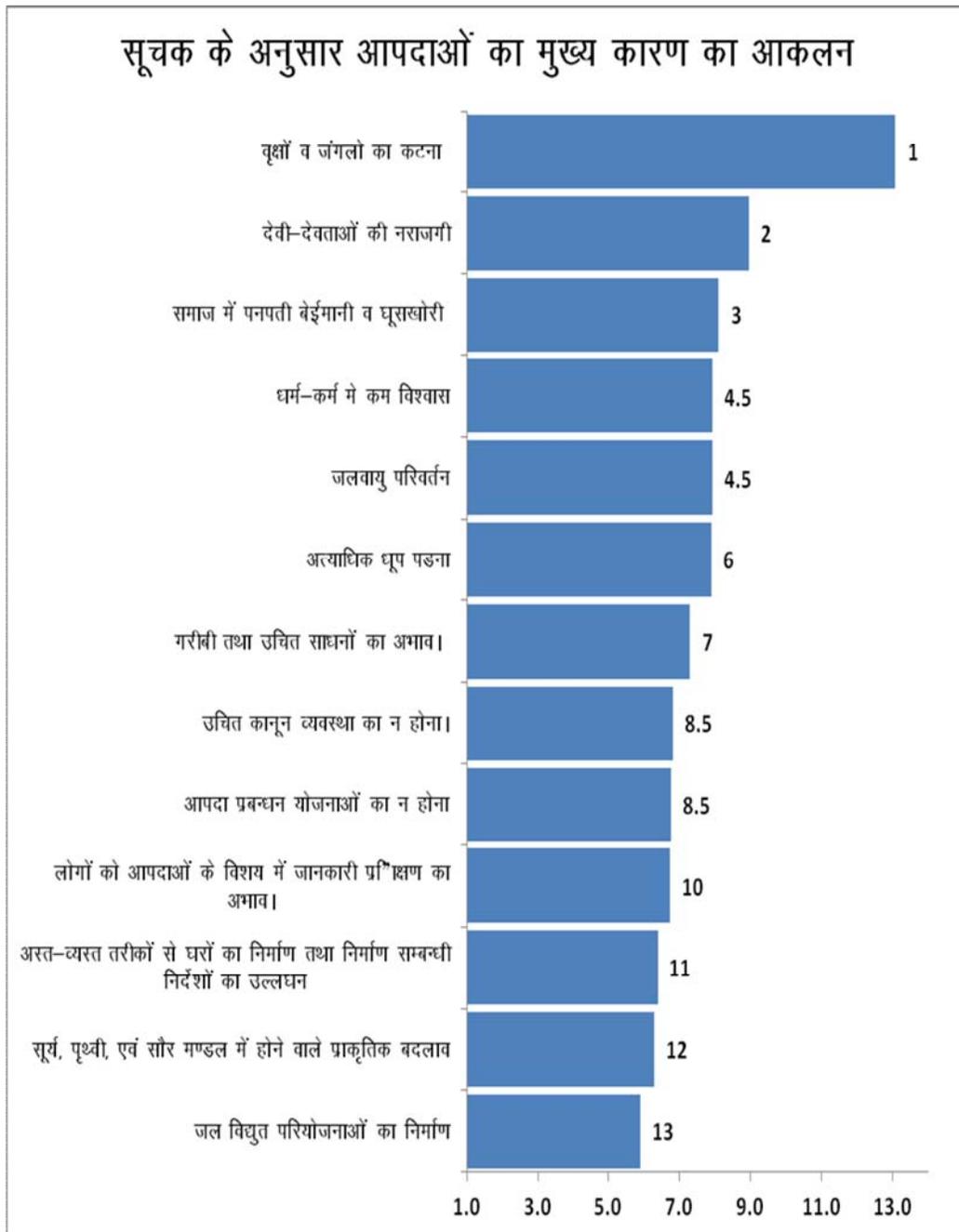
ftyk	gka	ugha	; kn ugha	tKM+
बिलासपुर	28	69	2	100
चम्बा	77	13	10	100
हमीरपुर	69	30	0	100
कांगड़ा	50	23	27	100
किन्नौर	95	3	2	100
कुल्लू	69	18	12	100
लाहौल स्पिति	98	2	0	100
मण्डी	53	43	4	100
शिमला	64	24	12	100
सिरमौर	62	36	2	100
सोलन	47	53	0	100
उना	66	33	2	100
tKM+	60	30	10	100

- Only 14 per cent of the sample population seems to have neither heard nor faced hazards of any kind in their lives 86 per cent of the sample population have heard of hazards.

**Table-4.9**

ftyk	gka	ugha	; kn ugha	tKM
बिलासपुर	85	9	6	100
चम्बा	99	1	0	100
हमीरपुर	93	7	0	100
कांगड़ा	62	16	22	100
किन्नौर	97	3	0	100
कुल्लू	96	2	2	100
लाहौल स्पिति	100	0	0	100
मण्डी	90	6	4	100
शिमला	84	7	8	100
सिरमौर	98	2	0	100
सोलन	98	2	0	100
उना	81	16	3	100
tKM	86	8	6	100

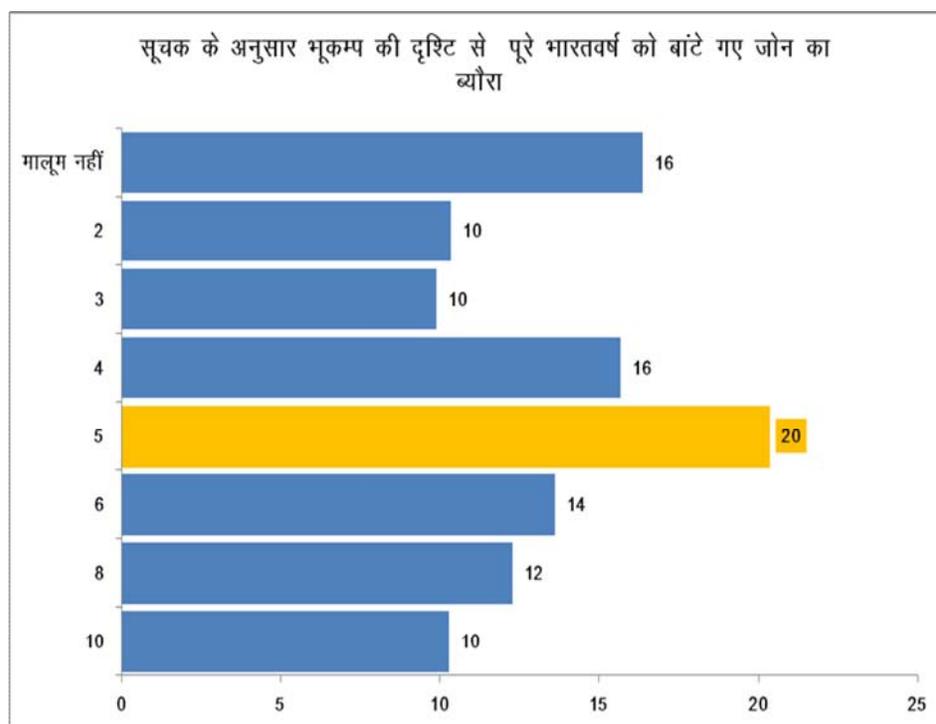
- The state of Himachal Pradesh is prone to various hazards both natural and manmade. A question was put to the sample population to rank in order of 1-13 (one for the mostly occurred and 13 for the least).
- Sample rural population has pointed out that deforestation is a major reason for disaster and ranked it first. It is interesting to note that a lot of the respondents believe wrath of gods and lack of faith in god contributes to be cause of disasters and ranked it second. Setting of the power projects in the state seems to have contributed the least to disasters and was ranked 13<sup>th</sup>.



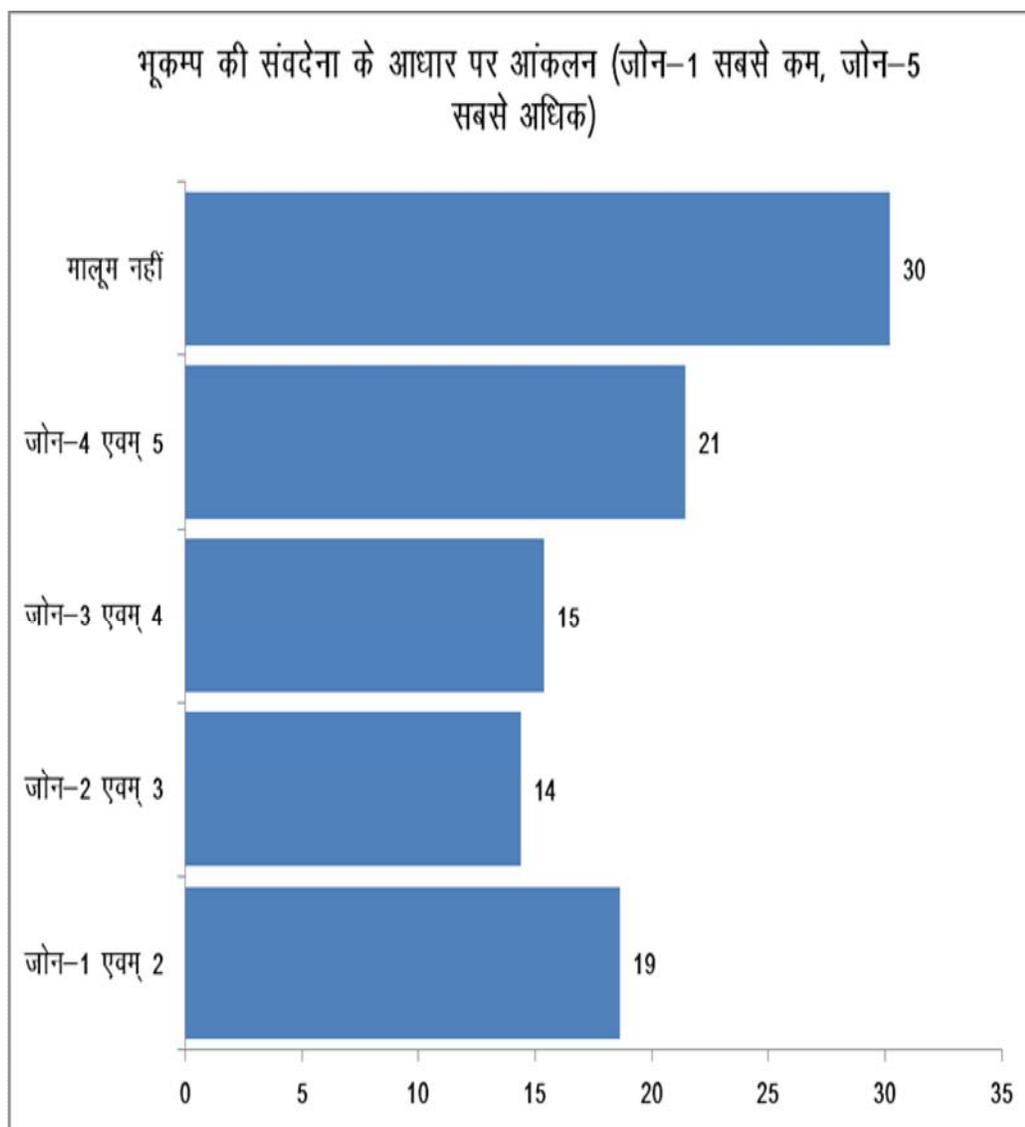
- The MSK (Medvedev-Sponheuer-Karnik) intensity broadly associated with the various seismic zones is VI (or less), VII, VIII and IX (and above) for Zones 2, 3, 4 and 5, respectively, corresponding to Maximum Considered Earthquake (MCE). The IS code follows a dual design philosophy:

- (a) Under low probability or extreme earthquake events (MCE) the structure damage should not result in total collapse, and
- (b) Under more frequently occurring earthquake events, the structure should suffer only minor or moderate structural damage. The specifications given in the design code (IS 1893: 2002) are not based on detailed assessment of maximum ground acceleration in each zone using a deterministic or probabilistic approach. Instead, each zone factor represents the effective period peak ground accelerations that may be generated during the **maximum considered earthquake** ground motion in that zone.

□ In this context to assess the awareness level the respondents were asked as to in how many earthquake zones India is divided into. They were asked to tick the correct answer from a multiple set of answers as shown in table below. Only 20 per cent of the sample population could give the correct answer.



- ❑ The state of Himachal Pradesh lies almost entirely in the Himalayan Mountains, and is part of the Punjab Himalayas. Due to its location it weathers dozens of mild earthquakes every year. Large earthquakes have occurred in all parts of Himachal Pradesh, the biggest being the Kangra Earthquake of 1905.
- ❑ The Himalayan Frontal Thrust, the Main boundary Thrust, the Krol, the Giri, Jutogh and Nahan thrusts lie in this region. Besides that there are scores of smaller faults, like the Kaurik Fault which triggered the 1975 earthquake. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located further away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes.
- ❑ Chamba, Kullu, Kangra, Una, Hamirpur, Mandi, and Bilaspur Districts lie in Zone V. The remaining districts of Lahual and Spiti, Kinnaur, Shimla, Solan and Sirmaur lie in Zone IV. Since the earthquake database in India is still incomplete, especially with regards to earthquakes prior to the historical period (before 1800 A.D.), these zones offer a rough guide of the earthquake hazard in any particular region and need to be regularly updated (See also: GSHAP Hazard Map for Himachal Pradesh).
- ❑ In this context it was asked from the sample population that in which zone does Himachal Pradesh falls. Only 21 per cent of the sample population could give the right answer that Himachal Pradesh falls in category 4 and 5 zone, while 34% of the sample rural population believes that Himachal Pradesh lies in Zone 4 with respect to sensitivity to earthquakes the same percentage of the respondents lack knowledge about sensitivity of Himachal Pradesh to earthquakes.



- The respondents were asked to tick a statement From a Multiple set of statements that fitted the statement’s “are you aware that how sensitive is Himachal Pradesh to earthquakes”. A majority of 26 per cent of the respondents rightly felt that Himachal Pradesh is highly sensitive to disasters since it falls into zone 4 and 5. While 23 per cent feels that there is nothing sensitive to earthquakes since the State falls into zone 2 and 3 category. 34 percent of the sample population did not have an opinion on this.

**Table-4.10**

I p d ds vud kj i n s k e a H k d E i d h n f V l s l o n u k h y r k					
जिला	I kekl; D; kfid HkwdEi dh nf•V l s bl dk vf/kdkak {ks= tku&2 ; k tku&3 ea i Mrk gS	I onu•khy D; kfid i n s k d k d y {ks= tku&4 ea i Mrk gS	vfr I onu•khy D; kfid bl dk d y {ks= tku&4 o tku&5 ea i Mrk gS	ekye ugh	tkM+
बिलासपुर	2	4	44	50	100
चम्बा	27	28	25	20	100
हमीरपुर	11	12	33	44	100
कांगड़ा	21	12	28	39	100
किन्नौर	2	5	25	68	100
कुल्लू	27	25	26	21	100
लाहौल स्पिति	10	7	52	32	100
मण्डी	13	15	26	45	100
शिमला	48	8	10	35	100
सिरमौर	23	19	48	10	100
सोलन	0	0	0	100	100
उना	28	24	25	23	100
जोड़	23	17	26	34	100

- Respondents were asked to tick an option from multiple set of options as to what would they do in case an earthquake strikes right now. 42 per cent revealed that they would run away from the house, 22 per cent believes that they would sit under the table, 7 per cent state that they would remember their god and pray.

Table-4.11

ftyk	rj ar ckgj Hkixxa	?kj ds l j f{kr dejs ea tk, xa	; gha cBdj Hkxoku dks ; kn djxa	fdl h etar Vdy ; k r [kr ds unps Nij dj vi us dks cpk, xa	ekyue ugh D; k djxa	tKM+
बिलासपुर	72	1	1	24	3	100
चम्बा	9	7	21	9	54	100
हमीरपुर	64	1	0	33	2	100
कांगड़ा	12	5	1	14	67	100
किन्नौर	32	5	3	59	1	100
कुल्लू	27	28	30	8	7	100
लाहौल स्पिति	57	2	0	42	0	100
मण्डी	57	3	6	27	8	100
शिमला	48	20	17	11	5	100
सिरमौर	60	4	1	34	2	100
सोलन	53	17	0	28	3	100
उना	64	0	1	31	4	100
tKM+	42	8	7	22	21	100

- Respondents were asked to tick an option from multiple set of options as to what would they do in case an earthquake strikes during travelling. Nearly 41 per cent have said that if faced by earthquake while traveling in a vehicle it is safe to leave the vehicle and stand on the road while 29 per cent believe it is safe to stay inside the vehicle after parking it far from bridges or buildings.

**Table-4.12**

vi uh xkMh ea tkrs l e; gks okys HkudEi ds ekeys ea i froknh dk fodYi					
ftyk	rj ar xkMh l s ctgj vk tk, xa vkj l Md ij tgka dgh Hkh gks ] [kMs jgxs	xkMh [kMh dj utnhd gh fdl h edku dh nhokj dk l gkj yxj [kMs jgxs rikfd fxj u tk,	xkMh dks igy vFkok fdl h bekjr l s nij [kMk dj xkMh ds Hkhrj gh cBs jgax	xkMh dh xfr c<tdj nij Hkxus dk c; ki dj xa	t kM+
बिलासपुर	17	0	82	1	100
चम्बा	31	29	10	30	100
हमीरपुर	72	1	27	0	100
कांगड़ा	32	15	30	22	100
किन्नौर	28	2	57	13	100
कुल्लू	19	23	18	40	100
लाहौल स्पति	68	3	28	0	100
मण्डी	53	9	31	7	100
शिमला	20	33	40	7	100
सिरमौर	52	18	29	1	100
सोलन	60	4	4	32	100
उना	72	4	5	18	100
t kM+	41	14	29	15	100

□ Respondents were asked to tick the correct statement from a multiple set of statements as to what would they do when their house has been flooded. 68 percent of the respondent's stated that after entering house they would switch off electrical supply so that wet things may not conduct electricity. Also 15 per cent of the respondents stated that they would drain out the water from their house, 11 per cent believed that they would switch on all the light of their house to increase the visibility.

**Table-4.13**

?kj ea ck< dk i kuh ?kd tkus ds ckn ?kj ea n'ckjk nkf[ky gkus ij ifroknh dk fodYi					
ftyk	rj r i kuh dks ckj fudkyxA	ij s ?kj ea fctyh dh cfr; ka txk, xa rkfd l c dN Bhd l s ns[k l ds	rj r fctyh ds i qkka dks pyk, xa rkfd i kuh l qk tk, s	?kj ea i osk djus l s igys fctyh dh l lykbz dks cln dj nxa rkfd fxs Q.kl ; k vl; OLRvka l sgfk u yxs A	tKM+
बिलासपुर	31	0	0	69	100
चम्बा	19	37	31	12	100
हमीरपुर	2	0	1	97	100
कांगड़ा	20	4	2	74	100
किन्नौर	4	2	3	92	100
कुल्लू	24	32	32	12	100
लाहौल स्पिति	0	0	0	100	100
मण्डी	14	3	5	78	100
शिमला	4	37	2	57	100
सिरमौर	15	1	1	83	100
सोलन	24	2	1	74	100
उना	9	2	0	89	100
tKM+	15	11	6	68	100

- A question as to how your house is built and who decides how it is to be built was asked from the target group. They were asked to tick the option from multiple set of options as is given in table below. 29 per cent each of the respondents stated that they themselves along with head mistry (mason & carpenter) would decide on the design of the house. Nearly 31 per cent of the respondents stated that Engineers & Architects would be consulted.

**Table-4.14**

i froknh dk xkbb ds Hkhrj ; k ckgj ?kj fuekZk ds fy, fy; s x, Q9 ys dk fodYi						
ftyk	b7t hfuf; j	vkrfdMjV	Lo; a	xkbb dk fel=h	ekye ugha	t kM+
बिलासपुर	0	3	57	40	1	100
चम्बा	28	34	26	7	5	100
हमीरपुर	8	24	14	54	0	100
कांगड़ा	16	13	27	28	16	100
किन्नौर	3	16	14	66	0	100
कुल्लू	30	9	9	31	21	100
लाहौल स्पिति	13	7	18	62	0	100
मण्डी	17	21	35	25	2	100
शिमला	27	9	13	24	27	100
सिरमौर	15	9	55	21	1	100
सोलन	0	3	53	13	31	100
उना	11	16	31	40	1	100
t kM+	16	15	29	29	11	100

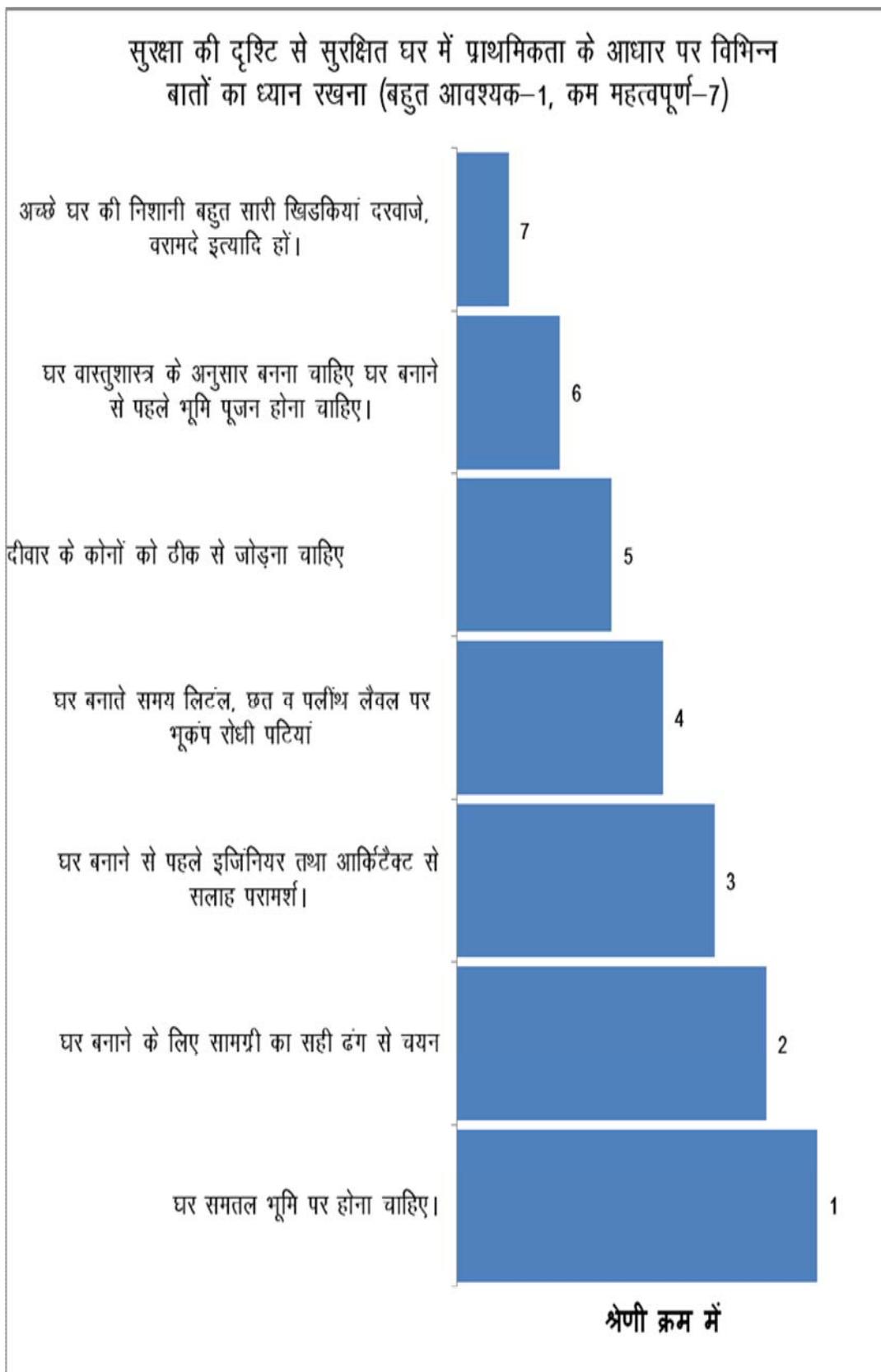
- ❑ A direct question was asked as to when constructing a house is it ever discussed to make the house safe. 70 per cent of the respondents have said that safety is kept in mind while constructing a house.
- ❑ Among the things that should be thought of while constructing a house foremost are selections of good quality materials and to make sure that house is being constructed on a flat land. Lots of

doors, windows and verandas are the least concern while constructing a house.

**Table-4.15**

?kj dks [krjka l s l gjf{kr cukus ds fy, ppkZ ea i froknh fodYi			
ftyk	gka	ugha	tKM+
बिलासपुर	88	12	100
चम्बा	21	79	100
हमीरपुर	96	4	100
कांगड़ा	57	43	100
किन्नौर	97	3	100
कुल्लू	83	17	100
लाहौल स्पति	100	0	100
मण्डी	95	6	100
शिमला	33	67	100
सिरमौर	95	5	100
सोलन	65	35	100
उना	90	10	100
tKM+	70	30	100

- The respondents were asked to rank in order of 1 to 7 (one for the most important & 7 for least important) from a multiple set of seven options as to how to make their house safe from Hazards. The sample population replied the house should be built on flat land ranked 1<sup>st</sup>, and choosing of proper material of good quality ranked 2<sup>nd</sup>, advise from qualified architects and engineers was ranked 3<sup>rd</sup>.



- When asked whether the current house that was occupied by the respondent was capable of withstanding shocks of earthquake, nearly 38 per cent said yes while 25 per cent believed that the house was not capable of withstanding shocks of earthquake and the rest (37 per cent) declined to make a comment on this.

**Table-4.16**

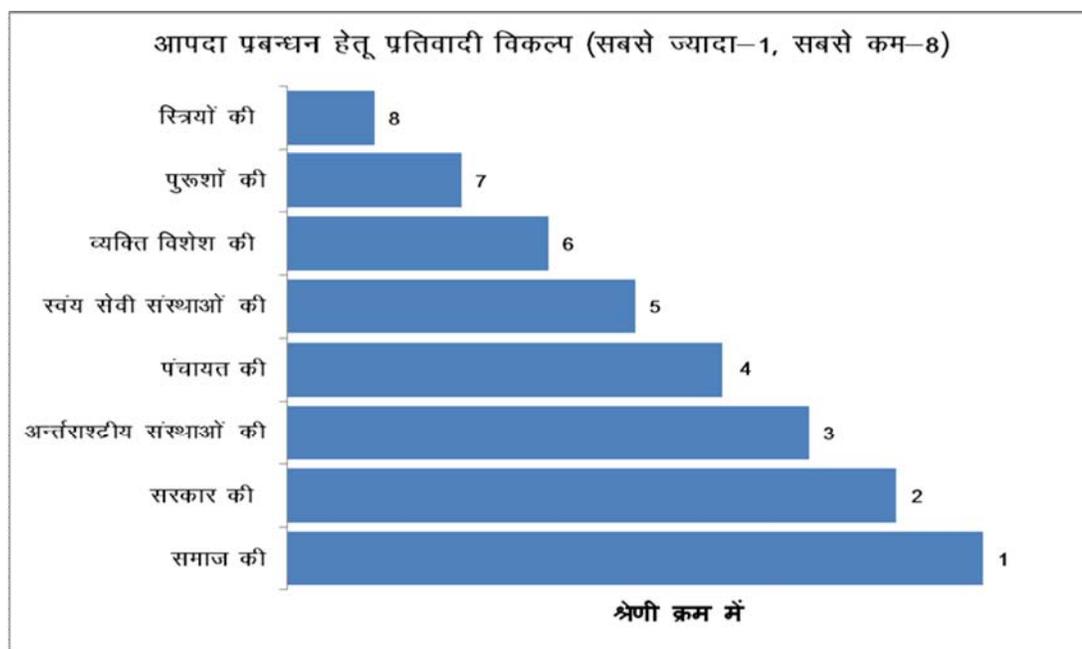
ftyk	gka	ugha	ekyue ughA	tKM+
बिलासपुर	59	9	32	100
चम्बा	27	34	39	100
हमीरपुर	50	38	12	100
कांगड़ा	23	24	53	100
किन्नौर	72	15	13	100
कुल्लू	43	22	35	100
लाहौल स्पिति	70	2	28	100
मण्डी	34	13	54	100
शिमला	30	48	22	100
सिरमौर	66	6	28	100
सोलन	56	26	18	100
उना	4	32	64	100
tKM+	38	25	37	100

- A direct question was asked if we could safeguards ourselves against natural calamities. 67 per cent of the sample population believes that we can safeguards ourselves against natural calamities while 33 per cent believed that one cannot fight against natural calamities.

**Table-4.17**

ftyk	gka	ugha	t kM+
बिलासपुर	68	32	100
चम्बा	51	49	100
हमीरपुर	93	7	100
कांगडा	55	45	100
किन्नौर	94	6	100
कुल्लू	69	31	100
लाहौल स्पिति	87	13	100
मण्डी	80	20	100
शिमला	47	53	100
सिरमौर	94	6	100
सोलन	40	60	100
उना	74	26	100
t kM+	67	33	100

- The responsibility to fight disasters should lie on government and society. Also it has been pointed out that it is not the individual responsibility of male or female part of the population to look after disaster management. The rank wise responsibility as per the results of the survey are depicted in the chart below:



- The respondents were asked to tick the correct statement from multiple set of statements to hypothetical questions as to what would they do if they face a fire hazards in and around them. 39 per cent of the respondents rightly said that their priority would be to inform the fire brigade, 17 per cent believed that they would try to inform their neighbors while 14n per cent believed that they would inform police, for 13 per cent the priority was to inform district administration.

**Table-4.18**

ftyk	Ok; j fcxM dks l fpr djxa	ifyl dks l fpr djxa	fctyh folkkx dks l fpr djxa	iMkfl ; ka dks l fpr djxa	tig l sfpYyk, xs	ftyk i-kl u dks Qku djxs	tKM+
बिलासपुर	37	0	0	27	13	24	100
चम्बा	37	16	17	7	14	8	100
हमीरपुर	45	43	2	8	1	2	100
कांगड़ा	30	26	7	6	8	23	100
किन्नौर	12	0	3	68	16	1	100
कुल्लू	17	15	1	1	1	65	100
लाहौल स्पति	28	2	0	68	2	0	100
मण्डी	62	3	1	23	10	1	100
शिमला	27	18	21	10	7	18	100
सिरमौर	58	0	0	29	13	0	100
सोलन	53	5	0	32	11	0	100
उना	52	0	1	17	29	1	100
tKM+	39	14	6	17	10	13	100

- To assess the awareness level of the respondents a question was asked as to what number they would dial from a multiple set of number depicted in table below. 71 per cent of the sample population said they would call number 108 which connects directly to ambulance services. 19 per cent revealed that they would call 100 which is directly connected to the police emergency room, and 2 per cent preferred that they would call 1077 i.e. district control room.

**Table-4.19**

वकीकल कल नककुक गकुसिज वकीकल फलकलर एडकु ल गक; रक तकुकुह	100	1077	108	कुकुए उहक	तकक+
बिलासपुर	20	0	78	2	100
चम्बा	66	8	23	3	100
हमीरपुर	3	0	97	0	100
कांगड़ा	21	2	53	23	100
किन्नौर	12	0	88	1	100
कुल्लू	15	0	78	7	100
लाहौल स्पति	0	0	98	2	100
मण्डी	19	1	78	2	100
शिमला	24	7	51	18	100
सिरमौर	0	0	99	0	100
सोलन	11	0	88	1	100
उना	9	0	90	0	100
तकक:	19	2	71	8	100

- A direct question was asked as to how to deal and manage disasters is ever discussed or have you ever taken part in a training session for this, 79 per cent of the sample population have never been trained only 21 per cent of the sample population ever discussed this or have been trained for this.

**Table-4.20**

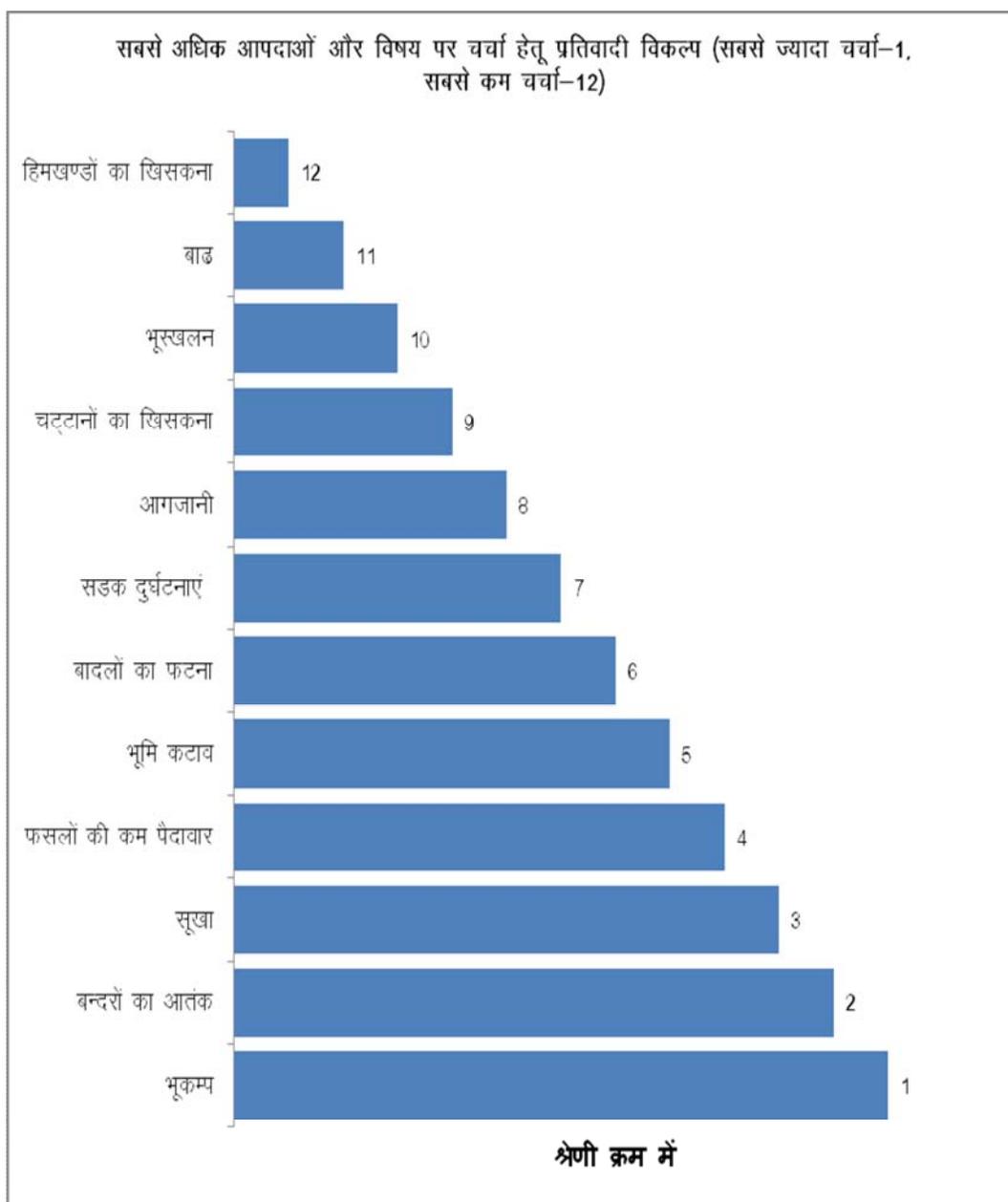
Ifroknh dk vki nkavka , oa i zU/ku dks fui Vus grw ppkj tkudkj ; k Vfuax			
ftyk	gka	ugha	tKM+
बिलासपुर	9	91	100
चम्बा	81	19	100
हमीरपुर	14	86	100
कांगड़ा	3	97	100
किन्नौर	5	95	100
कुल्लू	96	4	100
लाहौल स्पति	2	98	100
मण्डी	8	92	100
शिमला	22	78	100
सिरमौर	19	81	100
सोलन	4	96	100
उना	0	100	100
tKM+	21	79	100

- 76 per cent of the responded revealed that they do have discussions on disasters in their society/villages/ families.

**Table-4.21**

ifroknh dk ifjokj] l ekt ; k xka ea vki nkavka ds fo"k; ij fodYi			
ftyk	gka	ugha	tKM+
बिलासपुर	77	23	100
चम्बा	61	39	100
हमीरपुर	96	4	100
कांगड़ा	74	26	100
किन्नौर	97	3	100
कुल्लू	70	30	100
लाहौल स्पति	100	0	100
मण्डी	87	13	100
शिमला	50	50	100
सिरमौर	97	3	100
सोलन	78	22	100
उना	63	37	100
tKM+	76	24	100

- The results of the survey revealed that earthquake continues to be the most discussed subject on disasters followed by money menace, Dry weather, flood, less production of food grains and destruction caused by monkeys are the highly discussed topics of disasters among the rural households. The topics which are least discussed among the rural households are earthquakes, shifting of glaciers and shifting of landmass.



- The respondents were asked if in their opinion medical facilities in their village or nearby places is available to deal with disaster is sufficient, Only 24 per cent of the rural population believes that the medical facilities in and around the villages are completely capable of handling cases arising during a disaster while 53 per cent said that the facilities are partially available and 23 per cent stated that medical facilities are absolutely not capable of dealing with disasters.

**Table-4.22**

LokLF; I ECU/kh I fo/kk, a vki nkvk dks fui Vus grn xko o vki ikl {ks= dh I {kerk				
ftyk	पूण I {ke gñ	आंशक ढप से I {ke gñ	पूण vl {ke gñ	tKM+
बिलासपुर	3	89	7	100
चम्बा	98	1	1	100
हमीरपुर	18	80	2	100
कांगड़ा	16	45	39	100
किन्नौर	18	81	2	100
कुल्लू	96	2	3	100
लाहौल स्पति	48	52	0	100
मण्डी	7	75	18	100
शिमला	4	24	72	100
सिरमौर	13	83	4	100
सोलन	3	83	14	100
उना	11	69	20	100
tKM+	24	53	23	100

- Twenty eight per cent of the rural population still believes that religious rites and rituals can be of help to reduce the effect of disasters while 25 per cent of them are not sure. 47 per cent have clearly stated that they do not believe that religious rite and rituals can be of help to cope with disasters.

**Table-4.23**

ftyk	gka	ugh	ekyie ugha	t kM.
बिलासपुर	9	47	44	100
चम्बा	65	13	22	100
हमीरपुर	15	75	11	100
कांगड़ा	21	35	44	100
किन्नौर	31	64	4	100
कुल्लू	66	15	19	100
लाहौल स्पिति	75	22	3	100
मण्डी	43	35	22	100
शिमला	51	34	15	100
सिरमौर	11	70	19	100
सोलन	31	62	8	100
उना	32	59	10	100
t kM+	35	43	22	100

- The respondents were asked that in your opinion who affected the most during disasters. Most of the rural population thinks that all of the society is equally affected by disasters, but out of the options economically weaker persons in the society & female and children are considered to be affected most by any disaster.

**Table-4.24**

vki nk ds l e; l cl s T; knk i Hkkfor oxL ds fy, i f roknh fod Yi							
ftyk	vktFkd nf.V l s detig	; pk oxL	V/kM+	efgyk rFkk cPps	cqt xL	I Hkh oxL, d tS s gh i Hkkfor gkrs gñ	tKM+
बिलासपुर	8	0	0	4	5	82	100
चम्बा	38	10	12	27	6	7	100
हमीरपुर	6	0	0	4	5	85	100
कांगड़ा	18	4	7	19	20	32	100
किन्नौर	65	0	0	5	2	28	100
कुल्लू	49	33	0	8	7	3	100
लाहौल स्पति	8	2	2	0	0	88	100
मण्डी	11	2	3	15	8	62	100
शिमला	21	37	9	10	6	17	100
सिरमौर	19	0	0	20	13	47	100
सोलन	9	0	0	17	19	55	100
उना	35	0	0	12	8	45	100
tKM+	22	9	4	14	11	41	100

- A direct question was asked from the respondents that did you know any NGOs who helps the affected persons during disasters. The table below shows that most of the rural population (78 per cent) was not aware about any kind of NGO working for relief works during disasters.

**Table-4.25**

ftyk	gka	ugh	; fn gka rks uke o irk] nij Hkk•k l fgr fy [ka	tkM.
बिलासपुर	1	95	4	100
चम्बा	100	0	0	100
हमीरपुर	5	95	0	100
कांगड़ा	15	85	0	100
किन्नौर	4	96	0	100
कुल्लू	61	27	12	100
लाहौल स्पिति	2	98	0	100
मण्डी	19	77	4	100
शिमला	4	96	0	100
सिरमौर	7	91	2	100
सोलन	7	93	0	100
उना	6	93	2	100
TKM+	20	78	2	100

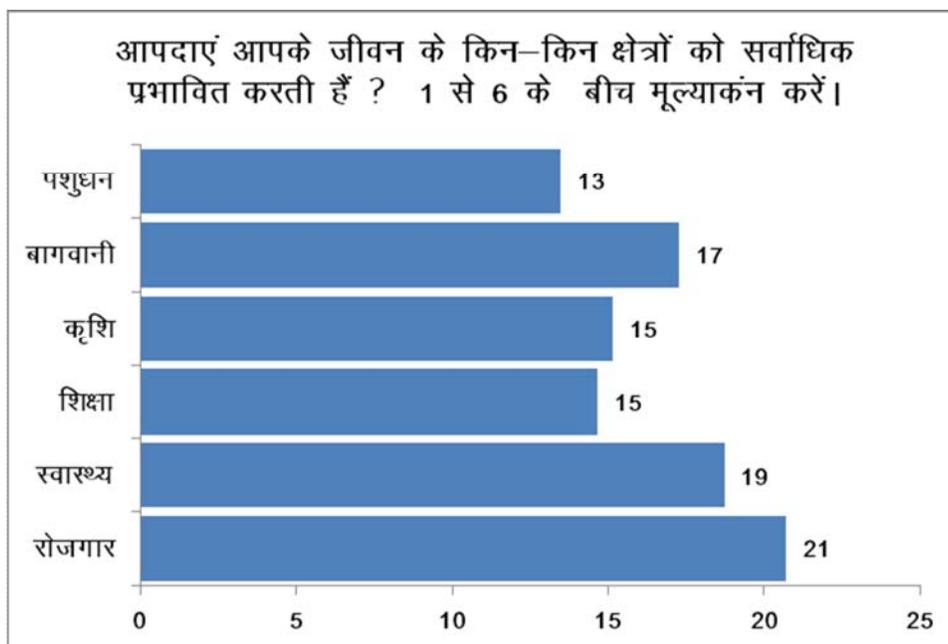
- It is necessary to construct a disaster management plan because disasters are sudden in nature and also that the effects of disaster can be reduced with careful planning.
- Very few respondents agree with the existing framework of disaster management, also some consider that because of the sudden nature of disasters it is worthless to plan for disasters as they would be ineffective.

- Nearly 53 per cent of the respondents feel that disasters occurs suddenly, therefore it is highly necessary to prepare a disaster management plan.

**Table-4.26**

ftyk	vki nka vkdfled vkrih g\$ vr% ; kstuk cukus dh vko• ; drk g\$	tis py jgk g\$ l c Bhd g\$	; kstuk cukuk ; k if'kfk.k bR; kfn l c fQtuy [kpl g\$	; kstukvka }kjk tku eky ds upl ku dks de fd; k tk l drk g\$ vr% ; kstuk cuokuk vko' ; d g\$	vki nk dkOh Hka dj gksth g\$ rFkk fdll h i xkj dh ; kstuk dkjxj ugh gks l drih g\$	tKM+
बिलासपुर	60	1	1	39	0	100
चम्बा	64	1	26	9	0	100
हमीरपुर	52	7	0	38	3	100
कांगड़ा	32	17	8	28	15	100
किन्नौर	64	1	0	36	0	100
कुल्लू	86	8	3	3	0	100
लाहौल स्पिति	58	0	0	42	0	100
मण्डी	47	6	4	37	7	100
शिमला	73	0	2	20	5	100
सिरमौर	56	3	4	36	0	100
सोलन	56	2	3	33	7	100
उना	31	1	6	53	9	100
tKM+	53	6	5	29	6	100

- Employments, Health, horticulture are thought to be most affected by disasters. Agriculture, education & livestock is also considered to be somewhat affected by disasters.



- It is clearly noticed that rural population considers all the economic, physical and psychological effects of disasters are harmful.

Table-4.27

efgyk , d cPPka ij vki nkVka ds i Hkko dk i froknh fodYi						
ftyk	ekufi d ruko	शकij mjd ruko	vKfFkd I dV	mi jkDr I Hkh	ekye ugha	tM+
बिलासपुर	1	0	31	62	7	100
चम्बा	7	10	41	31	10	100
हमीरपुर	9	1	6	82	2	100
कांगड़ा	9	10	11	54	17	100
किन्नौर	9	2	2	84	3	100
कुल्लू	18	32	20	14	17	100
लाहौल स्पति	2	0	3	95	0	100
मण्डी	9	5	6	77	3	100
शिमला	10	3	15	18	54	100
सिरमौर	36	2	4	54	4	100
सोलन	28	6	2	63	1	100
उना	50	18	20	11	1	100
tM+	15	8	13	50	14	100

□ The most prominent disasters in the rural areas of Himachal Pradesh are destruction caused by monkeys; fall in production of agricultural goods and shortage of rainfall. Though disasters like earthquakes are thought to be more harmful in nature, rural population has picked those disasters which affect their livelihood to be most prominent.

**Table-4.28**

ftyk	I [kk	ck<-	OI yka dh de i shkaj	clnjka dk vkrd	Hkl [kyu	HkdEi	fge [k. Mka dk f[kl duk	pVvkuks dk f[kl duk	vkxtkuh	Hkfe dVko	cknyka dk QVuk	I Md nqkVuk, a	t kM+
बिलासपुर	26	0	38	29	0	0	0	0	0	0	0	6	100
चम्बा	9	13	28	7	13	6	9	6	3	3	1	1	100
हमीरपुर	5	0	17	48	0	1	0	0	2	1	10	17	100
कांगड़ा	9	2	20	22	4	2	0	0	8	7	5	21	100
किन्नौर	23	23	21	11	4	1	1	2	0	3	0	13	100
कुल्लू	15	8	5	19	4	5	6	7	8	5	8	9	100
लाहौल स्पिति	0	43	7	0	2	0	35	10	2	0	0	2	100
मण्डी	16	5	33	25	4	1	1	1	0	4	3	8	100
शिमला	17	4	16	35	6	6	2	2	2	3	0	5	100
सिरमौर	29	0	9	55	2	1	0	0	1	0	2	1	100
सोलन	21	0	30	28	1	0	0	1	6	0	0	13	100
उना	4	3	35	41	1	0	0	0	1	1	0	14	100
t kM+	14	5	22	29	4	2	2	2	3	3	3	11	100

---

## Chapter-V

---

### 5. District Administration

#### 5.1 District Disaster Management Authority (DDMA)

The DDMA will be headed by the District Collector, Deputy Commissioner or District Magistrate as the case may be, with the elected representative of the local authority as the Co-Chairperson. The DDMA will act as the planning, coordinating and implementing body for DM at the District level and take all necessary measures for the purposes of DM in accordance with the guidelines laid down by the NDMA and SDMA. It will, inter alia prepare the District DM plan for the District and monitor the implementation of the National Policy, the State Policy, the National Plan, the State Plan and the District Plan. The DDMA will also ensure that the guidelines for prevention, mitigation, preparedness and response measures laid down by the NDMA and the SDMA are followed by all the Departments of the State Government at the District level and the local authorities in the District.

The DDMA will further ensure that the areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and the mitigation of its effects are taken, ensure that the guidelines for prevention of disasters, mitigation of its effects, preparedness and response measures as laid down by the National Authority and the State Authority are followed by all departments, lay down guidelines for prevention of disaster management plans by the department of the Government at the districts level and local authorities in the district, monitor the implementation of disaster management plans prepared by the Departments of the Government at the district level, lay down guidelines to be followed by the Departments of the Government at the district level for purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and monitor the implementation of the same, review the state of capabilities and preparedness level for responding to any disaster or threatening disaster situation at the district level and take steps for their up gradation as may be necessary, organise and coordinate specialised training programmes for different levels of officers, employees and voluntary

rescue workers in the district, facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non-governmental organisations, set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public, prepare, review and update district level response plan and guidelines.

The DDMA will also coordinate response to any threatening disaster situation or disaster, coordinate with, and provide necessary technical assistance or give advice to the local authorities in the district for carrying out their functions, examine the construction in any area in the district and issue direction the concerned authority to take such action as may be necessary to secure compliance of such standards as may be required for the area, and identify buildings and places which could, in the event of any threatening disaster situation or disaster, be used as relief centres or camps and make arrangements for water supply and sanitation in such buildings or places, establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice. The DDMA will encourage the involvement of non-governmental organisations and voluntary social-welfare institutions working at the grassroots level in the district for disaster management ensure communication systems are in order, and disaster management drills are carried out periodically.

## **5.2 Local Authorities**

For the purpose of this Policy, local authorities would include Panchayati Raj Institutions (PRI), Municipalities, District and Cantonment Institutional and Legal Arrangements Boards, and Town Planning Authorities which control and manage civic services. These bodies will ensure capacity building of their officers and employees for managing disasters, carry out relief, rehabilitation and reconstruction activities in the affected areas and will prepare DM Plans in consonance with the guidelines of the NDMA, SDMAs and DDMA. Specific institutional framework for dealing with disaster management issues in mega cities will be put in place.

### 5.3 Awareness

- ❑ At the District level, DDMA's will act as the District planning, coordinating and implementing body for disaster management and will take all measures for the purposes of disaster management in the District in accordance with the guidelines laid down by NDMA and SDMA
- ❑ District Administration plays a vital role in disaster management. A direct question was asked from the administrators at district level if they were aware of disaster management setup in their districts. Eighty three percent of the respondents were aware of the setup while surprisingly 19 percent of the officers were not aware of this. The results of the survey reveal that more efforts are needed especially in Mandi and Shimla districts to sensitize the administrator's right from Sub-Tesil to District Headquarters level in disaster management.

**Table 5.1**

<b>Respondents choice on familiarity with disaster management set up in their district</b>				
<b>S.N.</b>	<b>Districts</b>	<b>Yes</b>	<b>No</b>	<b>Total</b>
1	Bilaspur	100	0	100
2	Chamba	87	13	100
3	Hamirpur	74	26	100
4	Kangra	91	9	100
5	Kinnaur	86	14	100
6	Kullu	78	22	100
7	L&S	85	15	100
8	Mandi	51	49	100
9	Shimla	58	42	100
10	Sirmour	88	12	100
11	Solan	97	3	100
12	Una	93	8	100
	<i>Total</i>	<i>81</i>	<i>19</i>	<i>100</i>

- To ascertain the awareness level of district administrators, they were asked to tick the correct statement from multiple statements as to who is in charge of District disaster management authority (DDMA) as depicted in table 5.2. Thirty nine percent of the respondents believe that Deputy Commissioner of the district is the chief Executive of the DDMA while 33 percent respondents ticked that the district disaster management authority (DDMA) has been constituted as per the Relief Manual of Govt. of H.P. 17 percent are of the view that District crisis management group has been notified for each district

Table: 5.2

percent distribution of informants choice relating to disaster management in their district							
S.N.	Districts	The district disaster management authority(DDMA) has been substituted as per the Relief Manual of Govt. of H.P.	Deputy Commissioner of the district is the chief Executive of the DDMA	District crisis management group has been notified for each district	Chairman Zila Parishad is the chairman of the DDMA	Preparation of District Disaster Management Plan is the responsibility of SDMA	Total
1	Bilaspur	39	14	43	0	5	100
2	Chamba	41	41	13	0	5	100
3	Hamirpur	26	51	14	4	5	100
4	Kangra	47	30	3	20	0	100
5	Kinnaur	27	37	17	6	13	100
6	Kullu	27	42	17	6	8	100
7	L&S	33	33	20	3	10	100
8	Mandi	58	24	12	0	6	100
9	Shimla	42	48	6	2	2	100
10	Sirmour	27	38	18	6	11	100
11	Solan	33	43	25	0	0	100
12	Una	23	49	16	5	7	100
	<i>Total</i>	33	39	17	5	7	100

- District administrators were asked if the existing set up for disaster management in their districts was adequate or requires further strengthening, 52 percent of the respondents felt that the existing setup is somewhat adequate but requires strengthening while 22 percent felt that the present setup was adequate. 16 percent of the respondents felt that the present setup is highly inadequate and requires a lot of strengthening while 9 percent of the respondents felt that the present setup was totally inadequate and requires total change.

**Table: 5.3**

Percent distribution of respondents regarding existing set up for disaster management in their district								
S.N.	Districts	Adequate	Somewhat adequate but requires strengthening	Highly inadequate and requires a lot of strengthening	The existing system requires total change	Set up does not exist at all	Please give your suggestions	Total
1	Bilaspur	70	15	6	9	0	0	100
2	Chamba	13	33	20	13	17	3	100
3	Hamirpur	20	52	18	6	4	0	100
4	Kangra	7	66	20	5	2	0	100
5	Kinnaur	31	54	14	0	2	0	100
6	Kullu	15	70	15	0	0	0	100
7	L&S	5	90	5	0	0	0	100
8	Mandi	19	59	22	0	0	0	100
9	Shimla	8	44	14	6	28	0	100
10	Sirmour	18	61	12	6	2	0	100
11	Solan	14	52	34	0	0	0	100
12	Una	38	43	18	3	0	0	100
	<i>Total</i>	22	52	16	4	5	0	100

- On 23rd December, 2005, the Government of India took a defining step by enacting the Disaster Management Act, 2005, which envisaged creation of the National Disaster Management Authority (NDMA) headed by the Prime

Minister, State Disaster Management Authorities (SDMA) headed by the Chief Ministers, and District Disaster Management Authorities (DDMA) headed by the District Magistrates or Deputy Commissioners as the case may be, to spearhead and adopt a holistic and integrated approach to disaster management (DM). There will be a paradigm shift, from the erstwhile relief-centric response to a proactive prevention, mitigation and preparedness-driven approach for conserving development gains and to minimize loss of life, livelihood and property.

- ❑ In order to assess the awareness level of district officers from the grassroots level, they were asked to tick the correct statement from a multiple set of statements as depicted in Table 5.4. The results of the study show that more efforts are required to sensitize administrators at district level.

**Table: 5.4**

Percent distribution to assess the awareness level								
S.N.	Districts	Disasters management Act was passed in India in the year 2007	State Disaster Response fund has been notified for the state of Himachal Pradesh.	State Executive Committee under the Chairpersonship of Chief Secretary has been notified as part of SDMA	All of the Above (a to c)	b and c only	None of the above	Total
		a	b	c	d	e	f	
1	Bilaspur	13	17	15	17	18	20	100
2	Chamba	37	13	13	13	13	10	100
3	Hamirpur	30	16	12	26	12	4	100
4	Kangra	20	9	9	55	7	0	100
5	Kinnaur	10	16	14	32	24	3	100
6	Kullu	10	10	13	43	13	10	100
7	L&S	19	14	24	10	33	0	100
8	Mandi	26	19	23	19	10	3	100
9	Shimla	24	16	26	22	8	4	100
10	Sirmour	11	23	28	16	20	1	100
11	Solan	92	4	4	0	0	0	100
12	Una	15	13	20	25	24	4	100
	<i>Total</i>	20	15	17	23	17	7	100

- District Administrators were asked as to who in their opinion should be member of District Disaster Management Authority. 23 percent were of the opinion that all the departments which have role in emergency should be made members of DDMA 14 percent each wanted Local NGO's and Army units of local stations made members of DDMA. 14 percent wanted members from A, B & E as depicted in Table 5.5. Around 20 percent of the respondents wanted members to be made from vulnerable community and Panchyat Pradhans.

**Table 5.5**

<b>Informants choice on inclusion of member of District Disaster Management Authority</b>										
<b>S.N.</b>	<b>Districts</b>	<b>All the departments which have role in emergency</b>	<b>Local NGOs</b>	<b>Army units of local stations</b>	<b>Members of vulnerable community</b>	<b>Agencies responsible for issuing early warning</b>	<b>a),c) and e) only</b>	<b>Panchyat Pradhans</b>	<b>None of the above</b>	<b>Total</b>
		<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>h</b>	
1	Bilaspur	3	13	13	19	16	22	15	0	100
2	Chamba	20	17	16	11	17	9	9	3	100
3	Hamirpur	35	11	12	9	10	10	10	1	100
4	Kangra	33	9	16	3	11	17	11	0	100
5	Kinnaur	24	16	16	6	12	12	13	0	100
6	Kullu	23	15	13	11	14	10	9	6	100
7	L&S	29	10	10	12	8	18	10	2	100
8	Mandi	23	25	15	14	13	10	1	0	100
9	Shimla	23	15	13	11	14	11	10	2	100
10	Sirmour	29	13	17	10	1	22	6	1	100
11	Solan	19	12	15	10	15	15	13	1	100
12	Una	29	11	12	12	15	10	8	3	100
	<i>Total</i>	23	14	14	11	12	14	10	1	100

- The respondents were asked as to which should form part of inventory of resources for Disaster management. A majority of 39 percent of the respondents were of the opinion that a list of equipment and machinery should form part of inventory. 18 percent wanted list of drivers and 15 percent each preferred that Telephone Numbers of important officials/persons and list of medical facilities should form part of inventory of resources for Disaster management, while 13 percent wanted that list of ambulances service providers should form part of inventory of resources for Disaster management

**Table 5.6**

<b>Inventory of resources for Disaster management</b>							
<b>S.N.</b>	<b>Districts</b>	<b>List of equipment and machinery</b>	<b>List of drivers</b>	<b>Telephone Numbers of important officials/persons</b>	<b>List of medical facilities</b>	<b>List of ambulances service providers</b>	<b>Total</b>
1	Bilaspur	45	15	12	18	9	100
2	Chamba	47	20	17	13	3	100
3	Hamirpur	26	18	18	26	12	100
4	Kangra	41	16	20	11	11	100
5	Kinnaur	42	20	10	17	10	100
6	Kullu	41	19	15	7	19	100
7	L&S	35	15	15	15	20	100
8	Mandi	41	22	14	11	14	100
9	Shimla	34	16	12	16	22	100
10	Sirmour	31	12	8	24	24	100
11	Solan	62	14	17	3	3	100
12	Una	38	30	20	10	3	100
	<i>Total</i>	39	18	15	15	13	100

- Since a uniform plan needs to be formulated in tackling disasters it was asked as to who should prepare disaster management plan for your district. A majority of 43 percent of the respondents wanted The State Disaster Management Authority to prepare disaster management plan for their district while 23 percent wanted the district administration with technical assistance of an expert to prepare the DM plan for their district. 15 percent wanted that the district administration should make the DM plan by them by involving all stakeholders while 10 per cent wanted that some Technical institution of the Govt should make DM plan

**Table 5.7**

<b>Informants choice on formulation of disaster management plan for the district</b>								
<b>S.N.</b>	<b>Districts</b>	<b>A hired consultant</b>	<b>Some Technical institution of the Govt.</b>	<b>The district administration by themselves by involving all stakeholders</b>	<b>The district administration with technical assistance of an expert</b>	<b>The revenue department</b>	<b>The State Disaster Management Authority</b>	<b>Total</b>
1	Bilaspur	0	36	18	0	0	45	100
2	Chamba	3	0	17	20	0	60	100
3	Hamirpur	0	8	0	12	14	66	100
4	Kangra	0	7	11	16	9	57	100
5	Kinnaur	5	5	2	25	8	54	100
6	Kullu	19	15	0	4	7	56	100
7	L&S	0	20	30	0	10	40	100
8	Mandi	3	11	41	38	0	8	100
9	Shimla	4	4	22	40	14	16	100
10	Sirmour	4	10	0	14	2	69	100
11	Solan	0	14	21	45	3	17	100
12	Una	3	5	33	45	5	10	100
	<i>Total</i>	3	10	15	23	7	43	100

- ❑ Disasters can strike anytime, anywhere in the state. Therefore a debatable question is that should there be a DM plan for the whole state or district only or till the village level.
- ❑ A whopping 69 felt that DM plan is needed for state, districts, blocks, panchayats and right till the village level. 22 percent of the respondents felt that DM plan is needed only in state and district.

**Table 5.8**

Percent distribution of respondents views regarding need of making disaster management plan at various levels								
S.N.	Districts	State only	District only	At block level	At village level	All of the above	a and b only	Total
		a	b	c	d	e	f	
1	Bilaspur	15	18	6	9	9	42	100
2	Chamba	7	3	7	7	70	7	100
3	Hamirpur	2	2	0	4	86	6	100
4	Kangra	0	2	2	2	91	2	100
5	Kinnaur	0	3	2	5	86	3	100
6	Kullu	4	0	0	0	96	0	100
7	L&S	0	0	5	10	80	5	100
8	Mandi	3	5	5	5	78	3	100
9	Shimla	0	8	2	6	52	32	100
10	Sirmour	16	8	6	4	61	4	100
11	Solan	14	21	10	10	34	10	100
12	Una	10	8	5	0	75	3	100
	<b>Total</b>	6	6	4	5	69	10	100

### 5.3 Preparedness of District Administration

- A direct question was asked if the district administrator had prepared an inventory of resources available within their district that can be deployed at the time of crisis, 40 percent responded by saying that they have prepared an inventory of resources available within their district that can be deployed at the time of crisis while 60 percent of the respondents said that they have not prepared an inventory of resources available within their districts as the concerned department is already aware of the resources available with them.

**Table 5.9**

<b>inventory of resources available within the district that can be deployed at the time of crises</b>				
<b>S.N.</b>	<b>Districts</b>	<b>yes</b>	<b>No, because the concerned department already aware of the resources available</b>	<b>Total</b>
1	Bilaspur	58	42	100
2	Chamba	57	43	100
3	Hamirpur	36	64	100
4	Kangra	20	80	100
5	Kinnaur	41	59	100
6	Kullu	52	48	100
7	L&S	50	50	100
8	Mandi	30	70	100
9	Shimla	18	82	100
10	Sirmour	57	43	100
11	Solan	45	55	100
12	Una	38	63	100
	<i>Total</i>	40	60	100

- Himachal Pradesh is a hilly state. To reach out to disaster affected area in a hilly terrain in real quick time sometimes becomes a challenge to district authorities. The assistance of the Armed Forces then becomes mandatory. A direct question was asked if the district administrator was familiar with the modalities of requisitioning assistance from Armed Forces. Unfortunately only half the district administrators were familiar with the modalities of requisitioning assistance from Armed Forces.

**Table 5.10**

<b>Familiarity with the modalities for seeking help from armed forces</b>				
<b>S.N.</b>	<b>Districts</b>	<b>yes</b>	<b>No</b>	<b>Total</b>
1	Bilaspur	55	45	100
2	Chamba	60	40	100
3	Hamirpur	54	46	100
4	Kangra	75	25	100
5	Kinnaur	54	46	100
6	Kullu	41	59	100
7	L&S	60	40	100
8	Mandi	38	62	100
9	Shimla	28	72	100
10	Sirmour	53	47	100
11	Solan	41	59	100
12	Una	58	43	100
	<i>Total</i>	51	49	100

- Respondents were assessed about the awareness of the existence of Regional Response Centres for dealing with disasters which are located in Himachal and her neighbourhood. They were asked to tick on the response centres they were aware of. From the results of the study as depicted in the table below, it is clear that more than 80 percent of the respondents are not aware of the existence of Regional Response Centre for dealing with disasters which are located in Himachal and her neighbourhood.

**Table 5.11**

<b>Knowledge regarding existence of Regional Response Centre for dealing with disasters</b>									
<b>S.N.</b>	<b>Districts</b>	<b>SSB Sapri, Jawalamukhi</b>	<b>Army Station Yol Cantonment</b>	<b>ITBP Kullu</b>	<b>Army formation at Pathankot</b>	<b>ITBP Sarahan</b>	<b>ITBP RecongPeo</b>	<b>NDRF Bathinda</b>	<b>Total</b>
1	Bilaspur	15	9	12	18	24	6	15	100
2	Chamba	30	3	23	3	20	20	0	100
3	Hamirpur	4	2	0	24	22	26	22	100
4	Kangra	55	11	7	11	7	7	2	100
5	Kinnaur	14	10	25	10	7	8	25	100
6	Kullu	26	4	0	19	15	15	22	100
7	L&S	10	0	65	0	0	0	25	100
8	Mandi	3	0	0	24	24	22	27	100
9	Shimla	18	8	6	2	20	26	20	100
10	Sirmour	31	4	8	0	24	16	16	100
11	Solan	7	10	28	3	21	31	0	100
12	Una	13	8	20	3	25	15	18	100
	<i>Total</i>	<i>19</i>	<i>6</i>	<i>14</i>	<i>10</i>	<i>18</i>	<i>16</i>	<i>17</i>	<i>100</i>

- ❑ Efficacy of DMPs are tested and refined through training, seminars and mock drills. The SDMA, DDMA and Local Authorities in association with the NDMA will also conduct mock drills in different parts of the state to test the efficacy of the plans so prepared. District authorities will be encouraged to generate a culture of preparedness and quick response.
- ❑ A direct question was asked from the respondents whether periodic mock drills/rehearsals in dealing with DM are held in their districts only 56 percent said yes while 44 percent of the respondents said no.

**Table 5.12**

<b>Periodic Mock Rehearsal</b>				
<b>S.N.</b>	<b>Districts</b>	<b>yes</b>	<b>No</b>	<b>Total</b>
1	Bilaspur	42	58	100
2	Chamba	77	23	100
3	Hamirpur	52	48	100
4	Kangra	77	23	100
5	Kinnaur	39	61	100
6	Kullu	78	22	100
7	L&S	60	40	100
8	Mandi	43	57	100
9	Shimla	48	52	100
10	Sirmour	53	47	100
11	Solan	62	38	100
12	Una	65	35	100
	<i>Total</i>	56	44	100

- On further probing the respondents on a group as shown in Table 5.13 as to whom in their opinion should participate in district level disaster mock drill. In a mixed response 21 percent opined that local police should participate, 20 percent thought that local community should participate while 17 percent each opined that District Administration, Local NGO's and Fire services should participate. Eight percent of the respondents were of the opinion that Army of the local cantonment where available should participate in district level disaster mock drill.

**Table 5.13**

<b>Choice on participation in district level disaster mock drills</b>								
<b>S.N.</b>	<b>Districts</b>	<b>District Administration only</b>	<b>Local NGOs</b>	<b>Local Community</b>	<b>Local Police</b>	<b>Fire Services</b>	<b>Army of the local cantonment when available</b>	<b>Total</b>
1	Bilaspur	13	13	7	13	18	36	100
2	Chamba	17	16	18	18	16	15	100
3	Hamirpur	14	19	17	19	19	12	100
4	Kangra	18	19	19	22	22	0	100
5	Kinnaur	16	19	21	23	21	0	100
6	Kullu	21	18	20	22	20	0	100
7	L&S	19	16	20	19	14	12	100
8	Mandi	17	14	25	22	18	3	100
9	Shimla	16	18	19	20	19	8	100
10	Sirmour	20	18	20	19	15	7	100
11	Solan	13	21	30	32	4	0	100
12	Una	17	16	18	19	15	14	100
	<i>Total</i>	17	17	20	21	17	8	100

- ❑ Forecasting and early warning helps in mitigating the effects of disasters. The loss of life and property can be considerably reduced with accurate and timely warning. Climate-meteorological disasters such as flash floods, GLOF, avalanches etc. be predicted with certain degree of accuracy. To assess the awareness level, the 23 per cent respondents opined that IMD is responsible for weather hazards and forecasts, 16 per cent believe that Power project authorities are responsible for river basins, 15 percent thought that SASE is responsible for avalanches, 14 percent opined that CWC is responsible for floods and 11 percent believe that IPH is responsible for issuing early warning for GLOF and snow storms (Table-5.14).

**Table 5.14**

Forecasting and Early Warning								
S.N.	Districts	IMD for weather related hazards and forecasts	CWC for floods	IPH for GLOF & Snow Storms	SASE for avalanche	Power project Authorities for river basins	No early warning system exist in the our district	Total
1	Bilaspur	15	19	20	20	16	10	100
2	Chamba	14	8	8	16	33	22	100
3	Hamirpur	22	16	5	8	17	32	100
4	Kangra	41	13	6	6	10	24	100
5	Kinnaur	25	16	14	9	12	23	100
6	Kullu	24	10	10	22	11	22	100
7	L&S	17	6	15	26	19	17	100
8	Mandi	20	15	8	22	19	16	100
9	Shimla	27	16	8	16	17	16	100
10	Sirmour	26	11	9	12	20	23	100
11	Solan	29	7	2	10	17	34	100
12	Una	14	19	7	9	9	43	100
	<i>Total</i>	23	14	11	15	16	22	100

- Early warnings play a crucial role in saving lives and property in disaster situations. The respondent's opinion was sought whether early warning can be given to the public and what are the best practices that can be followed as given in Table 5.15. A majority 60 percent of the respondents were of the opinion that early warning can be given to the public with a dedicated control room and the community radio can also play an important role. 15 percent of the respondents seem to be satisfied with the existing system while 13 percent of the respondents believe that it is not possible to alert the public in advance. 12 percent of the respondents are of the opinion that Community has no role to play in early warning system.

**Table 5.15**

<b>Best Practices for Early Warnings</b>							
<b>S.N.</b>	<b>Districts</b>	<b>It is not possible to alert public in advance</b>	<b>It can be done with a dedicated control room</b>	<b>The existing system is good enough</b>	<b>Community radio can play an important role.</b>	<b>Community has no role to play in early warning system</b>	<b>Total</b>
1	Bilaspur	24	11	26	14	26	100
2	Chamba	14	45	5	30	7	100
3	Hamirpur	15	6	15	60	4	100
4	Kangra	7	47	5	36	5	100
5	Kinnaur	14	4	43	3	37	100
6	Kullu	8	41	4	43	4	100
7	L&S	18	45	15	18	3	100
8	Mandi	10	49	4	35	2	100
9	Shimla	14	42	9	32	4	100
10	Sirmour	7	48	5	39	1	100
11	Solan	4	36	2	57	0	100
12	Una	15	39	0	41	6	100
	<i>Total</i>	<i>13</i>	<i>30</i>	<i>15</i>	<i>30</i>	<i>12</i>	<i>100</i>

- A quick reaction and decision taken by the concerned authority in accordance to a crisis/disaster situation can save a lot of lives and property. A direct question was asked from the district administrators as to what measure would they take to ensure timely and quick response during emergency/disaster. 44 percent of the respondents responded by saying that they would inform the police control room to coordinate while 23 per cent of the respondents said they would personally contact everyone on telephone to respond. 17 per cent of the respondents felt that the concerned department heads respond themselves and 15 percent were of the opinion that the response is triggered as per SOPs and there is no delay.

**Table 5.16**

<b>Choice on measures to be taken during emergency/disaster situation</b>						
<b>S.N.</b>	<b>Districts</b>	<b>Inform the police control room to coordinate</b>	<b>Personally contact everyone on telephone to respond</b>	<b>The concerned department heads respond themselves</b>	<b>The response is triggered as per SOPs and there is no delay</b>	<b>Total</b>
1	Bilaspur	55	12	15	18	100
2	Chamba	40	30	13	17	100
3	Hamirpur	34	20	22	24	100
4	Kangra	50	34	7	9	100
5	Kinnaur	27	39	17	17	100
6	Kullu	44	30	11	15	100
7	L&S	40	25	35	0	100
8	Mandi	65	16	11	8	100
9	Shimla	50	20	24	6	100
10	Sirmour	24	16	24	35	100
11	Solan	59	10	17	14	100
12	Una	60	20	13	8	100
	<i>Total</i>	44	23	17	15	100

- ❑ For the purpose of this Policy, local authorities would include Panchayati Raj Institutions (PRI), Municipalities, District and Cantonment Institutional and Legal Arrangements Boards, and Town Planning Authorities which control and manage civic services. These bodies will ensure capacity building of their officers and employees for managing disasters, carry out relief, rehabilitation and reconstruction activities in the affected areas and will prepare DM Plans in consonance with the guidelines of the NDMA, SDMAs and DDMAAs.
- ❑ Panchayati Raj Institutions and Urban Local Bodies can play a crucial role in rural and urban areas of the state in a disaster situation. These are the institutions that are most likely to be the first to reach the crisis area question was asked from district administrators on this issue, a whopping 81 percent opined that PRI/ULB should be given a role in DM while 19 percent were against it.

**Table 5.17**

<b>Role of PRIs/ULBs on Disaster Management</b>				
<b>S.N.</b>	<b>Districts</b>	<b>Yes</b>	<b>No</b>	<b>Total</b>
1	Bilaspur	27	73	100
2	Chamba	97	3	100
3	Hamirpur	80	20	100
4	Kangra	91	9	100
5	Kinnaur	98	2	100
6	Kullu	78	22	100
7	L&S	90	10	100
8	Mandi	84	16	100
9	Shimla	66	34	100
10	Sirmour	94	6	100
11	Solan	76	24	100
12	Una	85	15	100
	<i>Total</i>	<i>81</i>	<i>19</i>	<i>100</i>

- ❑ The district administrators have given a mandate that PRI should be given a proactive role in DM. They were further probed as to what kind of relief work should be should be handled by PRI. 39 percent of the respondents were of the opinion that the community kitchen, damage assessment and identification of beneficiaries should be handled by panchayats. 26 percent of the respondents wanted that identification of the beneficiaries should be handled by panchayats while 23 percent of the respondents wanted to panchayats to handle community kitchen.
  
- ❑ Around 10 percent of district administrators wanted the panchayats to handle even damage assessment.

**Table 5.18**

<b>View on relief works handled by panchayats</b>							
<b>S.N.</b>	<b>Districts</b>	<b>The Community Kitchens</b>	<b>Damage Assessment</b>	<b>Identification of beneficiaries.</b>	<b>All of the above</b>	<b>None of the above</b>	<b>Total</b>
1	Bilaspur	12	9	58	21	0	100
2	Chamba	23	20	30	17	10	100
3	Hamirpur	16	8	24	48	4	100
4	Kangra	27	2	18	52	0	100
5	Kinnaur	24	2	19	54	2	100
6	Kullu	26	22	30	22	0	100
7	L&S	10	15	30	45	0	100
8	Mandi	19	8	30	43	0	100
9	Shimla	22	12	26	36	4	100
10	Sirmour	29	10	35	27	0	100
11	Solan	21	24	10	41	3	100
12	Una	38	0	18	43	3	100
	<i>Total</i>	23	10	26	39	2	100

- ❑ **Hazard** is a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.
  
- ❑ **Disaster** means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.
  
- ❑ **Vulnerability** is the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.
  
- ❑ To assess the awareness level, the respondents were asked to tick one or more choices from multiple set of statements as shown in table below. 32 percent believed that all hazards are basically disasters, 24 percent believed that Vulnerability is not natural it is the human dimensions of disasters a result of social, cultural & environmental factors, 22 and 21 percent thought that Disaster takes place whenever natural phenomenon takes place and Vulnerability is solely dependent on the nature of hazard.

Table 5.19

Respondents view to assess awareness level						
S.N.	Districts	All hazards are basically disasters	Disaster takes place whenever natural phenomenon takes place	Vulnerability is solely dependent on the nature of hazard	Vulnerability is not natural. It is the human dimensions of disasters a result of social, cultural & environmental factors	Total
1	Bilaspur	23	24	24	30	100
2	Chamba	51	15	13	21	100
3	Hamirpur	36	10	18	36	100
4	Kangra	50	23	5	23	100
5	Kinnaur	36	32	18	14	100
6	Kullu	19	14	33	33	100
7	L&S	66	14	14	7	100
8	Mandi	26	30	20	24	100
9	Shimla	37	22	22	19	100
10	Sirmour	25	20	25	29	100
11	Solan	17	30	27	27	100
12	Una	19	25	33	23	100
	<i>Total</i>	32	22	21	24	100

#### 5.4 Social Obligations of DM

- FC-XIII has recommended a grant of Rs. 525 crore for building capacity within the administrative machinery for better handling of disaster response and for preparation of district and state level disaster management plans as envisaged under the Disaster Management Act of 2005 (DM Act). For argument sake it can be debated whether there can be any scope of integration of Disaster Risk Reduction (DRR) into Development. To assess this, the respondents were asked to tick the correct statement from a multiple set of statements. 33 percent of the respondents felt that DRR can be integrated in construction while 32 percent felt that DRR should be integrated in education. Similarly 21 percent believed that DRR can be integrated in the ongoing poverty alleviation programmes and 14 felt that DRR needs to be addressed separately and can't be integrated into existing schemes, programmes and education.

**Table 5.20**

<b>View on scope of integration of Disaster Risk Reduction (DRR) into Development</b>						
<b>S.N.</b>	<b>Districts</b>	<b>DRR can be integrated in the ongoing poverty alleviation programmes</b>	<b>DRR can be integrated in construction</b>	<b>DRR should be integrated in education</b>	<b>DRR needs to be addressed separately and can't be integrated into existing schemes, programmes and education.</b>	<b>Total</b>
1	Bilaspur	33	23	17	27	100
2	Chamba	15	34	25	25	100
3	Hamirpur	20	36	33	10	100
4	Kangra	24	37	31	7	100
5	Kinnaur	14	39	31	16	100
6	Kullu	19	37	37	7	100
7	L&S	29	34	20	17	100
8	Mandi	22	36	36	6	100
9	Shimla	16	33	39	13	100
10	Sirmour	24	36	32	8	100
11	Solan	21	33	35	12	100
12	Una	20	21	46	13	100
	<i>Total</i>	21	33	32	14	100

### **5.5 Role of line departments on DM**

It is the responsibility of every department of the Government of a State to prepare DMP with respect to their respective departments as per the guidelines issued by the SEC and DDMA, take measures necessary for prevention of disasters, mitigation, preparedness and capacity-building in accordance with the guidelines laid down by the National Authority, the State Authority and the District Authority.

The departments will inter alia integrate into its development plans and projects, the measures for prevention of disaster and mitigation, allocate funds for prevention of disaster, mitigation, capacity-building and preparedness, respond effectively and promptly to any threatening disaster situation or disaster in accordance with the DMP and director issued by the SEC or the DDMA, review the enactments administered by it, its policies, rules and regulations with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness, provide assistance, as required, by the National Executive Committee, the State Executive Committee and District Authorities, for drawing up mitigation, preparedness and response plans, capacity-building, data collection and identification and training of personnel in relation to disaster management, assessing the damage from any disaster, and carrying out rehabilitation and reconstruction.

The department will also make provision for resources in consultation with the State Authority for the implementation of the District Plan by its authorities at the district level, HP State Disaster Management Policy 2011.

- ❑ In this context it was asked whether it relevant to prepare DM plans for all concerned Line Departments. 57 of the respondents felt that all Line Departments in the district should prepare their own DM plans while 43 percent were of the opinion that there should only be district disaster management plan

**Table 5.21**

<b>Need for separate DM plans for all concerned Line Department</b>				
<b>S.N.</b>	<b>Districts</b>	<b>There should only district disaster management plan</b>	<b>All Line Departments in the district should prepared their own DM plans</b>	<b>Total</b>
1	Bilaspur	58	42	100
2	Chamba	43	57	100
3	Hamirpur	38	62	100
4	Kangra	43	57	100
5	Kinnaur	46	54	100
6	Kullu	41	59	100
7	L&S	60	40	100
8	Mandi	41	59	100
9	Shimla	20	80	100
10	Sirmour	49	51	100
11	Solan	52	48	100
12	Una	48	53	100
	<i>Total</i>	43	57	100

- ❑ A direct question was asked from the respondents if in their opinion it is necessary to train line department officials in disaster management. 77 percent of the respondents opined that they should be trained while 23 percent were against it.

**Table 5.22**

<b>Necessity to train line department officials in disaster management</b>				
<b>S.N.</b>	<b>Districts</b>	<b>Yes</b>	<b>No</b>	<b>Total</b>
1	Bilaspur	27	73	100
2	Chamba	83	17	100
3	Hamirpur	80	20	100
4	Kangra	91	9	100
5	Kinnaur	93	7	100
6	Kullu	100	0	100
7	L&S	85	15	100
8	Mandi	84	16	100
9	Shimla	66	34	100
10	Sirmour	49	51	100
11	Solan	90	10	100
12	Una	85	15	100
	<i>Total</i>	77	23	100

---

## Chapter-VI

---

### 6. Engineers & Architects

- ❑ The role of engineers and architects is crucial in reducing earthquake risks by ensuring that the construction adheres to the norms of seismic safety. They engineers and architects play an important role in design and construction of built environment and industrial infrastructure. Large scale damage to houses and industrial infrastructure in the past major earthquakes indicate that earthquake resistant features were not incorporated in these buildings. In view of this it is necessary that engineers and architect should have adequate knowledge and capacity to design earthquake-resistant structures. So change in engineering and architecture curriculum in Under Graduate courses was felt to be equally important as disaster mitigation aspects were not the part of the then existing curriculum for the engineers and architect. It was therefore necessary to review the then curriculum prescribed for polytechnics, engineering colleges (both at undergraduate and post graduate level) and architecture colleges with a view to include disaster preparedness and mitigation aspects in the curriculum for some the of disasters such as cyclones, earthquakes and fire by adequately including the structural designs, retrofitting of existing buildings and related aspects in the curriculum.

#### 6.1 Housing Vulnerability

- ❑ The census of Houses, 2001 Census of India, gives the following details of houses bases on materials of construction for walls and roofs (BMTPC Vulnerability Atlas):

##### 6.1.1 Type of Roof:

- Pitched or sloping including Tiles, slate or shingle; Corrugated iron, zinc or other metal sheets; Asbestos cement sheet's thatch, grass, leaves, bamboo etc.

- Flat including brick, stone and lime; reinforced brick concrete/reinforced cement concrete.

### 6.1.2 Type of Wall:

- Mud, unburnt bricks, stone laid in mud or lime mortar.
- Burnt bricks laid in cement, lime or mud mortar.
- Cement concrete.
- Wood or Ekra walling.
- Corrugated iron, zinc or other metal sheets.
- Grass, leaves, reeds or bamboo or thatch and others.

### 6.1.3 Type of Flooring:

- ❑ Various types like mud, stone, concrete etc. On the basis of building material, the houses have been categorized in four types to assess the vulnerability to earthquake hazard:
  - **Category A:** Mud Wall (all roofs), Unburnt brick or Adobe wall with sloping roof, unburnt brick or Adobe wall with flat roof, stone wall with pitched/sloping roof, stone wall with flat roof.
  - **Category B:** Burnt brick wall with sloping roof, burnt brick wall with flat roof.
  - **Category C:** Concrete wall with sloping roof, concrete wall with flat roof, wooden wall (all roofs), ekra wall (all roofs)
  - **Category X:** Corrugated iron, zinc or other metal sheet walling (all roofs), bamboo, thatch, grass leaves etc. (all roofs).

## 6.2 House types and Risk

- ❑ The damage risk of various house types is based on their average performance observed during past occurrence of damaging events. In view of numerous variations in the architectural planning, structural, detailing, quality of construction and care taken in maintenance, the performance of each category of houses in a given event could vary substantially from the average observed. For example, under seismic occurrence, the following observations have been made in many cases (BMTPC Vulnerability Atlas).

### (a) All Masonry Houses (Categories A and B).

- Quality of construction comes out as a major factor in the seismic performance particularly under intensities MSK IX and lower. Good quality constructions perform much better than poor quality constructions in any category. Appropriate maintenance increases durability and maintains original strength.
- Number of storeys in the house and storey height is other factors. Higher the storey and more the number of storeys, greater is the observed damage.
- Size, location and number of door and window openings in the walls also determine seismic performance, since the openings have weakening effect on the walls. Smaller and fewer openings and located more centrally in the walls are better from seismic performance viewpoint.
- Architectural layout, particularly in large buildings, that is, shape of building in plan and elevation, presence of offsets and extended wings also play important role in initiation of damage at certain points and its propagation as well. More symmetrical plans and elevations reduce damage and unsymmetrical ones lead to greater damage.

- Where clay/mud mortar is used in wall construction, its wetness at the time of earthquake is very important factor in the seismic performance since the strength of fully saturated mortar can become as low as 15% of its dry strength.

**(b) Wooden Houses:**

- Quality of construction, that is, seasoning of wood and the joinery are important in seismic and cyclone wind performance. Better the quality better the performance.
- Wood decays with time due to dry rot, insect and rodent attack etc. therefore, the joints tend to become loose and weak. The state of maintenance of the wooden building will determine its performance during earthquake, high wind, as well as flooding.

**(c) Reinforced Concrete Houses:**

- In reinforced concrete construction, good structural design and detailing and good quality construction only could ensure excellent performance. Carelessness in any of these can lead to poor behaviour both under earthquake and cyclones.
- Now the average risk levels to various categories of houses for various hazards and their intensities are defined here below for use in the house vulnerability tables. The damage risk to various house types is defined under various seismic intensities on MSK scale. The following damage risks are defined based on this Intensity Scale:

**1. Very High Damage Risk (VH)**

- Total Collapse of building.

**2. High Damage Risk (H)**

- Gaps in walls; parts of buildings may collapse; separate parts of the building lose their cohesion; and inner walls collapse.

### 3. Moderate Damage Risk (M):

- Large and deep cracks in walls, fall of chimneys on roofs.

### 4. Low Damage Risk (L):

- Small cracks in walls; fall of fairly large pieces of plaster, pentiles slip off; cracks in chimneys, part may fall down.

### 5. Very Low Damage Risk (VL):

- Fine cracks in plaster; fall of small pieces of plaster.

## 6.3 Knowledge Awareness

**Seismic performance** is an execution of a building structure's ability to sustain its due functions, such as safety and serviceability, *at* and *after* a particular earthquake. A structure is, normally, considered *safe* if it does not endanger the lives and wellbeing of those in or around it by partially or completely collapsing. A structure may be considered *serviceable* if it is able to fulfill its operational functions for which it was designed.

- ❑ An attempt was made to gauge the knowledge/awareness level of the target group. A specific question as depicted in the table below was asked from multiple set of statements. Forty per cent of the respondents said all statements were correct. Twenty seven per cent thought that Ability of structures to sustain its due function of safety & serviceability at and after an earthquake is the correct answer while 12 per cent thought that Anticipation of earthquake parameter at the Site and around structures for improving the behavior and response of structures system is the correct statement. Ten and nine per cent of the respondents thought that Anticipation of earthquake parameter at the Site and around structures for improving the behavior and response of structures system and Anticipation of gravity waves from earthquakes or other natural hazard and understanding their impact on engineering structures and anticipation of gravity

waves from earthquakes or other natural hazard and understanding their impact on engineering structures are the correct statements. From the responses it can be concluded that the awareness level of the target group is low.

Table 6.1

Respondents knowledge on Seismic performance							
S.N.	Districts	(a)Anticipation of earthquake parameter at the Site and around structures for improving the behavior and response of structures system.	(b)Anticipation of gravity waves from earthquakes or other natural hazard and understanding their impact on engineering structures.	Ability of structures to sustain its due function of safety & serviceability at and after an earthquake	a and b above	All of the above	Total
1	Bilaspur	0	0	38	25	38	100
2	Chamba	0	0	50	0	50	100
3	Hamirpur	13	13	13	13	50	100
4	Kangra	33	0	67	0	0	100
5	Kinnaur	0	0	25	0	75	100
6	Kullu	0	0	50	0	50	100
7	L&S	0	0	25	0	75	100
8	Mandi	25	0	0	0	75	100
9	Shimla	0	50	0	0	50	100
10	Sirmour	0	14	29	0	57	100
11	Solan	9	9	0	18	64	100
12	Una	24	24	14	24	14	100
	Total	12	9	27	10	41	100

- ❑ The concept of base isolation is explained through an example building resting on frictionless rollers. When the ground shakes, the rollers freely roll, but the building above does not move. Thus, no force is transferred to the building due to the shaking of the ground; simply, the building does not experience the earthquake.
- ❑ Now, if the same building is rested on the flexible pads that offer resistance against lateral movements then some effect of the ground shaking will be transferred to the building above. If the flexible pads are properly chosen, the forces induced by ground shaking can be a few times smaller than that experienced by the building built directly on ground, namely a fixed base building. The flexible pads are called base-isolators, whereas the structures protected by means of these devices are called base-isolated buildings. The main feature of the base isolation technology is that it introduces flexibility in the structure.
- ❑ As a result, a robust medium-rise masonry or reinforced concrete building becomes extremely flexible. The isolators are often designed, to absorb energy and thus add damping to the system. This helps in further reducing the seismic response of the building. Many of the base isolators look like large rubber pads, although there are other types that are based on sliding of one part of the building relative to other. Also, base isolation is not suitable for all buildings. Mostly low to medium rise buildings rested on hard soil underneath; high-rise buildings or buildings rested on soft soil are not suitable for base isolation.
- ❑ In this context to assess the awareness level of the target group it was asked as to what purpose Base isolation techniques is used for from a multiple set of statements. A majority of 40 per cent of the respondents said that all the statements are correct while 31 per cent felt that it is used for vibration control and suppressing vibration for enhancing seismic

performance. 11 & 9 per cent believed that a base isolation technique is used for increasing the strength of engineering structures & Energy dissipation respectively. 8 per cent thought that all the statements are wrong.

**Table 6.2**

Base isolation techniques							
S.N.	Districts	increasing the strength of engineering structures	Energy dissipation	For vibration control and suppressing vibration for enhancing seismic performance	All the statements	None of the above	Total
1	Bilaspur	0	0	57	43	0	100
2	Chamba	20	20	20	20	20	100
3	Hamirpur	14	0	29	57	0	100
4	Kangra	0	0	67	33	0	100
5	Kinnaur	0	0	50	50	0	100
6	Kullu	0	0	100	0	0	100
7	L&S	0	0	20	80	0	100
8	Mandi	0	0	0	100	0	100
9	Shimla	0	0	0	100	0	100
10	Sirmour	11	11	22	56	0	100
11	Solan	9	0	36	55	0	100
12	Una	25	25	13	13	25	100
	<i>Total</i>	<i>11</i>	<i>9</i>	<i>31</i>	<i>40</i>	<i>8</i>	<i>100</i>

- Shear walls are type of structural systems that provide lateral resistance to a building or structure. They resist in-plane loads that are applied along its height. In structural engineering, a shear wall is a wall composed of braced panels (also known as shear panels) to counter the effects of lateral load acting on a structure. Wind and seismic loads are the most common loads braced wall lines are designed to counteract. Under several building codes, including the International Building Code

(where it is called a braced wall line) and Uniform Building Code, all exterior wall lines in wood or steel frame construction must be braced. Depending on the size of the building some interior walls must be braced as well.

- In this context to assess the awareness level of the target group it was asked “Shear walls are type of structural systems that provide ....” from a multiple set of statements. A majority 68 per cent rightly said that Shear walls are type of structural systems that provide Lateral resistance to a building or structure and 21 per cent said that it provides Vertical resistance to shaking building or structure. 11 per cent were of the view that it provides counter effects to vertical load acting on a structure.

**Table 6.3**

<b>Shear walls are structural systems</b>					
<b>S.N.</b>	<b>Districts</b>	<b>Vertical resistance to shaking building or structure.</b>	<b>Lateral resistance to a building or structure</b>	<b>counter effects to vertical load acting on a structure</b>	<b>Total</b>
1	Bilaspur	29	57	14	100
2	Chamba	0	100	0	100
3	Hamirpur	25	63	13	100
4	Kangra	0	100	0	100
5	Kinnaur	25	75	0	100
6	Kullu	50	50	0	100
7	L&S	50	25	25	100
8	Mandi	0	83	17	100
9	Shimla	0	50	50	100
10	Sirmour	14	86	0	100
11	Solan	27	45	27	100
12	Una	50	38	13	100
	<i>Total</i>	21	68	11	100

- ❑ **IS 13828:1993 Improving Earthquake Resistance of Low Strength Masonry Buildings?**
  - This standard covers the special features of design and construction for improving earthquake resistance of buildings of low-strength masonry.
  
- ❑ **IS 13935:1993 Repair and Seismic Strengthening of Buildings?**
  - This standard covers the selection of materials and techniques to be used for repair and seismic strengthening of damaged buildings during earthquakes and retrofitting for upgrading of seismic resistance of existing buildings.
  
- ❑ **IS 4326:1993 Earthquake Resistant Design and Construction of Buildings.**
  - This standard provides guidance in selection of materials, special features of design and construction for earthquake resistant buildings including masonry construction, timber construction, prefabricated construction etc. In this standard, it is intended to cover the specified features of design and construction for earthquake resistance of buildings of conventional types. The general principles to be observed in the construction of such earthquake resistant buildings as specified in this standard are Lightness, Continuity of Construction, avoiding/reinforcing Projecting and suspended parts, Building configuration, strength in various directions, stable foundations, Ductility of structure, Connection to non-structural parts and fire safety of structures.
  
- ❑ **IS 1893:1984 Criteria for Earthquake Resistant Design of Structures.**
  - This standard deals with earthquake resistant design of structures and is applicable to buildings; elevated structures; bridges; dams etc. It also gives a map which divides the country into five seismic

zones based on the seismic intensity. Part 2: Liquid Retaining Tanks - Elevated and Ground Supported.

- To know the awareness level of the target group on these aspects it was asked as to what in their opinion was the code for earthquake resistance construction, 44 per cent of the respondents thought code IS 4326 is correct, 34 per cent said code IS 1893 (Part 2) is correct while 11 and 10 per cent each said code IS 13828 and code IS 13935 is correct.

**Table 6.4**

<b>Awareness about code for earthquake resistant construction</b>						
<b>S.N.</b>	<b>Districts</b>	<b>IS 13828</b>	<b>IS 13935</b>	<b>IS 4326</b>	<b>IS 1893 (Part 2)</b>	<b>Total</b>
1	Bilaspur	25	13	25	38	100
2	Chamba	0	30	20	50	100
3	Hamirpur	13	0	38	50	100
4	Kangra	0	0	83	17	100
5	Kinnaur	25	0	75	0	100
6	Kullu	0	50	50	0	100
7	L&S	0	0	100	0	100
8	Mandi	0	0	50	50	100
9	Shimla	50	0	0	50	100
10	Sirmour	0	0	0	100	100
11	Solan	0	0	91	9	100
12	Una	24	24	14	38	100
	<i>Total</i>	<i>11</i>	<i>10</i>	<i>44</i>	<i>34</i>	<i>100</i>

- The target group was asked as to what in their opinion was a properly designed, engineered structure. They were asked to tick their opinion from a multiple set of statements with an option to tick more than one statement. 36 per cent of respondents thought that a properly designed structure is the one which is designed to withstand the seismic effects while sustaining an acceptable level of danger while 28 per cent that a proper structure is the one which is designed to with sand the seismic

effects without any damage. 16 per cent thought that properly designed, engineered structure is the one which is Hazard resistant while 10 & 9 per cent each thought that properly designed, engineered structure is the one which is Expensive & beautiful and Extremely strong

**Table 6.5**

<b>Target groups concept of properly designed engineered structure</b>							
<b>S.N.</b>	<b>Districts</b>	<b>Extremely strong</b>	<b>Hazard resistant</b>	<b>Expensive &amp; beautiful</b>	<b>Designed to withstand the seismic effects while sustaining an acceptable level of danger.</b>	<b>Designed to with stand the seismic effects without any damage</b>	<b>Total</b>
1	Bilaspur	9	0	0	64	27	100
2	Chamba	0	0	0	50	50	100
3	Hamirpur	15	20	25	10	30	100
4	Kangra	0	17	0	83	0	100
5	Kinnaur	0	13	0	63	25	100
6	Kullu	0	0	0	25	75	100
7	L&S	15	15	15	38	15	100
8	Mandi	0	50	0	0	50	100
9	Shimla	0	50	0	0	50	100
10	Sirmour	9	18	0	36	36	100
11	Solan	0	25	0	25	50	100
12	Una	21	26	26	11	16	100
	<i>Total</i>	9	16	10	36	28	100

- A lot of research work is being done in the field of creating equipment which is resistant to earthquakes. In this context to assess the awareness level of the target group it was asked as to what is called f “the capability of structures or equipment to resist earthquakes can be tested by simulation in a laboratory”. 31 per cent each gave the answer as Seismographs & Shaking tables while 21 & 18 per cent each gave Torstein Anderson pendulum and Accelogrammes as the correct answer.

**Table 6.6**

<b>Capability of structures or equipment to resist earthquakes</b>						
<b>S.N.</b>	<b>Districts</b>	<b>Seismographs</b>	<b>Accelogrammes</b>	<b>Torstein Anderson pendulum</b>	<b>Shaking tables</b>	<b>Total</b>
1	Bilaspur	25	13	13	50	100
2	Chamba	20	30	0	50	100
3	Hamirpur	13	75	0	13	100
4	Kangra	33	0	0	67	100
5	Kinnaur	63	0	25	13	100
6	Kullu	50	0	0	50	100
7	L&S	75	0	0	25	100
8	Mandi	50	25	25	0	100
9	Shimla	50	50	0	0	100
10	Sirmour	57	0	29	14	100
11	Solan	9	0	82	9	100
12	Una	19	24	24	33	100
	<i>Total</i>	<i>31</i>	<i>18</i>	<i>21</i>	<i>31</i>	<i>100</i>

- The Rapid Visual Screening (RVS) is a procedure used by trained personnel to identify potentially hazardous buildings before an earthquake. The RVS procedure comprises a method and several forms that help users quickly identify, inventory, and rank such buildings according to their expected safety and usability during and after earthquakes.

- In order to assess the awareness level, the target group was asked to tick the correct answer from a multiple set of answer statements as to what RVS procedure is adopted for. A majority 44 per cent responded that RVS is a procedure adopted for assessing the vulnerability of buildings, by taking a walk around the building by trained evaluator, 24 per cent thought that this procedure is adopted for Assessing the structural vulnerability of building by taking a detailed structural analysis while 19 & 13 per cent each believed that RVS Procedure is adopted for Enhancing strength, dustily and energy dissipating ability of seismically deficient structures and Structural modification.

Table 6.7

Rapid visual screening (R V S) procedure						
S.N.	Districts	Structural modification.	Enhancing strength, dustily and energy dissipating ability of seismically deficient structures	Assessing the vulnerability of buildings, by taking a walk around the building by trained evaluator.	Assessing the structural vulnerability of building by taking a detailed structural analysis	Total
1	Bilaspur	0	75	25	0	100
2	Chamba	0	0	50	50	100
3	Hamirpur	13	13	75	0	100
4	Kangra	0	0	50	50	100
5	Kinnaur	0	13	38	50	100
6	Kullu	0	0	50	50	100
7	L&S	25	0	50	25	100
8	Mandi	50	50	0	0	100
9	Shimla	0	0	100	0	100
10	Sirmour	29	0	43	29	100
11	Solan	27	45	18	9	100
12	Una	19	14	52	14	100
	<i>Total</i>	13	19	44	24	100

- ❑ The target was asked to choose on a single aspect an engineer should concentrate on for preserving important structure against an earthquake from a multiple set of statements as depicted in the table below. A majority 53 per cent of the respondents chose that a single aspect an engineer should concentrate on for preserving important structure is to make sure that the fundamental mechanisms for resistance of earthquake loads in your structure are sound.
  
- ❑ Nineteen per cent of the respondents chose that a single aspect an engineer should concentrate on for preserving important structure is to Make sure that the layer of building is aesthetic & pleasing symmetric in character.
  
- ❑ Fourteen per cent each chose that a single aspect an engineer should concentrate on for preserving important structure is to ensure that geologically the strata is sound and the site is away from dense populated area and to ensure the presence of good dense vegetation buffer around the building and excellent connectivity of site by road network.

Table 6.8

one single aspect an engineer should concentrate on for preserving important structure against earthquake.						
S.N.	Districts	Make sure that the fundamental mechanisms for resistance of earthquake loads in your structure are sound.	Make sure that the layer of building is aesthetic & pleasing symmetric in character.	Ensure that geologically the strata is sound and the site is away from dense populated area	Ensure the presence of good dense vegetation buffer around the building and excellent connectivity of site by road network.	Total
1	Bilaspur	88	0	13	0	100
2	Chamba	50	50	0	0	100
3	Hamirpur	75	0	13	13	100
4	Kangra	33	17	33	17	100
5	Kinnaur	100	0	0	0	100
6	Kullu	50	50	0	0	100
7	L&S	100	0	0	0	100
8	Mandi	100	0	0	0	100
9	Shimla	50	50	0	0	100
10	Sirmour	86	0	14	0	100
11	Solan	18	45	36	0	100
12	Una	14	19	14	52	100
	<i>Total</i>	53	19	14	14	100

- It has long been recognized that the intensity of ground shaking during earthquakes and the associated damage to structures are significantly influenced by local geologic and soil conditions. Unconsolidated sediments are found to amplify ground motion during earthquakes and are hence more prone to earthquake damage than ground with hard strata. Modern cities built on soft sediments are especially vulnerable to damage caused by amplified ground motions.

The Mexico City earthquake of September 19, 1985 is a good example of earthquake damage to a modern city built on soft sediment. Though the earthquake epicenter was located around 350 km from the city, the sites with soft clay deposits exhibited a huge amplification of ground motion resulting in severe damage. Mexico City is built on a thick layer of soft soil over a hard stratum. The western part of the city is located on the edge of an old lakebed, whereas, soft clay deposits filling the former lakebed underline the eastern part. In the lake bed area, the soft clay deposits have shear wave velocities ranging from 40 to 90 m/s and the underlying hard strata has a shear wave velocity in the range 500 m/s or greater. During the earthquake of 1985, the seismic waves were trapped in the soft strata. The soft soil layer allowed the upward propagating shear waves to propagate easily; however, the hard strata at the bottom acted like a reflector and bounced back the downward propagating waves. This kind of trapping of waves created a resonance and consequently resulted in an enormous amplification of the ground motion. As a result, the lake bed area suffered catastrophic damage; however, in the southwest part of the city, ground motions were moderate and building damage was minor. The acceleration recorded in the hill-zones were relatively low-amplitude, short period ground motions compared to high amplitude and long period ground motions recorded at stations located in the lake zone.

- ❑ To assess the awareness/knowledge level of the target group, they were asked to tick the right statement from a multiple set of statements that fits violent impact of shaking during an earthquake as depicted in table below. 31 per cent of the respondents believe that in violent impact of shaking during an earthquake, generally everything remains unchanged and only sand and water fountains may emerge. Twenty six and twenty three per cent of the respondents believe that in violent impact of shaking during an earthquake everything gets dampened in soft sediments and gets amplified in soft sediments and may cause liquefactions. 21 per cent feel

that in violent impact of shaking during an earthquake ripples get more amplified in hard rock.

**Table 6.9**

<b>Violent impact of shaking during an earthquake</b>						
<b>S.N.</b>	<b>Districts</b>	<b>Gets dampened in soft sediments</b>	<b>Gets amplified in soft sediments and may cause liquefactions</b>	<b>Generally remains unchanged and only sand and water fountains may emerge.</b>	<b>More amplified in hard rock</b>	<b>Total</b>
1	Bilaspur	0	0	75	25	100
2	Chamba	30	50	20	0	100
3	Hamirpur	75	25	0	0	100
4	Kangra	0	0	67	33	100
5	Kinnaur	0	25	25	50	100
6	Kullu	0	50	50	0	100
7	L&S	0	25	50	25	100
8	Mandi	100	0	0	0	100
9	Shimla	0	0	0	100	100
10	Sirmour	29	43	14	14	100
11	Solan	55	9	27	9	100
12	Una	19	33	24	24	100
	<i>Total</i>	26	23	31	21	100

A seismometer is an instrument that senses the earth's motion; a seismograph combines a seismometer with recording equipment to obtain a permanent record of the motion. From these records scientists can calculate how much energy was released in an earthquake, which is one way to decide its magnitude. Calculations are made from several different seismograms, both close to and far from an earthquake source to determine its magnitude. Calculations from various seismic stations and seismographs should give the same magnitude, with only one magnitude for any given earthquake. To determine the strength and location of earthquakes, scientists use a recording instrument known as a seismograph. A seismograph is equipped with sensors called seismometers that can detect ground motions caused by seismic waves from both near and distant earthquakes. Some seismometers are capable of detecting ground motion as small as 1 billionth of a meter, or about 40 billionth of an inch.

A seismograph produces wavy lines that reflect the size of seismic waves passing beneath it. The record of the wave, called a seismogram, is imprinted on paper, film, or recording tape or is stored and displayed by computers. The Richter scale is a standard scale used to compare earthquakes. It is a logarithmic scale, meaning that the numbers on the scale measure factors of 10. So, for example, an earthquake that measures 4.0 on the Richter scale is 10 times larger than one that measures 3.0. On the Richter scale, anything below 2.0 is undetectable to a normal person and is called a micro quake. Micro quakes occur constantly. Moderate earthquakes measure less than 6.0 or so on the Richter scale. Earthquakes measuring more than 6.0 can cause significant damage. The maximum quake rating ever measured is about 8.9. The Modified Mercalli Intensity Scale uses Roman Numerals from I to XII to describe different earthquake effects is commonly used.

- ❑ To assess the awareness level of the target group a simple question was asked as to what is the instrument to measure earthquakes called.

- ❑ Thirty nine per cent of the respondents rightly responded by stating that instrument used to record and measure earthquake vibrations is called a seismograph.
- ❑ Twenty seven per cent said the instrument is called Seismogram while 12, 11 and 10 per cent each responded by stating that the instrument is called MMI Scale, Telemeters and Accelogram respectively.

**Table 6.10**

<b>Awareness about sensitive Instruments to record Earthquakes</b>							
<b>S.N.</b>	<b>Districts</b>	<b>Accelogram</b>	<b>Telemeters</b>	<b>Seismographs</b>	<b>Seismogram</b>	<b>MMI Scale</b>	<b>Total</b>
1	Bilaspur	0	0	88	13	0	100
2	Chamba	0	0	0	50	50	100
3	Hamirpur	0	0	63	25	13	100
4	Kangra	0	0	33	67	0	100
5	Kinnaur	0	0	88	13	0	100
6	Kullu	50	0	50	0	0	100
7	L&S	0	0	50	25	25	100
8	Mandi	0	50	25	25	0	100
9	Shimla	0	0	50	0	50	100
10	Sirmour	0	14	86	0	0	100
11	Solan	36	27	0	18	18	100
12	Una	24	24	19	24	10	100
	<i>Total</i>	10	11	39	27	12	100

*Magnitude* is a measure of the amount of energy released during an earthquake. It may be expressed using several magnitude scales. One of these is called the Richter scale. To calculate magnitude, the amplitude of waves on a seismogram is measured, correcting for the distance between the recording

instrument and the earthquake epicentre. Since magnitude is representative of the earthquake itself, there is thus only one magnitude per earthquake.

- To assess the awareness /knowledge level of the target group, the literal meaning of magnitude of an earthquake was asked. 38 per cent of the respondents rightly ticked that it is the Degree of shaking on a descriptive scale and 14 per cent ticked on Total energy released in an earthquake. However 22 per cent believe that magnitude is a Measure of damage near an epicenter while 21 per cent think it is option b & c. 5 per cent believe that it is none of the below mentioned options.

**Table 6.11**

Awareness on Magnitude of an earthquake							
S.N.	Districts	(a)Degree of shaking on a descriptive scale	(b)Measure of damage near an epicenter.	(c)Total energy released in an earthquake.	B and C	None of the above	Total
1	Bilaspur	38	25	25	13	0	100
2	Chamba	0	50	0	50	0	100
3	Hamirpur	25	38	13	25	0	100
4	Kangra	100	0	0	0	0	100
5	Kinnaur	75	0	25	0	0	100
6	Kullu	50	50	0	0	0	100
7	L&S	100	0	0	0	0	100
8	Mandi	0	0	0	100	0	100
9	Shimla	0	50	0	50	0	100
10	Sirmour	29	0	57	14	0	100
11	Solan	18	55	18	9	0	100
12	Una	24	14	14	24	24	100
	<i>Total</i>	38	22	14	21	5	100

State of Himachal is prone to various hazards both natural and manmade. Main hazards consist of earthquakes, landslides, flash floods, snow storms and avalanches, draughts, dam failures, fires - domestic and wild, accidents - road, rail, air, stampedes, boat capsizing, biological, industrial and hazardous chemicals etc.

The hazard which however, poses biggest threat to the State is the earthquake hazard. The State has been shaken by more than 80 times by earthquakes having a magnitude of 4 and above on the Richter Scale as per the recorded history of earthquakes.

As per the BIS seismic zoning map five districts of the State, namely Chamba (53.2%) Hamirpur (90.9%), Kangra (98.6%), Kullu (53.1%), Mandi (97.4%) have 53 to 98.6 per cent of their area liable to the severest design intensity of MSK IX or more, the remaining area of these districts being liable to the next severe intensity VIII. Two districts, Bilaspur (25.3%) and Una (37.0%) also have substantial area in MSK IX and rest in MSK VIII. The remaining districts also are liable to intensity VIII.

- ❑ In this context, a question was asked from the target group to name the districts of HP which fall in Zone -V (MSK or more). 66 per cent of the respondents rightly responded by ticking Kangra, Mandi, Hamirpur districts. The remaining 36 per cent of the respondents ticked the wrong answer.

Table 6.12

Awareness of earthquake zones in Himachal Pradesh						
S.N.	Districts	Kinnour, Shimla, Sirmour	Lahaul & spiti, Kinnour & Solan	Biaspur, Kullu & Una	Kangra, Mandi, Hamirpur.	Total
1	Bilaspur	25	0	0	75	100
2	Chamba	0	10	10	80	100
3	Hamirpur	0	0	13	88	100
4	Kangra	0	0	0	100	100
5	Kinnaur	25	0	0	75	100
6	Kullu	0	0	50	50	100
7	L&S	50	0	0	50	100
8	Mandi	0	0	50	50	100
9	Shimla	0	0	0	100	100
10	Sirmour	0	0	0	100	100
11	Solan	0	36	27	36	100
12	Una	24	24	19	33	100
	<i>Total</i>	<i>11</i>	<i>10</i>	<i>12</i>	<i>66</i>	<i>100</i>

The damage risk of various house types is based on their average performance observed during past occurrence of damaging events. In view of numerous variations in the architectural planning, structural, detailing, quality of construction and care taken in maintenance, the performance of each category of houses in a given event could vary substantially from the average observed. For example, under seismic occurrence, the following observations have been made in many cases (BMTPC Vulnerability Atlas).

- Quality of construction comes out as a major factor in the seismic performance particularly under intensities MSK IX and lower. Good quality constructions perform much better than poor quality constructions in any category. Appropriate maintenance increases durability and maintains original strength
- Numbers of storey in the house and storey height are other factors. Higher the storey and more the number of storeys, greater is the observed damage.
- Size, location and number of door and window openings in the walls also determine seismic performance, since the openings have weakening effect on the walls. Smaller and fewer openings and located more centrally in the walls are better from seismic performance viewpoint.
- ❑ Architectural layout, particularly in large buildings, that is, shape of building in plan and elevation, presence of offsets and extended wings also play important role in initiation of damage at certain points and its propagation as well. More symmetrical plans and elevations reduce damage and unsymmetrical ones lead to greater damage.
- Where clay/mud mortar is used in wall construction, its wetness at the time of earthquake is very important factor in the seismic performance since the strength of fully saturated mortar can become as low as 15% of its dry strength.
- ❑ The respondents were asked to tick a choice from a multiple set of choices regarding the statement “Vulnerability of house types are generally determined by examining the nature of construction of which one of the following” 56 per cent of the respondents believed that Vulnerability of

house types are generally determined by examining the nature of Foundation, lintel & plinth bands while 12 per cent believed that it is determined by the No. of floors. 10per cent each believes that Roof, wall & flooring and Windows, Door & corners determine the nature of construction. 12 per cent of the target group believes that all the statements below are incorrect.

**Table 6.13**

<b>Respondents knowledge on Vulnerability of house types generally determined by examining the nature of construction</b>							
<b>S.N.</b>	<b>Districts</b>	<b>Foundation, lintel &amp; plinth bands.</b>	<b>Roof, wall &amp; flooring</b>	<b>Windows, Door &amp; corners</b>	<b>No. of floors</b>	<b>None of the above</b>	<b>Total</b>
1	Bilaspur	78	0	11	11	0	100
2	Chamba	25	25	0	25	25	100
3	Hamirpur	83	0	0	0	17	100
4	Kangra	100	0	0	0	0	100
5	Kinnaur	100	0	0	0	0	100
6	Kullu	33	0	33	33	0	100
7	L&S	100	0	0	0	0	100
8	Mandi	100	0	0	0	0	100
9	Shimla	50	0	50	0	0	100
10	Sirmour	57	0	29	0	14	100
11	Solan	50	0	0	50	0	100
12	Una	17	22	22	17	22	100
	<i>Total</i>	56	10	10	12	12	100

Floods are another form of natural hazards which the state experiences every year. Due to the diverse topography of the area, the flood problem in the state is largely isolated in nature. High monsoon rains in the area of the Shiwalik and Lower and Mid Himalayan ranges causes extensive floods during the rainy season. In the upper reaches of the Beas and Satluj valley, the main problems are flash floods and bank erosion because of steep slopes of rivers and High River flows due to heavy rains. Often the flash floods caused due to cloudbursts, glacial lake outbursts and temporary blockage of the river channels have been also observed. As a result of breaches in embankments and damage to various utilities like irrigation /flood control schemes and houses are also observed.

- ❑ In this context the respondents were asked to chose a statement from a multiple set of statements that best fitted “for designing drainage system in cities or towns to minimize the impact of flood hazard which factors generally considered” 36 per cent believed that all the statements are correct while 26 per cent believe that Catchment area & Annual rainfall are the factors generally considered while designing a drainage system for towns. 24 per cent believe that Catchment area & Annual rainfall are the factors generally considered while designing a drainage system for towns.

Table 6.14

<b>Respondents views on designing drainage system in cities and towns to minimize the impact of flood hazard</b>						
<b>S.N.</b>	<b>Districts</b>	<b>Catchment area &amp; average rainfall</b>	<b>Catchment area &amp; PMP values.</b>	<b>Catchment area &amp; Annual rainfall.</b>	<b>All of the above</b>	<b>Total</b>
1	Bilaspur	13	38	0	50	100
2	Chamba	50	50	0	0	100
3	Hamirpur	25	0	25	50	100
4	Kangra	17	0	67	17	100
5	Kinnaur	0	0	63	38	100
6	Kullu	0	50	0	50	100
7	L&S	0	0	75	25	100
8	Mandi	75	0	0	25	100
9	Shimla	0	0	0	100	100
10	Sirmour	71	0	14	14	100
11	Solan	9	0	9	82	100
12	Una	19	24	24	33	100
	<i>Total</i>	24	14	26	36	100

---

## Chapter-VII

---

### 7. School Safety

School safety was given a major focus by the United Nations International Strategy on Disaster Reduction (UN/ISDR) when the 2006-2007 World Disaster Reduction Campaign was devoted to the theme "Disaster Reduction Begins at School". This theme was chosen by UN/ISDR because (a) it is in line with the Priority 3 of the Hyogo Framework for Action 2005-2015: "Use knowledge, innovation and education to build a culture of safety and resilience at all levels, and (b) schools are the best venues for forging durable collective values; and therefore suitable for building a culture of prevention and disaster resilience.

UNESCO and UNEP (2004) emphasize on the importance of school safety by stating that, "the upgrading and construction of schools that will be relatively safe during the occurrence of disasters should be part of a nation's long-term planning." It even went beyond to identify the specific reasons for which a school should be made safe; for safety as school buildings can save lives, for shelter as schools be utilized as shelters in emergency period, for continuation of education as education is disrupted in times of emergencies and finally for resource preservation as schools are valuable local investment of a nation.

From Himachal's perspective, school infrastructures are sometimes vulnerable during disasters due to poor construction, lack of proper maintenance and many other issues related to the schools. Moreover, as a result of the rapid urbanization and over population in urban areas, schools are growing in an unplanned way to accommodate students in the education system. As a result, vulnerability is ever increasing in the education sector and safety of the students is becoming questionable day by day. Considering all these, school safety has become an issue of major priority to make schools safer for the wellbeing of our next generation. Schools play a versatile role in the communities and hence the impacts of disasters on schools are pervasive.

### 7.1 Awareness regarding School Safety:

- The district wise results showed that Solan was not fully aware of term school safety (86 per cent), whereas all the other districts of Himachal Pradesh are fully aware of the term school safety (Table-7.1).

**Table-7.1**

<b>Awareness regarding "School Safety"</b>				
<b>S.N.</b>	<b>Districts</b>	<b>Yes</b>	<b>No</b>	<b>Total</b>
1	Bilaspur	100	0	100
2	Chamba	100	0	100
3	Hamirpur	100	0	100
4	Kangra	100	0	100
5	Kinnaur	100	0	100
6	Kullu	100	0	100
7	L&S	100	0	100
8	Mandi	100	0	100
9	Shimla	100	0	100
10	Sirmour	100	0	100
11	Solan	86	14	100
12	Una	100	0	100
	<b>Total</b>	99	1	100

### 7.2 Meaning of School safety:

School safety is a process of education being able to continue without disruption, without harm, without danger. It's basically the best way to get the

most out of the learning process. It's actually the foundation for an effective learning environment.

- In this context target group was asked to tick one or more statements from multiple set of statements for correlating school safety. Twenty five percent of the target group believe that training and capacity building of teachers is most important part of school safety, while 24 believe that awareness of various hazards is important for school safety, 18 per cent perceived that hazard resistant safe construction is the true meaning of school safety, and 16 per cent believe that conducting of mock drills forms a part of school safety ( Table-7.2).

**Table-7.2**  
**Meaning of school safety**

S.N.	Districts	Fencing of school complex.	Hazard resistant safe construction	Training and capacity building of teachers in DM	Preparation of school Safety Plan	Conducting of mock drills	Awareness about various hazards	Total
1	Bilaspur	0	0	0	25	0	75	100
2	Chamba	9	10	0	18	27	36	100
3	Hamirpur	10	0	10	60	20	0	100
4	Kangra	0	0	20	0	60	20	100
5	Kinnaur	7	8	69	8	8	0	100
6	Kullu	0	0	0	100	0	0	100
7	L&S	0	90	10	0	0	0	100
8	Mandi	0	55	0	0	27	18	100
9	Shimla	20	0	0	0	0	80	100
10	Sirmour	10	10	0	0	10	70	100
11	Solan	0	0	86	14	0	0	100
12	Una	10	10	70	0	10	0	100
	<b>Total</b>	5	18	25	12	16	24	100

### 7.3 Importance of School Safety

School safety is necessary for learning to occur. The best way to have an excellent school is to have a safe school because safety incidents distract from the learning process. Our schools have never been so challenged as they are today in our society. We dare to educate those who are cast aside in previous generations, special needs students, for example. Schools face an even wider array of hazards than they did 20 and 30 years ago. For example, there has been a relatively new phenomenon like terrorism in schools over the last few decades. School safety is so that children can learn, parents do not worry about their children at school, and educators can apply their gift of helping our students.

- In order to assess the need for school safety the target group was asked to tick on one or more needs for school safety form a multiple set of school safety statements, Twenty four percent respondent feel that Disaster preparedness in school educates community is more important, 16 per cent each of the target group felt that it is important for school safety because Schools are generally more vulnerable, Children are more vulnerable group of society, and Historically disasters have caused more damage in schools, and 15 per cent believes that Schools require to survive during disasters so that they can used as relief centers (Table-7.3).

**Table- 7.3**  
**Responses to school safety**

S.N.	Districts	Schools are generally more vulnerable	Children are more vulnerable group of society	Schools are one of the key critical infrastructures	Schools require to survive during disasters so that they can be used as relief centers	Historically disasters have caused more damage in schools	Disaster preparedness in school educates community	Total
1	Bilaspur	4	9	22	13	22	30	100
2	Chamba	21	15	0	26	23	15	100
3	Hamirpur	18	29	0	12	0	41	100
4	Kangra	40	0	0	33	13	14	100
5	Kinnaur	11	5	0	11	26	47	100
6	Kullu	25	0	50	0	25	0	100
7	L&S	0	15	23	0	15	47	100
8	Mandi	48	0	5	10	24	13	100
9	Shimla	0	24	33	14	10	19	100
10	Sirmour	0	25	16	13	22	24	100
11	Solan	0	29	24	14	10	23	100
12	Una	47	26	16	11	0	0	100
	<b>Total</b>	16	16	13	15	16	24	100

#### 7.4 Responsibility of School Safety

- Sixty six per cent respondents stated that as per the multiple choices given all are responsible for school safety, 22 per cent respondent stated that District administration and school administration are responsible for school safety, 5 per cent respondent stated that society is responsible for school safety, 4 per cent students and 3 per cent teachers responsible for school safety (Table-7.4).

**Table 7.4**  
**Responsibility of school safety**

S.N.	Districts	District Administration	School Administration	Teachers	Students	Society	1) and 2)	All (1-5)	None of these	Total
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>				
1	Bilaspur	0	0	25	25	0	0	50	0	100
2	Chamba	0	0	9	0	27	64	0	0	100
3	Hamirpur	0	0	0	10	0	10	80	0	100
4	Kangra	0	0	0	0	20	20	40	20	100
5	Kinnaur	0	0	0	0	0	15	85	0	100
6	Kullu	0	0	0	0	0	0	100	0	100
7	L&S	0	0	0	0	0	10	90	0	100
8	Mandi	0	0	0	0	0	9	91	0	100
9	Shimla	0	0	0	0	0	40	60	0	100
10	Sirmour	0	0	0	0	0	10	90	0	100
11	Solan	0	0	0	0	0	43	57	0	100
12	Una	0	0	0	0	0	30	70	0	100
	<b>Total</b>	0	0	3	4	5	22	66	0	100

### 7.5 Steps taken for school safety

- Regarding steps taken by school authorities for school safety 33 per cent of the respondents revealed that students have been educated about do's & don'ts on various hazards, 19 per cent respondent stated that building has been constructed hazard resistant, 18 per cent respondents stated that mock drill are being conducted regularly, 15 per cent of the respondents revealed that the PTA, SMC has been involvement in school emergency management plan, 10 per cent stated that school disaster management plan has been prepared (Table-7.5).

**Table-7.5**  
**Steps for school safety**

S.N.	Districts	School disaster management plan has been prepared.	Students have been educated about Dos and Don'ts of various hazards	Mock drill conducted regularly	School building has been constructed hazard resistant	The PTA, SMC etc. have been involved in school emergency management plan	The vulnerable part of school has been strengthened	Total
1	Bilaspur	0	18	18	36	18	10	100
2	Chamba	25	15	25	22	13	0	100
3	Hamirpur	10	25	25	10	20	10	100
4	Kangra	7	33	13	20	13	14	100
5	Kinnaur	17	35	9	17	22	0	100
6	Kullu	0	20	40	20	0	20	100
7	L&S	17	33	33	17	0	0	100
8	Mandi	0	83	17	0	0	0	100
9	Shimla	0	43	0	29	30	0	100
10	Sirmour	0	43	0	21	21	15	100
11	Solan	0	25	50	0	25	0	100
12	Una	0	53	12	18	11	6	100
	<b>Total</b>	10	33	18	19	15	5	100

### 7.6 Inclusion in School Syllabus:

- In order to assess awareness level of the target group in inclusion of disaster management plan in school syllabus at various levels, 45 per cent respondents stated that it is included at higher secondary level, 32 per cent respondents stated that disaster management it is included at Senior Secondary Level, 20 per cent respondents stated that it is included in Middle Standard Level, 3 per cent respondents stated that it is included in Primary Standard Level (Table-7.6).

**Table-7.6**  
**Inclusion of disaster management plan in School Syllabus**

S.N.	Districts	Primary Standard Level	Middle Standard Level	Higher Secondary Level	Senior Secondary Level	Total
1	Bilaspur	0	38	25	37	100
2	Chamba	27	45	27	1	100
3	Hamirpur	0	10	20	70	100
4	Kangra	0	10	70	20	100
5	Kinnaur	0	31	62	7	100
6	Kullu	0	0	0	100	100
7	L&S	0	20	80	0	100
8	Mandi	0	0	27	73	100
9	Shimla	0	0	80	20	100
10	Sirmour	0	20	50	30	100
11	Solan	0	14	0	86	100
12	Una	0	20	60	20	100
	<b>Total</b>	3	20	45	32	100

### 7.7 Increase in the content of disaster management in school syllabus

- In order to evaluate the need to increase the content of disaster management in schools syllabus the target group was asked to tick at least one statement from multiple set of statements. Sixty per cent per cent opted that Disaster Management should be Included all levels, while 21 per cent stated that Disaster Management should not be included in curriculum but should be taught informally, and 15 per cent felt that it should be part of NCC/NSS training and syllabus (Table-7.7).

**Table-7.7**  
**Increase the content of Disaster Management in School Syllabus.**

S.N.	Districts	Coloring books at nursery/primary level should be prescribed	Disaster Management should be Included all levels	Should not be included in curriculum but should be Taught informally	Should be made part of NCC/NSS training and syllabus	There is no need to teach Disaster management in schools as it won't result in any fruitful exercise.	Total
1	Bilaspur	0	88	12	0	0	100
2	Chamba	0	82	18	0	0	100
3	Hamirpur	0	80	10	10	0	100
4	Kangra	0	60	0	40	0	100
5	Kinnaur	6	50	22	22	0	100
6	Kullu	0	100	0	0	0	100
7	L&S	0	73	27	0	0	100
8	Mandi	0	0	75	25	0	100
9	Shimla	20	30	0	30	20	100
10	Sirmour	0	82	18	0	0	100
11	Solan	0	42	41	17	0	100
12	Una	0	72	10	18	0	100
	<i>Total</i>	2	60	21	15	2	100

### 7.8 Opinion about the vulnerable part of school Building

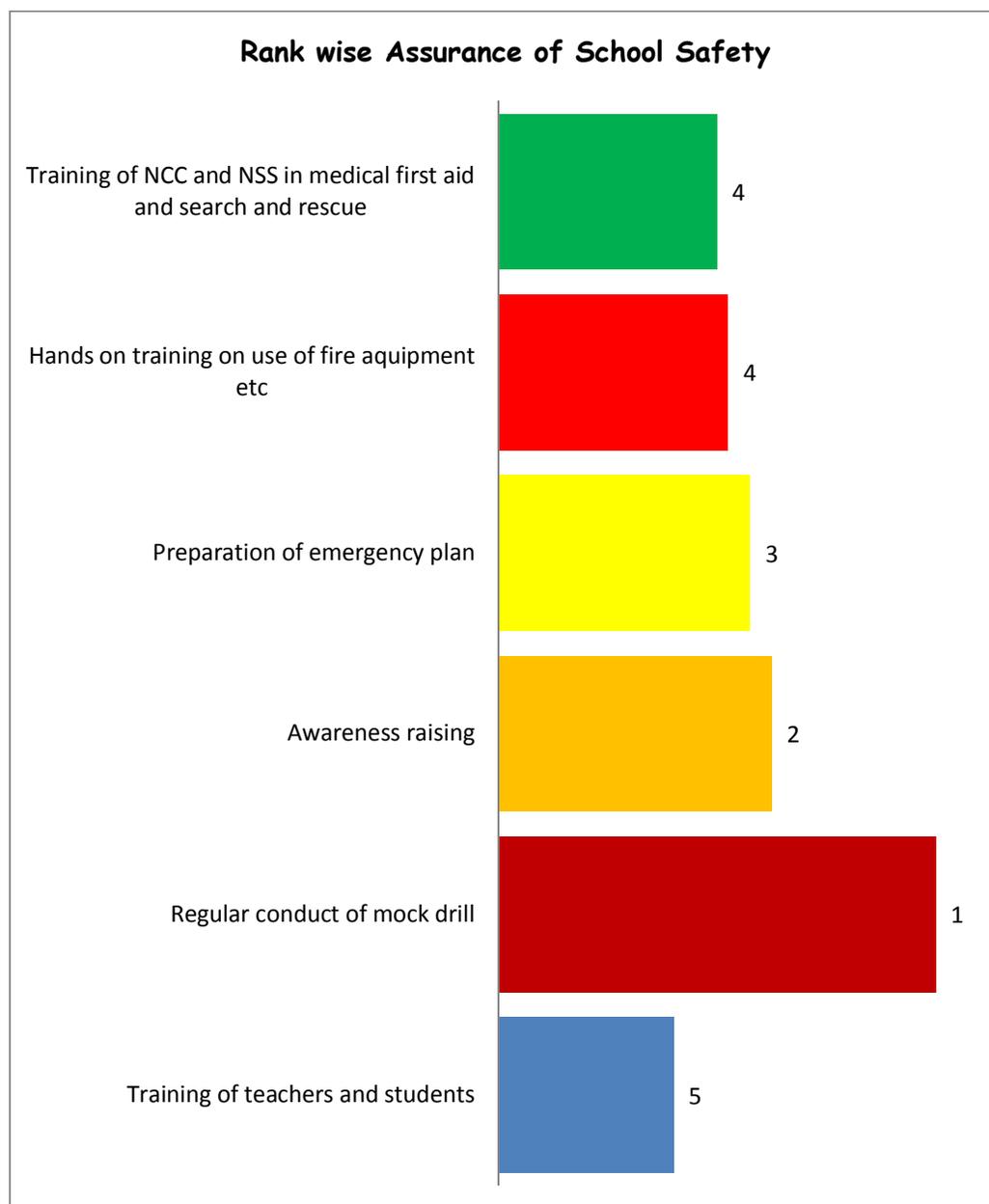
- Opinion was sought from the target group to select an option from multiple set of options as to what part of school building is most vulnerable, 29 per cent respondents stated that the building of the school is vulnerable, 26 per cent stated wiring of the school building is vulnerable, 16 per cent stated that staircases are more vulnerable part of the school, 12 per cent stated that kitchen of the school is more vulnerable 11 per cent stated that boundary wall is more vulnerable, 6 per cent stated that roof of the school is more vulnerable (Table-7.8).

**Table-7.8**  
**Opinion about vulnerable part of school Building**

S.N.	Districts	Roof	Building	Wiring	Staircases	Boundary Wall	Kitchen	None of the above	Total
1	Bilaspur	0	0	25	13	38	24	0	100
2	Chamba	0	9	18	45	18	10	0	100
3	Hamirpur	0	40	30	0	0	30	0	100
4	Kangra	0	40	30	20	10	0	0	100
5	Kinnaur	38	0	54	8	0	0	0	100
6	Kullu	0	100	0	0	0	0	0	100
7	L&S	0	0	60	10	10	20	0	100
8	Mandi	0	64	9	9	18	0	0	100
9	Shimla	0	60	40	0	0	0	0	100
10	Sirmour	0	50	0	10	20	20	0	100
11	Solan	0	29	29	42	0	0	0	100
12	Una	10	40	0	20	10	20	0	100
	<b>Total</b>	6	29	26	16	11	12	0	100

### 7.9 Assurances of School Safety during the disaster

- The target group was asked to rank one for high and five for low from a multiple set of statements in order to evaluate the safety in their schools. Regular conduct drills was ranked 1<sup>st</sup>, followed by awareness raising, the 3<sup>rd</sup> spot was for preparation of emergency (Table-7.9).



**Table-7.9**  
**Assurance of School Safety**

S.N.	Districts	Training of teachers and students	Regular conduct of mock drill	Awareness raising	Preparation of emergency plan	Hands on training on use of fire equipment etc	Training of NCC and NSS in medical first aid and search and rescue	Total
1	Bilaspur	7	38	8	31	8	8	100
2	Chamba	10	45	18	9	9	9	100
3	Hamirpur	8	36	21	14	7	14	100
4	Kangra	8	36	21	14	7	14	100
5	Kinnaur	22	36	14	14	7	7	100
6	Kullu	15	5	10	20	25	25	100
7	L&S	12	44	11	11	11	11	100
8	Mandi	16	17	17	17	16	17	100
9	Shimla	7	14	29	7	36	7	100
10	Sirmour	10	40	10	20	10	10	100
11	Solan	10	10	10	20	20	30	100
12	Una	10	20	40	10	10	10	100
	<i>Total</i>	<i>11</i>	<i>28</i>	<i>17</i>	<i>16</i>	<i>14</i>	<i>14</i>	<i>100</i>

### 7.10 Requirement of training on disaster management

- Opinion was sought from the target group as to who require training on disaster management and in what field. They were asked to tick a

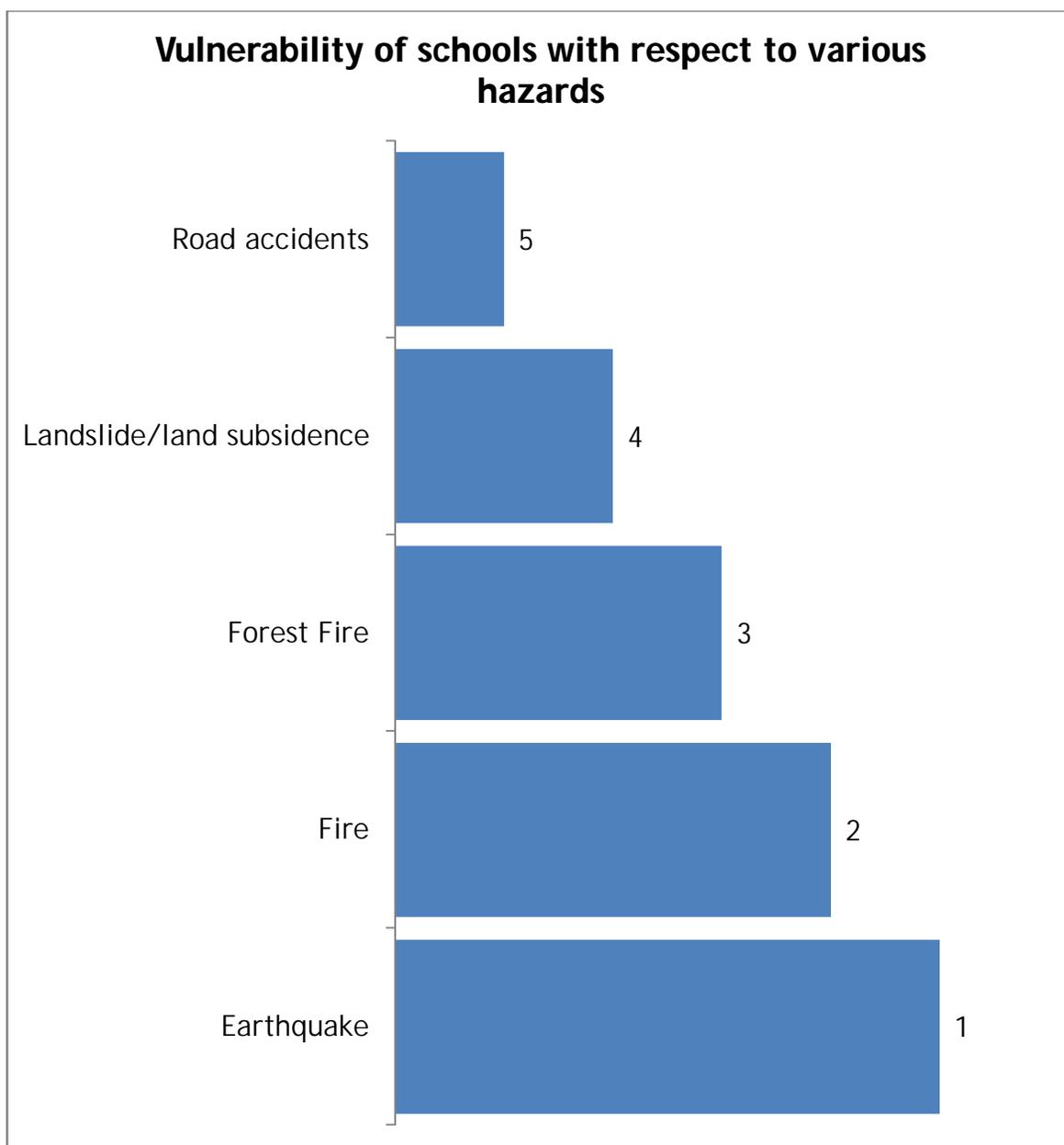
statement form a multiple set of statements. Thirty five per cent respondents were of the opinion that students should be involved in awareness generation and in mock drills, 26 per cent felt that the Principals of the schools should be provided training in all aspects of disaster management, 21 per cent felt that teachers should be trained in awareness generation and mock drills and 18 per cent felt that members of PTA and SMC, in emergency response should be provided training in disaster management (table-7.10).

**Table-7.10**  
**Requirement of training in disaster management**

S.N.	Districts	Principal in all aspect of disaster management	Teachers in awareness generation and conduct of mock drill	Students in awareness generation and conduct of mock drills	Members of PTA and SMC in emergency response	Total
1	Bilaspur	13	13	75	0	100
2	Chamba	9	18	27	45	100
3	Hamirpur	20	20	40	20	100
4	Kangra	20	40	20	20	100
5	Kinnaur	23	15	31	31	100
6	Kullu	0	0	100	0	100
7	L&S	20	20	60	0	100
8	Mandi	91	9	0	0	100
9	Shimla	0	20	40	40	100
10	Sirmour	30	30	20	20	100
11	Solan	29	14	43	14	100
12	Una	20	30	40	10	100
	<i>Total</i>	26	21	35	18	100

### 7.11 Ranking of the vulnerability of school

- The respondents were asked to rank five natural/manmade hazards one for the highest probability and five for the lowest probability that their schools would be most vulnerable to. Earthquake was ranked 1<sup>st</sup>, while road accident were ranked last hazard that would pose the maximum danger to their school.



### 7.12 Mechanism of contacting parents/ guardians in emergency

- In order to assess the mechanism of contacting parents/guardians in case of emergency, the target group was asked to tick a statement from multiple set of statements 37 per cent of the respondents felt that they have a mechanism to inform district administration, 28 per cent stated that they have prepared the directories of contact numbers, 16 per cent stated that they would only be able to intimate SMC and PTA, 12 per cent stated that they were in a position that they would be only able to intimate the local panchayats (Table-7.11).

**Table-7.11**  
**Mechanism of contacting parents/guardians in case of any emergency in school**

S.N.	Districts	We have prepared Directories of Contact numbers	We can Inform the District Administration	We can only Intimate the SMC and PTA	We can Intimate the local Panchayat only	Yet to think about it	Total
1	Bilaspur	25	38	25	0	13	100
2	Chamba	18	45	36	0	0	100
3	Hamirpur	30	40	20	10	0	100
4	Kangra	30	30	20	20	0	100
5	Kinnaur	15	31	23	23	8	100
6	Kullu	100	0	0	0	0	100
7	L&S	10	40	10	0	40	100
8	Mandi	91	9	0	0	0	100
9	Shimla	0	60	0	40	0	100
10	Sirmour	50	40	0	0	10	100
11	Solan	14	43	29	14	0	100
12	Una	0	50	10	40	0	100
	<b>Total</b>	28	37	16	12	7	100

### 7.13 Integration of disaster issues in regular subjects like Geography, History, Language and Science

- The possibility of integration disaster issues in regular subjects like Geography, History, Language and Science instead of separate subject on Disaster Management was sought from the target group. They were asked to tick on a probable statement from a multiple set of probable statements. Sixty four per cent felt that Yes, it would reduce the burden on students, 22 per cent felt that Disaster Management is not required to be taught formally, and 14 per cent felt that there was no need to integrate disaster issues in these subjects as it won't do justice to the subjects (Table-7.12).

**Table -7.12**  
**Integration of disaster issues in regular subjects like Geography, History, Language and Science**

S.N.	Districts	Yes, it would reduce the burden on students	No, it won't do justice to the subject	DM is Not required to taught formally at all level	Total
1	Bilaspur	50	0	50	100
2	Chamba	55	45	0	100
3	Hamirpur	80	10	10	100
4	Kangra	80	10	10	100
5	Kinnaur	62	15	23	100
6	Kullu	0	100	0	100
7	L&S	100	0	0	100
8	Mandi	9	0	91	100
9	Shimla	80	20	0	100
10	Sirmour	70	20	10	100
11	Solan	57	14	29	100
12	Una	80	10	10	100
	<b>Total</b>	64	14	22	100

### 7.14 Social value of school disaster management plan

- A direct question was asked from the target group whether there is any social value of preparing a disaster management plan. Eighty per cent of the target group opined that yes there is social value to it. (Table-7.13).

**Table-7.14**  
**Social value of school disaster management plan**

S.N.	Districts	Yes	No	Total
1	Bilaspur	50	50	100
2	Chamba	82	18	100
3	Hamirpur	50	50	100
4	Kangra	100	0	100
5	Kinnaur	92	8	100
6	Kullu	100	0	100
7	L&S	50	50	100
8	Mandi	91	9	100
9	Shimla	80	20	100
10	Sirmour	80	20	100
11	Solan	100	0	100
12	Una	100	0	100
	<b>Total</b>	80	20	100

---

## **Chapter-VIII**

---

### **8. Medical Professionals**

Natural disasters can overwhelm a local or national health structure in a matter of minutes. There are times when the aftermath of monumental disasters requires more of a development and reconstruction focus than a medical one. This was the case after the Indian Ocean tsunami in 2005, when other organizations and government agencies had the necessary capacities to address the most pressing needs and there actually was not much for medical professional to do.

In numerous instances, however, medical professional played a large role in tending to the wounded and the ill who were left in a catastrophe's wake. In several situations, medical professional teams were already present in a place when disaster struck and were thus able to respond quickly. This was the case when the Kashmir region of Pakistan and India was hit by a devastating earthquake in 2005, when flooding swamped Mexico in 2007, and when cyclones thrashed Bangladesh in 2007 and Myanmar in 2008. Medical professional teams were able to rapidly assess where their expertise would be of most assistance and set up primary and secondary care health facilities, surgical units, and mobile clinics to reach people trapped in remote areas.

More recently, medical professional launched what became the organization's largest-ever emergency effort following the January 2010 earthquake that devastated Haiti, killing more than 200,000 people and leaving more than a million homeless. Because medical professional has been working in Haiti since 1991 teams were able to respond quickly. In the first seven weeks, nearly 1,200 tons of supplies were flown, driven, and carried by boat into Haiti. Staff was increased from 800 to more than 3,300, the vast majority of them Haitian. In the three-month emergency phase that followed the earthquake, medical professional treated more than 165,000 people. Through October 2010, the organization treated nearly 360,000 people.

In this study an attempt was made to evaluate the awareness and preparedness level of medical professionals.

### 8.1 Duties of a doctor in a mass casualty situation

- While enquiring from the medical professional about the duties of a doctor in mass causality situation, 19 per cent of medical professional stated that firstly they will treat the victims, Secondly they will assess the disability of the victims 15 per cent, 14per cent stated that they dispose off the dead bodies, 11 per cent medical professional stated that they certify the cause of death, 11 per cent medical professional stated they preserve the evidences, 11 per cent medical professional stated they record chronology of the events, 10 per cent medical professional stated they preserve the records, and 9 per cent medical professional stated they will conduct the post mortem examination( Table-8.1).

**Table-8.1**  
**Duties of a doctor in a mass casualty situation**

Distt/ Parameters	Bilaspur	Chamba	Hamirpur	Kangra	Kinnaur	Kullu	L&S	Mandi	Shimla	Sirmour	Solan	Una	Total
1. To certify cause of death	9	8	15	22	10	14	11	9	8	8	14	9	11
2. To preserve the record	9	17	5	13	10	14	5	7	17	10	7	11	10
3. To treat the victims	28	17	26	13	20	14	21	17	8	20	21	20	19
4. To preserve evidences	9	8	8	13	12	7	5	13	8	13	14	13	11
5. To record chronology of the event	9	8	10	16	7	7	11	15	17	8	7	11	11
6. To access the disabilities of the victims	16	17	15	9	15	14	26	13	17	15	14	17	15
7. To conduct postmortem examination	9	8	8	0	10	14	11	11	8	8	7	11	9
8. To dispose of the dead bodies	9	17	13	16	17	14	11	15	17	20	14	9	14
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

## 8.2 Definition of Triage

A process for sorting injured people into groups based on their need for or likely benefit from immediate medical treatment. Triage is used in hospital emergency rooms, on battlefields, and at disaster sites when limited medical resources must be allocated.

- In this context the target group was asked to define triage from a multiple set of definitions with an option to tick more than one definition. A majority 53 per cent have rightly defined triage as medical action of prioritizing treatment & management based diagnosis & prognosis, 26 per cent stated that all of the above, 14 per cent stated that an emergency situation requiring highest level of medical alertness, 5 per cent stated that panic and chaos situation requiring specialized health management, 2 per cent stated none of the above (Table-8.2).

**Table-8.2**  
**Definition of triage**

S.N.	Districts	Emergency requiring highest medical alertness	Panic & Chaos situation health management.	Medical action of prioritizing treatment & management	None of these statements above	All of these statements above	Total
1	Bilaspur	8	15	54	0	23	100
2	Chamba	86	0	14	0	0	100
3	Hamirpur	0	0	60	10	30	100
4	Kangra	22	11	33	11	22	100
5	Kinnaur	8	8	69	0	15	100
6	Kullu	0	0	67	0	33	100
7	L&S	14	14	43	0	29	100
8	Mandi	0	0	70	0	30	100
9	Shimla	0	0	33	0	67	100
10	Sirmour	10	0	70	0	20	100
11	Solan	0	0	100	0	0	100
12	Una	18	0	27	0	55	100
	<i>Total</i>	14	5	53	2	26	100

### 8.3 Action of Physicians

- When the medical professional were asked about the action of physicians in case of any disorder, 27 per cent stated that they will identify victims whose lives are not in immediate danger and who are in need of urgent but not immediate medical care, 26 per cent stated that they will identify psychological traumatized victims needing to be reassured, 25 per cent stated that they will identify victims who can be saved and whose lives are in immediate danger requiring treatment straight away or are as matter of priority within the next few hours, 22 per cent stated that they will identify the injured persons requiring only minor treatment who can be treated later or by relief workers (Table-8.3).

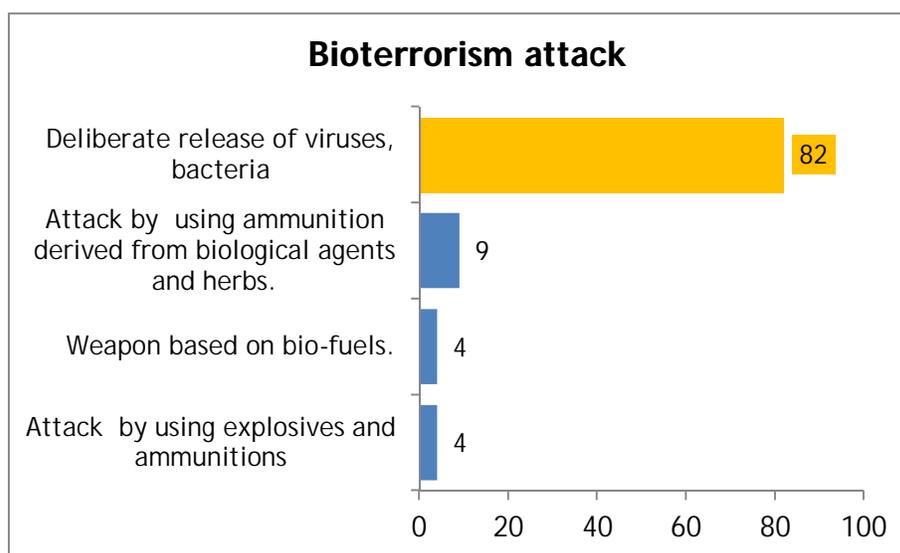
**Table-8.3**  
**Action of Physicians in Disaster**

S.N.	Districts	Identify psychologically traumatized victims needing to be reassured.	Identify victims whose lives are not in immediate danger	Identify victims who can be saved or are as matter of priority within the next few hours.	Identify injured persons requiring only minor treatment.	Total
1	Bilaspur	26	23	29	23	100
2	Chamba	33	33	33	0	100
3	Hamirpur	25	25	25	25	100
4	Kangra	29	24	24	24	100
5	Kinnaur	26	39	9	26	100
6	Kullu	44	22	22	11	100
7	L&S	29	21	21	29	100
8	Mandi	27	20	27	27	100
9	Shimla	25	38	25	13	100
10	Sirmour	23	29	29	19	100
11	Solan	38	25	13	25	100
12	Una	13	29	32	26	100
	<i>Total</i>	26	27	25	22	100

### 8.3 Bioterrorism Attack

A *bioterrorism attack* is the deliberate release of viruses, bacteria, toxins or other harmful agents used to cause illness or death in people, animals, or plants. These agents are typically found in nature, but it is possible that they could be mutated or altered to increase their ability to cause disease, make them resistant to current medicines, or to increase their ability to be spread into the environment. Biological agents can be spread through the air, water, or in food. Terrorists tend to use biological agents because they are extremely difficult to detect and do not cause illness for several hours to several days. Some bioterrorism agents, like the smallpox virus, can be spread from person to person and some, like anthrax, cannot

- The target group was asked to tick one statement from multiple set of statements they felt they could correlate to “*bioterrorism attack*”. A majority of 82 per cent rightly felt that the statement “deliberately release of viruses, bacteria, or other germs (agents) used to cause illness or death in people and animals”, 9 per cent stated that attack launched by terrorist using ammunition made from ingredients derived from biological agents and herbs, 4 per cent stated that attack made by using explosive and ammunitions, 4 per cent stated that weapons based on bio-fuels (Table-4).



**Table-8.4**  
**Bioterrorism attack**

S.N.	Districts	Attack by using explosives and ammunitions	Weapon based on bio-fuels.	Attack by using ammunition derived from biological agents and herbs.	Deliberate release of viruses, bacteria	Total
1	Bilaspur	13	13	13	60	100
2	Chamba	0	0	0	100	100
3	Hamirpur	0	0	0	100	100
4	Kangra	11	11	11	67	100
5	Kinnaur	0	0	0	100	100
6	Kullu	0	0	100	0	100
7	L&S	0	0	17	83	100
8	Mandi	0	0	30	70	100
9	Shimla	0	0	0	100	100
10	Sirmour	0	0	0	100	100
11	Solan	25	25	25	25	100
12	Una	0	0	0	100	100
	<i>Total</i>	4	4	9	82	100

### 8.5 Most common initial response during any disaster

- In a disaster situation medical professional play a very important role, to assess their preparedness the target group was asked to tick on the most common initial response he/she would resort to from a multiple set of responses with the option to tick on more than one response. 29 per cent stated that their initial response would be fear, 17 per cent of medical professional stated that their initial response would be to helpfulness to other disasters victims, 14 per cent medical professional feel that difficulty

in making decision about the disaster, 12 per cent stated the need for information about the disaster, 11 per cent medical professional stated that seeking help for yourself and your family, 9 per cent stated that they feel disorientation & numbing, 5 per cent stated that reluctance to abandon property, 2 per cent medical professional feel disbelief during disaster (Table-8.5).

**Table-8.5**  
**Most common initial response during any disaster**

S.N.	Districts	Fear	Disbelief	Reluctance to abandon property	Disorientation & numbing	Difficulty in making decisions	Need for information	Help for yourself and your family	Helpfulness to other disasters victims.	Total
1	Bilaspur	33	7	0	7	7	13	20	13	100
2	Chamba	10	0	17	0	20	20	20	13	100
3	Hamirpur	28	0	0	17	17	17	0	22	100
4	Kangra	36	9	9	9	9	9	9	9	100
5	Kinnaur	36	9	0	27	18	0	0	9	100
6	Kullu	0	0	0	0	0	0	0	100	100
7	L&S	17	0	17	0	50	0	0	17	100
8	Mandi	0	0	0	10	10	20	30	30	100
9	Shimla	33	0	0	0	33	0	0	33	100
10	Sirmour	70	0	0	10	0	10	10	0	100
11	Solan	50	0	0	0	0	0	0	50	100
12	Una	60	0	0	20	0	0	0	20	100
	<i>Total</i>	29	2	5	9	14	12	11	17	100

### 8.6 Methods for preservation of dead bodies

- ❑ Medical professional were also asked about which methods are adopted if dead bodies are to be preserved for long period, 41 per cent stated that the best method of preserving the dead bodies refrigeration in dry ice, 35 per cent Medical professional stated that second best method is keeping the

dead body in formalin, 7 per cent Medical professional stated that temporary burial for keeping the dead body, 7 per cent Medical professional stated that plastination of the dead body , 5 per cent Medical professional stated that sanitising of the dead body, 4 per cent Medical professional stated that complucad method for preserving the dead bodies (Table-6).

**Table-8.6**  
**Methods adopted for preservation of dead bodies**

S.N.	Districts	Refrigeration in Dry Ice	Temporary Burial	Formalin	Complucad	Sanitising	Plastination	Total
1	Bilaspur	40	0	33	0	7	20	100
2	Chamba	12	18	18	18	18	15	100
3	Hamirpur	56	6	22	6	6	6	100
4	Kangra	33	0	67	0	0	0	100
5	Kinnaur	44	8	44	0	4	0	100
6	Kullu	100	0	0	0	0	0	100
7	L&S	50	10	40	0	0	0	100
8	Mandi	90	0	10	0	0	0	100
9	Shimla	38	13	38	0	0	13	100
10	Sirmour	53	0	47	0	0	0	100
11	Solan	40	0	60	0	0	0	100
12	Una	39	6	50	0	0	6	100
	<i>Total</i>	41	7	35	4	5	7	100

### 8.7 Primary Methods used for identification of dead bodies

- When the medical professional were asked that what are the primary methods used for the identification of dead bodies, 26per cent of the medical professional revealed that finger prints should be the best method, 22 per cent revealed that DNA Analysis is the best method for identification

of dead bodies, 21 per cent stated that revealed that forensic odontology is the best method for identification of dead bodies, 16 per cent stated that forensic radiology, 15 per cent stated that forensic anthropology is the best method for the identification of dead bodies (Table-8.7).

**Table-8.7**  
**Primary methods used for identification of dead bodies.**

S.N.	Districts	Fingerprint	Forensic Odontology	Forensic Radiology	Forensic Anthropology	DNA Analysis	Total
1	Bilaspur	25	22	19	14	19	100
2	Chamba	23	17	17	20	23	100
3	Hamirpur	30	19	15	7	30	100
4	Kangra	41	12	18	18	12	100
5	Kinnaur	24	18	8	24	26	100
6	Kullu	20	0	20	20	40	100
7	L&S	21	16	16	21	26	100
8	Mandi	0	100	0	0	0	100
9	Shimla	22	22	11	22	22	100
10	Sirmour	29	16	23	10	23	100
11	Solan	57	29	14	0	0	100
12	Una	22	22	19	16	22	100
	<i>Total</i>	26	21	16	15	22	100

### 8.8 Aim for Hospital disaster management plan

- Medical professional were also asked what is the aim of hospital disaster management plan, 32 per cent stated that providing prompt and effective medical care to maximum possible victims, 30 per cent stated that minimising morbidity and mortality resulting from the mass casualty incident, 21 per cent stated that soliciting help from outside in a optimal way, 9 per cent addressing only mass casualties which may result from mass

casualty incident that has occurred away from hospital, 9 per cent Medical professional addressing structurally vulnerable element of hospital (Table-8.8).

**Table-8.8**  
**Aim of disaster management plan for Hospital**

S.N.	Districts	Providing prompt and effective medical care.	Soliciting help from the outside.	Minimizing morbidity and mortality	Addressing only mass casualties.	Addressing structurally vulnerable elements	Total
1	Bilaspur	31	19	31	8	12	100
2	Chamba	17	17	17	26	22	100
3	Hamirpur	30	23	27	20	0	100
4	Kangra	28	22	44	6	0	100
5	Kinnaur	36	14	39	0	11	100
6	Kullu	25	25	25	25	0	100
7	L&S	29	18	35	12	6	100
8	Mandi	73	0	9	9	9	100
9	Shimla	33	22	33	11	0	100
10	Sirmour	34	24	28	0	14	100
11	Solan	22	33	22	0	22	100
12	Una	36	28	32	0	4	100
	<i>Total</i>	32	21	30	9	9	100

### 8.9 Requirements of a referral-level facility for comprehensive emergency obstetric care

- When the medical professional were asked that what are requirements of a referral-level facility for comprehensive obstetric care from multiple set of requirements, 42 stated that all of the above, 21 per cent stated that skilled staff and resources for normal births and basis emergency obstetric care and new born care, 20per cent stated that safe blood transfusion

capabilities, 17 per cent stated that medical staff that can perform C-section available 24- hours per day, seven days per week (Table-9).

**Table-8.9**  
**Requirements of a referral-level facility for comprehensive emergency obstetric care**

S.N.	Districts	Safe blood transfusion capabilities	Medical staff can perform c-section available 24 hours	Skilled staff and resources for normal births	All of these statements	b and c only	Total
		a	b	c	d	e	
1	Bilaspur	38	15	15	31	0	100
2	Chamba	29	14	29	29	0	100
3	Hamirpur	10	10	60	20	0	100
4	Kangra	44	44	0	11	0	100
5	Kinnaur	0	0	15	85	0	100
6	Kullu	33	33	0	33	0	100
7	L&S	29	29	14	29	0	100
8	Mandi	0	0	20	80	0	100
9	Shimla	0	33	33	33	0	100
10	Sirmour	20	20	30	30	0	100
11	Solan	25	25	0	50	0	100
12	Una	18	18	18	45	0	100
	<b>Total</b>	20	17	21	42	0	100

### 8.10 Requirement for infection control

- Medical professional were also asked that what are requirements for infection control from a multiple set of facilities, a majority 40 per cent stated that decontaminating, cleaning, disinfecting and sterilizing used instruments, 22per cent stated infection can be controlled by facilities for frequent hand washing, 20per cent stated that by using both the methods facilities for frequent hand washing and safe handling of sharp objects,

14per cent stated that safe handling of sharp objects, 4per cent stated that by using the x-ray services (Table-8.10).

**Table-8.10**  
**Requirements for infection control**

S.N.	Districts	Facilities for hand washing	X-ray services	Decontaminating, cleaning, disinfecting, sterilizing used instruments	Safe handling of sharp objects	a,b, and d,	Total
		a	b	c	d	e	
1	Bilaspur	15	0	85	0	0	100
2	Chamba	29	0	71	0	0	100
3	Hamirpur	20	0	60	20	0	100
4	Kangra	33	33	11	11	11	100
5	Kinnaur	15	0	31	31	23	100
6	Kullu	33	0	33	33	0	100
7	L&S	14	0	14	0	71	100
8	Mandi	0	10	0	0	90	100
9	Shimla	0	0	67	33	0	100
10	Sirmour	30	0	10	40	20	100
11	Solan	0	0	100	0	0	100
12	Una	55	0	36	9	0	100
	<i>Total</i>	22	4	40	14	20	100

### 8.11 Leadership of Hospital disaster management plan

- When the medical professionals asked that who should head the Hospital disaster management plan, 22 per cent stated that head of the hospital should be head of hospital disaster management plan, 17 per cent Stated that Chief Nursing Superintendent/matron , 16 per cent stated that Chief of the security of hospital, 19 per cent stated that sanitation server should head the hospital disaster management plan,10 per cent stated that hospital union should be head of the Hospital disaster management plan, 9 per cent stated that finance officer of the hospital should be head of the

hospital disaster management plan, 8 per cent stated that hospital kitchen / dietary server should be head of the hospital disaster management plan (Table-8.11).

**Table-8.11**  
**Respondent's choice on leadership in the hospital Disaster Management Plan**

S.N.	Districts	Head of institution	The Chief Nursing Superintendent/ matrom	The Finance Officer	Hospital Unions	The Chief of Security of the Hospital	Hospital kitchen/dietary services	Sanitation Services	Total
1	Bilaspur	17	13	11	20	13	11	13	100
2	Chamba	19	15	12	20	12	12	12	100
3	Hamirpur	20	15	9	20	13	9	15	100
4	Kangra	35	23	12	8	23	0	0	100
5	Kinnaur	23	23	6	17	17	4	9	100
6	Kullu	13	13	13	38	13	0	13	100
7	L&S	22	19	0	18	19	11	11	100
8	Mandi	100	0	0	0	0	0	0	100
9	Shimla	20	13	13	14	13	13	13	100
10	Sirmour	19	19	10	16	17	8	10	100
11	Solan	20	20	13	13	27	7	0	100
12	Una	16	16	11	16	16	9	15	100
	<i>Total</i>	22	17	9	17	23	8	11	100

### 8.12 Cases for which Post-exposure Prophylaxis is administered

**Post-exposure prophylaxis (PEP)** is any prophylactic treatment started immediately after exposure to a pathogen (such as a disease-causing virus), in order to prevent infection by the pathogen and the development of disease.

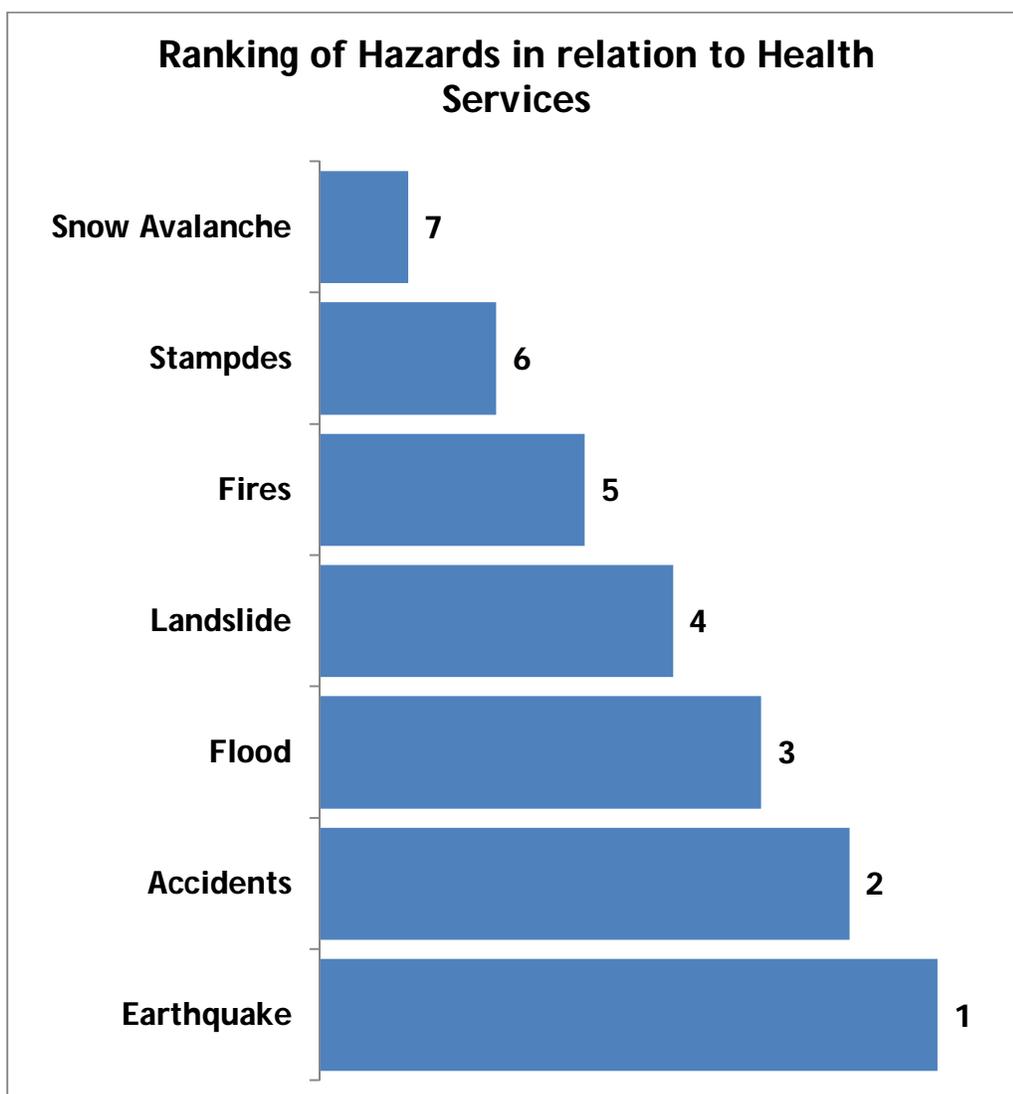
- Medical professional were also asked that what are the cases in which Post-exposure prophylaxis is administered, 46 per cent Medical professional stated that all of the above cases, 22 per cent stated that health professional exposed to HIV exposure, 21 per cent stated that in case of unprotected sexual exposure likely to result in HIV infection, 9 per cent stated that in rape cases, 2per cent stated that none of the above (Table-8.12).

**Table-8.12**  
**Respondent's choice on administration on**  
**Post-exposure prophylaxis**

S.N.	Districts	In rape cases	unprotected sexual exposure result in HIV infection	Health professional exposed to HIV exposure	All of these statements	None of the above	Total
1	Bilaspur	15	23	23	38	0	100
2	Chamba	29	29	0	29	14	100
3	Hamirpur	0	40	30	20	10	100
4	Kangra	0	56	0	44	0	100
5	Kinnaur	8	23	38	31	0	100
6	Kullu	0	0	33	67	0	100
7	L&S	0	14	43	43	0	100
8	Mandi	0	0	20	80	0	100
9	Shimla	0	0	0	100	0	100
10	Sirmour	30	10	20	40	0	100
11	Solan	25	25	50	0	0	100
12	Una	0	9	9	82	0	100
	<i>Total</i>	9	21	22	46	2	100

### 8.13 Ranking of the Hazards in relation to health services.

- When the Medical Professionals were asked that according to you health services should be strengthened to deal with which of the following hazard in the state of H.P (Rank in order of vulnerability), 17 per cent stated that hazards due to earthquakes and ranked it as 1<sup>st</sup>, 16 per cent stated that hazards due to accidents and ranked it as 2<sup>nd</sup>, approximately 15 per cent stated that hazards due to flood and ranked it 3<sup>rd</sup>, approximately 14 per cent stated that due hazards due landslides and ranked it 4<sup>th</sup>, and so on as depicted in following Fig.



#### 8.14 Whether Hospital is adequately equipped and prepared to face the hazards

- ❑ Medical professionals were also asked if their hospital is adequately equipped and prepared to face the hazards. 67 per cent unfortunately stated that they are not prepared and are inadequately equipped to face any sort of disasters (Table-8.13).

**Table-8.13**  
**Hospitals preparedness to face the hazards**

S.N.	Districts	Yes	No	Total
1	Bilaspur	15	85	100
2	Chamba	29	71	100
3	Hamirpur	60	40	100
4	Kangra	44	56	100
5	Kinnaur	15	85	100
6	Kullu	0	100	100
7	L&S	0	100	100
8	Mandi	100	0	100
9	Shimla	0	100	100
10	Sirmour	20	80	100
11	Solan	50	50	100
12	Una	27	73	100
	<i>Total</i>	33	67	100

#### 8.15 Training of the medical professional

- ❑ When the medical professional were asked about topics in which they have got training, 49 per cent stated that they do not get training on the above topics, 13 per cent stated that they have got training on mass casualty management and emergency medicine, 10 per cent stated that they have got the training on trauma care, 8 per cent stated that they have got training on handling causality of chemicals, biological, Nuclear and Radiological disasters, 8 per cent stated that they have got training on Hospital safety, 6 per cent stated that they have got training on dealing with dead in the aftermath of a disaster, 5 per cent stated that they have

got the training on Minimum Initial Service Package for RH in crisis situation (Table-8.14).

**Table-8.14**  
**Training requirements on disaster management**

S.N.	Districts	Mass Casualty Management and Emergency Medicine	Dealing with Dead in the aftermath of a Disaster	Minimum Initial Service Package for RH in crisis situation	Handling casualty of Chemical, Biological, Nuclear and Radiological Disasters	Hospital Safety	Trauma Care	None of these statements	Total
1	Bilaspur	14	14	7	14	7	14	29	100
2	Chamba	11	11	11	0	0	0	67	100
3	Hamirpur	11	6	11	11	11	17	33	100
4	Kangra	22	11	11	22	11	11	11	100
5	Kinnaur	0	0	0	33	0	33	33	100
6	Kullu	25	0	0	0	25	0	50	100
7	L&S	11	0	0	0	22	33	33	100
8	Mandi	0	0	0	0	0	0	100	100
9	Shimla	0	0	0	0	0	0	100	100
10	Sirmour	0	0	0	0	10	0	90	100
11	Solan	43	0	0	29	14	0	14	100
12	Una	20	10	0	0	0	10	60	100
	<i>Total</i>	13	6	5	8	8	10	49	100

### 8.16 Vulnerable part of hospital

- Medical professional were asked about the opinion about the vulnerable part of the hospital, 72 per cent stated that structural such as building etc. and non structural element such as equipment and machinery fitted in the operation theatre etc., 13 per cent stated that structural such as buildings etc., 11 per cent stated that non structural element such as equipment and machinery fitted in the operation theatre etc, and 4 per cent stated that

only the structural part is the vulnerable part of the hospital respectively (Table-8.15)

**Table-8.15**  
**Opinion about the vulnerable part of hospital**

S.N.	Districts	Structural such as buildings etc.	Non Structural elements such as equipment and Machinery	Both a and b	Only a	Total
		<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>	
1	Bilaspur	23	23	54	0	100
2	Chamba	0	0	100	0	100
3	Hamirpur	10	0	90	0	100
4	Kangra	22	11	67	0	100
5	Kinnaur	0	15	85	0	100
6	Kullu	0	33	33	33	100
7	L&S	0	0	57	43	100
8	Mandi	10	0	90	0	100
9	Shimla	33	0	67	0	100
10	Sirmour	10	10	80	0	100
11	Solan	75	25	0	0	100
12	Una	9	18	73	0	100
	<i>Total</i>	<i>13</i>	<i>11</i>	<i>72</i>	<i>4</i>	<i>100</i>

### 8.17 Networking of hospital for referral services

- Forty three percent of the medical professional stated that we intimate the hospital where the patient is referred, 38 per cent stated that no such

arrangement is in existence, 12 per cent stated that not aware of any of any such arrangements, 7 per cent stated that networking is not the responsibility of the hospital administration (Table-8.16).

**Table-8.16**  
**Networking of hospitals with other hospitals for referral services**

S.N.	Districts	Yes, we intimate the hospital where the patient is referred to	No such arrangement is in existence	Networking is not the responsibility of the hospital administration	Not aware of any such arrangement	Total
1	Bilaspur	31	23	23	23	100
2	Chamba	86	14	0	0	100
3	Hamirpur	20	40	0	40	100
4	Kangra	56	44	0	0	100
5	Kinnaur	38	38	23	0	100
6	Kullu	33	67	0	0	100
7	L&S	57	43	0	0	100
8	Mandi	100	0	0	0	100
9	Shimla	33	67	0	0	100
10	Sirmour	20	80	0	0	100
11	Solan	25	75	0	0	100
12	Una	18	27	9	45	100
	<i>Total</i>	43	38	7	12	100

#### 8.18 Bed capacity of hospital in case of emergencies:

- When the medical professional were asked that bed capacity in hospital should be increased in case of emergencies, on the whole 52 per cent stated that all the above situations bed capacity of the hospital should be increased, 15 per cent stated that bed capacity can be increased in emergency by Discharge the elective cases, 14 per cent stated that bed

capacity can be increased in stop admitting non-emergency patients, 11 per cent stated that bed capacity can be increased by converting waiting/non-patient areas into makeshift wards, 8 per cent stated that bed capacity can be increased by Discharge stable recovering patients (Table-8.17).

**Table-8.17**  
**Methods to be adopted to increase Bed capacity in hospital during emergencies**

S.N.	Districts	Discharge elective cases.	Stop admitting non-emergency patients.	Convert waiting/non-patient areas into makeshift wards.	Discharge stable recovering patients.	All of these statements	Total
1	Bilaspur	0	23	8	23	46	100
2	Chamba	14	14	14	14	43	100
3	Hamirpur	0	10	10	20	60	100
4	Kangra	22	22	11	0	44	100
5	Kinnaur	38	0	8	0	54	100
6	Kullu	0	67	0	0	33	100
7	L&S	71	0	0	0	29	100
8	Mandi	10	0	0	0	90	100
9	Shimla	0	0	33	0	67	100
10	Sirmour	10	20	30	10	30	100
11	Solan	0	25	25	0	50	100
12	Una	0	18	9	9	64	100
	<i>Total</i>	15	14	11	8	52	100

### 8.19 Emergency plan in hospitals

- 32 per cent medical professional stated that reception and triage area can be prepared for hospital emergency plan, 25 per cent medical professional stated that area for holding patients in case a part of hospital is evacuated , 17 per cent medical professional stated that mortuary area we can prepared hospital emergency plan, 15 per cent medical professional stated that decontamination area can be prepared for hospital emergency plan, 11 per cent medical professional stated that areas for holding media briefings can also be prepared hospital emergency plan (Table-8.18).

**Table-8.18**  
**Areas to be mentioned in a hospital Emergency Plan**

S.N.	Districts	Reception and triage area	Mortuary	Decontamination Area	Area for holding patients in case a part of hospital is evacuated	Areas for holding media briefings	Total
1	Bilaspur	23	20	17	20	20	100
2	Chamba	25	20	15	25	15	100
3	Hamirpur	40	16	12	24	8	100
4	Kangra	27	20	17	27	10	100
5	Kinnaur	33	21	18	21	6	100
6	Kullu	14	14	29	14	29	100
7	L&S	57	14	14	14	0	100
8	Mandi	60	0	0	40	0	100
9	Shimla	38	13	13	25	13	100
10	Sirmour	33	21	13	25	8	100
11	Solan	27	18	18	18	18	100
12	Una	32	11	11	42	5	100
	<i>Total</i>	32	17	15	25	11	100

## 8.20 Trauma management Plan

- When the medical professional were asked that there is any trauma management plan in your health facility, 31 per cent said yes and 69 per cent said No (Table-8.19).

**Table-8.19**  
**Availability of any specific trauma management Plan in the health faculty**

S.N.	Districts	Yes	No	Total
1	Bilaspur	8	92	100
2	Chamba	14	86	100
3	Hamirpur	30	70	100
4	Kangra	56	44	100
5	Kinnaur	0	100	100
6	Kullu	33	67	100
7	L&S	14	86	100
8	Mandi	100	0	100
9	Shimla	33	67	100
10	Sirmour	20	80	100
11	Solan	25	75	100
12	Una	45	55	100
	<i>Total</i>	<i>31</i>	<i>69</i>	<i>100</i>

## 8.21 Managing Post Trauma Stress Disorder

- 32 per cent medical professional were affirm in managing post trauma disorder, whereas 68 per cent were not (Table-8.20).

**Table-8.20**  
**Respondent's choice on experience on managing post trauma stress disorder**

S.N.	Districts	Yes	No	Total
1	Bilaspur	8	92	<b>100</b>
2	Chamba	14	86	<b>100</b>
3	Hamirpur	30	70	<b>100</b>
4	Kangra	56	44	<b>100</b>
5	Kinnaur	8	92	<b>100</b>
6	Kullu	33	67	<b>100</b>
7	L&S	57	43	<b>100</b>
8	Mandi	100	0	<b>100</b>
9	Shimla	33	67	<b>100</b>
10	Sirmour	30	70	<b>100</b>
11	Solan	25	75	<b>100</b>
12	Una	9	91	<b>100</b>
	<i>Total</i>	32	68	100

### 8.22 Standard Operating Procedures (SOPs) for operationalise DM plan of

- For the standard operating procedure to operationalise DM plan of institution, the 44 per cent of medical professionals stated that they are unaware about the standard operating procedure, 38 per cent stated that they do not know about standard operating procedure, 18 per cent said yes for standard operating procedure to operationalise DM plan (Table-8.21).

### 8.23 Training on Disaster management plan

- Finally medical professional were asked if they have received any training programme on disaster management, 10 per cent medical professional said yes and 90 per cent said no (Table-8.22).

**Table-8.21**  
**Standard Operating Procedures (SOPs) for operationalise DM plan of your institution.**

S.N.	Districts	Yes	No	Unaware	Total
1	Bilaspur	8	62	31	100
2	Chamba	14	29	57	100
3	Hamirpur	60	20	20	100
4	Kangra	33	11	56	100
5	Kinnaur	8	62	31	100
6	Kullu	33	67	0	100
7	L&S	0	57	43	100
8	Mandi	0	0	100	100
9	Shimla	0	33	67	100
10	Sirmour	30	20	50	100
11	Solan	25	75	0	100
12	Una	9	45	45	100
	<i>Total</i>	18	38	44	100

**Table-8.22**  
**Any training programme on disaster management**

S.N.	Districts	Yes	No	Total
1	Bilaspur	0	100	100
2	Chamba	14	86	100
3	Hamirpur	0	100	100
4	Kangra	44	56	100
5	Kinnaur	0	100	100
6	Kullu	33	67	100
7	L&S	0	100	100
8	Mandi	0	100	100
9	Shimla	0	100	100
10	Sirmour	0	100	100
11	Solan	50	50	100
12	Una	18	82	100
	<i>Total</i>	10	90	100

## ABBREVIATIONS

---

ARMVs	=	Accident Relief Medical Vans
BIS	=	Bureau of Indian Standards
CBOs	=	Community Based Organisations
CBRN	=	Chemical, Biological, Radiological and Nuclear
CSR	=	Corporate Social Responsibility
CRF	=	Calamity Relief Fund
CWC	=	Central Water Commission
DDMA	=	District Disaster Management Authority
DCMC	=	District Crisis Management Committee
DM	=	Disaster Management
DMC	=	Disaster Management Cell
GIS	=	Geographic Information System
GSI	=	Geological Survey of India
GoI	=	Government of India
GPS	=	Global Positioning System
HPC	=	High Powered Committee
HIPA	=	Himachal Institute of Public Administration
IAY	=	Indira Awas Yojana
ICIMOD	=	International Centre for Integrated Mountain Development
IRS	=	Incident Response System
ICT	=	Information and Communication Technology
IDRN	=	India Disaster Resource Network

IDKN	=	India Disaster Knowledge Network
IMD	=	Indian Meteorology Department
IITs	=	Indian Institutes of Technology
IT	=	Information Technology
ITIs	=	Industrial Training Institutes
ITK	=	Indigenous Technical Knowledge
MFA	=	Medical First Aid
MHA	=	Ministry of Home Affairs
NCC	=	National Cadet Corps
NCCF	=	National Calamity Contingency Fund
NDEM	=	National Database for Emergency Management
NDMA	=	National Disaster Management Authority
NDMF	=	National Disaster Mitigation Fun
NDRF	=	National Disaster Response Force
NEC	=	National Executive Committee
NGOs	=	Non=Governmental Organisations
NIDM	=	National Institute of Disaster Management
NITs	=	National Institutes of Technology
NSDI	=	National Spatial Data Infrastructure
NSS	=	National Service Scheme
NYKS	=	Nehru Yuva Kendra Sangathan
PPP	=	Public=Private Partnership
PRIs	=	Panchayati Raj Institutions
R&D	=	Research and Development
RH	=	Reproductive Health

SAARC	=	South Asian Association for Regional Cooperation
SAR	=	Search and Rescue
SASE	=	Snow and Avalanche Study Establishment
SCMC	=	State Crisis Management Committee
SDMA	=	State Disaster Management Authority
SDRF	=	State Disaster Response Force
SEC	=	State Executive Committee
SOPs	=	Standard Operating Procedures
ULBs	=	Urban Local Bodies
UN	=	United Nations

## Glossary of Terms

---

**Afforestation :** Systematic plantation in a deforested area to increase its forest cover.

**Deforestation :** Removal of a forest by human activity

**Disaster :** A catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage to, and degradation of environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.

**Disaster Management:** A continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for prevention of danger or threat of any disaster; mitigation or reduction of risk of any disaster or its severity or consequences; capacity building; preparedness to deal with any disaster; prompt response to any threatening disaster situation or disaster; assessing the severity or magnitude of effects of any disaster; evacuation, rescue and relief; and rehabilitation and reconstruction.

**Earthquake:** An earthquake is a series of vibrations on the earth's surface caused by the generation of elastic (seismic) waves due to a sudden rupture within the earth during release of accumulated strain energy.

**Flash Flood:** Very fast rise and recession with characteristics of small volume flow and high discharge, which causes high damage because of suddenness and force.

**Hazard:** A threatening event or the probability of occurrence of a potentially damaging phenomenon (e.g., an earthquake or a large flood) within a given time period and area.

**Landslide:** Landslides are downward and outward movement of slope materials such as rock debris and earth, under the influence of gravity.

**Liquefaction:** Liquefaction is a phenomenon in which the shear strength and stiffness of a soil is reduced by an earthquake or other rapid loading due to collapse of soil structure and temporary increase in porewater pressure.

**Mitigation:** Measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation.

**Preparedness:** The state of readiness to deal with a threatening disaster situation or disaster and the effects thereof.

**Resilience:** The capacity of a system to tolerate perturbation or disturbances without collapsing into a qualitatively different state, to withstand shock and rebuild whatever necessary.

**Risk:** The anticipated number of lives in danger, damage to property and disruption of economic activity due to a particular natural phenomenon.

**Risk Assessment:** The determination of the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihood, and the environment.

**Risk Management:** The systematic process of using administrative decisions, organisation, operational skills, and capacities to implement policies, strategies, and coping capacity of the society and communities to lessen the impact of hazards.

**Seismic Hazard:** In the context of engineering design seismic hazard is defined as the predicted level of ground acceleration which will be exceeded by 10 per cent over the probability of hazard at the site under construction due to occurrence of earthquake, anywhere in the region, in the next 50 years.

**Seismic Retrofitting:** The structural modifications to upgrade the strength, ductility and energy dissipating ability of seismically deficient or earthquake-damaged structures.

**Snow Avalanche:** Snow Avalanche is a slide of snow mass down a mountainside. It is a rapid, down slope movement of large detached mass of snow, ice and associated debris such as rock fragments, soil and vegetation.

**State Authority (SDMA):** State Disaster Management Authorities established under sub-section (I) of section 14 of the Disaster Management Act, 2005, and includes the disaster management authorities of union territories and State Governments

**Structural Measures:** Any physical construction to reduce or avoid possible impact of hazards, which include engineering measures and construction of hazard-resistant, protective structures and infrastructure.

**Vulnerability:** The degree of loss to a given element at risk or set of such elements resulting from the occurrence of a natural (or man-made) phenomenon of a given magnitude and expressed on a scale from 0 (no damage) to 1 (total loss).