QUALITATIVE-BASED SURVEY OF AWARENESS, PREPAREDNESS AND RESPONSE CAPACITIES RELATED TO CLIMATE CHANGE-INDUCED RISKS AND VULNERABILITIES FROM GLOF, AND THE DOCUMENTATION OF LESSONS LEARNT AND EXPERIENCES

Submitted to the Department of Disaster Management

Ministry of Home and Culture Affairs

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ACRONYMS, ABBREVIATIONS AND A GLOSSARY OF BHUTANESE TERMS

LDCF	Least Developed Country Fund
GEF	Global Environment Facility
UNDP	United Nations Development Programme
WWF	World Wide Fund for Nature
RGoB	Royal Government of Bhutan
GLOF	Glacial Lake Outburst Flood
DGM	Department of Geology and Mines
NAPA	National Adaptation Programme of Action
EWS	Early Warning System
DHMS	Department of Hydromet services
DDM	Department of Disaster Management
DMA	Disaster Management Act
CBDRM	Community Based Disaster Risk Management
DRR	Disaster Risk Reduction
CBEWS	Community Based Early Warning System
MoHCA	Ministry of Home and Cultural Affairs
CBDRM	Community Based Disaster Risk Management
DDMCM	District Disaster Management Committee Members
Dzongkhag	District
Gewog	Block
Chiwog	A group of villages but smaller than Block
Gup	Head of a *Gewog*, elected by the local community
Mangmi	Deputy to the *Gup*, elected by the local community
Tshogpa	Representative of a *Chiwog*

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I. INTRODUCTION

The Royal Government of Bhutan (RGoB) had initiated the first National Adaptation Program of Action on climate change project on - **Reducing Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar Valleys** – funded by an LDCF /GEF through UNDP and co-funded by the Austrian Government, the WWF and RGoB. The project duration was for five years (2008 – 2013) and was conceived and implemented to support the RGoB in reducing climate-change induced Glacial Lake Outburst Flood (GLOF) risks and vulnerabilities. Under the project, three main Components/activities were implemented to reduce the risks of GLOF:

I. Reducing the level of *Thorthormi* lake implemented by the Department of Geology and Mines (DGM);
II. Installation of the automatic Early Warning System (EWS) implemented by the Department of Hydro-met Services (DHMS); and
III. Raising awareness on GLOF risks and building capacities in the vulnerable areas implemented by the Department of Disaster Management (DDM).

The important activities of DDM in this Project were to build capacities at National, *Dzongkhag* (District), *Gewog* (Block) and Community-levels to enhance awareness, preparedness and response capacities to deal with climate change-induced risks and vulnerabilities.DDM activities in the pilot Dzongkhags of Punakha, Wangdue Phodrang and Bumthang included:

i. The drafting and consultation process for the enactment of the Disaster Management Act 2013;
ii. Training of Dzongkhag and Gewog Officials, Local Functionaries and Vulnerable Communities in the Community Based Disaster Risk Management approach to formulate preparedness plans and prioritize and implement mitigation and preparedness measures through community based interventions;
iii. Sensitization workshop and training on mainstreaming DRR for Dzongkhag/Gewog officials and local functionaries to initiate integration of climate risk reduction into plan, policy and development activities;
iv. Capacity building program for school teachers and students on disaster preparedness and response;
v. End to end awareness campaigns in communities on risk of GLOF and hazard zonation maps through posters, pamphlets and documentary clip, animation and through various media;
vi. Development and testing of Community Based Early Warning System through appointment of community focal points in each vulnerable community and designing of systematic Information flow mechanisms for GLOF event;
vii. Demarcation of GLOF hazard zonation by installation of iron pillars and wooden pegs based on GLOF hazard maps in Punakha-Wangdue and Chamkhar Valley;

viii. Identification of safe GLOF evacuation sites/routes in vulnerable communities and conducting evacuation drills following test activation of the Automatic Early warning System;
ix. Capacity development program for DDM, MoHCA, Dzongkhag and Gewog officials and local functionaries through ex-country trainings, workshops and institutional visits.

1.1 Project Description and Development Context

1.1.1 Project Start and Duration

Reducing Climate Change-Induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdue and Chamkar Valleys project is a UNDP supported, GEF-LDCF financed NAPA project co-financed by the Austrian Government, the WWF and RGoB. It was a 5-year project that started towards the end of 2008 and was completedin December 2013.

1.1.2 Problems that the Project Sought to Address

The main objective of the project was to support RGoB in enhancing adaptive capacity to reduce climate change-induced GLOF risks and vulnerabilities in Punakha-Wangdue and Chamkhar Valleys which was to be achieved through three major components, namely:

a) Reducing the level of *Thorthormi* lake implemented by the Department of Geology and Mines;
b) Installation of the automatic EWS implemented by the Department of Hydro-met Services; and
c) Strengthening disaster preparedness and response capacity through raising awareness on GLOF risks and other DRM programs in the vulnerable areas implemented by the Department of Disaster Management.

The expected outcomes were:

a) Reduced risks of GLOF from *Thorthormi*lake through an artificial lowering of water level of lake by 5 meters implemented by Department of Geology and Mines;
b) Established coherent, end to end and functional early warning system in Punakha-Wangdue Valley implemented by Department of Hydromet Services; and
c) Enhanced level of awareness and improved capacities at National, *Dzongkhag, Gewog* and Community levels to prevent climate change-induced GLOF disasters in Punakha-Wangdue and Chamkhar Valleys implemented by Department of Disaster Management.

1.2 Assessment

Along with the Thorthormi Lake Loweringcomponent, capacity building of the communities along the Punakha –Wangdue Valley was started by DDM as part of the **Reducing Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar Valleys.**

Along the said lines, DDM started the full fledged awareness raising campaign in the forms of trainings, meetings/workshops and study tours. This study tried to find out the qualitative based analysis of the initiatives taken by DDM and its impact on community preparedness in disaster management and also to document lessons learnt and best pratices from the three pilot districts, Punakha and Wangdue Valleys and Bumthang.

The five years of input of activities and initiatives by DDM was timely to do an assessment of the impact it created and changes it brought in terms of Preparedness and Responses Capacities to Climate induced risks and vulnerabilities, floods being the main one focused in this study.

1.2.1 Purpose of the Assessment

- To assess the level of disaster awareness, preparedness and response capacities in vulnerable communities related to climate change-induced risk and vulnerabilities; and
- To document lessons learned and experiences from activities undertaken to raise awareness, improve preparedness and strengthen response capacities.

1.2.1.1 Awareness Assessment Question

(a) Did public awareness and education programs on the climate change-induced risks and vulnerabilities from GLOF generate adequate public awareness among all the levels of National, *Dzongkhags, Gewogs,* and Communities?

1.2.1.2 Preparedness Assessment Question

(a) Does your organization/community have a contingency planning for pre-defined scenario analysis and planning parameters?
(b) Are you/your team/your organization able to manage delivery of resources to most vulnerable populations?

1.2.1.3 Response capacity Assessment Question

(a) Are you capable of analyzing resource management and logistics in the event of a disaster?

1.3 Limitation of the Study

To empirically assess the project results, a baseline is a pre-requisite. There was no baseline study carried out in the beginning of the project as far back as 2008-2009. The baseline study carried out in 2011 to establish the baseline data on the level of awareness, preparedness and response capacities related to climate change risks and vulnerabilities at various levels in the project areas is more or less a Mid-Term Study. By then, almost all of the GLOF activities were under implementation phase. This limited the Consultant from scientifically showing the effect of the project activities by making comparisons between the baseline study data with data collected after the project ended, i.e. this report.

Another drawback was the rigidness of the ToR where there was no scope for revising it. If there had been a provision for revising it, amongst others, a Propensity-Score Matching (PSM) approach would have been implemented. It would have a treatment group that consists of community and households impacted by the project and a control group that consists of community and households not impacted by the project. Then a comparison would be made to find out the real impact of the project, but as per ToR the places where the survey was to be administered were the places impacted by the project. There was no provision to include places not impacted by the project.

1.4 Assessment Report Structure

This report takes the following structure devided into chapters:

Chapter I Summarizes the GLOF project description and development context including project duration, intended goals and expected outcomes.

Chapter II Elucidates the assessment methodology for surveying and assessing the level of awareness, preparedness and response capacities related to climate change-induced risks and vulnerabilities. Under this assessment; sampling procedure, missing data imputation, and data analysis and estimation method are also illustrated in detail.

Chapter III Exhibits how statistical analyses were performed and inferences were drawn from the results of computation. Analyses were carried out on all data of awareness, preparedness and response capacity captured under all levels of National, *Dzongkhag* and *Gewog,* and community. The experiment results were exhaustively shown in the form of contingency tables, generalized linear models and logistic regression models. Carefully interpreting these results, inferences on each of the level of awareness, preparedness and response capacities were then drawn.

Chapter IV Recounts experiences and the lessons learnt and finally

Chapter VConcludes the report with a brief conclusion.

II. METHODOLOGY OF THE ASSESSMENT

A Concurrent Triangulation Mixed Method was designed to assess the level of disaster awareness, preparedness and response capacities in vulnerable communities. Quantitative data were collected through the administration of structured questionnaires. Qualitative data were elicited through open-ended responses, interviews, field notes, and document reviews.Both quantitative and qualitative data were collected simultaneously, analyzed separately, and compared/combined the findings from both the analyses.

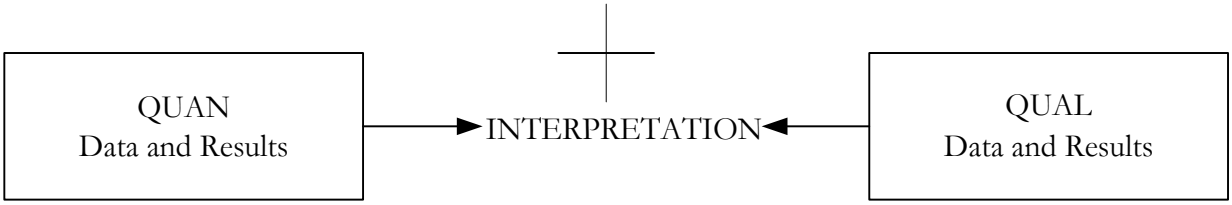


Figure 1Concurrent Triangulation Design

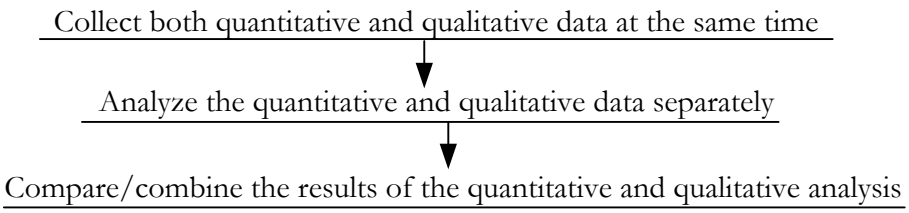


Figure 2Implementation Steps of the Concurrent Triangulation Design

2.1 Sampling Procedure

Stratified Random Sampling of the probabilistic sampling method was employed to split the population into strata, and then drew a random sample of 70% (predetermined in ToR) of the total population from each of the National Disaster Focal Persons ($N = 20, n = 14$), *Dzongkhag* Disaster Committee members($N = 53, n = 37$)and *Gewog* Disaster Committee members ($N = 61, n = 42$).

Table iNational, *Dzongkhag* and *Gewog* sample information

Total estimated population(N)	**Seventy percent of the total population($70\%N = n$)**	**Total samples surveyed**
National Disaster Focal Persons		
20	14	14
Dzongkhag and *Gewog* Disaster Committee members		
114	80	57

Representative samples from the Community members were collected in the following sequential steps:

i. Stratifying the population into categories(National Disaster Focal Persons, *Dzongkhag* Disaster Committee members, *Gewog* Disaster Committee, and Community Members);
ii. Listing the population of each category separately;
iii. Assigning numbers to the units of each category;
iv. Generating random numbers for the units of each category; and
v. Selecting the required samples from each category based on the lowest random numbers.

The required sample size of thevulnerable community members under *Punakha*, *Wangdue Phodrang* and *Bumthang Dzongkhags*are calculates as:

$$SampleSize = (Z - score)^2 * StdDev * (1 - StdDev)/(Marginoferror)^2$$

Where:

$N$is the total number of community members residing in the vulnerable communities in the 3 *Dzongkhags*;

$Margin\ of\ error\ (Confidence\ Interval)$is the acceptable deviation of sample mean from population mean;

$Confidence\ Level$is a measure of the reliability of a result; and

$StdDev$is the expected variance.

Samples in the 3 pilot *Dzongkhags*are determined with the$confidence\ level$ of 95% andthe $margin\ of\ error\ (confidence\ interval)$of +/-5%

Table iiCommunity sample information

Dzongkhag	Total Estimated Population (N)	Statistically representative sample size (n)	Total samples surveyed
Punakha	590	83	85
Wangdue Phodrang	285	72	109
Bumthang	557	82	85
Gasa	-	-	10

2.2 Missing Data Imputation

Missing data reflected in contingency tables are imputed with the state-of-the-art missing data imputation technique known by the name of Bootstrap-based Expectation Maximization algorithm imputation method.

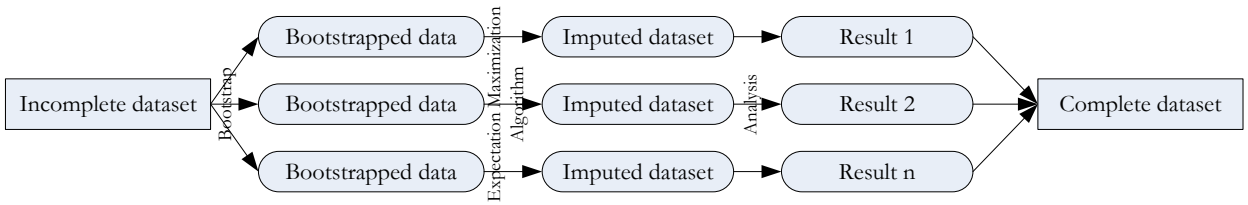


Figure 3Imputation by Bootstrap-based EM algorithm

2.3 Data Analysis and Estimation Method

Data collected through the administration of questionnaires are entered into data entry application. Basic statistics such as frequency, counts, cross tabulation, and correlations were generated to summarize quantitative information by performing basic statistical analyses on the data recorded in a database. Based on these basic statistics, statistical models were built, tested and validated.

Since the dependent variables are all categorical in nature such as: the awareness of the disaster management plans (0=Yes, 1=Don't know, No=2); the confidence in prioritizing, planning, and implementing measures to reduce human and material losses from potential GLOFs (0=Very confident, 1=Confident, 2=Not so confident, 3=Not confident at all); the awareness level of vulnerability and risk assessment in the community after the implementation of the project (0=High, 1=Medium, 2=Same, 3=Low,), an ordered probit model of Generalized Linear Models is employed thus:

$$y^* = x'\beta + \epsilon$$

Where y^* is the unobserved dependent variable; x is the vector of independent variables; and β is the vector of regression coefficients to be estimated.

$y^*$is unobservable, only response categories highlighted above are observable. Therefore, observations on y can be used to fit the parameter vector β of unobserved dependent variable y^* as:

$$y = \begin{Bmatrix} 0\ if\ y^* \leq \alpha_1 \\ 1\ if\ \alpha_1 < y^* \leq\ \alpha_2 \\ 2\ if\ \alpha_2 < y^* \leq\ \alpha_3 \\ \vdots \\ N\ if\ \alpha_{N-1} < y^*. \end{Bmatrix}$$

Where α_N are thresholds or *cutpoints*
Generalized linear models were fitted using the maximum likelihood estimates (MLE).
Data analysis and modeling were carried out in R-Programming language[1].

[1]R-language refers to a programming language for statistical computation and graphics.

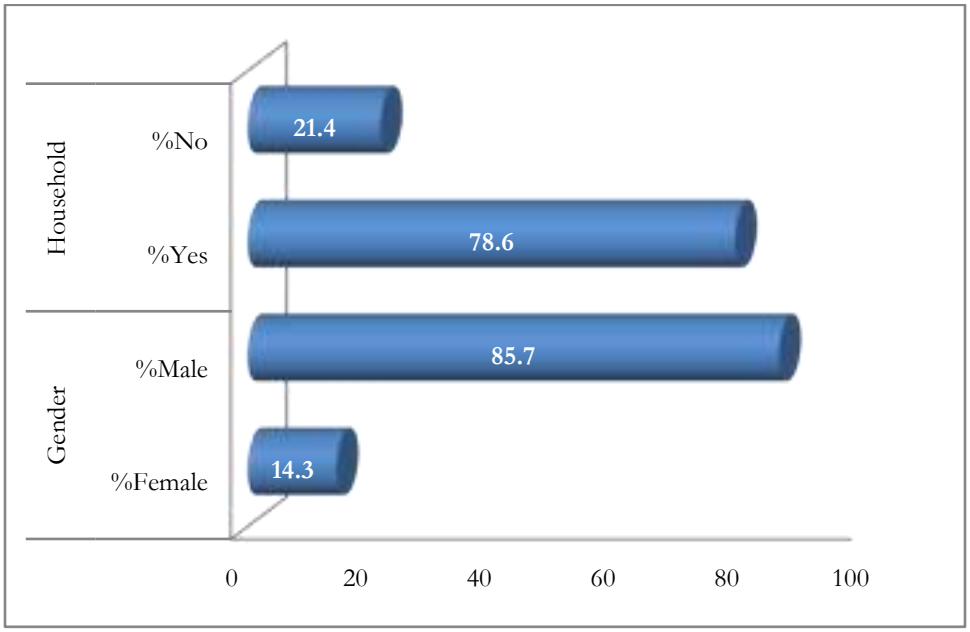
III. DATA ANALYSIS AND INFERENCEON DISASTER AWARENESS, PREPAREDNESS AND RESPONSE CAPACITY ASSESSMENT

3.1 National Level

3.1.1 Data Analysis
3.1.2 Descriptive Statistics

Of the total 24 national focal persons, 14 of them were interviewed out of which there were only 2 women focal persons at the national level. It is obvious that female representation is clearly lacking at the national level. Over 78% of the national focal persons interviewed were household heads imlpying that it would have a positive cascading effect on the entire family system about the disaster management programme and its themes.

Bar chart 1Respondents' profile

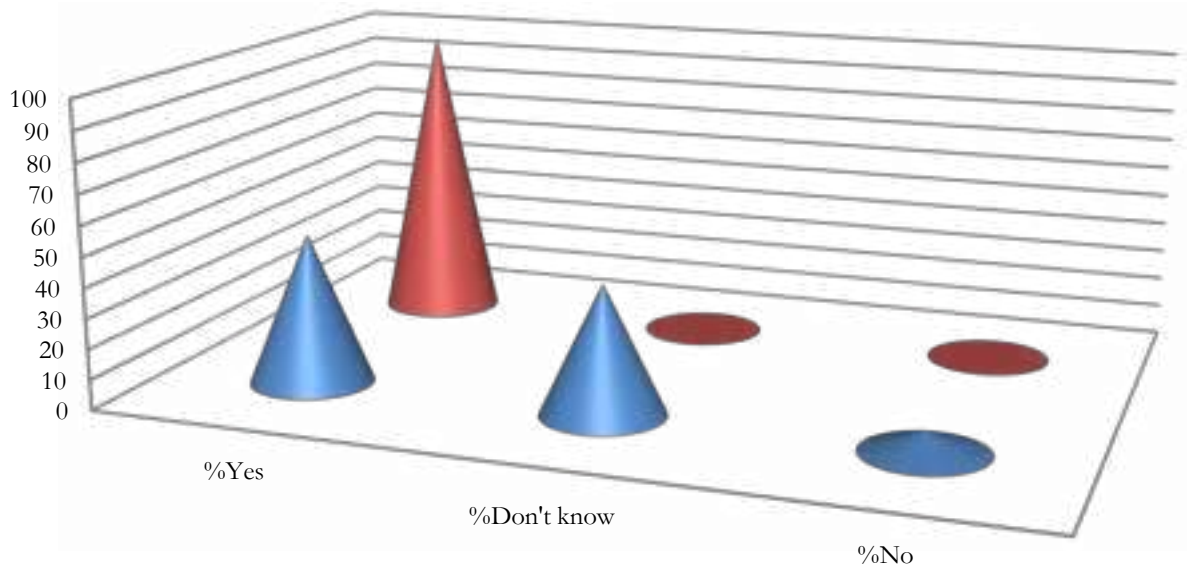


The 'yes' in the household compartment shows the response to the question of whether or not they were the heads of the households and the 'no' shows that they were not the household heads.

One hundred percent female (2/14) respondents reported that they were very confident in their abilities to prioritize and plan but are not so confident to implement measures against earthquake, flashfloods, fire, etc. to reduce human and material losses from potential GLOFs. Similarly, 100% male respondents echoed similer level of confidence in their abilities to prioritize and plan measures against GLOF events. They mentioned that more training would enable them to be able to implement the measures that they are currently not confident in.

In contrast, only 50% of the respondents reported that they were able to prioritize, plan and implement measures to reduce losses from potential GLOF events in the 2011 assessment report. The scenario here clearly depicts the positive impact of the initiatives taken by DDM to build the capacities of the national focal persons as there is a marked difference (50% in 2011 - 100% in 2014) in the levels of respondents answering they were able to prioritize, plan and implement measures to reduce losses from the potential GLOF calamities.

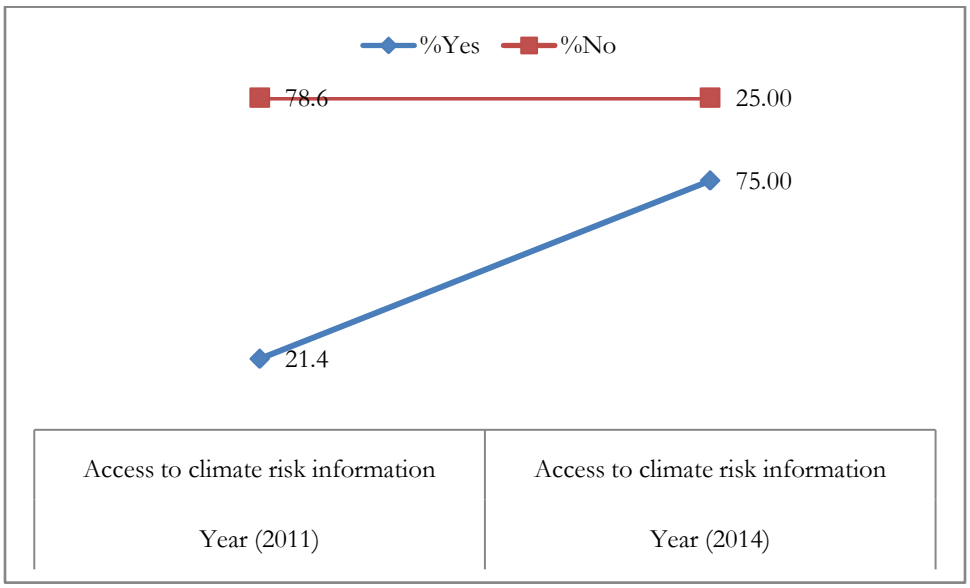
Column chart 2Percentage of national level focal Persons able to or not able to prioritize plan and implement measures to reduce human and material losses from potential GLOFs



	%Yes	%Don't know	%No
Year (2011) Ability to prioritize, plan and implement measures to reduce losses from potential GLOF events	50	42.9	7.1
Year (2014) Ability to prioritize, plan and implement measures to reduce losses from potential GLOF events	100.00	0.00	0.00

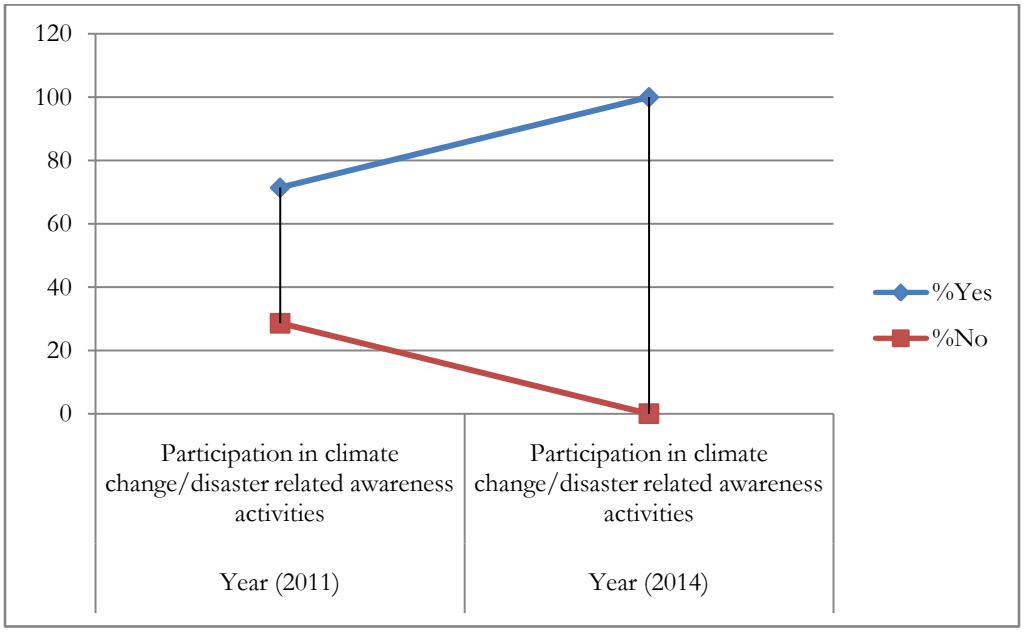
There has been a remarkable change in the percentage of national level focal persons able to prioritize plan and implement measures to reduce human and material losses from potential GLOFs between 2011 and 2014 as the increase was from 50-100% as shown in column chart 2 when the same question was asked.

Line chart 3 Access to climate risk information database



Both 2011 and 2014 assessment reports indicated that focal persons accessing climate risk information through DDM was fairly low. In 2011, it was reported there was only about 21% of focal persons accessing disaster management information system database, however, within 3 years it increased by 54% as there were 75% of them actively accessing climate risk information database as per the 2014 finding (changes depicted in Line chart 3 above). Theres is a marked change in this component too and the reasons can be attributed to the development of technology used by the relevant agencies and also the coordination that DDM had built with other relevant agencies in trying to give access to climate risk information database to the relevant agencies/individuals.

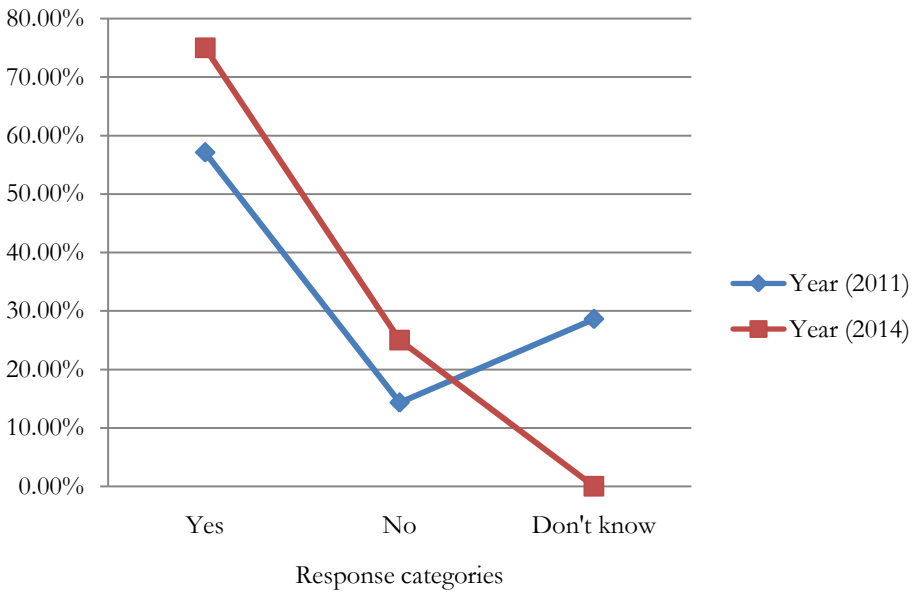
Line chart 4 Participation in any sensitization workshops or trainings organized by DDM



Line chart 4 above shows there was a drop of the answer 'no' to the question on partication in climate change/disaster related awareness activities from about 20% responding it in 2011 and the rise on the 'yes' response from 79 % in 2011 to 100 percent in 2014.

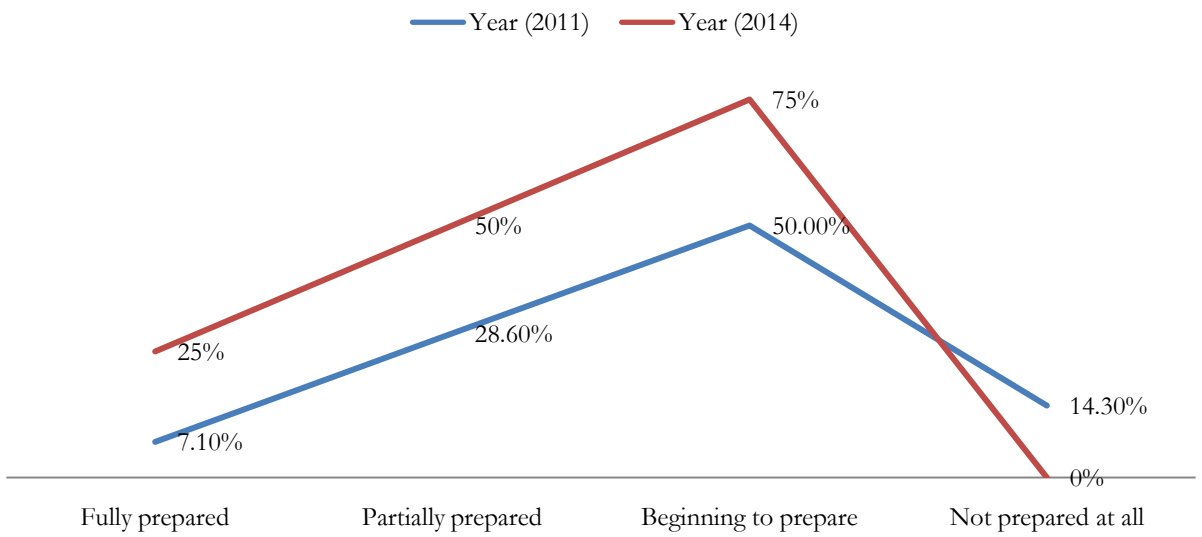
About 71% of the focal persons interviewed responded having participated in climate change/disaster related awareness workshops organized by DDM in the assessment study carried out in 2011. In 2014 study there was not a single respondent who reported that he/she hasn't availed any sensitization workshops or trainings. The respondents have also reported that they not only availed tranings, but also can take measures to mitigate and respond to disasters.

Line chart 5A comparisons of long-term activities carried out for GLOF and other hazards over the years



Line chart 5 shows responses when asked if there are any long-term prevention/mitigation strategies/activities for GLOF or other hazards in their annual or 5-Year Plan, a little over 57% answered 'yes', over 14% 'no' and the rest a little over 28% answered 'don't know' in the 2011 report. As per 2014 report, 75% reported 'yes' and the rest 25% reported 'no'. Not a single person answered 'don't know'. This indicates two things: a number of long-term prevention/mitigation strategies or activities have increased manifold; and adequate awareness has been created since the number of respondents who answered don't know have dropped from 28.6% in 2011 to 0% in 2014. There is a remarkable positive change in this too.

Line chart 6Responsiveness in the event of a disaster assessed in the year 2011 and 2014



When the assessment was carried out in 2011, only 7.1% of respondents reported that their sectors were fully prepared for any eventuality. This response has risen to 25% in 2014. Likewise, of 14.30% of respondents who reported that their sectors weren't prepared at all to respond in the event of a disaster, none has echoed the same in 2014.

So in the preparedness of the sectors to respond to disaster has also been built and the achievement level in this has a difference at least double the effect from 2011 to 2014.

3.2 Higher Order Analysis and Modeling

3.2.1 Inference

3.2.1.1 Awareness

To gauge the level of disaster awareness, it is hypothesized that having participated in any sensitization workshops and training have led to the awareness of disaster management act of Bhutan – 2013, CBDRM, *Gewog* disaster management policy and strategy, *Dzongkhag* disaster management policy and strategy, school disaster management policy and strategy, sector disaster management policy and strategy, and of national disaster management framework 2006.

The level of significance between participation in sensitization workshops or training and awareness level was determined by setting up hypothesis tests where null hypothesis (H_0) represents "no change" or "no difference" between the studies conducted in 2014 and 2011. Alternative hypothesis (H_a) represents chage impacted due to the intervention of the program.

The tables below show the results from the Chi-squared tests of relations between the Inputs by DDM as shown in the extreme left hand column and the derived changes/results with the respondents as shown in the right side of the columns with the answers yes and no.

Inference i Chi-squared test to determine whether participation in training is related to awareness on disaster management plans

	→	Are you aware of disaster management act of Bhutan - 2013?		
Have you participated in any ↓ sensitization workshops/training organized by DDM?		Yes	No	Don't know
	All	3	0	0
	Some	11	0	0
	Not at all	0	0	0
$\chi^2 = 4.5714$, *df = 1, p-value = 0.03251, critical value = 3.841*				
		Are you aware of CBDRM?		
Have you participated in any sensitization workshops/training organized by DDM?		Yes	No	Don't know
	All	5	0	0
	Some	5	3	3
	Not at all	0	0	0
$\chi^2 = 6.8636$, *df = 2, p-value = 0.0189, critical value = 5.991*				
		Are you aware of Gewog disaster management policy and strategy?		
Have you participated in any sensitization workshops/training organized by DDM?		Yes	No	Don't know
	All	0	3	0
	Some	3	5	3
	Not at all	0	0	0
$\chi^2 = 7.8636$, *df = 2, p-value = 0.0489, critical value = 5.991*				
		Are you aware of Dzongkhag disaster management policy and strategy?		

Have you participated in any sensitization workshops/training organized by DDM?		Yes	No	Don't know
	All	3	0	0
	Some	8	3	0
	Not at all	0	0	0
$\chi^2 = 0.0514$, *df = 1, p-value = 0.8206, critical value = 3.841*				
		Are you aware of school disaster management policy and strategy?		
Have you participated in any sensitization workshops/training organized by DDM?		Yes	No	Don't know
	All	3	0	0
	Some	5	6	0
	Not at all	0	0	0
$\chi^2 = 1.0694$, *df = 1, p-value = 0.3011, critical value = 3.841*				
		Are you aware of sector disaster management policy and strategy?		
Have you participated in any sensitization workshops/training organized by DDM?		Yes	No	Don't know
	All	3	0	0
	Some	5	6	0
	Not at all	0	0	0
$\chi^2 = 1.0694$, *df = 1, p-value = 0.3011, critical value = 3.841*				
		Are you aware of national disaster management framework 2006?		
Have you participated in any sensitization workshops/training organized by DDM?		Yes	No	Don't know
	All	3	0	0
	Some	8	3	0
	Not at all	0	0	0
$\chi^2 = 4.0514$, *df = 1, p-value = 0.04206, critical value = 3.841*				

In an investigation to assess if there is a significant association between participation in any sensitization workshops/training organized by DDM and the level of awareness of disaster management act of Bhutan 2013, we reject H_0 because $4.5714 \geq 3.841$ and we have a statistically significant evidence at $\alpha = 0.05$ to show that there is a significant (*p-value = 0.03251*) association between the two.

Likewise, it can be proven that a significant association exists between participation in any sensitization workshops/training organized by DDM and the level of awareness of CDBRM, of *Gewog* disaster management policy and strategy, and of national disaster management framework.

Nonetheless, there is no significant association between the participation in any sensitization workshops/training and the level of awareness of *Dzongkhag* disaster management policy and strategy, of school disaster management policy and strategy, and of sector disaster management policy and strategy. This may be attributed to the skepticism of some of the national focal persons on the impact of awareness programs.

For those pairs whose associations are significant we carry out modeling to estimate the effect of workshops and training organized by DDM on the level of awareness on a host of activities.

glm(DisasterManagementActBhutan2013~WorkshopsTrainingParticipation, family=binomial(link="logit"))

Model i Effect of sensitization workshops/training on the awareness management act of Bhutan - 2013

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.5934	0.2247	-0.566	0.0571
Participation in workshops/training	22.2387	8823.9117	0.003	0.0348
		AIC=5.8191		

For a unit increase in participation in worshops/training, the level of awareness on management act of Bhutan is predicted to be significantly increased by 8823.9117.

glm(CBDRMAwareness~WorkshopsTrainingParticipation, family=binomial(link="logit"))

Model ii Effect of sensitization workshops/training on CBDRM awareness

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.9824	0.4774	-3.351	0.000347***
Participation in workshops/training	1.7811	0.5262	2.844	0.009514***
	Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1			
	AIC=57.298			

In other words, the glm tests further proves the results earlier derived that the participation in the workshops/trainings by DDM led to positive change in the awareness of DMAct,2013, Gewog DM Policy and Strategy and NDRMF, 2006.

3.2.1.2 Preparedness

To suppose that having participated in any sensitization workshops/training had boosted the confidence of respondents in prioritizing, planning and implementing measures to reduce human and material losses from potential GLOFs, a chi-square test for independence is employed to see if the supposed associations exist.

Inference ii Chi-squared test to determine whether participation in training is related to confidence level in prioritizing, planning and implementing measures to reduce human and material losses

	→	How confident are you in prioritizing measures to reduce human and material losses from potential GLOFs?			
Have you participated in any ↓ sensitization workshops/training organized by DDM?		Very confident	Confident	Not so confident	Not confident at all
	All	2	1	0	0
	Some	0	11	0	0
	Not at all	0	0	0	0
$\chi^2 = 3.9773$, *df = 1, p-value = 0.04612, critical value = 3.841*					
		How confident are you in planning measures to reduce human and material losses from potential GLOFs?			
Have you participated in any sensitization workshops/training organized by DDM?		Very confident	Confident	Not so confident	Not confident at all
	All	0	3	0	0
	Some	0	11	0	0
	Not at all	0	0	0	
$\chi^2 = 4.5714$, *df = 1, p-value = 0.03251, critical value = 3.841*					
		How confident are you in implementing measures to reduce human and material losses from potential GLOFs?			
Have you participated in any sensitization workshops/training organized by DDM?		Very confident	Confident	Not so confident	Not confident at all
	All	0	1	2	0
	Some	0	5	6	0
	Not at all	0	0	0	0
$\chi^2 = 0$, *df = 1, p-value = 1, critical value = 3.841*					

We reject H_0 in first and second cases since their respective chi-sqaure values are greater than the critival values ($3.9773 \geq 3.841$, $4.5714 \geq 3.841$). At $\alpha = 0.05$ we conclude that there exist significant association between participation in sensitization workshops/training and the level of confidence in prioritizing (*p-value = 0.04612*), and planning (*p-value = 0.03251*) measures to reduce human and material losses from potential GLOFs.

In simple terms, there is a positive result in having attended the sensitization workshops/trainings and gaining confidence to respond to disasters in the future by planning, prioritizing and implementing measures against GLOF.

Again, generalized linear modeling was carried out for pairs exhibiting significant associations or showing positive changes to assess the effect of workshops and training conducted on the level of confidence in prioritizing, planning and implementing measures against potential GLOFs.

Glm(PrioritizingMeasures~WorkshopsTrainingParticipation, family=binomial(link="logit"))

Model iii Effect of sensitization workshops or training on the ability to prioritize measures to reduce human and material losses from potential GLOFs

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.6931	1.2647	-0.566	0.571
Participation in workshops/training	22.2592	813.9137	0.003	0.998
		AIC=7.8191		

A unit increase in participation in workshops/training is predicted to increase the ability of national disaster management committee members to prioritize measures to reduce human and material losses from GLOFs by 813.9137. However there's no significant effect.

glm(PlanningMeasures~WorkshopsTrainingParticipation, family=binomial(link="logit"))

Model iv Effect of sensitization workshops or training on the ability to plan measures to reduce human and material losses from potential GLOFs

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	0.6931	1.2247	0.566	0.571
Participation in workshops/training	-0.5108	1.3663	-0.374	0.708
		AIC=22.977		

Despite the fact that the respondents reported that they were able to prioritize and plan measure against GLOFs shot up from 50% in 2011 baseline study to 100% in 2014 terminal study, no statistically significant linear dependence of the mean of response variable on explanatory variable was detected.

The results from *glm tests* show a different scenario in that it tells us that participating in the sensitization workshops/trainings did not have the direct impact on the Effect on the ability to plan measures to reduce human and materials losses from GLOFs. This means that respondents tend to attribute this ability to factors other than the trainings given.

3.2.1.3 ResponseCapacities

The percentage of respondents who answered "fully prepared," "partially prepared," "beginning to prepare," for disaster eventualities have drastically risen in the 2014 study from that of the 2011 study. It is assumed that the rise was due to the workshops and training organized by DDM. A chi-square test of independence is used to test if the rise was due to the workshops and training organized by DDM.

Inference iii Chi-squared test to determine whether participation in training is associatedwiththe response capacity of a sector focal persons in the event of a disaster

		Do you think that your sector is prepared to respond in the event of a disaster?			
Have you participated in any sensitization workshops/training organized by DDM?		Fully prepared	Partially prepared	Beginning to prepare	Not prepared at all
	All	0	1	2	0
	Some	3	5	3	0
	Not at all	0	0	0	0
χ^2 *= 1.9232, df = 2, p-value = 0.3823, critical value = 3.841*					

Test result shows that *Chi-square value* (1.9232) is lower than the critical value (3.841) and *p-value* (0.3823)is higher than the α value (0.05), so we accept $H_0$and infer that there is no significant association between participation in workshops/training and the preparedness to respond to disaster eventualities.

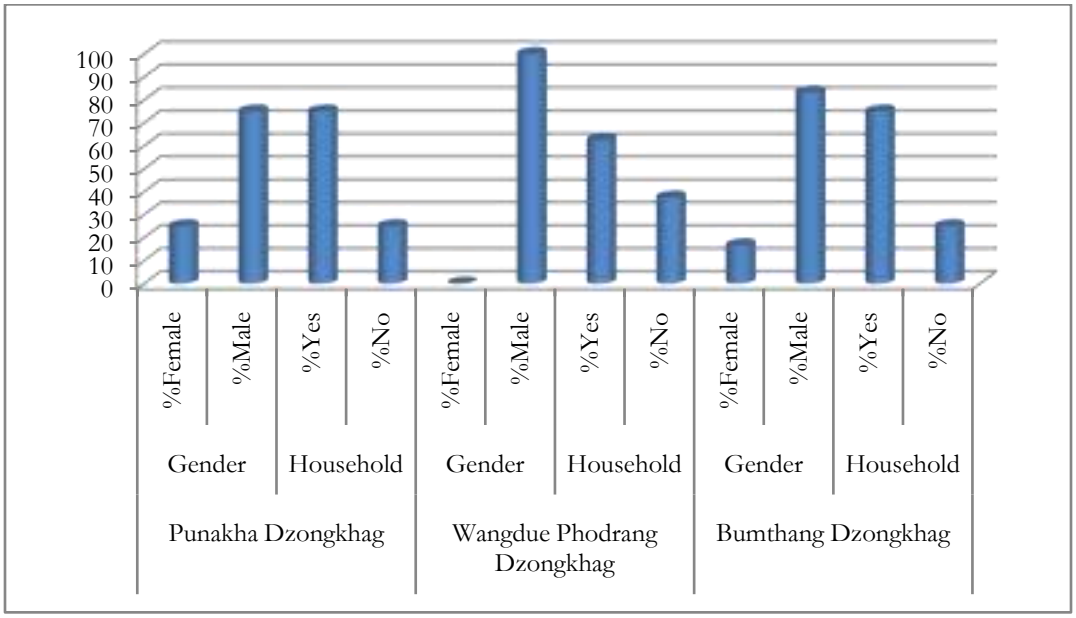
Inference iii above shows that the change in the preparedness levels of the sectors was not brought about by participating in the workshops/trainings availed which means that the sectors are saying their level of preparedness was not due to the sensitization workshops but rather due to other factors not captured in this study.

3.3 Dzongkhag and Gewog level

3.3.1 Data Analysis
3.3.2 Descriptive Statistics

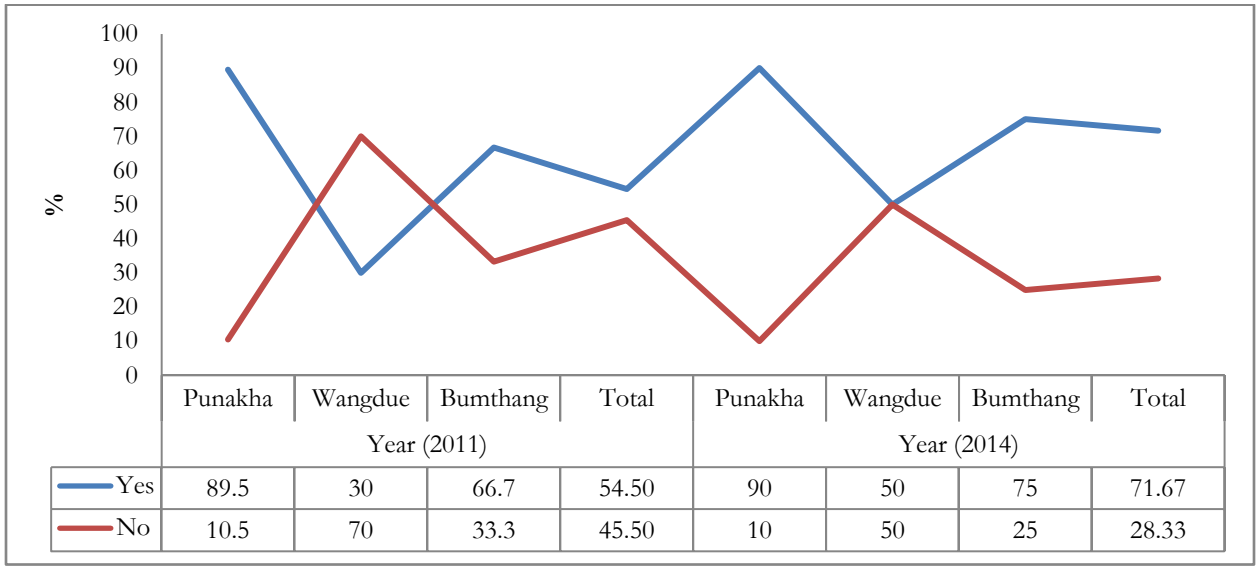
A total of 48 *Dzongkhag* and*Gewog* disaster focal persons of whom 41 men were interviewed in this study.Thirty four were the heads of their household.

Column chart 7Respondents' profile



Column chart 7 shows the respondents' profile at the Dzongkhags and the Gewog Level Focal Persons in which there were forty-eight respondents in total out of which, seven were women and forty-one were men. Gender-segregated dzongkhag-wise distribution shows that in all the three dzongkhags, there were more males than females and in all three dzongkhags, the hourseheads (HH) were majority men (34 from 41) as shown by the 'yes' responses in the chart.

Line chart 8*Dzongkhag* disaster management focal persons and *Gewog* disaster management committee members who attended or not attended CBDRM training

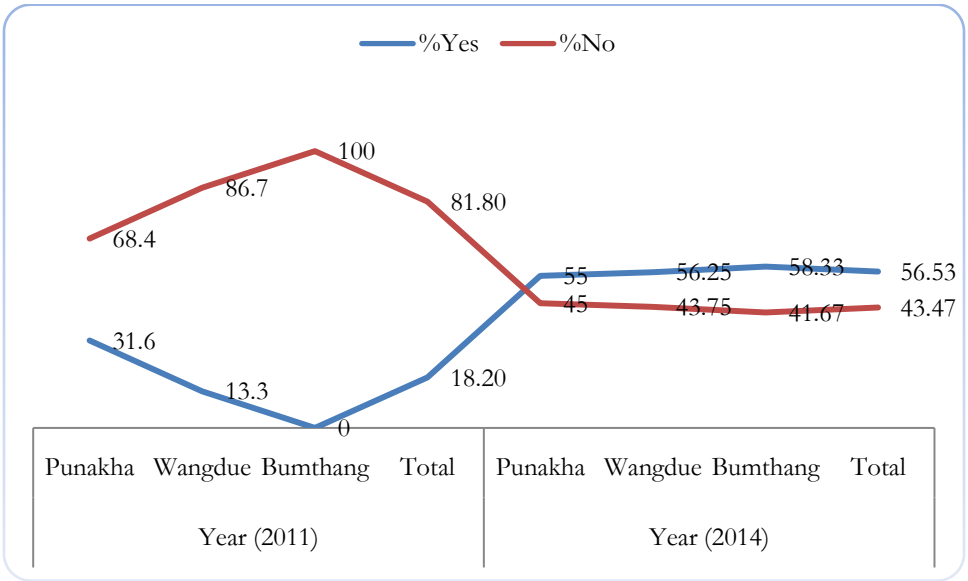


	Year (2011)				Year (2014)			
	Punakha	Wangdue	Bumthang	Total	Punakha	Wangdue	Bumthang	Total
Yes	89.5	30	66.7	54.50	90	50	75	71.67
No	10.5	70	33.3	45.50	10	50	25	28.33

Line chart 8 shows the comparative analysis of Dzongkhag and Geowg disaster management committee members who attended and did not attend the CBDRM trainings in 2011 and 2014. It is obvious that the number of respondents who reported having been trained in Community Based Disaster Risk Management planning process have substantially increased in all 3 pilot *Dzongkhags* compared to situation in 2011. The line showing 'yes' shows steady rise in the number of respondents attending the trainings as compared to 2011 data. In Punakha, there was an increase from 89.5 to 90 respondents, in Wangdue, there was an increase from 30 to 50 and in Bumthangm the increase was from 66.7 to 75 in 2014. In terms of percentage, the change was from 54.5 percent in 2011 to almost 72 percent in 2014. Subsequently, the 'no' response to show not having attended the CBDRM training has fallen steadily in 2014 as compared to 2011.

The above scenario is a clear demarcation that continuos effort of DDM in giving the CBDRM training has got its objective fulfilled in trying to reach out more to communities in the pilot dzongkhags.

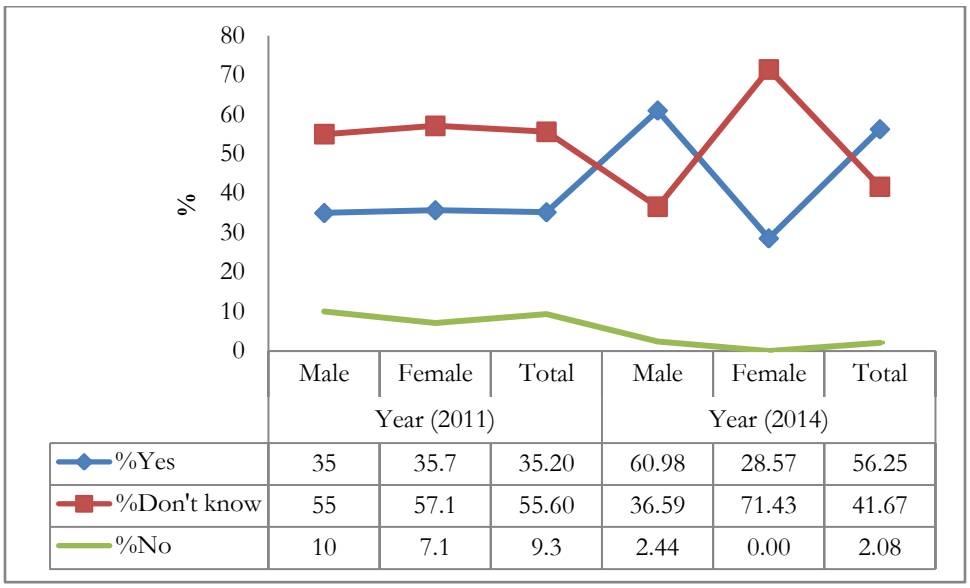
Line chart 9*Dzongkhag* disaster management focal persons and *Gewog* disaster management committee members who participated or not participated in mock/evacuation drills



According to the responses for the participation in the mock drills for evacuation (as shown in Chart 9) , the fall of percentage of "not having attended" was from 68.4% in 2011 to 45% in Punakha (shown by maroon line) , 86.7 down to 43.75 in Wangdue, and the rise of percentages in 'yes' (shown by blue line from 31.6 up to 55 in 2014, and 13.3 to 56.25 respectively, can be largely attributed to the the Mock Drill for GLOF Response conduced in Punakha-Wangdue valley conducted from 25–31 October 2012. The respondents also reported that such mock/evacuation drills are very useful, relevant and applicable.

The trend in this analysis shows a positive change/achievement in terms of having the dzongkhag/gewog disaster management committee members trained to stay prepared for evacuation in cases of a flood disaster.

Line chart 10Overviewall *Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members' opinions on whether disaster management guidelines and frameworks support climate change adaptation efforts by gender



	Year (2011)			Year (2014)		
	Male	Female	Total	Male	Female	Total
%Yes	35	35.7	35.20	60.98	28.57	56.25
%Don't know	55	57.1	55.60	36.59	71.43	41.67
%No	10	7.1	9.3	2.44	0.00	2.08

Line chart 10 showing the Gender-dissagregated Dzongkhag and Gewog DM Committee's response on whether or not the Management Guidelines and Frameworks support the Climate Change Adaptation efforts shows the overall percent of respondents who are of the positive opinion have increased from 35% in 2011 to 56.25% in 2014. Correspondingly, the total percent of respondents who answered 'don't know' and 'no' dropped from 55.60 to 41.67 and 9.3 to 2.08 respectively.

The response trend in chart 10 indicates that there has been a rise in the awareness of the Guidelines and the Frameworks that have been developed. However, the responses of female respondents were not consistent with the statistics of 2011 study, and this inconsistency can be either because there were very less female respondents (7/48) or it could be that female respondents do not have the habit of reading/referring the said documents. This statement merits further study in the future.

3.4 Higher Order Analysis and Modeling

3.4.1 Inference

3.4.1.1 Awareness

In order to ascertain the level of awareness because of mockdrills carried out, workshops conducted and meetings held, a *chi-square test* of independence is employed to see if having participated in mockdrills, workshops and meetings have any effect on the level of awareness on the roles and responsibilities in a disaster situation.

Inference ivAssociation between participation in awareness activities carried out and the level of awareness of the roles and responsibilities in a disaster situation

	→	Are you aware of your roles and responsibilities in a disaster situation?		
1) Have you participated ↓ in mockdrill?		Yes	No	Can't say
	Yes	19	0	3
	No	7	0	11
$\chi^2 = 16.5154$, df = 6, p-value = 0.01124				
		Are you aware of your roles and responsibilities in a disaster situation?		
2) Have you participated in workshops?		Yes	No	Can't say
	Yes	17	1	4
	No	8	2	10
$\chi^2 = 9.325$, df = 6, p-value = 0.1561				
		Are you aware of your roles and responsibilities in a disaster situation?		
3) Have you participated in meetings?		Yes	No	Can't say
	Yes	20	1	3
	No	5	2	8
$\chi^2 = 9.197$, df = 6, p-value = 0.1628				

In the first case we reject H_0 and at $\alpha = 0.05$ we conclude that mockdrill and the level of awareness of their respective roles and responsibilities are closely associated. The association is further investigated by modeling it as:

The result from the test in Inference iv showed that there was a positive result in the level of awareness raised for roles and responsibilities in times of disaster and the intervention made by DDM by giving Mock Drill Sessions, holding workshops and meetings in order to build the capacities of the communities.

This result was futher tested using the glm test below and the result derived was the same positive change derived from the Mock Drills but not from the workshops and the meetings.

glm(RolesResponsibilityAwareness~ParticipationInMockdrill, family=poission(link=log))

Model v Effect of participation in awareness activities on the awareness of roles and responsibilities in a disaster situation

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.9924	0.5774	-3.451	0.000559***
ParticipationInMockdrill	1.7811	0.6262	2.844	0.004452***
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC=67.298				

Awareness of roles and responsibilities in a disaster situation is predicted to be singnificantly (*p*-0.004452***) increased by 1.7811 with a unit increment in mockdrill participation.

Similar *chi-square* tests have been carried out to test the association between the awareness level of vulnerability and risk assessment and each of the participation in mockdrill, workshops and meetings.

Inference vAssociation between participation in awareness activities and the awareness level of vulnerability and risk assessment in the community

	→	How do you rate the awareness level of vulnerability and risk assessment in your community after the implementation of the project?			
1) Have you participated in mockdrill? ↓		High	Medium	Low	Same as before
	Yes	13	8	0	0
	No	5	10	4	0
$\chi^2 = 11.228$, *df = 6, p-value = 0.08158*					
		How do you rate the awareness level of vulnerability and risk assessment in your community after the implementation of the project?			
2) Have you participated in workshops?		High	Medium	Low	Same as before
	Yes	13	7	2	0
	No	5	11	2	0
$\chi^2 = 11.7408$, *df = 6, p-value = 0.06801*					
		How do you rate the awareness level of vulnerability and risk assessment in your community after the implementation of the project?			
3) Have you participated in meetings?		High	Medium	Low	Same as before
	Yes	15	12	1	0
	No	3	7	3	0
$\chi^2 = 24.8932$, df = 6, p-value = 0.0003574					

At $\alpha = 0.05$, participation in meetings show the significant associations with the level of awareness of vulnerability and risk assessment.

The result of the chi-square test in Inference v shows that there was no positive effect/change derived from participating in the Mock Drills and workshops and the awareness level of Vulnerability and Risk Assessment (VRA). However, the positive result was found in participating meetings and raise in the awareness levels of VRA in the communities. So, the association further investigated shows the following results:

glm(AwarenessLevelOfRiskAssessment~ParticipationInMeetings, family=poission(link=log))

Model vi Effect of participation in meetings on the awareness level of vulnerability and risk assessment

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-006931	0.2673	-2.594	0.0095**
Participation in meetings	0.6931	0.3852	1.800	0.0719 .

Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1

AIC=82.953

The awareness level of vulnerability and risk assessment is significantly (*p*-0.0095**) predicted to be -006931 when participation in meetings is 0. The significant association seen in *chi-square test*between participation in meetings and the awareness level of vulnerability and risk assmessment could be the cascading effects of other awareness campaign initiatives.

Inference viAssociation between participation in awareness activities and the awareness on the enforcement of circular

		Your level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA?			
1) Have you participated in mockdrill?		High	Medium	Low	Same as before
	Yes	13	11	0	0
	No	4	9	6	0
χ^2 = 16.7404, df = 6, p-value = 0.01029					
		Your level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA?			
2) Have you participated in workshops?		High	Medium	Low	Same as before
	Yes	11	11	2	0
	No	5	9	4	0
χ^2 = 5.7784, df = 6, p-value = 0.4485					
		Your level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA?			
3) Have you participated in meetings?		High	Medium	Low	Same as before
	Yes	12	15	2	0
	No	3	6	4	0
χ^2 = 10.8403, df = 6, p-value = 0.09344					

Participation in mockdrills has the strongest effect on the level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA followed by participation in meetings and then workshops.

The results from Inference vi shows that there was positive effect of participating in the Mock Drill and the level of awareness on the enforcement of the Circulars on Land Use based on GLOF hazard zonation and mapping issued by the MoHCA. This could be because the people got the opportunity to attend the Mock Drill physically. Along the same line, attending workshops also have given rise to positive result on the knowledge of the Land Use Mapping cited.

However, attending meetings and the knowledge of the Land Use Mapping had no positive relation meaning it was not the meetings which resulted to the knowledge of the Land Use mapping and the zonation of MoHCA.

Further glm test (Model vii) showed that participating in the Mock Drill and the Workshops were the definite reasons for raising the level of awareness of the Circular on the Land Use Mapping and the Zonation. It is to be noted here that glm tests are not done when there is no positive relations/results derived in the chi-square tests.

glm(EnforcementCircularAwareness~ParticipationInMockdrill, family=poission(link=log))

Model vii Effect of participation in mockdrill on the awareness of the enforcement of circular

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.7802	0.3015	-2.588	0.00967**
Participation in mockdrill	0.9343	0.3722	2.510	0.01206*
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC=87.007				

A unit participation in mockdrill is significantly (0.01206*) predicted to increase the awareness on the enforcement of circular by 0.9343.

3.4.1.2 Preparedness

Trainings in CBDRM, mainstreaming DRR, school disaster preparedness and response, and *Dzong* fire safety training have led to instituting *Dzongkhag, Gewog* and communitydisaster management plans in place.

Inference vii shows that there exists a positive result on getting trained in CBDRM and having the DM Plan in place unlike other situations where having the Dzongkhag/Gwog DM Plans in place wa not due to the respondents' getting trained in CBDRM.

Subsection 2 of Inference vii shows that respondents getting trained in the Disaster Risk Reduction (DRR) had the positive effect on getting the Dzongkhag/Gewog DM Plans in place.

Likewise, subsection 3 of Inference vii shows that getting trained in the School Disaster Preparedness had a positive impact/effect on having the Dzongkhag, Gewog and Community DM Plans in place meaning DM Plans were found at all the said three levels.

In case 4, however shows no positive result/relation in having the Dzongkhag. Gewog and Community DM Plans in place and getting trained in Dzong Fire Safety Trainings.

Inference viiAssociation between the training conducted and the disaster management plan in place

		Does your *Dzongkhag* have disaster management plans in place?		
1) Are you trained in CBDRM?		Yes	No	Don't know
	Yes	11	1	4
	No	7	8	9
$\chi^2 = 11.5259$, *df = 6, p-value = 0.07342*				
		Does your *Gewog* have disaster management plans in place?		
Are you trained in CBDRM?		Yes	No	Don't know
	Yes	7	5	4
	No	3	11	8
$\chi^2 = 8.9127$, *df = 6, p-value = 0.1785*				
		Does your community have disaster management plans in place?		
Are you trained in CBDRM?		Yes	No	Don't know
	Yes	9	8	1
	No	8	6	9
$\chi^2 = 12.6384$, df = 6, p-value = 0.04915				
		Does your *Dzongkhag* have disaster management plans in place?		
2) Are you trained in mainstreaming DRR?		Yes	No	Don't know
	Yes	12	1	1
	No	6	8	12
$\chi^2 = 21.4123$, df = 6, p-value = 0.001546				
		Does your *Gewog* have disaster management plans in place?		
Are you trained in mainstreaming		Yes	No	Don't know
	Yes	7	6	1
	No	3	10	11

DRR?				
χ^2 = 13.2381, df = 6, p-value = 0.03941				
		Does your community have disaster management plans in place?		
Are you trained in mainstreaming DRR?		Yes	No	Don't know
	Yes	9	7	1
	No	8	7	9
χ^2 = 8.9877, df = 6, p-value = 0.1743				
		Does your *Dzongkhag* have disaster management plans in place?		
3) Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	7	0	1
	No	11	9	12
χ^2 = 13.8999, df = 6, p-value = 0.03077				
		Does your *Gewog* have disaster management plans in place?		
Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	6	1	1
	No	4	15	11
χ^2 = 17.6785, df = 6, p-value = 0.007088				
		Does your community have disaster management plans in place?		
Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	8	2	1
	No	10	12	9
χ^2 = 13.5936, df = 6, p-value = 0.03452				
		Does your *Dzongkhag* have disaster management plans in place?		
4) Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	13	4	4
	No	5	5	10
χ^2 = 8.4058, df = 6, p-value = 0.2099				
		Does your *Gewog* have disaster management plans in place?		
Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	6	10	3
	No	4	6	10
χ^2 = 7.9537, df = 6, p-value = 0.2415				
		Does your community have disaster management plans in place?		

Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	9	9	3
	No	9	5	8
$\chi^2 = 7.3416$, *df = 6, p-value = 0.2904*				

glm(DisasterManagementPlansInPlace~CBDRMTraining, family=poission(link=log))

Model viii Effect of CBDRM training on community preparedness

Variable	**Estimate**	**Std. Error**	**Z value**	**Pr (>|z|)**
Intercept	-0.9808	0.4082	-2.403	0.0163*
Training in CBDRM	1.8660	0.4546	2.247	0.0246*
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC=88.206				

Disaster management plans in place is predicted to be increase by 1.8660 when training in CBDRM goes up by one. And it's predicted to be -0.9808 if there's no CBDRM training at all.

Model viii on the Community Preparedness and Effect of Trainings in CBDRM highly justifies the relation that the preparedness was achieved as a result of the CBDRM trainings.

3.4.1.3 Response Capacities

Training in CBDRM, mainstreaming DRR, school disaster preparedness and response, and *Dzong* fire safety training have helped *Dzongkhag* disaster management persons and *Gewog* disaster management committee members to prioritize, plan and implement measures to reduce human and material losses from potential GOLFs as shwn by results in inference viii and further validated by the *glm test* of model ix.

Ability or inability to prioritize, plan and implement measures to reduce human and material losses from the GLOFs is used to assess the respone capacity. It is hypothesized that having trained in CBDRM, mainstreaming DRR, school disaster preparedness and response, and *Dzong* fire safety training had enabled the community members to be able to prioritize measures to reduce human and material losses from GLOFs. These hypotheses are tested by using the *chi-square* test of independence.

Inference viiiRelationship between the training conducted and the ability to prioritize, plan and implement measures to reduce human and material losses from the potential GLOFs

		Are you able to prioritize measures to reduce human and material losses from the potential GOLFs?		
1) Are you trained in CBDRM?		Yes	No	Don't know
	Yes	13	4	1
	No	16	4	5
χ^2 = 13.7152, df = 6, p-value = 0.03298				
		Are you able to plan measures to reduce human and material losses from the potential GOLFs?		
Are you trained in CBDRM?		Yes	No	Don't know
	Yes	14	3	0
	No	16	4	5
χ^2 = 5.381, df = 6, p-value = 0.496				
		Are you able to implement measures to reduce human and material losses from the potential GOLFs?		
Are you trained in CBDRM?		Yes	No	Don't know
	Yes	11	4	2
	No	12	5	9
χ^2 = 10.4738, df = 6, p-value = 0.1061				
		Are you able to prioritize measures to reduce human and material losses from the potential GOLFs?		
2) Are you trained in mainstreaming DRR?		Yes	No	Don't know
	Yes	15	1	1
	No	14	7	5
χ^2 = 16.6309, df = 6, p-value = 0.01074				
		Are you able to plan measures to reduce human and material losses from the potential GOLFs?		
Are you trained in mainstreaming		Yes	No	Don't know
	Yes	15	1	0
	No	15	6	5

DRR?				
$\chi^2 = 8.996$, *df = 6, p-value = 0.1738*				
		Are you able to implement measures to reduce human and material losses from the potential GOLFs?		
Are you trained in mainstreaming DRR?		Yes	No	Don't know
	Yes	14	2	1
	No	9	7	10
$\chi^2 = 17.4679$, df = 6, p-value = 0.007709				
		Are you able to prioritize measures to reduce human and material losses from the potential GOLFs?		
3) Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	10	0	0
	No	19	8	6
$\chi^2 = 16.5449$, df = 6, p-value = 0.01111				
		Are you able to plan measures to reduce human and material losses from the potential GOLFs?		
Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	10	0	1
	No	21	7	4
$\chi^2 = 7.3851$, *df = 6, p-value = 0.2867*				
		Are you able to implement measures to reduce human and material losses from the potential GOLFs?		
Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	9	0	1
	No	14	9	10
$\chi^2 = 12.9502$, df = 6, p-value = 0.04383				
		Are you able to prioritize measures to reduce human and material losses from the potential GOLFs?		
4) Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	15	3	4
	No	14	5	3
$\chi^2 = 6.1041$, *df = 6, p-value = 0.4116*				
		Are you able to plan measures to reduce human and material losses from the potential GOLFs?		
Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	18	3	2
	No	13	4	4

χ^2 = 2.4612, df = 6, p-value = 0.8728				
		Are you able to implement measures to reduce human and material losses from the potential GOLFs?		
Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	13	5	4
	No	10	4	8
χ^2 = 4.8255, df = 6, p-value = 0.5664				

The test result shows that there exists significant (*p-value 0.03298*) association at $\alpha = 0.05$ between CBDRM training and the ability to prioritize measures against potential GLOFs. Similarly, significant associations are also seen between the ability to prioritize measures against GLOFs and training in mainstreaming DRR, and training in school disaster preparedness and response. Significant association is also seen between the ability to implement measures against GLOFs and training in *Dzong* fire safety.

Case 1 of Inference viii shows that there is a positive relation in that getting trained in CBDRM had positive effect in being able to prioritize and plan measures to reduce human and material losses from potential GLOF threats whereas getting such training did not show positive relation in being able to implement measure to reduce human and material losses from the threat mentioned.

Case 2 shows the positive relation/impact or change derived between getting trained in DRR and being able to prioritize, plan and implement measures to reduce human and material losses from the potential GLOF threats.

Case 3 shows otherwise, in that it shows that getting traine in DRR did not have the positive relation with being able to plan measures to reduce human and material losses from the said GLOF threats. Likewise, subsection 4 goes to show there is no positive relation between "getting trained for Dzong Fire Safety and and being able to prioritize, plan and implement measures to reduce the mentioned losses against the GLOF threats. This is obvious in that GLOF threat and Fire Safety are entirely two different worlds of hazards.

3.5 Community Level

3.5.1 Data Analysis
3.5.2 Descriptive Statistics

A total of 85 community members from Punakha *Dzongkhag* participated in the survey. Female respondents made up 67.1% of the total respondents. Over 51% of them were household heads, 25.9% business people, 9.4% civil servants, 42.4% farmer, and 20% students. A large majority of 74.1% were married, 21.2% single and 4.7% were divorcees. The percent of literate respondents was at 50.6 while the rest of 49.4% were illiterates.

In Wangdue Phodrang, 109 community members were interviewed out of which 53 were male and 56 were females. Amongst them, 54% of them were household heads, 22% business people, 10% civil servants, 24% farmers, 9% house wives, 24% students and 10% others. Of them 3% were divorcees, 65% married and 32% single people. Literate respondents made up 74%.

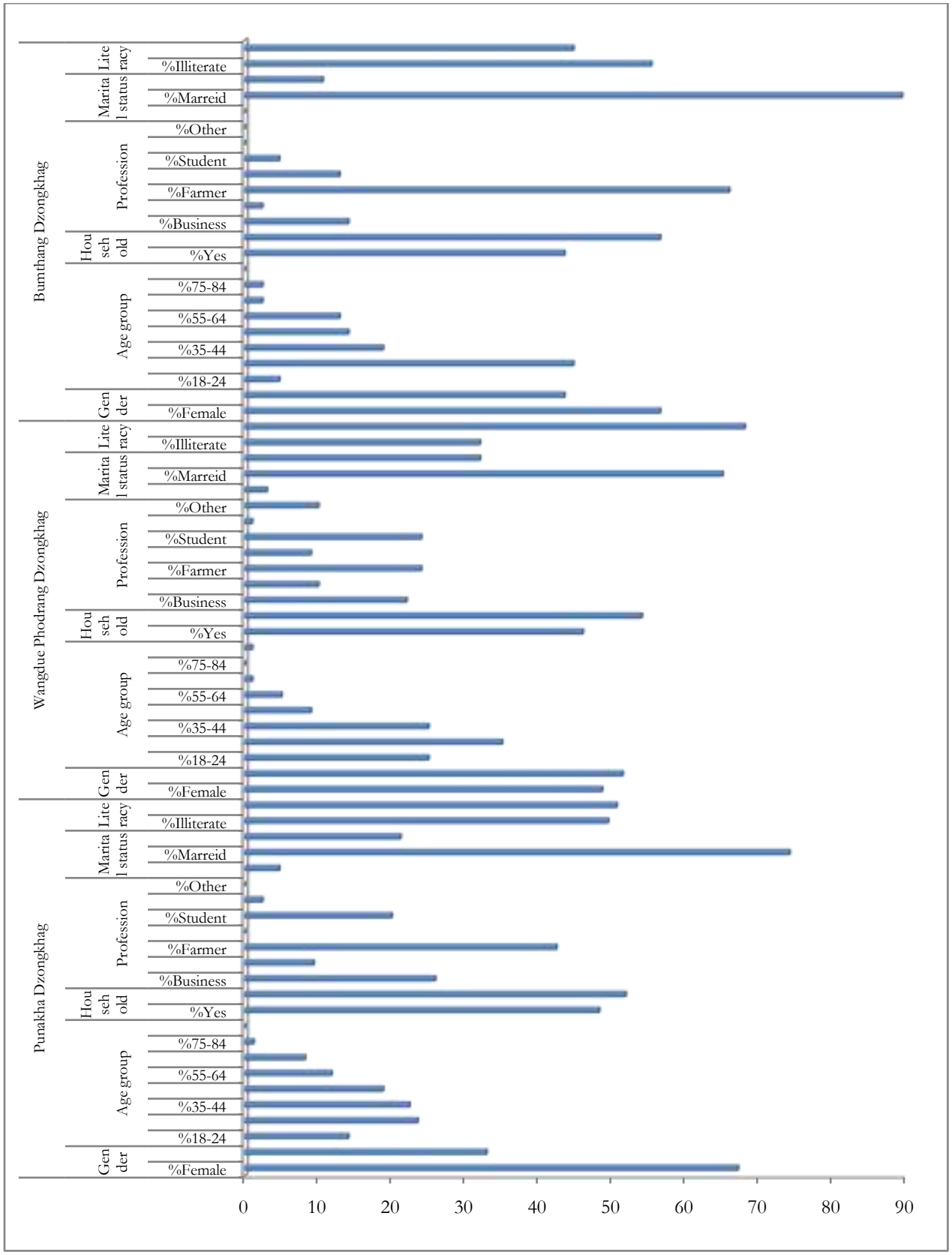
Eighty five community members were interviewed in Bumthang *Dzongkhag* out of which 56.5% were female. There were 48 household heads, making up 56.5% of the total respondents. Samples were drawn from a wide range of occupations groups–14.1% were business people, 2.4% civil servants, 65.9% farmers, 12.9 house wives, and 4.7% were students.

It is interesting to note that at the Community Level, female respondents constitute the maximum percentage in all three dzongkhags of Punakha, Wangdue and Bumthang and in all the three dzongkhags, majority of them (always 50%) were heads of households.

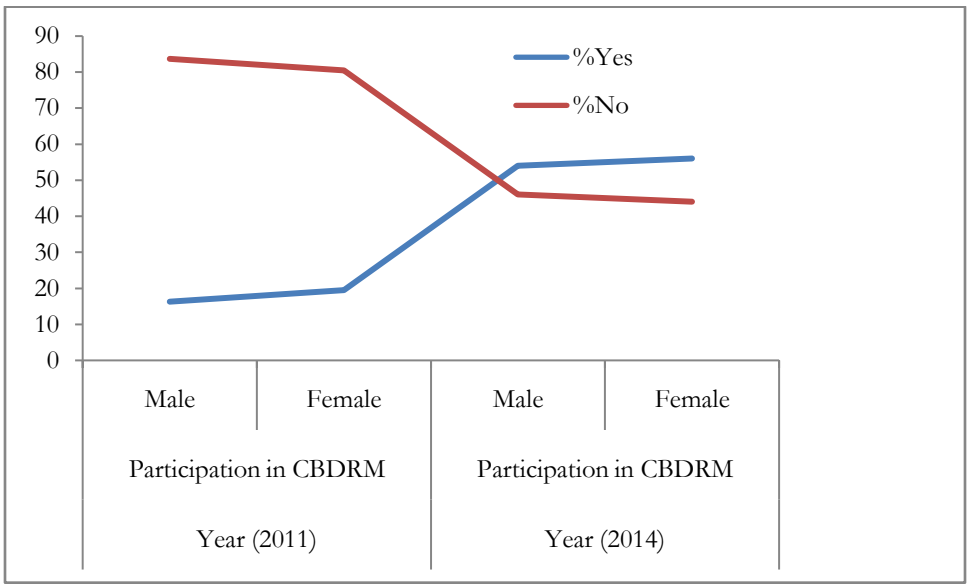
Chart 11 shows the detailed gender-dissagregated profile of community respondents covering their occupations, literacy levels and marital statuses.

In terms of Literacy Levels, Punakha had about 50% illiterate respondents, Wangdue had about 26% illiterates. Surprisingly, Wangdue respondents were the highest literate ones at the percentage level of 74.

Bar chart 11Respondents' profile

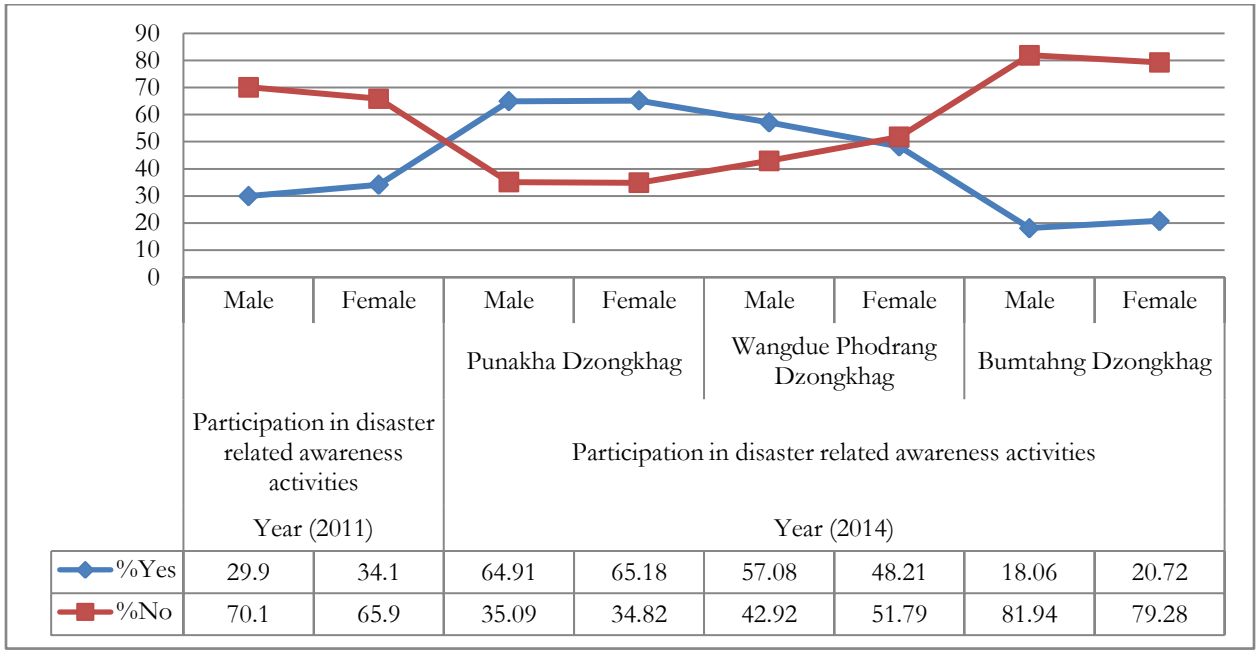


Line chart 12Percentage of community members trained in CBDRM by gender



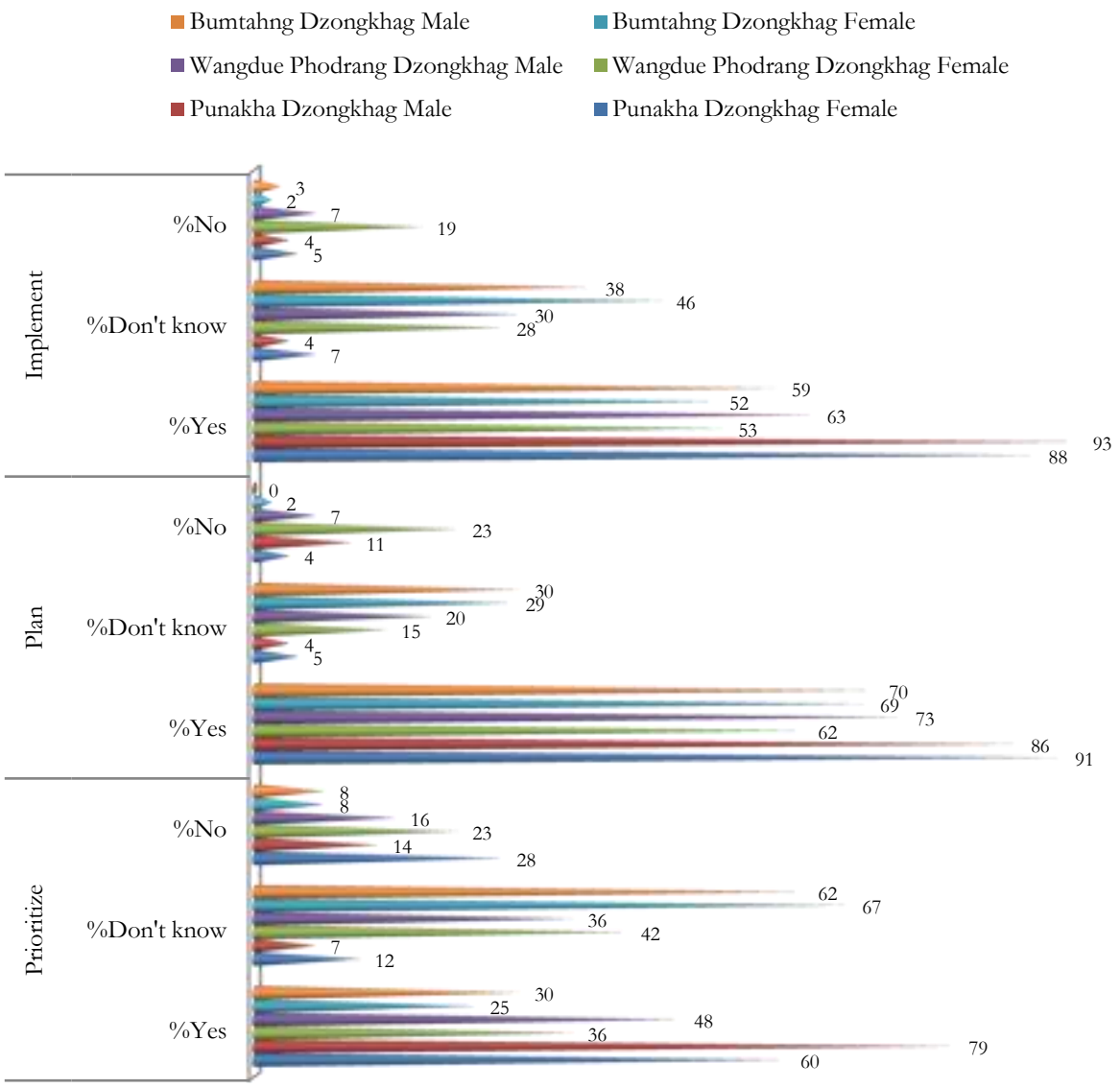
A gender-disaagregated study on the percenate of community members being trained in CBDRM showed the results that a total of 16.3% male and 19.5% femalecommunity members were found to have been trained in CBDRM in 2011 baseline study. The percentages have shot up to 54 and 56 respectively in this 2014 terminal study. The increase in the CBDRM trained community members was attributed largely to awareness trainings conducted in post-2011. The community also attributed the increase to awareness created through media (radio, television and print media).

Line chart 13Participation in disaster related awareness activities by gender



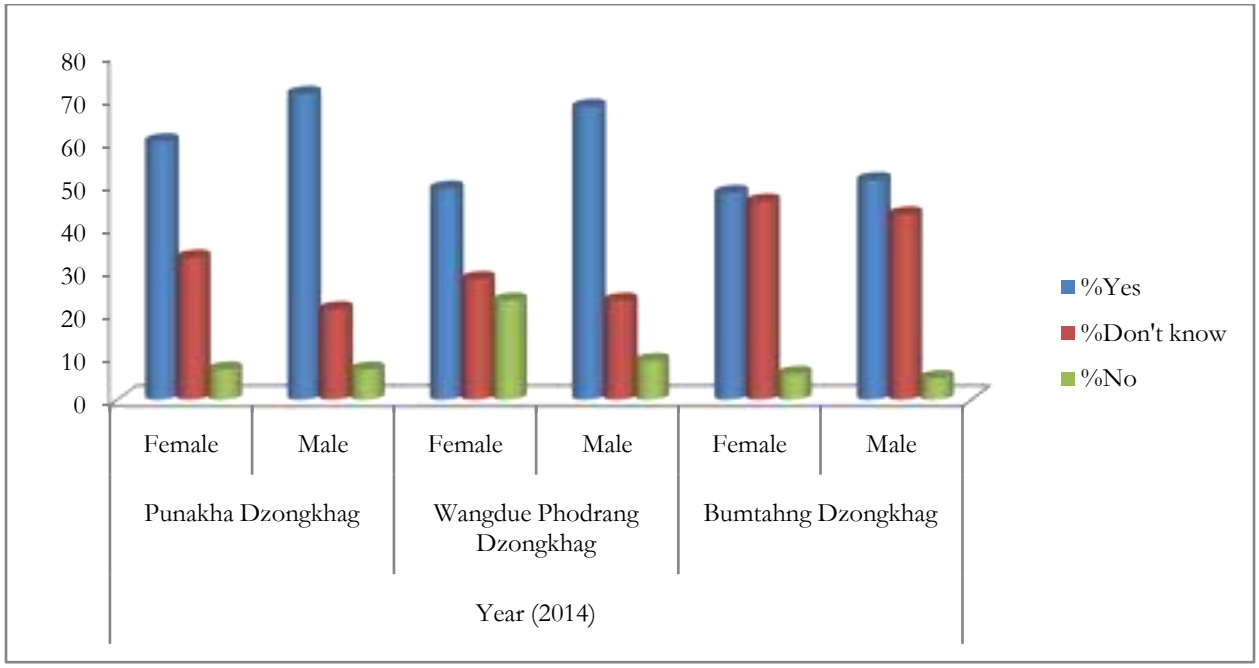
Percentage of male and female respondents who reported having participated in disaster related awareness activities such as CBDRM, School Disaster Preparedness and Response Training, *Dzong* Fire Safety Trainingwere 29.9% and 34.1% in 2011 baseline study. In 2014 terminal evaluation study, the percengtages were 64.91% and 65.18% in Punakha *Dzongkhag,* 58.08% and 48.21% in Wangdue Phodrang *Dzongkhag,* and 18.06% and 20.72% in Bumthang *Dzongkhag.*

Bar chart 14Community members able to prioritize plan and implement measures to reduce human and material losses from potential GLOF



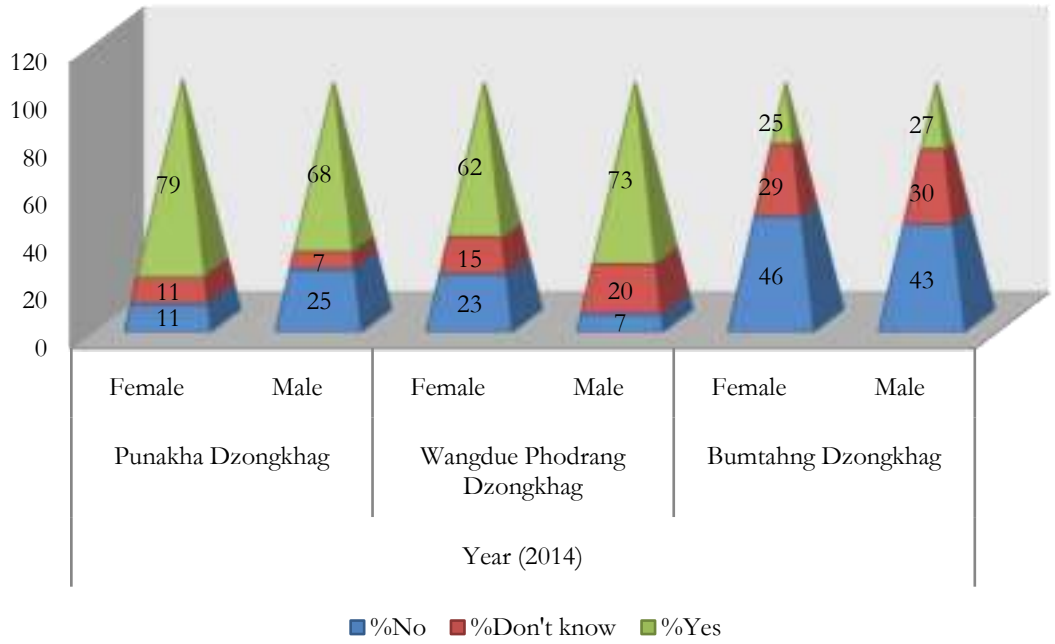
Seventy percent of male and 69% of female from Bumthang, 73% of male and 62% of female from Wangdue Phodrang, 86% of female and 91% of male respondents reported that they were able to plan measures to reduce human and material losses from potential GLOF. According to them, the planning include monitoring weather forecasts, having emergency evacuation plan, preparing to to move to the designated evacuation/safe areas marked by concerned authorities. This shows that the need to strengthen awareness at the community level reflected in the 2011 report has been strengthened to a large extent.

Column chart 15Community members who are able to take precautionary measures in the event of GLOF



As per 2011 baseline study, on an average the percent of community members who are able to take precautionary measures and react to potential GLOFs to minimize human and material losses by securing safe grain storage and insuring house against GLOF are 6.9 and 33 respectively. These low percents have drastically improved over the last 3 years.

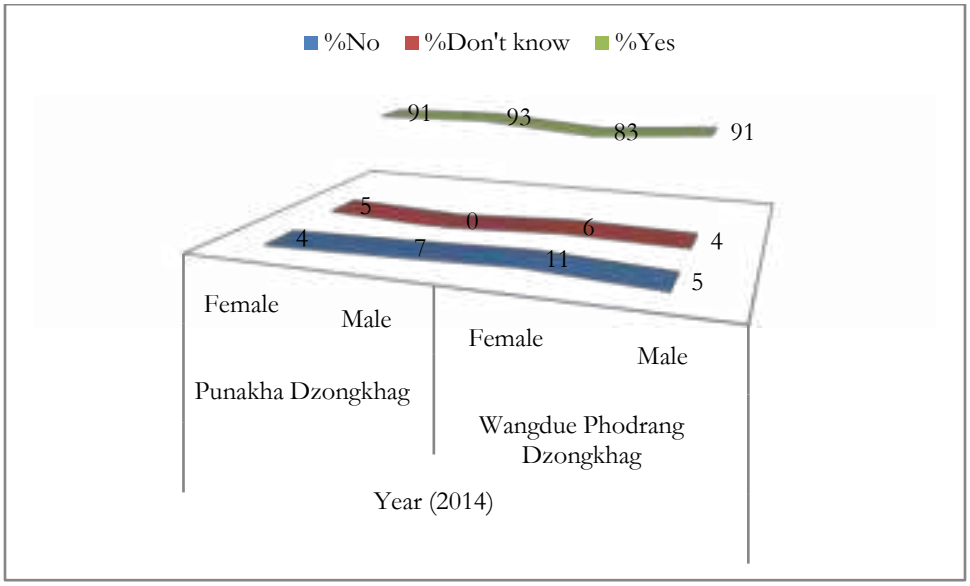
Column chart 16Disaster management plans in place at the community level



They baseline study conducted in 2011 reported that 72.7% of respondents in Punakha, 57.1% in Wangdue Phodrang, and 100% in Bumthang have disaster management plans in place at their communities. This study showed 79% of female and 68% of male respondents in Punakha, 62% female and 73% male in Wangdue Phodrang, and only 25% female and 27% male in Bumthang reported having disaster management plans in place at their communities. The low pecent in Bumthang was attributed to non-functional *Gewog* disaster management community members.

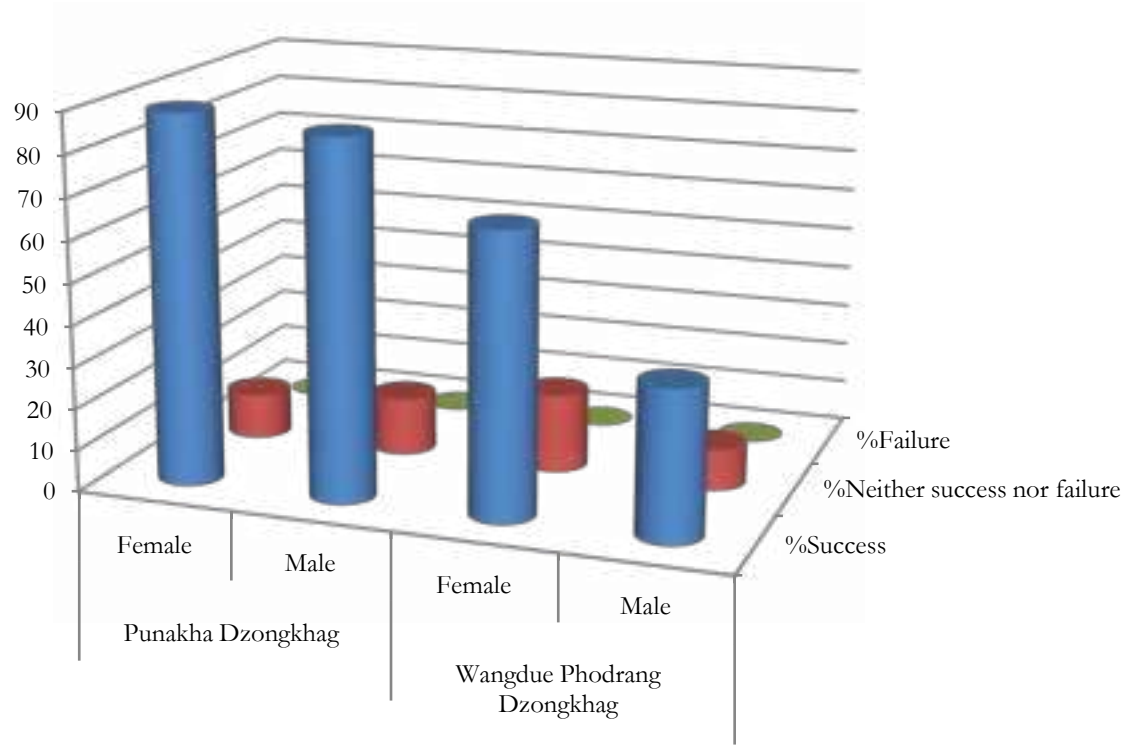
It is remarkable to note that Bumthang has almost equal percent of males and females in all the categories of responses of 'yes', "do not know" and 'no' but more females are shown to have the knowledge than males in Punakha Dzonkhag which is the worst hit District in the previous floods of 1994, and Cyclone Aila in 2009.

Line chart 17Level of awareness on mitigation work at Thorthormi lake



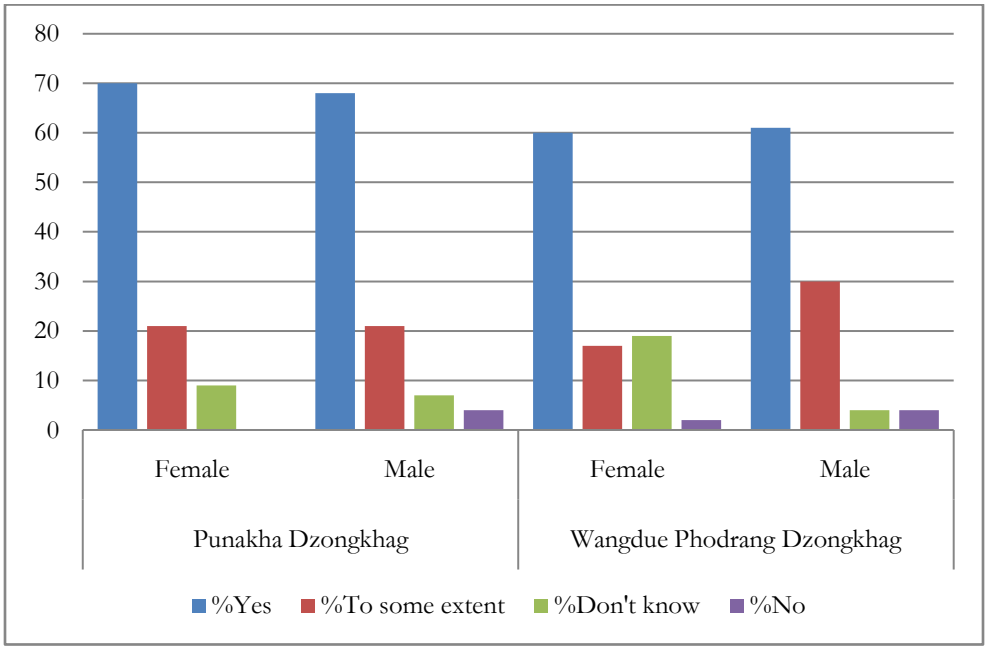
The level of awareness of mitigation work at Thorthormi lake was exceedingly high in both Punakha and Wangdue Phodrang *Dzongkhags* with 91% female and 93% male in Punakha *Dzongkha,* 83% female and 91% male in Wangdue Phodrang *Dzongkhag* answering yes that they are aware of mitigation work at Thorthormi lake.

Column chart 18Rating of Thorthormi lake mitigation work



Column chart 18 shows the rating given by respondents in the success levels of mitigation of Thorthormi Lake in causing flood threat in the future and it was found that 89% of female respondents and 86% male respondents rated the work as success in Punakha *Dzongkha* shown by the blue cylinder in the front. Under Wangdue Phodrang *Dzongkhag* 68% of female and 83% of male respondents rated the work as success. This clearly shows men are being more cautious in responding about the success of mitigation intervention which has not been tested yet by a major flood like that of 1994.

Column chart 19Mitigation work and the risk of GLOF



With the completion of mitigation work, 70% of female and 68% of male respondents in Punakha Dzongkhag are of the opinion that the risk of GLOF has now been reduced to a safe level. Twenty one percent of female and male respondents think that the risk has been reduced to some extend only. Under Wangdue Phodrang Dzongkhag the pecent of female and male respondents who were of the opinion that the GLOF mitigation work at Thorthormi lake had reduced the risk of GLOF to a safe level were 60% and 61%.

3.6 Higher Order Analysis and Modeling

3.6.1 Inference

3.6.1.1 Awareness

Test (1) through (3) show that at community level participation in mockdrills, workshops, and meetings have significantly enchanced the awareness level of roles and responsibilities amongst the community members.

Inference ixRelationship between participation in awareness activities and the level of awareness of the roles and responsibilities

		Your awareness level of roles and responsibilities?		
1) Have you participated in mockdrill?		High	Low	Medium
	Yes	59	2	68
	No	20	68	61
χ^2 = 83.3097, df = 4, p-value = 2.2e-16				
		Your awareness level of roles and responsibilities?		
2) Have you participated in workshops?		High	Low	Medium
	Yes	10	0	3
	No	70	70	125
χ^2 = 17.194, df = 4, p-value = 0.001772				
		Your awareness level of roles and responsibilities?		
3) Have you participated in meetings?		High	Low	Medium
	Yes	58	3	58
	No	22	67	71
χ^2 = 71.5443, df = 2, p-value = 2.91e-16				

In all of the above tests, at $\alpha = 0.05$ the *p-value* is highly significant, so the alternative hypothesesthat the awareness level of roles and responsibilities of community members are closely associated with participation in mockdrills, workshops and meetings. The relationships are further investigated by modeling them.

glm(LevelOfRRAwareness~ParticipationInMockdrill, family=poission(link=log))

Model ix Effect of participation in mockdrill on the awareness of roles and responsibilities

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.3876	0.1748	-7.939	2.04e-15***
Participation in mockdrill	0.6717	0.1177	5.708	1.14e-08***
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC= 455.62				

The level of awarenss of the roles and responsibilities is predicted to increase by 0.6717 when the participation in mockdrill goes up by one.

glm(LevelOfRRAwareness ~ParticipationInWorkshops, family=poission(link=log))

Model x Effect of participation in workshops on the awareness of roles and responsibilities

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.11346	0.10380	-1.093	0.274
Participation in workshops	0.06677	0.08367	0.798	0.425

Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1

AIC = 558.75

For a unit increment in participation in workshops, the level of awareness of their roles and responsibilities are predicted to be increased by 0.06677. But the coefficients are not significant.

glm(LevelOfRRAwareness ~ParticipationInMeetings, family=poission(link=log))

Model xi Effect of participation in meetings on the awareness of roles and responsibilities

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.2375	0.1646	-7.519	5.54e-14***
Participation in meetings	0.6058	0.1127	5.376	7.60e-08***

Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1

AIC = 471.64

Participation in disaster management meetings has a significant positive effect on the level of awarensss of roles and responsibilities. The level of awarenss is predicted to rise by 0.6058 with a unit increase in meetings.

Inference xRelationship between participation in awareness activities and the awareness of location and access safe GLOF evacuation sites

		Are you aware of location and access routes to safe GLOF evacuation sites?	
1) Have you participated in mockdrill?		Yes	No
	Yes	103	4
	No	68	15
χ^2 = 80.7402, df = 10, p-value = 3.594e-13			
		Are you aware of location and access routes to safe GLOF evacuation sites?	
2) Have you participated in workshops?		Yes	No
	Yes	11	2
	No	160	17
χ^2 = 7.6017, df = 10, p-value = 0.6677			
		Are you aware of location and access routes to safe GLOF evacuation sites?	
3) Have you participated in meetings?		Yes	No
	Yes	88	4
	No	84	15
χ^2 = 76.9385, df = 5, p-value = 3.663e-15			

At $\alpha = 0.05$thetests (1) and (3) support the hypotheses that participation in mockdrills and meetings have significant positive effect on the awareness of locations and access routes to safe GLOF evacuation sites. The tests are further investigated by modeling them as:

glm(LocationAccessRoutesAwareness~ParticipationInMockdrill, family=binomial(link=logit))

Model xii Effect of participation in mockdrill on the awareness of location and access routes to safe GLOF evacuation sites

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.4006	0.1556	-2.575	0.01002*
Participation in mockdrill	1.7224	0.5838	2.950	0.00318**
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 255.23				

glm(LocationAccessRoutesAwareness~ParticipationInMeetings, family=binomial(link=logit))

Model xiii Effect of participation in meetings on the awareness of location and access routes to safe GLOF evacuation sites

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.04652	0.15254	-0.305	0.7604
Participation in meetings	1.36828	0.58304	2.347	0.0189*
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 261.91				

3.6.1.2 Preparedness

Inference xiRelationship between the training conducted and the preparedness

		In the event of potential GLOF, can you take precautionary measures against it?		
1) Are you trained in CBDRM?		Yes	No	Don't know
	Yes	76	8	18
	No	83	20	73
χ^2 = 21.2105, df = 4, p-value = 0.0002876				
		Does your community have disaster management plans in place?		
Are you trained in CBDRM?		Yes	No	Don't know
	Yes	85	14	3
	No	64	61	51
χ^2 = 62.3618, df = 4, p-value = 9.245e-13				
		In the event of potential GLOF, can you take precautionary measures against it?		
2) Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	27	3	12
	No	133	25	79
χ^2 = 1.0754, df = 2, p-value = 0.5841				
		Does your community have disaster management plans in place?		
Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	28	7	7
	No	121	69	47
χ^2 = 3.8421, *df = 2, p-value = 0.1465*				
		In the event of potential GLOF, can you take precautionary measures against it?		
3) Are you trained in Dzong fire safety preparedness and response?		Yes	No	Don't know
	Yes	14	2	1
	No	146	26	90
χ^2 = 5.9946, df = 2, p-value = 0.04992				
		Does your community have disaster management plans in place?		
Are you trained in Dzong fire safety preparedness		Yes	No	Don't know
	Yes	14	3	0
	No	135	73	54

and response?				
$\chi^2 = 6.956$, df = 2, p-value = 0.03087				

In all cases of tests (1) and (3) the *p-values* are smaller than the significance level ($\alpha = 0.05$), hence alternative hypotheses are accepted and the relationship are further investigated by modeling them.

glm(PrecautionaryMeasures~TrainingInCBDRM, family=poission(link=log))

Model xiv Effect of trainingin CBDRM on the ability to take precautionary measures against GLOF

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.8408	0.1508	-5.577	2.45e-08***
Training in CBDRM	0.7766	0.1696	4.580	4.65e-06***
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 645.44				

Result: Strong relationship exists between the two.

glm(DisasterManagementPlanInPlace~TrainingInCBDRM, family=poission(link=log))

Model xv Effect of training in CBDRM on having disaster management plan in place

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.6292	0.2236	-7.286	3.19e-13***
Training in CBDRM	1.5530	0.2368	6.557	5.50e-11***
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 537.05				

Result: Strong relationship exists between the two.

glm(PrecautionaryMeasures~TrainingInDzongFireSafety, family=poission(link=log))

Model xvi Effect of training in *Dzong* fire safety on the ability to take precautionary measures against GLOF

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.4469	0.4998	-2.895	0.00379**
Training in *Dzong* fire safety	1.2065	0.5046	2.391	0.01681*
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 660.8				

glm(DisasterManagementPlanInPlace~TrainingInDzongFireSafety, family=poission(link=log))

Model xvii Effect of training in *Dzong* fire safety on having disaster management plan in place

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.7346	0.5773	-3.005	0.00266**
Training in *Dzong* fire safety	1.3648	0.5820	2.345	0.01904*
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 591.15				

3.6.1.3 Response Capacities

Inference xiiRelationship between the training conducted and the ability to prioritize, plan and implement measures to reduce human and material losses from the potential GLOFs

		Are you able to prioritize measures to reduce human and material losses from the potential GOLFs?		
1) Are you trained in CBDRM?		Yes	No	Don't know
	Yes	69	18	15
	No	56	30	90
χ^2 = 142.7117, df = 4, p-value = 1.188e-08				
		Are you able to plan measures to reduce human and material losses from the potential GOLFs?		
Are you trained in CBDRM?		Yes	No	Don't know
	Yes	92	6	4
	No	115	16	43
χ^2 = 28.0028, df = 6, p-value = 9.385e-05				
		Are you able to implement measures to reduce human and material losses from the potential GOLFs?		
Are you trained in CBDRM?		Yes	No	Don't know
	Yes	92	3	7
	No	92	17	65
χ^2 = 44.4575, df = 6, p-value = 5.998e-08				
		Are you able to prioritize measures to reduce human and material losses from the potential GOLFs?		
2) Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	22	2	18
	No	103	46	88
χ^2 = 5.3908, df = 2, p-value = 0.06751				
		Are you able to plan measures to reduce human and material losses from the potential GOLFs?		
Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	27	3	10
	No	180	19	38
χ^2 = 13.2283, df = 3, p-value = 0.004168				
		Are you able to implement measures to reduce human and material losses from the potential GOLFs?		
Are you trained in school disaster preparedness and response?		Yes	No	Don't know
	Yes	22	3	15
	No	162	17	58
χ^2 = 114.3893, df = 3, p-value = 0.00242				

		Are you able to prioritize measures to reduce human and material losses from the potential GOLFs?		
3) Are you trained in Dzong fire safety measures?		Yes	No	Don't know
	Yes	12	1	4
	No	113	47	102
χ^2 = *5.0321, df = 2, p-value = 0.08078*				
		Are you able to plan measures to reduce human and material losses from the potential GOLFs?		
Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	15	0	2
	No	192	22	46
χ^2 = *2.3497, df = 3, p-value = 0.5031*				
		Are you able to implement measures to reduce human and material losses from the potential GOLFs?		
Are you trained in Dzong fire safety training?		Yes	No	Don't know
	Yes	14	0	3
	No	170	20	70
χ^2 = *2.668, df = 3, p-value = 0.4457*				

glm(AbilityToPrioritize~TrainingInCBDRM, family=poission(link=log))

Model xviii Effect of training in CBDRM on the ability to prioritize measures to reduce human and material losses from potential GLOFs

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.7538	0.1443	-5.223	1.76e-07***
Training in CBDRM	0.9342	0.1598	5.845	5.06e-09***
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 666.8				

glm(AbilityToPlan~TrainingInCBDRM, family=poission(link=log))

Model xix Effect of training in CBDRM on the ability to plan measures to reduce human and material losses from potential GLOFs

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.9859	0.2673	-7.431	1.08e-13***
Training in CBDRM	1.4655	0.2847	5.148	2.63e-07***
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 470.39				

glm(AbilityToImplement~TrainingInCBDRM, family=poission(link=log))

Model xx Effect of training in CBDRM on the ability to implement measures to reduce human and material losses from potential GLOFs

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-1.7918	0.2425	-7.388	1.49e-13***
Training in CBDRM	1.6309	0.2560	6.371	1.88e-10***
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 546.05				

glm(AbilityToPlan~TrainingInSchoolDPR, family=poission(link=log))

Model xxi Effect of training in school disaster preparedness and response on the ability to plan measures to reduce human and material losses from potential GLOFs

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.5534	0.2085	-2.654	0.00796**
Training in CBDRM	-0.3608	0.2324	-1.553	0.12053
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 546.05				

glm(AbilityToImplement~TrainingInSchoolDPR, family=poission(link=log))

Model xxii Effect of training in school disaster preparedness and response on the ability to implement measures to reduce human and material losses from potential GLOFs

Variable	Estimate	Std. Error	Z value	Pr (>|z|)
Intercept	-0.5534	0.2085	-2.654	0.00796**
Training in CBDRM	-0.3608	0.2324	-1.553	0.12053
Singnif. Codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1				
AIC = 546.05				

IV. LESSONS LEARNT, EXPERIENCES AND RECOMMENDATIONS

A summary of lessons, experiences and recommendations from specific training and workshops carried out:

Training workshop on CBDRM for the *Dzongkhag* Disaster Management Committee (DDMC) and *Dzongkhag* disaster Management Teams (DDMT) was found to be extremely beneficial, relevant and equipped the participants with information on the important topics and tools for developing *Dzongkhag* Disaster Management Plans. It also gave them the requisite capacity to, in turn train the *Gewog* functionaries in disaster management plans.

Recommendations:

- It is recommended that the formation of DDMC and DDMT be supported by bestowing powers and responsibilities which is clearly spelt out in their terms of reference. Also, having a very strong line of command and coordination between these two bodies would help them function smoothly.
- In view of the *Dzongkhag*officials being burdened with the additional responsibility of manning emergency operation center (EOC), it is recommended that DDM recruit at least two regular trained staff to operate the EOC.
- It is highly recommended that a close coordination and collaboration is promoted between agencies and government partners through information sharing, conferences, and researches, etc.

Workshops on Disaster Preparedness and Response for Safe School were reported to be relevant and timely with the occurrence of disasters increasing ever before.

- A need to conduct workshops on multi-hazard was recommended with the nature of disaster changing every year.

Mock drill on Glacial Lake Outburst Flood Disaster Response showed direct positive impact on the response and preparedness level among the vulnerable communities.

Recommendations:

- It is recommended to organize and conduct more multi-hazard drills in the country to help increase the level of preparedness of the people who are always the first responders.
- Stakeholder co-ordination and co-operation was vital and necessary in organizing drills and was deemed necessary during real emergencies.
- For security and running EWS, community ownership was found be to be inevitable.

A summary of lessons learnt, experiences and recommendations from the review of training and workshops, and mock drill documents, interviews with key informants and analysis of the data collected:

Recommendations:

- Women's representation as sector focal persons at national level is significantly low (14.3%). There is a need to encourage women's participation, particularly at national level.
- Focal persons accessing climate risk information through Disaster Management Information System are almost non-existent. Therefore, DDM may explore better alternative ways of utilizing climate risk information at the sector levels.
- There is a need for continuous awareness campaign and sharing of information at community level and in vulnerable areas.
- More empirical studies may be conducted on glaciers and climate change, and on the application of state-of-the-art technology to combat and better prepare against the adverse effect of climate change.
- Laws and regulations have been put in place, awareness activities have been carried out to a large extent, yet preparedness against GLOF is however quite low.
- Government and corporate officials have been familiarized with Disaster Management policies and strategies but the DDM has not taken any initiative to familiarize people working in private sector who are also equally vulnerable.
- To carry out risk reduction activities in a planned manner, it is felt that a legal framework like Thromde Disaster Management plan is necessary.
- It is recommended to continue awareness activities and build capacity of planner and policy makers to enable them to mainstream DDR concerns into their plans and policies.
- Evacuation and mockdrills were reported to be very helpful and efforts must continue.
- Dedicated disaster management personnel at *Dzongkhag* level would be helpful. Currently, the focal persons are *Dzongkhag* officials who have their respective primary responsibility. Therefore, DDM may look into the placement of dedicated disaster management personnel at *Dzongkhag* level.
- DDM may look into developing standard training monitoring, reporting and evaluation tools to keep track of training conducted, assess effectiveness and provide support as and when required.
- Focal persons for early warning system are seen to have gone ineffective since the discontinuation of providing mobile vouchers.
- There is a need to create an emergency response funds at *Dzongkhag* and *Gewog* levels.
- Need to conduct of first responder training at *Dzongkhag, Gewog,* and community levels.
- Risk reduction and disaster awareness activities and measures being adopted or carried out by sectors and *Dzongkhags*are project tied and outside the scope of five-year plans. These activities and measures can be mainstreamed or made sustainable by incorporating them into sectors and *Dzongkhags* planned activities.
- DDM to explore other effective options of carrying out awareness and knowledge dissemination activities to reach the intended target audience. Radio programs and messages were reported to be effective media. Even in emergency communication, owing to their reach and access, mobile phones and radio proved to be the two powerful and effectivetools.

It is recommended that DDM consults telecommunication and broadcasting agencies like Bhutan Telecom, Tashi Cell and the Bhutan Broadcasting Service and explore alternative early warning and emergency communication mechanisms.

- Although people have realized the hard way as to why they should insure their homes and other belongings, there are still quite a bit of residents who need to be encouraged and pursued to insure their homes and belongings against such untoward occurrences. DDM may take up with the insurance companies to advocate for and offer such schemes.
- Since co-ordination seems to be weak and ineffective, there is need to re-energize the multi-sector committees and the teams at the *Dzongkhag* and *Gewog* levels.

V. CONCLUSION

DDM and its initiatives can be compared to have had "the organic growth" getting their DM Act, 2013 in place after series of deferring the endorsement of DM Bill, 2010 by the previous Government. As a party/signatory to the Hyogo Framework of Action (2005-2015) and having been guided by the NDRMF, 2006 back in the country, DDM has been working on building the capacities of not only the communities to build disaster resilient communities but also built the capacities at the national and district levels in the effort of able to respond to the all forms of natural disasters like earthquakes, wind storms, landslides and floods.

This study "Qualitative Based Survey of Awareness, Preparedness and Response Capacities related to Climate Induced Risks and Vulnerabilites from GLOF" focused particularly on those districts and communities where Capacity Building had happened as part of the Flood Mitigation to minimize losses should there be a GLOF like the one experienced in 1994 and Cyclone Aila 2009 in which many households lost much properties in the form of cattle, land area and loss of some dear ones in the flood.

DDM took the partnership of educating the people of Gasa District at Lunana with the UNDP-GEF funded Thorthormi Lake Lowering Project (2008-2012) for disaster management and building resilience. The said project came as a boon to communities in Wangdue, Punakha and Gasa. When the former two districts benefitted in terms of getting the technical interventions like the Flood Warning Sirens (17 in Punakha-Wangdue Valley), Gasa benefitted socio-economically as the Project contributed to the porterage and labour payments to the communities of Gasa in the Project Period.

This Study focused on the efforts taken by DDM in building capacities of the three districts and the National Level officials by forming Disaster Management Committees at all levels till the village (Chiwog/Community) who were supposed to be the Trainer of Trainers to roll out the activities.

Taking the findings of the quantitative statistical analysis, the qualitative data analysis, review of relevant documents, and the interviews with the informants into account, the study questions on the awareness, preparedness and response capacity can be summed up thus:

DDM has relentlessly carried out an array of awareness raising meetings, trainings, workshops and mockdrills. to sensitize, orient and enhance the awareness and build the capacities of stakeholders, beneficiaries, and counterparts on the natural disasters, in particular the GLOF threat in Bhutan. Significant impact has been created on the ground, especially in Punakha-Wangdue Valleys. Having said that, the Department could do more by developing comprehensive awareness building strategy as part of the National Preparedness and Contingency Plan; and by upscaling systematic awareness, mockdrills and capacity building programs at all levels, including advocacy at decision-making levels.

To a large extent, disaster preparedness has now gained great significance and has been duly integrated as part of the larger development strategy. However, owing to the lack of technical expertise and resources, a few sectors couldn't initiate the formulation of disaster contingency plans

and the absence of contingency plans has resulted in the lack of effective coordination, delays in relief distribution and planning for disaster response. Therefore, it is urgent to come up with contingency plans for all sectors at all levels in order to have teams, resources and information flows in the event of emergencies.

Despite the fact that a significant number of respondents were able to prioritize, plan and implement measures to reduce losses from potential GLOF, there is a need to encourage resource sharing and optimize resource acquisition, allocation, and deployment through increased communication, collaboration and standardization.

The study found that much has been achieved by DDM in terms of building preparedness, raising awareness of GLOF and capacity to respond as all of these initiatives showed positive relation to the nation-wide CBDRM training provided by DDM as one of the initial steps. Communities are better informed after the project as it was observed that there were marked changes of awareness levels from 2011 to 2014 with some changes like 50-100 percent awareness levels in some communities and stakeholders.

Implementaiton of the Land Use Mapping and Hazard Zonation will now become stronger with the DM Act in place and the few households who are still residing in the red zones will have to move/run the risk of not getting insurance should they become victim to flood.

Disaster management has taken good roots in the schools across the country in the form of drills for response to earthquakes and identification of evacuation sites in times of flood.

The National Disster Management Steering Committee, being the over all apex body of implementing orders in times national disasters, similar other committee down the line till the gewog have mandated roles to respond and act in times of a disaster in any part of the country.

Development of documents like the NDRMF, 2006, Rules and Regulations, 2012, DM Policy and Strategy and having DM Plans at all levels of institutions not only in the three districts limited to this study but also in the whole country were all products of DDM's constant effort of raising awareness and making everyone able to respond to unforeseen disasters in their Mission of Building a Disaster Resilient Bhutan are all commendable achievements and the initiatives should keep rolling till each and every citizen of the country can answer "100%Yes" to all the assessment questions of disaster awareness, preparedness and response capacities.

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7 APPENDICES

7.1 TABLES

7.1.1 National Level Tables

Table iii Respondents' profile

NATIONAL LEVEL			
Gender		Frequency	Percent
	Female	2	14.3
	Male	12	85.7
Total		14	100
Household head	No	3	21.4
	Yes	11	78.6
Total		14	100

Table iv Count and percentage of national level focal Persons able to or not able to prioritize, plan and implement measures to reduce human and material losses from potential GLOFs

NATIONAL LEVEL						
Ability to:		Respondents				
		National level focal persons				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Prioritize	Very confident	2	0	2	100	0
	Confident	0	12	12	0	100
	Not so confident	0	0	0	0	0
	Not confident	0	0	0	0	0
Total		2	12	14	100	100
Plan	Very confident	0	0	0	0	0
	Confident	2	12	14	100	100
	Not so confident	0	0	0	0	0
	Not confident	0	0	0	0	0
Total		2	12	14	100	100
Implement	Very confident	0	0	0	0	0
	Confident	0	6	6	0	50
	Not so confident	2	6	8	100	50
	Not confident	0	0	0	0	0
Total		2	12	14	100	100

Table v Access to climate risk information database

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
How often to you access to climate risk information database?	On a regular basis	0	0	0	0	0
	Sometimes	0	9	9	0	75
	Not at all	2	3	5	100	25
Total		2	12	14	100	100

Table vi Utilization of climate risk information

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Do you utilize climate risk information?	Missing	2	3	5	100	25
	No	0	3	3	0	25
	Yes	0	6	6	0	50
Total		2	12	14	100	100

Table vii Participation in any sensitization workshops or trainings organized by DDM

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Have you participated in any sensitization workshops or trainings organized by DDM?	All	0	3	3	0	25
	Some	2	9	11	100	75
	Not at all	0	0	0	0	0
Total		2	12	14	100	100

Table viii Long-term strategies or activities for GLOF or other hazards

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are there any long-term prevention/mitigation strategies/activities for GLOF or other hazards in your sector's annual or five-year plan?	No	0	3	3	0	25
	Don't know	0	0	0	0	0
	Yes	2	9	11	100	75
Total		2	12	14	100	100

Table ix Awareness on disaster management plans

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Disaster management act of Bhutan - 2013	Don't know	0	0	0	0	0
	No	0	0	0	0	0
	Yes	2	12	14	100	100
Total		2	12	14	100	100
Community-based disaster risk management (CBDRM)	Don't know	0	3	3	0	25
	No	0	3	3	0	25
	Yes	2	6	8	100	50
Total		2	12	14	100	100
Gewog disaster management policy and strategy	Don't know	0	3	3	0	25
	No	2	6	8	100	50
	Yes	0	3	3	0	25
Total		2	12	14	100	100
Dzongkhag disaster management	Don't know	0	0	0	0	0

policy and strategy	No	0	3	3	0	25
	Yes	2	9	11	100	75
Total		2	12	14	100	100
School disaster management policy and strategy	Don't know	0	0	0	0	0
	No	0	6	6	0	50
	Yes	2	6	8	100	50
Total		2	12	14	100	100
Sector disaster management policy and strategy	Don't know	0	0	0	0	0
	No	0	6	6	0	50
	Yes	2	6	8	100	50
Total		2	12	14	100	100
National disaster management framework 2006	Don't know	0	0	0	0	0
	No	0	3	3	0	25
	Yes	2	9	11	100	75
Total		2	12	14	100	100

Table x DRR, CCA and sector plans/policies/activities

NATIONAL LEVEL								
				Respondents				
				National level focal persons				
				Gender (counts)		**Total**	**%**	
				Female	**Male**		**Female**	**Male**
Do your sector plans, policies and activities have Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) incorporated into them?	DRR	Sector plans/policies/ activities	Don't know	0	0	0	0	0
			No	0	3	3	0	25
			Yes	2	9	11	100	75
		Total		2	12	14	100	100
	CCA	Sector plans/policies/ activities	Don't know	0	0	0	0	0
			No	0	9	9	0	75
			Yes	2	3	5	100	25
		Total		2	12	14	100	100

Table xi Implementation status of disaster management plans

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think that the disaster management plans are implemented successfully?	In the process of implementation	2	0	2	100	0
	No	0	6	6	0	50
	Yes	0	6	6	0	50
Total		2	12	14	100	100

Table xii Responsiveness in the event of a disaster

NATIONAL LEVEL					
	Respondents				
	National level focal persons				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**

Do you think that you are sector is prepared to respond in the event of a disaster?	Fully prepared	0	3	3	0	25
	Partially prepared	0	6	6	0	50
	Beginning to prepare	2	3	5	100	25
	Not prepared at all	0	0	0	0	0
Total		2	12	14	100	100

Table xiii Preparedness of *Dzongkhags* after the implementation of the project

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
In your opinion, are the districts now better prepared to deal with the GLOF after the implementation of the project?	Don't know	2	6	8	100	50
	No	0	0	0	0	0
	Yes	0	6	6	0	50
Total		2	12	14	100	100

Table xiv Relevance, effectiveness, efficiency, sustainability, and impact of the awareness and education programs carried out on the risk of a GLOF

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Not relevant	0	3	3	0	25
	Relevant	2	9	11	100	75
Total		2	12	14	100	100
Effectiveness	Highly satisfactory	0	3	3	0	25
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	2	3	5	100	25
	Moderately Unsatisfactory	0	0	0	0	0
	Satisfactory	0	6	6	0	50
	Unsatisfactory	0	0	0	0	0
Total		2	12	14	100	100
Efficiency	Highly satisfactory	0	3	3	0	25
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	0	0	0	0	0
	Moderately unsatisfactory	0	3	3	0	25
	Satisfactory	2	6	8	100	50
	Unsatisfactory	0	0	0	0	0
Total		2	12	14	100	100
Sustainability	Likely	0	6	6	0	50
	Moderately likely	2	6	8	100	50
	Moderately Unlikely	0	0	0	0	0
	Unlikely	0	0	0	0	0

Total		2	12	14	100	100
Impact	Minimal	2	3	5	100	25
	Negligible	0	0	0	0	0
	Significance	0	9	9	0	75
Total		2	12	14	100	100

Table xv Relevance, effectiveness, efficiency, sustainability, and impact of the prevention and mitigation activities carried out on the risk of GLOF

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Not relevant	0	3	3	0	25
	Relevant	2	9	11	100	75
Total		2	12	14	100	100
Effectiveness	Highly satisfactory	0	0	0	0	0
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	2	3	5	100	25
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	0	9	9	0	75
	Unsatisfactory	0	0	0	0	0
Total		2	12	14	100	100
Efficiency	Highly satisfactory	0	3	3	0	25
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	2	3	5	100	25
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	0	6	6	0	50
	Unsatisfactory	0	0	0	0	0
Total		2	12	14	100	100
Sustainability	Likely	0	6	6	0	50
	Moderately likely	2	6	8	100	50
	Moderately Unlikely	0	0	0	0	0
	Unlikely	0	0	0	0	0
Total		2	12	14	100	100
Impact	Minimal	2	6	8	100	50
	Negligible	0	0	0	0	0
	Significance	0	6	6	0	50
Total		2	12	14	100	100

Table xvi Relevance, effectiveness, efficiency, sustainability, and impact of the response capacities

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Not relevant	0	3	3	0	25

	Relevant	2	9	11	100	75
Total		2	12	14	100	100
Effectiveness	Highly satisfactory	0	0	0	0	0
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	2	6	8	100	50
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	0	6	6	0	50
	Unsatisfactory	0	0	0	0	0
Total		2	12	14	100	100
Efficiency	Highly satisfactory	0	0	0	0	0
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	2	6	8	100	50
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	0	6	6	0	50
	Unsatisfactory	0	0	0	0	0
Total		2	12	14	100	100
Sustainability	Likely	0	6	6	0	50
	Moderately likely	0	6	6	0	50
	Moderately Unlikely	0	0	0	0	0
	Unlikely	2	0	2	100	0
Total		2	12	14	100	100
Impact	Minimal	2	9	11	100	75
	Negligible	0	0	0	0	0
	Significance	0	3	3	0	25
Total		2	12	14	100	100

Table xvii Opinions about the occurrence of GLOF

NATIONAL LEVEL						
		Respondents				
		National level focal persons				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think you will not experience GLOF in winter?	No	2	6	8	100	50
	Yes	0	6	6	0	50
Total		2	12	14	100	100

Table xviiiRespondents' profile

PUNAKHA DZONGKHAG			
		Frequency	**Percent**
Gender	Female	5	25.0
	Male	15	75.0
Total		20	100.0
Household head	No	5	25.0
	Yes	15	75.0
Total		20	100.0
WANGDUE PHODRANG DZONGKHAG			

		Frequency	Percent
Gender	Female	0	0
	Male	16	100.0
Total		16	100.0
Household head	No	6	37.5
	Yes	10	62.5
Total		16	100.0
BUMTHAG DZONGKHAG			
		Frequency	**Percent**
Gender	Female	2	16.7
	Male	10	83.3
Total		12	100
Household head	No	3	25.0
	Yes	9	75.0
Total		12	100

7.1.2 *Dzongkhag* and *Gewog* Level Tables

Table xixCount and percentage of *Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members trained in the following training

PUNAKHA DZONGKHAG						
Training		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community-Based Disaster Risk Management (CBDRM)	Yes	4	14	18	80	93
	No	1	1	2	20	7
Total		5	15	20	100	100
Mainstreaming Disaster Risk Reduction (DRR)	Yes	4	12	16	80	80
	No	1	3	4	20	20
Total		5	15	20	100	100
School Disaster Preparedness and Response Training	Yes	4	12	16	80	80
	No	1	3	4	20	20
Total		5	15	20	100	100
Dzong Fire Safety Training	Yes	5	10	15	100	67
	No	0	5	5	0	33
Total		5	15	20	100	100
Others	Yes	5	13	18	100	87
	No	0	2	2	0	13
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
Training		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community-Based Disaster Risk Management (CBDRM)	Yes	0	8	8	0	50
	No	0	8	8	0	50
Total		0	16	16	0	100
Mainstreaming Disaster Risk Reduction (DRR)	Yes	0	7	7	0	44
	No	0	9	9	0	56
Total		0	16	16	0	100
School Disaster Preparedness and Response Training	Yes	0	11	11	0	69
	No	0	5	5	0	31
Total		0	16	16	0	100
Dzong Fire Safety Training	Yes	0	6	6	0	38
	No	0	10	10	0	63
Total		0	16	16	0	100
Others	Yes	0	15	15	0	94
	No	0	1	1	0	6
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
Training		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community-Based Disaster Risk	Yes	1	8	9	50	80

Management (CBDRM)	No	1	2	3	50	20
Total		2	10	12	100	100
Mainstreaming Disaster Risk Reduction (DRR)	Yes	1	6	7	50	60
	No	1	4	5	50	40
Total		2	10	12	100	100
School Disaster Preparedness and Response Training	Yes	2	8	10	100	80
	No	0	2	2	0	20
Total		2	10	12	100	100
Dzong Fire Safety Training	Yes	0	3	3	0	30
	No	2	7	9	100	70
Total		2	10	12	100	100
Others	Yes	1	9	10	50	90
	No	1	1	2	50	10
Total		2	10	12	100	100

Table xxCount and percentage of *Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members who participated in awareness activities

PUNAKHA DZONGKHAG						
Awareness Activities		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Mock drill	Yes	4	7	11	80	47
	No	1	8	9	20	53
Total		5	15	20	100	100
Workshops	Yes	4	6	10	80	40
	No	1	9	10	20	60
Total		5	15	20	100	100
Meetings	Yes	3	7	10	60	47
	No	2	8	10	40	53
Total		5	15	20	100	100
Others	Yes	5	14	19	100	93
	No	0	1	1	0	7
Total		5	15	20	100	100

WANGDUE PHODRANG DZONGKHAG						
Awareness Activities		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Mock drill	No	0	7	7	0	44
	Yes	0	9	9	0	56
Total		0	16	16	0	100
Workshops	No	0	6	6	0	38
	Yes	0	10	10	0	63
Total		0	16	16	0	100
Meetings	No	0	4	4	0	25
	Yes	0	12	12	0	75
Total		0	16	16	0	100
Others	No	0	0	0	0	0
	Yes	0	0	0	0	0

Total		0	0	0	0	0
BUMTHANG DZONGKHAG						
Awareness Activities		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Mock drill	No	0	5	5	0	50
	Yes	2	5	7	100	50
Total		**2**	10	12	100	100
Workshops	No	1	6	7	50	60
	Yes	1	4	5	50	40
Total		2	10	12	100	100
Meetings	No	0	4	4	0	40
	Yes	2	6	8	100	60
Total		**2**	10	10	100	100
Others	No	1	9	10	50	90
	Yes	1	1	2	50	10
Total		2	10	12	100	100

Table xxi Count and percentage of the opinions of *Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee memberson the usefulness of awareness activities

PUNAKHA DZONGKHAG					
	Respondents				
	***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**
Usefulness of Mock drill					
Not relevant	4	5	9	80	33
Not useful	0	0	0	0	0
Useful	0	6	6	0	40
Very useful, relevant and applicable	1	4	5	20	27
Total	5	15	20	100	100
Usefulness of Workshops					
Not relevant	3	4	7	60	27
Not useful	0	0	0	0	0
Useful	1	5	6	20	33
Very useful, relevant and applicable	1	6	7	20	40
Total	5	15	20	100	100
Usefulness of Meetings					
Not relevant	2	5	7	40	33
Not useful	0	0	0	0	0
Useful	1	4	5	20	27
Very useful, relevant and applicable	2	6	8	40	40
Total	5	15	20	100	100
Usefulness of Other Awareness Activities					

Not relevant	5	14	19	100	93
Not useful	0	0	0	0	0
Useful	0	0	0	0	0
Very useful, relevant and applicable	5	14	19	100	93
Total	5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG					
	Respondents				
	***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**
Usefulness of Mock drill					
Not relevant	0	5	5	0	31
Not useful	0	0	0	0	0
Useful	0	5	5	0	31
Very useful, relevant and applicable	0	6	6	0	38
Total	0	16	16	0	100
Usefulness of Workshops					
Not relevant	0	5	5	0	31
Not useful	0	0	0	0	0
Useful	0	4	4	0	25
Very useful, relevant and applicable	0	7	7	0	44
Total	0	16	16	0	100
Usefulness of Meetings					
Not relevant	0	6	6	0	38
Not useful	0	0	0	0	0
Useful	0	5	5	0	31
Very useful, relevant and applicable	0	5	5	0	31
Total	0	16	16	0	100
Usefulness of Other Awareness Activities					
Not relevant	0	0	0	0	0
Not useful	0	0	0	0	0
Useful	0	0	0	0	0
Very useful, relevant and applicable	0	0	0	0	0
Total	0	0	0	0	0
BUMTHANG DZONGKHAG					
	Respondents				
	***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**
Usefulness of Mock drill					

Not relevant	0	5	5	0	50
Not useful	0	0	0	0	0
Useful	2	3	5	100	30
Very useful, relevant and applicable	0	2	2	0	20
Total	2	10	12	100	100
Usefulness of Workshops					
Not relevant	1	6	7	50	60
Not useful	0	0	0	0	0
Useful	1	2	3	50	20
Very useful, relevant and applicable	0	2	2	0	20
Total	2	10	12	100	100
Usefulness of Meetings					
Not relevant	0	4	4	0	40
Not useful	0	0	0	0	0
Useful	2	4	6	100	40
Very useful, relevant and applicable	0	2	2	0	20
Total	2	10	12	100	100
Usefulness of Other Awareness Activities					
Not relevant	1	9	10	50	90
Not useful	0	0	0	0	0
Useful	1	1	2	50	10
Very useful, relevant and applicable	0	0	0	0	0
Total	2	10	12	100	100

Table xxii Count and percentage of *Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee membersable to prioritize, plan and implement measures to reduce human and material losses from potential GLOFs

PUNAKHA DZONGKHAG						
Ability to:		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Prioritize	No	1	4	5	20	27
	Don't know	2	0	2	40	0
	Yes	2	11	13	40	73
Total		5	15	20	100	100
Plan	No	0	5	5	0	33
	Don't know	2	2	4	40	13
	Yes	3	8	11	60	53
Total		5	15	20	100	100
Implement	No	0	5	5	0	33
	Don't know	3	3	6	60	20
	Yes	2	7	9	40	47

Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
Ability to:		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Prioritize	No	0	3	3	0	19
	Don't know	0	3	3	0	19
	Yes	0	10	10	0	63
Total		0	16	16	0	100
Plan	No	0	3	3	0	19
	Don't know	0	1	1	0	6
	Yes	0	12	12	0	75
Total		0	16	16	0	100
Implement	No	0	3	3	0	19
	Don't know	0	6	6	0	38
	Yes	0	7	7	0	44
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
Ability to:		**Respondents**				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Prioritize	No	1	1	2	50	10
	Don't know	0	2	2	0	20
	Yes	1	7	8	50	70
Total		2	10	12	100	100
Plan	No	1	0	1	50	0
	Don't know	0	2	2	0	20
	Yes	1	8	9	50	80
Total		2	10	12	100	100
Implement	No	1	1	2	50	10
	Don't know	0	2	2	0	20
	Yes	1	7	8	50	70
Total		2	10	12	100	100

Table xxiii Count and percentage of *Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members' opinions on whether disaster management guidelines and frameworks support climate change adaptation efforts

PUNAKHA DZONGKHAG						
		Respondents				
		Dzongkhag disaster management focal Persons and *Gewog* disaster management committee members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think that the disaster management guidelines and frameworks support climate change adaptation efforts?	No	0	1	1	0	7
	Don't know	5	3	8	100	20
	Yes	0	11	11	0	73
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						

		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think that the disaster management guidelines and frameworks support climate change adaptation efforts?	No	0	0	0	0	0
	Don't know	0	7	7	0	44
	Yes	0	9	9	0	56
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think that the disaster management guidelines and frameworks support climate change adaptation efforts?	No	0	0	0	0	0
	Don't know	0	5	5	0	50
	Yes	2	5	7	100	50
Total		2	10	12	100	100

Table xxivRespondents' profile

GASA DZONGKHAG			
		Frequency	**Percent**
Gender	Female	2	18.2
	Male	9	81.8
Total		11	100.0
Literacy	Illiterate	0	0
	Literate	11	100.0
Total		11	100.0

Table xxvParticipation in disaster related awareness workshop

GASA DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Have you participated in disaster related awareness workshop?	No	2	9	11	100	100
	Yes	0	0	0	0	0
Total		2	9	11	100	100
Have you participated in GLOF and early warning sensitization training/workshop?	No	2	9	11	100	100
	Yes	0	0	0	0	0
Total		2	9	11	100	100
Have you participated in any mock drill?	No	2	9	11	100	100
	Yes	0	0	0	0	0

Total		2	9	11	100	100
Have you attended any training or workshops outside Bhutan?	No	2	9	11	100	100
	Yes	0	0	0	0	0
Total		2	9	11	100	100
Have you been trained in CBDRM?	No	2	9	11	100	100
	Yes	0	0	0	0	0
Total		2	9	11	100	100

Table xxviDisaster management plans in place

GASA DZONGKHAG					
	Respondents				
	***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**
Community DMP	2	5	7	100	56
Gewog DMP	0	3	3	0	33
Dzongkhag DMP	0	1	1	0	11
Total	2	9	11	100	100

Table xxviiRequirements of women and disaster management plans

GASA DZONGKHAG						
		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
In your opinion, does the disaster management plan address the requirements of women adequately?	No	2	1	3	100	11
	Don't know	0	1	1	0	11
	Yes	0	7	7	0	78
Total		2	9	11	100	100
Do you think that the guidelines and frameworks support the climate change adaptation efforts?	No	2	2	4	100	22
	Don't know	0	3	3	0	33
	Yes	0	4	4	0	44
Total		2	9	11	100	100
Do the disaster management plans consider long term climate risk?	No	2	2	4	100	22
	Don't know	0	2	2	0	22
	Yes	0	5	5	0	56
Total		2	9	11	100	100
Do you know how to address long term climate risk?	No	2	1	3	100	11
	Don't know	0	2	2	0	22
	Yes	0	6	6	0	67
Total		2	9	11	100	100
Do you think that you will be able to prioritize, plan and implement measure to reduce human and material losses from potential GLOF?	No	2	2	4	100	22
	Don't know	0	1	1	0	11
	Yes	0	6	6	0	67

Total		2	9	11	100	100
Were the trainings and workshops relevant to your functions or community needs?	No	2	3	5	100	33
	Don't know	0	0	0	0	0
	Yes	0	6	6	0	67
Total		2	9	11	100	100
Was the district/community GLOF risk assessment conducted?	No	2	3	5	100	33
	Don't know	0	4	4	0	44
	Yes	0	2	2	0	22
Total		2	9	11	100	100
Are you aware of the GLOF hazard zonation for your district/community?	No	2	2	4	100	22
	Don't know	0	2	2	0	22
	Yes	0	5	5	0	56
Total		2	9	11	100	100
In the high risk zones, are people still constructing new houses for settlement?	No	0	0	0	0	0
	Don't know	0	0	0	0	0
	Yes	2	9	11	100	100
Total		2	9	11	100	100
Do you think that people are better prepared to deal with natural disaster than 3 years ago?	No	2	3	5	100	33
	Don't know	0	3	3	0	33
	Yes	0	3	3	0	33
Total		2	9	11	100	100
Are there any long term prevention strategies for GLOF in the district work plan?	No	2	2	4	100	22
	Don't know	0	4	4	0	44
	Yes	0	3	3	0	33
Total		2	9	11	100	100

Table xxviiiDisaster management plans in place

GASA DZONGKHAG						
		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Disaster management bill	Yes	0	1	1	0	11
	No	2	4	6	100	44
	Don't know	0	3	3	0	33
	Not applicable	0	1	1	0	11
Total		2	9	11	100	100
CBDRM	Yes	0	3	3	0	33
	No	2	4	6	100	44
	Don't know	0	2	2	0	22
	Not applicable	0	0	0	0	0
Total		2	9	11	100	100
Gewog disaster management plan	Yes	0	2	2	0	22
	No	2	5	7	100	56
	Don't know	0	2	2	0	22

	Not applicable	0	0	0	0	0
Total		2	9	11	100	100
Dzongkhag disaster management plan	Yes	0	2	2	0	22
	No	2	5	7	100	56
	Don't know	0	2	2	0	22
	Not applicable	0	0	0	0	0
Total		2	9	11	100	100
Schooldisaster management plan	Yes	0	5	5	0	56
	No	2	2	4	100	22
	Don't know	0	2	2	0	22
	Not applicable	0	0	0	0	0
Total		2	9	11	100	100
Sectordisaster management plan	Yes	0	3	3	0	33
	No	2	3	5	100	33
	Don't know	0	3	3	0	33
	Not applicable	0	0	0	0	0
Total		2	9	11	100	100
Any others	Yes	0	0	0	0	0
	No	2	7	9	100	78
	Don't know	0	2	2	0	22
	Not applicable	0	0	0	0	0
Total		2	9	11	100	100

Table xxixParticipation in the development of disaster management plans

GASA DZONGKHAG						
		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Have you taken part in the development of any disaster management plans?	No	2	4	6	100	44
	Don't know	0	0	0	0	0
	Yes	0	5	5	0	56
Total		2	9	11	100	100
Do you think such plans are useful?	No	2	0	2	100	0
	Don't know	0	2	2	0	22
	Yes	0	7	7	0	78
Total		2	9	11	100	100
Do you think that the plans are implemented successfully?	No	2	2	4	100	22
	Don't know	0	4	4	0	44
	Yes	0	3	3	0	33
Total		2	9	11	100	100

Table xxx Responsiveness in the event of a disaster

GASA DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Do you think that your *Dzongkhag*/*Gewog*/sector is prepared to respond in the event of a disaster?	Fully prepared	0	3	3	0	33
	Partially prepared	0	4	4	0	44
	Beginning to prepare	0	1	1	0	11
	Not prepared at all	0	0	0	0	0
	Don't know	2	1	3	100	11
Total		2	9	11	100	100

Table xxxiAwareness on National Disaster Risk Management Framework (NDRMF)

GASA DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of the National Disaster Risk Management Framework?	Missing	0	0	0	0	0
	No	1	6	7	50	67
	Not applicable	0	0	0	0	0
	Yes	1	3	4	50	33
Total		2	9	11	100	100
Are you aware of the district hazard zonation map for GLOF?	Missing	0	0	0	0	0
	No	0	5	5	0	56
	Don't know	0	0	0	0	0
	Yes	2	4	6	100	44
Total		2	9	11	100	100
Are you aware of the circular on land use based on the *Dzongkhag* hazard zonation map for GLOF?	Missing	0	0	0	0	0
	No	0	3	3	0	33
	Don't know	0	0	0	0	0
	Yes	2	6	8	100	67
Total		2	9	11	100	100
Are you aware of the early warning systems being installed?	Missing					
	No	0	1	1	0	11
	Don't know	0	0	0	0	0
	Yes	2	8	10	100	89
Total		2	9	11	100	100
Did the committee identify safe evacuation area for the community?	Missing	0	0	0	0	0
	No	0	4	4	0	44
	Don't know	0	1	1	0	11
	Yes	2	4	6	100	44
Total		2	9	11	100	100

Table xxxiiIncorporation of long-term climate risk planning into ongoing DRM responsibilities

PUNAKHA DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Do you incorporate long-term climate risk planning into your ongoing DRM responsibilities in your project areas?	No	1	5	6	20	33
	Don't know	4	6	10	80	40
	Yes	0	4	4	0	27
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Do you incorporate long-term climate risk planning into your ongoing DRM responsibilities in your project areas?	No	0	6	6	0	38
	Don't know	0	4	4	0	25
	Yes	0	6	6	0	38
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Do you incorporate long-term climate risk planning into your ongoing DRM responsibilities in your project areas?	No	0	1	1	0	10
	Don't know	1	8	9	50	80
	Yes	1	1	2	50	10
Total		2	10	12	100	100

Table xxxiiiDisaster management plans in place

PUNAKHA DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Community DMP	Missing	0	0	0	0	0
	No	0	4	4	0	27
	Don't know	3	4	7	60	27
	Yes	2	7	9	40	47
Total		5	15	20	100	100
Gewog DMP	Missing	0	0	0	0	0
	No	1	4	5	20	27
	Don't know	2	7	9	40	47

	Yes	2	4	6	40	27
Total		5	15	20	100	100
Dzongkhag DMP	Missing	0	0	0	0	0
	No	0	3	3	0	20
	Don't know	3	8	11	60	53
	Yes	2	4	6	40	27
Total		5	15	20	100	100

WANGDUE PHODRANG DZONGKHAG

		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community DMP	Missing	0	3	3	0	19
	No	0	5	5	0	31
	Don't know	0	3	3	0	19
	Yes	0	5	5	0	31
Total		0	16	16	0	100
Gewog DMP	Missing	0	5	5	0	31
	No	0	4	4	0	25
	Don't know	0	3	3	0	19
	Yes	0	4	4	0	25
Total		0	16	16	0	100
Dzongkhag DMP	Missing	0	4	4	0	25
	No	0	2	2	0	13
	Don't know	0	3	3	0	19
	Yes	0	7	7	0	44
Total		0	16	16	0	100

BUMTHANG DZONGKHAG

		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community DMP	Missing	0	1	1	0	10
	No	1	4	5	50	40
	Don't know	1	1	2	50	10
	Yes	0	4	4	0	40
Total		2	10	12	100	100
Gewog DMP	Missing	0	3	3	0	30
	No	1	6	7	50	60
	Don't know	1	1	2	50	10
	Yes	0	0	0	0	0
Total		2	10	12	100	100
Dzongkhag DMP	Missing	0	2	2	0	20
	No	0	4	4	0	40
	Don't know	0	1	1	0	10
	Yes	2	3	5	100	30
Total		2	10	12	100	100

Table xxxivAwareness of roles and responsibilities in a disaster situation

PUNAKHA DZONGKHAG						
		Respondents				
		Dzongkhag disaster management focal Persons and *Gewog* disaster management committee members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of your roles and responsibilities in a disaster situation?	No	2	1	3	40	7
	Can't say	2	7	9	40	47
	Yes	1	7	8	20	47
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Dzongkhag disaster management focal Persons and *Gewog* disaster management committee members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of your roles and responsibilities in a disaster situation?	No	0	2	2	0	13
	Can't say	0	2	2	0	13
	Yes	0	12	12	0	75
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
		Respondents				
		Dzongkhag disaster management focal Persons and *Gewog* disaster management committee members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of your roles and responsibilities in a disaster situation?	No	0	0	0	0	0
	Can't say	0	4	4	0	40
	Yes	2	6	8	100	60
Total		2	10	12	100	100

Table xxxvAssessment of to what extent the needs of different groups are addressed

PUNAKHA DZONGKHAG						
Needs of:		Respondents				
		Dzongkhag disaster management focal Persons and *Gewog* disaster management committee members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Men	Don't know	0	0	0	0	0
	Fully addressed	3	8	11	60	53
	Not at all addressed	2	3	5	40	20
	Partially addressed	0	4	4	0	27
Total		5	15	20	100	100
Women	Don't know	0	0	0	0	0
	Fully addressed	1	5	6	20	33
	Not at all addressed	2	3	5	40	20
	Partially addressed	2	7	9	40	47
Total		5	15	20	100	100
Boys	Don't know	0	0	0	0	0
	Fully addressed	0	8	8	0	53
	Not at all addressed	3	3	6	60	20

	Partially addressed	2	4	6	40	27
Total		5	15	20	100	100
Girls	Don't know	0	0	0	0	0
	Fully addressed	0	5	5	0	33
	Not at all addressed	3	3	6	60	20
	Partially addressed	2	7	9	40	47
Total		5	15	20	100	100

WANGDUE PHODRANG DZONGKHAG

Needs of:		**Respondents** ***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Men	Don't know	0	2	2	0	13
	Fully addressed	0	9	9	0	56
	Not at all addressed	0	2	2	0	13
	Partially addressed	0	3	3	0	19
Total		0	16	16	0	100
Women	Don't know	0	2	2	0	13
	Fully addressed	0	5	5	0	31
	Not at all addressed	0	3	3	0	19
	Partially addressed	0	6	6	0	38
Total		0	16	16	0	100
Boys	Don't know	0	2	2	0	13
	Fully addressed	0	8	8	0	50
	Not at all addressed	0	3	3	0	19
	Partially addressed	0	3	3	0	19
Total		0	16	16	0	100
Girls	Don't know	0	2	2	0	13
	Fully addressed	0	5	5	0	31
	Not at all addressed	0	4	4	0	25
	Partially addressed	0	5	5	0	21
Total		0	16	16	0	100

BUMTHANG DZONGKHAG

Needs of:		**Respondents** ***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Men	Don't know	0	2	2	0	20
	Fully addressed	2	6	8	100	60
	Not at all addressed	0	0	0	0	0
	Partially addressed	0	2	2	0	20
Total		2	10	12	100	100
Women	Don't know	0	2	2	0	20
	Fully addressed	2	1	3	100	10
	Not at all addressed	0	1	1	0	10
	Partially addressed	0	6	6	0	60
Total		2	10	12	100	100
Boys	Don't know	0	2	2	0	20
	Fully addressed	2	4	6	100	40
	Not at all addressed	0	0	0	0	0

	Partially addressed	0	4	4	0	40
Total		2	10	12	100	100
Girls	Don't know	0	2	2	0	20
	Fully addressed	2	2	4	100	20
	Not at all addressed					
	Partially addressed	0	6	6	0	60
Total		2	10	12	100	100

Table xxxviAwareness level of vulnerability and risk assessment

PUNAKHA DZONGKHAG						
		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
How do you rate the awareness level of vulnerability and risk assessment in your community after the implementation of the project?	Missing	0	1	1	0	7
	High	1	7	8	20	47
	Medium	2	6	8	40	40
	Low	2	1	3	40	7
	Same as before	0	0	0	0	0
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
How do you rate the awareness level of vulnerability and risk assessment in your community after the implementation of the project?	Missing	0	3	3	0	19
	High	0	6	6	0	38
	Medium	0	6	6	0	38
	Low	0	1	1	0	6
	Same as before	0	0	0	0	0
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
		Respondents				
		***Dzongkhag* disaster management focal Persons and *Gewog* disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
How do you rate the awareness level of vulnerability and risk assessment in your community after the implementation of the project?	Missing	0	3	3	0	30
	High	1	3	4	50	30
	Medium	1	4	5	50	40
	Low	0	0	0	0	0
	Same as before	0	0	0	0	0
Total		2	10	12	100	100

Table xxxviiiLevel of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA

PUNAKHA DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Your level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA?	Missing	0	1	1	0	7
	High	0	6	6	0	40
	Medium	2	7	9	40	47
	Low	3	1	4	60	7
	Same as before	0	0	0	0	0
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Your level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA?	Missing	0	0	0	0	0
	High	0	9	9	0	56
	Medium	0	5	5	0	31
	Low	0	2	2	0	13
	Same as before	0	0	0	0	0
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
		Respondents				
		Dzongkhag **disaster management focal Persons and** ***Gewog*** **disaster management committee members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Your level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA?	Missing	0	3	3	0	30
	High	1	1	2	50	10
	Medium	1	6	7	50	60
	Low	0	0	0	0	0
	Same as before	0	0	0	0	0
Total		2	10	12	100	100

Table xxxviii*Dzongkhag* incorporating Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into its annual and 5-year plans

PUNAKHA DZONGKHAG								
				Respondents				
				***Dzongkhag* disaster management focal Persons**				
				Gender (counts)		**Total**	**%**	
				Female	**Male**		**Female**	**Male**
Does your *Dzongkhag* incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?	DRR	Annual Plan	Don't know	0	0	0	0	0
			No	3	6	9	60	40
			Yes	2	9	11	40	60
		Total		5	15	20	100	100
		Five-Year Plan	Don't know	0	0	0	0	0
			No	1	8	9	20	53
			Yes	4	7	11	80	47
		Total		5	15	20	100	100
	CCA	Annual Plan	Don't know	0	0	0	0	0
			No	4	8	12	80	53
			Yes	1	7	8	20	47
		Total		5	15	20	100	100
		Five-Year Plan	Don't know	0	0	0	0	0
			No	2	10	12	40	67
			Yes	3	5	8	60	33
Total				5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG								
				Respondents				
				***Dzongkhag* disaster management focal Persons**				
				Gender (counts)		**Total**	**%**	
				Female	**Male**		**Female**	**Male**
Does your *Dzongkhag* incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?	DRR	Annual Plan	Don't know	0	2	2	0	13
			No	0	1	1	0	6
			Yes	0	13	13	0	81
		Total		0	16	16	0	100
		Five-Year Plan	Don't know	0	5	5	0	31
			No	0	4	4	0	25
			Yes	0	7	7	0	44
		Total		0	16	16	0	100
	CCA	Annual Plan	Don't know	0	2	2	0	13
			No	0	1	1	0	6
			Yes	0	13	13	0	81
		Total		0	16	16	0	100

		Five-Year Plan	Don't know	0	5	5	0	31
			No	0	4	4	0	25
			Yes	0	7	7	0	44
Total				0	16	16	0	100
BUMTHANG DZONGKHAG								
				Respondents				
				***Dzongkhag* disaster management focal Persons**				
				Gender (counts)		**Total**	**%**	
				Female	**Male**		**Female**	**Male**
Does your *Dzongkhag* incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?	DRR	Annual Plan	Don't know	0	3	3	0	30
			No	0	2	2	0	20
			Yes	2	5	7	100	50
		Total		2	10	12	100	100
		Five-Year Plan	Don't know	1	5	6	50	50
			No	0	1	1	0	10
			Yes	1	4	5	50	40
		Total		2	10	12	100	100
	CCA	Annual Plan	Don't know	0	3	3	0	30
			No	0	3	3	0	30
			Yes	2	4	6	100	40
		Total		2	10	12	100	100
		Five-Year Plan	Don't know	1	5	6	50	50
			No	0	2	2	0	20
			Yes	1	3	4	50	30
Total				2	10	12	100	100

Table xxxix*Gewog* incorporating Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into its annual and 5-year plans

PUNAKHA DZONGKHAG			
	Respondents		
	***Gewog* disaster management committee members**		
	Gender (counts)	**Total**	**%**
	Female	**Male**		**Female**	**Male**

Does your *Gewog*incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?	DRR	Annual Plan	Don't know	0	0	0	0	0
			No	3	7	10	60	47
			Yes	2	8	10	40	53
		Total		5	15	20	100	100
		Five-Year Plan	Don't know	0	0	0	0	0
			No	2	10	12	40	67
			Yes	3	5	8	60	33
		Total		5	15	20	100	100
	CCA	Annual Plan	Don't know	0	0	0	0	0
			No	4	7	11	80	47
			Yes	1	8	9	20	53
		Total		5	15	20	100	100
		Five-Year Plan	Don't know	0	0	0	0	0
			No	4	11	15	80	73
			Yes	1	4	5	20	27
Total				5	15	20	100	100

WANGDUE PHODRANG DZONGKHAG

				Respondents				
				***Gewog* disaster management committee members**				
				Gender (counts)		**Total**	**%**	
				Female	**Male**		**Female**	**Male**
Does your *Dzongkhag* incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?	DRR	Annual Plan	Don't know	0	7	7	0	44
			No	0	0	0	0	0
			Yes	0	9	9	0	56
		Total		0	16	16	0	100
		Five-Year Plan	Don't know	0	8	8	0	50
			No	0	3	3	0	19
			Yes	0	5	5	0	31
		Total		0	16	16	0	100
	CCA	Annual Plan	Don't know	0	7	7	0	44
			No	0	0	0	0	0
			Yes	0	9	9	0	56
		Total		0	16	16	0	100
		Five-Year Plan	Don't know	0	8	8	0	50
			No	0	3	3	0	19
			Yes	0	5	5	0	31
Total				0	16	16	0	100

BUMTHANG DZONGKHAG								
				Respondents				
				Gewog disaster management committee members				
				Gender (counts)		Total	%	
				Female	Male		Female	Male
Does your *Dzongkhag* incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?	DRR	Annual Plan	Don't know	1	5	6	50	50
			No	0	2	2	0	20
			Yes	1	3	4	50	30
		Total		2	10	12	100	100
		Five-Year Plan	Don't know	2	7	9	100	70
			No	0	1	1	0	10
			Yes	0	2	2	0	20
		Total		2	10	12	100	100
	CCA	Annual Plan	Don't know	1	5	6	50	50
			No	0	3	3	0	30
			Yes	1	2	3	50	20
		Total		2	10	12	100	100
		Five-Year Plan	Don't know	2	6	8	100	60
			No	0	2	2	0	20
			Yes	0	2	2	0	20
Total				2	10	12	100	100

Table xlrelevance, effectiveness, efficiency, sustainability, and impact of the awareness and education programs carried out on the risk of a GLOF

PUNAKHA DZONGKHAG							
		Respondents					
		Dzongkhag focal persons and *Gewog* community members					
		Gender (counts)		Total	%		
		Female	Male		Female	Male	
Relevance	Missing	0	1	1	0	7	
	Not relevant	0	0	0	0	0	
	Relevant	5	14	19	100	93	
Total		5	15	20	100	100	
Effectiveness	Missing	0	1	1	0	7	
	Highly satisfactory	0	5	5	0	33	
	Highly unsatisfactory	0	0	0	0	0	
	Moderately satisfactory	1	2	3	20	13	
	Moderately Unsatisfactory	1	0	1	20	0	
	Satisfactory	3	7	10	60	47	
	Unsatisfactory	0	0	0	0	0	
Total		5	15	20	100	100	

Efficiency	Missing	0	1	1	0	7
	Highly satisfactory	0	5	5	0	33
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	2	4	6	40	27
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	2	5	7	40	33
	Unsatisfactory	1	0	1	20	0
Total		5	15	20	100	100
Sustainability	Missing	0	1	1	0	7
	Likely	2	5	7	40	33
	Moderately likely	3	8	11	60	53
	Moderately Unlikely	0	1	1	0	7
	Unlikely	0	0	0	0	0
Total		5	15	20	100	100
Impact	Missing	0	1	1	0	7
	Minimal	2	6	8	40	40
	Negligible	0	1	1	0	7
	Significance	3	7	10	60	47
Total		5	15	20	100	100

WANGDUE PHODRANG DZONGKHAG

		Respondents				
		***Dzongkhag* focal persons and *Gewog* community members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	2	2	0	13
	Not relevant	0	1	1	0	6
	Relevant	0	13	13	0	81
Total		0	16	16	0	100
Effectiveness	Missing	0	2	2	0	13
	Highly satisfactory	0	5	5	0	31
	Highly unsatisfactory	0	1	1	0	6
	Moderately satisfactory	0	5	5	0	31
	Satisfactory	0	3	3	0	19
	Unsatisfactory	0	0	0	0	0
Total		0	16	16	0	100
Efficiency	Missing	0	2	2	0	13
	Highly satisfactory	0	6	6	0	38
	Highly unsatisfactory	0	1	1	0	6
	Moderately satisfactory	0	3	3	0	19
	Moderately unsatisfactory	0	1	1	0	6
	Satisfactory	0	3	3	0	19
	Unsatisfactory	0	0	0	0	0

Total		0	16	16	0	100
Sustainability	Missing	0	2	2	0	13
	Likely	0	6	6	0	38
	Moderately likely	0	4	4	0	25
	Moderately Unlikely	0	2	2	0	13
	Unlikely	0	2	2	0	13
Total		0	16	16	0	100
Impact	Missing	0	2	2	0	13
	Minimal	0	5	5	0	31
	Negligible	0	1	1	0	6
	Significance	0	8	8	0	50
Total		0	16	16	0	100
BUMTAHNG DZONGKHAG						
		Respondents				
		***Dzongkhag* focal persons and *Gewog* community members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	2	2	0	20
	Not relevant	0	0	0	0	0
	Relevant	2	8	10	100	80
Total		2	10	12	100	100
Effectiveness	Missing	0	2	2	0	20
	Highly satisfactory	0	1	1	0	10
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	1	1	2	50	10
	Satisfactory	1	6	7	50	60
	Unsatisfactory	0	0	0	0	0
Total		2	10	12	100	100
Efficiency	Missing	0	2	2	0	20
	Highly satisfactory	0	0	0	0	0
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	1	2	3	50	20
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	1	6	7	50	60
	Unsatisfactory					
Total		2	10	12	100	100
Sustainability	Missing	0	2	2	0	20
	Likely	1	5	6	50	50
	Moderately likely	1	3	4	50	30
	Moderately Unlikely	0	0	0	0	0
	Unlikely	0	0	0	0	0
Total		2	10	12	100	100
Impact	Missing	0	2	2	0	20
	Minimal	1	2	3	50	20
	Negligible	0	0	0	0	0
	Significance	1	6	7	50	60

Total		2	10	12	100	100

Table xlirelevance, effectiveness, efficiency, sustainability, and impact of the prevention and mitigation activities carried out on the risk of GLOF

PUNAKHA DZONGKHAG						
		Respondents				
		***Dzongkhag* focal persons and *Gewog* community members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	1	1	0	7
	Not relevant	1	0	1	20	0
	Relevant	4	14	18	80	93
Total		5	15	20	100	100
Effectiveness	Missing	0	1	1	0	7
	Highly satisfactory	0	5	5	0	33
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	3	4	7	60	27
	Moderately unsatisfactory	0	1	1	0	7
	Satisfactory	2	4	6	40	27
	Unsatisfactory	0	0	0	0	0
Total		5	15	20	100	100
Efficiency	Missing	0	1	1	0	7
	Highly satisfactory	0	3	3	0	20
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	2	3	5	40	20
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	3	8	11	60	53
	Unsatisfactory	0	0	0	0	0
Total		5	15	20	100	100
Sustainability	Missing	0	1	1	0	7
	Likely	1	4	5	20	27
	Moderately likely	4	9	13	80	60
	Moderately Unlikely	0	1	1	0	7
	Unlikely	0	0	0	0	0
Total		5	15	20	100	100
Impact	Missing	0	1	1	0	7
	Minimal	3	4	7	60	27
	Negligible	0	1	1	0	7
	Significance	2	9	11	40	60
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		***Dzongkhag* focal persons and *Gewog* community members**				

		Gender (counts)		Total	%	
		Female	Male		Female	Male
Relevance	Missing	0	2	2	0	13
	Not relevant	0	1	1	0	6
	Relevant	0	13	13	0	81
Total		0	16	16	0	100
Effectiveness	Missing	0	2	2	0	13
	Highly satisfactory	0	4	4	0	25
	Highly unsatisfactory	0	1	1	0	6
	Moderately satisfactory	0	3	3	0	19
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	0	6	6	0	38
	Unsatisfactory	0	0	0	0	0
Total		0	16	16	0	100
Efficiency	Missing	0	2	2	0	13
	Highly satisfactory	0	6	6	0	38
	Highly unsatisfactory	0	1	1	0	6
	Moderately satisfactory	0	3	3	0	19
	Moderately unsatisfactory	0	1	1	0	6
	Satisfactory	0	3	3	0	19
	Unsatisfactory	0	0	0	0	0
Total		0	16	16	0	100
Sustainability	Missing	0	2	2	0	13
	Likely	0	7	7	0	44
	Moderately likely	0	5	5	0	31
	Moderately Unlikely	0	1	1	0	6
	Unlikely	0	1	1	0	6
Total		0	16	16	0	100
Impact	Missing	0	2	2	0	13
	Minimal	0	3	3	0	19
	Negligible	0	2	2	0	13
	Significance	0	9	9	0	56
Total		0	16	16	0	100

BUMTHANG DZONGKHAG

		Respondents				
		Dzongkhag **focal persons and** ***Gewog*** **community members**				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Relevance	Missing	0	2	2	0	20
	Not relevant	0	0	0	0	0
	Relevant	2	8	10	100	80
Total		2	10	12	100	100

Effectiveness	Missing	0	2	2	0	20
	Highly satisfactory	0	1	1	0	10
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	1	2	3	50	20
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	1	5	6	50	50
	Unsatisfactory	0	0	0	0	0
Total		2	10	12	100	100
Efficiency	Missing	0	2	2	0	20
	Highly satisfactory	0	1	1	0	10
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	1	2	3	50	20
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	1	5	6	50	50
	Unsatisfactory	0	0	0	0	0
Total		2	10	12	100	100
Sustainability	Missing	0	2	2	0	20
	Likely	1	3	4	50	30
	Moderately likely	1	5	6	50	50
	Moderately Unlikely	0	0	0	0	0
	Unlikely	0	0	0	0	0
Total		2	10	12	100	100
Impact	Missing	0	2	2	0	20
	Minimal	1	4	5	50	40
	Negligible	0	0	0	0	0
	Significance	1	4	5	50	40
Total		2	10	12	100	100

Table xliirelevance, effectiveness, efficiency, sustainability, and impact of the response capacities

PUNAKHA DZONGKHAG						
		Respondents				
		***Dzongkhag* focal persons and *Gewog* community members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	1	1	0	7
	Not relevant	0	0	0	0	0
	Relevant	5	14	19	100	93
Total		5	15	20	100	100
Effectiveness	Missing	0	1	1	0	7
	Highly satisfactory	1	5	6	20	33
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	3	3	6	60	20
	Moderately unsatisfactory	0	1	1	0	7
	Satisfactory	1	5	6	20	33

	Unsatisfactory	0	0	0	0	0
Total		5	15	20	100	100
Efficiency	Missing	0	1	1	0	7
	Highly satisfactory	1	3	4	20	20
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	3	3	6	60	20
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	1	8	9	20	53
	Unsatisfactory	0	0	0	0	0
Total		5	15	20	100	100
Sustainability	Missing	0	1	1	0	7
	Likely	1	5	6	20	33
	Moderately likely	4	8	12	80	53
	Moderately Unlikely	0	1	1	0	7
	Unlikely	0	0	0	0	0
Total		5	15	20	100	100
Impact	Missing	0	1	1	0	7
	Minimal	3	4	7	60	27
	Negligible	0	0	0	0	0
	Significance	2	10	12	40	67
Total		5	15	20	100	100

WANGDUE PHODRANG DZONGKHAG

		Respondents				
		***Dzongkhag* focal persons and *Gewog* community members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	2	2	0	13
	Not relevant	0	1	1	0	6
	Relevant	0	13	13	0	81
Total		0	16	16	0	100
Effectiveness	Missing	0	2	2	0	13
	Highly satisfactory	0	4	4	0	25
	Highly unsatisfactory	0	1	1	0	6
	Moderately satisfactory	0	3	3	0	19
	Satisfactory	0	6	6	0	38
	Unsatisfactory	0	0	0	0	0
Total		0	16	16	0	100
Efficiency	Missing	0	2	2	0	13
	Highly satisfactory	0	5	5	0	31
	Highly unsatisfactory	0	1	1	0	6
	Moderately satisfactory	0	2	2	0	13
	Moderately unsatisfactory	0	1	1	0	6
	Satisfactory	0	5	5	0	31

	Unsatisfactory	0	0	0	0	0
Total		0	16	16	0	100
Sustainability	Missing	0	2	2	0	13
	Likely	0	7	7	0	44
	Moderately likely	0	4	4	0	25
	Moderately unlikely	0	1	1	0	6
	Unlikely	0	2	2	0	13
Total		0	16	16	0	100
Impact	Missing	0	2	2	0	13
	Minimal	0	5	5	0	31
	Negligible	0	2	2	0	14
	Significance	0	7	7	0	44
Total		0	16	16	0	100

BUMTHANG DZONGKHAG

		Respondents				
		***Dzongkhag* focal persons and *Gewog* community members**				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	2	2	0	20
	Not relevant	0	0	0	0	0
	Relevant	2	8	10	100	80
Total		2	10	12	100	100
Effectiveness	Missing	0	2	2	0	20
	Highly satisfactory	0	1	1	0	10
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	1	2	3	50	20
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	1	5	6	50	50
	Unsatisfactory					
Total		2	10	12	100	100
Efficiency	Missing	0	2	2	0	20
	Highly satisfactory	0	0	0	0	0
	Highly unsatisfactory	0	0	0	0	0
	Moderately satisfactory	1	1	2	50	10
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	1	7	8	50	70
	Unsatisfactory					
Total		2	10	12	100	100
Sustainability	Missing	0	2	2	0	20
	Likely	1	3	4	50	30
	Moderately likely	1	5	6	50	50
	Moderately Unlikely	0	0	0	0	0
	Unlikely	0	0	0	0	0
Total		2	10	12	100	100

Impact	Missing	0	2	2	0	20
	Minimal	1	3	4	50	30
	Negligible	0	0	0	0	0
	Significance	1	5	6	50	50
Total		2	10	12	100	100

Table xliiiOpinions about the occurrence of GLOF

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think you will not experience GLOF in winter?	Missing	0	1	1	0	7
	No	0	1	1	0	7
	Don't know	5	10	15	100	67
	Yes	0	3	3	0	20
Total		5	15	20	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think you will not experience GLOF in winter?	Missing	0	1	1	0	6
	No	0	9	9	0	56
	Don't know	0	5	5	0	31
	Yes	0	1	1	0	6
Total		0	16	16	0	100
BUMTHANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think you will not experience GLOF in winter?	Missing	0	2	2	0	20
	No	2	2	4	100	20
	Don't know	0	5	5	0	50
	Yes	0	1	1	0	10
Total		2	10	12	100	100

7.1.3 Community Level Tables

Table xliv Respondents' profile

PUNAKHA DZONGKHAG			
Gender		**Frequency**	**Percent**
	Female	57	67.1
	Male	28	32.9
Total		85	100.0
Age group	18 – 24	12	14.1
	25 – 34	20	23.5
	35 – 44	19	22.4
	45 – 54	16	18.8
	55 – 64	10	11.8
	65 – 74	7	8.2
	75 – 84	1	1.2
	85 +	0	0
Total		85	100.0
Household head	No	41	48.2
	Yes	44	51.8
Total		85	100.0
Profession	Business	22	25.9
	Civil servant	8	9.4
	Farmer	36	42.4
	House wife	0	0
	Student	17	20.0
	Trainee	2	2.4
	Other	0	0
Total		85	100.0
Marital status	Divorce	4	4.7
	Married	63	74.1
	Single	18	21.2
Total		85	100.0
Literacy	Illiterate	42	49.4
	Literate	43	50.6
Total		85	100.0
WANGDUE PHODRANG DZONGKHAG			
Gender		**Frequency**	**Percent**
	Female	53	48.6
	Male	56	51.4
Total		109	100.0
Age group	18 – 24	27	25
	25 – 34	38	35
	35 – 44	27	25
	45 – 54	10	9
	55 – 64	5	5
	65 – 74	1	1
	75 – 84		

	85 +	1	1
Total		109	100
Household head	No	50	46
	Yes	59	54
Total		109	100
Profession	Business	24	22
	Civil servant	11	10
	Farmer	26	24
	House wife	10	9
	Student	26	24
	Trainee	1	1
	Other	11	10
Total		109	100.0
Marital status	Divorce	3	3
	Married	71	65
	Single	35	32
Total		109	100
Literacy	Illiterate	35	32
	Literate	74	68
Total		109	100
BUMTAHNG DZONGKHAG			
Gender		**Frequency**	**Percent**
	Female	48	56.5
	Male	37	43.5
Total		85	100.0
Age group	18 – 24	4	4.7
	25 – 34	38	44.7
	35 – 44	16	18.8
	45 – 54	12	14.1
	55 – 64	11	12.9
	65 – 74	2	2.4
	75 – 84	2	2.4
	85 +	0	0
Total		85	100.0
Household head	No	37	43.5
	Yes	48	56.5
Total		85	100.0
Profession	Business	12	14.1
	Civil servant	2	2.4
	Farmer	56	65.9
	House wife	11	12.9
	Student	4	4.7
	Trainee	0	0
	Other	0	0
Total		85	100.0

Marital status	Divorce	0	0
	Married	76	89.4
	Single	9	10.6
Total		85	100.0
Literacy	Illiterate	47	55.3
	Literate	38	44.7
Total		85	100.0

Table xlvCount and percentage of community members trained in the following training

PUNAKHA DZONGKHAG						
Training		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community-Based Disaster Risk Management (CBDRM)	No	25	13	38	44	46
	Yes	32	15	47	56	54
Total		57	28	85	100	100
School Disaster Preparedness and Response Training	No	48	23	71	84	82
	Yes	9	5	14	16	18
Total		57	28	85	100	100
Dzong Fire Safety Training	No	54	23	77	95	82
	Yes	3	5	8	5	18
Total		57	28	85	100	100
Others	No					
	Yes					
Total						
WANGDUE PHODRANG DZONGKHAG						
Training		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community-Based Disaster Risk Management (CBDRM)	No	14	15	29	26	27
	Yes	39	41	80	74	73
Total		53	56	109	100	100
School Disaster Preparedness and Response Training	No	11	14	25	21	25
	Yes	42	42	84	79	75
Total		53	56	109	100	100
Dzong Fire Safety Training	No	1	6	7	2	11
	Yes	52	50	102	98	89
Total		53	56	109	100	100
Others	No	52	56	11	98	100
	Yes	1	0	1	2	0
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
Training		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Community-Based Disaster Risk Management (CBDRM)	No	15	12	27	31	32
	Yes	33	25	58	69	68

Total		**48**	37	85	100	100
School Disaster Preparedness and Response Training	No	46	36	82	96	97
	Yes	2	1	3	4	3
Total		48	37	85	100	100
Dzong Fire Safety Training	No	47	36	83	98	97
	Yes	1	1	2	2	3
Total		48	37	85	100	100
Others	No					
	Yes					
Total						

Table xlviCount and percentage of community members who participated in awareness activities

PUNAKHA DZONGKHAG						
Awareness Activities		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Mock drill	No	20	9	29	35	32
	Yes	37	19	56	65	68
Total		57	28	85	100	100
Workshops	No	54	26	80	95	93
	Yes	3	2	5	5	7
Total		57	28	85	100	100
Meetings	No	20	12	32	35	43
	Yes	37	16	53	65	57
Total		57	28	85	100	100
Others	No					
	Yes					
Total						
WANGDUE PHODRANG DZONGKHAG						
Awareness Activities		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Mock drill	No	19	33	52	36	59
	Yes	34	23	57	64	41
Total		53	56	109	100	100
Workshops	No	3	5	8	6	9
	Yes	50	51	101	94	91
Total		53	56	109	100	100
Meetings	No	17	22	39	32	39
	Yes	36	34	70	68	61
Total		53	56	109	100	100
Others	No	52	56	11	98	100
	Yes	1	0	1	2	0
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
Awareness Activities		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**

Mock drill	No	36	27	63	75	73
	Yes	12	10	22	25	27
Total		**48**	37	85	100	100
Workshops	No	48	37	85	100	100
	Yes	**0**	**0**	**0**	**0**	**0**
Total		48	37	85	100	100
Meetings	No	34	24	58	71	65
	Yes	14	13	27	29	35
Total		**48**	37	85	100	100
Others	No					
	Yes					
Total						

Table xlvii Count and percentage of the opinions of community members on the usefulness of awareness activities

PUNAKHA DZONGKHAG					
Usefulness of Mock drill	**Respondents**				
	Community Members				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**
Usefulness of Mock drill					
Not relevant	20	11	31	35	39
Not useful	0	0	0	0	0
Useful	3	2	5	5	7
Very useful, relevant and applicable	34	15	49	60	54
Total	57	28	85	100	100
Usefulness of Workshops					
Not relevant	55	25	80	96	89
Not useful	0	0	0	0	0
Useful	0	2	2	0	7
Very useful, relevant and applicable	2	1	3	4	4
Total	57	28	85	100	100
Usefulness of Meetings					
Not relevant	19	13	32	33	46
Not useful	0	0	0	0	0
Useful	3	2	5	5	7
Very useful, relevant and applicable	35	13	48	61	46
Total	57	28	85	100	100
Usefulness of Other Awareness Activities					
Not relevant					
Not useful					
Useful					
Very useful, relevant and applicable					
Total					

WANGDUE PHODRANG DZONGKHAG					
Usefulness of Mock drill	**Respondents**				
	Community Members				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**
Not relevant	4	2	6	8	4
Not useful	2	1	3	4	2
Useful	3	7	10	6	13
Very useful, relevant and applicable	44	46	90	83	82
Total	53	56	109	100	100
Usefulness of Workshops					
Not relevant	4	2	6	8	4
Not useful	2	1	3	4	2
Useful	3	8	11	6	14
Very useful, relevant and applicable	2	10	12	4	18
Total	53	56	109	100	100
Usefulness of Meetings					
Not relevant	4	2	6	8	4
Not useful	1	1	2	2	2
Useful	3	8	11	6	14
Very useful, relevant and applicable	16	26	42	30	46
Total	53	56	109	100	100
Usefulness of Other Awareness Activities					
Not relevant	3	1	4	6	2
Not useful	0	1	1	0	2
Useful	1	0	1	2	0
Very useful, relevant and applicable	53	56	109	100	100
Total	3	1	4	6	2
BUMTHANG DZONGKHAG					
Usefulness of Mock drill	**Respondents**				
	Community Members				
	Gender (counts)		**Total**	**%**	
	Female	**Male**		**Female**	**Male**
Not relevant	36	27	63	75	73
Not useful	0	0	0	0	0
Useful	0	0	0	0	0
Very useful, relevant and applicable	12	10	22	25	27
Total	48	37	85	100	100
Usefulness of Workshops					
Not relevant	0	0	0	0	0
Not useful	0	0	0	0	0
Useful	0	0	0	0	0
Very useful, relevant and applicable	0	0	0	0	0
Total	0	0	0	0	0

Usefulness of Meetings					
Not relevant	34	24	58	71	65
Not useful	0	0	0	0	0
Useful	0	0	0	0	0
Very useful, relevant and applicable	14	13	27	29	35
Total	48	37	85	100	100
Usefulness of Other Awareness Activities					
Not relevant					
Not useful					
Useful					
Very useful, relevant and applicable					
Total					

Table xlviiiOpinions about the occurrence of GLOF

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think you will not experience GLOF in winter?	No	15	6	21	26	21
	Don't know	19	11	30	33	39
	Yes	23	11	34	40	39
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think you will not experience GLOF in winter?	No	15	27	42	28	48
	Don't know	26	19	45	49	34
	Yes	12	10	22	23	18
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think you will not experience GLOF in winter?	No	14	20	34	29	54
	Don't know	30	16	46	63	43
	Yes	4	1	5	8	3
Total		48	37	85	100	100

Table xlixrelevance, effectiveness, efficiency, sustainability, and impact of the awareness and education programs carried out on the risk of a GLOF

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	1	0	1	2	0

	Not relevant	9	5	14	16	18
	Relevant	47	23	70	82	82
Total		57	28	85	100	100
Effectiveness	Missing	1	0	1	2	0
	Highly satisfactory	33	13	46	58	46
	Highly unsatisfactory	7	4	11	12	14
	Moderately satisfactory	3	4	7	5	14
	Moderately Unsatisfactory	2	1	3	4	4
	Satisfactory	9	5	14	16	18
	Unsatisfactory	2	1	3	4	4
Total		57	28	85	100	100
Efficiency	Missing	1	0	1	2	0
	Highly satisfactory	31	13	44	54	46
	Highly unsatisfactory	8	3	11	14	11
	Moderately satisfactory	7	3	10	12	11
	Moderately unsatisfactory	0	1	1	0	4
	Satisfactory	8	6	14	14	21
	Unsatisfactory	2	2	4	4	7
Total		57	28	85	100	100
Sustainability	Missing	1	0	1	2	0
	Likely	36	17	53	63	61
	Moderately likely	10	4	14	18	14
	Moderately Unlikely	4	3	7	7	11
	Unlikely	6	4	10	11	14
Total		57	28	85	100	100
Impact	Missing	1	0	1	2	0
	Minimal	8	5	13	14	18
	Negligible	7	6	13	12	21
	Significance	41	17	58	72	61
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	5	0	5	9	0
	Not relevant	20	15	35	38	27
	Relevant	28	41	69	53	73
Total		53	56	109	100	100
Effectiveness	Missing	5	1	6	9	2
	Highly satisfactory	17	20	37	32	36
	Highly unsatisfactory	15	9	24	28	16
	Moderately satisfactory	4	3	7	8	5
	Satisfactory	7	21	28	13	38
	Unsatisfactory	5	2	7	9	4
Total		53	56	109	100	100

Efficiency	Missing	5	1	6	9	2
	Highly satisfactory	16	19	35	30	34
	Highly unsatisfactory	16	8	24	30	14
	Moderately satisfactory	2	5	7	4	9
	Moderately unsatisfactory	1	0	1	2	0
	Satisfactory	9	20	29	17	36
	Unsatisfactory	4	3	7	8	5
Total		53	56	109	100	100
Sustainability	Missing	6	1	7	11	2
	Likely	22	32	54	42	57
	Moderately likely	6	12	18	11	21
	Unlikely	19	11	30	36	20
Total		53	56	109	100	100
Impact	Missing	5	1	6	9	2
	Minimal	6	9	15	11	16
	Negligible	20	12	32	38	21
	Significance	22	34	56	42	61
Total		53	56	109	100	100

BUMTAHNG DZONGKHAG

		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	0	0	0	0
	Not relevant	34	23	57	71	62
	Relevant	14	14	28	29	38
Total		48	37	85	100	100
Effectiveness	Missing	0	0	0	0	0
	Highly satisfactory	6	2	8	13	5
	Highly unsatisfactory	34	23	57	71	62
	Moderately satisfactory	0	2	2	0	5
	Satisfactory	8	10	18	17	27
	Unsatisfactory	0	0	0	0	0
Total		48	37	85	100	100
Efficiency	Missing	0	0	0	0	0
	Highly satisfactory	6	2	8	13	5
	Highly unsatisfactory	34	23	57	71	62
	Moderately satisfactory	0	3	3	0	8
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	8	9	17	17	24
	Unsatisfactory	0	0	0	0	0
Total		48	37	85	100	100
Sustainability	Missing	0	0	0	0	0
	Likely	11	5	16	23	14
	Moderately likely	2	9	11	4	24
	Moderately Unlikely	1	1	2	2	3

	Unlikely	34	22	56	71	59
Total		48	37	85	100	100
Impact	Missing	0	0	0	0	0
	Minimal	3	9	12	6	24
	Negligible	34	23	57	71	62
	Significance	11	5	16	23	14
Total		48	37	85	100	100

Table lrelevance, effectiveness, efficiency, sustainability, and impact of the prevention and mitigation activities carried out on the risk of GLOF

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	1	0	1	2	0
	Not relevant	7	4	11	12	14
	Relevant	49	24	73	86	86
Total		57	28	85	100	100
Effectiveness	Missing	1	0	1	2	0
	Highly satisfactory	33	14	47	58	50
	Highly unsatisfactory	4	3	7	7	11
	Moderately satisfactory	3	2	5	5	7
	Moderately unsatisfactory	5	1	6	9	4
	Satisfactory	11	7	18	19	25
	Unsatisfactory	0	1	1	0	4
Total		57	28	85	100	100
Efficiency	Missing	2	0	2	4	0
	Highly satisfactory	31	14	45	54	50
	Highly unsatisfactory	4	3	7	7	11
	Moderately satisfactory	3	2	5	5	7
	Moderately unsatisfactory	4	0	4	7	0
	Satisfactory	13	7	20	23	25
	Unsatisfactory	0	2	2	0	7
Total		57	28	85	100	100
Sustainability	Missing	1	0	1	2	0
	Likely	39	18	57	68	64
	Moderately likely	11	5	16	19	18
	Moderately Unlikely	2	4	6	4	14
	Unlikely	4	1	5	7	4
Total		57	28	85	100	100
Impact	Missing	1	0	1	2	0
	Minimal	8	6	14	14	21
	Negligible	5	4	9	9	14
	Significance	43	18	61	75	64

Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	5	0	5	9	0
	Not relevant	20	15	35	38	27
	Relevant	28	41	69	53	73
Total		53	56	109	100	100
Effectiveness	Missing	6	1	7	11	2
	Highly satisfactory	15	16	31	28	29
	Highly unsatisfactory	16	10	26	30	18
	Moderately satisfactory	3	5	8	6	9
	Moderately unsatisfactory	1	1	2	2	2
	Satisfactory	8	22	30	15	39
	Unsatisfactory	4	1	5	8	2
Total		53	56	109	100	100
Efficiency	Missing	5	1	6	9	2
	Highly satisfactory	16	17	33	30	30
	Highly unsatisfactory	17	11	28	32	20
	Moderately satisfactory	3	6	9	6	11
	Moderately unsatisfactory	0	1	1	0	2
	Satisfactory	8	19	27	15	34
	Unsatisfactory	4	1	5	8	2
Total		53	56	109	100	100
Sustainability	Missing	5	1	6	9	2
	Likely	22	36	58	42	64
	Moderately likely	5	8	13	9	14
	Unlikely	21	11	32	40	20
Total		53	56	109	100	100
Impact	Missing	5	1	6	9	2
	Minimal	7	10	17	13	18
	Negligible	19	12	31	36	21
	Significance	22	33	55	42	59
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	0	0	0	0
	Not relevant	34	22	56	71	59
	Relevant	14	15	29	29	41
Total		48	37	85	100	100
Effectiveness	Missing	0	0	0	0	0
	Highly satisfactory	6	2	8	13	5

	Highly unsatisfactory	33	23	56	69	62
	Moderately satisfactory	1	3	4	2	8
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	7	9	16	15	24
	Unsatisfactory	1	0	1	2	0
Total		48	37	85	100	100
Efficiency	Missing	0	0	0	0	0
	Highly satisfactory	6	2	8	13	5
	Highly unsatisfactory	34	23	57	71	62
	Moderately satisfactory	1	3	4	2	8
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	7	9	16	15	24
	Unsatisfactory	0	0	0	0	0
Total		48	37	85	100	100
Sustainability	Missing	0	0	0	0	0
	Likely	10	6	16	21	16
	Moderately likely	3	8	11	6	22
	Moderately Unlikely	1	0	1	2	0
	Unlikely	34	23	57	71	62
Total		48	37	85	100	100
Impact	Missing	0	0	0	0	0
	Minimal	5	8	13	10	22
	Negligible	33	23	56	69	62
	Significance	10	6	16	21	16
Total		48	37	85	100	100

Table lirelevance, effectiveness, efficiency, sustainability, and impact of the response capacities

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	1	1	2	2	4
	Not relevant	9	4	13	16	14
	Relevant	47	23	70	82	82
Total		57	28	85	100	100
Effectiveness	Missing	1	0	1	2	0
	Highly satisfactory	28	13	41	49	46
	Highly unsatisfactory	6	3	9	11	11
	Moderately satisfactory	8	2	10	14	7
	Moderately unsatisfactory	4	0	4	7	0
	Satisfactory	10	9	19	18	32
	Unsatisfactory	0	1	1	0	4

Total		57	28	85	100	100
Efficiency	Missing	1	0	1	2	0
	Highly satisfactory	28	13	41	49	46
	Highly unsatisfactory	6	3	9	11	11
	Moderately satisfactory	5	3	8	9	11
	Moderately unsatisfactory	4	1	5	7	4
	Satisfactory	13	7	20	23	25
	Unsatisfactory	0	1	1	0	4
Total		57	28	85	100	100
Sustainability	Missing	1	0	1	2	0
	Likely	36	17	53	63	61
	Moderately likely	11	6	17	19	21
	Moderately Unlikely	3	2	5	5	7
	Unlikely	6	3	9	11	11
Total		57	28	85	100	100
Impact	Missing	2	0	2	4	0
	Minimal	10	7	17	18	25
	Negligible	8	5	13	14	18
	Significance	37	16	53	65	57
Total		57	28	85	100	100

WANGDUE PHODRANG DZONGKHAG

		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	5	0	5	9	0
	Not relevant	20	17	37	38	30
	Relevant	28	39	67	53	70
Total		53	56	109	100	100
Effectiveness	Missing	5	1	6	9	2
	Highly satisfactory	15	19	34	28	34
	Highly unsatisfactory	17	11	28	32	20
	Moderately satisfactory	4	3	7	8	5
	Satisfactory	8	21	29	15	38
	Unsatisfactory	4	1	5	8	2
Total		53	56	109	100	100
Efficiency	Missing	5	1	6	9	2
	Highly satisfactory	15	15	30	28	27
	Highly unsatisfactory	16	10	26	30	18
	Moderately satisfactory	4	4	8	8	7
	Moderately unsatisfactory	2	1	3	4	2
	Satisfactory	8	22	30	15	39
	Unsatisfactory	3	3	6	6	5
Total		53	56	109	100	100
Sustainability	Missing	5	1	6	9	2
	Likely	20	36	56	38	64

	Moderately likely	8	8	16	15	14
	Moderately unlikely	1	0	1	2	0
	Unlikely	19	11	30	36	20
Total		53	56	109	100	100
Impact	Missing	5	1	6	9	2
	Minimal	7	6	13	13	11
	Negligible	20	12	32	38	21
	Significance	21	37	58	40	66
Total		53	56	109	100	100

BUMTHANG DZONGKHAG

		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Relevance	Missing	0	0	0	0	0
	Not relevant	34	23	57	71	62
	Relevant	14	14	28	29	38
Total		48	37	85	100	100
Effectiveness	Missing	0	0	0	0	0
	Highly satisfactory	6	2	8	13	5
	Highly unsatisfactory	34	23	57	71	62
	Moderately satisfactory	1	3	4	2	8
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	7	9	16	15	24
	Unsatisfactory	0	0	0	0	0
Total		48	37	85	100	100
Efficiency	Missing	0	0	0	0	0
	Highly satisfactory	6	2	8	13	5
	Highly unsatisfactory	34	23	57	71	62
	Moderately satisfactory	1	3	4	2	8
	Moderately unsatisfactory	0	0	0	0	0
	Satisfactory	7	9	16	15	24
	Unsatisfactory	0	0	0	0	0
Total		48	37	85	100	100
Sustainability	Missing	0	0	0	0	0
	Likely	11	7	18	23	19
	Moderately likely	2	7	9	4	19
	Moderately Unlikely	3	0	3	6	0
	Unlikely	32	23	55	67	62
Total		48	37	85	100	100
Impact	Missing	0	0	0	0	0
	Minimal	3	7	10	6	19
	Negligible	34	23	57	71	62
	Significance	11	7	18	23	19

Total	48	37	85	100	100

Table liiRespondent and household information of community members

GASA DZONGKHAG			
		Frequency	**Percent**
Gender	Female	7	70.0
	Male	3	30.0
Total		10	100.0
Profession	Farmer	7	70.0
	Business	0	0
	Civil servant	0	0
	House wife	2	20.0
	Student	1	10.0
	Teacher	0	0
	Others	0	0
Total		10	100.0
Marital status	Married	6	60.0
	Single	3	30.0
	Divorcee	1	10.0
	Others	0	0
Total		10	100.0
Type of house	Concrete	0	0
	Typical Bhutanese	10	100.0
	Bago(hut)	0	0
	Others	0	0
Total		10	100
No. of story	1 storied	7	70.0
	2 storied	3	30.0
	3 storied	0	0
	Others	0	0
Total		10	100.0
Literacy	Illiterate	8	80.0
	Literate	2	20.0
Total		10	100.0

Table liiiKnowledge of hazards and vulnerabilities

GASA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think that you and your family members are vulnerable to hazard?	No	1	0	1	14	0
	Yes	6	3	9	86	100
Total		7	3	10	100	100
Have you or any members of your household experienced any disaster in the past?	No	3	1	4	43	33
	Yes	4	2	6	57	67
Total		7	3	10	100	100
In your opinion, are you better prepared to deal with such disaster than the last event?	No	3	1	4	43	33
	Yes	4	2	6	57	67
Total		7	3	10	100	100
Who do you think will be the most at risk (vulnerable) during natural disaster?	Men	1	0	1	14	0
	Women	5	3	8	71	100
	Women and	1	0	1	14	0

	Children					
Total		7	3	10	100	100
Do you think there are different requirements for response and preparedness to GLOF for men and women?	No	5	2	7	71	67
	Yes	2	1	3	29	33
Total		7	3	10	100	100

Table livDisaster management trainings

GASA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Have you participated in mock drill?	No	7	2	9	100	67
	Yes	0	1	1	0	33
Total		7	3	10	100	100
Have you participated in any disaster related awareness workshops or meeting?	No	5	2	7	71	67
	Yes	2	1	3	29	33
Total		7	3	10	100	100
Did you attend any community based training on disaster management?	No	7	3	10	100	100
	Yes	0	0	0	0	0
Total		7	3	10	100	100
Is there problem for women attending these disaster related workshops or trainings?	No	6	3	9	86	100
	Yes	1	0	1	14	0
Total		7	3	10	100	100
Who should be trained in disaster risk management?	Male	0	0	0	0	0
	Female	0	0	0	0	0
	Both equally	7	3	10	100	100
Total		7	3	10	100	100

Table lvAwareness

GASA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
If there is GLOF, is your house and household at risk?	No	2	1	3	29	33
	Yes	5	2	7	71	67
Total		7	3	10	100	100
Who are the most vulnerable from your household members if there is a GLOF outburst?	Male member of the family	1	1	2	14	33
	Female member of the family	5	1	6	71	33
	Children	0	0	0	0	0
	Elderly member of the family	1	1	2	14	33
Total		7	3	10	100	100
In your opinion, is your house strong enough to withstand an earthquake?	No	4	2	6	57	67
	Yes	3	1	4	43	33
Total		7	3	10	100	100
Are you aware that there are	No	5	3	8	71	100

government building and seismic codes for constructing new house to prevent injuries related to earthquake?	Yes	2	0	2	29	0
Total		7	3	10	100	100
During an earthquake, what do you have to do?	Run outside	4	2	6	57	67
	Duck under a table or a desk	3	1	4	43	33
	Sit on a floor against a wall	0	0	0	0	0
Total		7	3	10	100	100
From where did you hear/learn about the risk and mitigations related to natural disaster?	Media – radio	4	1	5	57	33
	Media – newspaper	0	0	0	0	0
	Awareness campaigns	3	2	5	43	67
	Trainings/workshops	0	0	0	0	0
	Posters/pamphlets	0	0	0	0	0
	Others	0	0	0	0	0
Total		7	3	10	100	100
Did you see the brochure on earthquake?	Yes	0	0	0	0	0
	No	7	3	10	100	100
Total		7	3	10	100	100
Did you see the brochure on GLOF?	Yes	0	0	0	0	0
	No	7	3	10	100	100
Total		7	3	10	100	100
Did you see these posters any where?	Yes	0	0	0	0	0
	No	7	3	10	100	100
Total		7	3	10	100	100
Do you know when an earthquake will strike?	Yes	0	0	0	0	0
	No	7	3	10	100	100
Total		7	3	10	100	100
When is the most likely for GLOF to occur?	Raining heavily for days	4	2	6	57	67
	Immediately after an earthquake	0	0	0	0	0
	Don't know	3	1	4	43	33
Total		7	3	10	100	100
Will you know if there is a glacial lake outburst?	Yes	6	1	7	86	33
	No	1	2	3	14	67
Total		7	3	10	100	100
If there is a GLOF warning system, did you ever hear it?	Yes	4	2	6	57	67
	No	3	1	4	43	33
Total		7	3	10	100	100
In your opinion, can your household members be saved by the early warning system from GLOF?	Yes	5	3	8	71	100
	No	2	0	2	29	0
Total		7	3	10	100	100
Immediately after a flood or an earthquake, is it safe to enter the house?	Yes	0	0	0	0	0
	No	7	3	10	100	100
Total		7	3	10	100	100
After the floods, is it safe to go and collect the fishes?	Yes	0	0	0	0	0
	No	7	3	10	100	100
Total		7	3	10	100	100

Table lviResponse and preparedness

GASA DZONGKHAG	
	Respondents

		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Did you discuss with your family members on how to deal in case there is a natural disaster?	No	6	3	9	86	100
	Yes	1	0	1	14	0
Total		7	3	10	100	100
Do you have an emergency evacuation plan?	No	6	2	8	86	67
	Yes	1	1	2	14	33
Total		7	3	10	100	100
Are your grains stored safely from GLOF?	No	7	3	10	100	100
	Yes	0	0	0	0	0
Total		7	3	10	100	100
Are you grains protected from house fire?	No	7	3	10	100	100
	Yes	0	0	0	0	0
Total		7	3	10	100	100
Are your livestock safe from GLOF?	No	3	1	4	43	33
	Yes	4	2	6	57	67
Total		7	3	10	100	100
Is there an emergency exit in your house?	No	7	3	10	100	100
	Yes	0	0	0	0	0
Total		7	3	10	100	100
Do you have a family emergency kit?	No	7	3	10	100	100
	Yes	0	0	0	0	0
Total		7	3	10	100	100
Do you have a mobile phone?	No	1	0	1	14	0
	Yes	6	3	9	86	100
Total		7	3	10	100	100
Do you have a radio?	No	1	0	1	14	0
	Yes	6	3	9	86	100
Total		7	3	10	100	100
During natural disaster, how will you update the information on the situation?	Don't know	2	0	2	29	0
	From Bhutan news	5	3	8	71	100
	Others	0	0	0	0	0
Total		7	3	10	100	100
During natural disaster, what is your first priority?	Save life of household members?	7	3	10	100	100
	Save valuable items	0	0	0	0	0
Total		7	3	10	100	100

Table lvii Count and percentage of community members able to prioritize, plan and implement measures to reduce human and material losses from potential GLOFs

PUNAKHA DZONGKHAG						
Ability to:		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Prioritize	No	16	4	20	28	14
	Don't know	7	2	9	12	7
	Yes	34	22	56	60	79
Total		57	28	85	100	100
Plan	No	2	3	5	4	11

	Don't know	3	1	4	5	4
	Yes	52	24	76	91	86
Total		57	28	85	100	100
Implement	No	3	1	4	5	4
	Don't know	4	1	5	7	4
	Yes	50	26	76	88	93
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
Ability to:		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Prioritize	No	12	9	21	23	16
	Don't know	22	20	42	42	36
	Yes	19	27	46	36	48
Total		53	56	109	100	100
Plan	No	12	4	16	23	7
	Don't know	8	11	19	15	20
	Yes	33	41	74	62	73
Total		53	56	109	100	100
Implement	No	10	4	14	19	7
	Don't know	15	17	32	28	30
	Yes	28	35	63	53	63
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
Ability to:		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Prioritize	No	4	3	7	8	8
	Don't know	32	23	55	67	62
	Yes	12	11	23	25	30
Total		**48**	37	85	100	100
Plan	No	1	0	1	2	0
	Don't know	14	11	25	29	30
	Yes	33	26	59	69	70
Total		**48**	37	85	100	100
Implement	No	1	1	2	2	3
	Don't know	22	14	36	46	38
	Yes	25	22	47	52	59
Total		**48**	37	85	100	100

Table lviii Count and percentage of community members who are able to take precautionary measures in the event of GLOF

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Able to take precautionary measure	No	4	2	6	7	7
	Don't know	19	6	25	33	21
	Yes	34	20	54	60	71
Total		57	28	85	100	100

WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Able to take precautionary measure	No	12	5	17	23	9
	Don't know	15	13	28	28	23
	Yes	26	38	64	49	68
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Able to take precautionary measure	No	3	2	5	6	5
	Don't know	22	16	38	46	43
	Yes	23	19	42	48	51
Total		48	37	85	100	100

Table lix Count and percentage of disaster management plans in place at the community level

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Does your community have disaster management plans in place?	No	6	7	13	11	25
	Don't know	6	2	8	11	7
	Yes	45	19	64	79	68
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Does your community have disaster management plans in place?	No	12	4	16	23	7
	Don't know	8	11	19	15	20
	Yes	33	41	74	62	73
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Does your community have disaster management plans in place?	No	22	16	38	46	43
	Don't know	14	11	25	29	30
	Yes	12	10	22	25	27
Total		48	37	85	100	100

Table lx Count and percentage of *Gewog/Chiwog*/community which reviewed their CBDRM plan

PUNAKHA DZONGKHAG

		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Have you reviewed your CDRM plan?	No	43	17	60	75	61
	Yes	14	11	25	25	39
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Have you reviewed your CDRM plan?	No	43	45	88	81	80
	Yes	10	11	21	19	20
Total		53	56	109	100	100
BUMTHANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Have you reviewed your CDRM plan?	No	48	37	85	100	100
	Yes	0	0	0	0	0
Total		48	37	85	100	100

Table lxiAssessment of to what extent the needs of different groups are addressed

PUNAKHA DZONGKHAG						
Needs of:		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Men	Don't know	0	0	0	0	0
	Fully addressed	45	20	65	79	71
	Not at all addressed	10	3	13	18	11
	Partially addressed	2	5	7	4	18
Total		57	28	85	100	100
Women	Don't know	0	0	0	0	0
	Fully addressed	3	3	6	5	11
	Not at all addressed	12	9	21	21	32
	Partially addressed	42	16	58	74	57
Total		57	28	85	100	100
Boys	Don't know	0	0	0	0	0
	Fully addressed	32	14	46	56	50
	Not at all addressed	10	6	16	18	21
	Partially addressed	15	8	23	26	29
Total		57	28	85	100	100
Girls	Don't know	0	0	0	0	0
	Fully addressed	4	4	8	7	14
	Not at all addressed	14	6	20	25	21
	Partially addressed	39	18	57	68	64
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						

Needs of:		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Men	Don't know	2	0	2	4	0
	Fully addressed	29	43	72	55	77
	Not at all addressed	14	10	24	26	18
	Partially addressed	8	3	11	15	5
Total			53	56	109	100
Women	Don't know	2	0	2	4	0
	Fully addressed	4	7	11	8	13
	Not at all addressed	26	28	54	49	50
	Partially addressed	21	21	42	40	38
Total			53	56	109	100
Boys	Don't know	2	0	2	4	0
	Fully addressed	13	18	31	25	32
	Not at all addressed	19	13	32	36	23
	Partially addressed	19	25	44	36	45
Total			53	56	109	100
Girls	Don't know	2	0	2	4	0
	Fully addressed	5	6	11	9	11
	Not at all addressed	29	28	57	55	50
	Partially addressed	17	22	39	32	39
Total			53	56	109	100
BUMTHANG DZONGKHAG						
Needs of:		**Respondents**				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Men	Don't know	0	0	0	0	0
	Fully addressed	16	10	26	33	27
	Not at all addressed	26	21	47	54	57
	Partially addressed	6	6	12	13	16
Total		48	37	85	100	100
Women	Don't know	0	0	0	0	0
	Fully addressed	0	0	0	0	0
	Not at all addressed	29	25	54	60	68
	Partially addressed	19	12	31	40	32
Total		48	37	85	100	100
Boys	Don't know	0	0	0	0	0
	Fully addressed	8	6	14	17	16
	Not at all addressed	28	21	49	58	57
	Partially addressed	12	10	22	25	27
Total		48	37	85	100	100
Girls	Don't know	0	0	0	0	0
	Fully addressed	0	0	0	0	0
	Not at all addressed	30	25	55	63	68
	Partially addressed	18	12	30	38	32
Total		48	37	85	100	100

Table lxiiLevel of awareness on mitigation work at Thorthormi lake

PUNAKHA DZONGKHAG	
	Respondents

		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of mitigation work at Thorthormi lake?	No	2	2	4	4	7
	Don't know	3	0	3	5	0
	Yes	52	26	78	91	93
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of mitigation work at Thorthormi lake?	No	6	3	9	11	5
	Don't know	3	2	5	6	4
	Yes	44	51	95	83	91
Total		53	56	109	100	100

Table lxiiiRating of Thorthormi lake mitigation work

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
If yes, how would you rate Thorthormi lake mitigation work?	A success	51	24	75	89	86
	Neither a success nor failure	6	4	10	11	14
	A failure	0	0	0	0	0
	Unanswered (not aware of mitigation work)	0	0	0	0	0
	No idea	0	0	0	0	0
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
If yes, how would you rate Thorthormi lake mitigation work?	A success	36	45	81	68	83
	Neither a success nor failure	10	8	18	19	10
	A failure	0	0	0	0	0
	Unanswered (not aware of mitigation work)	6	3	9	11	6
	No idea	1	0	1	2	1
Total		53	56	109	100	100

Table lxivMitigation work and the risk of GLOF

PUNAKHA DZONGKHAG

		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
With GLOF mitigation work done, do you now think the risk of GLOF has been reduced to a safe level?	Yes	40	19	59	70	68
	To some extent	12	6	18	21	21
	Don't know	5	2	7	9	7
	No	0	1	1	0	4
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
With GLOF mitigation work done, do you now think the risk of GLOF has been reduced to a safe level?	Yes	32	34	66	60	61
	To some extent	9	17	26	17	30
	Don't know	10	2	12	19	4
	No	1	2	3	2	4
	Missing	1	1	2	2	2
Total		53	56	109	100	100

Table lxvAwareness of Community Early Warning System

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of Community Early Warning System?	Missing	0	0	0	0	0
	No	2	0	2	4	0
	Yes	55	28	83	96	100
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Are you aware of Community Early Warning System?	Missing	1	0	1	2	0
	No	4	0	4	8	0
	Yes	48	56	104	91	100
Total		53	56	109	100	100

Table lxviThe reach of Early Warning System

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		Total	%	
		Female	Male		Female	Male
Is there Early Warning System installed in your community?	Missing	0	0	0	0	0
	Don't know	3	0	3	5	0
	No	3	1	4	5	4

	Yes	51	27	78	89	96
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Is there Early Warning System installed in your community?	Missing	1	0	1	2	0
	Don't know	2	1	3	4	2
	No	3	1	4	6	2
	Yes	47	54	101	89	96
Total		53	56	109	100	100

Table lxviiThe roles of community focal persons with respect to community Early Warning System

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
How important is the role of community focal persons with respect to community early warning system?	Missing	0	0	0	0	0
	Not important	1	0	1	2	0
	Somewhat important	1	0	1	2	0
	Very important	55	28	83	96	100
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
How important is the role of community focal persons with respect to community early warning system?	Missing	5	1	6	9	2
	Not important	1	0	1	2	0
	Somewhat important	7	1	8	13	2
	Very important	40	54	94	75	96
Total		53	56	109	100	100

Table lxviiiUsefulness of the Early Warning System

PUNAKHA DZONGKHAG						
		Respondents				
		Community Members				
		Gender (counts)		**Total**	**%**	
		Female	**Male**		**Female**	**Male**
Do you think EWS would help reduce human and material losses in your valley in the event of GLOF?	Missing	0	0	0	0	0
	Don't know	1	0	1	2	0
	No	0	0	0	0	0
	Yes	56	28	84	98	100
Total		57	28	85	100	100
WANGDUE PHODRANG DZONGKHAG						
		Respondents				
		Community Members				

		Gender (counts)		Total	%	
		Female	Male		Female	Male
Do you think EWS would help reduce human and material losses in your valley in the event of GLOF?	Missing	1	0	1	2	0
	Don't know	1	1	2	2	2
	No	0	0	0	0	0
	Yes	51	55	106	96	98
Total		53	56	109	100	100

7.2 TERMS OF REFERENCE

Terms of Reference for the National Consultant

Title:

Qualitative-Based Survey (QBS) of awareness, preparedness and response capacities related to climate change induced risks and vulnerabilities and the documentation of lessons and experiences.

A. Background:

The Royal Government of Bhutan has initiated the first National Adaptation Program of Action on climate change project on - **Reducing Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in the Punakha-Wangdi and Chamkhar Valleys** – funded by an LDCF /GEF through UNDP and co-funded by the Austrian Government, the WWF and RGoB. The project duration is for five years (2008 – 2013) and was conceived and implemented to support the RGoB in reducing climate-change induced Glacial Lake Outburst Flood (GLOF) risks and vulnerabilities. Under the project, three main Components/activities are implemented to reduce the risk of GLOF, viz;

I. Reducing the level of *Thorthormi* lake implemented by the Department of Geology and Mines (DGM),
II. Installation of the automatic Early Warning System (EWS) implemented by the Department of Hydro-met Services (DHMS)and
III. Raising awareness on GLOF risks and building capacities in the vulnerable areas implemented by the Department of Disaster Management.

The important activities of DDM are to build capacities at National, Dzongkhag (District), Gewog(Block)and Community-levels to enhance awareness, preparedness and response levels to deal with climate change-induced risks and vulnerabilities.DDM activities in the pilot Dzongkhags included:

- The drafting and consultation process for the enactment of the Disaster Management Act 2013;
- Training of Dzongkhag and Gewog Officials, Local Functionaries and Vulnerable Communities in the Community Based Disaster Risk Management approach to formulate preparedness plans and prioritize and implement mitigation and preparedness measures through community based interventions;
- Sensitization workshop and training on mainstreaming DRR for Dzongkhag/Gewog officials and local functionaries to initiate integration of climate risk reduction into plan, policy and development activities;
- Capacity building program for school teachers and students on disaster preparedness and response;
- End to end awareness campaigns in communities on risk of GLOF and hazard zonation maps through posters, pamphlets and documentary clip, animation and through various media;
- Development and testing of Community Based Early Warning System through appointment of community focal points in each vulnerable community and designing of systematic Information flow mechanisms for GLOF event;
- Demarcation of GLOF hazard zonation by installation of iron pillars and wooden pegs based on GLOF hazard maps in Punakha-Wangdue and Chamkhar Valley;

1

- Identification of safe GLOF evacuation sites/routes in vulnerable communities and conducting evacuation drills following test activation of the Automatic Early warning System;
- Capacity development program for DDM, MoHCA, Dzongkhag and Gewog officials and local functionaries through ex-country training, workshop and institutional visit.

B. Objectives of the Assignment

The objectives of this contract are :-

1. To carry out a comprehensive gender-sensitive QBSin pilot areas to assess the level of disaster awareness, preparedness and response capacities in vulnerable communities, in particular, to climate change-induced risks and vulnerabilities, such as GLOF.

2. To document lessons learned and experiences, particularly for activities undertaken to raise awareness and strengthen community preparedness.

C. Comprehensive gender-sensitive Qualitative Based Survey (QBS):

The project results especially those related to capacity development and strengthening of disaster management are require to be assessed through Qualitative Based Survey (QBS). Although there was no baseline established at the beginning of the project in 2008, a baseline QBS was carried out in 2011 to establish the base line data on the level of awareness, preparedness and response capacities related to climate change risks and vulnerabilities at various levels in the project areas.

The study was conducted at three levels – at the National level through consultations with the DDM and administering in-depth interviews to national sector focal persons; at Dzongkhag and Gewog level through in-depth interviews with disaster management committee and team members and focus group discussions and; at the community level through a community based qualitative survey. At all times, and all levels, efforts were made to gather gender-disaggregated data.

Similarly, the final comprehensive gender-sensitive QBS will be conducted to assess the level of awareness and capacity at various levels in the three pilot Dzongkhags of Punakha, Wangdue Phodrang and Bumthang and to find out how and whether vulnerable communities have benefited from this project.

D. Results/Expected outcomes:

1. Review and update the survey questionnaires based on the attached data requirements and additional information from the project manager, as required. Survey methodology (including sample size) and questionnaires must be approved by DDM before launching the survey.
2. Conduct the survey according to acceptable research and statistical protocols and analyze results accordingly.
3. Conduct data cleaning, data entry and analysis of all items listed in Annex 1: Data requirements.
4. Submit draft report and present survey findings and recommendations to DDM and key stakeholders.

5. Incorporate comments and feedback into final report for submission in soft copy together with the filled-in questionnaires and dataset.

E. Methodology:

Data collection should be based on the questionnaires prepared by the consultant according to the data requirements specified in Annex 1. Both, Quantitative and Qualitative methods will be used. Interviews will be carried out with individuals at the national level and at various levels under Punakha, Wangdue and BumthangDzongkhags.

1. Interview with National Disaster Management Focal points (at least 70% of national focal points)
2. Interview with Dzongkhag Disaster Management Focal points, Dzongkhag Disaster Management Committee and Dzongkhag Disaster Management Awareness and Planning Teams/ CBDRM ToTs (at least 70% of members)
3. Interview with Gewog Disaster Management Committee and CBDRM ToTs (at least 70% of members)
4. Interview with community members, from households, school teachers, students, other agencies/institutions existing in identified communities (statistically representative sample size from each identified target area)

F. Scope of work for QBS

1. Sample area and size

At the district level, the targets Dzongkhags to be surveyed arePunakha, Wangdue and Bumthang districts. Interviews and survey sample size shall be as per requirements in E. Methodology above.

Under Punakha and WangduePhodrangDzongkhags, the following 14 communities shall be targeted:

1. Wolathang
2. Samdingkha
3. Jara
4. Tsekha
5. Changjukha
6. Shedra area near Punakhadzong
7. Old Punakha town
8. Khuruthang
9. Samthang
10. BajoThangu
11. Bajothang
12. Tsokona
13. Chichilum area near Rinchengang village
14. Hesothangkha
15. Basachhu
16. Kamichhu

Under BumthangDzongkhag, the following communities shall be targeted:

- WangdiChooling
- Dekiling
- Jilikhar
- Gongkhar
- Chamkhar
- Tamzhing
- Dorjibee
- Gooling

The Department has conducted the survey using same questionnaires in Lunana Gewog under Gasa Dzongkha, which is one of the vulnerable communities from the GLOF. The Department will be sharing completed survey questionnaires with consultant for Data Analysis, Validation and inclusion in the final Report.

2 Review and Update of survey questionnaires

The Department will be providing a set of questionnaires used at various levels during the inital QBS conducted in 2011.Consultant would be responsible for reviewing and updating the questionnaires and sharing it with the Department of Disaster Management for finalization before launching the survey.

3. Selecting, training, fielding and supervising the enumerators

The Consultant will be responsible for providing experienced and competent enumerators. Training of the enumerators is needed to ensure competent and uniform administration of the survey questionnaire. Any cost related to the enumerators shall be borne by the Consultant firm.

4. Data collection

After the training and final selection of the enumerators, the Consultant will be responsible for conducting the survey as per the agreed methodology and sample size. Any problems encountered during the fieldwork shall be managed by the Consultant's firm.

5. Quality control of data collected

DDM will coordinate with the Consultant on a regular basis to monitor the progress of the enumeration and completion of the survey. To ensure quality control, a random selection of communities will be contacted by the DDM to confirm that the enumerator did conduct the interview and a small number of answers will be validated.

6 Data Analysis, Validation and Report Writing

The Consultant will be responsible for data cleaning, data entry, data analysis, validation and report writing.

The data analysis should include all aspects listed in the data requirements (Annex 1) and suggest recommendations to improve the level of awareness and preparedness/response capacities of the respondents. The data should be gender disaggregated and include an analysis of gender-related aspects, i.e. special needs of men/women in relation to climate change induced risks and vulnerabilities, early warning systems, etc.

The draft report and final report should be prepared by the Consultant and presented and submitted to the Director General, Department of Disaster Management, Ministry of Home & Cultural Affairs. The survey firm is not allowed to share data with any third party, and no identifying information should be released, used for other projects/purposes or sold to any third party.

7. Documentation of all the lessons and experiences derived from the project:-

The Department under this project has carried out various Disaster Risk Management program in the form of Trainings, Workshops, door to door Awareness campaign, public consultation meetings, mock drills, evacuation drills, etc. Under this task, the Consultant is expected to synthesize the lessons learned and identify and document best practices from the activities implemented. The Consultant is expected to:

7.1. Review the various workshop/training/meeting reports

7.2. Prepare comprehensive report on achievements made under the project including lessons learned and experiences gained from this project

G. Qualifications of National Consultant

1. Academic and professional background (minimum of Bachelor's Degree) in Sociology, Social Work/Social Sciences, Rural Development, Business or Public Administration, Environment or fields related to Climate Change/Disaster Management;
2. A minimum of 5 years of working experience in the development sector in Bhutan is required. Experience in conducting research related to disaster management and climate change would be an advantage.
3. Understanding of disaster management and climate change adaptation in Bhutan;
4. Proficiency in field research and statistical protocols, preferably in the area of disaster management/ climate change;
5. Excellent communication and interviewing skills and ability to interact with grass root level respondents;
6. Proficiency in writing and communicating both in English and in Dzongkha;
7. Proficiency with statistical packages/software used in analyzing survey results;
8. Should hold a valid Bhutanese consultancy license; and
9. Excellent in human relations, coordination, planning and team work.

(Please enclose any supporting documents)

H. Timeframe and work plan:

Please submit your proposed work plan/ timeframe, including statistically representative sample size under the target areas, for implementing the above activities within 30 days from the date of signing of the contract. As a guideline, the tentative timeframe includes:

1. 10 days for consultations with DDM, desk review of training/meeting/workshop reports and review and finalization of questionnaires; and training of e-numerators;
2. 21 days for data collection and field work in Thimphu, Punakha, Wangdue and Bumthang;
3. 7 days for data entry and analysis;
4. 15 days for report writing, presentation and finalization incorporating comments/feedback from DDM and relevant stakeholders.

I. Earnest Money Deposit:

Sealed quotation must be submitted with an earnest money of 2 % of the quoted amount (quotation without EMD will not be entertained).

J. Payment Terms:

The complete cost of the above study will be paid in the following manner:

10% of the total cost will be paid on the award of the work contract against the submission of bank guarantee of the same.
25% of the total cost will be paid upon submission of the finalized survey questionnaires and completion of desk review of training/meeting/workshop reports.
25% of total cost will be paid upon submission and presentation of the draft final report.
40% of the cost will be made on submission of the final report (both QBS and documentation of lesson learned) in soft copy along with entire raw data and the soft copy of the report.

Annex 1: Data requirements

The survey should respond to, but is not limited to, the following data requirements:

- All aspects marked with *should be analyzed from a gender-perspective (additional information to be given by DDM)

Background

- *All data should be gender disaggregated (i.e. number of men/women interviewed/represented in DM focal points/ committees/team, number of women headed households interviewed)
- Identification of statistically representative sample survey size for households in the identified target areas
- *Total population of each Dzongkhag/Gewog/Chiwog surveyed
- No. of households (Hh) in each Dzongkhag/Gewog/Chiwog surveyed

National level (interviews with at least 70% of National Disaster Management focal points, Thimphu)

- *Percentage of national DRM focal points able to prioritize, plan, and implement measures to reduce human and material losses from potential GLOFs
- Number of government departments actively accessing and utilizing climate risk information
- *Percentage of respondents trained or participated in sensitization workshops organized by DDM
- Measures to improve awareness/capacity of national DRM focal points

District and Gewog level (interviews with at least 70% of Dzongkhag Disaster Management Focal points, Dzongkhag Disaster Management Committee and Dzongkhag Disaster Management Teams and with Gewog Disaster Management Committee and Teams in each of the three districts)

- *Percentage/number of respondents interviewed trained in CBDRM/Mainstreaming DRR/School Disaster Preparedness and Response/ Dzong Fire Safety Training etc. by DDM
- *Percentage/number of respondents interviewed participated in awareness activities (i.e. meetings, workshop, mockdrill)
- *Percentage of district DRM focal points and DRM committees members able to prioritize, plan, and implement measures to reduce human and material losses from potential GLOFs
- *Percentage of DRM focal points at Dzongkhag, Gewog and community level reporting that Disaster Management frameworks and guidelines support climate change adaptation efforts*
- *Number of Dzongkhag and Gewog Disaster Management Committees in project areas incorporating long-term climate risk planning into their ongoing DRM responsibilities
- Number/percentage of Disaster Management Plans in place at the Dzong/Gewog level
- *Awareness of roles and responsibilities in a disaster situation
- * Assessment of whether different needs of men/women/boys/girls in a disaster situation are addressed
- Number and awareness level of Vulnerability and Risk assessments conducted at the Dzong/Gewog level
- Level of awareness and enforcement of Circular on land use based on GLOF hazard zonation mapping issued by MoHCA
- *Measures to improve awareness/capacity of Dzongkhag and Gewog DRM focal points, committees and teams

Community level (interviews with household member, school teachers, students and persons in identified communities (statistically representative sample size from identified target areas in the three districts))

- *Percentage /number of respondents interviewed trained in CBDRM/School Disaster Preparedness and Response/ Dzong Fire Safety Training etc., by DDM
- * Percentage/number of respondents interviewed participated in awareness activities (i.e. meetings, workshop, mockdrill)
- **Percentage of communities able to prioritize, plan, and implement measures to reduce human and material losses from potential GLOFs*
- **Percentage of households in target communities who are able to take precautionary measures and react to potential GLOFs in a way to minimize human and material losses*
- Number/percentage of Disaster Management Plans in place at the community-level
- Number/percentage of Gewog/Chiwog/Community reviewed their CBDRM plan
- *Awareness level on role/what to do in a disaster situation
- *Assessment of the different needs of men/women/boys/girls in a disaster situation and how these are addressed
- *Measures to improve awareness/capacity of communities

- * Number of vulnerable target communities in Punakha-Wangdi Valley reached by early warning system (specify whether manual or automatic system) *For Punakha-Wangdue Dzongkhag only*
- **Percentage of households in vulnerable communities in Punakha-Wangdueable to receive and respond to warnings in time to avoid human losses -*For Punakha-Wangdue Dzongkhag only*
- **Percentage of households invulnerable communities in Punakha-Wangdue aware of the new automatic GLOF early warning system- *For Punakha-Wangdue Dzongkhag only*
- **Number of communities in vulnerable communities in Punakha-Wangdue aware of location and access routes to safe GLOF evacuation areas (even for Bumthang Dzongkhag)- *For Punakha-Wangdue Dzongkhag only*
- **Number of communities in vulnerable communities in Punakha-Wangdue and Chamkhar valley aware of GLOF hazard zonation (level of risk from GLOF)- *For Punakha-Wangdue Dzongkhag only*

7.2

7.3 QUESTIONNAIRES

7.3.1 Interview Questionnaire for National Level Focal Persons

Interviewer's Name:..... Date:.....

INTERVIEW FORMAT FOR NATIONAL LEVEL FOCAL PERSONS

1) Name: _____
2) Gender:
   a. Male ☐
   b. Female ☐
3) Household head:
   a. Yes ☐
   b. No ☐
4) Designation: _____
5) Department: _____
   a. Ministry:
      i. Ministry of Agriculture;
      ii. Ministry of Economic Affairs;
      iii. Ministry of Education;
      iv. Ministry of Finance
      v. Ministry of Foreign Affairs
      vi. Ministry of Health
      vii. Ministry of Home and Cultural Affairs
      viii. Ministry of Information and Communications
      ix. Ministry of Labour and Human Resources
      x. Ministry of Works and Human Settlement
6) How confident are you in prioritizing, planning, and implementing measures to reduce human and material losses from potential GLOFs?

	Very confident	Confident	Not so confident	Not confident at all
a) Prioritizing	☐	☐	☐	☐
b) Planning	☐	☐	☐	☐
c) Implementing	☐	☐	☐	☐

7) How often do you access climate risk information database?
   a. On a regular basis
   b. Sometimes
   c. Not at all
      i. If your answer is either (a) or (b), then do you utilize climate risk information?
         1. Yes ☐
         2. No ☐
8) Have you participated in any sensitization workshops or trainings organized by Department of Disaster Management?
   a. All ☐
   b. Some ☐
   c. Not at all ☐

9) Are there any long-term prevention/mitigation strategies/activities for GLOF or other hazards in your district or sector's annual or five year plan?
   a. Yes ☐
   b. No ☐
   c. Don't know ☐

10) Are you aware of the following disaster management plans?

	Yes	No	Don't know
a) Disaster Management Act of Bhutan – 2013	☐	☐	☐
b) Community-Based Disaster Risk Management (CBDRM)	☐	☐	☐
c) Gewog Disaster Management Policy and Strategy	☐	☐	☐
d) Dzongkhag Disaster Management Policy and Strategy	☐	☐	☐
e) School Disaster Management Policy and Strategy	☐	☐	☐
f) Sector Disaster Management Policy and Strategy	☐	☐	☐
g) National Disaster Management Framework 2006	☐	☐	☐

11) Do your sector plans, policies and activities have DRR and CCA incorporated into them?

	Sector plans/policies/activities
DRR	Yes ☐
	No ☐
CCA	Yes ☐
	No ☐

12) Do you think that the disaster management plans are successfully implemented?
   a. Yes ☐
   b. No ☐

13) Do you think that your sector is prepared to respond in the event of a disaster?
   a. Fully prepared ☐
   b. Partially prepared ☐
   c. Beginning to prepare ☐
   d. Not prepared at all ☐

14) In your opinion, are the districts now better prepared to deal with the GLOF after the implementation of the project?
   a. Yes ☐
   b. No ☐
   c. Don't know ☐

15) Rate the level of awareness, preparedness and response capacities against the following criteria:

AWARENESS						
How do awareness and education programs carried out on the risk of a GLOF relate to the main objective of the reducing climate-change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives of the programs been achieved?						
Effectiveness	**HS**	**S**	**MS**	**MU**	**U**	**HU**
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	**HS**	**S**	**MS**	**MU**	**U**	**HU**
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	**L**		**ML**		**MU**	**U**
	☐		☐		☐	
Are these indications that the awareness programs have enhanced the communities' awareness on disaster risk, in particular on GLOF risk?						
Impact	**S**		**M**		**N**	
	☐		☐		☐	

HINT: Relevant (R); Not relevant (NR);
Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

PREPAREDNESS						
How do the prevention and mitigation plans and activities relate to the main objective of the reducing climate-change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives been achieved?						
Effectiveness	**HS**	**S**	**MS**	**MU**	**U**	**HU**
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	**HS**	**S**	**MS**	**MU**	**U**	**HU**
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	**L**		**ML**		**MU**	**U**
	☐		☐		☐	
Are there any visible and measureable impact created?						
Impact	**S**		**M**		**N**	
	☐		☐		☐	

HINT: Relevant (R); Not relevant (NR);
Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

CAPACITY DEVELOPMENT

How does capacities and needs assessment undertaken at various levels, and subsequently trainings conducted relate to the main objective of the reducing climate-change-induced risks and vulnerabilities from GLOF project?

	R	NR
Relevance	☐	☐

To what extent have the outcomes and objectives been achieved?

Effectiveness	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐

Was it implemented efficiently and in-line with international, national norms and standards?

Efficiency	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐

Is it sustainable?

Sustainability	L	ML	MU	U
	☐	☐	☐	

Are there any visible and measureable impact created?

Impact	S	M	N
	☐	☐	☐

HINT: *Relevant (R); Not relevant (NR);*
: Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
: Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

16) Do you think you will not experience GLOF in winter?
   a. Yes ☐
   b. No ☐
   c. I don't know ☐

17) Kindly share some lessons you have learned as a national focal person:

_____
_____
_____
_____
_____
_____

18) Kindly narrate your experience as a national focal person:

_____
_____
_____
_____
_____

19) Any comments and feedback?

_____
_____
_____
_____

7.3.2 Interview Questionnaire for *Dzongkhag* and *Gewog* Focal Persons

Interviewer's Name:..... Date:.....
District:.....Gewog:..... Village/Community:.....

INTERVIEW FORMAT FOR DISTRICT AND GEWOG LEVEL FOCAL PEOPLE

1) Name: _____
2) Gender:
   a. Male ☐
   b. Female ☐
3) Household head:
   a. Yes ☐
   b. No ☐
4) Designation: _____
5) Literacy:
   a. Literate ☐
   b. Illiterate ☐
6) Name of committee(s) you are member of:
   a. _____
   b. _____
   c. _____
7) Are you trained in the following:

	Yes	No
a) Community-Based Disaster Risk Management (CBDRM)	☐	☐
b) Mainstreaming Disaster Risk Reduction (DRR)	☐	☐
c) School Disaster Preparedness and Response	☐	☐
d) Dzong Fire Safety Training	☐	☐
e) Others (_____)	☐	☐

8) Have you participated in the following awareness activities carried out by DDM:

	Yes	No
a) Mockdrill	☐	☐
b) Workshops	☐	☐
c) Meetings	☐	☐
e) Others (_____)	☐	☐

   a. Are they useful?

	Useful	Very useful, relevant and applicable	Not useful
a) Mockdrill	☐	☐	☐
b) Workshops	☐	☐	☐
c) Meetings	☐	☐	☐
e) Others (_____)	☐	☐	☐

9) Are you able to prioritize, plan and implement measures to reduce human and material losses from potential GOLFs?

	Yes	No	Don't know
a) Prioritizing	☐	☐	☐
b) Planning	☐	☐	☐
c) Implementing	☐	☐	☐

10) Do you think that disaster management guidelines and frameworks support climate change adaptation efforts?
   a. Yes ☐
   b. No ☐
   c. Don't know ☐
      i. If yes, in what ways?

_____

_____

11) Do you incorporate long-term climate risk planning into your ongoing DRM responsibilities in your project areas?
   a. Yes ☐
   b. No ☐
   c. Don't know ☐
      i. If yes, how?

_____

_____

12) Does your community have disaster management plans in place?

	Yes	No	Don't know
a) Community-DMP	☐	☐	☐
b) Gewog-DMP	☐	☐	☐
c) District-DMP	☐	☐	☐

13) Are you aware of your roles and responsibilities in a disaster situation?
   a. Yes ☐
   b. No ☐
   c. Can't say ☐
      i. If yes, what is it?

_____

_____

14) In your opinion, how far have the needs of men/women/boys/girls in a disaster situation are addressed?

Needs of:	Fully addressed	Partially addressed	Not at all addressed
a) Men	☐	☐	☐
How?			
b) Women	☐	☐	☐
How?			
c) Boys	☐	☐	☐
How?			
d) Girls	☐	☐	☐
How?			

15) Kindly mention the number of vulnerability and risk assessment conducted at your Gewog and Dzongkhag:

	Number of times conducted
a) Gewog	
b) Dzongkhag	

16) How do you rate the awareness level of vulnerability and risk assessment in your community after the implementation of the project?
   a. High ☐
   b. Medium ☐
   c. Low ☐
   d. Same as before the implementation of the project ☐

17) Your level of awareness on the enforcement of circular about the land use based on GLOF hazard zonation mapping issued by MoHCA?
   a. High ☐
   b. Medium ☐
   c. Low ☐
   d. Same as before the implementation of the project ☐

18) From your experience, what was the most effective measure to improve awareness/capacity of Dzongkhag and Gewog DRM focal people, committees and teams?

_____

_____

_____

19) Does your Dzongkhag incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?

	Annual Plan	Five-Year Plan
DRR	Yes ☐	Yes ☐
	No ☐	No ☐
CCA	Yes ☐	Yes ☐
	No ☐	No ☐

If no, why?

_____

_____

_____

20) Does your Gewog incorporate Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) activities into your annual and 5-year plans?

	Annual Plan	Five-Year Plan
DRR	Yes ☐	Yes ☐
	No ☐	No ☐
CCA	Yes ☐	Yes ☐
	No ☐	No ☐

If no, why?

_____

_____

_____

21) Rate the level of awareness, preparedness and response capacities against the following criteria:

AWARENESS						
How do awareness and education programs carried out on the risk of a GLOF relate to the main objective of the reducing climate-change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives of the programs been achieved?						
Effectiveness	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	L		ML		MU	U
	☐		☐		☐	
Are there indications that the awareness programs have enhanced the communities' awareness on disaster risk, in particular on GLOF risk?						
Impact	S		M		N	
	☐		☐		☐	

HINT: Relevant (R); Not relevant (NR);
Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

PREPAREDNESS						
How do the prevention and mitigation plans and activities relate to the main objective of the reducing climate-change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives been achieved?						
Effectiveness	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	L		ML		MU	U
	☐		☐		☐	
Are there any visible and measureable impact created?						
Impact	S		M		N	
	☐		☐		☐	

HINT: Relevant (R); Not relevant (NR);
Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

CAPACITY DEVELOPMENT						
How does capacities and needs assessment undertaken at various levels, and subsequently trainings conducted relate to the main objective of the reducing climate-change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives been achieved?						
Effectiveness	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	L		ML		MU	U
	☐		☐		☐	
Are there any visible and measureable impact created?						
Impact	S		M		N	
	☐		☐		☐	

HINT: *Relevant (R); Not relevant (NR);*
-Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
-Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
-Significant (S); Minimal (M); Negligible (N);

22) Do you think you will not experience GLOF in winter?
   a. Yes ☐
   b. No ☐
   c. I don't know ☐

23) Kindly share some lessons you have learned as a *Dzongkhag/Gewog* focal person:

____
____
____
____
____

24) Kindly narrate your experience as a *Dzongkhag/Gewog* focal person:

____
____
____
____

25) Any comments and feedback?

____
____
____
____

7.3.3 Interview Questionnaire for Community Members

Interviewer's Name:..... Date:.....
District:..... Gewog:..... Village/Community:.....
Hazard Zone: Red ☐ Yellow ☐ Blue ☐

INTERVIEW FORMAT FOR COMMUNITY MEMBERS

1) Name: _____
2) Gender:
   a. Male ☐
   b. Female ☐
3) Age: ___(in years)
4) Household head:
   a. Yes ☐
   b. No ☐
5) Profession:
   a. Farmer ☐
   b. Business ☐
   c. Civil servant ☐
   d. House wife ☐
   e. Student ☐
   f. Teacher ☐
   g. Others (_____)
6) Marital status:
   a. Married ☐
   b. Single ☐
   c. Divorcee ☐
   d. Others (_____)
7) Literacy:
   a. Literate ☐
   b. Illiterate ☐
8) Are you trained in any of the following:

	Yes	No
a) Community-Based Disaster Risk Management (CBDRM)	☐	☐
b) Mainstreaming Disaster Risk Reduction (DRR)	☐	☐
c) School Disaster Preparedness and Response	☐	☐
d) Dzong Fire Safety Training	☐	☐
e) Others (_____)	☐	☐

9) Have you participated in the following awareness activities carried out by Department of Disaster Management:

	Yes	No
a) Mockdrill	☐	☐
b) Workshops	☐	☐
c) Meetings	☐	☐
e) Others (_____)	☐	☐

a. How useful is it?

	Useful	Very useful, relevant and applicable	Not useful
a) Mockdrill	☐	☐	☐
b) Workshops	☐	☐	☐
c) Meetings	☐	☐	☐
e) Others (_____)	☐	☐	☐

10) Can you prioritize, plan and implement measures to reduce human and material losses from potential GLOFs?

	Yes	No	Don't know
a) Prioritizing	☐	☐	☐
b) Planning	☐	☐	☐
c) Implementing	☐	☐	☐

11) In the event of potential GLOF, can you take precautionary measures against it?
   a. Yes ☐
   b. No ☐
   c. Don't know ☐

12) Does your community have disaster management plans in place?
   a. Yes ☐
   b. No ☐
   c. Don't know ☐

13) Have you reviewed your CBDRM plan?
   a. Yes ☐
   b. No ☐

14) How aware are you of your roles and responsibilities?
   a. High ☐
   b. Medium ☐
   c. Low ☐

15) What would you do in a disaster situation?

_____

16) In your opinion, how far have the needs of men/women/boys/girls in a disaster situation are addressed?

Needs of:	Fully addressed	Partially addressed	Not at all addressed
a) Men	☐	☐	☐
How?			
b) Women	☐	☐	☐
How?			
c) Boys	☐	☐	☐
How?			
d) Girls	☐	☐	☐
How?			

2

17) With the GLOF mitigation work done, do you now think the risk of GLOF have been reduced to a safe level?
   a. Yes ☐
   b. To some extent ☐
   a. No ☐
18) Do you think you will not experience GLOF in winter?
   a. Yes ☐
   b. No ☐
   c. I don't know ☐
19) From your experience, what was the most effective measure to improve awareness/capacity of community member?

_____
_____
_____

For Punakha and Wangdue only

20) Are you aware of mitigation work at Thorthormi lake?
   a. Yes ☐
   b. No ☐
   c. Don't know ☐
      i. If yes, how would you rate Thorthormi lake mitigation work?
         a. A success ☐
         b. Neither a success nor failure ☐
         c. A failure ☐
21) How do you rate the roles being played by Community Focal People with respect to Community Early Warning System (EWS)?
   a. Very important ☐
   b. Somewhat important ☐
   c. Not important ☐
      i. What roles do they play?

_____
_____
_____

22) Is there EWS installed in your community?
   a. Yes ☐
   b. No ☐
      i. If yes, is it a manual ☐ or an automatic system ☐?
23) Do you think EWS would help reduce human and material losses in your valley in the event of GLOF?
   a. Yes ☐
   b. No ☐
   c. Don't know
24) Do you and your family live in vulnerable community?
   a. Yes ☐
   b. No ☐
      i. If yes, can you receive and respond to warnings in time to avoid human losses?
         1. Yes ☐
         2. No ☐
            a. If no, why?

_____
_____
_____

ii. If yes, are you aware of location and access routes to safe GLOF evacuation areas?
   3. Yes ☐
   4. No ☐

iii. If no in question 24, are you aware of the new automatic GLOF early warning system installed?
   5. Yes ☐
   6. No ☐

25) Are you aware of GLOF hazard zonation?
   a. Yes ☐
   b. No ☐
      i. If no, why?

_____

_____

_____

26) Rate the level of awareness, preparedness and response capacities against the following criteria:

AWARENESS						
How do awareness and education programs carried out on the risk of a GLOF relate to the main objective of the reducing climate change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives of the programs been achieved?						
Effectiveness	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	L		ML		MU	U
	☐		☐		☐	
Are there indications that the awareness programs have enhanced the communities' awareness on disaster risk, in particular on GLOF risk?						
Impact	S		M		N	
	☐		☐		☐	

HINT: Relevant (R); Non-relevant (NR);
Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Minimally unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU)
Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

PREPAREDNESS						
How do the prevention and mitigation plans and activities relate to the main objective of the reducing climate change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives been achieved?						
Effectiveness	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	L		ML		MU	U
	☐		☐		☐	
Are there any visible and measureable impact created?						
Impact	S		M		N	
	☐		☐		☐	

HINT: Relevant (R); Not relevant (NR);
Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

CAPACITY DEVELOPMENT						
How does capacities and needs assessment undertaken at various levels, and subsequently trainings conducted relate to the main objective of the reducing climate change-induced risks and vulnerabilities from GLOF project?						
	R			NR		
Relevance	☐			☐		
To what extent have the outcomes and objectives been achieved?						
Effectiveness	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Was it implemented efficiently and in-line with international, national norms and standards?						
Efficiency	HS	S	MS	MU	U	HU
	☐	☐	☐	☐	☐	☐
Is it sustainable?						
Sustainability	L		ML		MU	U
	☐		☐		☐	
Are there any visible and measureable impact created?						
Impact	S		M		N	
	☐		☐		☐	

HINT: Relevant (R); Not relevant (NR);
Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HU);
Likely (L); Moderately likely (ML); Moderately unlikely (MU); Unlikely (U);
Significant (S); Minimal (M); Negligible (N);

27) Kindly share some lessons you have learned:

28) Kindly narrate your experience:

29) Any comments and feedback?

7.4 ITENERARY

Date	Day	Place/Activity
11 March 2014	Tuesday	Travel from T/phu to W/Phodrang
12 March 2014	Wednesday	Meet focal persons and District Disaster Management Committee Members
13 March 2014	Thursday	Meet *Geog* Disaster Management Committee Members Survey Ritsi Rinchengang and Tshokhana community
14 March 2014	Friday	Survey the community of Kamichu
15 – 16 March 2014	Saturday & Sunday	Survey the community of Wolathang, Samdingkha, Jara, Khawa Jara and Tsekha
17 March 2014	Monday	Meet focal persons of Punakha and the DDMCM Survey the community in and around VTI Khuruthang
18 March 2014	Tuesday	Survey at Changyul, Old Punakha town, and Khuru town
19 March 2014	Wednesday	Meet the Bap Gup and continue survey in Khuru town
20 March 2014	Thursday	Travel to T/phu
21 March 2014	Friday	Travel to B/thang
22 March 2014	Saturday	Survey at Jalikhar and Gongkhar
23 March 2014	Sunday	Survey at Garithang and Chamkhar town
24 March 2014	Monday	Meet the focal persons and DDMCM
25 March 2014	Tuesday	Survey Upper Chokhor Communities