Baseline Study on Disaster Risk Management and Climate Change Impacts Knowledge and Understanding among CDMP Stakeholders

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Comprehensive Disaster Management Programme (CDMP)

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Final Report

Prepared by

Bangladesh Centre for Advanced Studies (BCAS)
in collaboration with
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Executive Summary

Bangladesh is a country that is frequently affected by natural disasters and climate change related extreme events. Due to its high population density and poverty level, the loss of lives and property takes a toll on the society, economy and development activities. In order to protect the population especially the marginalized and vulnerable people, the Ministry of Food and Disaster Management undertook an integrated approach entitled "Comprehensive Disaster Management Programme (CDMP)" to promote Prevention, Preparedness, Response and Recovery (PPRR) to deal with natural and man-made disaster along with climate change impacts.

CDMP works towards fulfilling the vision of the government, reducing the suffering of people struck by disaster, and ensuring reduction of vulnerability and risk of the poor to disaster and climate change events. In order to function properly through capacity building, CDMP felt it necessary to assess the level of knowledge and awareness on disaster/ risk, climate change impacts and adaptation strategies. CDMP assigned Bangladesh Centre for Advanced Studies (BCAS) to carry out this baseline study to assess the knowledge of CDMP stakeholders or DMC members of different administrative levels. Seven districts of Bangladesh (Lalmonirhat, Rajshahi, Sirajganj, Sunamganj, Faridpur, Satkhira and Sunamganj) representing different climate and disaster characteristics were selected for carrying out survey, Focus Group Discussions (FGD), in-depth interviews and workshops to assess knowledge and understanding among DMC members.

The study has been designed to provide comparison of knowledge level of the DMC members at different administrative levels. In some cases comparison couldn't be done. The male and female responses were also compared to find out their level of knowledge and awareness of issues. Some of the issues were only appropriate for the particular level

The respondent's knowledge and awareness of the issues were based on the specific and composite indicators. Average understanding on the definition of risk shows that the union level DMC members are more aware than upper administrative level DMC members. It was found that 58.6 percent (average) DMC members at the union level could appropriately identify the definition of risk while at the upazilla and district level appropriate respondents were 56.4 and 54.3 percent respectively. Regarding awareness on Standing Orders for Disaster (SoD) it was poor at every level of administration. Interestingly, union level stakeholders were found to be more aware (35.0 %) about SoD than the stakeholders at the upazilla and district levels. The lowest response for this issue was 13.3 percent at the district level of Sunamganj. On the issue of manmade disasters (fire, water pollution, explosion and others) the highest number of correct responses (39.6% at union level, 45% at upazilla level and 57.1% at district level) was for the combined option of fire, water pollution and explosion. In some cases the respondents chose single options or other combinations of two options. On the subject of the relevance of training material to address disaster, most of the respondents at different levels choice 'Moderately Relevant' (union-62.4, upazilla-83.6 and district-72.8%). This indicates that the training materials need to be more specific and area based instead of general.

There were some specific issues like international activities on disaster risk reduction and climate changes issues set for the national level surveys only. According to the findings, awareness about the World Conference on Disaster Reduction, Kobe was low, only 37 percent (39.1% male response and 25% female response). But on the other hand, when the stakeholders were asked about monitoring plans for prevention/ mitigation, preparedness, relief and rehabilitation, the response was strong with an overall awareness.

Knowledgeable respondents about climate change and its definition was very low at the union (23.9 %) and upzilla (22.9 %) level while it was very high (90%) at the national level. Although the knowledge level on "climate change" definition was a bit poor the DMC

members seem better aware on climate change impacts. Regarding possible impacts of climate change the appropriate response ranged from 79.3 percent at the upazilla level to 83.1 percent at the union level. It was observed that with regard to the issues of types of GHGs and effects of increasing GHGs, knowledge level was more than 70% at all study levels.

With regards to existing adaptation practices to Disaster Risk and Climate Change Impacts the respondents at every administrative level was significantly positive. On the issues of preparing "community based highland" to address potential hazard especially floods, the percentage of appropriate respondents were 91.1, 90 and 89.5 at the union, upazilla and district levels respectively. Regarding "preparedness" to adapt with possible risks the level of awareness of the respondents was also high. The highest overall appropriate response was 90.5 percent at the District level and lowest was 78.9 at the union level.

The stakeholders and key persons that took part in the FGD and in-depth interviews gave important perceptions from their own experience of disasters. The qualitative methods (FGDs, consultation workshops and In-depth interviews) reflected the findings from the surveys. The DMC members at different levels identified flood, river bank erosion, drought, cyclones, salinity intrusion etc as the major natural hazards. Important coping/adaptation strategies and recommendations were also put forward by the respondents. The workshops were conducted at the national and district levels and the topics of discussion included the nature and types of disaster, various impacts, climate change and different coping strategies. The workshop also provided essential policy recommendations, the need for structural interventions and adaptation options.

The full FGD, In-depth interview and workshop report are included in the annex at the end of the report.

Acronyms

BRRM	:	Bangladesh's Risk Reduction Model
BCAS	:	Bangladesh Centre for Advanced Studies
CBOs	:	Community Based Organization
CCI	:	Climate Change Impacts
CDM	:	Clean Development Mechanism
CDMP	:	Comprehensive Disaster Management Programme
CDSP	:	Char Development and Settlement Project
CFCs	:	Chlorofluorocarbon
CO_2	:	Carbon dioxide
DFID	:	Department for International Development
DMB	:	Disaster Management Bureau
DMC	:	Disaster Management Committee
DNA	:	Designated National Authority
DoE	:	Department of Environment
DRM	:	Disaster Risk Management
DRR	:	Directorate of Relief and Rehabilitation
FGD	:	Focus Group Discussion
GHG	:	Green House Gases
GoB	:	Government of Bangladesh
GOs,	:	Government Organizations
IMDMCC	:	Inter-Ministerial Disaster Management Coordination Committee
IPCC	:	Intergovernmental Panel on Climate Change
MoEF	:	Ministry of Environment and Forest
MoFDM	:	Ministry of Food and Disaster Management
NAPA	:	National Adaptation Programmes of Action
NGOs	:	Non Government Organizations
NOAA	:	National Oceanic and Atmospheric Administration
PRSP	:	Poverty Reduction Strategy Paper
RMF	:	Risk Management Framework
RMP	:	Risk Management Process
SLR	:	Sea Level Rise
SOD	:	Standing Orders on Disaster
SPSS	:	Statistical Package for Social Science
UNFCCC	:	United Nations Framework Convention on Climate Change
UNDP	:	United Nations Development Programme
UNO	:	Upazilla Nirbahi Officer
WCDR	:	World Conference on Disaster Reduction

Chapter 1

Introduction

According to available literature the natural hazards cause 100,000 deaths every year and inflict billions of dollars in damage. About 97% of deaths due to natural disasters occur in developing countries with an estimated 256 million people affected in 2000(Irish Aid, 2006). Interestingly, the poorest suffer the greatest losses (at least in relative terms), and they are in the weakest position to cope and adapt.

Bangladesh, with a population of about 144 million, is one of the poorest and is most vulnerable countries in the world to disaster and climate change impacts (CDMP, 2003). Different types of natural hazards including flood (e.g. river flood, urban flood and flash flood), cyclone and storm surges, drought, river bank erosion, tornadoes etc hit the country almost every year. These catastrophic events significantly hinder the economic and social development of the country through two phases-- first, damaging the resources, establishments and infrastructure and second, pulling back the on-going development, business and trade at local, national, regional and even global levels.

Apart from natural hazards the community is exposed to surface water pollution, water logging, fires in urban areas etc. Climate change may be the added factor for substantial increase of the frequency and intensity of some of the events like floods, droughts, cyclones etc in future (CDMP, 2003). It has been predicted that some extreme events like drought, may not have previously occurred in some places and may now be experienced.

The risks of natural hazards including climate change issues have become a serious threat to the lives, livelihoods and sustainable development of Bangladesh. It is predicted that by the year 2030, an additional 14.3% of the country would become extremely vulnerable to floods, while the existing flood prone areas will face higher levels of flooding. Analysis of past floods suggests that, about 26% of the country is subject to annual flooding and an additional 42% is at risk of floods with varied intensity. Climate change will also exacerbate saline intrusion through several means such as the intrusion of the saline waterfront in the rivers, saline water interface in the groundwater aquifers, percolation from the increased saline surface waters into the ground water systems, and increased storm surges, which carry seawater inland.

The reasons for this higher level of vulnerability to natural, human induced and technological hazards may be due to its geographical location with the characteristics of low-lying coastal plain and floodplain, unplanned urbanization, excessive population growth, poverty, lack of awareness, effective education, knowledge and understanding on the relevant issues for example disaster and climate change issues etc. The successive floods of 1987, 1988, 1998 and 2004 adversely affected the lives and livelihoods of a large number of people. It affected production and support services including agricultural, industrial, infrastructure, health, education and development activities. The tropical cyclone has hit this country about 26 times in last half of the century. One of the most devastating cyclones hit was in 29 April 1991. About 138,000 human lives perished and vast agricultural yields, forestry, fisheries and livestock were destroyed (BCAS, 1991).

Considering the vulnerability and history of suffering of the people due to various hazards and disasters, the Government of Bangladesh (GoB) has explored the need for a new dimension in disaster management, from conventional response and recovery to a more comprehensive risk reduction culture, and to promote food security as an important factor in ensuring the resilience of communities to hazards-which is the current mission of GoB (Ministry of Food and Disaster Management, Corporate Plan, 2005).

In 2003, the MoFDM of the GoB launched the Comprehensive Disaster Management Programme (CDMP) in partnership with the United Nations Development Programme (UNDP) and Department for International Development (DFID) to achieve a significant policy and planning reforms and to build operational frameworks to facilitate a shift in the country's disaster management programmes, from response and relief to a more balanced and comprehensive risk reduction focus (CDMP Concept). CDMP will basically optimize the reduction of long-term risk and strengthen the operational capacities for responding to emergencies and disaster situations, including actions to improve recovery from extreme events. This will bring a common platform for GOs, NGOs, private sectors and the community to address the national priority issues such as disaster and climate change impacts. The resources, skills and expertise of this partnership platform will facilitate the government to strengthen the capacity of the Bangladesh disaster management system, identifying the gaps, inequality or disparity and to reduce unacceptable risks, to improve response and recovery management at all levels and to effectively integrate and manage the national food security system.

The CDMP stakeholders include professionals from GOs, NGOs, private sectors, academic and research institutions and community people at different levels (national, district, upazilla and union). According to draft SOD, the total members of the district Disaster Management Committees (DMCs) is 37 plus all Upazilla Nirbahi Officers (UNOs) while in Upazilla it is 30 plus all union parishad's chairman. The total member of the union DMCs are 35.

The CDMP recognizes the need of working out the level of existing knowledge, understanding and awareness of its stakeholders on disaster risk management and climate change impacts issues in seven districts (Lalmonirhat, Rajshahi, Sirajganj, Sunamganj, Faridpur, Satkhira, Cox's Bazar). Short profile of the study districts is given in chapter 3. This will help to find the gap and design the programme and also evaluate and monitor the system and its progress.

Bangladesh Centre for Advanced Studies (BCAS) which has a long track record in research and participatory planning exercise on environment, climate change and disaster issues was assigned by CDMP to carryout the task.

Chapter 2

Objective and Methodology

2.1   Objective

The main objective of the study is to generate baseline information about knowledge and understanding of CDMP stakeholders at various levels on disaster risk management and climate change impacts which would facilitate designing and developing the capacity building, awareness, coordination strategies, programmes and plans to reduce vulnerability of the poor to the effects of natural, environmental and human induced hazards, to a manageable and acceptable humanitarian level.

Specific Objectives of the study are as follows:

- Assess current knowledge base and understanding on disaster risk management and climate change impacts among CDMP stakeholders
- Examine the degree of knowledge and awareness about existing and future risk of natural, human induced and technological hazards
- Highlights perceptions about the existing risk reduction options
- Make suggestions for managing future risk
- Focus on the degree of knowledge and awareness about possible climate change impacts in Bangladesh among target institutions and the adaptation to climate change impacts of their existing activities and mechanism
- Development of monitoring indicators

2.2   Conceptual framework

The Government of Bangladesh through CDMP identified seven districts based on the exposure history and nature of suffering of the people due to various hazards and disasters to conduct a baseline study on disaster risk management and climate change impacts knowledge and understanding among CDMP stakeholders. The CDMP stakeholders are basically the members of the Disaster Management Committees (DMCs) at different administrative levels according to Standing Orders for Disaster (SoD) of the Government of Bangladesh (GoB). SOD describes the detailed roles and responsibilities of committees, Ministries and other organizations in disaster risk management, and establishes the necessary actions required in implementing Bangladesh's Risk Reduction Model (defining the risk environment, managing the risk environment, and responding to the threat environment).   The DMC members represent different government agencies, NGOs, research/academic institutions, local elites, religious leaders and community leaders etc as mentioned earlier. CDMP has targeted the DMC members at different levels to assess their knowledge and understanding on disaster risk management and climate change impacts. They were targeted due to their specific involvement as mentioned above in addressing hazard and disaster impacts in Bangladesh.

The methodology is based on approach to evaluate knowledge of the target groups using objective criteria including quantified indicators. In addition, qualitative assessment of knowledge through the expressed views, opinions and perceptions of the study populations. It included collection and analysis of both quantitative and qualitative data/information. Multiple methods which include sample survey, Focus Group Discussion (FGD), In-depth Interview and consultation workshops were used to collect primary data to assess knowledge and understanding on disaster risk management and climate change impacts of DMC at different administrative levels.

A set of specific indicators was developed to reflect knowledge level among the target DMC members on different issues under disaster management, climate change impacts and adaptation. Composite index/indicators were also developed by taking an average (weighted) of the specific indicators under each of the three broad areas: Disaster management, climate change and adaptation.

The formula for specific indicator which reflects the percentage of respondents having clear understanding and knowledge is as follows:

$$\frac{\eta}{N} \times 100$$

Where η is the number respondents having clear understanding and knowledge of a particular issue and N is the total number of respondents.

The general formulas for composite indicators are:

$$\frac{1}{k} \left(\sum_{1}^{k} \frac{\eta}{N} \right)$$

Where k is the number of specific indicators belonging to each broad area.

In addition to specific and composite indicators the overall knowledge of the individual stakeholder on all three issues has been assessed. Overall knowledge of the DMC members were also determined using a scoring system. Each correct answer was assigned a scored value "1" while "0" was the score for other answers and a total score of the individual respondents was computed. Further analysis was carried out using the maximum and minimum score, mean and median values as well as standard deviation.

2.3   Scope of the study

The study included the DMC members at different administrative levels including union, upazilla, district and national level. Seven districts namely Lalmonirhut, Rajshahi, Sirajganj, Sunamganj, Faridpur, Satkhira and Cox's Bazar were selected to assess the knowledge and understanding on disaster risk management and climate change impacts among DMC members. These districts were selected based on the climate and disaster characteristics. For example, Lalmonirhut and Rajshahi were selected considering drought impacts while Cox's Bazar and Satkhira were selected for salinity, Cyclone and Sea Level Rise (SLR), Sirajgang, Sunamganj and Faridpur for floods and river bank erosion. From each district two upazilla and from each upazilla two unions were covered in the study. The total administrative units/locations in the study were 49 (7 districts + 14 Upazillas + 28 Unions). The following table shows the specific study locations:

Table 1: Locations covered under the study on disaster risk management and climate change impacts knowledge and understanding among DMC members

SL	District	Upazilla	Union
1	Lalmonirhut	Aditmari	Mohishkhocha
		kaliganj	Palashi
			Bhotmari
			Tushbhandar
2	Rajshahi	Tanor	Pachandar
		Godagari	Badhair
			Mohonpur
			Pakari
3	Sirajganj	Shahjadpur	Shuvagacha
		Kajipur	Gala
			Kajipur
			10 no Koijuri

SL	District	Upazilla	Union
4	Sunamganj	Derai	Shachna bazaar
		Jamalganj	Karimpur
			Rajanagar
			Beheli
5	Faridpur	Faridpur Sadar	Aliabad
		Charbhadrashan	Degreer char
			Charbhadrashan
			Gazir Tak
6	Satkhira	Tala	Padmapukur
		Shayamnagar	Koikhali
			Kheshra
			Dhandia
7	Cox's Bazar	Moheshkhali	Choto Moheshkhali
		Ukhya	Kutubjum
			Jalia palong
			Palong khali

The study included both quantitative and qualitative assessment of disaster risk management and climate change impacts knowledge and understanding among DMC members. The quantitative aspects were mainly addressed through questionnaire survey using specific and composite indicators. On the other hand, qualitative aspects were addressed through FGD, consultation workshops and in-depth interviews.

2.4   Literature review

Our initial step was review of all the documented information that we could find about climate, climate change, and its potential human health impacts in Bangladesh. Information sources included documents of CDMP, journal articles, databases, researcher/expert surveys, documents of the government and non-government organizations, universities and communities etc. The context of disaster risk management and climate change impacts knowledge and understanding, and relevant issues have been given exclusive priority in the selection of studies reviewed.

Hasan Shareef Ahmed (2004) edited a baseline survey report on "Towards a profile of the ultra poor in Bangladesh: Findings from Challenging the Frontiers of Poverty Reduction/Targeting the Ultra poor (CFPR/TUP)". This report has helped to develop specific indicators for baseline survey on disaster risk management and climate change impacts knowledge and understanding among CDMP stakeholders

CARE-Bangladesh (2003) prepared a report of household level baseline survey conducted for the Reducing Vulnerability to Climate Change Project. This report indicates that at least 1 million community people of southwest Bangladesh have been aware on climate change issues.

David Hik (2001) was the author of the report on State of Knowledge: Impacts of Climate Change on Biophysical Systems in Northern Canada. He developed matrices (or tables) to organize and compile the information about the state of knowledge of climate change impacts in northern Canada. The matrices are only a tool to detect the current state of knowledge about climate change impacts on the various systems operating in northern Canada. It was useful to develop issue base indicators for this study.

Mr. William Hare (2003), visiting scientist, Potsdam Institute of Climate Impact Research was the author of the "Assessment of Knowledge on Impacts of Climate Change – Contribution to the Specification of Article 2 of the UNFCCC: Impacts on Ecosystems, Food Production, Water and Socio-economic Systems". This report has compiled and summarized the present knowledge on impacts of climate change as a basis for a consideration of what may constitute dangerous anthropogenic interference with the climate system under Article

2 of the United Nations Framework Convention on Climate Change (UNFCCC). This report was informative and quite useful for baseline study on disaster risk management and climate change impacts knowledge and understanding among CDMP stakeholders.

Brian Appleton (2001) edited a report on Climate Change and the water rules: how water manager can cope with today's climate variability and tomorrow's climate change". This report indicates that the climate community has knowledge to share with water managers. It recommended that the climate community should offer tools and knowledge to water managers to cope with today's problem and also prepare for tomorrow's problems.

Ministry of Environment and Forests (MOEF) of the GoB (2005) published National Adaptation Programmes of Action (NAPA). This report indicates that over the period of time both government and non-government organizations/institutions have taken number of initiatives that facilitated improved understanding of the community people to adapt with adverse impacts of floods, drought, cyclone and storm surges etc. Reducing Vulnerability to Climate Change (RVCC), implemented by CARE Bangladesh with local partners was one of the major initiatives.

Irish Aid (2006) has prepared a paper as a part of a series of awareness raising tools to accompany its Environment Policy for Sustainable Development. This paper has overviewed the impacts of natural hazards in developing countries.

Bangladesh Centre for Advanced Studies (1991) published a document on assessment of the impacts of Cyclone'91: A follow up study. This report is a living document on detail assessment of the impacts of a hazard in Bangladesh.

Comprehensive Disaster Management Programme (CDMP) (2003) has developed its Log frame incorporating goals, objectives, activities and expected outputs of different components of the programme. It has helped in different process of this study especially in developing indicators and methodological approaches.

Comprehensive Disaster Management Programme (CDMP) (2003) has developed its concepts with Overview of Bangladesh National Disaster Management Framework Strategic Drivers, Strategic Focus of Disaster Management in Bangladesh, Disaster Management Model-Bangladesh, Disaster Management Institutional Arrangement etc. The baseline study was benefited from this national level strategies related to disaster and climate change impacts.

Disaster Management Bureau (2005) formulated "Standing Orders for Disaster" (SoD)[draft version] which describes the detailed roles and responsibilities of committees, Ministries and other organizations in disaster risk management, and establishes the necessary actions required in implementing Bangladesh's Risk Reduction Model (defining the risk environment, managing the risk environment, and responding to the threat environment).

Ministry of Food and Disaster Management (2005) formulated a corporate plan for the duration 2005-2009 that shows a series of commitments including address of key issues: risk reduction, capacity building, climate change, food security, issues of gender and the socially disadvantaged among others. The report was benefited on information of mission, vision and plan of the government on disaster management issues.

Banglapedia (National Encyclopedia of Bangladesh) was polished in 2003 by the Asiatic Society of Bangladesh. The report was benefited from this very useful publication as it covered demographic and topographic information of the projects areas under the study.

A. M. Muazzam Hussain (1998) edited an assessment study report on poverty alleviation and empowerment (the Second Impact Assessment Study of BRAC's Rural Development Programme. This report provides a concrete and clear guideline on methodological development of Baseline Study on Disaster Risk Management and Climate Change Impacts Knowledge and Understanding among CDMP Stakeholders.

2.5   Methodology

The methodology for conducting the study has been based on methods, tools and approaches in consultation with CDMP officials/experts, which are as follows:

- Discussion with CDMP personnel, familiarization with CDMP goals and objectives and conceptual development and planning of the proposed study
- Collection and review of secondary information
- Designing sampling scheme including sample size
- Development of tools (e.g. questionnaire, checklists) for information gathering
- Development of baseline indicators of knowledge and understanding of CDMP stakeholders
- Primary data collection (Field survey, FGDs, In-depth Interviews and workshops at national, district and upazilla level)
- Processing and analyzing data
- The draft report preparation and submission to CDMP.
- Sharing of information and consultation for feedback from the stakeholders
- Final report preparation with comments and suggestions and submission to CDMP

Terms and definitions used in the report and in the field surveys are listed in Annex 8 at the end of the report.

Discussion with CDMP

At the onset of the study the BCAS study team held discussions with the CDMP team leader and experts as well as with the representative of the climate change cell. The discussions were particularly useful for the conceptual development and planning of the study. The study team was specially benefited through these discussions with focus on the mission, goals and objectives of the CDMP and the baseline study. Continuous discussions between CMDP and BCAS also covered the methodological issues, including relevant quantitative and qualitative tools as well as the study outputs. The discussions led to the clarification and better understanding of the study tasks.

Collection and Review of Secondary Data/Information

The relevant information and documents were collected from concerned local, national, regional and international sources. All the documents that were made available from government, NGO and research/academic institutions on disaster management, climate change and adaptation issues were reviewed. CDMP project documents, including Standing Order on Disaster (SOD)[draft version], CDMP log-frame etc were thoroughly reviewed by the study team for planning and designing the study.

Primary Data Collection

Primary data for the baseline study has been collected using different methods and tools which include:
- Sample survey of CDMP
- Focus Group Discussion (FGD)
- In-depth interview
- Workshops

While the sample survey was designed to gather information and data in a more structured format, the other methods including FGD, in-depth interview, and workshops were focused on open ended opinions and views of the target study groups. The detail analysis of FGD, In-depth interview and workshop is given in annex-1.

Sample Survey

As per requirement of the study, the sample survey was targeted to the CDMP stakeholders who belong to the Disaster Management Committee (DMC) at union, upazilla and district levels (please see map of the studied area in annex-2). The DMC members at each level were treated as a separate study population. The number of DMC members for each union, upazilla and district generally ranges from 30 to 50. The survey covered a representative sample of about 25% of DMC members from each union, upazilla and district under the study. Although a strict random sampling procedure could not be followed, it was ensured that the sample DMC members are selected without any choice to avoid any biases. The number of sample DMC members per union, upazilla and district is shown in the following table.

Table 2: Sample size of the DMC member in study districts

Name of District	Sample Size of DMC member				
	Sex	Union (4/district)	Upazilla (2/district)	District	total
Lalmonirhat	Male	29	18	15	62
	Female	11	2	0	13
	Both	40	20	15	75
Rajshahi	Male	35	19	15	69
	Female	5	1	0	6
	Both	40	20	15	75
Sirajganj	Male	33	19	14	66
	Female	7	1	1	9
	Both	40	20	15	75
Sunamganj	Male	34	20	14	68
	Female	6	0	1	7
	Both	40	20	15	75
Faridpur	Male	30	15	15	60
	Female	10	5	0	15
	Both	40	20	15	75
Satkhira	Male	33	20	13	66
	Female	7	0	2	9
	Both	40	20	15	75
Cox's bazar	Male	33	20	15	68
	Female	7	0	0	7
	Both	40	20	15	75
All district	Male	227	131	101	459
	Female	53	9	4	66
	Both	280	140	105	525

In addition to sample DMC members at union, upazilla and district levels, the survey has also covered national level stakeholders who are associated with CDMP process. At the national level sample included the CDMP stakeholders representing different ministries, agencies, NGOs, academic/research institutions etc.

Development of Survey Questionnaire

Three sets of questionnaires – one for union level, one for upazilla and district level and one for national level stakeholders were developed for the survey (**Annex-3**). All the questionnaires generally comprised four broad sections which are: risks/hazards/

vulnerability, disaster/disaster management, climate change issues and adaptation/ mitigation of climate change. Each section included as number of structured/closed ended question/variables to assess knowledge level and understanding of the CDMP stakeholder.

There were some common questions/variables in all the three questionnaires while some of the questions/variables were specific to a particular questionnaire. The questionnaires were designed in such a way that each question was accompanied by three/four answers of which only one was the appropriate in the given context. The respondents were allowed to choose from the given answers or he/she could give own opinion. In addition to the structured/close ended questions, there were also a few open ended questions in the questionnaire. Detail response of the sample survey is given in annex-7. It may be noted that open-ended issues, including opinions, experience of CDMP stakeholders were addressed through FGDs and in-depth-interview and workshops.

Focus Group Discussion (FGD)

The FGDs were conducted at the district, upazilla and union levels based on the checklists (Annex-4 Checklists for FGD). Attempts were made to involve participants from development sectors like agriculture, LGED, fisheries, forestry, health etc and also senior as well as knowledgeable persons in FGDs. The number of attendants of the FGD was 8-12. In some study areas, the attendants were more than that. The total FGD was 49 (1 from each of the 7 districts, 14 upazillas and 28 unions). The topic and the issues from the checklist developed were presented to the groups by a facilitator while another facilitator recorded the responses of the participants accordingly.

In-depth Interview

The in-depth interviews were taken at district, upazilla and union level based on the checklist (Annex-4 Checklists for In-depth Interview). The number of interviewee for district level was 5 per district while it was 3 for each upazilla and union. The total in-depth interview for the study was 161 (5 from each of the 7 districts, 3 from each of the 14 upazillas and also 3 from each of the 28 unions). Like FGD, questions were asked by an investigator and responses were taken by another.

Workshop

As part of the primary data collection, the workshop was organized at national, district and upazilla level (Please see photographic documentation in annex-5). Most of the committee members including the chair were invited to participate and share the knowledge and understanding on disaster risk management and climate change impacts in their respective site. There were total 22 workshops held at national, district and upazilla level (1 at national, 1 in each 7 districts and 14 upazillas). The major discussion was held on understanding of terms such as risk, hazard, vulnerability, adaptation and mitigation etc and also the management issues of disaster and climate change impact risks in local perspectives. Existing adaptation and options for coping with future changes were also discussed in the workshop.

Table 3: Summary information of the respondents/ participants covered by different methods

SL	Level	Unit	Number of Respondents/ participants			
			Sample Survey	**FGD**	**In-depth Interview**	**Workshop**
1	Union	28	10x28=280	1x28=28	3x28=84	-
2	Upazilla	14	10x14=140	1x14=14	3x14=42	1x14=14
3	District	7	15x7=105	1x7=7	5x7=35	1x7=7
4	National	-	1x27=27	-	-	1
	Total	-	552	49	161	22

Sample respondents (%) at different levels

National 5%
District 19%
Union 51%
Upazilla 25%
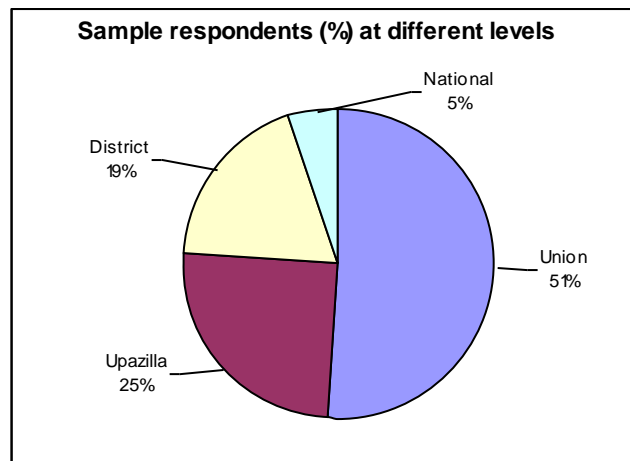
Training of Field Staff

BCAS deployed a field team comprising one field supervisor and two field investigators in each of the seven study areas. All the field staff had a bachelor or higher degree and some of them had previous experience in field data collection through survey, FGD, etc. A two day long training programme was organized for the field staff at BCAS headquarters. The training programme was conducted by the experts of the study team to explain the objectives and field research methodologies including interviews, FGDs, in-depth interview and workshops. The survey questionnaires, checklists, terms and definitions (please see annex-8) used in the data collection tools and related issues for FGDs, in-depth interview, workshops were discussed in detail during the training. The field staffs were encouraged to take proactive role and ask any questions for a clear understanding of their task. The experts explained all the issues and questions raised by the field staff during the training. The field staff also participated in role-play on field data collection methods which are carefully observed by the participants. The training exercise was especially fruitful in gathering field data/information by the field staff. The fieldwork was regularly monitored by the experts who also participated in the local workshops.

Development of Indicators

Development of indicators to assess knowledge and understanding of the CDMP stakeholders has taken into consideration that the indicators are quantifiable, measurable, comparable and easily interpretable. A set of specific indicators has been formulated to reflect knowledge level among the target CDMP stakeholders on different issues under disaster management, climate change and adaptation (please see the following table).

Table 4: Selected indicators of disaster risk management and climate change impacts knowledge and understanding among CDMP stakeholders

Issues/variables	Broad indicators	Specific indicators
Knowledge and understanding on disaster and disaster risk management	Average % of respondents having clear Knowledge and Understanding on hazard, disaster and disaster risk management	% of male respondents having knowledge and understanding on the definitions of hazard
		% of female respondents having knowledge and understanding on the definitions of hazard
		% of male respondents having knowledge and understanding on the definitions of risk
		% of female respondents having knowledge and understanding on the definitions of risk
		% of male respondents having knowledge and understanding on the definitions of mitigation
		% of female respondents having knowledge and

Issues/variables	Broad indicators	Specific indicators
		understanding on the definitions of mitigation
		% of male respondents having knowledge and understanding on the definitions of flood and flash flood
		% of female respondents having knowledge and understanding on the definitions of flood and flash flood
		% of male respondents having knowledge and understanding on the definitions of drought
		% of male and female respondents having knowledge and understanding on the definitions of drought
		% of male respondents having knowledge and understanding on the definitions of tropical cyclone
		% of female respondents having knowledge and understanding on the definitions of tropical cyclone
		% of male respondents having knowledge and understanding on the definitions of tornadoes
		% of female respondents having knowledge and understanding on the definitions of tornadoes
		% of male respondents having knowledge and understanding on the definitions of disaster
		% of female respondents having knowledge and understanding on the definitions of disaster
		% of male respondents having knowledge and understanding on the impact of river bank erosion on the land of Bangladesh
		% of female respondents having knowledge and understanding on the impact of river bank erosion on the land of Bangladesh
		% of male respondents having knowledge and understanding on the human induced hazards
		% of female respondents having knowledge and understanding on the human induced hazards
		% of male respondents having knowledge and understanding on the definitions of SODM
		% of female respondents having knowledge and understanding on the definitions of SODM
		% of male respondents having knowledge and understanding on the priority issues covered by SODM
		% of female respondents having knowledge and understanding on the priority issues covered by SODM
		% of male respondents having knowledge and understanding on responsibility of specific disaster management committee
		% of female respondents having knowledge and understanding on responsibility of specific disaster management committee
		% of male respondents received training on disaster risk management
		% of female respondents received training on disaster risk management
		% of male respondents having awareness on international activity on disaster risk reduction
		% of female respondents having awareness on international activity on disaster risk reduction
		% of male respondents having awareness on disaster management vision of the government of Bangladesh
		% of female respondents having awareness on disaster management vision of the government of Bangladesh

Issues/variables	Broad indicators	Specific indicators
		% of male respondents having awareness CDMP
		% of female respondents having awareness CDMP
		% of male respondents having awareness on the implementing agencies of CDMP
		% of female respondents having awareness on the implementing agencies of CDMP
		% of male respondents having awareness on the direct beneficiaries of CDMP
		% of female respondents having awareness on the direct beneficiaries of CDMP
		% of male respondents having knowledge and understanding on the risk management framework of CDMP
		% of female respondents having knowledge and understanding on the risk management framework of CDMP
		% of male respondents having knowledge and understanding on the risk management process of CDMP
		% of female respondents having knowledge and understanding on the risk management process of CDMP
Knowledge and understanding on Climate change and impacts	Average % of respondents having clear Knowledge and understanding on Climate change and impacts	% of male respondents having knowledge and understanding on the definitions/meaning of "climate change"
		% of female respondents having knowledge and understanding on the definitions/meaning of "climate change
		% of male respondents having knowledge and understanding on the possible impact of "climate change
		% of female respondents having knowledge and understanding on the possible impact of "climate change
		% of male respondents having knowledge and understanding on the basics of "climate change (types of GHGs, source of GHGs etc)
		% of female respondents having knowledge and understanding on the basics of "climate change (types of GHGs, source of GHGs etc)
		% of male respondents having knowledge and understanding on the impacts of increasing GHG emission
		% of female respondents having knowledge and understanding on the impacts of increasing GHG emission
		% of male respondents having knowledge and understanding on the impacts of increasing GHG emission
		% of female respondents having knowledge and understanding on the impacts of increasing GHG emission
		% of male respondents having awareness on international treaties (Kyoto protocol, Montreal protocol)
		% of female respondents having awareness on international treaties (Kyoto protocol, Montreal protocol)

Issues/variables	Broad indicators	Specific indicators
Knowledge, understanding and practices on adaptation to disaster risk management and climate change impacts	Average % of respondents having clear Knowledge and understanding on adaptation to disaster risk and climate change impacts	% of male respondents having awareness on programmes/interventions being implemented in the respective area that address climate change
		% of female respondents having awareness on programmes/interventions being implemented in the respective area that address climate change
		% of male respondents having perception on existing coping strategies
		% of female respondents having perception on existing coping strategies
		% of male respondents having knowledge and understanding on community level adaptation practices (e.g. preparing community based highland at union level to address hazard)
		% of female respondents having knowledge and understanding on community level adaptation practices (e.g. preparing community based highland at union level to address hazard)
		% of male respondents having knowledge about who helped them to develop coping strategies
		% of female respondents having knowledge about who helped them to develop coping strategies
		% of male respondents having knowledge about formulation of National Adaptation Programmes of Action (NAPA) and formation of Designated National Authority (DNA)
		% of female respondents having knowledge about formulation of National Adaptation Programmes of Action (NAPA) and formation of Designated National Authority (DNA)

In addition to specific indicators, composite index and indicators have been developed highlighting the knowledge level on the broad areas of disasters management, climate change impacts and adaptation (please see following table).

Table 5: Composite index/indicator shows an average of the percentages of the respondents having clear understanding on the component issues under three broad categories

Indicators	Union	Upazilla	District	National
Average % of respondents having clear Knowledge and Understanding on hazard, disaster and disaster risk management	58.84	47.02	53.66	68.77
Average % of respondents having clear Knowledge and understanding on Climate change and impacts	53.50	66.58	74.66	71.86
Average % of respondents having clear Knowledge and understanding on adaptation to disaster risk and climate change impacts	85.0	88.20	90.0	62.05

Both the specific and composite indicators have been obtained which are disaggregated at level of the seven study districts and aggregated for the seven districts combined. Besides, disaggregated indicators have also been obtained for the male and female.

Data Analysis

Data analysis has been carried out keeping in mind the desired outputs and indicators for the baseline study. SPSS program has been used to obtain the outputs and indicators.

Simple statistical measures such as means, medians, standard deviations and percentages were obtained for the sake of analysis. Qualitative information through FGDs, In-depth interviews and workshops were also analyzed based on the records/notes taken during field work. The report has analyzed the data pertaining to appropriate response of the stakeholders. A list of the detailed response of the CDMP stakeholders in the study district is presented in Annex 7.

Draft Report

The research team has analyzed the data/information generated through different methods and prepared the draft report. This draft report will be presented to experts and relevant stakeholders at the national level consultation meeting for feedback.

Final Draft Report

The study team will incorporate the suggestions and feedback of stakeholders, finalize and submit it to CDMP.

Limitations of the Study

Although the baseline study has dealt with the knowledge and understanding relating to disaster, climate change and adaptation issues using multiple methods among CDMP stakeholders it is subject to some limitations and constraints. It is neither possible nor expected that such as baseline study covers all relating issues to disaster, climate change and adaptation within the scope of the work of the study. The survey, although has covered a significant number of stakeholders, there are some risk to generalize the survey results for all the CDMP stakeholders.

There is a tendency among respondents to engage in guess work in giving answers with multiple options, which therefore may not reflect the actual knowledge level at least for some respondents. The number of female respondents was rather small under the survey. The indicator values for the female respondents may therefore be subject to some biases and should be viewed with caution.

Despite all these limitations, the study provides fairly acceptable and reliable information/findings towards achieving the study objectives.

Chapter 3

Level of knowledge and understanding among CDMP Stakeholders

Short Profile of the Study Area

It may be mentioned that the study districts were, to a various extent, different in terms of exposure to types of hazards and disaster. According to available literature Rajshahi and Lalmonirhut are primarily exposed to drought, Sirajganj and Faridpur faces flood and river bank erosion, Sunamganj is more exposed to flash flood while Satkhira and Cox Bazar are vulnerable to coastal/tidal flood, cyclone, sea level rise and salinity intrusion. In addition, all these study districts may be more or less exposed to other natural and human induced hazards such as tornado, water pollution, fire, accidental explosion etc. A short profile of the study districts are presented hereafter:

Lalmonirhat:

Lalmonirhat District with an area of 1241.46 sq km and population of over 1 million, is surrounded by Kuchbihar and Jalpaiguri districts of West Bengal (India) on the north, Rangpur district on the south, Kurigram district and Kuchbihar district of West Bengal on the east, Nilphamari and Rangpur districts on the west (Banglapedia, 2003). Average literacy of Lalmonirhut is 66.6%, male 63.9%, female 69.9%. The main occupations include agriculture 50.61%, agricultural laborer 26.05%, wage laborer 3.32%, commerce 7.97%, service 4.1% and others 7.95%. The major crops are paddy, tobacco, sugarcane, wheat, corn, potato, ground nut, mustard seed, tomato, onion, chilli, radish, cauliflower, cabbage and vegetables. There are 7 main rivers in this district, few of them such as Sarnamati, Trimohoni and Ratnai etc are almost silted. The district is prone to moderate drought and other hazards like lightening, river erosion and siltation etc. One of the major social problems of this district is polygamous character of the people here.

Rajshahi:

The area and the population of Rajshahi district is 2407.01 sq km and around 2.5 million respectively. The district is bounded by Naogaon district on the north, West Bengal of India, Kushtia district and the Ganges on the south, Natore district on the east and Nawabganj district on the west. The maximum and minimum annual average temperature is 37.8°C and 11.2°C. The annual rainfall of Rajshahi district is1862 mm. The average literacy is only 30.61% (Banglapedia, 2003). The major occupations include agriculture 38.73%, agricultural laborer 23.64%, wage laborer 3.50%, commerce 12.44%, service 8.81%, transport 2.36% and others 10.52%. Rajshahi is prone to drought, flood, river bank erosion etc.

Sirajganj:

Sirajganj District with an area of 2497.92 sq km and about 3 millions of people, bounded by Bogra district on the north, Pabna district on the south, Tangail and Jamalpur districts on the east, Pabna, Natore and Bogra districts on the west. Main rivers are Jamuna, Baral, Ichamati, Karatoa and Phuljuri. Average literacy of this district is 27%, male 33.4% and female 20.2%.The main occupations include 35.49%, agricultural labourer 21.45%, wage labourer 5.77%, commerce 11.98%, service 5.49%, handicraft 5.59%, industrial labourer 2.78%, others 11.45%. The primary hazards for this district are flood and river bank erosion.

Sunamganj:

Sunamganj District with an area of 3669.58 sq km and over 2 millions of people is bounded by Khasia and Jaintia hills (India) on the north, Habiganj and Kishoreganj districts on the

south, Sylhet district on the east, Netrokona and greater Mymensingh districts on the west. There are many *haors* and *beels* in this district. Average literacy rate of this district is 22.3% (male 27.5%, female 17.6%). The main hazards include flash flood, hillside erosion/hill cutting, water logging etc.

Faridpur:

Faridpur District with an area of 2072.72 sq km and about 2 millions of people is bounded by Rajbari and Manikganj districts on the north, Gopalganj district on the south, Dhaka, Munshiganj and Madaripur districts on the east, Norail, Magura and Rajbari districts on the west. The average literacy rate of this district is 37.44% (male 43.51%, female 30.76%). The main occupations include agriculture 42.76%, fishing 1.47%, agricultural labourer 21.67%, wage labourer 2.74%, commerce 10.63%, transport 2.06%, service 7.16%, others 11.51% (Banglapedia, 2003). The main hazards include flood and river bank erosion.

Satkhira:

Satkhira District with an area of 3858.33 sq km and about 2 millions of people is bounded by Jessore district on the north, the Bay of Bengal on the south, Khulna district on the east, Pargana district of West Bengal on the west. The annual average temperature is maximum 35.5°C, minimum 12.5°C; annual rainfall 1710 mm. *The a*verage literacy rate is 30.35% (male 39.7% and female 21%). *The main occupations* include agriculture 36.9%, fishing 1.86%, pisciculture 1.01%, agricultural labourer 26.74%, wage labourer 3.72%, commerce 13.32%, industry 1.49%, transport 2.46%, service 4.37%, and others 8.13%. The major hazards include coastal flood, storm surge, salinity intrusion, sea level rise, cyclone etc.

Cox's Bazar:

Cox's Bazar District with an area of 2491.86 sq km and over 2 millions of people is bounded by Chittagong district on the north, Bay of Bengal on the south, Bandarban district, Arakan (Myanmer) and the NAF River on the east, the Bay of Bengal on the west. The annual average temperature is 34.8°C (maximum) and 16.1°C (minimum) while the annual rainfall in this district is 4285 mm. The literacy is only 21.9% (male 28.2%, female 14.9%). The major hazards are sea storm, tidal bore, hurricane and cyclone etc. Sea level rise, salinity intrusion etc are the added threat for this district

Study Findings

This section deals with findings of the study conducted in the seven pilot districts under CDMP. The findings of the study has been qualitatively and quantitatively assessed to find disaster risk management and climate change impacts knowledge and understanding among CDMP stakeholders at national, district, upazilla and union level. The sample survey included 552 CDMP stakeholders. As mentioned earlier that all these CDMP stakeholders are the member of respective disaster management committee. Most of them belong to different relevant GOs, NGOs, CBOs, research, academic and religious institutions, and the rest are local elites as well as knowledgeable persons selected by the chair of the disaster management committee. The detail study population covered at union, upazilla and districts was given in chapter 2.2.

The findings on the disaster risk management and climate change impacts knowledge and understanding among CDMP stakeholders have been considered from two viewpoints-

a. Comparative analysis of knowledge on common issues: The common questions for the union, upzilla, district and national levels were analyzed together in order to compare the findings.

b. Analysis of knowledge on issues: Some of the questions that were specific for union, upzilla, district or national levels were analyzed separately for the stakeholders at four levels.

Both comparative and separate analysis was done under three broad areas which are as follows:

3.1   Knowledge and understanding on different types of hazards, risk, disaster and disaster risk management

This sectors deal with different terms and issues related to hazard, risk, disaster, disaster risk management practices at different level

3.1.1 Comparative Analysis of findings at union, upazilla, district and national level

The findings of the study have been qualitatively and quantitatively assessed to find CDMP stakeholder knowledge on the basics of hazard, disaster and disaster risk management. Since there were common questions for hazard, disaster and disaster risk at the union, upazilla, district and national levels, comparative analysis among these levels were carried out. Some of the questions were asked at the upzilla, district and national levels only. However, the analysis of the questions and issues are given below:

Knowledge and understanding of the definition of 'hazard': The working definition of 'hazard' can be stated as '**the potential cause of disaster**'. The correct response at the upzilla level was quite low, 52.9 percent only. The understanding of hazard at the District and National level were better than the upazilla level, 71.4 and 77.8 percent respectively, with having correct response. The lowest response to the definition of hazard was at the district level of Sunamganj (53.3%). (Table 1)

Table 6: Percentage of respondents having clear understanding on hazard at different levels of the study districts and national level

Name of District	Study location		
	Upazilla	District	National
Lalmonirhut	50.0	80.0	-
Rajshahi	55.0	60.0	-
Sirajganj	50.0	60.0	-
Sunamganj	55.0	53.3	-
Faridpur	50.0	86.7	-
Satkhira	55.0	80.0	-
Cox's bazar	55.0	80.0	-
All	52.9	71.4	77.8

Comparison of data, where the responses of male and female stakeholder were taken separately, showed that at the district and national levels female stakeholders had a more clear understanding of hazard than their male counterparts (Table 2). The total response by females were 100 percent for both district and national levels, while comparatively, the response for males at the district and national levels were 70.3 and 73.9 respectively. 100 percent response was also observed among the females at the district level of Sirajganj, Sunamganj and Satkhira. The lowest response to the definition of hazard was at the upzilla level with male and female response of 53.4 and 44.4 percent respectively.

The FGD at the upazilla level highlighted the fact that people often confuse the terms 'hazard' and 'risk'. Most of the participants were also confused with the terms hazard and disaster. Some of the respondents during workshops and In-depth interviews in both the upazilla and district level were found to have clear understanding of the definition of hazard.

Figure 1: Knowledgeable respondents (%) on hazard
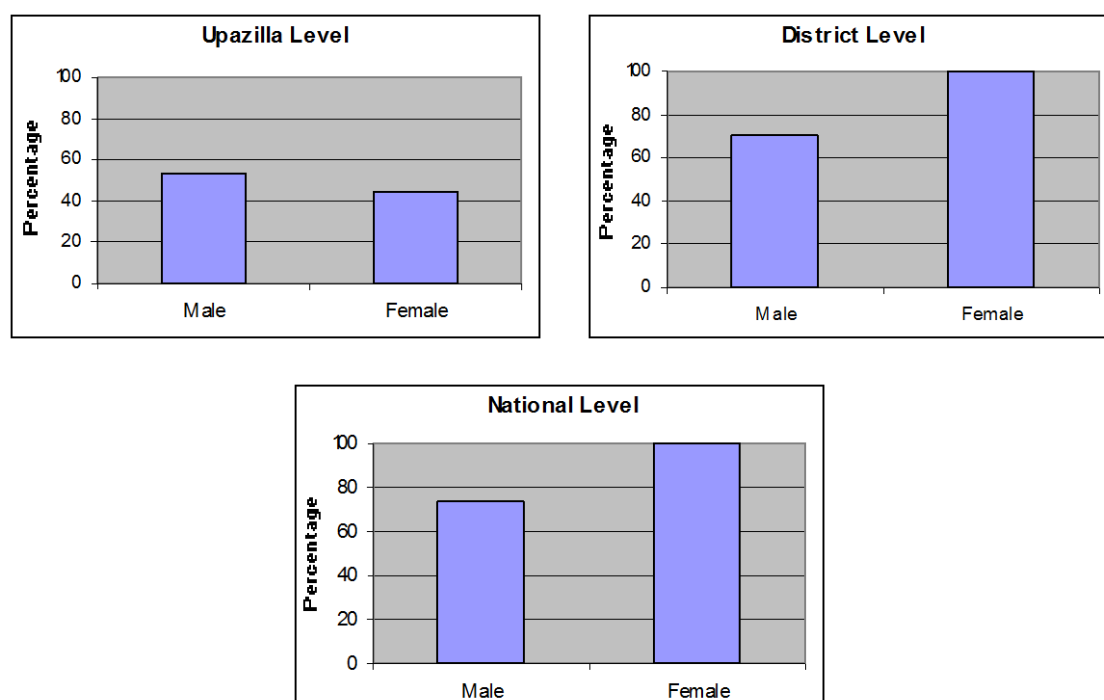
Knowledge and understanding of the definition of 'risk': In the questionnaire, the question of risk was set as "In your opinion, which of the following statement is most appropriate to describe risk?". The most appropriate response to this question, based on draft SODM, "**likelihood of harmful consequences**". The appropriate response was obtained 58.6, 56.4 and 54.3 percent at the union, upzilla and district level respectively. The highest response was 70.4 percent at the national level. At the union level the highest appropriate response was obtained from Lalmonirhat (70 percent) and the lowest was from Sirajganj (37.5 percent). The highest and lowest appropriate response at the upzilla level was 75 percent (Lalmonirhat and Rajshahi) and 30 percent in Satkhira respectively. The district level had the highest (80 percent) in Lalmonirhat and lowest (26.7 percent) in Sunamganj and Cox's Bazar among all the levels surveyed.

The 'risk' issue, particularly about the term, was broadly discussed in FGDs, workshops and in-depth interviews. The findings regarding the definition of risk were more or less similar for all the levels of administration except at the national level.

Table 7: Percentage of respondents having clear understanding of the definition of "risk" at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	70.0	75.0	80.0	-
Rajshahi	67.5	75.0	60.0	-
Sirajganj	37.5	60.0	73.3	-
Sunamganj	57.5	45.0	26.7	-
Faridpur	67.5	70.0	66.7	-
Satkhira	60.0	30.0	46.7	-
Cox's bazar	50.0	40.0	26.7	-
All	58.6	56.4	54.3	70.4

When understanding of male and female stakeholders is concerned the response from the females was higher at the union (female- 60.4% and males- 58.1%) and Upzilla levels

(female- 66.7 % and male- 55.7%). For both the district and national levels the males had higher appropriate response to the question than the females.

Table 8: Percentage of male and female respondents having clear understanding of the definition of risk at union, upazilla, district and national level

Name of District	Study location							
	Union		Upazilla		District		National	
	Male	Female	Male	Female	Male	Female	Male	Female
Lalmonirhat	72.4	63.6	72.2	100.0	80.0	-	-	-
Rajshahi	68.6	60.0	73.7	100.0	60.0	-	-	-
Sirajganj	39.4	28.6	63.2	0.0	71.4	100.0	-	-
Sunamganj	55.9	66.7	45.0	-	28.6	0	-	-
Faridpur	63.3	80.0	73.3	60.0	66.7	-	-	-
Satkhira	60.6	57.1	30.0	x	46.2	50.0	-	-
Cox's bazar	48.5	57.1	40.0	x	26.7	-	-	-
All	58.1	60.4	55.7	66.7	54.5	50.0	73.9	50.0

Knowledge and Understanding on 'Flood': The appropriate response for 'flood' was defined as '**the condition when water overflows the artificial or natural boundaries of a stream, river, or other body of wate**r' and only the union and national levels had an overall high understanding of 71.1 and 85.2 percent respectively. For upzilla and district clear understanding for flood was quite low at only 56.4 and 65.7% respectively. The highest awareness of flood at the union level was found at Sunamganj (95%) and the lowest at Cox's Bazar (71.1%). At the upzilla level the highest percentage was 70 in Lalmonirhat and lowest was 35 percent in Satkhira. At the district level the highest was 80 % and lowest 53.3 percent in Sunamganj and Rajshahi respectively.

Flood was the major topic of discussion in the FGDs and also in the workshops and in-depth interviews for all levels. According to the FGDs, Sunamganj has the highest perception of flood (as seen in the table), but similarly the districts of Lalmonirhat, Sirajganj and Faridpur also identified floods as the major disaster of the area.

Table 9: Percentage of respondents having clear understanding of the definition of flood at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	60.0	70.0	66.7	-
Rajshahi	72.5	55.0	53.3	-
Sirajganj	57.5	65.0	60.0	-
Sunamganj	95.0	55.0	80.0	-
Faridpur	87.5	55.0	73.3	-
Satkhira	77.5	35.0	60.0	-
Cox's bazar	47.5	60.0	66.7	-
All	71.1	56.4	65.7	85.2

Responses were also analyzed considering male and female separately. Except at the national level, where appropriate response from female was 100 percent, for the union, upzilla and district level clear understanding of flood was higher among males. Only at the union and district level of Sunamganj female understanding of flood was 100%. The highest response on flood among males was found to be 94.1 percent at Sunamganj (union level) and lowest was 35 percent in Satkhira (upzilla level). The lowest response from female was 28.6 percent for both Sirajganj and Cox's Bazar (union level).

Figure 2: Knowledgeable respondents (%) on flood
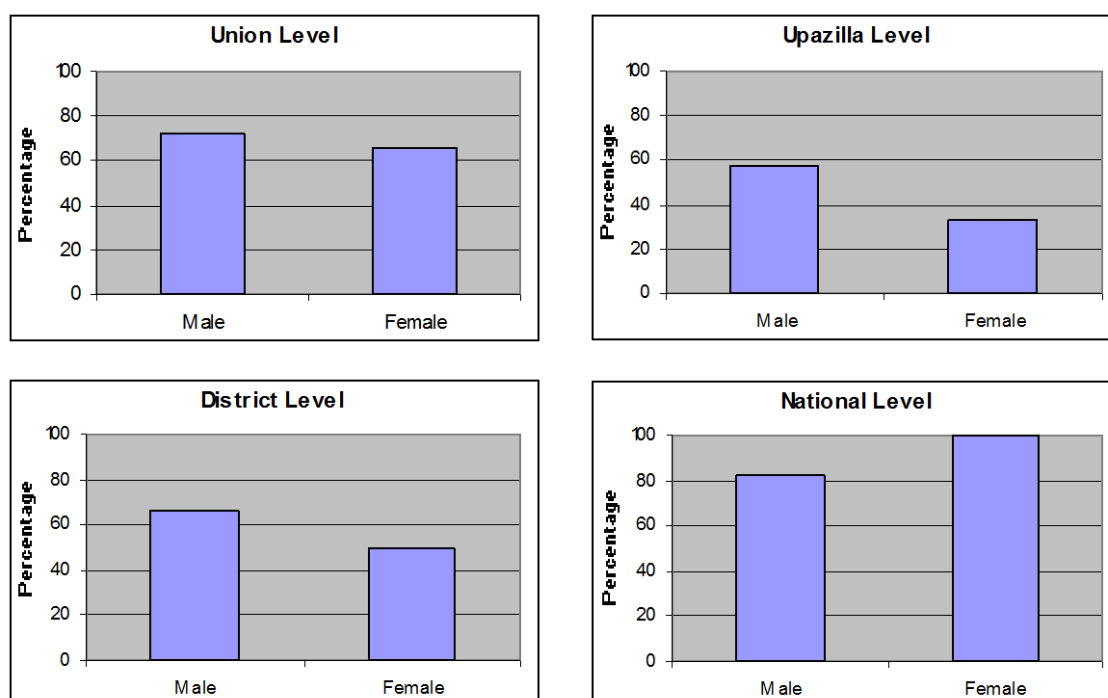
Knowledge and Understanding on 'Drought': According to The Australian Bureau of Meteorology drought can be defined as '**prolonged, abnormally dry period when there is not enough water for users' normal needs**'. Based on this definition the percentage of appropriate response to drought was determined. The stakeholders at the National level obtained the highest appropriate response of 88.9 percent followed by District level (72.4%), upzilla (62.9 %) and union (57.1 %). The highest percentage with clear understanding at the union level was 67.5 for both Lalmonirhat and Rajshahi. At the upzilla level Sirajganj, Faridpur and Satkhira had a clear understanding of 80.0 percent. Faridpur had the highest appropriate response of 93.3 percent while Cox's Bazar had the lowest response of 53.3 percent at the district level.

The stakeholders of Rajshahi and Lalmonirhat identified drought as the most important natural disaster during the FGDs, but understanding on drought is not significantly reflected in the table below. It was also mentioned that almost all the districts suffer from some seasonal drought related problems. This issue was broadly discussed in workshop and also in in-depth interviews. Some of the DMC members or the respondents do not know the scientific definition of drought but their perception and local knowledge about drought partially reflects the formal definition. This indicates that the CDMP stakeholders or the DMC members have knowledge regarding drought issues.

Table 10: Percentage of respondents having clear understanding of the definition of drought at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	67.5	75.0	66.7	-
Rajshahi	67.5	50.0	60.0	-
Sirajganj	65.0	80.0	73.3	-
Sunamganj	47.5	50.0	80.0	-
Faridpur	52.5	80.0	93.3	-
Satkhira	50.0	80.0	80.0	-
Cox's bazar	50.0	25.0	53.3	-
All	57.1	62.9	72.4	88.9

At the district level female response to the definition of drought was 100 percent appropriate over all since the responses from Sirajganj, Sunamganj and Satkhira were also 100 percent. On the other hand, overall male response at the District level was 71.3 percent and at the national level 91.3 percent.

Table 11: Percentage of male and female respondents having clear understanding of the definition of drought at union, upazilla, district and national level

Name of District	Study location							
	Union		Upazilla		District		National	
	Male	Female	Male	Female	Male	Female	Male	Female
Lalmonirhat	65.5	72.7	72.2	100.0	66.7	-	-	-
Rajshahi	74.3	20.0	52.6	0.0	60.0	-	-	-
Sirajganj	69.7	42.9	78.9	100.0	71.4	100.0	-	-
Sunamganj	47.1	50.0	50.0	-	78.6	100.0	-	-
Faridpur	53.3	50.0	73.3	100.0	93.3	-	-	-
Satkhira	51.5	42.9	80.0	-	76.9	100.0	-	-
Cox's bazar	48.5	57.1	25.0	-	53.3	-	-	-
All	58.6	50.9	61.1	88.9	71.3	100.0	91.3	75.0

Knowledge and Understanding of Tornado: The National Geographic Society describes tornado as "**a violently rotating column of air that forms at the bottom of a cloud and touches the ground**" and it was this definition that was used in the questionnaire. According to the findings, people's perception of tornado is not very high. Only at the national level, the percentage of people with clear understanding of tornado is 59.3. For the union, upazilla and district levels, percentage response is less than 50% (40.7, 39.3 and 45.7 respectively). The lowest response of 13.3 percent was found at Cox' Bazar (District level) while the highest response was 60 percent from Sunamganj and Satkhira again at the district level. At the upazilla level the highest response was 55 percent at Sirajganj and lowest was 25 percent in Sunamganj.

Tornadoes were hardly mentioned in the FGDs as hazard. It was not considered an important hazard due to infrequent appearance. But during workshop and in-depth interviews the people of Satkhira and Sirajganj have specifically mentioned tornadoes as an important issue. Though the response of many of participants didnot correctly reflect the working definition but their local knowledge on the characteristics of tonadoes and its effect on the community was more or less clear.

Table 12: Percentage of respondents having clear understanding of the definition of tornado at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	47.5	45.0	53.3	-
Rajshahi	35.0	35.0	46.7	-
Sirajganj	55.0	55.0	46.7	-
Sunamganj	35.0	25.0	60.0	-
Faridpur	35.0	35.0	40.0	-
Satkhira	45.0	50.0	60.0	-
Cox's bazar	32.5	30.0	13.3	-
All	40.7	39.3	45.7	59.3

At the district level, awareness about tornadoes was quite high among the female stakeholders (100 percent) while the overall male response was just 43.6 percent. At the national level the response of the male and female were 60.9 and 50 percent respectively. The upzilla level had appropriate male response of 37.4 percent and female response of

66.7 percent. There was 41.4 percent response from the male stakeholders at the union level while the female response was 37.7 percent.

Figure 3: Knowledgeable respondents (%) on tornado
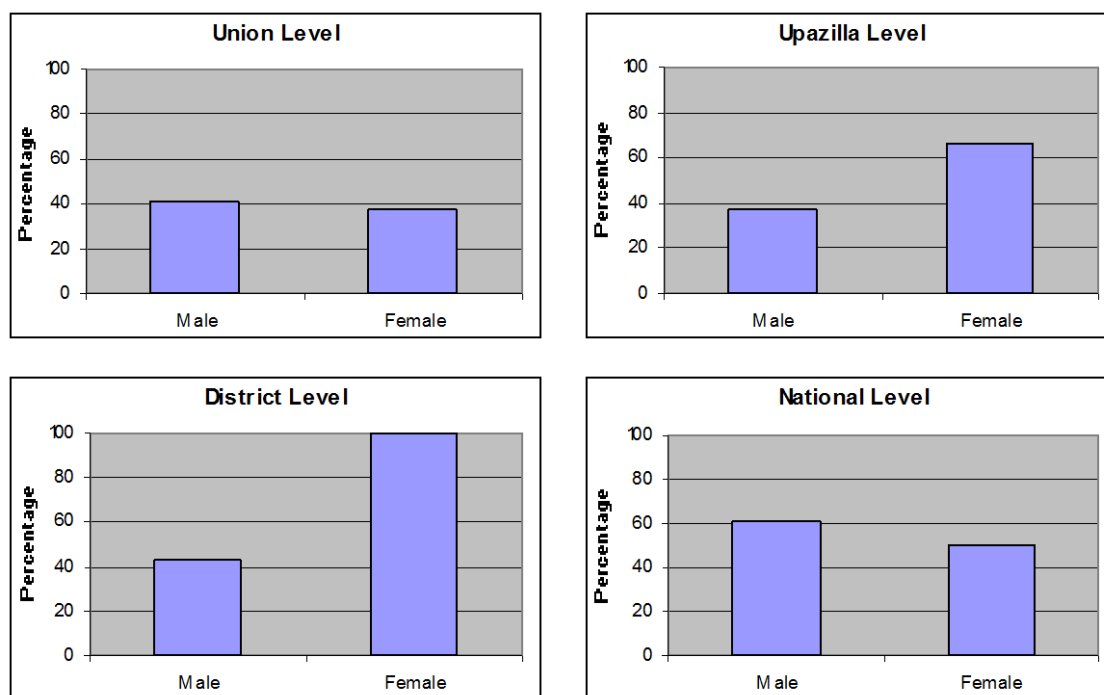
Perception on 'Disaster': Disaster may be defined as **a severe situation which is usually associated with serious damage to infrastructure and utilities, death, injuries and homelessness** (based on SODM).

In response to the question "What do we understand by 'disaster'?" most of the overall response was within the range of 70 – 74.1 percent. This denotes that the stakeholders have somewhat of a clear understanding of Disaster. The national level had the highest response of 74.1 percent followed by district level with an overall percentage of 70.5 and both upazilla and union having 70 percent. At the district level the highest response was from Faridpur and Cox's Bazar (86.7 percent) and lowest at Satkhira (40 percent). The highest and lowest scores at the upzilla level were 80 percent (Sirajganj and Cox's Bazar) and 55 percent (Faridpur) respectively. At the union level score ranged from 85 percent in Satkhira to 55 percent in Faridpur.

Table 13: Percentage of respondents having clear perception on disaster at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	82.5	75.0	53.3	-
Rajshahi	65.0	75.0	86.7	-
Sirajganj	60.0	80.0	60.0	-
Sunamganj	65.0	60.0	80.0	-
Faridpur	55.0	55.0	86.7	-
Satkhira	85.0	65.0	40.0	-
Cox's bazar	77.5	80.0	86.7	-
All	70.0	70.0	70.5	74.1

When the data was analyzed taking the response of the male and female stakeholders separately, the overall response had a greater range of 50 – 78.3 percent, with 78.3 percent appropriate response from males and 50 percent response from females at the national level. The highest response from males at the district level was 86.7 percent from Rajshahi, Faridpur and Cox's Bazar. For females at the district level the highest response was 100 percent from Sunamganj and Satkhira. For the Upazilla level, however, the lowest response among females was 0 percent in Rajshahi. At the union level the highest response among the females was 90.9 percent in Lalmonirhat while it was 84.8 percent among the males in Satkhira.

During FGD, workshop and in-depth interviews it was found that more or less all the stakeholders had some perception regarding disaster even though they did not know the proper definition of it. The people have mentioned that disaster is a way of life for most of them and it is nothing new.

Table 14: Percentage of male and female respondents having clear perception on disaster at union, upazilla, district and national level

Name of District	Study location							
	Union		Upazilla		District		National	
	Male	Female	Male	Female	Male	Female	Male	Female
Lalmonirhat	79.3	90.9	72.2	100.0	53.3	-	-	-
Rajshahi	65.7	60.0	78.9	0.0	86.7	-	-	-
Sirajganj	63.6	42.9	78.9	100.0	64.3	0	-	-
Sunamganj	64.7	66.7	60.0	-	78.6	100.0	-	-
Faridpur	60.0	40.0	53.3	60.0	86.7	-	-	-
Satkhira	84.8	85.7	65.0	-	30.8	100.0	-	-
Cox's bazar	75.8	85.7	80.0	-	86.7	-	-	-
All	70.5	67.9	70.2	66.7	70.3	75.0	78.3	50.0

Participation on Disaster Risk Management Training: A question was asked on whether the respondents received any disaster risk management training or not. Naturally, the response to this question was either YES or NO. At the district level, 62.9 percent of the respondents took part in some form of Disaster Risk Management Training, at the upazilla level 57.1 percent responded as Yes and at the union level again 62.9 percent had positive response. The highest positive response to training was 93.3 percent at Faridpur at the district level and the lowest positive response was from the upazilla level in Sirajganj.

Disaster risk management training issues were also discussed in the FGD, workshop and in-depth interviews. Many of the participants said that they did not attend any disaster risk management related training, which is reflected in the sample survey. But most of the participants at every administrative level have mentioned that they need rigorous training on disaster risk management to build up their capacity to adapt with future impacts.

Table 15: Percentage of respondents with training on disaster risk management at union, upazilla, district level

Name of District	Study location							
	Union		Upazilla		District		National	
	Yes	No	Yes	No	Yes	No	Yes	No
Lalmonirhat	40.0	60.0	45.0	55.0	60.0	40.0		
Rajshahi	45.0	55.0	60.0	40.0	66.7	33.3		
Sirajganj	37.5	62.5	35.0	65.0	40.0	60.0		
Sunamganj	82.5	17.5	70.0	30.0	66.7	33.3		
Faridpur	92.5	7.5	75.0	25.0	93.3	6.7		
Satkhira	77.5	22.5	50.0	50.0	80.0	20.0		
Cox's bazar	65.0	35.0	65.0	35.0	33.3	66.7		
All	62.9	37.1	57.1	42.9	62.9	37.1		

Table 16: Percentage of male and female respondents with training on disaster risk management at union, upazilla, district level

Name of District	Sex	Union			Upazilla			District			National		
		Yes	No	*Total*	Yes	No	*Total*	Yes	No	*Total*	Yes	No	*Total*
Lalmonirhat	male	48.3	51.7	100.0	50.0	50.0	100.0	60.0	40.0	100.0			
	female	18.2	81.8	100.0	-	100.0	100.0	-	-	-			
Rajshahi	male	45.7	54.3	100.0	57.9	42.1	100.0	66.7	33.3	100.0			
	female	40.0	60.0	100.0	100.0	-	100.0	-	-	-			
Sirajganj	male	42.4	57.6	100.0	36.8	63.2	100.0	35.7	64.3	100.0			
	female	14.3	85.7	100.0	-	100.0	100.0	100.0	-	100.0			
Sunamganj	male	85.3	14.7	100.0	70.0	30.0	100.0	64.3	35.7	100.0			
	female	66.7	33.3	100.0	-	-	-	100.0	-	100.0			
Faridpur	male	90.0	10.0	100.0	86.7	13.3	100.0	93.3	6.7	100.0			
	female	100.0	-	100.0	40.0	60.0	100.0	-	-	-			
Satkhira	male	78.8	21.2	100.0	50.0	50.0	100.0	84.6	15.4	100.0			
	female	71.4	28.6	100.0	-	-	-	50.0	50.0	100.0			
Cox's bazar	male	60.6	39.4	100.0	65.0	35.0	100.0	33.3	66.7	100.0			
	female	85.7	14.3	100.0	-	-	-	-	-	-			
All	male	64.3	35.7	100.0	58.8	41.2	100.0	62.4	37.6	100.0			
	female	56.6	43.4	100.0	33.3	66.7	100.0	75.0	25.0	100.0			

Perception on Standing Orders for Disaster (SOD): The "**SOD describes the detailed roles and responsibilities of committees, Ministries and other organizations in disaster risk management, and establishes the necessary actions required in implementing Bangladesh's Risk Reduction Model (defining the risk environment**, **managing the risk environment, and responding to the threat environment**. In response to a question on this (what is SOD?), only at the national level 51.9 percent of the stakeholders had a clear understanding of SOD. Knowledge at the other levels was quite low with 28.6 percent correct response at the district level, 30.7 percent at the upazilla level and 35.0 percent at the union level. The lowest appropriate response at the district level was 13.3 at Sunamganj and highest was 66.7 percent at Faridpur.

Regarding perception on SoD only few respondents in FGD and workshop could correctly mention what it is. This indicates that the DMC members are not quite aware of SoD or issues related to SoD

Table 17: Percentage of respondents having clear perception on SOD at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	20.0	20.0	40.0	-
Rajshahi	37.5	15.0	20.0	-
Sirajganj	50.0	50.0	20.0	-
Sunamganj	22.5	15.0	13.3	-
Faridpur	47.5	55.0	66.7	-
Satkhira	35.0	30.0	40.0	-
Cox's bazar	32.5	30.0	-	-
All	35.0	30.7	28.6	51.9

Clear understanding of SOD was highest among the male stakeholders at the national level with 56.5 percent response while the response from the female stakeholders was only 25 percent. Among all the females surveyed, the highest appropriate response was from the upazilla level (44.4 percent). The lowest female response of 0%, where none of the stakeholders gave satisfactory answers, was seen at the Upazilla level of Rajshahi and Sirajganj.

Figure 4: Knowledgeable respondents (%) on Standing Orders for Disaster (SoD)
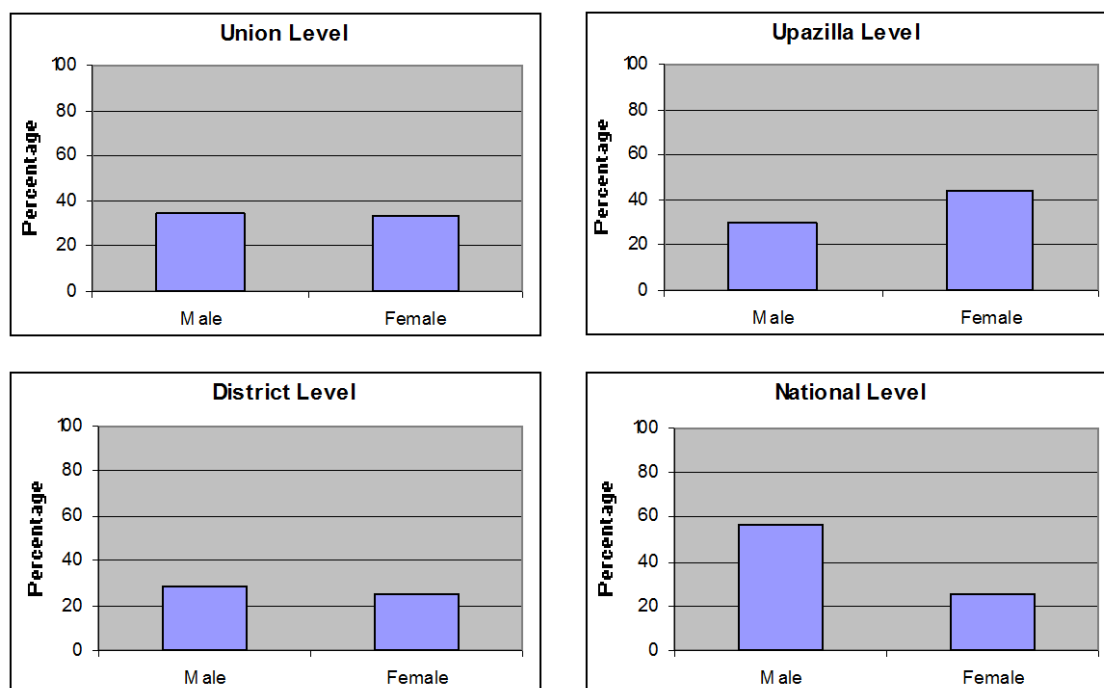
Understanding on the priority issue/issues covered in SOD: To ascertain the level of stakeholder awareness and knowledge about the issues covered by SOD, the stakeholders were asked to respond to the question "What is/are the priority issue/s covered in Standing Orders for Disaster Management (SOD) in the context of disaster risk management?. Of the given options "Disaster risk management" and "recovery" (both) were expected as appropriate response. According to the response of the stakeholders it is seen that people do not have much awareness about the priority issues/s covered in SODM as a whole. At the national level, 44.4 percent response was appropriate which is the highest among the district, upazilla and union levels which have an overall appropriate response of 24.8, 24.3 and 23.9 percent respectively. The district level had a highest response of 60 percent at Sunamganj and lowest of 6.7 percent in Sirajganj. For the upazilla level the highest was 35 percent in Sunamganj and lowest 15 percent in both Lalmonirhat and Satkhira.

Table 18: Percentage of respondents having clear understanding on the priority issues covered in SOD at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	30.0	15.0	33.3	-
Rajshahi	12.5	25.0	13.3	-
Sirajganj	25.0	25.0	6.7	-
Sunamganj	25.0	35.0	60.0	-
Faridpur	32.5	25.0	40.0	-
Satkhira	25.0	15.0	20.0	-
Cox's bazar	17.5	30.0	-	-
All	23.9	24.3	24.8	44.4

When male and female data was analyzed separately it was seen that at the national level, the female respondents with appropriate answers were 75 percent while the male respondents were only 39.1 percent. This shows that at the national level, the female stakeholders have a better perception regarding the priority issues in SOD than their male counterparts. The appropriate response from the district, upazilla and union level was significantly lower than the national level. Also at these levels there is not much difference in perception among the male and female stakeholders.

Table 19: Percentage of male and female respondents having clear understanding on the priority issues covered in SOD at union, upazilla, district and national level

Name of District	Study location							
	Union		Upazilla		District		National	
	Male	Female	Male	Female	Male	Female	Male	Female
Lalmonirhat	34.5	18.2	16.7	0.0	33.3	-		
Rajshahi	14.3	-	21.1	100.0	13.3	-		
Sirajganj	27.3	14.3	26.3	0.0	7.1	0.0		
Sunamganj	23.5	33.3	35.0	-	57.1	100.0		
Faridpur	33.3	30.0	26.7	20.0	40.0	-		
Satkhira	27.3	14.3	15.0	-	23.1	0.0		
Cox's bazar	15.1	28.6	30.0	-	0	-		
All	24.7	20.7	24.4	22.2	24.8	25.0	39.1	75.0

Awareness on formulating union level risk reduction and capacity building plans:
The question "Which of the following Disaster Management Committee (DMC) holds the responsibility to prepare a short, medium and long term vulnerability reduction and capacity building action plan at the union level?" was only applicable for the union, upazilla and district level only. Analysis of this question has shown that the overall highest appropriate response (Union level DMC) of was 80 percent at the union level. Compared to the union level, 46.4 and 46.7 percent response at the upazilla and district level respectively is not satisfactory. This highest appropriate response at the district level was 80 percent (Sirajganj and Satkhira) while the highest response at the union level was 92.5 percent (Cox's Bazar).

Table 20: Percentage of respondents having clear awareness on the responsibility of formulating union level risk reduction and capacity building plans

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	80.0	35.0	20.0	
Rajshahi	67.5	45.0	40.0	
Sirajganj	82.5	55.0	80.0	
Sunamganj	90.0	60.0	40.0	
Faridpur	72.5	45.0	40.0	
Satkhira	75.0	45.0	80.0	
Cox's bazar	92.5	40.0	26.7	
All	80.0	46.4	46.7	

Separate analysis of male and female response shoes that at the district level 50 percent of the females gave appropriate response to the question and 45.5 percent of the males gave appropriate response. Here the percentages are very close together. For the upzilla and union data the difference between the response of the male and female stakeholders is much higher. At the upazilla level the male perception was 48.1 percent while the female perception was only 22.2 percent. Similarly at the union level the male perception was higher than the female response.

Figure 5: Knowledgeable respondents (%) on the responsibility of formulating union level risk reduction and capacity building plans
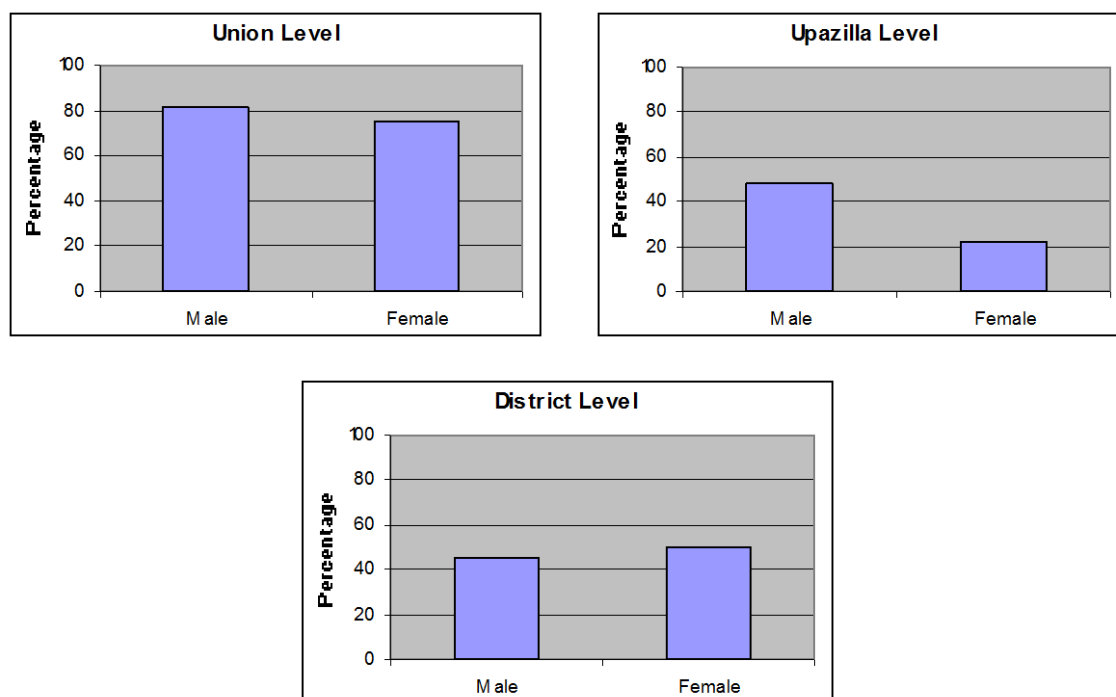
Stakeholder perception regarding Earthquake: In the questionnaire the stakeholders were asked the complete the statement "Earthquake is…" and four choices were given. The most appropriate response was "Earthquake is a natural hazard". Based on this response, the data was analyzed at the upzilla, district and national levels. As seen from the table below, the highest appropriate response was from the national level (33.3 %), while the district and upzilla level has an overall response of 20 and 15.7 percent respectively. The highest appropriate response at the district level was 33.3 percent in Faridpur and lowest was 6.7 percent in both Rajshahi and Cox's Bazar. At the upzilla level, people's perception about earthquake was highest at Satkhira (30%) and lowest at Rajshahi (5% only).

Table 21: Percentage of respondents having clear perception on earthquake at union, upazilla, district and national level

Name of District	Study location		
	Upazilla	**District**	**National**
Lalmonirhat	20.0	26.7	-
Rajshahi	5.0	6.7	-
Sirajganj	15.0	20.0	-
Sunamganj	10.0	20.0	-
Faridpur	15.0	33.3	-
Satkhira	30.0	26.7	-
Cox's bazar	15.0	6.7	-
All	15.7	20.0	33.3

At the national level we observe that the perception about earthquake among the female stakeholders is higher (50%) while the male stakeholders have only 30.4 percent appropriate response. Also at the district level the female perception about earthquake was higher at 25% than the male perception which was 19.8 percent. On the other hand, at the upzilla level female stakeholders from only four districts responded to the question. Among the four, only Faridpur had 20 percent appropriate response while Lalmonirhat, Rajshahi and Sirajganj had 0 percent appropriate response.

Earthquake is another issue that was not given much importance by the DMC members during the FGDs, workshop and also in the in-depth interviews though people from Cox's Bazar mentioned it in terms of effects on livelihood.

Table 22: Percentage of male and female respondents having clear perception on earthquake at union, upazilla, district and national level

Name of District	Study location					
	Upazilla		District		National	
	Male	Female	Male	Female	Male	Female
Lalmonirhat	22.2	0	26.7	-	-	-
Rajshahi	5.3	0	6.7	-	-	-
Sirajganj	15.8	0	14.3	100.0	-	-
Sunamganj	10.0	-	21.4	0	-	-
Faridpur	13.3	20.0	33.3	-	-	-
Satkhira	30.0	-	30.8	0	-	-
Cox's bazar	15.0	-	6.7	-	-	-
All	16.0	11.1	19.8	25.0	30.4	50.0

Stakeholder understanding of Flashflood: According to the questionnaire, the appropriate response to the definition of flashflood is "**flood which is caused by heavy and excessive rainfall in a short period of time**". This question was also confined to only the upzilla, district and national levels. The highest percentage with clear understanding of Flashflood was at the national level (88.9 percent), followed by district level (84.8 percent) and upzilla level (79.3 percent). At the district level the highest number of stakeholders with clear understanding of flashflood was 100 percent at Cox's Bazar and lowest was at Rajshahi and Satkhira (66.7 percent). The highest appropriate response at the upzilla level was 95 percent from Sirajganj, Sunamganj and Cox's Bazar, while the lowest was 50 percent at Satkhira.

The FGD report shows that flashflood was given importance by the stakeholders of Sunamganj and Cox's Bazar. DMC members of Sunamganj were very active on flash flood issues and clearly mentioned about the adverse impacts of flash flood in the area..

Table 23: Percentage of respondents having clear understanding on Flash flood at upazilla, district and national level

Name of District	Study location		
	Upazilla	District	National
Lalmonirhat	70.0	93.3	-
Rajshahi	70.0	66.7	-
Sirajganj	95.0	86.7	-
Sunamganj	95.0	93.3	-
Faridpur	80.0	86.7	-
Satkhira	50.0	66.7	-
Cox's bazar	95.0	100.0	-
All	79.3	84.8	88.9

Analysis of the male and female response shows that at the district level the female stakeholder understanding of Flashflood was 100 percent in all three districts surveyed (Sirajganj, Sunamganj and Satkhira). The overall male appropriate response at the district level was 84.2 percent while the highest male response was 100 percent at Cox's Bazar. At the national level the male and female response was 91.3 and 75.0 percent respectively. Furthermore at the Upzilla level, the overall female response was 60 percent even though there was 100 percent response from Lalmonirhat, Rajshahi and Sirajganj.

Figure 6: Knowledgeable respondents (%) on flash flood
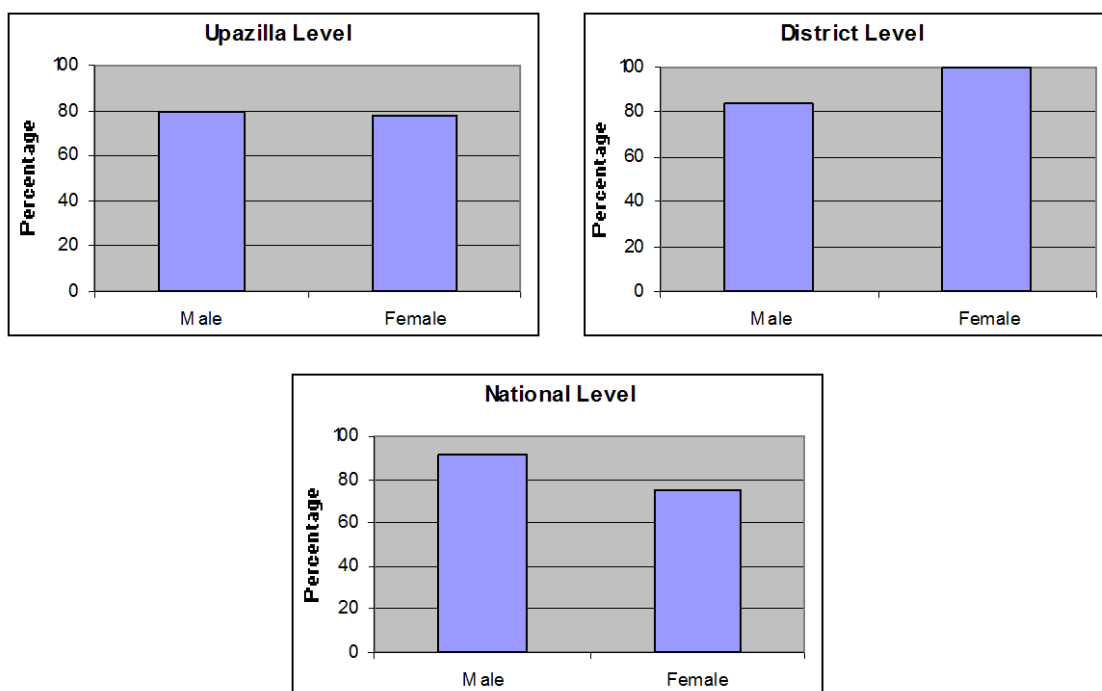
Stakeholder awareness about 'River Bank erosion': River bank erosion causes loss of 10,000 acres of land per year in Bangladesh. When the stakeholders were asked this question at the upzilla, district and national levels, the national level had the highest appropriate response of 77.8 percent. District level had a response of 59.0 percent, while the lowest was at the upzilla level (30 %). At the district level the highest appropriate response was 86.7 percent in Cox's Bazar and the lowest was 33.3 percent in Rajshahi. The upzilla level had the lowest response of 10 percent from Rajshahi and highest appropriate response of 55 percent from Cox's Bazar. The findings show that at the district and upzilla level, the highest and lowest response was from Cox's Bazar and Rajshahi respectively.

Most of the CDMP stakeholders or DMC members at both FGD and workshop agreed that River Bank erosion is a major problem especially for the districts Sirajganj, Faridpur and Lalmonirhat. Cox's Bazar also faces erosion of coastal lands. But clear perception on the impact of river bank erosion on amount of land all over Bangladesh was poor in both upazilla and district level. During FGDs river bank erosion was highlighted as a major area of concern of the stakeholders.

Table 24: Percentage of respondents having clear awareness on "river bank erosion" at upazilla, district and national level

Name of District	Percentage of Appropriate Response		
	Upazilla	District	National
Lalmonirhat	30.0	73.3	-
Rajshahi	10.0	33.3	-
Sirajganj	40.0	40.0	-
Sunamganj	30.0	73.3	-
Faridpur	20.0	66.7	-
Satkhira	25.0	40.0	-
Cox's bazar	55.0	86.7	-
All	30.0	59.0	77.8

The male and female awareness about destruction caused by river bank erosion was highest at the national level and lowest at the upazilla level. At the national level the appropriate response among the male and female stakeholders were 78.3 and 75 percent respectively, while at the upazilla level it was only 29.8 and 33.3 percent respectively. The district level had a mid-point response of 59.4 percent among males and 50 percent among females.

Table 25: Percentage of respondents having clear awareness on "river bank erosion" at upazilla, district and national level

Name of District	Percentage of Appropriate Response					
	Upazilla		District		National	
	Male	Female	Male	Female	Male	Female
Lalmonirhat	27.8	50.0	73.3	-	-	-
Rajshahi	10.5	0	33.3	-	-	-
Sirajganj	36.8	100.0	42.9	0	-	-
Sunamganj	30.0	-	71.4	100.0	-	-
Faridpur	20.0	20.0	66.7	-	-	-
Satkhira	25.0	-	38.5	50.0	-	-
Cox's bazar	55.0	-	86.7	-	-	-
All	29.8	33.3	59.4	50.0	78.3	75.0

3.1.2 Separate analysis of specific findings at different levels

It has been considered that the knowledge and understanding on disaster risk management and climate change impacts of the CDMP stakeholders at different levels (e.g. union, upazilla, district etc) would be dissimilar due to the factors of literacy, professional background and experiences, lack of learning opportunities etc. However, different specific issues related to disaster risk management and climate change impacts were placed at different levels (e.g. union, upazilla, district) to determine the level of knowledge and understanding. Findings on the specific issues at union, upazilla, district and national level are given below:

3.1.2.1 Union Level

Understanding on hazard: It was mentioned earlier that the hazard may be defined as '**the potential cause of disaster**'. At the union level, this definition was given and the question was whether it is **true** or **false**. The overall response for all the study districts for "true" was 93.2 percent (both). All the respondents (100 percent) in Satkhira answered "true" while in Rajshahi, 80 percent respondents opted for "true", which was the lowest among the districts. On the other hand, all the female respondents were for "true" in five districts (Rajshahi, Sunamganj, Faridpur, Satkhira and Cox's Bazar) while all the males were for "true" in only two districts (Sirajganj and Satkhira).   The female respondents had 94.3 percent appropriate response (true) while the male stakeholders were with 92.9 percent. The highest appropriate response, 100 percent (both), came from Satkhira followed by 97.5 percent in Sirajganj, Sunamganj, Faridpur and Cox's Bazar. The findings show that all the males and females responded to "true" in Satkhira.

The Focus Group Discussion (FGD) at the union level has shown that the stakeholders cannot clearly distinguish between the terms 'hazard',and 'risk'. However most of them agreed that there is the hazard of potential disasters occurring.

Table 26: Percentage of male and female respondents having appropriate response on hazard in the study districts?

Name of District	Percentage of respondents		
	Male	Female	Both (N=40)
Lalmonirhat	82.8 (n= 29)	81.8 (n=11)	82.5
Rajshahi	77.1 (n=35)	100.0 (n=5)	80.0
Sirajganj	100.0 (n=33)	85.7 (n=7)	97.5
Sunamganj	97.1 (n=34)	100.0 (n=6)	97.5
Faridpur	96.7 (n=30)	100.0 (n=10)	97.5
Satkhira	100.0 (n=33)	100.0 (n=7)	100.0
Cox's bazar	97.0 (n=33)	100.0 (n=7)	97.5
All	92.9 (n=227)	94.3 (n=53)	93.2 (n=280)

Perception on "human induced hazards": In response to the question "What are the human induced hazards?", fire, water pollution and explosion were expected as appropriate response. The analysis shows that 39.6 percent respondents identified all these three options while 18.2 and 17.9 percent identified fire and water pollution, and fire and explosion respectively. It was also found that overall 6.8, 5 and 3.9 percent respondents have successively identified fire, water pollution and explosion. On the other hand, 65 percent respondents (both) in Faridpur identified three appropriate options, highest among the study districts, while only 25 percent respondents (both) of Cox's Bazar mentioned three appropriate options, the lowest among the study districts. It may be noted that 2.9 percent respondents chose "others" as human induced hazards which include flood, drought, river bank erosion, earthquake and Arsenic pollution.

Table 27: Percentage of male and female respondents having response on types of human induced hazards in the study districts

Name of District	Sex	Type of human induced hazard							
		Fire	Water pollution	Explosion	Fire+ water pollution	Fire+ explosion	Water pollution+ explosion	Fire+ water pollution + explosion	Others
Lalmonirhat	Male (n=29)	6.9	6.9	-	24.1	3.4	6.9	51.8	-
	Female (n=11)	18.2	9.1	-	36.4	9.1	-	18.2	9.0
	Both (n=40)	10.0	7.5	-	27.5	5.0	5.0	42.5	2.5
Rajshahi	Male (n=35)	11.4	-	2.9	14.3	5.7	5.7	57.1	2.9
	Female (n=5)	-	-	-	-	-	-	80.0	20.0
	Both (n=40)	10.0	-	2.5	12.5	5.0	5.0	60.0	5.0
Sirajganj	Male (n=33)	3.0	6.1	-	21.2	27.3	6.1	36.3	-
	Female (n=7)	14.3	-	-	14.3	14.3	-	42.9	14.2
	Both (n=40)	5.0	5.0	-	20.0	25.0	5.0	37.5	2.5
Sunamganj	Male (n=34)	2.9	2.9	-	35.3	20.6	5.9	26.5	5.9

Name of District	Sex	Type of human induced hazard							
		Fire	Water pollution	Explosion	Fire+ water pollution	Fire+ explosion	Water pollution+ explosion	Fire+ water pollution + explosion	Others
	Female (n=6)	-	-	-	33.3	-	33.3	16.7	16.7
	Both (n=40)	2.5	2.5	-	35.0	17.5	10.0	25.0	7.5
Faridpur	Male (n=30)	-	3.3	3.3	-	23.3	3.3	66.8	-
	Female (n=10)	-	-	10.0	10.0	20.0	-	60.0	-
	Both (n=40)	-	2.5	5.0	2.5	22.5	2.5	65.0	-
Satkhira	Male (n=33)	6.1	9.1	15.2	15.2	24.1	6.1	21.2	3.0
	Female (n=7)	28.6	-	28.6	14.3	-	-	28.5	-
	Both (n=40)	10.0	7.5	17.5	15.0	20.0	5.0	22.5	2.5
Cox's bazar	Male (n=33)	9.1	9.1	-	15.2	27.3	9.1	30.2	-
	Female (n=7)	14.3	14.3	14.2	14.3	42.9	-	-	-
	Both (n=40)	10.0	10.0	2.5	15.0	30.0	7.5	25.0	-
All	Male (n=227)	5.7	5.3	3.1	18.1	18.8	6.2	41.0	1.8
	Female (n=53)	11.3	3.8	7.5	18.9	13.2	3.8	34.0	7.5
	Both (n=280)	6.8	5.0	3.9	18.2	17.9	5.7	39.6	2.9

Figure 7: Awareness level of human induced hazard in union level
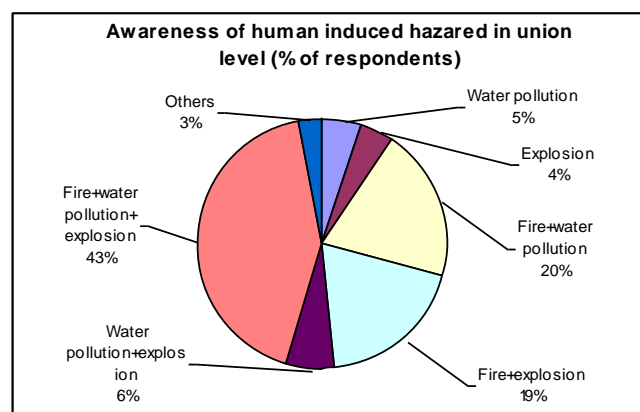
At FGD, workshop and in-depth interview it was found that most of the respondents have clear understanding on human induced hazard types. It was also found that some of the respondents could mention at least one of the human induced hazard which reflects that they have some degree of knowledge regarding this. Besides the given options in some district, for instance the respondents of Sirajganj mentioned cutting embankments, local conflicts are the human induced hazard. Respondents of Sunamganj mentioned unplanned urbanization as human induced hazard. In Cox's Bazar, hill cutting, shrimp cultivation infertile land, salt farming etc were mentioned as human induced hazard.

Perception on the relevance of the training materials with disaster issues: Four options (highly relevant, moderately relevant, not so relevant and don't know) were given as possible response to the question, "how relevant were the materials that were given in

training/workshop/meeting to address disaster issues". Most of the respondents (62.4 percent) said moderately relevant. The other three options such as highly relevant, not so relevant and don't know received 18.8, 10.8 and 8 percent respectively (**details in table)**.

Table 28: Percentage of male and female respondents having perception on degree of relevance of training materials to address disaster in the study districts

Name of District	Sex	Degree of relevance			
		Highly relevant	Moderately relevant	Not so relevant	Don't know
Lalmonirhat	Male (n=29)	14.3	78.6	-	7.1
	Female (n=11)	-	50.0	-	50.0
	Both (n=40)	12.5	75.0	-	12.5
Rajshahi	Male (n=35)	18.8	62.5	12.5	6.2
	Female (n=5)	-	100.0	-	-
	Both (n=40)	16.7	66.7	11.1	5.5
Sirajganj	Male (n=33)	14.3	64.3	21.4	-
	Female (n=7)	-	100.0	-	-
	Both (n=40)	13.3	66.7	20.0	-
Sunamganj	Male (n=34)	31.0	65.6	-	3.4
	Female (n=6)	25.0	75.0	-	-
	Both (n=40)	30.3	66.7	-	3.0
Faridpur	Male (n=30)	14.8	70.4	14.8	-
	Female (n=10)	10.0	70.0	20.0	-
	Both (n=40)	13.5	70.3	16.2	-
Satkhira	Male (n=33)	26.9	46.2	11.5	15.4
	Female (n=7)	40.0	-	-	60.0
	Both (n=40)	29.0	38.7	9.7	22.6
Cox's bazar	Male (n=33)	10.0	55.0	20.0	15.0
	Female (n=7)	-	83.3	16.7	-
	Both (n=40)	7.7	61.6	19.2	11.5
All	Male (n=227)	19.9	62.3	11.0	6.8
	Female (n=53)	13.3	63.4	10.0	13.3
	Both (n=280)	18.8	62.4	10.8	8.0

3.1.2.2 Upazilla Level

Perception on "human induced hazards": At the upazilla level questionnaire, a question was set as "What are the human induced hazards'?" A number of options were given as appropriate response including fire, water pollution and explosion. The analysis shows that 45 percent respondents identified all these three options while 18.5, 14.3 and 5 percent identified fire and water pollution, water pollution and explosion, and fire and explosion

respectively. It was also found that 10.7 percent respondents identified only water pollution as human induced hazard (**details in table**).

Table 29: Percentage of male and female respondents having response on types of human induced hazards in the study districts

Name of District	Sex	Percentage of Response							
		Fire	Water pollution	Explosion	Fire+ water pollution	Fire+ explosion	Water pollution+ explosion	Fire+water pollution+ explosion	Others
Lalmonirhat	Male (n=18)	5.6	16.7	-	5.6	-	16.7	50.0	5.4
	Female (n=2)	-	-	-	50.0	-	-	50.0	-
	Both (n=20)	5.0	15.0	-	10.0	-	15.0	50.0	5.0
Rajshahi	Male (n=19)	-	-	-	10.5	10.5	21.1	52.6	5.3
	Female (n=1)	-	-	-	-	-	-	100.0	-
	Both (n=20)	-	-	-	10.0	10.0	20.0	55.0	5.0
Sirajganj	Male (n=19)	5.3	-	-	21.1	10.5	10.5	52.6	-
	Female (n=1)	-	-	-	-	100.0	-	-	-
	Both (n=20)	5.0	-	-	20.0	15.0	10.0	50.0	-
Sunamganj	Male (n=20)	-	20.0	-	20.0	-	30.0	30.0	-
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=20)	-	20.0	-	20.0	-	30.0	30.0	-
Faridpur	Male (n=15)	-	6.7	6.7	-	-	-	86.6	-
	Female (n=5)	-	20.0	-	-	-	40.0	40.0	-
	Both (n=20)	-	10.0	5.0	-	-	10.0	75.0	-
Satkhira	Male (n=20)	5.0	10.0	-	30.0	5.0	10.0	35.0	5.0
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=20)	5.0	10.0	-	30.0	5.0	10.0	35.0	5.0
Cox's bazar	Male (n=20)	5.0	20.0	-	40.0	5.0	5.0	20.0	5.0
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=20)	5.0	20.0	-	40.0	5.0	5.0	20.0	5.0
All	Male (n=131)	3.1	10.7	0.8	19.1	4.6	13.7	45.0	3.0
	Female (n=9)	-	11.1	-	11.2	11.1	22.2	44.4	-
	Both (n=140)	2.9	10.7	0.7	18.5	5.0	14.3	45.0	2.9

Perception on the relevance of the training materials with disaster issues: The stakeholders were asked a question on the relevance of the training materials that address disaster issues. The question was "In your opinion, how relevant were the materials that have been given in training/workshop/meeting with addressing disaster issues" and four choices (highly relevant, moderately relevant, not so relevant and don't know) were given as response. Most of the respondents (83.6 percent) said that the training/workshop/ meeting were moderately relevant. The other three options such as highly relevant, not so relevant and don't know were identified by 8.8, 3.8 and 3.8 percent of the respondents respectively (**details in table)**.

Table 30: Percentage of male and female respondents having perception on degree of relevance of training materials to address disaster in the study districts

Name of District	Sex	Degree of relevance			
		Highly relevant	Moderately relevant	Not so relevant	Don't know
Lalmonirhat	Male (n=18)	22.2	66.7	11.1	-
	Female (n=2)	-	-	-	-
	Both (n=20)	22.2	66.7	11.1	-
Rajshahi	Male (n=19)	9.1	90.9	-	-
	Female (n=1)	-	100.0	-	-
	Both (n=20)	8.3	91.7	-	-
Sirajganj	Male (n=19)	-	85.7	-	14.3
	Female (n=1)	-	-	-	-
	Both (n=20)	-	85.7	-	14.3
Sunamganj	Male (n=20)	14.3	71.4	7.2	7.1
	Female (n=0)	-	-	-	-
	Both (n=20)	14.3	71.4	7.2	7.1
Faridpur	Male (n=15)	-	100.0	-	-
	Female (n=5)	-	100.0	-	-
	Both (n=20)	-	100.0	-	-
Satkhira	Male (n=20)	20.0	70.0	-	10.0
	Female (n=0)	-	-	-	-
	Both (n=20)	20.0	70.0	-	10.0
Cox's bazar	Male (n=20)	-	92.3	7.7	-
	Female (n=0)	-	-	-	-
	Both (n=20)	-	92.3	7.7	-
All	Male (n=131)	9.1	83.1	3.9	3.9
	Female (n=9)	-	100.0	-	-
	Both (n=140)	8.8	83.6	3.8	3.8

3.1.2.3 District Level

Perception on "human induced hazards": A question was set as "What are the human induced hazards?" at the district level questionnaire. Appropriate options included fire, water pollution and explosion. The analysis shows that 57.1 percent respondents identified all these three options while 10.5, 4.8 and 12.4 percent identified fire + water pollution, fire + explosion, and water pollution + explosion respectively. Single response was also received for fire (1.9 percent), water pollution (7.6 percent) and explosion (1.9 percent). It was also found that at least 3.8 percent respondents together identified others (e.g. flood, drought, river bank erosion etc) as human induced hazards (**details in following table**).

Table 31: Percentage of male and female respondents having response on types of human induced hazards in the study districts

Name of District	Sex	Types of human induced hazards							
		Fire	Water pollution	Explosion	Fire+ water pollution	Fire+ explosion	Water pollution+ explosion	Fire+ water pollution+ explosion	Others
Lalmonirhat	Male (n=15)	6.7	6.7	-	6.7	6.6	20.0	53.3	-
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	6.7	6.7	-	6.7	6.6	20.0	53.3	-
Rajshahi	Male (n=15)	-	-	-	33.3	-	-	66.7	-
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	-	-	-	33.3	-	-	66.7	-
Sirajganj	Male (n=14)	-	14.3	-	-	7.1	7.1	64.4	7.1
	Female (n=1)	-	-	-	-	-	-	100.0	-
	Both (n=15)	-	13.3	-	-	6.7	6.7	66.7	6.6
Sunamganj	Male (n=14)	-	7.1	-	14.3	-	21.4	50.1	7.1
	Female (n=1)	-	-	-	-	-	-	100.0	-
	Both (n=15)	-	6.7	-	13.3	-	20.0	53.3	6.7
Faridpur	Male (n=15)	-	6.7	-	6.7	-	33.3	53.3	-
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	-	6.7	-	6.7	-	33.3	53.3	-
Satkhira	Male (n=13)	7.7	-	7.7	7.7	7.7	7.7	53.8	7.7
	Female (n=2)	-	-	-	-	-	-	100.0	-
	Both (n=15)	6.7	-	6.7	6.7	6.6	6.7	60.0	6.6
Cox's bazar	Male (n=15)	-	20.0	6.7	6.7	13.3	-	46.7	6.6
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	-	20.0	6.7	6.7	13.3	-	46.7	6.6
All	Male (n=101)	2.0	7.9	2.0	10.9	5.0	12.9	55.3	4.0
	Female (n=4)	-	-	-	-	-	-	100.0	-
	Both (n=105)	1.9	7.6	1.9	10.5	4.8	12.4	57.1	3.8

Perception on the relevance of the training materials with regard to disaster issues: The stakeholders were asked the question "In your opinion, how relevant were the materials that were given in training/ workshop/meeting with regard to addressing disaster issues". Four options (highly relevant, moderately relevant, not so relevant and don't know) were given for the respondents to choose from. Most of the respondents (72.8 percent) chose moderately relevant. The other three options such as highly relevant, not so relevant and don't know were identified by 12.1, 13.6 and 1.5 percent respectively (**details in following table**).

Table 32: Percentage of male and female respondents having perception on degree of relevance of training materials to address disaster in the study districts

Name of District	Sex	Degree of relevance			
		Highly relevant	Moderately relevant	Not so relevant	Don't know
Lalmonirhat	Male (n=15)	11.1	88.9	-	-
	Female (n=0)	-	-	-	-
	Both (n=15)	11.1	88.9	-	-
Rajshahi	Male (n=15)	10.0	90.0	-	-
	Female (n=0)	-	-	-	-
	Both (n=15)	10.0	90.0	-	-
Sirajganj	Male (n=14)	20.0	20.0	40.0	20.0
	Female (n=1)	-	100.0	-	-
	Both (n=15)	16.7	33.3	33.3	16.7
Sunamganj	Male (n=14)	11.1	77.8	11.1	-
	Female (n=1)	-	100.0	-	-
	Both (n=15)	10.0	80.0	10.0	-
Faridpur	Male (n=15)	7.1	85.8	7.1	-
	Female (n=0)	-	-	-	-
	Both (n=15)	7.1	85.8	7.1	-
Satkhira	Male (n=13)	27.3	45.5	27.2	-
	Female (n=2)	-	100.0	-	-
	Both (n=15)	25.0	50.0	25.0	-
Cox's bazar	Male (n=15)	-	60.0	40.0	-
	Female (n=0)	-	-	-	-
	Both (n=15)	-	60.0	40.0	-
All	Male (n=101)	12.7	71.4	14.3	1.6
	Female (n=4)	-	100.0	-	-
	Both (n=105)	12.1	72.8	13.6	1.5

Regarding degree of relevance of the training materials on disaster issues most of the participants mentioned that these were moderately relevant in both upazilla and district level FGD, workshop and in-depth interviews conducted in the study area.

3.1.2.4 National Level

Stakeholders' perception on the definition of "mitigation and tropical cyclone": The draft SOD mentions mitigation as **the process of implementing measures that eliminate or significantly reduce the risks associated with the impact of potential hazards**. This definition was given as one of the four options to the question in the sample survey at the national level. The analysis shows that 88.9 percent respondents (both) identified this as the appropriate option. Furthermore, 87 percent male respondents could

identify the appropriate choice while 100 percent female stakeholders did the same. Regarding Tropical Cyclone the National Oceanic and Atmospheric Administration (NOAA) defined it as "a warm-core non-frontal synoptic-scale cyclone, originating over tropical or subtropical waters, with organized deep convection and a closed surface wind circulation about a well-defined center". It was found that 85.2 percent of the national level respondents could identify this option as appropriate response to the question on the definition of tropical cyclone.

Table 33: Percentage of male and female respondents having appropriate response on definition of mitigation and tropical cyclone

Sex	Percentage of appropriate respondents to different terms	
	Mitigation	**Tropical cyclone**
Male (n=23)	87.0	91.3
Female (n=4)	100.0	50.0
Both (n=27)	88.9	85.2

Awareness on the World Conference on Disaster Reduction: To determine the awareness on international activity on disaster reduction, the question "In which year the World Conference on Disaster Reduction (WCDR) was held in Kobe, Japan?" was put forward. The WCDR was held in 2005. Only 37 percent respondents could correctly answer. It also shows that only 25 percent i.e. one out of four female respondent had the correct answer.

Table 34: Percentage of male and female respondents having clear awareness on international activity on disaster risk reduction

Sex	Percentage of respondents
Male (n=23)	39.1
Female (n=4)	25.0
Both (n=27)	37.0

Perception on disaster management vision of the Government of Bangladesh (GoB): A question was placed as "Which of the following statements may bear the message of the vision of the Government of Bangladesh in terms of disaster management?". The options were a. response at right time; b. reduce the vulnerability of people; c. both; and d. none. Appropriate option was (c) which is to reduce the vulnerability of the people by taking response at the right time. The analysis shows that 55.6 percent respondents could identify this option (**Details in table and annex).**

Table 35: Percentage of male and female respondents having clear perception on disaster management vision of the government of Bangladesh at the national level

Sex	Percentage of respondents
Male (n=23)	52.2
Female (n=4)	75.0
Both (n=27)	55.6

Awareness on the specific organizational responsibility of the government for driving national risk reduction programme: The Ministry of Food and Disaster

Management of the GoB holds the responsibility to drive the national disaster risk reduction programme. This option was given as one of the responses to the question "Which of the following ministries of the GoB is responsible for driving the national disaster risk reduction programme?". The appropriate response was very good as it was 88.9 percent (**details in table and annex**).

Table 36: Percentage of male and female respondents having clear perception on responsibility of specific GO on driving national risk reduction programme at the national level?

Sex	Percentage of respondents
Male (n=23)	91.3
Female (n=4)	75.0
Both (n=27)	88.9

Awareness on different issues of Comprehensive Disaster Management Programme (CDMP): The national level respondents were asked three consecutive questions to determine their awareness on CDMP. The questions were 1. What is CDMP? 2. Who manages CDMP? 3. Who are the direct beneficiaries of CDMP?. CDMP is basically an approach to reduce the long-term risk and to strengthen the operational capacities to improve recovery from disaster events in Bangladesh. It was found that 92.6 percent respondents could identify the appropriate option. CDMP is being managed by Disaster Management Bureau (DMB), Directorate of Relief and Rehabilitation (DRR) and Department of Environment (DoE). Only 40.7 percent respondents were correctly aware about this. Regarding the question on beneficiaries of CDMP, 70.4 percent appropriately identified that communities, community based organizations, NGOs through involvement in the process and GO officials through advocacy and awareness programmes were beneficiaries of CDMP.

Table 37: Percentage of male and female respondents having clear awareness on different issues of CDMP at the national level

Sex	Percentage of respondents to different issues of CDMP		
	What is CDMP?	Who manages CDMP?	Beneficiaries of CDMP?
Male (n=23)	91.3	39.1	69.6
Female (n=4)	100.0	50.0	75.0
Both (n=27)	92.6	40.7	70.4

Knowledge and understanding on "Risk Management Framework" on disaster issue: A question was placed as "Under which of the programmes the Risk Management Framework was developed to reach the goal of the government on disaster management". In fact, this framework was developed under CDMP for disaster management issue. Other options were PRSP, CDSP and none. Nearly three-fourth (74.1 percent) respondents identified appropriate option, CDMP.

Table 38: Percentage of male and female respondents having clear understanding on relationship of risk management framework and CDMP at the national level

Sex	Percentage of respondents
Male (n=23)	69.6
Female (n=4)	100.0
Both (n=27)	74.1

Perception on Risk Management Process of CDMP: Regarding "Risk Management Process", 85.2 percent respondents chose the option "identify risk-analyze risk-evaluate risk and treat risk" as an appropriate response to the question "Which one is more appropriate in terms of Risk Management Process".

Table 39: Percentage of male and female respondents having clear perception on risk management process of CDMP at national level

Sex	Percentage of Correct Response
Male (n=23)	87.0
Female (n=4)	75.0
Both (n=27)	85.2

Awareness on the responsibilities of Inter-ministerial Disaster Management Committee to different issues: The respondents at the national level were asked two consecutive questions on the responsibilities of Inter-ministerial Disaster Management Committee. These were: 1. Who develops national and sub-national programs for risk reduction? and 2. Who monitor plans for prevention/mitigation, preparedness, emergency assistance, relief and rehabilitation? Only 37 percent respondents could appropriately identify that the IMDMCC develops national and sub national programs for risk reduction. Regarding second question, 74.1 percent respondents identified IMDMCC which was the appropriate response.

Table 40: Percentage of male and female respondents having clear awareness on the responsibilities of Inter-ministerial Disaster Management Coordination Committee at the national level

Sex	Percentage of respondents to different issues	
	Who develops national and sub-national programs for risk reduction (defining the risk environment)?	Who monitor plans for prevention/mitigation, preparedness, emergency assistance, relief and rehabilitation (managing the risk environment)?
Male (n=23)	34.8	69.6
Female (n=4)	50.0	100.0
Both (n=27)	37.0	74.1

3.2 Knowledge and Understanding on Climate Change and Impacts

This section deals with comparative and separate analysis on climate and impacts knowledge and understanding among CDMP stakeholders. These are as follows-

3.2.1. Comparative analysis of findings at union, upazilla, district and national level

The following issues have been comparatively analyzed to determine the knowledge and understanding among CDMP stakeholders:

Understanding of Climate Change: The stakeholders were asked the question "what do you understand by climate change?" and respondents at the national level was seen to have the most clear understanding of climate change with a response of 92.6 percent. According to IPCC, climate change usually means "any change in climate over time, whether due to natural variability or as a result of human activity". At the district, upzilla and union levels, the overall appropriate response was 54.3, 22.9 and 23.9 percent

respectively. The analysis of the data from the union and upzilla level shows that there is not enough clear understanding about climate change and more awareness and knowledge building programs are needed.

Table 41: Percentage of respondents having clear understanding on "climate change" at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	30.0	20.0	60.0	-
Rajshahi	12.5	20.0	73.3	-
Sirajganj	25.0	30.0	40.0	-
Sunamganj	30.0	35.0	46.7	-
Faridpur	7.5	10.0	26.7	-
Satkhira	40.0	35.0	53.3	-
Cox's bazar	22.5	10.0	80.0	-
All	23.9	22.9	54.3	92.6

At the national level clear understanding among the female stakeholders was 100 percent and among the males 91.3 percent. The district level had a response of 75 percent among the females and 53.5 percent of the males gave an appropriate response to the question. For the upzilla and union levels, the overall percentages of male and female responses were less than 25 percent.

The FGD however gave a totally different view to the perception of climate change. The survey results have shown that the stakeholders do not have a clear understanding of climate change, but during the FGDs the stakeholders gave comparatively good reflection regarding climate change and its associated events. It is clear from the FGD that even though the people do not understand the science behind climate change, they have identified shifting weather conditions and extreme events as impacts of climate change. Many of the respondents in almost all the study districts have mentioned about some changes which include-- increased temperature in summer, excessive or prolonged rainfall during rainy season or untimely rainfall, increased duration of flood, increase of fog during winter, increase of cold waves etc.

Figure 8: Knowledgeable respondents (%) on climate change

41
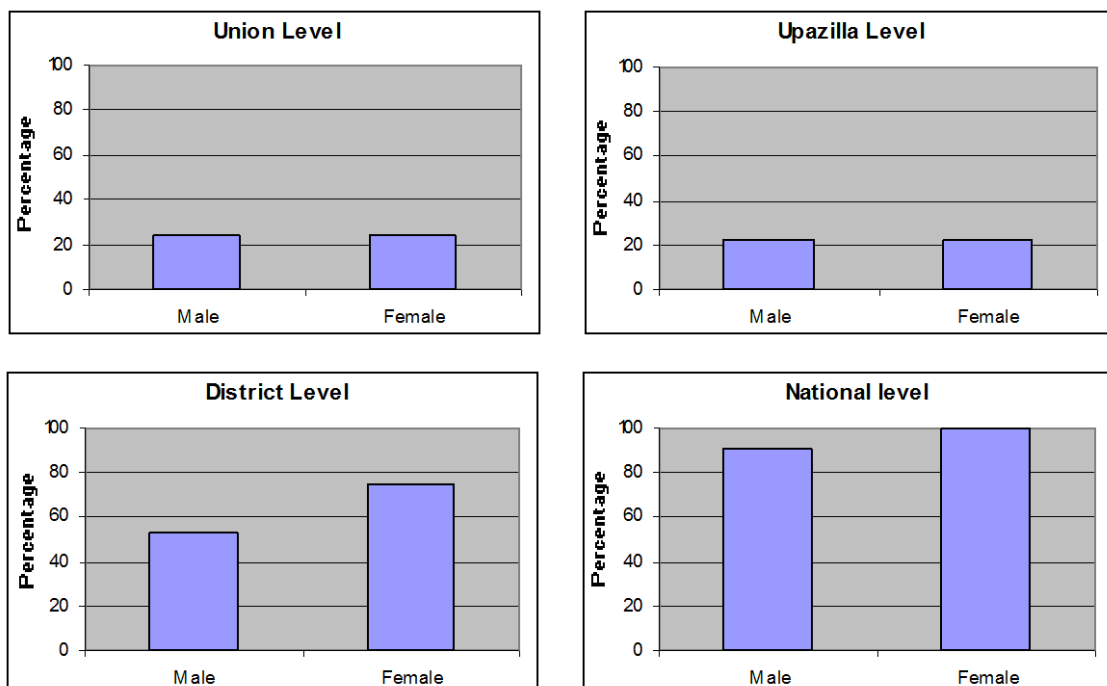
Knowledge and understanding on the possible impact of climate change: To the question "Which of the following may be the possible reason for drought, sea level rise and temperature increase?" Of the options, "climate change" was expected as appropriate response. This question was not asked at the national level. The overall responses for district, upzilla and union levels were 80.9, 79.3 and 83.1 percent respectively. This suggests that the stakeholders are aware of the possible reasons for the problems of drought, sea level rise and temperature increase even if they do not understand the concept of climate change properly. At the district level the highest response was 100 percent at Satkhira and lowest was 53.3 percent at Lalmonirhat. At both the upzilla and union level, the highest response was 90 percent at Faridpur and Sunamganj respectively.

Table 42: Percentage of respondents having knowledge and understanding on the possible impact of "climate change" at union, upazilla, district level

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	77.8	75.0	53.3	
Rajshahi	82.5	73.7	66.7	
Sirajganj	82.5	94.7	80.0	
Sunamganj	90.0	80.0	93.3	
Faridpur	84.2	90.0	93.3	
Satkhira	84.6	80.0	100.0	
Cox's bazar	79.5	73.7	80.0	
All	83.1	79.3	80.9	

When the responses of male and female stakeholders were analyzed separately, it was seen that both at the district and upzilla levels, the percentage of appropriate response from the female stakeholders were 100 percent for all districts surveyed. Also at the union level, highest percentage of appropriate response (100%) among the females was from Sunamganj and Satkhira. Overall findings show that the female stakeholders have more knowledge of climate change induced events than their male counterparts.

Even though the FGD has brought to light the limited awareness of climate change science among the stakeholders, climate change impacts have been the centre of focus. The stakeholders and people interviewed clearly stated that they believe that the change in weather patterns is the leading cause of other disasters such as severe floods, drought, salinity intrusion etc. The workshop and in-depth findings also support that the respondents are aware about the possible impacts of climate change. The stakeholders at Cox's Bazar reported frequent cyclones and tidal surges.

Table 43: Percentage of male and female respondents having clear understanding on the possible impact of "climate change" at union, upazilla, district level

Name of District	Study location							
	Union		Upazilla		District		National	
	Male	Female	Male	Female	Male	Female	Male	Female
Lalmonirhat	69.0	72.7	72.2	100.0	53.3	-		
Rajshahi	80.0	100.0	68.4	100.0	66.7	-		
Sirajganj	84.8	71.4	89.5	100.0	78.6	100.0		
Sunamganj	88.2	100.0	80.0	-	92.9	100.0		
Faridpur	83.3	70.0	86.7	100.0	93.3	-		
Satkhira	78.8	100.0	75.0	-	100.0	100.0		
Cox's bazar	78.8	71.4	70.0	-	80.0	-		
All	80.6	81.1	77.1	100.0	80.2	100.0		

Participation in climate change related training/ meeting: The stakeholders at the national, district, upzilla and union levels were asked if they ever participated in any climate change related training/ meetings and the responses were either YES or NO. At the national level 59.3 percent of the respondents said YES while the rest 40.7 said NO. The percentage of stakeholders that responded YES to training/ meetings/ workshop on climate change was dramatically less at the district, upzilla and union levels. At the district, upzilla and union levels, the percentage of respondents that gave the answer YES was 17.1, 15 and 14.3 percent respectively.

Table 44: Percentage of respondents with training on climate change at union, upazilla, district and national level

Name of District	Study location							
	Union		Upazila		District		National	
	Yes	No	Yes	No	Yes	No	Yes	No
Lalmonirhat	10.0	90.0	15.0	85.0	13.3	86.7	-	-
Rajshahi	10.0	90.0	15.0	85.0	-	100.0	-	-
Sirajganj	7.5	92.5	15.0	85.0	6.7	93.3	-	-
Sunamganj	15.0	85.0	15.0	85.0	13.3	86.7	-	-
Faridpur	12.5	87.5	10.0	90.0	40.0	60.0	-	-
Satkhira	22.5	77.5	20.0	80.0	26.7	73.3	-	-
Cox's bazaar	22.5	77.5	15.0	85.0	20.0	80.0	-	-
All	14.3	85.7	15.0	85.0	17.1	82.9	59.3	40.7

Table 45: Percentage of male and female respondents with training on climate change at union, upazilla, district and national level

Name of District	Sex	Study location											
		Union			Upazila			District			National		
		Yes	No	Total	Yes	No	Total	Yes	No	Total	Yes	No	Total
Lalmonirhat	male	10.3	89.7	100.0	16.7	83.3	100.0	13.3	86.7	100.0	-	-	-
	female	9.1	90.9	100.0	-	100.0	100.0	-	-	-	-	-	-
Rajshahi	male	8.6	91.4	100.0	15.8	84.2	100.0	-	100.0	100.0	-	-	-
	female	20.0	80.0	100.0	-	100.0	100.0	-	-	-	-	-	-
Sirajganj	male	6.1	93.9	100.0	15.8	84.2	100.0	7.1	92.9	100.0	-	-	-
	female	14.3	85.7	100.0	-	100.0	100.0	-	100.0	100.0	-	-	-
Sunamganj	male	17.6	82.4	100.0	15.0	85.0	100.0	14.3	85.7	100.0	-	-	-
	female	-	100.0	100.0	-	-	-	-	100.0	100.0	-	-	-
Faridpur	male	10.0	90.0	100.0	13.3	86.7	100.0	40.0	60.0	100.0	-	-	-
	female	20.0	80.0	100.0	-	100.0	100.0	-	-	-	-	-	-
Satkhira	male	21.2	78.8	100.0	20.0	80.0	100.0	30.8	69.2	100.0	-	-	-
	female	28.6	71.4	100.0	-	-	-	-	100.0	100.0	-	-	-
Cox's bazar	male	21.2	78.8	100.0	15.0	85.0	100.0	20.0	80.0	100.0	-	-	-
	female	28.6	71.4	100.0	-	-	-	-	-	-	-	-	-
All	male	13.7	86.3	100.0	16.0	84.0	100.0	17.8	82.2	100.0	60.9	39.1	100.0
	female	17.0	83.0	100.0	-	100.0	100.0	-	100.0	100.0	50.0	50.0	100.0

Knowledge about the types of Greenhouse Gases (GHG): The stakeholders at the upzilla and district level were asked about the main Greenhouse Gases (GHG). They were given five choices and asked to choose the most important gases that contributed to global warming. The overall appropriate response to the question was 69.5 percent at the district level and 60.7 percent at the upzilla level. The highest appropriate response at the district level was 86.7 percent in Sirajganj and Satkhira and the lowest was 40 percent at Rajshahi. At the upzilla level the highest response was 80 percent in Cox's Bazar and lowest was 45 percent in Rajshahi.

Table 46: Percentage of respondents having adequate knowledge on the Greenhouses gas at upazilla and district level

Name of District	Study location	
	Upazila	**District**
Lalmonirhat	60.0	86.7
Rajshahi	45.0	40.0
Sirajganj	60.0	86.7
Sunamganj	55.0	66.7
Faridpur	55.0	53.3
Satkhira	70.0	86.7
Cox's bazar	80.0	66.7
All	60.7	69.5

The male and female stakeholder data shows that at the district level the female stakeholders have better knowledge about the most important GHGs. The male response to the question was 69.3 percent while the female response was 75 percent. At the upzilla level, the female stakeholders' knowledge was reflected with 66.7 percent appropriate response. The overall male response at the upzilla level was 60.3 percent and the highest response was 80.0 percent at Cox's Bazar.

Discussion on GHGs and their sources took place at the District level FGD, workshops and in-depth interviews. The stakeholders at the district level comparatively have a better understanding of climate change and its impacts. They are aware that GHGs are responsible for climate change and global warming. There is also clear perception of the sources of GHGs and had the knowledge that the burning of fossil fuels emit CO_2. The stakeholders were also aware that the rich and industrialized nations emit more GHGs and they are the main culprits behind climate change.

Figure 9: Knowledgeable respondents (%) Greenhouse gases
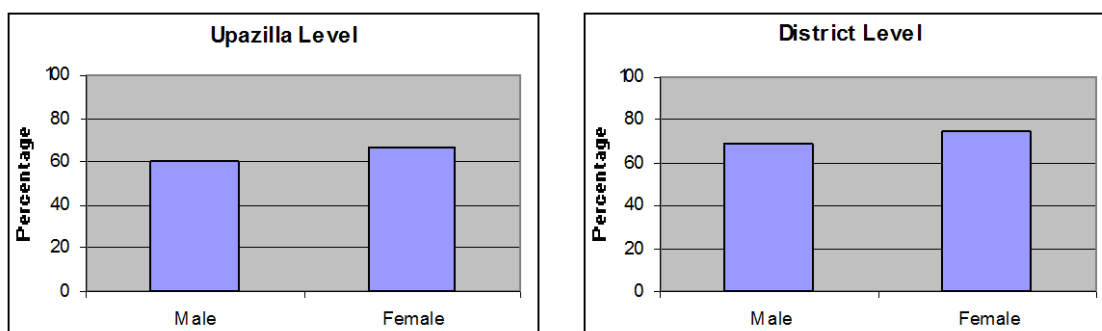
Stakeholder Knowledge on the Source of GHG: The stakeholders at the upzilla, district and national level were further asked to identify the main source of GHG. In this case the highest appropriate response was 70.4 percent at the national level, followed by 70 percent at the upzilla level and 64.8 percent at the District level. At the district level the highest response was at Sunamganj (93.3 %) and the lowest was at Lalmonirhat (26.7 %). The upzilla level had 85 percent as highest appropriate response at both Faridpur and Satkhira.

Table 47: Percentage of respondents having adequate knowledge on the source of greenhouse gas at upazilla, district and national level

Name of District	Study location		
	Upazila	District	National
Lalmonirhat	55.0	26.7	-
Rajshahi	75.0	80.0	-
Sirajganj	55.0	46.7	-
Sunamganj	60.0	93.3	-
Faridpur	85.0	86.7	-
Satkhira	85.0	86.7	-
Cox's bazar	75.0	33.3	-
All	70.0	64.8	70.4

The overall male and female knowledge regarding the source of GHG was between a narrow range of 64.4- 77.8 percent. At the national level male stakeholders had an appropriate response of 69.6 percent and higher female response was 75 percent. In both the district and upzilla level it can be seen that female stakeholder knowledge regarding source of GHG is higher than the male knowledge.

Table 48: Percentage of male and female respondents having adequate knowledge on the source of greenhouse gas at upazilla, district and national level

Name of District	Study location					
	Upazila		District		National	
	Male	Female	Male	Female	Male	Female
Lalmonirhat	55.5	50.0	26.7	-	-	-
Rajshahi	73.7	100.0	80.0	-	-	-
Sirajganj	52.6	100.0	50.0	0	-	-
Sunamganj	60.0	-	92.9	100.0	-	-
Faridpur	86.7	80.0	86.7	-	-	-
Satkhira	85.0	-	84.6	100.0	-	-
Cox's bazar	75.0	-	33.3	-	-	-
All	69.5	77.8	64.4	75.0	69.6	75.0

Stakeholder perception about the effects of increasing emission of GHG: The stakeholders at the upzilla, district and national level were asked about the possible effects of increasing emissions of GHG to gauge their level of knowledge regarding GHG. The response from this question was quite high with the district level having the overall highest appropriate response of 93.3 percent, followed by 90 percent from the upzilla level and 88.9 percent at the district level. The highest appropriate response at the district level was 100 percent at Faridpur and lowest was 86.7 percent at Sirajganj. At the Upzilla level the highest response also 100 percent at Faridpur and lowest appropriate response was 75 percent at Rajshahi.

During FGD, workshop and in-depth interviews many of the respondents could mention about the possible effects of increasing emission of GHG with their local language which reflects their clear perception on the issue.

Table 49: Percentage of respondents having clear perception on Effects of increased emission of greenhouse gas at upazilla, district and national level

Name of District	Study location		
	Upazila	**District**	**National**
Lalmonirhat	90.0	93.3	-
Rajshahi	75.0	93.3	-
Sirajganj	95.0	86.7	-
Sunamganj	95.0	93.3	-
Faridpur	100.0	100.0	-
Satkhira	90.0	93.3	-
Cox's bazar	85.0	93.3	-
All	90.0	93.3	88.9

Separate analysis of male and female stakeholder perception about the effects of increased GHG emission showed that at both the national and district level, female response was 100 percent. Only at the upzilla level the male perception was higher at 90.1 percent as opposed to female perception of 88.9 percent. The national level male stakeholder response was only 87 percent which is quite low compared to the female stakeholder response of 100 percent.

Figure 10: Knowledgeable respondents (%) on Effects of increased emission of greenhouse gas
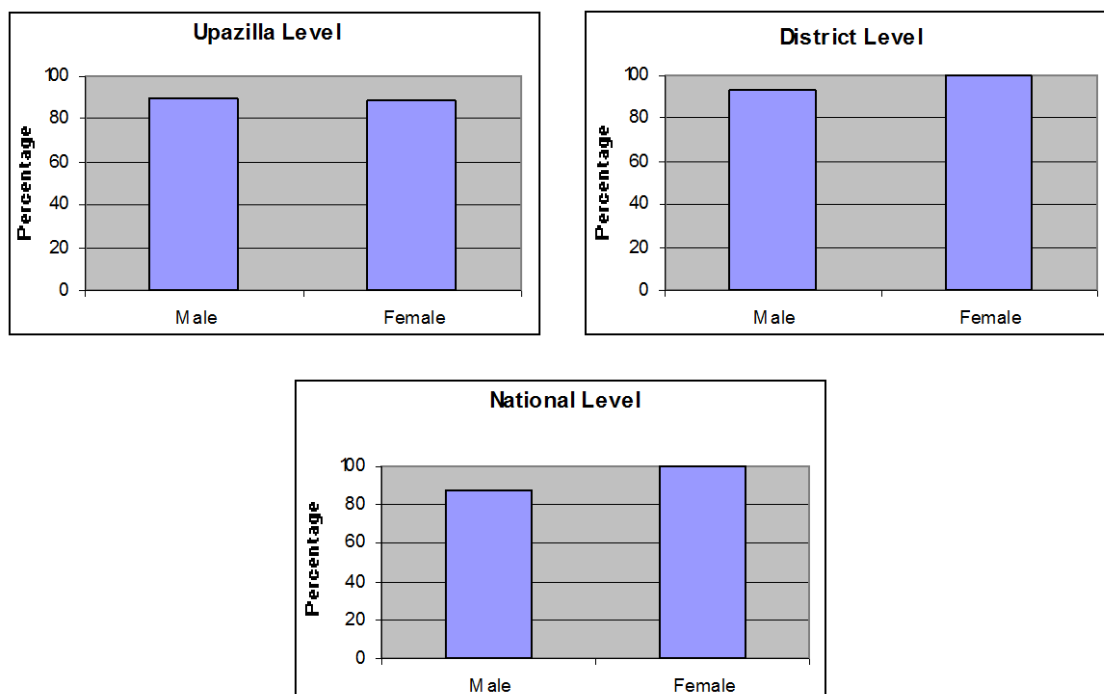
3.2.2. Separate analysis of findings at union, upazilla, district and national level

The following issues were separately analyzed at union, upazilla, district and national level to determine the knowledge and understanding on climate change and impacts among CDMP stakeholders:

3.2.2.1 Union Level

Perception on the sources of learning about climate change: In response to the question "how do you know about the climate change issues of Bangladesh?" the sources were set as TV, radio, news paper, internet, journalist, training/workshop/meeting and from other people. TV was identified by 33.7 respondents (both) while 32.2 and 21 percent identified radio and newspaper respectively as the sources of information. Only 5.1 percent respondents mentioned training/workshop/meeting as the learning sources about climate change. At least 2.6 percent respondents mentioned that they have learnt it from journalists of different media particularly print.

Table 50: Percentage of male and female respondents with different sources of learning about climate change issues in the study districts?

Name of District	Sex	Sources of learning						
		Radio	TV	News paper	Internet	Journalist	Training/meeting/workshop	From other people
Lalmonirhat	Male (n=29)	34.7	34.7	25.3	2.7	1.3	1.3	-
	Female (n=11)	32.0	44.0	24.0	-	-	-	-
	Both (n=40)	34.0	37.0	25.0	2.0	1.0	1.0	-
Rajshahi	Male (n=35)	33.7	33.7	21.1	3.2	1.1	4.2	3.0
	Female (n=5)	38.5	38.5	15.4	7.6	-	-	-
	Both (n=40)	34.3	34.2	20.4	3.7	0.9	3.7	2.8
Sirajganj	Male (n=33)	24.5	24.6	23.6	10.0	8.2	5.5	3.6
	Female (n=7)	33.3	40.0	13.3	-	6.7	-	6.7
	Both (n=40)	25.6	26.4	22.4	8.8	8.0	4.8	4.0
Sunamganj	Male (n=34)	34.3	38.6	14.3	-	2.9	8.6	1.3
	Female (n=6)	36.4	36.4	9.1	-	9.1	-	9.0
	Both (n=40)	34.6	38.2	13.6	-	3.7	7.4	2.5
Faridpur	Male (n=30)	27.8	34.7	27.8	-	-	8.3	1.4
	Female (n=10)	25.9	37.1	25.9	-	-	11.1	-
	Both (n=40)	27.3	35.3	27.3	-	-	9.1	1.0
Satkhira	Male (n=33)	30.7	29.7	23.8	3.0	3.0	5.9	3.9
	Female (n=7)	50.0	28.6	-	-	-	21.4	-
	Both (n=40)	33.0	29.6	20.9	2.6	2.6	7.8	3.5
Cox's bazar	Male (n=33)	38.0	36.7	16.5	-	1.3	2.5	5.0
	Female (n=7)	43.8	43.7	12.5	-	-	-	-
	Both (n=40)	38.9	37.9	15.8	-	1.1	2.1	4.2
All	Male (n=227)	31.6	32.6	21.9	3.2	2.8	5.1	2.8
	Female (n=53)	35.5	38.8	16.5	0.8	1.7	5.0	1.7
	Both (n=280)	32.2	33.7	21.0	2.8	2.6	5.1	2.6

Figure 11: Source of learning about climate change issues in union level
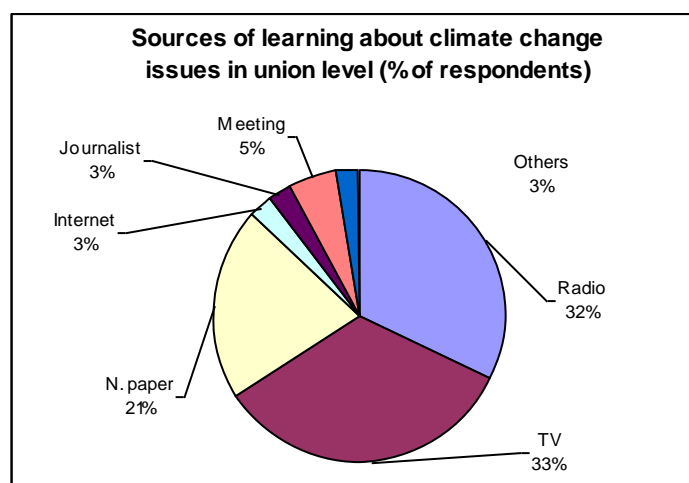
Perception on the Relevance of the Training Materials with Climate Change Issues:
In the questionnaire, the question of the relevance of the training materials with climate change issues was set as "How relevant were the materials that have been provided in climate change related training/workshop/meeting?" One of the three options (adequately, moderately or not so relevant) was expected as reply from each respondent. The analysis shows that 48.7 percent respondents mentioned "moderately relevant" while 29.7 percent said "adequately relevant" and 21.6 percent respondents mentioned "not so relevant". It was found that 100 percent males and females of Rajshahi were for "adequately relevant" while 50 percent male of Satkhira and female of Cox's Bazar was for "not so relevant".

Table 51: Percentage of male and female respondents having perception on degree of relevance of training materials and to climate change issues in the study districts

Name of District	Sex	Degree of relevance		
		Adequately relevant	Moderately relevant	Not so relevant
Lalmonirhat	Male (n=29)	33.3	66.7	-
	Female (n=11)	-	100.0	-
	Both (n=40)	25.0	75.0	-
Rajshahi	Male (n=35)	100.0	-	-
	Female (n=5)	100.0	-	-
	Both (n=40)	100.0	-	-
Sirajganj	Male (n=33)	66.7	-	33.3
	Female (n=7)	-	100.0	-
	Both (n=40)	50.0	25.0	25.0
Sunamganj	Male (n=34)	33.3	66.7	-
	Female (n=6)	-	-	-
	Both (n=40)	33.3	66.7	-
Faridpur	Male (n=30)	-	66.7	33.3
	Female (n=10)	-	100.0	-
	Both (n=40)	-	83.3	16.7

Name of District	Sex	Degree of relevance		
		Adequately relevant	Moderately relevant	Not so relevant
Satkhira	Male (n=33)	25.0	25.0	50.0
	Female (n=7)	-	-	-
	Both (n=40)	25.0	25.0	50.0
Cox's bazar	Male (n=33)	25.0	37.5	37.5
	Female (n=7)	-	50.0	50.0
	Both (n=40)	20.0	40.0	40.0
All	Male (n=227)	34.5	41.4	24.1
	Female (n=53)	12.5	75.0	12.5
	Both (n=280)	29.7	48.7	21.6

3.2.2.2 Upazilla level

Perception on the sources of learning about climate change: The stakeholders were asked to respond to "how do you know about climate change issues of Bangladesh?" with the choices of TV, radio, newspaper, internet, journalist, training/workshop/meeting and from other people. TV was identified by 30.3 percent respondents (both) as the portal of information while 27.6 and 23.7 percent identified radio and newspaper respectively. On the other hand, 5.8 percent respondents mentioned training/workshop/meeting as the learning source for climate change.

Table 52: Percentage of male and female respondents with different sources of learning about climate change issues in the study districts?

Name of District	Sex	Sources of learning						
		Radio	TV	News paper	Internet	Journalist	Training/meeting/ workshop	From other people
Lalmonirhat	Male (n=18)	19.6	32.7	26.1	6.5	6.5	4.3	4.3
	Female (n=2)	25.0	25.0	12.5	12.5	-	12.5	12.5
	Both (n=20)	20.4	31.5	24.1	7.4	5.6	5.6	5.4
Rajshahi	Male (n=19)	30.5	30.5	28.8	1.7	1.7	3.4	3.4
	Female (n=1)	33.4	33.3	-	-	-	-	33.3
	Both (n=20)	30.6	30.8	27.4	1.6	1.6	3.2	4.8
Sirajganj	Male (n=19)	27.0	28.6	22.2	6.3	4.8	6.3	4.8
	Female (n=1)	100.0	-	-	-	-	-	-
	Both (n=20)	28.1	28.1	21.9	6.3	4.7	6.3	4.6
Sunamganj	Male (n=20)	29.1	29.1	20.0	5.5	3.6	9.1	3.6
	Female (n=0)	-	-	-	-	-	-	-
	Both (n=20)	29.1	29.1	20.0	5.5	3.6	9.1	3.6
Faridpur	Male (n=15)	22.6	28.3	28.3	3.8	3.8	5.7	7.5
	Female (n=5)	13.3	33.4	33.3	-	-	6.7	13.3
	Both (n=20)	20.6	29.5	29.4	2.9	2.9	5.9	8.8

Name of District	Sex	Sources of learning						
		Radio	TV	News paper	Internet	Journalist	Training/meeting/ workshop	From other people
Satkhira	Male (n=20)	31.1	27.9	21.3	6.6	1.6	3.3	8.2
	Female (n=0)	-	-	-	-	-	-	-
	Both (n=20)	31.1	27.9	21.3	6.6	1.6	3.3	8.2
Cox's bazar	Male (n=20)	34.7	36.7	20.4	-	-	8.2	-
	Female (n=0)	-	-	-	-	-	-	-
	Both (n=20)	34.7	36.7	20.4	-	-	8.2	-
All	Male (n=131)	28.0	30.3	23.8	4.4	3.1	5.7	4.7
	Female (n=9)	22.3	29.6	22.2	3.7	-	7.4	14.8
	Both (n=140)	27.6	30.3	23.7	4.4	2.9	5.8	5.3

Perception on the Relevance of the Training Materials with Climate Change Issues:
Upazilla level respondents were asked about the relevance of the materials that were provided in different programmes with regard to climate change issues. The question was "How relevant were the materials that were provided in climate change related training/ workshop/meeting". The selections for response were adequately relevant, moderately relevant and not so relevant. Most of the respondents (60 percent) said moderately relevant while 30 and 10 percent were for "adequately relevant" and "not so relevant" respectively.

Table 53: Percentage of male and female respondents having perception on degree of relevance of training materials and to climate change issues in the study districts

Name of District	Sex	Degree of relevance		
		Adequately relevant	Moderately relevant	Not so relevant
Lalmonirhat	Male (n=18)	-	100.0	-
	Female (n=2)	-	-	-
	Both (n=20)	-	100.0	-
Rajshahi	Male (n=19)	50.0	50.0	-
	Female (n=1)	-	-	-
	Both (n=20)	50.0	50.0	-
Sirajganj	Male (n=19)	-	100.0	-
	Female (n=1)	-	-	-
	Both (n=20)	-	100.0	-
Sunamganj	Male (n=20)	66.7	33.3	-
	Female (n=0)	-	-	-
	Both (n=20)	66.7	33.3	-
Faridpur	Male (n=15)	-	100.0	-
	Female (n=5)	-	-	-
	Both (n=20)	-	100.0	-

Name of District	Sex	Degree of relevance		
		Adequately relevant	Moderately relevant	Not so relevant
Satkhira	Male (n=20)	50.0	25.0	25.0
	Female (n=0)	-	-	-
	Both (n=20)	50.0	25.0	25.0
Cox's bazar	Male (n=20)	33.3	33.4	33.3
	Female (n=0)	-	-	-
	Both (n=20)	33.3	33.4	33.3
All	Male (n=131)	30.0	60.0	10.0
	Female (n=9)	-	-	-
	Both (n=140)	30.0	60.0	10.0

* This table shows the analysis of those who participated in climate change related meeting/workshop/training before

Perception on the effect of Global Warming: In the sample survey questionnaire at upazilla level, a question was asked as to "What may occur if the "Global Warming" really happens"? Four options were given for response. This included sea level rise (SLR), drought, temperature variation and none. The ultimate effects of increasing GHG emission may include SLR, drought and temperature variation etc. All these three were expected as appropriate responses. The analysis shows that 20.8 percent respondents could identify all these three while 17.1 and 13.6 percent identified SLR + temperature variation, and SLR + drought respectively. In contrast, 22.1, 6.4 and 14.3 percent respondents identified SLR, drought and temperature variation correspondingly.

Table 54: Percentage of male and female respondents having perception on possible effects of global warming in the study districts

Name of District	Sex	Possible effects of global warming							
		SLR	Drought	Temperature variation	None	SLR+ Drought	Drought+ Temperature variation	SLR+ Temperature variation	SLR+Drought + Temperature variation
Lalmonirhat	Male (n=18)	22.2	5.5	38.9	-	11.1	5.6	5.6	11.1
	Female (n=2)	50.0	50.0	-	-	-	-	-	-
	Both (n=20)	25.0	10.0	35.0	-	10.0	5.0	5.0	10.0
Rajshahi	Male (n=19)	10.5	10.5	5.3	-	15.8	10.5	15.8	31.6
	Female (n=1)	-	-	-	100.0	-	-	-	-
	Both (n=20)	10.0	10.0	5.0	5.0	15.0	10.0	15.0	30.0
Sirajganj	Male (n=19)	15.8	10.5	15.8	-	15.8	-	21.0	21.1
	Female (n=1)	-	-	-	-	-	-	100.0	-
	Both (n=20)	15.0	10.0	15.0	-	15.0	-	25.0	20.0
Sunamganj	Male (n=20)	25.0	-	15.0	-	15.0	10.0	20.0	15.0
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=20)	25.0	-	15.0	-	15.0	10.0	20.0	15.0
Faridpur	Male (n=15)	26.7	-	-	-	-	-	20.0	53.3

Name of District	Sex	Possible effects of global warming							
		SLR	Drought	Temperature variation	None	SLR+ Drought	Drought+ Temperature variation	SLR+ Temperature variation	SLR+Drought + Temperature variation
	Female (n=5)	40.0	-	-	-	20.0	-	20.0	20.0
	Both (n=20)	30.0	-	-	-	5.0	-	20.0	45.0
Satkhira	Male (n=20)	30.0	5.0	5.0	-	10.0	10.0	20.0	20.0
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=20)	30.0	5.0	5.0	-	10.0	10.0	20.0	20.0
Cox's bazar	Male (n=20)	20.0	10.0	25.0	-	25.0	-	15.0	5.0
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=20)	20.0	10.0	25.0	-	25.0	-	15.0	5.0
All	Male (n=131)	21.4	6.1	15.3	-	13.7	5.3	16.8	21.4
	Female (n=9)	33.3	11.1	-	11.1	11.1	-	22.2	11.2
	Both (n=140)	22.1	6.4	14.3	0.7	13.6	5.0	17.1	20.8

Figure 12: Perception on possible effects of global warming in upazilla level

Perception on possible effects of global warming in upazilla level (% of respondents)

- SLR 22%
- Drought 6%
- Temperature variation 14%
- None 1%
- SLR+Drought 14%
- Drought + Temperature variation 5%
- SLR + Temperature Variation 17%
- SLR+Drought+ Temperature variation 21%
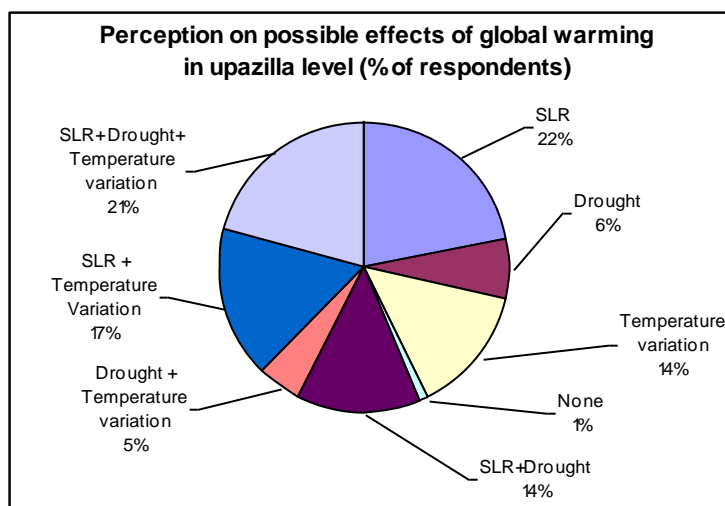
3.2.2.3 District level

Perception on the sources of learning about climate change: In response to the question "how do you know about climate change issues of Bangladesh', most of the respondents (30.9 percent) identified TV as the most important source of information. Radio, newspaper, internet, journalist, training/workshop/meeting were also identified by 24.9, 27.5, 4.7, 2.8 and 6 percent correspondingly.

Table 55: Percentage of male and female respondents with different sources of learning about climate change issues in the study districts?

Name of District	Sex	sources of learning about climate change issues						
		Radio	TV	News paper	Internet	Journalist	Training/ meeting/ workshop	From other people
Lalmonirhat	Male (n=15)	11.4	34.1	27.3	13.6	6.8	4.5	2.3
	Female (n=0)	-	-	-	-	-	-	-
	Both (n=15)	11.4	34.1	27.3	13.6	6.8	4.5	2.3
Rajshahi	Male (n=15)	33.3	33.3	26.7	-	2.2	-	4.5
	Female (n=0)	-	-	-	-	-	-	-
	Both (n=15)	33.3	33.3	26.7	-	2.2	-	4.5
Sirajganj	Male (n=14)	27.9	30.2	30.2	2.3	-	7.0	2.4
	Female (n=1)	33.3	33.3	33.4	-	-	-	-
	Both (n=15)	28.3	30.4	30.4	2.2	-	6.5	2.2
Sunamganj	Male (n=14)	21.6	32.5	24.3	2.7	-	13.5	5.4
	Female (n=1)	-	50.0	50.0	-	-	-	-
	Both (n=15)	20.5	33.4	25.6	2.6	-	12.8	5.1
Faridpur	Male (n=15)	24.4	31.1	28.9	6.7	2.2	6.7	-
	Female (n=0)	-	-	-	-	-	-	-
	Both (n=15)	24.4	31.1	28.9	6.7	2.2	6.7	-
Satkhira	Male (n=13)	23.9	26.1	21.7	6.5	6.5	10.9	4.4
	Female (n=2)	25.0	25.0	25.0	12.5	-	-	12.5
	Both (n=15)	24.1	25.9	22.2	7.4	5.6	9.3	5.5
Cox's bazar	Male (n=15)	31.8	29.5	31.8	-	2.3	2.3	2.3
	Female (n=0)	-	-	-	-	-	-	-
	Both (n=15)	31.8	29.5	31.8	-	2.3	2.3	2.3
All	Male (n=101)	25.0	30.8	27.3	4.6	3.0	6.3	3.0
	Female (n=4)	23.1	30.8	30.8	7.7	-	-	7.6
	Both (n=105)	24.9	30.9	27.5	4.7	2.8	6.0	3.2

Sources of learning about climate change was one of the issues discussed in FGD and workshop at different administrative levels. Most of them mentioned print media e.g news paper as the source of information. Meeting/workshop was also one the sources.

Perception on the Relevance of the Training Materials regarding Climate Change Issues: District level respondents were also asked about the relevance of the materials that were provided in different programmes with regard to climate change issues. The question asked was "How relevant were the materials that were provided in different training/ workshop/meeting regarding climate change issues. The options for response were adequately relevant, moderately relevant and not so relevant. Half of the respondents (50 percent) said moderately relevant while 11.1 and 38.9 percent were for "adequately

relevant" and "not so relevant" respectively. Interestingly, in Lalmonirhat and Cox's Bazar all the respondents said moderately relevant.

Table 56: Percentage of male and female respondents having perception on degree of relevance of training materials to climate change issues in the study districts

Name of District	Sex	Degree of relevance		
		Satisfactorily relevant	Moderately relevant	Not so relevant
Lalmonirhat	Male (n=15)	-	100.0	-
	Female (n=0)	-	-	-
	Both (n=15)	-	100.0	-
Rajshahi	Male (n=15)	-	-	-
	Female (n=0)	-	-	-
	Both (n=15)	-	-	-
Sirajganj	Male (n=14)	100.0	-	-
	Female (n=1)	-	-	-
	Both (n=15)	100.0	-	-
Sunamganj	Male (n=14)	50.0	-	50.0
	Female (n=1)	-	-	-
	Both (n=15)	50.0	-	50.0
Faridpur	Male (n=15)	-	50.0	50.0
	Female (n=0)	-	-	-
	Both (n=15)	-	50.0	50.0
Satkhira	Male (n=13)	-	25.0	75.0
	Female (n=2)	-	-	-
	Both (n=15)	-	25.0	75.0
Cox's bazar	Male (n=15)	-	100.0	-
	Female (n=0)	-	-	-
	Both (n=15)	-	100.0	-
All	Male (n=101)	11.1	50.0	38.9
	Female (n=4)	-	-	-
	Both (n=105)	11.1	50.0	38.9

* *This table shows the analysis of those who participated in climate change related meeting/workshop/training before*

Perception on the effect of Global Warming: The stakeholders were asked the question "What may occur if the "Global Warming" really happens"? The options for response included sea level rise (SLR), drought, temperature variation and none. In fact, the ultimate effect of increasing greenhouse gas emission may cause SLR, drought, temperature variation etc. The following table shows all the respondents identified at least one appropriate option. Some identified two of the three and some all three. All three (SLR, drought and temperature) were identified by 31.7 percent respondents. Furthermore, SLR

+ drought, drought + temperature variation, and SLR + temperature variation were consecutively identified by 8.7, 6.7 and 11.5 percent respondents. Only SLR was identified by 32.8 percent respondents while drought and temperature variation was identified by 1.9 and 6.7 percent respondents.

Table 57: Percentage of male and female respondents having perception on possible effects of global warming in the study districts

Name of District	Sex	Possible effects of global warming							
		SLR	Drought	Temperature variation	None	SLR+ Drought	Drought+ Temperature variation	SLR+ Temperature variation	SLR+Drought+ Temperature variation
Lalmonirhat	Male (n=15)	66.6	6.7	6.7	-	-	-	-	20.0
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	66.6	6.7	6.7	-	-	-	-	20.0
Rajshahi	Male (n=15)	-	-	-	-	26.6	6.7	26.7	40.0
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	-	-	-	-	26.6	6.7	26.7	40.0
Sirajganj	Male (n=14)	35.7	-	7.1	-	14.3	-	28.6	14.3
	Female (n=1)	-	100.0	-	-	-	-	-	-
	Both (n=15)	33.3	6.7	6.7	-	13.3	-	26.7	13.3
Sunamganj	Male (n=14)	30.7	-	7.7	-	-	-	15.4	46.2
	Female (n=1)	-	-	-	-	100.0	-	-	-
	Both (n=15)	28.6	-	7.1	-	7.1	-	14.3	42.9
Faridpur	Male (n=15)	13.3	-	-	-	6.6	6.7	6.7	66.7
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	13.3	-	-	-	6.6	6.7	6.7	66.7
Satkhira	Male (n=13)	7.6	-	7.7	-	7.7	30.8	7.7	38.5
	Female (n=2)	-	-	-	-	-	50.0	-	50.0
	Both (n=15)	6.6	-	6.7	-	6.7	33.3	6.7	40.0
Cox's bazar	Male (n=15)	80.0	-	20.0	-	-	-	-	-
	Female (n=0)	-	-	-	-	-	-	-	-
	Both (n=15)	80.0	-	20.0	-	-	-	-	-
All	Male (n=101)	34.0	1.0	7.0	-	8.0	6.0	12.0	32.0
	Female (n=4)	-	25.0	-	-	25.0	25.0	-	25.0
	Both (n=105)	32.8	1.9	6.7	-	8.7	6.7	11.5	31.7

3.2.2.4 National Level

Stakeholder's knowledge on Greenhouse gases (GHG): The greenhouse gases include methane, carbon dioxide, nitrous oxide and CFCs. In response to the question on what are the Greenhouse gases, only 14.8 percent respondents could identify all these four. Methane, Carbon dioxide and CFCs were identified by 22.3 percent, carbon dioxide and CFCs by 14.8

and only CFCs by 18.5 percent respondents (details in table and annex). However, the analysis shows that only few stakeholders (14.8 percent) have clear understanding on number of greenhouse gases and the others have partial knowledge of this.

Table 58: Percentage of male and female respondents of the national level having clear understanding on types of greenhouse gases

National	Sex	Greenhouse gases									
		Methane	Carbon dioxide	CFCs	Methane+ Carbon dioxide+ Nitrous oxide	Carbon dioxide + CFCs	Methane+ Carbon dioxide+ Nitrous oxide+ CFCs	Methane + CFCs	Methane + Carbon dioxide+ CFCs	Methane + Carbon dioxide	Carbon dioxide+ Nitrous oxide
	Male (n=23)	4.3	8.7	17.4	4.3	8.7	13.0	8.7	26.1	4.3	4.3
	Female (n=4)	-	-	25.0	-	50.0	25.0	-	-	-	-
	Both (n=27)	3.7	7.4	18.5	3.7	14.8	14.8	7.4	22.3	3.7	3.7

Knowledge and understanding on the future impact of climate change in coastal areas of Bangladesh: To determine the knowledge and understanding on the future impact of climate change in coastal areas of Bangladesh, the question asked was "What may happen in coastal areas of Bangladesh if climate change predictions come true in 2050"?. According to available literature, the prediction of climate change impacts in Bangladesh (by 2050) includes submerges of nearly 15 % of the country (A), loss of the largest mangrove forest-Sundarban (B) and serious demographic changes (C) etc (Potsdam Institute, 2003). All these three options were given as choice for response. The analysis shows that only 59.3 percent respondents could identify all three while 11.1 percent respondents identified A and B. Only 22.2 and 7.4 percent respondents could identify A and B respectively.

Table 59: Percentage of male and female respondents having clear understanding on CC impacts in coastal areas by 2050

Sex	Percentage of respondents to different impacts				
	Nearly 15% of the country will be submerged (A)	The largest mangrove forest-Sundarban will be lost (B)	Serious demographic changes (e.g. population etc) will take place (C)	A + B	A + B + C
Male (n=23)	17.4	8.7	-	13.0	60.9
Female (n=4)	50.0	-	-	-	50.0
Both (n=27)	22.2	7.4	-	11.1	59.3

Perception on international treaties (Kyoto Protocol and Montreal Protocol) related to climate change: The Kyoto Protocol to the United Nations Framework Convention on Climate Change is an international treaty on climate change and Montreal Protocol means the Montreal Protocol on substances that deplete ozone layer. The national level respondents were asked the appropriate meanings of these two protocols. The table shows that 70.4 percent respondents could correctly responded about Kyoto protocol but only 37 percent respondents did the same about Montréal protocol.

Table 60: Percentage of male and female respondents of the national level having clear awareness on international treaties related to climate change

Sex	Percentage of respondents to different treaties	
	Kyoto Protocol	**Montreal Protocol**
Male (n=23)	69.6	43.5
Female (n=4)	75.0	25.0
Both (n=27)	70.4	37.0

Stake holder's awareness on Kyoto protocol: The question "When did the Kyoto protocol come into force?" was asked in the questionnaire. A single response was expected from the different options given (dates and years). It was found that 44.4 percent respondents could correctly respond.

Figure 13: Percentage of male and female respondents of the national level having clear awareness on Kyoto protocol
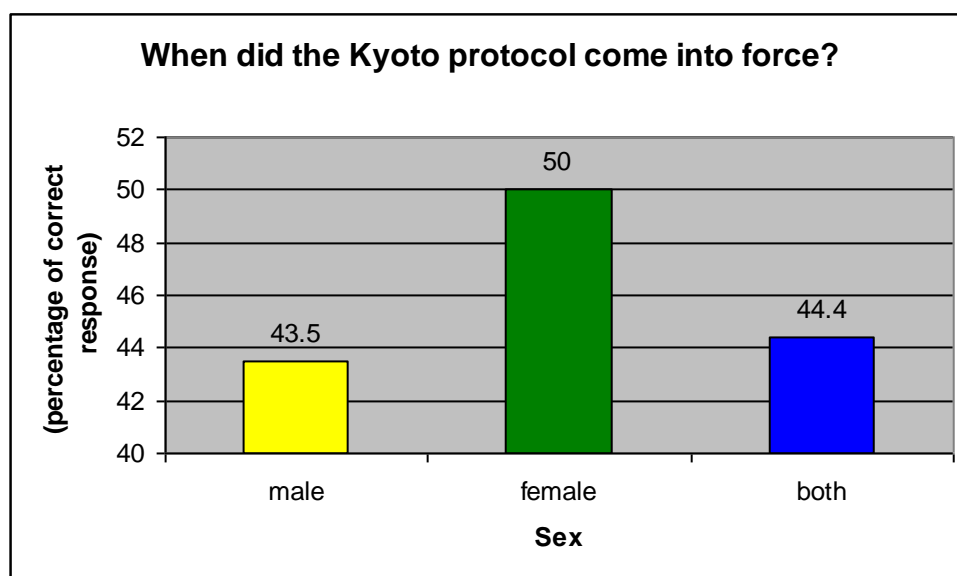
3.3 Knowledge, Understanding and practices on adaptation to disaster risk and climate change impacts

This section deals with comparative and separate analysis on Knowledge, Understanding and practices on adaptation to disaster risk and climate change impacts. These are as follows-

3.3.1. Comparative analysis of findings at union, upazilla, district and national level

The following issues have been comparatively analyzed to determine the knowledge and understanding on adaptation practices to disaster risk and climate change impacts:

Awareness on programmes/interventions that are being implemented to reduce climate change risk: In response to the question 'Is there any intervention as a means of reduction of climate change impacts being implemented/ expected to be implemented soon in your area?', the answers were either YES or NO. At the national level, 55.6 percent of the stakeholders' response was YES. Positive response at the district, Upazilla and union level was very low. At the district level only 28.6 percent responded YES and at Upazilla level 24.3 percent. The lowest overall positive response to the question was at the union level with only 13.6 percent of the stakeholders answering yes to the question.

Table 61: Percentage of respondents having adequate awareness on programmes/ interventions that are being implemented to reduce climate change risk at union, upazilla, district and national level?

Name of District	Study location							
	Union		Upazilla		District		National	
	Yes	No	Yes	No	Yes	No	Yes	No
Lalmonirhat	15.0	85.0	25.0	75.0	33.3	66.7	-	-
Rajshahi	25.0	75.0	55.0	45.0	80.0	20.0	-	-
Sirajganj	2.5	97.5	5.0	95.0	13.3	86.7	-	-
Sunamganj	7.5	92.5	-	100.0	13.3	86.7	-	-
Faridpur	32.5	67.5	40.0	60.0	26.7	73.3	-	-
Satkhira	2.5	97.5	10.0	90.0	26.7	73.3	-	-
Cox's bazaar	10.0	90.0	35.0	65.0	6.7	93.3	-	-
All	13.6	86.4	24.3	75.7	28.6	71.4	55.6	44.4

Regarding interventions to climate change risk, the FGDs and in-depth interviews uncovered different views from the stakeholders. Some of the stakeholders think that actions at the local level cannot address the problems. But some of the other stakeholders felt that they can do something at individual, family and community level in terms of awareness and preparedness for natural disaster and climate change impacts.

Perception on whether the existing coping strategies can be used in the future or not: The stakeholders were asked their opinion on whether "the strategies used to adapt to the current climate change situation will still be workable in future?". The response to this question was either YES or NO. At the national level 33.3 percent of the stakeholders answered YES while the rest responded to NO. But at the district and Upazilla levels, 48.6 percent of the stakeholders believe that the current strategies in place are enough to cope with the future climate change scenario. This suggests that more awareness and knowledge about coping strategies and climate change impact is required at the district and Upazilla level.

Table 62: Percentage of respondents having perception on whether the existing coping strategies can be used in the future or not at union, upazilla, district and national level

Name of District	Study location							
	Union		Upazilla		District		National	
	Yes	No	Yes	No	Yes	No	Yes	No
Lalmonirhat	12.5	87.5	30.0	70.0	33.3	66.7	-	-
Rajshahi	68.8	31.2	45.0	55.0	93.3	6.7	-	-
Sirajganj	35.0	65.0	40.0	60.0	46.7	53.3	-	-
Sunamganj	60.0	40.0	55.0	45.0	20.0	80.0	-	-
Faridpur	30.0	70.0	20.0	80.0	33.3	66.7	-	-
Satkhira	48.3	51.7	75.0	25.0	86.7	13.3	-	-
Cox's bazar	45.0	55.0	75.0	25.0	26.7	73.3	-	-
All	41.8	58.2	48.6	51.4	48.6	51.4	33.3	66.7

The stakeholders at Cox's Bazar mentioned the need for more cyclone shelters at the FGDs. Both soft measures and physical interventions were suggested as further coping strategies to climate change impacts. The soft measures include awareness building, experience sharing, early warning system etc. There was also recommendation to include climate change in the education curriculum at the secondary and higher secondary level. Furthermore, awareness raising, capacity building through training and workshops and popular campaigns were common suggestions from all districts to address climate change at the local level.

Perception about adaptation practices carried out at different administrative level: To understand the level of awareness regarding the practices at the administrative level as adaptation measures during disaster, the stakeholders were asked "At which administrative

level should the 'community based highland' be prepared to address potential hazards like flood ?" This was asked at the union, Upazilla and district level and the appropriate response was analyzed. According to the table the overall appropriate response for the district level was 89.5 percent, 90 percent for Upazilla and 91.1 percent for union. This high percentage of appropriate response suggests that people are knowledgeable about the adaptation practices and the level of administration that carries out the 'community based highland' measure. At all three level, the highest response was 100 percent from Faridpur (at district level), Cox's Bazar (Upazilla level) and Sirajganj (union level).

During FGD and workshop the respondents of the union level were more aware than district and upazilla level respondents on measures to be practices to address potential disaster. This is may be due to most of the climate change or disaster related projects/programmes get implemented at the union level. Union level stakeholders are practically more involved in the implementation process.

Table 63: Percentage of respondents having clear awareness on adaptation measures (community based highland) to be practiced at the community level to address potential disaster at union, upazilla, district and national level

Name of District	Study location			
	Union	Upazilla	District	
Lalmonirhat	85.0	95.0	86.7	
Rajshahi	82.5	85.0	93.3	
Sirajganj	100.0	95.0	86.7	
Sunamganj	95.0	85.0	86.7	
Faridpur	97.5	90.0	100.0	
Satkhira	80.0	80.0	80.0	
Cox's bazar	97.5	100.0	93.3	
All	91.1	90.0	89.5	

It was seen that among the female stakeholders at the district level, perception about community based highland was 100 percent while the male stakeholders had an appropriate response of 89.1 percent. At the Upazilla level the male and female perception was 90.1 and 88.9 percent respectively. For the male stakeholders at the union level, the appropriate response was 100 percent at Sirajganj and Cox's Bazar.

Table 64: Percentage of male and female respondents having clear awareness on adaptation measures (community based highland) to be practiced at the community level to address potential disaster at union, upazilla, district and national level

Name of District	Study location							
	Union		Upazilla		District		National	
	male	female	male	female	male	female	male	female
Lalmonirhat	89.6	72.7	94.4	100.0	86.7	-		
Rajshahi	82.9	80.0	84.2	100.0	93.3	-		
Sirajganj	100.0	100.0	94.7	100.0	85.7	100.0		
Sunamganj	97.1	83.3	85.0	-	85.7	100.0		
Faridpur	96.7	100.0	93.3	80.0	100.0	-		
Satkhira	78.8	85.7	80.0	-	76.9	100.0		
Cox's bazar	100.0	85.7	100.0	-	93.3	-		
All	92.1	86.8	90.1	88.9	89.1	100.0		

Knowledge about community based preparedness to adapt with possible risks: The stakeholders were asked "what immediate measure is being taken by the community people to adapt with possible risks". Of the given options "preparedness" was expected as the appropriate response. Appropriate response at the national level was 88.9 percent, at the district level was 90.5 percent, Upazilla level 86.4 percent and union level was 78.9 percent. The high percentage of appropriate response signals that the stakeholders are aware of the community based coping strategies required to adapt to potential hazards. At

the district level the highest response was 100 percent in Cox's Bazar and lowest was 80 percent in Sirajganj. For the Upazilla level, the highest response was 90 percent at Rajshahi, Sirajganj, Faridpur and Cox's Bazar.

Table 65: Percentage of respondents having adequate knowledge on preparedness to address possible risks

Name of District	Study location			
	Union	Upazilla	District	National
Lalmonirhat	70.0	65.0	86.7	-
Rajshahi	80.0	90.0	93.3	-
Sirajganj	80.0	90.0	80.0	-
Sunamganj	70.0	95.0	86.7	-
Faridpur	90.0	90.0	93.3	-
Satkhira	75.0	85.0	93.3	-
Cox's bazar	87.5	90.0	100.0	-
All	78.9	86.4	90.5	88.9

At the national level the highest percentage of appropriate response was 100 percent from the female stakeholders and 87 percent among the male stakeholders. The district level shows 91.1 percent appropriate response from the male participants and 75 percent from the female participants. The lowest overall response was at the union level with male response of 78.8 percent and female response of 79.2 percent.

Figure 14: Knowledgeable respondents (%) on community based preparedness
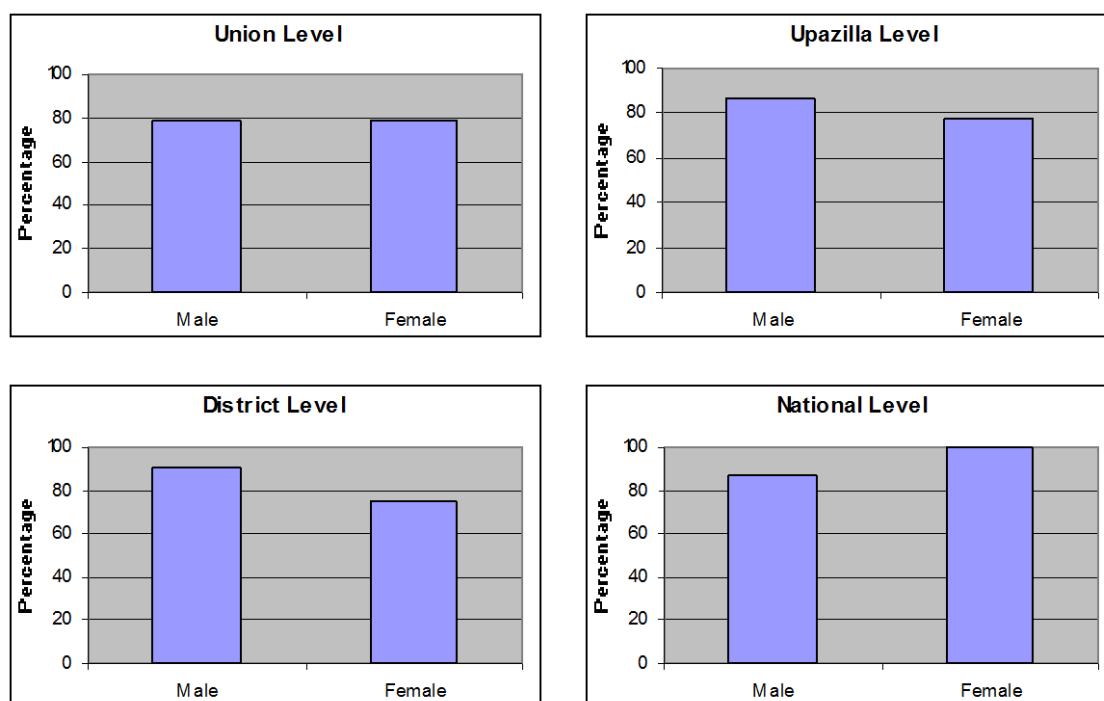
During the FGD the stakeholders in Rajshahi mentioned that the people of the region should change their food habits, dressing and life-style etc to better adapt to the climate change impacts in their localities. In some upzillas the people have said that they do not have clear understanding of adaptation issues and have very limited capacity to initiate action to address the problem of climate change.

3.3.2. Separate analysis of findings at union, upazilla, district and national level

The following issues were separately analyzed at union, upazilla, district and national level to determine the knowledge and understanding on adaptation practices to disaster risk and climate change impacts:

3.3.3.1 Union Level

Awareness on developing coping strategies: There was a question in the questionnaire that asked "who helped you to develop the coping strategies"?. Five options (GOs, NGOs, CBOs, Own and none) were given. The maximum respondents (35. 7 percent) identified GOs as the helping body. The options NGOs, CBOs, and none were identified by 24.8, 11.3 and 1.6 percent respondents respectively. It was found that 26.6 percent respondents identified "own". This denotes that over one-fourth respondents developed the coping strategies by themselves.

Table 67: Percentage of male and female respondents on developing of coping strategies in the study districts

Name of District	Sex	Who helps to develop coping strategies				
		GOs	NGOs	CBOs	Own	No one
Lalmonirhat	Male (n=29)	36.4	9.1	9.1	45.4	-
	Female (n=11)	18.2	18.2	-	63.6	-
	Both (n=40)	31.8	11.4	6.8	50.0	-
Rajshahi	Male (n=35)	55.0	20.0	15.0	5.0	5.0
	Female (n=5)	33.3	33.3	-	33.4	-
	Both (n=40)	52.3	21.7	13.0	8.7	4.3
Sirajganj	Male (n=33)	29.7	40.6	8.1	21.6	-
	Female (n=7)	40.0	40.0	10.0	10.0	-
	Both (n=40)	31.9	40.5	8.5	19.1	-
Sunamganj	Male (n=34)	45.5	13.6	15.9	25.0	-
	Female (n=6)	83.3	-	-	16.7	-
	Both (n=40)	50.0	12.0	14.0	24.0	-
Faridpur	Male (n=30)	38.6	34.1	2.3	22.7	2.3
	Female (n=10)	42.2	36.8	-	21.0	-
	Both (n=40)	39.7	34.9	1.6	22.2	1.6
Satkhira	Male (n=33)	17.1	34.1	29.3	17.1	2.4
	Female (n=7)	-	25.0	37.5	37.5	-
	Both (n=40)	14.3	32.7	30.6	20.4	2.0
Cox's bazar	Male (n=33)	36.1	11.1	8.3	38.9	5.6
	Female (n=7)	42.9	28.6	-	28.5	-
	Both (n=40)	37.2	14.0	7.0	37.2	4.6
All	Male (n=227)	35.7	23.9	12.5	25.9	2.0
	Female (n=53)	35.9	28.1	6.2	29.8	-
	Both (n=280)	35.7	24.8	11.3	26.6	1.6

Figure 15: Who develops coping strategies in union level (% of respondents)
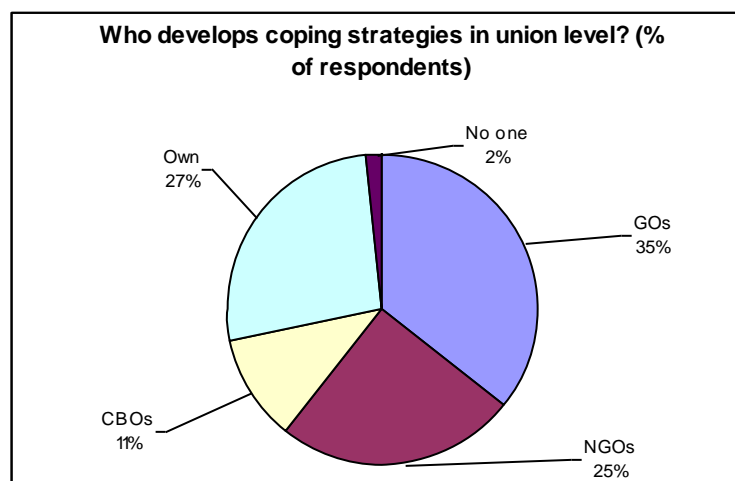
3.3.3.2 Upazilla Level

Awareness on developing coping strategies: Five options (GOs, NGOs, CBOs, Own and none) were given as response for a question related to the development of coping strategies? The GOs were identified by 49 percent respondents at upazilla level as being most relevant in offering assistance for the development of coping strategies. The options of NGOs, CBOs and own were identified by 27.9, 10.2 and 11.6 percent respondents respectively.

Table 68: Percentage of male and female respondents on developing of coping strategies in the study districts

Name of District	Sex	Who helps to develop coping strategies				
		GOs	NGOs	CBOs	Own	No one
Lalmonirhat	Male (n=18)	40.9	36.4	-	22.7	-
	Female (n=2)	-	100.0	-	-	
	Both (n=20)	39.1	39.2	-	21.7	-
Rajshahi	Male (n=19)	50.0	40.0	10.0	-	-
	Female (n=1)	-	-	-	-	-
	Both (n=20)	50.0	40.0	10.0	-	-
Sirajganj	Male (n=19)	30.0	25.0	15.0	25.0	5.0
	Female (n=1)	-	-	-	-	-
	Both (n=20)	30.0	25.0	15.0	25.0	5.0
Sunamganj	Male (n=20)	63.7	13.6	9.1	13.6	-
	Female (n=0)	-	-	-	-	-
	Both (n=20)	63.7	13.6	9.1	13.6	-
Faridpur	Male (n=15)	54.5	36.4	9.1	-	-
	Female (n=5)	40.0	40.0	20.0	-	-

Name of District	Sex	Who helps to develop coping strategies				
		GOs	NGOs	CBOs	Own	No one
	Both (n=20)	51.9	37.0	11.1	-	-
Satkhira	Male (n=20)	47.8	26.1	17.4	8.7	-
	Female (n=0)	-	-	-	-	-
	Both (n=20)	47.8	26.1	17.4	8.7	-
Cox's bazar	Male (n=20)	59.1	18.2	9.1	9.1	4.5
	Female (n=0)	-	-	-	-	-
	Both (n=20)	59.1	18.2	9.1	9.1	4.5
All	Male (n=131)	49.6	27.0	9.9	12.1	1.4
	Female (n=9)	33.3	50.0	16.7	-	-
	Both (n=140)	49.0	27.9	10.2	11.6	1.3

3.3.3.3 District Level

Awareness on developing coping strategies: Five options (GOs, NGOs, CBOs, Own and none) were given as response to the question "who helped you to develop the coping strategies?". The GOs were identified by 56.8 percent respondents while the NGOs, CBOs and own were consecutively identified by 27.4, 4.2 and 11.6 percent respondents.

Table 69: Percentage of male and female respondents on developing of coping strategies in the study districts

Name of District	Sex	who helps to develop coping strategies				
		GOs	NGOs	CBOs	Own	No one
Lalmonirhat	Male (n=15)	69.2	15.4	-	15.4	-
	Female (n=0)	-	-	-	-	-
	Both (n=15)	69.2	15.4	-	15.4	-
Rajshahi	Male (n=15)	66.7	11.1	-	22.2	-
	Female (n=0)	-	-	-	-	-
	Both (n=15)	66.7	11.1	-	22.2	-
Sirajganj	Male (n=14)	50.0	37.5	-	12.5	-
	Female (n=1)	-	-	-	-	-
	Both (n=15)	50.0	37.5	-	12.5	-
Sunamganj	Male (n=14)	75.0	12.5	6.3	6.2	-
	Female (n=1)	100.0	-	-	-	-
	Both (n=15)	76.4	11.8	5.9	5.9	-
Faridpur	Male (n=15)	55.6	38.9	5.5	-	-
	Female (n=0)	-	-	-	-	-

Name of District	Sex	who helps to develop coping strategies				
		GOs	NGOs	CBOs	Own	No one
	Both (n=15)	55.6	38.9	5.5	-	-
Satkhira	Male (n=13)	36.8	36.9	10.5	15.8	-
	Female (n=2)	-	50.0	-	50.0	-
	Both (n=15)	33.3	38.2	9.5	19.0	-
Cox's bazar	Male (n=15)	100.0	-	-	-	-
	Female (n=0)	-	-	-	-	-
	Both (n=15)	100.0	-	-	-	-
All	Male (n=101)	57.6	27.2	4.3	10.9	-
	Female (n=4)	33.3	33.4	-	33.3	-
	Both (n=105)	56.8	27.4	4.2	11.6	-

3.3.3.4 National Level

Awareness on the recent initiatives of the government regarding climate change and adaptation issues: Most of the respondents (74.1 percent) correctly mentioned that the National Adaptation Programmes of Action (NAPA) was formulated under supervision of the Ministry of Environment and Forest when a question on this was asked.

Table 70: Percentage of male and female respondents of the national level having clear awareness on the responsible government authority of the formulation of National Adaptation Programmes of Action (NAPA)

Sex	Percentage of respondents having Correct Response
Male (n=23)	78.3
Female (n=4)	50.0
Both (n=27)	74.1

Awareness on Clean Development Mechanism (CDM) and the activity of Designated National Authority (DNA): Two questions were asked regarding DNA and CDM in the national level questionnaire: 1. What is CDM? 2 Why the DNA was formed?. CDM is basically a process that facilitates reduction of GHG by developed country partner through implementing project in a developing country. It was found that in response to the question on CDM, only 55.6 percent respondents could identify this appropriate option. On the other hand, regarding activity of DNA, the response seems to be very poor as only 29.6 percent respondents were correct on this.

Table 71: Percentage of male and female respondents of the national level having clear awareness on Clean Development Mechanism and Designated National Authority

Sex	Percentage of respondents to CDM and DNA	
	What is CDM	Why DNA was formed
Male (n=23)	56.5	26.1
Female (n=4)	50.0	50.0
Both (n=27)	55.6	29.6

Awareness on developing coping strategies: In the national level sample survey questionnaire, a question was set as "who helped you to develop the coping strategies"? Nearly one-third (33.3 percent) respondents identified GOs. The CBOs were also identified by the same percentage of the respondents. NGOs were identified by 28.6 percent of respondents while 4.8 percent respondents said that the strategies were developed by themselves (own).

Table 72: Percentage of male and female respondents of the national level having clear awareness on developing coping strategies.

| Sex	Percentage of Response				
	GOs	NGOs	CBOs	Own	None
Male (n=23)	35.3	29.4	35.3	-	-
Female (n=4)	25.0	25.0	25.0	25.0	-
Both (n=27)	33.3	28.6	33.3	4.8	-

Chapter 4

Overall Knowledge and Understanding on Disaster Risk Management and Climate Change Impacts among CDMP Stakeholders

In addition to assessing the knowledge and understanding among CDMP stakeholders on DRM and CCI, overall knowledge of stakeholders has been determined as well. The overall knowledge and understanding of the CDMP stakeholders of seven study districts has been determined based on a scoring system as mentioned earlier under development of indicators. Each correct answer is assigned with scoring value "1" and "0" for otherwise. The potential maximum score equals to the number of questions asked to the stakeholders.

Union Level: The score achieved by the stakeholders at the union level ranges from minimum of 3 to the maximum of 13 out of the maximum potential score 14. The overall mean score is 9 and median score is also 9. The average score for the districts doesn't show any significant difference. It ranges from minimum of 8.4 in Rajshahi district and to maximum of 9.2 in both Sunamganj and Sirajganj (please see the following table). The closeness of mean score and median score implies that the distribution of overall knowledge level follows a symmetric pattern (please see following fig.). The average score is 64.3 percent of the maximum potential score.

Name of District	Maximum potential score	Minimum score	Maximum score	Mean score	Mean score as % of maximum potential score	Median Score	Std. deviation
Lalmonirhat	14	5	13	8.9	63.6	8.5	1.84
Rajshahi	14	4	12	8.4	60.0	9.0	1.88
Sirajganj	14	5	13	9.1	65.0	9.0	1.96
Sunamganj	14	7	12	9.2	65.7	9.0	1.18
Faridpur	14	7	12	9.2	65.7	9.5	1.21
Satkhira	14	3	12	9.1	65.0	9.5	2.11
Cox's bazar	14	6	12	8.8	62.9	9.0	1.48
All	14	3	13	9.0	64.3	9.0	1.70

Figure 16: Percentage distribution of respondents by score at union level

Percentage distribution of respondents by score level
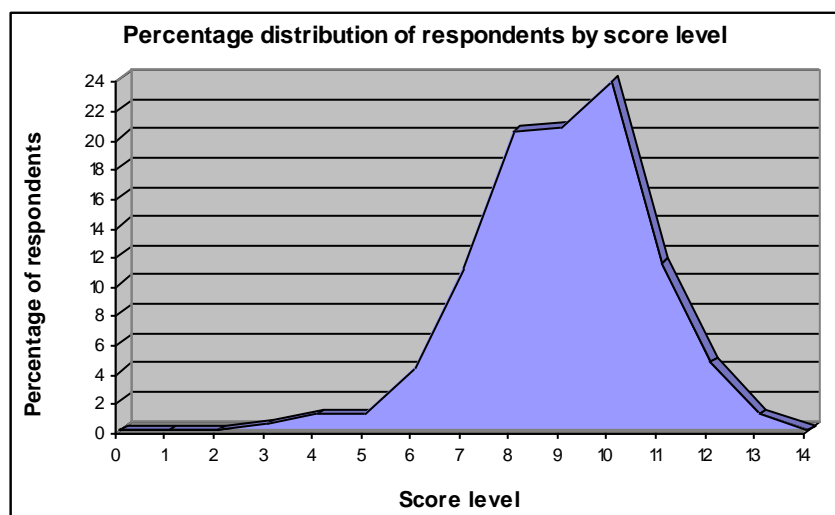
Upazilla Level: The minimum score at upazilla level was 7 while the maximum score was 19 out of maximum potential score 21. The highest average score was 15.1, found in Sirajganj while in Lalmonirhut it was 12.5, the lowest. Overall mean score for all study districts was 13.4 and median score was 13.0 (please see following table)**.** The average

score is 63.8 percent of the maximum potential score. The pattern of the distribution of overall knowledge is shown in following fig.

| Name of District	Maximum potential score	Minimum score	Maximum score	Mean score	Mean score as % of maximum potential score	Median Score	Std. deviation
Lalmonirhat	21	7	17	12.5	59.5	12.5	2.35
Rajshahi	21	8	16	12.6	60.0	13.0	2.16
Sirajganj	21	12	19	15.1	71.9	15.0	1.65
Sunamganj	21	10	19	13.3	63.3	13.0	2.32
Faridpur	21	10	18	14.3	68.1	14.0	2.28
Satkhira	21	9	18	12.7	60.5	12.0	2.54
Cox's bazar	21	11	18	13.4	63.8	13.0	1.93
All	21	7	19	13.4	63.8	13.0	2.33

Figure 17: Percentage distribution of respondents by score at upazilla level
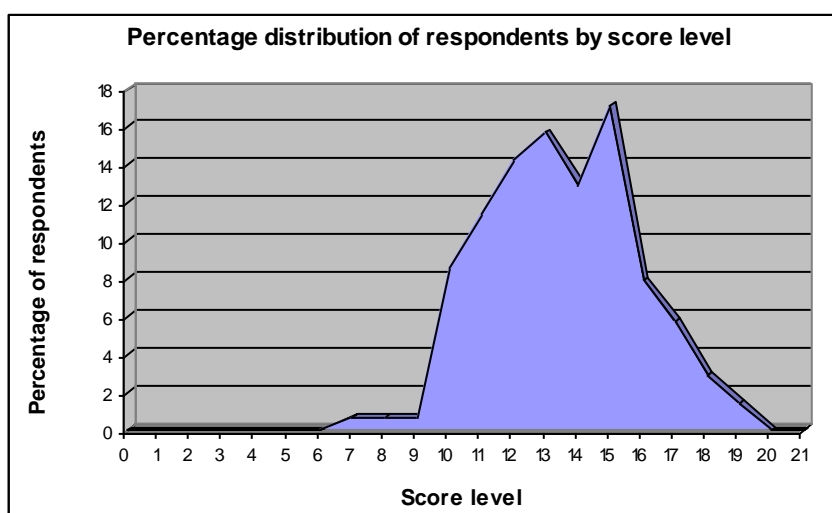
District Level: At the district level, the potential maximum score was also 21. The range of minimum and maximum score was 7 to 19. Average mean score was 14.6 while median score was 15. In terms of average score, the lowest (13.7) was in Rajshahi while the highest (16.5) was in Faridpur. The average score is 69.5 percent of the maximum potential score. The pattern of the distribution of overall knowledge is shown in following fig.

Name of District	Maximum potential score	Minimum score	Maximum score	Mean score	Mean score as percentage of maximum potential score	Median Score	Std. deviation
Lalmonirhat	21	9	18	14.1	67.1	14.0	2.58
Rajshahi	21	7	18	13.7	65.2	14.0	2.96
Sirajganj	21	8	18	13.9	66.2	14.0	2.40
Sunamganj	21	8	19	14.9	70.9	15.0	3.14
Faridpur	21	15	19	16.5	78.6	16.0	1.41
Satkhira	21	11	19	14.7	70.0	15.0	2.58
Cox's bazar	21	10	17	14.2	67.6	15.0	2.14
All	21	7	19	14.6	69.5	15.0	2.59

Figure 18: Percentage distribution of respondents by score at district level

Percentage distribution of respondents by score level
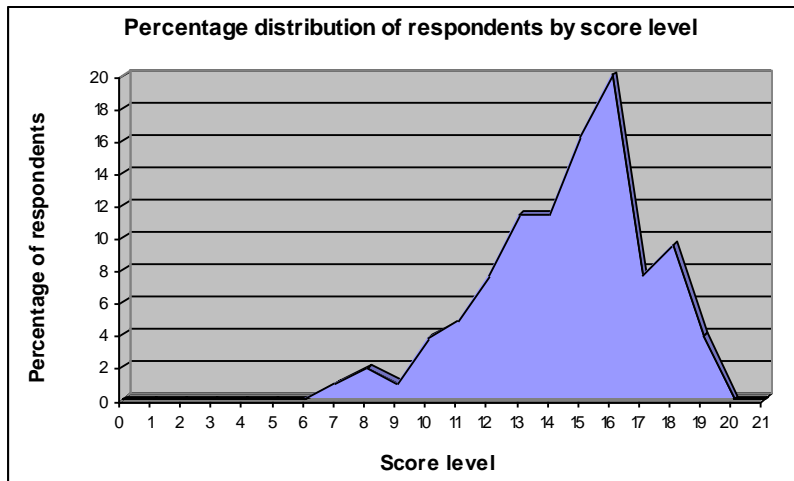
National Level: The maximum potential score was 34 at the national level. The minimum and maximum score achieved by the stakeholders were 11 and 30 respectively. The mean and median score were 22.8 and 24.0 respectively. The average score was 67.1 percent of the maximum potential score.

Figure 19: Percentage distribution of respondents by score at national level

Percentage distribution of respondents by score level (National)
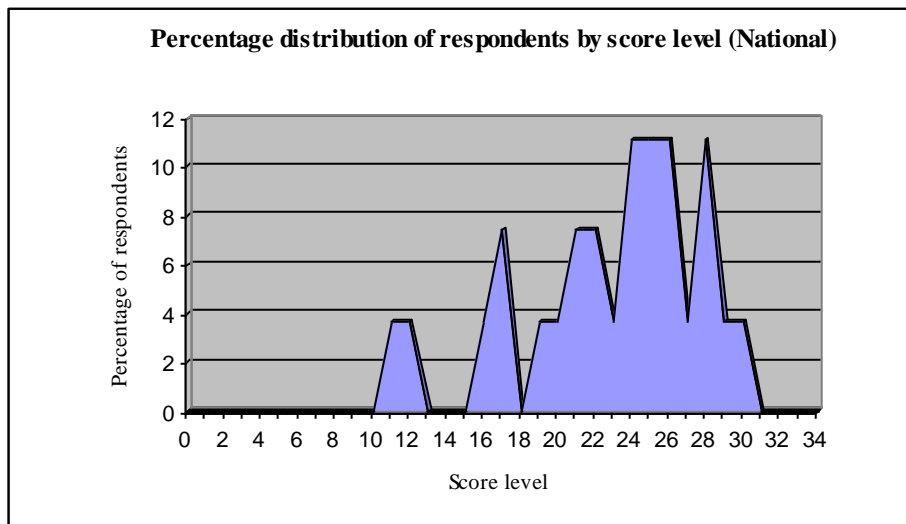
Chapter 5

Conclusion and Recommendation

'The general level of understanding, capacity and commitment to risk reduction needs to be increased by information sharing and training at all levels of the organization"- Twigg*

The study demonstrates that the level of knowledge and understanding on three thematic issues (hazard, risk, disaster and disaster risk management; climate change and its impacts; adaptation to disaster risk and climate change impacts) of discussions were not the same. In some cases the stakeholders had adequate knowledge of the issues but in some cases their level of knowledge was quite poor.

According to the composite index/ indicator, appropriate knowledge and understanding on hazard, risk and disaster, and disaster management ranged between 47.07 and 68.77 percent respondents (union-58.84, upazilla-47.04, district-53.66 and national-68.77). At the upazilla level it was quite low (47.02%). Even at the union and district levels the percentages were 58.84 and 53.66 respectively.

There is especially a lack of knowledge both among the male and female stakeholders on issues of Disaster Risk Management Training, SOD, priority issues in SOD etc. Basically awareness on Standing Orders for Disaster (SoD) DMC members were poor at every level of administration. Interestingly, union level members were found to be more aware (35.0 %) about SoD than the stakeholders at the upazilla and district levels. The findings show that only 13.3 percent respondents of district level DMC members of Sunamganj on SOD issues.

Surprisingly the stakeholders at the union level appear to have better knowledge about formulating short, medium and long term vulnerability reduction and capacity building action plans. The findings show that overall correct respondents at union level for all districts was 80 percent whereas it was 46.4 percent and 46.7 percent in upazilla and district level respectively.

Knowledge and understanding about climate change and its impacts is about 53.5 percent at the union level. At upazilla and district level it was more than 60 percent. The union level DMC members needs to be more aware on climate change and its impacts issues.

Regarding adaptation measures in addressing disaster and climate change impacts the responses at every level were more or less satisfactory as the composite indicators show the correct respondents on adaptation issues were 85.0, 88.20 and 90.0 percent at union, upazilla and district level respectively. However, in most of the districts, the training need on climate change impacts and adaptation measures to reduce the risk and vulnerability was emphasized in FGD, in-depth interviews and also in the workshops.

As it transpired from FGD/in-depth interview, some of the members in different districts were not quite aware about their involvement, roles and responsibilities in Disaster Management Committee (DMC). All the members of the DMC need to know their specific roles –pre, during and post hazard period. Direct communication and networking system needs to be built up among local DMC members and the relevant responsible authority.

As most of the national level stakeholders are not well conversant about the role of DNA (Designated National Authority) and also about CDM (Clean Development Mechanism), efforts should be undertaken by the concerned agencies to make aware about such issue.

The overall findings of the study indicates the necessity of training on climate change and climate variability, and disaster management issues for the DMC members of all administrative levels. A comprehensive training manual can be developed focusing on climate change and disaster management issues to train DMC members at every level considering their existing knowledge and understanding. Since most of the members of the

DMCs at different levels are from the government organizations and there is a government provision to get transferred from place to place so the same training can be held after every 2/3 years of period. This may be practiced immediately in most affected or predicted to be affected districts of Bangladesh. This manual may be updated through assessing status of knowledge and understanding of the stakeholders.

It may be noted that the existing DMC members do not include all stakeholders. Once the existing DMC members are trained, the capacity and information needs to be shared with larger community.

People at community level, particularly in union and upazilla, should be well aware about human induced hazards. The training programme is necessary to create awareness and build-up capacity of the stakeholders to reduce risk of human induced hazards**.**

More extensive awareness and training progarmme may be organized at union, upazilla and district level immediately to equip the DMC members on knowledge regarding climate change issues in order to reduce adverse impacts and adaptation to climate change issues.

Likewise training programme may be conducted to increase awareness on the existing disaster risk management strategy of the government and build up capacity of DMC members at every level.

Early warning systems should be utilized more efficiently and the stakeholders need to have a proper procedure that they can follow in case of emergency. Pamphlets, workshops/ training sessions, door to door knowledge dissemination systems etc can all help towards increasing stakeholder's knowledge about disaster and disaster risk management

Training programmes should be designed to evaluate the performance of the group as well as the individual members of DMCs. This is particularly important in the context of wide knowledge gap among the DMC members as highlighted through the study.

The baseline study should be followed by post-intervention studies to assess the change in knowledge level among the stakeholders using appropriate indicators.

The functions/ activities of the DMCs should be properly monitored by the appropriate agency and each member of the DMCs should be well informed about their roles and responsibilities during normal and disaster periods.

Continuity of membership in DMCs especially at the union levels should be ensured
so that acquired knowledge and capabilities are properly utilized

It may be mentioned that the different government organizations including Department of Environment, Disaster Management Bureau, Department of Agriculture Extension, Local Government and Engineering Development etc and NGOs have been working on disaster and climate change issues for last long. Reducing Vulnerability to Climate Change (RVCC) was one of the major recent successful programme which has made at least 1 million community people of South West districts of the country aware on climate change issues. This might have contributed in enhancing the knowledge level of the DMC members. In some areas high percentage of correct answer on some issues might be the outcome of such programme.

Twigg* (2004), Good Practice Review no. 9, *Disaster risk reduction: Mitigation and Preparedness in development and emergency programming*, Overseas Development Institute)