

**Preparedness in Facing the Challenges of Climate Change:  
A Study on the Role of Local Government  
(With Particular Focus on Upazila and Union Parishad)**



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*Dedicated to*

*My Parents*

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## Abbreviations

<b>BIDS</b>	<b>Bangladesh Institute of Development Studies</b>
<b>BCAS</b>	<b>Bangladesh Center for Advance Studies.</b>
<b>BCCASP</b>	<b>Bangladesh Climate Change Strategy and Action Plan</b>
<b>CC</b>	<b>Climate Change</b>
<b>CDMP</b>	<b>Comprehensive Disaster Management Program.</b>
<b>CSO</b>	<b>Civil Society Organization.</b>
<b>GHG</b>	<b>Green House Gas</b>
<b>GOB</b>	<b>Government of Bangladesh</b>
<b>IPCC</b>	<b>Inter Governmental Panel on Climate Change</b>
<b>LG</b>	<b>Local government</b>
<b>MDG</b>	<b>Millennium Development Goal</b>
<b>M/o:E &amp;F</b>	<b>Ministry of Environment and Forest.</b>
<b>M/o:LGRD&amp;C</b>	<b>Ministry of Local government ,Rural development and Cooperatives</b>
<b>NGO</b>	<b>Non Government Organization</b>
<b>NAPA</b>	<b>National Adaptation Programme of Action.</b>
<b>PIO</b>	<b>Project Implementation Officer</b>
<b>PRS</b>	<b>Poverty Reduction Strategy Paper</b>
<b>UAEO</b>	<b>Upazila Agriculture Extension Officer</b>
<b>UFO</b>	<b>Upazila Fisheries Officer</b>
<b>UNO</b>	<b>Upazila Nirbahi Officer</b>
<b>UP</b>	<b>Union Parishad</b>
<b>UPZP</b>	<b>Upazila Parishad</b>
<b>UPHE</b>	<b>Upazila Public Health Engineer</b>

## **Abstract**

Climate change is global phenomenon but climate induced adversities are local in manifestation. So adaptation process to cope with those adversities deserves preparation at local level. Local government has potentialities to contribute to this field as there are congruence between the climate change adaptation activities and services of local government. But practical inclusion of local government is rarely observed in this regard, though policies are being urged for comprehensive effort of all sector and levels to cope with the extreme climatic events. Most of the adaptation measures and related programs to deal with the effect is and will largely be implemented at local level. Thus preparedness of local government to face the climate change challenges is very crucial. In this context this exploratory research has attempted to examine the state of preparedness of local government of Bangladesh in facing the challenges of climate change.

Setting a research question this study has developed an analytical framework to understand the state of preparedness of local government in reference to related theories on the relation between institutions and adaptation activities. This research takes both quantitative and qualitative methods of inquiry.

Climate change preparedness measures of local government includes its adaptation related activities, program and contingency plan to cope with the climate induced adversity. Preparedness can be visible through a set of measures that has taken or to be taken to cope with the climatic adversity. The process of taking initiative for these measures is influenced by some cognitive and institutional factors.

This study revealed that most of the LG representatives are somehow aware of climatic extreme events in their neighborhood. The study also found that the preparedness of local governments of coastal areas is relatively higher than those of non coastal areas in Bangladesh.

Awareness of LG representatives and institutional network significantly influence the preparedness of LG. This study also revealed that NGO endeavor is noteworthy to familiarize the issue of climate change among the local government representatives. Direct involvement with NGO and GO and their financial and technical support influence the preparation of LG in CC program though it has its limitations. Finally the study finds that the various resource constraints, political and administrative limitation and complexity are the possible barrier to be prepared to respond to the climate change impact.

# **Chapter: One**

## **Introduction**

### **Introduction**

There is a consensus that climate change is taking place, though the specific dimension of its probable adversity is unpredictable. Climate projections and scenarios are based on hypothesis (emission scenarios) and therefore uncertain (UNDP, 2010). But it is neither a myth nor a prophecy; rather it is something we need to prepare for (Raihan et al. 2010). Ample research conducted in Bangladesh context reveal that many of the sectors (and systems) are already experiencing the increasing stresses from climate variability and extremes. The core economic activities of Bangladesh are highly nature dependent and climate sensitive. The systems those are more climates sensitive but have least adaptability are more vulnerable (Second Assessment Report of IPCC 1996, cited in: Kelly and Adger, 2000). Thus less preparation to adapt to meet these increasing stresses will accelerate the vulnerability. Adaptation measures to cope with the adversity indicate one of the prerequisites of sound preparedness.

Climate change impact encompasses all most all aspects of human system specially the socio economic system. Climate driven adversity is the challenge for sustainable development (Islam, 2009; Ahmed, 2006; Kelly and Adger, 2000; Smit et al. 2000; Ministry of Environment and Forests (M/o: E&F), 2005). This concern has been drawn the mounting attention in policy direction and guide line for preparedness strategy.

Climate change is global phenomenon but its consequence is faced locally and adaptation to its impact is a local process (Raihan et al. 2010; UNDP, 2010). The increasing severity and uneven consequence of climate induced threat requires institutional intervention to enhance ability of community to be prepared to cope with the climatic hazard. Mandated as the local service provider local government is in charge for maintenance and implementation of many development activities and responsible to oversee the programs of other departments (Agriculture, health, livestock etc) too. There is a high degree of convergence between climate change adaptation and provision of basic local government service (UNDP, 2010). Many

activities of Union Parishad and Upazila Parishad are directly or indirectly related with environmental issue. All these issues indicate a large space of role of local government to play regarding climate change impact.

Adaptations to climate change and development activities are closely interrelated. Considering adaptation as a part of the continuous process of development, local governments have the opportunity to put extra effort on its routine work to meet the new strain of climate change.

Local government of Bangladesh has to work under the policy guideline of government. Limited legal and political power, resource constraints and lack of awareness of local government representatives about their responsibilities are depicted as the most common attributive of institutional capacity of local government of Bangladesh in the concerned literatures. All these factors are crucial to influence the preparedness activities of local government to reduce the adverse effect of climate change and variability.

Adaptation literatures that deal with the preparedness, adaptive capacity, vulnerability regarding climatic hazard in local level, intensely highlighted on the role of local government. Adaptation activities responds to climate induced threat are mostly implemented in the local government level. Local institutions influence the adaptation activities and climate vulnerability in various ways (Agarwal, 2008). Local government can act as a mediator and service provider for adaptation activities (Agarwal, 2008; Staden , 2010). Inherent characteristics of institutions (Agrawal, 2008; Gupta et al, 2008) and its regulatory power, financial capacity, ability to use resources, awareness (knowledge) about the impact of climate change and inter organizational cooperation to response to the climate change may influence the preparedness activities.

Considering 'Preparedness as a set of measures intended to cope with the adversity of climate change impact' this exploratory study attempts to examine the state of preparedness of local government in the adaptation process to face the challenges of climate change. To focus on the role of local government, this study also tries to find the factors that promote or hinder the potential of local government to be sufficiently prepared to face the adversity of climate change.

## **1.2. Understanding Climate Change in Bangladesh context**

Climate change refers to alterations of the earth atmosphere leading to changes in climate system, such as climate warming and more frequent and intense extreme weather event (UNDP: 2010). A lot of scientific study depicted the reality and projection of climate change, its impacts and variability in Bangladesh and treated it as the most climate vulnerable country due to its climate sensitive geographical position, and weak capacity to deal (Harmeling,2011; M/o: E&F , 2005; Lewis, 2011.)

General circulation method (GCM) was used by the US CC (United States Climate Change) study team for Bangladesh. The study has reported that the average increase in temperature would be 1.3 degree celcius and 2.6 degree celcius for the years 2030 and 2070. (M/o: E&F , 2005)

In Bangladesh the observed data indicates that the temperature is generally increase in the monsoon, and the average winter time maximum and minimum temperature shows respectively in decreasing and increasing trend annually at the rate of 0.001 degree celcius and 0.016 degree celcius (Rahman Alam, 2003,cited in: M/o: E&F, 2005). Regional variations have been observed around the average trend (SMRC: 2003 cited in: M/o: E&F, 2005).Over all the trend of the annual mean maximum temperature has shown a significant increase over the period of 1960-1990.

Increasing and uneven tendency of salinity, water logging, precipitation (rainfall), draught etc is being occurred (Ahmed, 2006; Kulsum and Azam, 2009; M/o: E&F, 2005). SAARC Metrological Research Council (SMRC) study has shown the significant increasing tendency of cyclone in Bay of Bengal. By analyzing the past 22 years historical tidal data another SMRC study revealed that the rate of sea level rise is many times higher than the mean rate of global average. It is projected that the coastal belt (27% of the country residence of 22% total population) is more vulnerable to Climate change. The populations living in the coastal area are more vulnerable than the population in other areas (Alam and Laurel, 2005, cited in: M/o: E&F, 2005).

The agricultural sector will face significant yield reduction. Thus food-grain self sufficiency will be at risk in future (BCAS/RA/Approtec, 1994; Alam, 2004; cited in M/o: E&F, 2005) According to a report of IUCN (2002), by the year 2030, an additional 14.3% of the country will become extremely vulnerable to floods, while the already flood-vulnerable areas will face higher

levels of flooding. Bangladesh will also be at risk of droughts. It is found that, under a moderate climate change scenario, Aus (pre-monsoon paddy) production would decline by 27% while wheat production would be reduced to 61% (IUCN, 2002). Under a severe climate change scenario (with 60% moisture stress), yield of Boro (dry season paddy) might be reduced by 55~62%. Shortage of water might force farmers to reduce the area for Boro cultivation. (IUCN, 2005)

NAPA (National Adaptation Programme of Action) of Bangladesh has recognized and stated the intensity of impact due to Climate Change on different sector, such as food security, agriculture health, infrastructure, industry, trade.

Effect of climate induced impact is inescapable, it encompasses all most all aspect of human system, thus out come of climatic variable influences socio-economic and development aspect to a great extent. 'Low level of economic development and corresponding low investment capacity, inadequate infrastructure, low level of social development, lack of institutional capacity, and a high dependency on the natural resource base make the country highly vulnerable to climate change' (M/o: E&F, 2005).

### **1.3. Scope of Local Government<sup>1</sup> in Response to Climate induced Threat in Bangladesh**

There are two response options to face the climate change occurrence. One is mitigation another is adaptation. Mitigation options deals with the reducing of 'Green House Gas' emission. Adaptation refers any activities of adjustment with the extreme climate event. It is a process to cope or dealing with the occurrence due to change of climate.

Adaptation is a fundamental human behavior that has been practiced by the individual and community through out the history of mankind. But the intensification and severity of extreme climatic event requires institutional intervention. Each of every sector such as agriculture, water management, livestock, fisheries, infrastructure development, environment, disaster management etc requires special focus of adaptation, if extreme climatic event occurs. As a local face and next

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<sup>1</sup> In this study the term local government refers to both the UP (Union Parishad) and UPZP (Upazila Parishad) and later it is termed as LG.

door service provider it is local government that can play a vital role in this regard due to the convergence of adaptation activities and its (LG) basic services.

A study revealed that Bangladesh possess low potential for mitigation options. Rather the adaptation options is relatively viable for Bangladesh to face the climate change adversity (Ahmed et al. 1999). In this context, to find out the state of preparedness of local government of Bangladesh this study mainly focuses on the adaptation activities.

Largely two types of the literature are found in the study on local government's role in climate change issues; one is guideline (practical) format another is academic. Both types of literatures have recognized local government as important actor in adaptation activities. Local government can play role through guiding community, acting as service provider, sharing information, providing leadership, help to raise awareness (act as awareness educator) etc (Staden , 2010). Response to Climate change requires local knowledge and institutional support; in this aspect local government can work as a flow channel to disseminate the information to upward and downward.

Local government is the bridge institution between community and central government. Since Climate change is very scientific assessment of anticipated global risk issues that required very high degree of technical research, so its seems to be very difficult for a small local government to acquire all authentic information regarding local effect of climate change but national government can acquire it through various global agencies and forum. Government can disseminate and share the information with local government. Local government can share this information with the community as well as can use for its own adopted program.

Further, local government can provide information of local experience for routine development scheme (Road, embankment, canal, Shelter center) and other sustainable development project such as land use planning, zoning, infrastructure (protection and build), and social protection and safety net program and so on. Local Governments may have any local plan or project regarding disaster management to share with government that can address the climate change induced threat issues too. In what extent the Local government uses this mechanism of information flow channel can be an indicator of it preparedness for adaptation.

Despite significant distinction between ‘disaster risk reduction’ and ‘adaptation’, in many aspects both are closely related. For example ‘tree plantation’ program may be considered as a part of disaster management or environmental management. In fact it serves both the purpose of climate change adaptation and mitigation activities. Further, while new areas are inundated by saline water due to sea level rise and people face the scarcity of fresh drinking water for a long time, it requires something more than disaster risk reduction. Local government can take initiative to facilitate any appropriate measures in this regards as per their jurisdiction.

To cope with the severity of extreme climate; any phase of activities by the local government indicates its (LG’s) adaptation measures. For example, local government may be an awareness educator or organizer to promote ‘flood or draught resistance’ varieties of suitable crops as per local need. To face frequent drought, water management for irrigation; to reduce increasing soil salinity, digging canal; to preserve fresh water for irrigation or step to preserve drinking water from salinity, preparing the road or embankment to protect from newly and frequently observed surge and tidal wave level can be activities of local government’s climate change response activities in Bangladesh context.<sup>2</sup>

However, it is much talked about local government’s role on adaptation in facing the challenge of climate change from different corner but very few practical inclusions of its, is observed in the developing countries like Bangladesh. There are specific projects and programmes, funded by donors and governments, which try to address climate change issue at the local level, and which sometimes (but not always) work through local governments (UNDP, 2010). Many of the non government organizations are working with climate issues in Bangladesh (Rahman, et al. 2008) their inclusion (any form) with local government may influence its preparedness but it is rarely practiced.

Climate change is relatively new phenomenon and sometimes may be perplexing issues for ‘rural local government’. Because that ‘much of popular and policy debate has been pitched at ‘global’ levels rather than sub national term (UNDP, 2010). While the lack of awareness about own

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<sup>2</sup> Pender, 2010; Ahmed, 2006; W.B., 2010; described different kinds of adaptation measurs according to the need of different system and area in Bangladesh context.



duties of LG representatives of Bangladesh is noticed (Aminuzzaman, 2011; Haque, 2010) it seems that the local meaning making of climate change impact within the jurisdiction of local government may be difficult. But awareness about the climate change impact is crucial for priority fixing to set off response measures that ultimately influence the preparedness level.

Different policy directions of Bangladesh express intention for comprehensive effort but they rarely recognized the need to work closely with local government. 'Neither the BCCSAP nor the NAPA recognize local government's role in adaptation. Only five programmes out of 44 in the BCCSAP mention the Ministry of Local Government, Rural Development and Cooperatives as one of the 'responsible institutions' for implementation. Four of these relate to urban drainage, water and sanitation, and supported migration. Only one mentions the involvement of Union Parishad (the T3P8 Planning, design and implementation of reconstruction of the networks of rivers and canals through dredging and de-siltation work) (Raihan et al. 2010).

Mostly central government is the revenue provider for local government; such revenue therefore cannot be used by local government for adaptation independently, unless there is no instruction from central government. Thus the national regulatory frame work and plan is very influential to shape the preparedness level of local government. Local Governments work in a resource constrains. Very often they face difficulty to expense for their existing portfolio and routine scheme, thus it seem to be difficult for local governments to take adaptation scheme as their priority.

However, local governments have the prospect for 'making adjustments to existing activities and practice, so that vulnerability to potential impacts associated with climate change can be reduced' (Commonwealth of Australia, 2010).

Local government of Bangladesh is primarily familiar with environmental and disaster issue. Despite having notable distinction, climate issues are closely related to those issues. This institutional opportunity may enhance the potential of local government to be prepared to face the climate induced adversity.

Since the out come of climate change affects different segment of people or different area in different dimension thus this local variation requires place specific and group specific and system specific response (UNDP, 2010). Local Government institutions have enough scope to play vital role in this context.

#### **1.4. Statement of the problem**

Lack of sound preparedness makes a system less adaptable that ultimately generates more vulnerability. So it is imperative for the local government of Bangladesh to be well prepared. A well prepared organization will be aware of the fact the range of extreme event may be growing and will enhance its strategies to reduce people's vulnerability to such event. (Aalst and Helmer, n.d.)

Climate change not only raises the risk but also increases the uncertainty and its consequences are unavoidable (Aalst and Helmer, n.d.). Number of study projected the future adversity of climate change and depicted the consequences of cost-benefit analysis of action and inaction (to face its impact) and finally suggested for adaptation action. Local government is the key actor in the local level adaptation activities because it leads, guides and serves the community (Staden, 2010). In this regard it can be argued that a well prepared local government can ensure the optimum success of such adaptation measures.

While for many in developed countries climate change is threat of the future, Bangladesh is already bearing the burn of it (Islam, 2009). Many developed and middle income countries have prepared their guide line for local government's role to climate change adaptation aimed at sound preparedness to reduce the climatic threat but it is rarely noticed in the developing countries like Bangladesh. Practical inclusion of local government in adaptation policies and activities is widely recommended in the literatures as climate change impact is threat to sustainable development, and also a possible obstacle to achieve MDG. In many extents local government is in charge for implementing these development activities thus the preparation of local government to face the challenges of climate change is crucial.

#### **1.5. Rationale**

Researchers and international community have marked Bangladesh as high vulnerable country to the effect of climate change adversity in many aspects. Country's socio-economic development is facing challenges posed by climate change. A notable portion of these climate induced challenges are also posing strain on the local government's regular activities as it is mandated as local service provider and authorized for adopting many socio- economic development activities at the local level. So the preparedness of local government to face these challenges is very

important. But a very few research is conducted in the context of Bangladesh, specially the academic research that mainly focus on the preparedness of local government as well as role of local government to face the climate change driven impact.

Climate change is treated as threat to growth and development. Remarkable attention has been given by the government of Bangladesh on climate change issues in her policy directions. Strengthening local government is one of the promises of government, similarly climate change and environmental issues are one of the prime attentions of government. In this aspect it is significant to investigate the preparedness state of local government to meet the climate change adversity.

Exploring the preparedness levels of local government and relevant influential factors for preparedness is very crucial for the appraisal of existing strategy as well as for further necessary policy design.

Due to the noticeable convergence between the adaptation activity and duties of local government, it seems that LG possess many potential opportunity to play important role in adopting adaptation measure to be prepared for facing the climatic adversity at the local level. In this regard this exploratory study is conducted to explore the extent of preparedness of local government in facing the challenge of climate change.

## **1.6. Objectives**

In line with the above stated circumstances this research has set the following objectives.

1. To assess the preparedness of local government in the adaptation process to face the challenges of climate change.
2. To assess the role of local government in the adaptation process to meet the challenges of climate change.

## **1.7. Research Question**

To address the objectives the study attempts to find the answer of the following research question.

Are the local governments prepared to address the adaptation process infacing the challenges of climate change?

## **1.8. Operational Definition**

**Local Government:** In this study the term local government (LG) refers both the UP (union Parishad) and UPZP (Upazila Parishad).

**Union Parishad(UP):** The lowest tier of local government of Bangladesh, established on constitutional and legal basis, constituted of 13 directly elected member (including one Chairman)for five years responsible for discharging some prescribed civic, revenue, development, administrative, security and judiciary function of a local area (Haque, Sk. M.T., 2011 ). UP is the residence of average 27 thousand of people. No local department of central administration/line ministry is under the direct supervision of UP.

**Upazila Parishad(UPZP):** Established on constitutional and legal basis, constituted of a chairman and two vice chairmen (including one woman) directly elected by the resident for five year responsible for some civic, revenue, administrative, development function of a sub district. Upazila parishad enjoys relatively more administrative power than UP.

UPZP is the residence of about more than 50 thousand to 4 lac people.13 local department of line ministries are under the supervision of UPZP.

In terms of climate change activities, UP may be classified and termed as the small rural service delivery unit for less than 50 thousands population that own minimal resources and largely depend on intergovernmental financial transfer, having very limited degree of political power, where the UPZP is a large rural local service delivery unit for more than 50 thousand population possess moderate resources and largely depend on inter governmental financial transfer having limited degree of political power.(UNDP, 2010).

**LG representative:** LG representative refers both the elected representatives of Union Parishad and Upazila Parishad. Chairman and Members of UP, Chairman and Vice Chair man of Upazila Parishad are the LG representatives.

### **Adaptation Process:**

Adaptation process refers both the initiative and activities of local government for adaptation measures (any phase of any kind of adaptation) through project or relevant program or contingency plan bearing the threat of climate adversity in mind. Preparedness can be visible through these measures.

## **Chapter: Two**

### **Literature Review**

#### **Introduction**

This chapter has attempted to review the existing literatures that deal with the role of local government in climate change adaptation. To understand the institutional potentials and barriers of local government for initiating preparedness measures to face the climatic adversity; literatures that discussed the inherent institutional attributive of local government of Bangladesh especially regarding environmental governance are also reviewed.

#### **2.2. Local Government: Adaptation, and Environmental Governance Issues**

Ample research works are found regarding climate change and adaptation, among its number of rapidly increasing literatures have focused the local government affairs. But the works that exclusively deal with the relation between the role of local government and climate change issues is not that much; especially in the Bangladesh context it is very rare. Many developed countries have already reached in a remarkable position regarding making practical guide line for local government to meet the challenges of climate change, but the developing countries like Bangladesh is to date , far behind in this regard.

Beside the academic publications different donor agencies and research institutes have also published their research works on climate change adaptation. For example, UNDP(2010) has published a discussion note on 'Local governance and climate change' on south and south-east Asian context that can help to understand the crossing point of relation between climate change and the role of local government.

The note stated that, lack of awareness of what 'climate change impact' mean for them, their residence and their jurisdiction is the main challenge for the local government of the developing countries; especially for the 'rural small local government to inclusion of the climate change issues in their activities. National policy obstacle, budget constrains, lack of political incentives, lack of accountability of local government to the local people are described as the potential constraints and challenges for the local government to address the climate change issues in their jurisdiction (UNDP, 2010). Many other studies also identified lack of understanding (awareness)

of climate change issues of local government representatives, and inadequate financing capacity as the major limitation of local government (Ahmed and Neelormi, 2010).

In Bangladesh context, not only for the ‘adaptation to climate change challenges’; perhaps these type of limitation is also common scenario for overall governance of local government. As Haque (2010) stated ‘in the institutionalization of governance, in most developing countries like Bangladesh , local government suffers from negligence and is most often lost in the shadow of national policies, practices, and efforts at economic growth and social and political development. The Union Parishad still remains weak due to the overshadowing dark cloud of inefficiency, lack of resources’ (Haque, 2010). Most of the standing committee of UP are not functioning well (Haque, 2010). ‘UP member are partially aware about their formally prescribe responsibilities, and in many cases lack of the skill and resources required to discharge those functions’ (Aminuzzaman, 2011). Limited capacity for revenue earning constructs their high dependency upon central government’ (Aminuzzaman, 2010).

UPs have to work under various type of legal and practical constrains for each of their prescribed responsibilities. In a study (Khan, n.d.), limited legal power, lack of resources, lack of trained man power, administrative complexities, lack of awareness of service seeker were identified as the obstacles for proper functioning of their assigned duties by the UP representatives. The study found that for functioning of ‘agricultural, Plantation, live stock, and fisheries’ and disaster management related duties’ most of the UP representatives faced different kinds of obstacle (Khan, n.d.).

As stated earlier, one of the promising arenas of interface of local government’s activities and climate change adaptation activities is their congruence and interrelation (UNDP, 2010). Local government of Bangladesh possesses prescribed responsibilities of environmental and disaster management duties and local government representatives are at least primarily familiar with the concept of it.

According to the Local Government Union Parishads (Amendment) Acts. 1993 and 2001 each UP will constitute thirteen standing committees (Siddiqui, 2005:163, cited in: Haque, 2010) for carrying out and oversee the different type of activities of the council. Among the responsibilities

of UP standing committees, the following areas of responsibility are very pertinent to climate change activities and may seek urgent ‘adaptation’ attention in necessary. These are (1) health (2) agriculture and other development works (3) fisheries and livestock (4) conservation of the environment and tree plantation (5) Union public works (6) Rural water supply and sanitation.<sup>3</sup>

As per local government ordinance, the UP is entitled to perform thirty eight responsibilities of which, eleven duties are mostly related to management and promotion of micro environmental issues (Ali, et al., 2000). Study of Ali, et al. (2000) found that though UPs (of the studied area) perform partially only six areas among the eleven environments related responsibilities, the role of UPs in preserving rural environment was significantly higher than not at all. Though it is found that no UP is involved in augmenting the people awareness on environmental conservation, they possess the potential to play the role in this aspect. The study revealed that UPs utilized only 15% of its potentials. This study also exposed that there is no linkage or co-ordination among the GOs-and NGOs regarding the issues. In most cases, UPs are not consulted (Ali, et al. 2000).

A project study on community based adaptation conducted by Action Aid, Bangladesh, (Raihan et al. 2010) focused on one of its part about the role of local Government in adaptation activities. It offered an idea about the limitation of local government in climate change adaptation issues in Bangladesh context. The study stated that although climate change is policy priority in the policy level, this does not seem to have reached at local government level. The local government representatives know very little about how climate change is affecting their area and kind of problem it is causing for local people. Little capacity for coordinated action, weak local national linkage, and low trust of local government were presented as the limitations of local government for assisting the community in adaptation activities. The study also described that, to some extent some government project may create problem for community based adaptation. In the case of fresh water management, local government does not assist the poor man’s adaptation rather their step helps the rich man in the study area (Raihan et al. 2010).

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<sup>3</sup>Climate change associated impacts may poses threat to all most all the system. Pender, 2010; Islam, 2009; and M/o: E&F, (2005, 2009) and many other literatures discussed details about CC associated impacts in Bangladesh context.

Against the disappointing feature of limited institutional capacity of rural local government agencies some promising aspect regarding their potentiality and significant role as next door service provider also revealed by the researchers. 'Many of the UPs of Bangladesh successfully used the 'Block grand of ADP' against the conventional assumption of its weak capacity. Considerable discretionary power to use the resources may fostered the accountability, efficiency and local participation'(Aminuzzaman, 2010).

A case study presents that UP can fruitfully participate with other institutions (GO-NGO) and can manage the climate change adaptation activities with the help of the community. UP recognized as the most acceptable institutions to assist and work for community based adaptation to climate change challenges. Considering the sustainability of long term adaptation measures UP can be 'right vehicle' to integrate adaptation concerns of targeted communities (Ahmed and Neelormi, 2010).

For successful adaptation activities in rural area of developing countries the role of local institution is well recognized. (Bakker, 1999; cited in: Agrawal, 2010). A compendium publication of many case studies on 'Assessment of Impacts and Adaptation to Climate change (AIACC) concluded that adaptation is mostly local affairs and local institution should be strengthen and recognized in local adaptation process. (Leary et al. 2008). Local level climate change adaptation is highly depends on institutional and political factor and the policy interpretation of the government for the safeguard of the affected people at local level. (Raihan et al. 2010). But the relative importance of local institution in NAPA adaptation project is not promising in Bangladesh (Agrawal, 2008).

'Local institution structured the adaptation activities. Adaptation to climate change is highly local, and its effectiveness depends on local and external institutions through which incentives for individual and collective action are structured' (Agrawal, 2010).

On the basis of the analysis of 118 cases of adaptation drawn from the UNFCCC database Agrawal (2010) concluded that 'particularly for rural areas contexts (1) local institutions can play a central role in all observed adaptation efforts and practice, (2) civil and public sector



organizations are key to local adaptations and (3) private sector and market forces have been less important to adaptation (Agrawal, 2010).

Agrawal stated,

‘Although household and communities historically have used many different strategies to adapt to climate change variability and the vulnerability resulting from it, their capacity to adapt depends in significant measure on the ways institutions regulate and structure their interactions both among themselves and external actors’ (Agrawal, 2010).

Local institution not only affect the rural people’s response regarding environmental hazard rather it act as mediating mechanism that helps to translate the impact of external intervention to facilitate adaptation of rural people. Institutional role of information sharing by local institution helps to reduce the vulnerability. Mediating role of local government (institution) to information dissemination (Upward and downward) regarding climate change is very important (Agrawal, 2010; UNDP, 2010). Agrawal (2008) emphasized on institutional partnership and central government’s facilitating role for promoting adaptation in local level.

### **2.3. Inference of Literature review**

From above discussion it is observed that local government of Bangladesh possess a lot of potential and can play a vital role to meet the challenges of climate change. Despite not having adequate knowledge about the cause and impact of climate change and proper dealing capacity, the need of local government as the local face cannot be ignored to achieve a successful adaptation program in a local area.

Institutional partnership and coordination is very crucial for adaptation activities. Lack of awareness or lacks of knowledge for local meaning making of climate change impacts, lack of resources, budgetary constraints, and limited policy attention are the influential factors for adopting adaptation activities and other preparedness measures by the local government.

## **Chapter: Three**

### **Analytical Framework**

#### **Introduction**

This chapter is promised to develop an analytical framework on the basis of existing literatures review. The first section of this chapter discusses the conceptualization of preparedness for adaptation process and the factors that influence the process. In this regard the details of the two terminologies, 'Preparedness and Adaptation' are presented first. Finally an analytical framework has been developed linking the relation between dependent and independent variables on the basis of existing literatures of theoretical connotation. Operational definition of the variables is also presented.

#### **3.2. Conceptual dimension: Preparedness for Adaptation Measures**

This research is proposed to asses the state of readiness of local government (through its action, program, and contingency plan) in adaptation process and to understand the major factors that may influence preparedness to response to the climate change induced impact.

As a response option to cope with climate adversity proper adaptation can be considered as one of the best indications of sound preparation. In other word preparedness can be understood through adaptation measurs. Adaptation measurs of an institution is influenced and shaped by bio-physical, socio-economic, institutional and cognitive factors.

##### **3.2.1. Understanding preparedness**

Literally the term 'prepare' means 'get ready to do or deal with something' (Oxford Dictionary Thesaures, 2003). This research refers 'preparedness' as the state of readiness of local government to deal with the climate driven impacts. How this readiness can be understood or how it becomes visible? Preparedness can be understood through measures (Sutton and Tierney, 2006), protective and responsive activities and relavent contingency plan of local government to respond to the climate induced events. Different types of adaptation oriented measures indicate the preparedness.

In terms of ‘disaster preparedness of different units’ Sutton and Tierney (2006) stated that ‘preparedness is typically understood as consisting of measures that enable different units of analysis—individuals, household, organizations, communities and societies—to respond effectively and recover more quickly when disaster strike.

Preparedness activities and elements differ according to which social unit is involved, such as, the activities and element of preparedness of private organization will not be the same as the public organization or local government. Preparedness requires authorities, responsibilities for action and resources to support those actions (Sutton and Tierney, 2006).

According Sutton and Tierney (2006) ‘the concept of preparedness is multi dimensional and includes elements such as, hazard awareness and analysis, formal plans, mutual aid agreements, enduring social and institutional relationships, resource acquisition, training and education, drills and exercise and method for institutionalizing lesson learned. They also emphasize on partnership among different sectors for preparedness in their literature of disaster preparedness concept.

According to UNISDR (2009) the terminology preparedness means ‘

The knowledge and capacities developed by Government, professional response and recovery organizations, communities and individual to effectively anticipate, response to, and recover from, the impact of likely, imminent or current hazard events or conditions. (Preparedness) includes such activities as contingency planning, stockpiling of equipment and supplies, the development of arrangement to co-ordination,. These must be supported by formal institutional, legal and budgetary capacities.

Preparedness is not a matter of future consideration only or not a requirement for a particular edge (phase) of an action only, rather it brings the future in present and every phase of an action requires preparation. Preparedness entails developing the existing ability to cope with the uncertainty. Thus preparedness is a holistic concept (Sutton and Tierney, 2006).

In line with the above stated sense, it can be argued that the preparedness of local government to cope with the adversity of climate change can be understood through a set of measures (adaptation oriented action and plan); but the process of taking these measures may influenced

by awareness (Knowledge about hazard), institutional network (co-operation and co-ordination among the concern organization) and institutional capacities (resource and legal authority).

### **3.2. 2. Adaptation**

Simply, adaptation means any action to adjust with the climate change and variability. As a scientific agenda adaptation to climate change and variability has been occupied a significant concentration of different social sciences. Adaptation itself a multidimensional issue (Smit et.al. 1999) and it has been analyzed in different point of view in different discipline. (McEntire, 2004; O'Berien and Gail Hochachka, n.d.; Gupta et al. 2008).

When adaptation is discussed in the economics point of view it entails the discussion of 'cost-benefit analysis of adaptation', 'adaptation as public goods' as well as relation between adaptation and growth, equity, and access to resources etc (Kelly and Adger, 2000; Mendelshon, n.d.; W.B., 2010). Adaptation discourse in sociological point of view entails human interaction with environmental change, culture, norms, (how adaptation is perceived), relation between adaptation and social capital (Pelling and High, 2005; Pelling, n.d.) and socio-economic development, adaptation as social action, and how social institution involve in and influence adaptation and so on.

Similarly when adaptation is viewed in sustainable development milieu, it studies the economic, social and ecological aspect of development, equity and sustainability in the context of planned adaptation (Smit, 2001). Adaptation is considered as an important policy option or response strategy to concerns about climate change (Fankhauser, 1996, Smith, J., 1996, cited in: Kelly and Adger, 2000).

Further, the terminology 'adaptation' is explained in the climate change literatures by emphasizing on state of capacity, vulnerability, adaptability and in the context of different type of system (sector), time etc. Because 'adaptation vary according to the system in which it occurs, who under takes them, the climatic stimuli that prompts them, and their timing, function, forms, and effects. (Smit et al. 2000 ; Smit , et al. n.d; Kelly and Adger 1999, cited in: Gupta et al. 2008). Thus defining the term adaptation covering all of its aspect is difficult. The IPCC provides a consensus definition of adaptation as:

‘Adjustment in natural or human system in response to actual or expected climatic stimuli or their effects, which moderate harm or exploit beneficial opportunities (IPCC 2001a: 982, cited in: Gupta et al. 2008).

In a nut shell adaptation is - ‘being better prepared’ or adapting to climate change, not fighting it, but, learning to live with it (Rahman, 2008 cited in: Pender, 2010). Adaptation is the activities that are aimed to cope with the consequences of extreme climatic impacts. Adaptation process can reduce the vulnerability to some extent on an individual level and adaptation activities are highly local matter. (Ahmed, et al. 1999)

Considering above discussion it can be argued that, in terms of preparation ‘adaptation is a response options of a system to be prepared to cope and deal with the climate change induced impact and variability.

However, climate change is not only a function of biophysical outcome, but also of socio-political, and institutional factors (Adger, 2006; cited in: Agrawal, 2010). ‘Adaptation planning’ requires a thorough understanding of the local context of gender, culture and other socio-economic factors (Ziervogel, and Taylor, 2011).

Previous chapter discussed that adaptation activities may be influenced by cognitive, socio-cultural, institutional and political factors. Three main barriers frequently cited in the adaptation literatures, these are- lack of information, lack of resources and institutional limitations (Measham et al. 2011.cited in : Gero et al. 2012). Gero et al. (2012) identified four common contextual barriers for adaptation planning and implementation.

These are; (a) Operational Barriers: Limited knowledge and technical capacity to asses and reduce climate risk, limited resources.

(b) Policy: General lack of policy support and direction from other government departments,

(c)Financial: Competing priorities for funding.

(d)Cognitive and Cultural: Community’s preference, community’s perception, values and belief (Gero et al. 2012).

Above discussion implies that adaptation activities are the vital step of being prepared to cope with climatic hazard. Policy support, resources and technical capacity and cognitive (awareness, knowledge) aspect of an institution are crucial to influence preparedness for adaptation measures. In this context the following section discusses the relevant theories and frameworks that examined the adaptation activities of local institutions or local government.

### **3.3. Theoretical Discussions**

As stated earlier that adaptation is itself a multidimensional concept and ‘multi-disciplinary’ issues thus the focusing point of its analysis and theoretical arrangement is diverse and wide-ranging. For example, ‘Economic theory suggests that adaptations are efficient (desirable) only if their benefit exceeds their cost (Mendelshon, n.d.).

Adaptation is ‘public goods’ in the eye of the government. Robert Mendelshon proposed that the local government can take initiative for adaptation on the basis of cost-benefit analysis. Proposal of Mendelshon (n.d.) is almost same as the ‘bare losses’<sup>4</sup> approach, where it is proposed that ‘doing nothing, except accepting the losses when the cost is higher than the benefit of adaptation. Robert Mendelshon has also emphasized on the adaptation through development (by developing service, manufacture and other sector of economy) where proper income distribution, poverty reduction will be ensured. Because the lion share of economy of the developing countries comes from the climate sensitive sectors. ‘For developing countries, another effective adaptation strategy is development it self’. (Schelling, 1992; cited in: Mendelshon, n.d.)

Kelly and Adger (2000) have explained adaptation and vulnerability focusing on the socio-economic and institutional constraints that limit the capacity to respond to climate variability and change. Socio economic well being is kept at the center of their analysis. Kelly and Adger (2000) analyzed their approach of adaptation and vulnerability in the light of ‘access (entitled) to resources principle’ of Amartya Sen that ‘the extent to which individual, groups or communities are ‘entitled’ (have access to resources) to make use of resources determines the ability of that particular population to cope with or adapt to stress. Inequality, poverty and institutional constraint of society that hinder the entitlement of people to make use of resources enhance the

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<sup>4</sup> There are different kinds of anticipatory adaptation measures such as, bare losses, ‘share losses (imposing tax on privileged group)’ ‘changing location (shifting from vulnerable area), change use (shrimps culture in stead of agriculture due to saline water) etc (Haq, et al.,1999, : 130).

vulnerability. According to them ‘all economic structures can be viewed as dependent on the institutional structure that frames them (Kelly and Adger, 2000). A primary role of institutions is in fact, to enable society to adapt (O’Riordan and Jordan, 1999; cited in: Kelly and Adger, 2000).

Recognizing institutions as one of the important determinantes of adaptation Smit et al. (2001) have discussed adaptation and sustainable development. According to them adaptation response are closely linked to developments activities which should be considered in evaluating adaptation options. They have called attention to local involvement for effective planed adaptation.

It is required to consider the wellbeing of citizen, equity ,equal access to resources, poverty eradication and development aspect while local government initiate the adaptation plan as preparedness measures.

How an organization will deal with the equivocal consequence of climate change? In this regard mainstream theory of organizational change (Rational choice theory, System theory, Complexity theory) and theory of emergency management are studied in the many concern researches. As the specific impact of ‘climate change and variability’ is anticipatory, uncertain, and uneven, the chaos theory (since disaster and climate change is non linear event) is also proposed in climate change literatures as it is discussed in the disaster management study.

Although many of these literatures and theoretical connotations are helpful to examine the position of local government to deal with the climate induced changing situation, this research is attentive to those theoretical analysis that are more adherent to explain the relation between adaptation activities and local level institution.

### **3.3.1. Action theory of adaptation to climate change**

Adaptation can be considered as an action (or activities) to respond to the climate change and variability. Action requires actor having with resource and capability to act. Local government as an actor (operator) of adaptation activities how operates the adaptation action within its legal provision, and through its limited resource ability can be understood by the action theory of adaptation to climate change of Eisenack and Stecker (2010).

Eisenack and Stecker (2010) analyzed adaptation in an ‘action oriented’ perspective. According to them ‘one could define adaptation as individual or collective actions that are explicitly or

implicitly intended to affect impacts from climate change, or that are instrumental for achieving the end. An adaptation is the social response by an individual, or an organization in the broad sense.'

Action theory attempts to answer the question of 'who or what adapts and how does the adaptation occurs. 'Action requires actors and intention; and this intention is directed towards an impact of climate change. Adaptation requires the use of resources as means to achieve the intended end'. (Eisenack and Stecker, 2010)

In general sense, the simple augmentation of action theory is- the biophysical change due to climate induced events (stimulus) affect the exposure unit (a system or entity),and the actor (mainly the operator) exercise the adaptation activities to response to it(impact) with the help of necessary means (knowledge, resource, power).

According to Eisenack and Stecker (2010), climate change impact is the combination state of stimulus and exposure unit. Stimulus refers climate induce bio physical change and exposure unit means the system that affected by climate change. Example as stated by them 'a reduced energy production of a thermal power plant (exposure unit) due to more frequent scarcity of cooling water (stimulus) is an impact'. Actors respond to this impact.

The collective actor that exercises the response is called operator (such as Government, Local Government, and NGO), operator tries to achieve the intended ends that are associated with other actors, social, or non human system. The ends are ultimately targeted at impact. Operator needs resources (financial, social network, knowledge, availability of information etc).Action is further shaped by the constraints and resources that cannot be controlled by the operator. In this respect the approach of action theory of adaptation presented by Eisenack and Stecker (2010) can contribute to understand the adaptation activities (action) of local government of Bangladesh.

However after in depth analysis of the process of adaptation activities, different kind of means that hinder or promotes the adaptation and classifying different kind of adaptation in light of action, finally Eisenack and Stecker (2010) have presented some barriers that limit the adaptation activities. Such as, missing means about impacts and capacity or budget constraints etc.

According to them (Eisenack and Stecker, 2010) 'although there is no lack of perceived problem urgency; capacity or budget constraints hinders the appropriate adaptation...there is no operator due to complete ignorance of impacts. In this case, not even the necessary means for adaptation



are known. Although there might be vague problem awareness, adaptation is hindered on the base of missing means in terms of individual knowledge about impacts or due to conditions that prohibit problem awareness (high information cost, social habits and normative stand)' (Eisenack and Stecker, 2010).

### **3.3.2. Integral Theoretical Approach**

Action theory proficiently designed the process of adaptation activities and identified the barrier of adaptation but it largely emphasizes on the impact, respond to and change of a system. Though intention of actor and 'knowledge as a means for adaptation' is recognized in action theory, awareness is viewed here in a different aspect where as many other researchers directly explained and explicitly recognized the level of awareness and dimension of people's attitude, knowledge, and perception towards the impact of climate change as one of the major elements of starting point for adaptation activities. Climate awareness is kept in the center of adaptation analysis. Climate awareness thus constitutes a very important step toward any adaptation planning (Saroar and Routray, 2010).

More over, it is also cannot be ignored that a fruitful action requires motivation of actor to act. An insight of motivation to adaptation activities can be understood through the different level of awareness and consciousness. Subjective experience and behavior of individual, cultural matching of adaptation and individual and collective awareness and meaning making are very important for understanding adaptation process as a whole (O'Berin and Hochachka, n.d). According to them, 'You can bring a horse to water but you can not make him drink. No matter how excellent the technology is, it will be of little use to people and communities who do not understand how to use them, or do not feel motivated to do so (O'Berin and Hochachka, n.d.).

People's subjective beliefs and assumption as well as cultural norms, tangibly impact both discussion and action response to climate change.' How people perceive the challenge of climate change is very important, different type of 'worldview' level of awareness, consciousness (norm, belief, knowledge etc) may influence the climate change adaptation. ((O'Berin and Hochachka, n.d.). O'Berin and Hochachka (n.d.) have offered a theoretical framework of integral adaptation of trans -disciplinary approach where they focused on the benefits of integrating interiority (of

individual and collective) and greater attention to worlds view, awareness, and motivation in adaptation research.

According to them ‘An integral approach to adaptation recognized that adaptation can not be solely conceptualized or engaged as behavioral and systematic change it must also include interior change, both personally and culturally. There is a need to be considering how individuals and group perceive the challenges and opportunities associated with climate change, to identify what matters to them, and to be aware that the very idea of anthropogenic climate change may affect-and be affected by world views and belief’(O’Berin and Hochachka, n.d.).

In the discussion of the importance of awareness and meaning making of climate change they (O’Berin and Hochachka) mentioned that traditional world view, belief that a ‘Supreme Other’ (God, Allah) will protect and take care of humanity often occlude a full understanding of rational science of climate change. This is may not be surprising at all; in a study conducted in Dhaka city by Islam (2005) on the peoples perception on cause of flood revealed most of the(31%) respondent replied that cause of flood is “*Allar Gazab* (Curse of God) (Islam, 2005)<sup>5</sup>. Thus the different perspective of world view (awareness and consciousness) regarding climate change should care fully be recognized and human-environment relation require a greater attention in the study of climate change impact and adaptation.

However O’Berin and Hochachka (n.d.) have emphasized on the integration of individual and collective interiority (subjective experience, belief, understanding, culture, and norm) with individual and collective exteriority (behavior, system, technology, economics, scientific knowledge) and different level of awareness, world view and consciousness to depict the integral analytical frame work of adaptation.

Very simple explanation of their integral theoretical frame work can be explained as follows. O’Berin and Hochachka (n.d.) emphasized on the integration of social, cultural and psychological dimension of adaptation with the scientific and technological knowledge for an adaptation process. According to their framework any adaptation process can be assessed by multi validity claim and they go through the four domains of reality. Each domain of reality

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<sup>5</sup> Out of 31 main causes perceived of 1998 flood by respondent. (Most of these respondents are representative of lower socio-economic category with low literacy though a few middle and high income groups also mentioned this factor as a cause of flood.)

requires different type of methodology (Multi disciplinary approach) to explain and different validity claims are proposed for each domain. 'Awareness, consciousness and world view' are the matter of consideration for each type of adaptation. These four domains of reality and validity claim are as follows-

**Individual interior:** It is associated with individual subjective experience, belief, understanding, motivation and world view. Validity claim of this section are- Is the adaptation understood by the individual? Is it embedded in an individual's beliefs and faith or does it resonate with an individual's value and world view? Structuralism is proposed as one of the methodologies for this section

**Collective interior:** related with the culture. Validity will be ensured if the adaptation appropriately connected with the culture. Ethno methodology is the proposed methodology to depict this section.

**Individual exterior:** refer the behavior and psychology of individual. The validity assessment of this section is;-does this adaptation correctly reflect the scientific studies that suggest we need it or is it effective adaptation? Empiricism and life science are the methodologies to explain it.

**Collective exterior:** An adaptation will be validated, when the adaptation is functionally fit in the present economic, social, political and ecological system. Collective exterior is connected with 'system' (such as ecological system, social system even agriculture system).System theory approach can contribute as the methodology to understand the collective interior.

However finally they proposed for capacity building in four types of adaptation activities. Among the four , the 'Systematic adaptation' that relatively more focuses on the local and national level adaptation, where emphasize are given for increasing capacity by fostering good governance, enhancing access to resources and legal right of the poor, transfer of knowledge, access to international adaptation (O'Berin and Hochachka, n.d.).

Thus an adaptation process should be addressed by social, cultural and psychological dimension along with technical and scientific knowledge. Various disciplinary approaches are required for appropriate understanding of adaptation. Finally different types of awareness level play an influential role to understand the impact of climate change and appropriate adaptation.

### **3.3.3. Inherent characteristics of institution and adaptive capacity**

Integral theory of O'Berin and Hochachka pertinently pointed out the importance of individual and collective interiority to figure out adaptation process and adaptive capacity. At the same time

it is important to understand the ‘inherent characteristics’ of an institution that promote or constraint the adaptation and adaptive capacity to climate change and variability impact.

Inherent characteristics of an institutions help to identify the traits that stimulate adaptive capacity (Gupta et al. 2008).According to them ‘the inherent characteristics of institutions to stimulate the adaptive capacity of society involves both the possibilities that institutions give society to response to climate change and possibilities that institutions offer to redesigned themselves by social actor (Gupta et al. 2008). A very systematic adaptation scorecard that includes different characteristics of an institution is presented by Gupta et al. (2008) to realize and assess the adaptive capacity.

The broad six criteria of their (Gupta et al. 2008) adaptive scorecard that influence the adaptation capacity are-variety, learning capacity, space for planned and innovative autonomous action, leadership, availability of resources, and an fair governance. Each of these broad characteristics includes other criteria (Gupta et al. 2008).

Since climate change impact is often uncertain and unpredictable thus *variety* requires (refers) multi actor, multi solution, diversity and different problem definitions. *Learning capacity* emphasizes on mutual trust and cooperation among different stakeholders and continuous internalization and realization of the problem solving, *resources* include authority, human, and economic resource and *leader* is considered as the change manager. A single criterion may be more influential than other to assess the adaptive criteria such as *fair governance* and *resource* may play vital role for adaptation capacity for an institution than other criteria (Gupta et al. 2008).

Gupta et al. (2008) also pointed the relationship between adaptation capacity and adaptive measure. Although they (Gupta et al. 2008) largely emphasized on the inherent characteristics of institutions to understand the adaptive capacity, it is important to understand how the institution structure the impacts of climate risk, mediating role of institution regarding external intervention, importance of institutional partnership of different kinds of local institution and coordination of local level institution with national level. In this regard ‘Adaptation, Institution and Livelihoods framework’ of Agrawal (2008) can be considered as a momentous contribution.

#### **3.3.4. Adaptation, Institution and Livelihoods Framework**

According to Agrawal (2008) ‘Local institutions influence the adaptation and climate variability in three critical ways: (a) they structure impact and vulnerability, (b) they mediate between

individual and collective response to climate impacts and there by shape out come of adaptation (c) they act as the means of delivery of external resources to facilitate adaptations and thus given access to such resources' (Agrawal, 2008).

Agrawal stated-

'Institutions structure the impacts of climate risk on house hold s in a given ecological and social context, and shape the degree to which the responses of house holds are likely to be individually or collectively oriented. They also mediate the influence of any external interventions (information, technology, fund etc) on adaptation practices. The exact manner in which institutions generate these effects depends on a large variety of factors, among them the nature and severity of climate events and trends, the local context and house hold and community endowments, the larger set of social, political factors within which institutions function, and obviously, the interest of those whose decisions and actions institutions translate into actions and out comes'. (Agrawal, 2008)

Agrawal emphasized on the institutional partnership (among the local public and civil society institutions) and institutional coordination for adaptation activities. Agrawal stated 'If adaptation is inevitably local, there is a great need to involve local institutions more centrally in planning for and implementing adaptation policies and projects (Agrawal, 2008).

Literatures of climate change that deal with the relation between local institution and adaptation mostly focused on various dimension of adaptation in institutional context. Literatures explain how adaptation occurs in an institution, how does the institution structure and shape the adaptations, relevant factors of institution that influence the adaptation activities and adaptive capacity etc. Very few of the literatures analyzed local government's preparedness activities as a whole and particularly focused on the adaptation as preparedness measures. But the literatures discussed above provide clear factors that influential for adaptation preparedness. On the basis of literature review it is argued earlier that, preparedness as a set of adaptation measures includes concerne activities, program, and contingency plan of local government oriented to climate change adaptation. Incorporating any measures to reduce the climate threat in routine work of local government and development strategies and plan designed to reduce the climatic threat also indicate the preparedness measures of local government.

### **3.3.5. Inference from theoretical connotations**

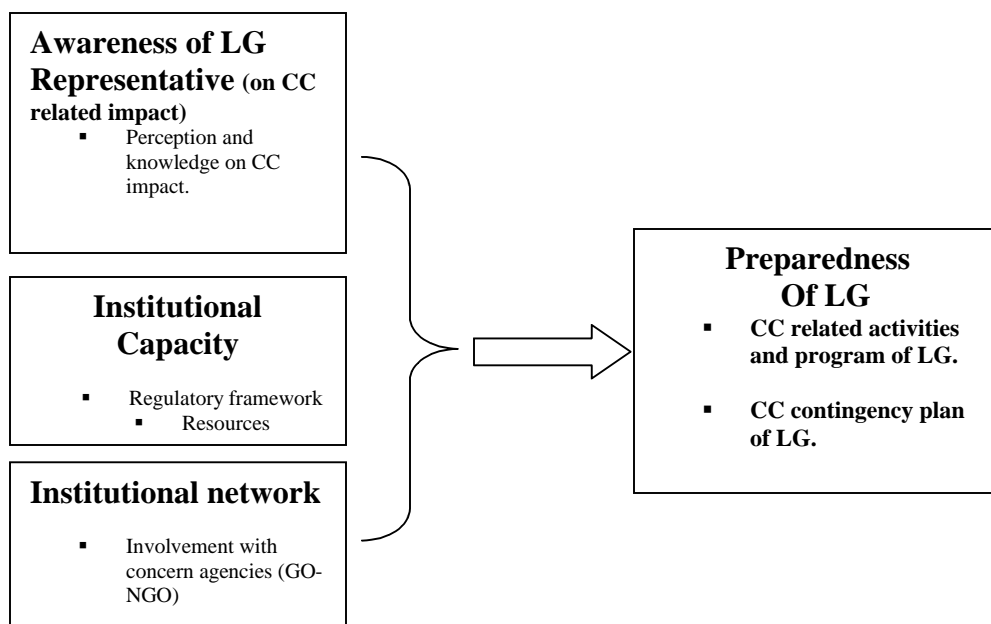
According to action theory local government can be considered as an operator (actor) who needs means (knowledge, resources) for adaptation activities. Integral approach of O'Berin and Hochachka (n.d.) has emphasized on awareness level for adaptation activities. Gupta et al. (2008.) highlighted inherent characteristics of institution and multi-actor, resources and fair governances.

Agrawal (2008) called attention to the institutional partnership (among the local public and civil society institutions) and institutional coordination for adaptation activities. Local government's role for mediating external interventions (technology, fund) and central government's role for providing policy support and financial support to promote adaptation activities also highlighted by Agrawal (2008).

As this research argued that preparedness of local government can be understood through its adaptation measures, thus the factors that influence adaptation actions in turn influence its preparedness for adaptation activities. From the above discussion this paper argued that awareness (knowledge, familiarity, perception, and attitude) of local government representatives on climate change and its impact, institutional network of local government (involvement with GO-NGO and co-operation) and institutional capacities (resource, policy support and legal authority) may influence the preparedness of local government for adaptation measures. Accordingly 'Preparedness of local government (for adaptation measures)' has set as the dependent variable of this research. 'Awareness of LG representative, 'Institutional network of LG' with other concern organization and its 'Institutional capacity; (resource, regulatory frame work) are taken as the independent variable.

### **3.4. Analytical frame work**

Extracting from the literature review and above theoretical discussion this study develops the following analytical frame work to understand the extant of preparedness of local government in facing climate change.



**Figure -1: Analytical frame work**

### **3.4.1. Preparedness of LG**

Preparedness is commonly viewed as consisting of activities aimed at improving response activities and coping capabilities (Sutton and Tierney, 2006). Preparedness can be understood through the action, arrangement (of resources) and contingency plan of an organization where an institution or organization response to the hazard events by developing its knowledge and capacity (UNSIDR, 2009).

This research refers that ‘Preparedness’ can be visible through a set of measures (related action, program and contingency plan) of local government intended to cope with the consequence of climate induced adversity.

### **3.4.2. Awareness**

‘Climate awareness is manifested through ‘familiarity with’, ‘perception about’, and ‘intuitive knowledge’ about Climate change events. ‘Climate awareness is a bundle of ‘experience of /familiarity with climate change/weather extreme signal (Saroar and Routray, 2010).

Local and traditional knowledge is the key point to study climate change. (Dolan and Walker, 2006). Indigenous observation may go also with scientific knowledge (Clarence et al. 2011). In

this regard this research mostly focuses on individual's personal experience to understand his or her awareness regarding climate change because individual's personal experience on natural outcome is very crucial to understand his or her awareness regarding climate change.

This study has mainly followed the quantitative model that illustrated by Saroar and Routray (2010). This is a set of climate change attributive statement regarding extreme climate event that measure the perception and knowledge of the respondent. More over this study examines awareness through respondent's attitude on extreme climate event, their opinion on dimension of harm due to climate change and ability to identify the impact of extreme climate event that they are facing in different sectors of their locality. And finds their familiarity with the term 'climate change'.

### **3.4.3. Measuring of Awareness**

Different study examined awareness in different way. Both the qualitative and quantitative methods are used in this regard. Since the terminology 'climate change' is highly scientific and anticipatory issues, and it is often closely related to disaster events and other environmental issues too, thus it is quite difficult to translate it in the language of commoners who does not have any familiarity with the term.

This study has largely followed the method of Saroar and Routray, (2010) to understand climate change awareness of LG representatives. However the researcher has slightly modified the scoring scale in view of the nature of data, supplementing documents and local context.

### **3.4.4. Institutional capacity**

Institutional capacity refers the arrangement of financial ability, legal authority, human and technical resources of an institution to act as per its prescribed goal.

Ability of LG to resources allocation for adaptation measures, policy direction and resources support (financial, technical, human) of government for LG for initiating adaptation measures or adjusting the existing routine works considering the threat of climate induced hazard, and other resource arrangement by LG to meet climate change issues refers the institutional capacity. Institutional capacity includes self financial ability, training, policy and resources support to initiate any climate adaptation activities.



### **3.4.5. Institutional network:**

Agrawal (2008) has applied the term '*institutional articulation*' to explain the relation between institutions. Other researchers explained vertical and horizontal relation among the institutions. This research is primarily intended to observe the involvement level of local government with local departments of government and NGOs that are working in climate change related program, and project. Institutional network includes LG's participation and institutional involvement pattern with that organization regarding climate change issues.

As the lowest tier of government, local government institution usually supposed to enclose with the local administration i.e. government agencies. But involvement or participation of LG in adaptation and other program (own adopt or as partner of other agency's) does not always depend on its own decision, rather policy provision and jurisdiction and recognition of counterpart may influence the degree of involvement and participation.

In what extent local government can participate in the concern project and program of government agencies or that of NGOs is important to measure the preparedness of local government in adaptation process. Degree of involvement (active partner, or co sharer, or mere stake holder or only informed about other organization's program. or not any participation) of local government with other institution that working in these processes may help us to measure the preparedness as well as the role of local government in facing the climate change challenge.

## **Chapter: Four**

### **Methodology**

The variables of this research is rooted in and related with the three different context; cognitive, institutional and policy sphere. Thus, this study has adopted mixed approach both the quantitative and qualitative with different technique to conduct the research.

#### **4.2. Data Collection Technique**

##### **4.2.1. Questionnaire Survey and Interview**

Interview is a very systematic method by which a person enters deeply in to the life of even a stranger and can bring out needed information and data for the research purpose. Personal opinion, attitude can be explored through interview (Aminuzzaman, 1991). As this research is promised to explore the perception, opinion, and attitude of the respondent regarding climate induced threat, mostly depends on the semi structured interview technique. To understand the view of different group of respondents of different institution regarding institutional network of LG and to know the adaptation activities of LG, interview through semi-structured questionnaire is applied. Both open and close ended questionnaire is used to gather data and evidence.

The primary data has been collected from six Union Parishad of four Upazila. This four Upazilas represent the three divisions of the country. Four UP of three Upazila are taken from the coastal belt of south and south west part of Bangladesh and other two UP of one Upazila taken from non coastal belt. Thirty four LG representatives of these UP and Upazila parishad are interviewed.

Four sets of semi structured questionnaire have been used for interviewing the LG representatives, Officers of five local departments of four Upazila (total 19), Four NGO officials of research area and forty five local people of that four Upazila.

##### **4.2.2. Sampling**

Respondents of the local government representatives, NGO Official and Government officials selected purposively. Five governments local departmet's Officers whose jurisdiction is congruent with both the UP and Upazila Parishad have selected.(UNO,PIO,UPHE,AEO,UFO).

NGO officials are taken from those NGOs that are working (or Worked) at least in one program in climate change issues in the study area

#### **4.2.3. Content analysis**

To understand the vulnerability extant of the research area, scientific projection of climate induced impact, the secondary data have been collected through review of related research works and other sources. Another purpose of this research is to understand the institutional capacity of local government through policy and regulatory provision. In this regard relevant policy papers and researchs have been reviewed.

#### **4.2.4. Case Study**

The term ‘case study’ usually refers to a fairly intensive examination of a single unit, such as a person, a small group of people or indeed a single organization. The case study approach provides the researcher a wide range and depth of experience. Case study data provide useful anecdotes or example to illustrate more generalized statistical findings (Aminuzzaman, 1991). Since this study is intended to examine the preparedness of local government through various adaptation activities and how the institutional network (involvement pattern) influence the preparedness, a case study on an adaptation project of a local government(UP) has been conducted.

#### **4.2.5. Study Area**

Total ten local government institutions have been studied for this research. Total six UP of four Upazila of three divisions (South, South- west, and Middle part) of Bangladesh (four UP of three coastal belt’s Upazila and two UP from one non coastal belt Upazila) are taken for the research purposely. These are:-

- Lalua and Nilgonj UP of Kolapara Upazila of Potuakhali district and Kolapara Upazila Parishad.
- Pankhali UP of Dacope Upazila of Khulna district and Dacope Upazila Parishad.
- Surkhali UP of Botiaghata Upazila of Khulna district and Botiaghata Upazila Parishad.
- Imampur and Gazaria UP of Gazaria Upazila of Munshigonj district and Gazaria Upazila Parishad.

#### **4.2.6. Selection Criteria**

Coastal area is relatively more vulnerable than non coastal belt but other area is also facing some critical event of extreme weather. Though impact and vulnerability of climate change differ from

area to area but climate change is not an issue of particular one area. Climate change Trust Fund of M/O: forest and environment affairs of PRB or other department has implemented at least one program each of all Upazila. That is why these Upazila were selected.

The following table presents the data collection tecquiniue and sampling as whole.

**Table: 4.1: Data collection tecquiniue and sampling**

Study Area	Respondent and Techniques of Data collection	Sample size	Selection	Selection Criteria
Total ten(10) LGs	LG Representatives	34	Purposive selection	-Coastal area is relatively vulnerable. -At least one adaptation project was taken by GO/NGO in the study area. -Understand the over all scenario.
	Coastal = 24			
	Non coastal = 10			
Four UP of Three Coastal areas UPZP.	Interview (Survey with semi-structured questionnaire)			
Two UP of one non coastal UPZP	Government's Local department's Officer. (UNO, PIO, UPHE, AEO, UFO). Interview (semi-structured questionnaire)	19	Purposive selection	Jurisdiction is congruent with both UP and UPZP
	NGO Officer (working in the study area) Interview	4	Purposive selection	At least one CC related program in the study area.

### 4.3. Data Processing and analysis Plan

Simple mathematical tools such as percentage, tabulation and some techniques of SPSS are applied in this research. Since this is an exploratory and largely descriptive study, the mixed approach of qualitative and quantative methods are applied to interpret the data.

To explain the independent variable awareness this study largely has followed the quantative method that illustrated by (Saroar & Routary, 2010) with little change. Qualitative interpretation is also applied in this regard.

To presents the relationship between preparedness and institutional capacity and institutional network qualitative interpretation has followed along with some quantative presentation. Though

the research finally interprets the preparedness level by calculating the quantitative data, it is largely based on qualitative interpretation.

#### **4.3.1. Validation of Data**

Data has been validated by cross-method and by secondary sources. Data collected from interview method has been crosschecked by case study and secondary data. Primary survey data has been crosschecked by relevant documents. Activities and Personal experience of individual of same area regarding climate change associated impacts is compared with the data collected from different segment of respondent and, relevant official document and secondary sources.

## **Chapter: Five**

### **Data Analysis and Findings**

The Chapter attempts to analyze the data collected for the study in combination with secondary literatures. The discussion is designed into four parts in reference to analytical framework, first, awareness level of the respondents is measured and discussed, second, institutional network of LG is explored, third the institutional capacity of LG is discussed and fourth, the over all findings of LG's preparedness relating the dependent and independent variables is presented. A case study is presented that depicts the relation of variables as a whole.

#### **5.1 Analysis and interpretation of level of awareness on climate change**

##### **5.1.1. General Information about study area and respondent:**

No respondent of this study is below the age of 25 because climate change is not a matter of all of a sudden like disaster. More over this study is intended to examine the individual personal experience based perception and knowledge regarding the outcome of extreme weather event that they have been observed through out the years. It is expected that a respondent of age of 25 can express his/her opinion at least on the basis of 10 years observation.

Coastal belt is more sensitive to climate induced threat (M/o: E&F, 2005; Bhattachariya et al. 2009) that is why more respondents (70%) and study units are taken from there. These area have already experienced the different type of climate induced shocks such as increasing trend of soil salinity, scarcity of fresh water, frequent cyclone etc. (M/o: E&F, 2005; Bhattachariya et al. 2009; Pender, 2010<sup>6</sup>). Since the country as a whole is also facing the many other manifestation of climate change, thus non coastal belt study unit is also helpful to understand the overall general picture.

82.4% respondent are the representative of UP (67.6% respondent are UP member, 14.7% chairman) and almost 33% are the representative of Upazila Parishad (including UP chairman).

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<sup>6</sup> Salinity of soil has been increasing in south part of Bangladesh (Potuakhali, Borguna district) from past four decade by 26% and it has increased by 3.5 % in previous decade as result the arable land is decreasing in Potuakhali and Borguna. Source: 03, April, 2012, The daily Prothom Alo (Bengali News Paper) has published a report as cited the research information of SRDI (Soil Resource Development institute) on salinity intrusion of South part of Bangladesh

About 54% of LG representative have the experience of tenure for more than one year and rest of them are either experienced for more than three years or have previous experience as LG representative.<sup>7</sup>

**Table 5.1: Post distribution of LG representative (N=34)**

Position of LG representatives	%
UP Member	67.6
UP Chairman	14.7
Upazila Vice Chairman	5.9
Upazila Chairman	11.8
Total	100.0

Most of the LG representatives of the study area (58.8%) possess high school education (class VI to SSC) and 97% of them have at least primary education. A majority of the male respondent has mentioned agriculture as their occupation where most of the female respondents mention 'House hold' as their occupation<sup>8</sup>. Almost 67% are male representative and 33% are female.

**Table: 5.2: Gender distribution of LG representative (n=34)**

Gender(LG Representative)	%
Female	32.4
Male	67.6
Total	100.0

<sup>7</sup> As for example; UP member of previous term elected as UP Chairman in present term. Or Formerly UP chairman elected as the chairman or vice chairman of UPZP in present term. Representatives who are elected for the first time in UP have experience of more than one year and who are elected in UPZP for the first time have more than three years of experience. See-Table-5 in appendix

<sup>8</sup> See.details in Table-i, andTable-ii-in the Appendix-2

### 5.1.2. Awareness level of LG representatives

Climate awareness has different connotations and it can be measured and understood in different ways. This research largely considered the individual experience (knowledge, and perception) and attitude on extreme climate events as the basis of the climate awareness. Respondents were asked to answer from their personal observations and past experiences regarding the ‘uneven and unusual weather events’. And their perception on a set of climate/extreme weather attributive statements (Box: one) has been measured. This research does not intend to ask the respondents to interpret the ‘phrase Climate change’ as ‘classical scientific meaning’ though, the respondents were asked whether they heard about the term ‘climate change’ or not.

More over respondent’s opinion on hazard dimension due to intensified and uneven climatic events was taken in to account to understand climate awareness. Then respondents were asked to identify the associated impacts of extreme climate event (i.e. climate change) that they are facing in different sectors of their locality. In the following, awareness of the respondents has been interpreted quantitatively and qualitatively.

This research follows method of Saroar and Routray (2010) for quantitative analysis of climate awareness of the respondents. Respondents were requested to mark their opinion on a set of climate change attributive statements regarding extreme climate/weather events (Box: one). For example, for the statement “Less distinct season change is being observed”; a respondent can mark his/her opinion either (a) I did not feel; or (b) I have heard form other; or (c) Felt by my self. Different value (0, 0.5, and 1 respectively) was given for respondent’s opinion for each statement. Then the total value of all (10) statements is computed for each respondent. In this way if a respondent’s total score stands on 7-10; his or her perception level on extreme climate event is considered as high<sup>9</sup>. Table: 5.3 shows the result calculated from statements in Box: One.

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<sup>9</sup> Though this research has followed the method that illustrated by Saroar and Routray, 2010, calculate it in different way with slight modification.



**Box: One: Climate Change attributive statements**

Three levels of Perception (awareness) - High, Medium, and Low - are calculated on the basis of personal index. Personal index is calculated on the basis of respondent total score for the following 10 statements. For each of the following ‘10 **Climate Change attributive statement**, answer of the each respondent is measured by 0, 0.5 and 1 respectively. Each of statements has three options to answer: I cannot remember/did not feel = 0, I have heard from other = 0.5 and observed (felt) by my self. = 1

Individual total score is computed on the basis of indicative statements. If the total score of an individual stands on 0- <3, it indicates low level of perception, 3- <6 indicates medium and 6-10 indicates the high level of perception.

1. Less distinct season change is being observed
2. Prolonged Summer is being observed,
3. Warmer Summer is being observed,
4. Less span winter is being observed,
5. Less cold winter is being observed,
6. Un-time and Unusual rainfall are being observed,
7. Over all Less rain fall is being observed,
8. Unusual form of fog is being observed,
9. Intensity of frequent storm and surge is being observed.
10. Winter start at late.

*Source: Saroar and Routray, 2010*

Table: 5.3 shows that perception of 73% of respondents from the local government is high on climate change (attributive statements) or extreme weather events.

**Table: 5.3: Perception level of LG representatives on extreme climate events (n=34)**

<b>Level</b>	<b>%</b>
Low	<b>3</b>
Medium	<b>24</b>
High	<b>73</b>
Total	<b>100</b>

Almost in the same way that described in Box- one, perception on ‘Sea Level Rise’ of the respondents of coastal area were measured. Respondents were asked to mark their opinion (I don’t think, it is happening =0, There is doubt but may happen=0.5 and I think so, it is happening =1) on the following five statements regarding sea level rise. (Attributive statements).

(1). Indeed, Sea level is increasing day by day (2) ‘New area is being inundated by saline water permanently’, (3) ‘Inward shifting of coast line is being observed’, (4) ‘Acute scarcity of fresh water is being observed’, (5) Intensified and frequent storm / surge/tidal wave etc is being observed with high magnitude. (Source: Saroar and Routray, 2010). For each respondent an index is created on the basis of their total score and leveled it as high, medium and low.

In this way, it is observed that perception of a large number of respondents of coastal area (83%) is high as far as their awareness on the rise of sea level is concerned.

**Table: 5.4: Perception level of coastal area’s LG representative’s on Sea Level Rise (n=24)**

<b>Perception level</b>	<b>%</b>
Low	<b>4</b>
Medium	<b>13</b>
High	<b>83</b>
Total	<b>100</b>

To respond to climate change attributive statements most of the respondents mark either “I observed by my self” or ‘I cannot remember’ a very few of them answer that “heard from other”. It indicates that the perception of respondents on extreme climatic events is influenced by their personal experience that they observed through the natural out come in their daily life.

Respondent’s answer on the above statements (Table- 5.3 and table-5.4) is also validated by their attitude towards the intensification of extreme climatic event. 94% respondents replied that unusual climatic trend is being observed. And 88% respondent opined that calamities and hazards due to newly intensified extreme climatic events have increased than that of any time of previous. 85% of the respondents can identify at least one relevant climate change associated impact that has been occurred in their locality. Following table (Table: 5.5) shows these findings.

**Table: 5.5: Attitude of LG representatives on climatic extreme and variability and their ability to identify the climate change associated impact (n=34)**

Events and ability	Yes (%)	No (%)	Mean
Extreme climatic events and risk have been observed unusually with new intensification	94	6	16
Calamities and hazards has increased than any time of that of previous due to unusual and intensified extreme climatic trend.	88	12	15
LG representative who can identify at least one relevant impact of extreme climatic events.	85	15	14.5

*Range 0-34, considering Yes= 1 and no =0, standard mean is computed as 17*

To understand climate change awareness of the respondents this research endeavored to find their familiarity with the term ‘climate change’ along with the above stated individual experience of respondents regarding climate change and variability. Result shows that 100% of LG representatives have heard about the term ‘Climate Change’. In reply to the question ‘From whom do you inform about the term ‘climate change? Most of them mentioned media and NGO as source. Table: 5.6 shows the finding:

**Table: 5.6: LG representatives’ on how they are familiar with term “Climate change”**

Through official work(GO source)	NGO	TV	Radio	News paper
32%	64.7%	64.7%	5.8%	20%

*Respondents were asked to mark more than one source from whom they have heard about the term climate change.*

This result indicates that media and NGO play significant role at least to familiar the term climate change (i.e. awareness of climate change).

The following box presents some of the statements of the respondents that they expressed about extreme climatic trend of their locality may helps to understand climate change awareness.

**Box: Two: Respondents' statement on extreme climate event.**

- To whom do we need to go to hear about the weather (Climate change!), we observed it!(in reply to the question from whom do you heard about climate change)
- Now we see three seasons: rainy, summer and less span winter
- Have you seen fog in April ever! These days we see.
- In our child hood, saline water was far from here (indicating their area)
- Saline water was not seen in these canals (indicating near canal) in the past.
- Nothing happens in time! Unpredictable!
- We feel cold in some part of summer season's night(March)
- In our boyhood we saw that saline water stayed for 3 months but now we see it for 6 months.
- We are following the evidence what the media and scientist are saying.
- Matching our daily life experience with their (NGO and Media) discussion: we see that 'they are saying the authentic on climate change issue'.
- We live in threat; river may start flow through the village.
- Unusual and frequent thunderstorm is being observed.

Respondent spontaneously mentioned about different types of unusual trend of weather and climate variability that they have been facing. From the above analysis it can be argued that LG representatives are satisfactorily aware of the extreme climatic events and its intensified dimension and impact in their locality.

### 5.1.3. Climate change associated major problems

The following box presents the summary of the major associated problem due to climate induced impact that identified by the local government representatives of the studied area. Crop damage due to increasing salinity, scarcity of fresh water for cultivation, increasing scarcity of drinking water are identified as the major associated problem in the costal area by the respondents. Limited response activities by the LG that observed in the study area are very line with this problem.

**Box: Three: Associated impact as identified By the LG representatives:**

Upazila	Climate change associated impact identified by the LG representative
Kolapara	Crop damage due to increasing of salinity, scarcity of fresh water for cultivation,
Dacope	Increasing Scarcity of drinking water due to salinity, Crop damage due to salinity,
Botiaghata Gozaria	Increasing Scarcity of drinking water ,Crop damage due to salinity, Risk of reduce of agriculture production due to unusual fog, un time and unusual rainfall or flood. Man made environment pollution.

Similarly scarcity of fresh drinking water<sup>10</sup> sedimentation of river<sup>11</sup> and canal and salinity of land also identified as the major problem. LG of that area has tried to respond to that problem (making the bank of the ponds high, Ponds and canal digging for fresh water and drinking water, making embankment high, etc).

### 5.1.4. NGO Personnel's view on climate change awareness of LG Representatives

NGO officials of the research area were asked to comments on “Does the Local government representatives value the climate change related program as their organizational priority? How they evaluate your program? The following statements of the officials may helps to understand position of LG as a whole in regard to climate change issues.

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<sup>10</sup> Respondents said that, though saline water has been observed for a long time in many parts of Dacope and Botiaghata, its intensification of spreading is being observed.

<sup>11</sup> Different research expressed that it is difficult to conclude whether it is due to climate change or other causes(See. for details.Bhattachaya,et al . 2009)

- ✓ ‘The LG representative plays very positive role in this regard, they valued our program. They all are very conscious, bitter experience has made them conscious.’
- ✓ ‘They participate spontaneously because they are conscious about the impact ’
- ✓ “Some times they participate with organizational priority, some time they are reluctant. They valued the program as per the nature of the Project.’

From above it is found that institutional priority of local government also influence by the experience on the outcome of natural event. LG representative are conscious because they experience the impact.

## **5.2: Analysis and interpretation of institutional network of LG on climate change issues**

### **5.2.1. Institutional Network of Local government**

To understand the institutional network of local government with NGO, LG representatives were asked to comment on involvement level whether LG has any active partnership with NGO or NGO only shares opinion with LG with NGO. They were asked to consider at least one program of any NGO that has implemented or is going on within its locality. They were requested to comment on their experience about the work with NGO and concern local departments of government. The following findings are revealed:

- 71 % Local government representatives<sup>12</sup> informed that NGO was working in their area. All the respondents of coastal area pointed out that at least one NGO was working in their area. Respondent of non coastal area mentioned nothing about the NGO activities regarding climate change.
- Almost 67% LG representatives of coastal area replied that NGOs informed them about their activities or shared their opinion at any phase of the NGO program regarding climate change issue.(Table-5.7)

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<sup>12</sup> See. Table iii, in Appendix -2

- Most of the UP members cannot share any experience with GO activities. But a very few replied that agriculture extension department informed them about their activities. On the other hand all the chairmen replied that government's program implemented as per the instruction through proper channel but they discuss it in the Upazila Parishad meeting and they decide on site selection for the project.

Other than coastal area the climate change activities and involvement of NGO regarding climate change issue is not remarkably visible<sup>13</sup>. In coastal area 100% respondents said that at least one NGO had been working in their area. But active partnership of LG in NGO's climate change program was found only in one UP.

**Table: 5.7: Level of involvement of LG with NGO activities on CC issues**  
(n=34)

<b>Involvement Pattern</b>	<b>All Area's LG (%)</b>	<b>Coastal LG (%)</b>	<b>Non Coastal LG (%)</b>
Only Information or Opinion is shared by NGO	47	67	-
LG is not informed at all	38	12	100.0
LG have active involvement with NGO	15	21	-
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Due to relative vulnerability of the coastal area, numbers of NGO are working there with climate change issues. It can be assumed that local government as a stake holder was supposed to be consulted by NGO. Perhaps this is one of the reasons of this large number of 'opinion or information sharing' regarding climate change activities of NGO with LG.

Though many of the respondents have valued the NGO activities in climate change related program; overall the mixed attitude of LG representatives is observed about the involvement pattern with NGO. Even a single respondent expresses different views regarding different NGO's program. Following table presents some selective comments of the respondents.

<sup>13</sup> Researcher was informed that a NGO arranged workshop regarding climate change issues for their beneficiaries in non coastal belt.

**Box: Four:**

**Statements of LG Representative's on NGO's involvement with Local government  
(Regarding Climate change program of NGO)**

- 'Very often NGO shared opinion with us for selection of beneficiary and site.'
- 'Some one doing better and doing good job for our people'.
- They are doing a lot in this regard.
- 'It would be better if we get their help'
- NGOs endeavor is observed enough in this issue.
- 'some one informed us and some of them never keep in our touch even'
- 'They do in their way but informed us',
- They invite us, talk with us, and meet us.
- 'They Do as they like'
- 'They do sporadically and scattered, no co-ordination with us except sending a report'
- 'After finishing the work holding a sign board then some one informed us!'

The following case study presents that direct involvement and cooperation of NGO-GO-LG influence the preparedness. This case study also provides an insight that the response depends on major impact that the locality felt.

**Case study: Institutional network of LG in CC adaptation**

LG representatives at Kolapara Upazila identified increasing tendency of salinity (Soil salinity of arable land) as one of the major climate change induced impacts. Just at the end of the rainy season (during mid November) the sluice gate is supposed to close so that the saline water cannot enter the small canal. But due to increasing salinity induced by climate change and intensified natural disaster hampered the gate management' as a result land inundated by the saline water. Tri-crop /bi-crop land has been turned in to mono-crop land due to increasing tendency of salinity.

To protect the land from salinity at early mid November when there is enough fresh water in the river, the sluice gate is to open to get water inside the canal for



preservation. Then the gate is to close and simultaneously embankment is made round the sluice gate. Through this system canal is filled with fresh water for cultivation. Due to close gate and embankment round the gate increasing saline water of river can not enter the canal. And the land is protected from salinity for the season. For both the two Union Parishad (Nilgonj and Lalua) it was public demand to the UP to preserve the fresh water and protect the land from saline water. CBA-LG (scaling up Community based Adaptation with Local Government in Bangladesh) project of Action Aid Bangladesh finance and provide necessary cooperation to Lalua UP of Kolapara Upazila to implement such a project . Purpose of the project is to adapt with the climate change impact by preserving fresh water in the canal to protect arable land from saline water and extension of *Robi crop* (Winter seasons crops) and *Boro(winter seasons crop)* paddy.

Bangladesh Water Development Board and Agriculture Extension (AE) Division of Government and BRAC (NGO) provided technical support to the UP as required. AE office trained the farmer and Action Aid provided fertilizer, and seeds. UP formed three committees in this regard. Sluice protection committee' was comprised with the stake holder (farmer) and local people. They looked after it. The whole project was implemented under the management and direct supervision of UP. It is a project of Lalua UP where GO-NGO-LG-and people collectively participated. Upazila chairman commented on the project '*Lalua UP achieved the first position in Upazila in Boro paddy production, where this project possesses a great contribution to their success.*'

Importance of this project is widely discussed in various meetings in Upazila parishad. Nilgonj UP has also taken the project to implement by the help of their people. They made six embankments round the sluice gate with direct and combined effort of their people but they could not make other two embankments which was required. As a result saline water penetrated in the area and salinity is occurred. Finally Nilgonj did not achieve the result as expected. (Source: Interview: LG representatives of Nilgonj and Lalua UP, Program Coordinator of Action Aid).

This case study indicates local government (UP) can manage and supervise a climate change adaptation project. UP has achieved direct financial cooperation from NGO, technical support from GO& NGO, and active participation from people. UP arranged and managed the project successfully. Case study also indicates institutional network through direct cooperation influence the success of adopting such project.

**Observations drawn from the case study are as follows:**

- Direct involvement with NGO and GO and their financial and technical support enhance the preparation of LG in CC program.
- Local government (UP) can manage and supervise a climate change adaptation project if they got financial and technical support.
- The case study presents that the LG’s response was in line with the perception of the people ( survey found salinity intrusion was the major problem of that area)
- In coastal area NGO endeavor on CC issues is noticeable though only few number of LG has the direct partnership on NGO program. NGO has played influential role to inform the LG representative regarding climate change issues.

**5.3. Analysis and interpretation of institutional capacity of LG**

**5.3.1. Institutional capacity of local government:**

To understand policy and regulatory provision, LG representatives were asked about government’s guideline/ instruction /circular/booklet regarding the role of LG on CC issues. They were requested to describe at least one of their relevant responsibilities to face the climatic hazards. LG representatives were asked about their experience of training/formal orientation on climate change and disaster issues. The following table (5.8) presents the summaries of quantitative result regarding the above queries. Relevant secondary data has also been analyzed briefly in this context. Finally the respondents were requested to identify their limitation in this regard.

**Table: 5.8: Summary of institutional Capacity of Local Government**

	Yes (%)	No (%)
1. LG representatives who have got Government’s Guideline/instruction on CC issues	9	91
2. LG representatives who have got training/participate in any workshop on CC/disaster issues	41	59

Only 9 % respondent mentioned that they have got guideline or circular or instruction from government channel regarding LG's role on climate change issues. Climate change Cell of M/O: Environment and Forests has published 17 booklets (Both in Bengali and English), among its one is titled as 'Role of LG (UP) in Climate Change'. Different sectors of government have published and circulated instructions or guideline regarding role of different sector in local level. Result indicates perhaps there is a communication gap in this regard. May be there are some instructional obligation, or any kind of limitation of record keeping, information sharing or individual's priority behind this gap.

Most of the LG representatives have not got training or workshops. Respondent who have experience of training or workshop mostly get training on 'disaster issue' sometimes that has addressed the climate change issue too. Only 3 % respondent received training<sup>14</sup> that was exclusively for climate change issues. It indicates that the climate change issues were not formally and exclusively reached to the LG representatives through any channel.

It is observed that 79% LG representative can identify at least one relevant role that LG can play to adapt with the climate change induced impact of their locality.

LG representatives are requested to identify the limitation of LG in taking the program to face the climate change impact of their locality. Most of them mentioned that lack of fund, lack of administrative power, Political and administrative complexity, are the hindrance. The following section analyzes their view qualitatively.

**Box: Five: Limitation for Preparedness as identified by the LG representatives**

Identified Limitation of Local government	Statements of LG representative on Limitation of LG to incorporate Climate Change response related program
Lack of fund	'Let us give a hammer (tools)! Then you will see that whether we can do or not.' 'We have aspiration but not ability'
Lack of administrative power	No one listen our voice, we sought several time in Upazila Coordination meeting, regulation were taken, but Sluice gate management is not effective yet. What can we do except <i>salish</i> !(Dispute

<sup>14</sup> See details on training of LG representatives in Table: iv and v in appendix-2

	resulation)
<b>Box: Five: Limitation for Preparedness as identified by the LG representatives (Cont.....)</b>	
Identified Limitation of Local government	Statements of LG representative on Limitation of LG to incorporate Climate Change response related program
Political and administrative complexity,	Despite having good intention due to weak administrative capacity, Political and administrative complexities LG can not do take such adaptive project.
Leasing system	Some time erroneous leasing of canal and water body creates the complexity.
Interest of influential group,	Sluice gate keeper ( <i>Khalasi</i> ) post is banned, Sluice management has vested to the beneficiaries and UP but they could not stop the influential group who open the gate for shrimp cultivation. Who will monitor the gate? In this system no one is liable. LG cannot do anything against the vested group.
Lack of Human resources,	I have as much as department as in the secretariat but I have only one personnel.
Lack of training	We need training, So that we can inform people about the risk
Lack of coordination with NGO and GO	There is no effective and direct mechanism in local level to monitor the WDB activities. LGED may be involved in embankment making under direct supervision of LG and Local people. NGO-LG co-ordination is needed.
Lack of people awareness	People should be more aware regarding the problem
Highly centralized decision making process of government	We are isolated from DC Office that is why our demand does not reach to the higher authority (quickly and directly)
Lack of proper planning	If plan is flawed, what will supervision do?
Wrong technical assessment of development project.	We have walked in the wrong way of development and natural hazard added with it.

Number of institutional constraint are cited by the respondents, among it the common limitation is mostly mentioned by the respondent is lack of budget and resources. The limitation that pointed by the respondents is very line with the secondary data that revealed by the other

different research regarding the limitation of LG. Limitations that identified by the respondents implies that local level decision is also important for any local adaptation planning.

### **5.3.2. Regulatory frame work and Policy Provision**

Upazila Parishad manual clearly addresses the climate change and environmental issue and directed the Parishad to allocate budget regarding climate change adaptation project (M/o: LGRD&C, Upazila Parishad Manual 2010)<sup>15</sup>. Government has made some guide line booklets regarding the change impact role of Local government on climate change adaptation. (Climate change Cell. Department of Environment M/o: E&F, 2009).Number of responsibilities and duties have vested on UP (local government) in the Comprehensive Disaster Management guideline the government. It indicates that the Government has paid attention on the role of local government regarding climate change adaptation issues.

The Bangladesh Government has been quick to respond to the local and international climate change agenda, becoming the first to produce a National Adaptation Plan of Action in 2005, after a range of consultations were organized with local communities and civil society groups (Ayers, 2011, cited in: Lewis, 2012).Representative of local government also consulted in NAPA preparation process and a working team was formed for local governance affairs in this regard. (NAPA: 2005).In November 2007, the Government announced that it would incorporate the impact of climate change into all of its development activities. (Lewis, 2012). In September 2009,the government produced its *Climate change Strategy and action Plan* based on six “pillars for Action”; food security, social protection and health; comprehensive disaster management, infrastructure, research and knowledge management; mitigation and low carbon development; and capacity building and institutional strengthening (MoEF, 2009.cited in Lewis, 2012 :177).However, Despite all good intention and effort the engagement of local government in implementing climate change adaptation process are remain in primary level. There may be several practical and contextual causes behind this situation. Most of the LG work under the budget constraint. LG can not provide adequate budget for such project. As an Upazila chairman said ‘*Yes, I know! but I can only make two kilometer semi-pacca (only made of Bricks) road in a year with my revenue budget.* Development activities of Bangladesh is mostly sector based and central government decision oriented. Local department of the government mostly implement the

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<sup>15</sup> Development budget distribution instructions states Upazila Parishad can allocate at least 5%, at best 8% for climate change related problem, scouting, etc. but not more than 1% for any one.

projects as per the government instruction though all the local level decision is supposedly taken by the Upazila Parishad.

It is observed that climate change related programs are mostly taken centrally; it is almost same for the government and NGO. Very often LG is shared only for site selection.

### **5.3.3. Climate change issues in government's local department.**

All the Upazila officers mentioned that climate change issues are discussed in the Upazila Parishad forum (different meeting). Most of the Upazila officers (69%) mentioned that they have gotten government instruction about the climate change impact on their department's activity. All of them mentioned about the instruction of disaster related duties. Many of them mentioned about special project on climate change and disaster issues.

## **5.4: Answering research objectives 2: role of LG in climate change adaptation process**

Assessing the role of local government in adaptation process is one of the objectives of this study. Study observed that almost 79 % of the LG representative could mention at least one relevant role that LG may initiate as response options to climate change associated impact.

On the other hand 63% government officer mentioned that they generally get information about any natural disaster or calamities from the LG representatives. It indicates that LG play very important role in information dissemination regarding disaster.

Regarding their climate change related activities most of the LG cited 'tree plantation' 'forestation'. The LG representatives mentioned (as per their jurisdiction) the following activities that they can do:

**Box: six: Adaptation role identified by the LG representative**

- Preserving the fresh water to protect arable land from saline water intrusion by canal and pond digging, Sluice gate management,
- Work as awareness educator to enhance the awareness of the people.
- Idea sharing with higher authority.
- Inform the government authority about our misery.
- Seeking fund from government (climate change trust fund.)
- We can make the *Killa* (earthen platform used as flood shelter for human and or animal,) we can make adaptable the approach road to the cyclone centre.
- Knowledge sharing with the community,
- We should raise local emergency fund.
- Repairing the drainage, embankment and road
- We need help for rain water harvesting
- And we should have own system of drinking water supply
- We can co-ordinate with the government local department for fresh water
- We can raise our voice and make the people aware about fresh water preserving.
- We can make the people aware to keep the environment from the water pollution due to growing industry.

**5.5. Analysis and interpretation of level of preparedness of Local Government:**

To understand their preparedness level to face the challenge of climate change, LG representatives were asked nine questions regarding their climate change related activities. The following table presents the level of preparedness of the representatives from local government institutions (both UP and Upazila).

**Table 5.9: Level of preparedness on the basis of measures taken by LG representatives  
(n=34) [individually]**

Serial	Preparedness measures for adaptation	Yes (%)	No (%)
1	Fund Allocation for special adaptation project	<b>29</b>	71
2	Additional fund allocation for adjusting routine/general project	<b>9</b>	91
3	Introduction of special technologies and equipment	<b>0</b>	100
4	Arrangement of awareness program regarding CC and disaster risks	47	53
5	Sending special project plan regarding CC and disaster risks to the higher authority	<b>3</b>	97
6	Designing local plans addressing the disaster hazards	<b>3</b>	97
7	Disaster and climate change related issues in previous yearly work plan	44	56
8	Consideration of CC risks and intensified disaster hazards in routine works	<b>76</b>	24
9	Discussion and resolution regarding climate change issues in Parishad forum	<b>71</b>	29

From the above table it is seen that most of the respondents agreed fund is not allocated for climate change related special or general project. They could not design plans locally for the project and also do not send project proposal or plan to the higher authority. All of the respondents said that special technologies or equipment are not provided to address impact of climate change. However, most of them (76 % & 71%) responded positively that they consider climate change risks in their routine works, discuss and take resolution on these issues.

Table -5.9 shows the percentage of LG representative's individual answer regarding the nine questions of preparedness and table -5.10 shows the institutional score for the same.



**Table 5.10: Level of preparedness on the basis of measures taken by Local Government Institutions [institutionally] (n=10)**

Serial	Preparedness measures for adaptation	No. of LG who have taken the measures	No. of LG who have not taken the measures
1	Fund Allocation for special adaptation project	2	8
2	Additional fund allocation for adjusting routine/general project	2	8
3	Introduction of special technologies and equipment	0	10
4	Arrangement of awareness program regarding CC and disaster risks	6	4
5	Sending special project plan regarding CC and disaster risks to the higher authority	1	9
6	Designing local plans addressing the disaster hazards	1	9
7	Disaster and climate change related issues in previous yearly work plan	5	5
8	Consideration of CC risks and intensified disaster hazards in routine works	10	0
9	Discussion and resolution regarding climate change issues in Parishad forum	9	1

From the above table it is observed only two of the LG (UPs) of coastal area have taken a special full phase adaptation project to protect the arable land from salinity intrusion. They allocated fund for special adaptation project.

Two coastal LGs have allocated additional fund for adjusting routine project. These two coastal Upazila Parishad representatives mentioned that they have allocated additional fund for canal excavation<sup>16</sup> to preserve fresh water for irrigation. Additionally, they claimed of utilization of government fund<sup>17</sup> in this regard. But no step is noticed in the study area that LG introduce or

<sup>16</sup> Small river and Bil(water body) also mentioned by the respondent.

<sup>17</sup> 40 days program(employment facilitating program) of government.

facilitate or help to promote any special technology, equipment or element for any kind of adaptation purpose.

It is also observed most of the LGs (6=60%) asserted that they arranged different kind of awareness program regarding climate change for the people. In the coastal areas different NGO and CSO have been working. They have many kind of awareness program regarding climate change and disaster issues (such as playing theater) for the people. Government also implements some kind of awareness program (Cyclone Preparedness Program-CPP, Program of Comprehensive Disaster Management committee-/CDMP). In coastal area the 'Disaster rehearsal' and CDMP yard meeting is held in different time where LG representative participate actively as local leader. Local people participate in these programs. Possibly, the above circumstances may be the reason for large number of respondent's assertive answer regarding awareness program.

All of the LG, except one does not have designed any local plan regarding climate change and disaster issues. None of them, except one, have made any special project plan regarding their local threat of climatic event for sending to higher authority. Only a coastal Upazila mentioned that it has designed a full local plan regarding disaster management. However there may be much reason behind this gap such as initiative of personnel and LG representative, government requirements, proper information about the issues, priority fixing, etc.

Representatives from five LGs (coastal) answered that they have mentioned the disaster and climate change related issues in their previous yearly work plan.

All LG representatives asserted that they consider the intensified disaster risk and climatic extreme in their routine works. Climate change issues were discussed in most of the LG's forum and resolution was taken in this regard.

On the basis of these preparedness measures the following table presents the total preparedness score (mean value) of each LG and compares their preparedness level.

**Table 5.11: Comparison of preparedness level of local governments**

Serial No	Name of LG	Number of measures taken by LG		Preparedness Score
		Yes	No	
1	Lalua UP*	5	4	2.5
2	Nilgonj UP*	5	4	2.5
3	Pankhali UP*	3	6	1.5
4	Surkhali UP*	3	6	1.5
5	Imampur UP	2	7	1
6	Gazjaria UP	1	8	.5
7	Kolapara Upazila*	5	4	2.5
8	Dacope Upazila*	5	4	2.5
9	Botiaghata Upazila*	5	4	2.5
10	Gazaria Upazila	2	7	1
	<b>Total LG =10</b>			<b>Total score = 18 , Average score = 1.8</b>

Scores are calculated considering 9 adaptation measures related activities. Scale of measurement is No= 0 and yes=1, range of score=0- 9. Average calculation: for example, Lalua UP has taken 5 measures so its score is  $(5 \times 1 + 4 \times 0)/2 = 2.5$  standard mean value is computed as 4.5 for each LG. \* Sign indicates coastal areas local government and without star (\*) indicates non-coastal area's local government.

The above table shows that average score for preparedness of LG's is 1.8. It is found that LGs of coastal area is relatively more prepared. Lalua and Nilgong the two coastal UP scored 2.5 each which is greater than average score 1.8. On the other hand the non-coastal UPs score 1 and 0.5 respectively which is much lower than average score. This result indicates the comparatively low preparation of non coastal UPs. Findings depict the same result for Upazila. Coastal Upazilas are relatively more prepared than non coastal Upazila.

## **5.6. Relating Awareness, Institutional Network and Institutional Capacity with preparedness of Local Government**

Findings show that most of the local government representatives are satisfactorily aware of the extreme climatic variability and its impacts in their locality. It is found in this study that Lalua UP got better cooperation from NGO and GO. Through direct involvement with NGO and technical support from GO this UP implemented a special project for climate change adaptation and operated the project successfully. It indicates that effective institutional network influence the preparedness of local government to cope with the climate induced impact.

Nilgonj the adjacent UP of Lalua UP was also taken the same project to protect arable land from salinity intrusion with the contribution of their people. Respondents from both UP identified 'increasing trend of soil salinity' as one of the major problem of their locality. The few adaptation measures (general and special steps) that observed in the research area are mostly related with the impact that respondents identified as the major problem.

LG representatives identified several limitation of preparedness. Lack of fund is commonly cited in this regard. All most all of the LG representatives do not have any formal training on climate change issues and did not get any government instruction in this regard. This limitation is very common for all studied LG. However, some attempts were taken by LG for adjustment with the climate change associated impacts that local people felt.

Evidence from case study shows that the two LGs endeavored to respond to the public desire. Respondents of the studied coastal area hold relatively high perception on extreme climate events. Numbers of NGOs are working there. LGs of that area directly or indirectly associated with NGOs activities. Government's project was also implemented there. LG of studied coastal area took comparatively more preparedness measures than the non coastal area. In line with this analysis study finds the positive relationship between awareness and preparedness as well as institutional involvement of LG with NGO and its preparedness.

**Table: 5.12: Correlation and regression between independent and dependent variables**

Independent Variables	Dependent Variables	Pearson Correlation Co-efficient	Regression R square (R <sup>2</sup> )
Awareness of LG	Preparedness of LG	.464**	.22
Institutional Network of LG (with NGO)		.648**	.42

\*\* Significance at .01 levels

From table -5.12 it is found that level of awareness of LG as an independent variable has strongly associated with dependent variable: preparedness of the LG. The Pearson correlation coefficient is significant at 0.01 level, besides, R<sup>2</sup> is 22% which implies that preparedness of LG can be explained by 22% by the variable awareness of LG. More over the R clearly demonstrates the proportionate relation between the variables.

The same table shows that institutional network with NGO-LG interface with preparedness of LG is significant at 0.01 level. At the same time R<sup>2</sup> is larger which 42 % is. This means preparedness can be explained 42% by the variable of institutional network.

# **CHAPTER- SIX**

## **Discussion and Conclusion**

This chapter discusses the major findings of this study in line with the analytical framework derived from the relevant secondary sources and finally it draws some conclusions about the study in reference to the objectives and research question.

### **6.2 Major Findings**

This study is conducted to assess the state preparedness of local government in adaptation process. Study explores some factors that influence the preparedness of local government to cope with the challenges of climate change. Major findings of the study are as follows:

#### **1. Findings on climate change awareness of LG representatives**

- Perception of LG representatives on extreme climate events is high (73%)
- Perception of a large number of respondents of coastal area (83%) is high as far as their awareness on the rise of sea level is concerned.
- 94% respondents expressed that they are experiencing unusual climatic trend. 88% respondents supported that calamities and hazards due to newly intensified extreme climatic events have increased. 85% respondent identified at least one relevant climate change associated impact that has been occurred in their locality.

#### **2. Findings on institutional network of LG**

- Media and NGO play significant role at least to familiar the term climate change. Most of the LG representatives have got training and or attended workshop from NGO.
- 67% of LG representatives in coastal area mentioned that NGO shared information with them where as 21% of them replied that they have active involvement with NGO. All of the respondents of non-coastal areas said that they are not informed regarding climate change issues by the NGO where as their number is 12% in coastal areas.

#### **3. Finding from case study**

- Direct involvement with NGO and GO and their financial and technical support influence the preparation of LG in CC program.

#### **4. Findings on institutional capacity of LG**

- Most of the LG representatives (91%) have not got any instruction or guideline from the government. 59% of the LG representatives did not have any training or formal orientation on climate change and disaster issues.
- Most of the respondents agreed fund is not allocated for climate change related special or general project.

#### **5. Findings on the relationship between awareness and institutional network with preparedness**

- Awareness of LG representatives and institutional network significantly influence the preparedness of LG.
- Coastal LGs (both UP and UPZP) are relatively more prepared than non coastal LG.

#### **6.3. Discussion**

This study found that local government representatives are satisfactorily aware of the extreme weather events and possible associated impact of climatic variability in their neighborhood and they are at least familiar with the term ‘climate change’. It is also found that preparedness of LG to cope with the climate adversity is positively influenced by awareness of LG representatives.

Coastal area is relatively vulnerable (M/o:E&F, 2005). This study revealed that coastal LGs are relatively more prepared than studied non coastal LG. This finding can be explained by the observation of Ahmed (2006). He stated that ‘Adaptations are mere reflections of ‘needs of adjustments’ felt by the impacted individual, house hold, and community. However, needs of adjustments’ are largely characterized by extent of adverse impacts’. It implies that climatic vulnerabilities in coastal areas lead the people to response more in comparison with less vulnerable people.

This study mostly measures awareness of LG representatives on the basis of their perception and knowledge that acquainted through their personal observation on extreme weather events and their ability to identify the relevant climate change associated impact. These are very crucial to understand awareness because perception and experience (knowledge) with climate extreme influence the respond activities (Dolan and Walker, 2006). Awareness is one of the important factor for adaptation planning (Saroar and Routray, 2010) because it ‘influences the intention and

motivation of the actor to respond' (O' Brien and Hoachkchka, n.d.) on a certain impact of climate change.

All most all the LG representatives have not received any formal training on climate change issue except some of them got nominal orientation on disaster issues. Most of them have not got any instruction, guideline from the government channel. Policies provided limited inspiration for solely LG driven initiative for full phase adaptation project. Resource constraints, legal, administrative and political limitations are identified as the possible barriers for preparedness by the LG representatives.

Adaptation project that solely initiated by local government is rarely observed. Most of the local governments of the studied area did not allocate any fund to incorporate any adaptation project and they did not have any plan in this regard. But endeavors of local government for adjusting the existing routine activities to cope with the climatic extreme events are observed according to their jurisdiction.

There are limited practical and direct inclusions of local government in NGO activities is observed in the study area. Though NGOs endeavor in coastal area in climate change issues are noteworthy, most of the LG representatives of coastal area are become primarily familiar with the 'climatic extreme issue' by NGOs; many LG representatives are oriented with the natural disaster issues by the NGOs.

The case study depicts a successful adaptation story of a UP also mostly initiates and implements through the direct co-operation of a NGO. But from the case study it is revealed that if LG gets effective technical and financial support it can manage a project through co-ordination of different agencies and participation of local people. This evidence in one hand indicates that effective and direct institutional network among LG-NGO- Government agencies may enhance the institutional capacity of local government for climate change response activities as well as channelize formal knowledge of climate change on the other hand local government can facilitate the external support to promote the adaptation activities. Local institutions can facilitate the external support and mediate the influence of any external intervention such as information, fund, technology etc. (Agrwal, 2008). Thus it can be argued that these findings of the study may go with the theoretical connotation of 'Adaptation, Institutions, and Lively hood frame work'. (Agrwal, 2008).



Regarding government climate change related project, most of the LG representative stated that 'according to government instruction it is implemented through proper channel, they only select the project site. 'Projects (that implemented in Upazila level) are generally designed and decisions are being under taken at the ministry level and relegated to the Upazila based line agencies for implementation only (Aminuzzaman, 2011). Climate change related project implemented in the study area has also followed the similar approach. It implies that local government has limited scope to do in this regard except monitoring the implementation and site selection of the project. Upazila Parishad manual has vested many discretionary powers to Upazila Parishad for selecting project and allocating fund and it has clearly directed the Parishad that their first priority should be the local need. But the manual directed only 1 % (at best) fund would be allocated for climate change related problem. Further, NAPA of Bangladesh has given relatively less importance on local institution (Government). (Agrawal, 2008 ; Raihan et al. 2010).

Local governments of Bangladesh are managed and controlled by central government administrative structure (Akash, 2009. cited in: Aminuzzaman, 2011). Government is the main fund provider of local government. The activities of local government in Bangladesh are mostly shaped by the direction, support (resources and policy) and supervision of the government. Thus the direct support of government for adaptation preparedness of local government is very crucial. As Agrawal (2008) stated central governments facilitate the function of local institutions by creating effective support, providing information, finance. And it is one of the factors for promoting better institutional performance. (Agrawal, 2008).

Respondents identified several causes as their possible limitation for initiating adaptive activities to be prepared to meet the challenge of climate induced threats. Such as, lack of fund, weak administrative and financial powers of local government, and interest of influential group, administrative and political complexity and limitation, faulty leasing system of local administration.

Beside the limitations that identified the respondents, there may be some other possible factors to influence status of preparedness. Such as local context of priority (voter's choice), will and initiative of LG leaders, overall competing priorities for fund allocation due to lack of resources, direct and specific instruction of government etc. In case-study it is observed that taking

initiative to prevent salinity intrusion was a public demand. This study implicitly observed that self motivated initiative of LG representative for adaptation activities is rare. It seems that there is a scope for further research to explore the priorities of climate change adaptation in local government's activity and how the local democracy and voter choice<sup>18</sup> influence the adaptation activities.

## **Conclusion**

Preparedness requires enormous arrangement of measures and elements. There is no common matrix in the relevant literatures to measure the preparedness level of an institution especially for understanding the quantitative extent of preparedness. On the other hand, in local meaning, it is difficult to draw sharp line between climate change associated impact and disaster impact. Taking it into account, this study has endeavored to explain the preparedness of LG in facing the challenges of climate change both in qualitatively and quantitatively. Study explores the influential factors of preparedness. It explores that LG representative is aware of climatic extreme of their locality. Though it was observed in few cases, LGs endeavored to adjust their existing routine activities.

Evidence implies that despite its limitations local government possesses potential to be a right actor for many of the adaptation activities to face the challenges of extreme climate driven impact in local level. Successful preparedness of local government for adaptation process requires formal knowledge to internalize the anticipated affect. Preparedness requires technical, financial and adequate administrative support.

In this regard a specific preparedness guide line for the local government based on scientific knowledge and practical inclusion of local government in the policy framework as one of the key actor for local adaptation activities can enhance its preparedness for adaptation activities.

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<sup>18</sup> Staden (2010) hints regarding this, he expressed that typical climate protection is not yet on the agenda of many local elections, but this could change in near future. Representative of a LG informed the researcher that 'to protect the arable land from salinity' was one of his/her election manifesto (promise).

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**Rjevqy cwieZ©t̄bi SuzwKt̄gvKv̄t̄ejvi cÖ́ ÍywZ: ́ 'vbxq miKv̄t̄ii  
f'wgKvÓ kxl©K M̄t̄elYvi Rb'' cÖkæḡvjv:**

**( ́ 'vbxq miKvi cÖwZwbwāt̄' i Rb'')**

(b\_© mvD\_ wek'we''vj̄t̄qi mævZt̄Kv̄Ēi (GgwcwR) wWwMÖi Ask wnmv̄t̄e m̄x̄c~Y© GKv̄t̄WwgK D̄t̄t̄k'' G M̄t̄elYvi cÖkæc̄l cÖYqb Kiv n̄t̄q̄t̄Q| DĒi'vZvi e''w³MZ t̄Kvb Z\_'' t̄Kvb D̄t̄t̄k''B cÖKvk Kiv n̄t̄ebv ev DĒi'vZvi gZvgZ Zuvi | Zuvi cÖwZôv̄t̄bi Rb'' ¶wZi KviY nq Ggb D̄t̄t̄k'' e''envi Kiv n̄t̄ebv|)

BDwbq̄b:

Dc̄t̄Rjv:

1. bvg:

2.K. eqm:

2.L. t̄ckv:

2.M.

bvix/cyi''l

3.K) c`ex:

L) eZ©gvb c̄t̄' Avcbvi t̄gqv`Kvj(cye© AwfÁZv \_vKt̄j

D̄t̄t̄j-L Ki''b):

4. cÖwZôvwbK wk¶v:(wUK w`b): wbi¶i( )/ mv¶i( )/ cÖv\_wgK( )/ gva''wgK( )/ D''P gva''wgK( )/ mævZK( )/ mævZt̄Kv̄Ēi( ) |

5. Avcbw hw` Avcbvi GjvKvi cÖvK...wZK cwīt̄ēt̄k D̄t̄t̄j-L Kivi gZ t̄Kvb cwieZ©b ev A`^vfvweKZv t̄hgb, t̄gŠmȳt̄gi t̄Kvb cwieZ©b ,A`^vfvweK gv̄lvq So-e,,wó,Liv,eb''v j¶'' Kt̄i \_v̄t̄Kb Zvn̄t̄j Avcbvi AwfÁZvi Av̄t̄jv̄t̄K DĒi w`b|

cwieZ©t̄bi wel̄t̄q DĒi'vZvi cwiwPwZ	Avwg welqwU wVK t̄Lqvj KwibvB ev ḡt̄b Kīt̄Z cvwibv	Ab''t̄' i ej̄t̄Z īt̄bwQ,	Avwg wb̄t̄R G welqwU Abyfe /j¶'' Kt̄iwQ
*GK t̄gŠmyg t̄_̄t̄K Av̄t̄iK t̄gŠmȳt̄gi cv_©K'' ev Avmv hvlqvi mḡt̄qi t̄h cwieZ©b (Av̄t̄Mi gZ) Zv c,,_Kfv̄t̄e Abyfe Kiv hvq̄bv			
* GLb Mig Kvj Āt̄bK eo A_©vr `xN© mgq _v̄t̄K			
* GLb MigKvj Lye t̄ekx Mig Abyfe nq			
* kxZ Kvj (Av̄t̄Mi t̄P̄t̄h) GLb t̄ek t̄QvU n̄t̄q Ḡt̄m̄t̄Q			
* kxZ Kv̄t̄j (Av̄t̄Mi t̄P̄t̄h) VvŪv Kg jv̄t̄M			
* kxZ Kvj (Av̄t̄Mi t̄P̄t̄h) GLb t̄ek t̄'ix̄t̄Z i'' nq			
* Amḡt̄q e,,wó nq A_v©r mvaviYZ t̄h mḡt̄q e,,wócvZ nlqvi K_v Zv n̄t̄''Qbv			
*t̄gv̄t̄Ui Dci e,,wócvZ Kg n̄t̄''Q			

* A <sup>-</sup> ^vfwweK aɪbi /MVɪbi Kzqvkv ɪ`Lv hvq .			
*So-SvcUvi NUbv   G,ɪjvi Zxe <sup>a</sup> Zv (fqvenZvi ifc) ɪɛɔ ɪMɪQ			
Amgɪq eb`v AvmɪQ cÖvqB			
cÖvqB GKB eQɪ evi evi eb`v ɪ`Lv w`ɪ`Q			
eb`vi cvwb hZ mgq ch©šÍ _vKvi K_v Zvi ɪPɪq AɪbK ɪekx mgq aɪi _vKɪQ			
GKB eQɪ evi evi Amgɪq e,wó ɪ`Lv w`ɪ`Q			
Amgɪq So/Rɪjv`Q;vm nɪ`Q			

(\*MɪelK KZ...©K fvlvšɪɪ mvgvb` cwieZ©ɪbi gva`ɪg Saroar and Routray,2010 ɪ\_ɪK M,,nxZ)

6.\* (Dckzjq GjvKvi `vqx evwm`vɪ`i Rb`) wbɪPi welɪq Avcbvi aviYv ejyb

Avcwb Kx gɪb Kɪb	Ggb wKQz nɪ`Q eɪj Avgvi gɪb nqvb	GUV mɪ`n AvɪQ,Zɪe GiKg nɪZ cvɪi	Avgvi gɪb nq GiKgB nɪ`Q
mvMɪii cvwbi D`PZv mwZ`B μɪgB evoɪQ			
mvMi `a`ZB ɪekx ɪekx Kɪi DckZɪi wfZɪi w`ɪK Pɪj AvmɪQ			
bZzb bZzb GjvKv `vqxfvɪeB jevbv <sup>3</sup> cvwbɪZ AvμvšÍ(Wyɪe/ɪɪm) nɪ`Q			
So/mvBɪK-vb, Rɪjv`Q;vm μɪgB evoɪQ Ges G,ɪjvi Zxe <sup>a</sup> Zvl AvɪMi ɪPɪq ɪekx nɪ`Q			
jebv <sup>3</sup> Zvgy <sup>3</sup> Lvlqvi cvwbi Pig mskU ɪ`Lv w`ɪqɪQ			

(\*MɪelK KZ...©K fvlvšɪɪ mvgvb` cwieZ©ɪbi gva`ɪg Saroar and Routray,2010 ɪ\_ɪK M,,nxZ)

7. mvwe©Kfvɪe Avcbw Kx gɪb Kɪb Dcɪi ejv nɪjv Ggb welq,ɪjv ev SywK,ɪjv hyM hyM aɪi `^vfwweKfvɪe Pɪj AvmɪQ bvWK bZzb gvɪvq A<sup>-</sup> ^vfwweKfvɪe ɪ`Lv hvɪ`Q| (K) (n`v ) bZzb gvɪvq A<sup>-</sup> ^vfwweKfvɪe ɪ`Lv hvɪ`Q| (L) (bv) hyM hyM aɪi `^vfwweKfvɪeB Pɪj AvmɪQ|

8. hw` gɪb Kɪb H welq ev SywK,ɪjv bZzb gvɪvq A<sup>-</sup> ^vfwweKfvɪeB ɪ`Lv hvɪ`Q Zvnɪj Avcbvi AZxZ AwfÁZvi wfwĒɪZ G,ɪjvi KviɪY m,,ó cÖavb cÖavb cwiɪekMZ SzwK | cÖvK...wZK `yɪh©vM,ɪjvi ɪwZi gvɪv Avcbvi gZ Abyhvqx μgvbymvɪi Dɪj-L Ki`b|  
 ➤ AɪMi ɪPɪq ɪwZ Lye ɪekx ɪɛɔɪQ ( )/AvɪMi ɪPɪq ɪwZ ɪek ɪɛɔɪQ ( )/ AvɪMi ɪPɪq ɪwZ mvgvb` ɪɛɔɪQ ( )/ɪwZi gvɪv AvɪMi gZB AvɪQ ( )|

9. Avcbw hw` gɪb Kɪb Avenlvqi H mg`Í Pig A<sup>-</sup> ^vfwweKZvi KviɪY Liv/eb`v/Rɪjv`Q;vm/mvBɪK-vb BZ`vw`, B`vwbs bZzbgvɪvi ev A<sup>-</sup> ^vfwweK iKɪgi

`yþh@vþMi m,,wó KiþQ þm þcÖ¶vcþU (cwilþ`i Kg@þÿþÍ AvlZvaxb) Avcbvi GjvKvq wbþP ewY@Z wewfbœ þ¶þÍ, hw` þKvb mgm`v m,,wó nþqþQ eþj Rvþbb þm AvþjvþK DËi w`b |

mgm`vi welq	Avcbvi RvbgþZ G mgm`vi we`lvwiZ I wbw`©ó iyc
*K...wl Drcv`þbi mgm`v wPwýZ Ki`b	
*ci cvjb I gvQ Pvl Gi mgm`v nþ`Q Zv wPwýZ Ki`b;	
*iv`lvNvU,weªR,eva,þcvivi, KvjfvU©, þWªb, bvjv ,møyBRþMU, Lvj, `vjvþKvVvi mgm`v wPwýZ Ki`b	
cvbxq Rþji mgm`v	
þmþPi cvwbi msKU	
RjvexZvi msKU	
cwiþek/e,¶ msKU	

10. Avcbw Kx Ggb þKvb cÖwk¶Y ( ) ev /Kg@kvjv,( ) /mfv ev( ) / þmwgbvþi( ) Ask  
wbþqwQþj þhLvþb wbþPi welq msþvšÍ þKvb wKQz AewnZ Kiv nþqwQj |

cÖwk¶Y/Kg@kvjv/mfv/þmwgbvi Gi welq	w U K w` b	cwilþ`i ev Avcbvi cþ`i KiYxq msþvšÍ welþq AvþjvPbv nþqwQj		G cÖwk¶b ev Kg@kvjvi, mfv ev þmwgbvþii AvþqvRK Kviv wQj	
		n`v (msþ¶þc Dþþj-L KiþZ cvþib)	bv	cÖwk¶ b`vZv	gþb bvB
ïaygvÍ cwiþek msi¶Y ev e,¶þivcY welqK					
cwiþek msi¶Y ev e,¶þivcY welqK nþjI Rjevqy cwieZ@þbi SzvK þgvKvþejvi welqI mshy³ wQj					
ïaygvÍ GjvKvi cÖvK...wZK `yþh@vM SzvK wbY@q I Zvi e`e`_vcbv welqK					
GjvKvi cÖvK...wZK `yþh@vM SzvK wbY@q I Zvi e`e`_vcbv welqK nþjI þmLvþb Rjevqy cwieZ@þbi SzvK welþq AvþjvPbv nþqwQj					
mivmwi Rjevqy cwieZ@b Ges Zvi SzvK þgvKvþejv msþvšÍ					
K...wl/cïcvjb/`^v`" ev Ab" þKvb welþqi nþjI ZvþZ Rjevqy cwieZ@þbi SzvK þgvKvþejvi welqI mshy³ wQj					

G aiþbi þKvb cÖwk¶Y/Kg©kvjv/mfv/þmwgbvþi Avwg AskMÖnY KiþZ cvwibvB					
---	--	--	--	--	--

11. ÖRjevqy cwieZ©bÓ Ges Gi cÖfve mǎúþK© hw` Avcwb wKQz þRþb ev iþb \_vþKb Zvnþj Zv Kxfvþe þRþþQb (GKvwaK DËi nþZ cvþi)

K. miKvixfvþe / `vßwiK KvþRi gva`þg ( ) L.GbwRIþ`i gva`þg ( ) M. wbR þ\_þK cwîKvi gva`þg ( ) N. þiwWI þ\_þK ( ) O. wUwf þ\_þK ( ) P. Ab`þKvbfvþe ( ) (Dþj-L Ki`b)

12. cÖvK...wZK `yþh©vþMi bZzbvþvi A`^vfvweK G mgm`vi welq,þjv þh Rjevqy cwieZ©þbi KviþY nþZ cvþi Ges GþZ cwilþ`i wKQz KiYxq welq iþqþQ , G welhwU Avcbvi cwil`þK þKvb KZ...©c¶ RvwbþqwQj wKbv:

K. n`v ( ) L. bv ( ) M. gþb KiþZ cvwibv ( )

13. Rvbvþj Zv þKvb cÖwZôvb RvwbþqwQj:

K. miKvixAwdm ( ) L. þemiKvix (GbwRI) ( ) M. þš^"Qvþmex msMVb ( )

14.(AvþMi 09 bǎi cÖþkœi DËþii þcÖw¶þZ ) Avcbvi RvbgþZ A`^vfvweK I bZybgvþvi cÖvK...wZK `yþh©vM A\_ev Rjevqy cwieZ©þbi mgm`v ev SzwK,þjvi mvþ\_ Lvc LvlqvþZ Avcbvi GjvKvq þh aiþbi c`þ¶c þbqv nþqþQ ev Pvjy AvþQ Zvi we`ÍwviZ I wbw`©ó ifc mǎúþK© `qv Kþi ejyb|

wPwýZ mgm`v	mgm`v þgvKvþejvq ev Lvc LvBþq Pjvi Rb` GjKvi þjvK/GbwRI/miKvi x Awdm/cwil` þh aiþYi c`þ¶c wbþqþQ		c`þ¶c MÖnYKvix					c`þ¶c MÖnYKv ix GKvwaK nþj `vwhþZji gvþv(þhŠ Dþ`vþMi Askx`vi) gšlé" mn Dþþj-L Ki`b
	þh c`þ¶c þbqv nþqþQ (Kg©KvþÛi eY©bv)	Avg vi Rvb v bvB	BD wc	DcþRj v cwil`	miKvi x Awd m (wefv	Gbw RI	Ab`vb` (e`w <sup>3</sup> / mǎcÖ` vq mwgw	

					M D†j-L Kí“b)	Z/ msMV b		
K...wl Drcv` †bi mgm`v								
cī cvjb l gvQ Pvl Gi mgm`v								
iv̄ ívNvU,we <sup>a</sup> R,ev a,†cvivi, KvjfvU©, †W <sup>ab</sup> , bvjv ,møyBR†MU, Lvj, `vjv†KvVvi mgm`v								
cvbxq R†ji mgm`v								
†m†Pi        cvwbi msKU								
RjvexZvi msKU								
cwi†ek     /    e,,ÿ msKU								

15. Avcbvi GjvKvq †Kvb GbwRI/ †^"Qv†mexmsMVb(K-ve/mwgvZ/ev G RvZxq msMVb) cÖvK...wZK `y†h©v†Mi bZzbgvÍvi A ^vfvweKZvi mgm`v ev Rjevqy cwieZ©†bi GB mgm`vi welq,†jv wb†q KvR K†i wKbv ? n`v / bv ( DĒi n`v n†j h\_v mæœe we` ívwiZ ejyb: KZwU cÖwZôvb KvR K†i/Kx ai†bi KvR K†i/Gu†`i g†a" Kv†`i mv†\_ cwil†`i cÖwvZôvwB †hvmv†hvm Av†Q BZ`vw`)

16. Dc†ii Av†jvPbvi †cÖw††Z Rjevqy cwieZ©†bi SzvK †gvKv†ejvi Rb" Avcbvi cwil†`i Kg©††††i g†a" Ab" ms`v KZ...©K ev` íevwqZ n†"Q ev n†Z hv†"Q ev Rvbg†Z n†q†Q Ggb †Kvb GKwU cÖKí hv†Z cwil†`i †Kvbfv†e f~wgKv ivLvi my†hvm Av†Q ev wQj Gi †cÖw††Z ejyb (mæœe n†j mvwe©Kfv†e ejyb)

ev` ÍZevqbKvix ms`v	†Kvb †Kvb ch©v†q cwil†`i gZvgZ †bqv nq/AewnZ Kiv nq/ n†q†Q	mn Askx`vi wnmv†e cwil†`i cÖZ"†† e`e` 'vcbvq/Z`vi wK†Z	cÖKíwU†Z cwil†`i f'wgKv ivLvi my†hvm _vKv m†Ēj  Askx`vi Kiv ev gZvgZ †bqv nq bvB
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		ev̄ íevwqZ nq / n†"Q	
GbwRI			
miKvix(wefvM D†j-L Ki"b)			
Ab"vb"			

16.(K.): Q†K̄ úó ejv nq bvB Ggb welq \_vK†j `qv K†i gZvgZ w`b|

17. Rjevqy cwieZ©†bi SzwKi mv†\_ gwwb†q †bqvi Rb" KvR Ki†Q Ggb †Kvb GbwRI ev Ab"vb" †emiKvix cÖwZôv†bi mv†\_ cwil†i Kv†Ri AwfÁZv eb©bv Ki"b:(cwil†i m†PZbZv/m†gZv e,,wxi KvRK†i/ †Kvbai†Yi wi†mvm© w`†q mnvqZv K†i/cÖK†ii ev̄ íevq†b Askx`vwi†Zji wfwĚ†Z KvR K†i/BZ"vw`|)

18. Rjevqy cwieZ©†bi SzwKi mv†\_ gwwb†q †bqvi Rb" cwil†i mv†\_ miKvix cÖwZôv†bi †Kvb ai†Yi KvR Kivi aiY A\_ev AwfÁZv eb©bv Ki"b|

19. Rjevqy cwieZ©b wel†q cwil†i Kibxq m¼«vší miKvix †Kvb wb†`©wkKv /MvBWjvBb/ cyw̄ íKv mvKz©jvi nv†Z †c†q†Qb wKbv|

n"v (D†j-L Ki"b)

/bv ( )

20. GjvKvi A`^vfwek bZzb gvívi cÖvK,,wZK `y†hv©M Gi †wZ wbi†c†bi †Kvb e"e"v ev Gmsv†ší †Kvb `vbxq cøvb/cwiKíbv †bqv n†qwQj e†j Avcwb Rv†bb wKbv| n"v(D†j-L Ki"b) /bv ( )

21. cwil†i weMZ evwl©K Kg©cwiKíbvq m†øve" bZzbgvívi A`^vfwek cªvK...wZK `y†h©v†Mi SzwK ev Rjevqy cwieZ©b msvvší SzwK mgyn l Zv †gvKv†ejvi wel†q KiYxq mªúwK©Z wKQz D††j-L Av†Q wKbv| : n"v(D†j-L Ki"b) /bv ( )

22. weMZ †Kvb A\_© eQ†i, Rjevqy cwieZ©†bi SzwKi mv†\_ gwwb†q †bqvi Rb" †Kvb GKwU Őmªú~b© we†kl cÖK†iÖ cwil†i c††\_†K A\_© eivl/ eiv†li cÖ íve Kiv n†qwQj wKbv| n"v(D†j-L Ki"b) /bv ( )

23. cwil†i mvaviY cÖKímgv†ni †Kvb GKwU†Z (K...wl,grm,iv̄ ív, euva, AeKvVv†gv,cvbxq Rj, †mP,Lbb,wb`v|b BZ"vw`†Z) weMZ †Kvb A\_© eQ†i bZzbgvívi A`^vfwek cªvK...wZK `y†h©v†Mi Kvi†Y m,,ó mgm"v we†ePbvq ev Rjevqy cwieZ©†bi SzwKi mv†\_ gwwb†q †bqvi K\_v we†ePbv K†i cwil†i c††\_†K AwZwi³ A\_© eivl/eiv†li cÖ íve Kiv n†qwQj e†j Rv†bb wKbv|

n"v(D†j-L Ki"b) /bv

( )

24. GjvKvi bZzbgvîvi A<sup>-</sup> ^vfvweK c<sup>av</sup>K...wZK `yþh©vþMi SzwK weþePbvq ev Rjevqy cwieZ©þbi SzwKi mvþ\_ gwwbþh þbhvi Rb<sup>”</sup> þKvb GKwU weþkl cÖKí %oZwi Kþi Da©Zb þKvb KZ...©cþ¶i wbKU cvVvþbv nþqwQj wKbv|

n<sup>v</sup> (Dþj-L Ki“b)

/bv ( )

25. bZzbgvîvi A<sup>-</sup> ^vfvweK c<sup>av</sup>K...wZK `yþh©vþMi SzwK weþePbvq ev Rjevqy cwieZ©þbi SzwKi mvþ\_ gwwbþq þbqvi Rb<sup>”</sup> cwilþ`i c¶þ\_þK RbMþYi Rb<sup>”</sup> þh þKvb welþq (K...wl,grm,iv<sup>-</sup> Ív, euvai¶v, AeKvVvþgv,cvbxq Rj,<sup>-</sup> ^v<sup>-</sup>”, þmP,Lbb,wb<sup>-</sup> vlv BZ<sup>-</sup>vw`þZ)þKvb mþPZbZvgyjK Kg©m~Px þbqv nþqwQj wKbv|

n<sup>v</sup>(Dþj-L Ki“b)

/bv ( )

26. Rjevqy cwieZ©þbi SzwKi mvþ\_ gwwbþq þbqvi Rb<sup>”</sup> Ni evwo i¶v, K...wlþZ þKvb bZzb dmþji RvZ, bZyb cxwZi Pvl, gvQaivi weþklaiþYi þbŠKv, grm m<sup>au</sup>` i¶v ,cvbxq Rj msi¶Y ev cÖvwßi Dcvq, ckycvjb, þmP,Lbb,wb<sup>-</sup> vlv ,BZ<sup>-</sup>vw`i þ¶þÍ weþkl þKvb cÖhyw<sup>3i</sup> cÖPjb,ev e<sup>”</sup>envþi DØyx Kivi Rb<sup>”</sup> cwilþ`i c¶ þKvb Kg©myPx þbqv nþqwQj wKbv|

n<sup>v</sup>(Dþj-L Ki“b)

/bv ( )

27.cwilþ`i þKvb wgwUs-þq Rjevqy cwieZ©þbi SzwK þgvKvþejvq AwfþhvRb welþq þKvb AvþjvPbv nþqwQj Ges þiRyþjkvþb M,,nxZ nþqwQj eþj Avcwb gþb KiþZ cvþibv wKbv:

n<sup>v</sup>(Dþj-L Ki“b) /bv ( )

28. Avcbvi cwilþ`i mswk-óZvq Pjgvb Dbœqb cÖKí,þjvþZ c<sup>av</sup>K...wZK `yþh©vþMi gvîv weþePbvq ev Rjevqy cwieZ©þbi SzwKi mvþ\_ gwwbþq þbqvi Rb<sup>”</sup> þKvb c`þ¶c þbqv nþqþQ wKbv|

n<sup>v</sup> (Dþj-L Ki“b) /bv( )

29. Rjevqy cwieZ©þbi SzwKi mvþ\_ gwwbþq þbqvi Rb<sup>”</sup> þKvb c`þ¶c þbqvi þ¶þÍ cwilþ`i mxgvexZv,þjv Kx eþj Avcwb gþb Kþib|

30.Rjevqy cwieZ©þbi SzwKi mvþ\_ gwwbþq þbqvi Rb<sup>”</sup> cwil` þh þh c`þ¶c wbþZ cvþi AšÍZ Zvi GKwU m<sup>au</sup>þK© ejyb|

m<sup>nv</sup>qZvi Rb<sup>”</sup> MþelK Avcbvi KvþQ K...ZÁ | AvcbvþK ab<sup>”</sup>ev`|



## ÓRjevqy cwieZ©†bi SzwK†gvKv†ejvi cÖ´lywZ: ´vbxq miKv†ii

### f´wgKvÓ kxl©K M†elYvi Rb´ cÖkægvjv:

(mvjvrKvi wb†´©wkKv/Abym~Px)

(´vbxq cÖkvm†bi Kg©KZ©v†´i Rb´)

(b\_© mvD\_ wek!we´´v†qi mævZ†KvEi (GgwcwR) wWwMÖi Ask wnmv†e mæc~Y© GKv†WwgK D††k´ G M†elYvi cÖkæc´ cÖYqb Kiv n†q†Q| DËi´vZvi e´w³MZ †Kvb Z\_´ †Kvb D††k´B cÖKvk Kiv n†ebv ev DËi´vZvi gZvgZ Zuvi | Zuvi cÖwZôv†bi Rb´ ¶wZi KviY nq Ggb D††k´ e´envi Kiv n†ebv|)

1. c`ex:  
Kvj:

2. eZ©gvb Kg©´´†j PvKzix

3. Avcbvi Kg©†¶†li cÖZ´ší GjvKvi †Kvb cÖvK...wZK `y†h©vM Gi cÖfve djvdj/ ¶q¶wZ BZ´vw´ wel†q mvaviYZ: cÖ\_†g Avcbvi wefvM Kv†´i gva´†g AewnZ nq|(wUK w`b| (GKvwaK n†Z cv†i)|

➤ MÖvgcywj/ †g^vi/ †Pqvig´vb/´vbxq Mb´gvb´ e´vw³/ wbR wefv†Mi DcKvi†fvMx/wbR Aa´´Íb Awdm/BDGbl Awdm/Ab´vb´|

4. Avcbvi wefv†M †h †Kvb cÖKícÖYq†bi ev Kg©myPx MÖn†Yi mg†q Rjevqy cwieZ©†bi SzwK†gvKv†ejvi c´†¶c †bqvi wel†q †Kvb cwic´/wb†´©kbv ev MvBWjvBb Rvwi Kiv n†q \_vK†j †m mæú†K© AbyMÖn K†i ejyb|

➤ n´v (´qv K†i D†j-L Ki´b):  
➤ bv|

5. Avcbvi wefv†M G GjvKvi Rjevqy cwieZ©b Gi SzwK †gvKv†ejvh LvcLvlqv†bvi Rb´(Aw†RvRb msvš´) we†kl †Kvb cÖKí/Kg©myPx mæú†K© `qv K†i ej†eb(BDGbl g†nv`q mvwe©Kfv†e ej†eb): wUK/µm w`b

Rjevqy cwieZ©b Gi SzwK †gvKv†ejvh LvcLvlqv†bvi Rb´(Aw†RvRb msvš´) we†kl cÖKí/Kg©myPx Av†Q	
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Pjgvb mvaviY Kg©myPx†Z Rjevqy cwieZ©b Gi SzwK†gvKv†ejvi Awf†Rvrb mꝛú†K© mywbw`©ó wb†`©kby Av†Q	
ÖmvaviY Kg©myPxi Ask wnmv†eÖ ev ÖïayBgvÍ Rjevqy cwieZ©b Gi SzwK †gvKv†ejvq LvcLvlqv†bvi Rb“(Awf†RvRb mꝛvšÍ )we†kl Kg©myPxÖ `ywUi †KvbwUB bvB	
cÖvK...wZK `y†h©vM †gvKv†ejvi Rb” mvaviY MvBWjvBb Av†Q hv†Z Rjevqy cwieZ©†bi SzwK we†ePbvi welqwUI `úó Ges wbw`©ófv†e ejv Av†Q	
cÖvK...wZK `y†h©vM †gvKv†ejvi Rb” mvaviY MvBWjvBbl bvB	
Ab” †Kvb gZvgZ _vK†j ejyb:	

6. G GjvKvi Rjevqy cwieZ©b Gi SzwK †gvKv†ejvq LvcLvlqv†bvi Rb” c`†¶c †bqvi wel†q (Awf†RvRb mꝛvšÍ) Avcbvi wefv†Mi we†kl ev mvaviY cÖKÍ hv Pjgvb /ev ev` íevwqZ/ ev ev` íevq†bi cÖwÍqvaxb/ ev cwíKÍbv M,,nxZ n†q†Q Zv†Z BDwbqb cwíł`/Dc†Rjv cwíł`i Gi AskMÖnY ev f`wgKv mꝛú†K© Avcbvi gZvgZ w`b|

gZvgZ	Rjevqy cwieZ©bRwbZ Awf†RvRb mꝛvšÍ we†kl/ mvaviY cÖKÍ Zv†Z BDwc I D:†R:c: Gi f`wgKv	
	BDwc	Dc†Rjv cwíł`
Kg©myPx cÖYq†b gZvgZ †bqvi my†hvM bvB		
Kg©myPx cÖYq†b gZvgZ †bqvi my†hvM Av†Q		
cwíł`i AskMn†Yi eva`evaKZv i†q†Q		
mKj cÖK†í cÖZ`¶ Askx`vwiZj we`gvb		

7. Dc†Rjv cwíł`i †Kvb wgwUs G Rjevqy cwieZ©†bi SzwK†gvKv†ejvi c`†¶c †bqvi wel†q G wel†q †Kvb Av†jvPbv n†qwQj Ges †iRy†jKv†b M,,nxZ n†qwQj e†j Avcwb g†b Ki†Z cv†ib wKbv:

- n`v (`qv K†i D††j-L Kiyb) bv ( )|

Avcbvi mnvqZvi Rb” M†elK K...ZÁ| Avcbv†K ab`ev`|

**ÓRjevqy cwieZ©þbi SzwKþgvKvþejvi cÖ- ÍywZ: - 'vbxq miKvþii  
f'wgKvÓ kxl©K MþelYvi Rb" cÖkægvjv:  
(mvÿvrKvi wbþ`©wkKv/ Abym~Px)**

**(- 'vbxq ch©vþq Kg©iZ GbwRI Kg©KZ©vþ`i Rb")**

(b\_© mvD\_ wek'we`vjþqi mævZþKvËi (GgwcwR) wWwMÖi Ask wnmvþe mæc~Y©  
GKvþWwgK Dþþk" G MþelYvi cÖkæcÍ cÖYqb Kiv nþqþQ| DËi`vZvi e"w³MZ þKvb Z\_` þKvb  
Dþþk"B cÖKvk Kiv nþebv ev DËi`vZvi gZvgZ Zuvi | Zuvi cÖwZôvþbi Rb" ¶wZi KviY nq Ggb  
Dþþk" e`envi Kiv nþebv)

1.K).c`ex :                      1.L).ms`'vi bvg:                      1.M). Kg©`'j :                      1.N).  
eZ©gvb Kg©`'þj PvKzix Kvj:

2. Avcbvi ms`'v KZ...©K G GjvKvq Rjevqy cwieZ©b Gi SzwK þgvKvþejvq AwfþRvRb  
msþvšÍ weþkl þKvb cÖKí /Kg©myPx Pjgvb /ev ev` ÍevwqZ/ev` Íevqþbi cÖwµqvaxb nþq  
\_vKþj AbyMÖn Kþi Zvi msw¶ß eY©bv w`b:

KvþRi bvg   aiY	G cÖKí ev` Íevqþb Avcbvi ms`'v GKK/ mnþhvwM/ þhŠ_ Askx`vi			A_©vqb Kvix	cÖKþí BDwc/DcþRjv cwil` Gi þKvb aiþYi mæú,,³Zv		mivmwi DcKviþfvMx RbþMvôx/cÖ wZôvb (weþklfvþe Dþj-L Ki"b)
	GKK	mnþh vMx	þhŠ_ Askx`v i		AvþQ	bvB	


3. Rjevqy cwieZ©þbi SzwKþgvKvþejvi c`þ¶c þbqvi welþq mivmwi BDwbqb/ DcþRjv cwilþ`i mvþ\_ Avcbviv KvR KþiþQb ev KiþQb ev KiþZ hvþ”Qb Ggb GKwU cÖKí ev Kg©myPx mþúþK© ejyb| (G cÖKí ev` Íevqþb/cÖYqþb Avcbvi ms`'vi mvþ\_ `vbxq miKvi cÖZ¶¶ AvbyóvwbK mnþhvwM/ þhŠ\_ Askx`vi wKbv/ev Zuvþ`i Ask MÖnþYi gvÍv þKvb ch©vþq/ cÖKíwUi welþq Zvþ`i cÖvwZóvwbK AvMÖn I AMÖvwaKvi/cÖKíi avivevwnKZv I aviYþhvM`Zv i¶vq ZrciZv /cÖvwZóvwbK m¶gZv-mxgvexZv mn Avcbvþ`i Kv h©µg eY©bv Ki“b)

4. Avcbvi ms`'v KZ©©„K Rjevqy cwieZ©b þgvKvþejvq AwfþRvRb mspvšÍ mvaviY/weþkl þKvb cÖKí Kg©myPx ev` Íevqb I mgš`þqi mgþq DcþRjv cwil` / BDwbqb cwilþ`i Gi f`wgKv Kx \_vþK Ges Kxfvþe Zviv G Kg©myPxþK g~j`vwqZ Kþi , `qv Kþi Avcbvi gZvgZ w`b|

	BDwc		DcþRjv cwil`	
	✓	µm	✓	µm
Kg©myPx cÖYqþb Zuvþ`i gZvgZ þbqvi myþhvM bvB				
Kg©myPx cÖYqþb/ ev` Íevqþb Zuvþ`i `^ZùzZ© gZvgZ cvlqv hvq				
Kg©myPx ev` Íevqþbi mgq AewnZ Kiv nq				
mnvqZv Kivi myþhvM _vKv mþËj  cÖþqvRbgZ Zvþ`i KvQ þ_þK cÖZ`vwkZ mnvqZv cvlqv hvqbv				
cÖKíi KvR ,þjvþZ Zviv cÖvwZóvwbK AMÖvwaKvi w`þq Ask þbq				

4.K.Dcþii QþK ejv nqwB Ggb þKvb gZvgZ \_vKþj w`b |

Avcbvi mnvqZvi Rb` MþelK K...ZÁ| AvcbvþK ab`ev` |

## **Preparedness in Facing the Challenges of Climate Change: A Study on the Role of Local Government**

**(Questionnaire for local government representatives )**

Union:

Upazila:

1. Name:      2.a.Age:      2.b.Occupation:      2.c.Sex:male/Female:

3. a. Designation:      3.b.Tenure (if previous experiences please mention).

4. Educational qualification: Illiterate/ Literate/Primary/ High school/ HSC/Graduate/ Post graduate:

5. Please answer from your past experience if you have observed any noticeable change or unusual climatic events such as unusual and frequent storm, draught, flood, precipitation etc

Respondents familiarity on observed change	I cannot remember/ did not feel	Heard from other	Observed by my self.
*Less distinct season change is being observed			
*Prolonged summer is being observed,			
*Warmer summer is being observed			
*Less span winter is being observed			
*Less cold winter is being observed,			
*Un-time and Unusual rainfall is being observed			
*Over all Less rain fall is being observed,			
*Unusual form of fog is being observed			
*Intensity of frequent Strom and surge is being observed			
*Late start winter is being observed			
Untime flood is being observed frequently			
More than one flood in same year is being observed			
Flood water stayed more than usual time			
Untime rain in same year is being observed frequently			
Untime storm and tidal wave/surge is being observed			

(\*Source: Saroar and Routray, 2010. Slight modification is made)

6. Please mark your perception on the following statements (for the coastal areas residents)

Do you think	I don't think it is happening	There is doubt but may happen	I think so, it is happening
Indeed, Sea level is increasing day by day			
More inward shifting of coastline is being observed.			
New area is being inundated/ by saline water permanently			
Intensified and frequent storm / surge/tidal wave etc is being observed with high magnitude			
Acute scarcity of fresh water has been occurred.			

(Source: Saroar and Routray,2010) (\*Slight modification is made)

7. Do you think, over all, these extreme weather events are being observed 'unusual with new intensification or it is observed very usual and through out the years.

a)Yes it is observed 'unusual with new intensification.

(b) (No) it is observed very usual and through out the years.

8. If you think these risks have been ‘observed with new intensification and unusual’ then evaluate the dimension of natural calamities and environmental hazards due to it from your past experience.

- (a) Hazard has increased severely than any time of previous.
- (b) Hazard has increased than any time of previous
- (c) Hazard has increased slightly than previous.
- (d) Hazard is remaining same as that of previous.

9. If you think that due to these new intensified and unusual extreme weather events the natural calamities such as draught/flood/surges/cyclone etc are creating uneven disaster with new dimension then (considering the context) identify the relevant impact (problem) for the following sectors of your locality.

Sector/system	Problem
Agricultural Production.	
fisheries/fishing Animal Husbandry	
Road / Bridges/ Culvert/ Household/ Infrastructures/ Sluice gate/ Canal /Embankments etc	
Drinking water	
Irrigation	
Plantation and environment	
Water logging	

10. Have you participated in any orientation course/program/workshop/or gets any training on the following subjects? If yes which organization arranges it? Then please tick the box.

Subjects	Tick	Arranged by	
		GO	NGO
Only Environment and plantation issues			

Only on Disaster management Issues			
Disaster or Plantation or Environment Issue but CC is Addressed			
Directly CC Issue			
No Training/Workshop/Orientation at all			

11. If you have informed /heard some thing regarding climate change, then please mentioned on how you have informed/heard. (You can mark more than one)

a) Through Official work (GO channel). (b) By NGO (c) Through News paper (d) TV (e) Radio (f) other.

12. Have any authorities/Organization informed you that the new dimension of these natural disaster is being occurred due to climate change and your council possesses some responsibilities in this regard?-(a.) yes. (b) No. (c) Can not remember.

13. If Yes, Please mention the Authorities/Organizations (You can mark more than one)

A) Government Office (b) NGO (c) Other Voluntary Organizations

14. Have any step taken at your locality to meet the risk of newly observed intensified natural disaster or climate change (on the basis of answer of Q.9.)

Sector/system Problem	Step taken		Step taken by					Step taken by more than one unit
	Descripti on	No step	UP	GO dept.	UPZP	NGO	Individual or community	
Agricultural Production.								
fisheries/fishing Animal Husbandry								
Road / Bridges/ Culvert/ Household/ Infrastructures/ Sluice gate/ Canal /Embankments etc								
Drinking water								
Irrigation								
Plantation and environment								
Water logging								



15. Do you know any NGO activity which is working on CC issues in your area? If Yes, Please describes as details as you know

16. Please comments (as best as you know) on involvement of your Parishad with any NGO's/GO's project or program regarding climate change adaptation; where your council would have any role to play according to its jurisdiction.

	Information or Opinion is shared only in any phase of the program	Parishad is involved as active partner or program is implemented under the direct supervision of LG	LG is Not Informed at all
GO			
NGO			

16. a. Please mention more that does not described in the above table (If any)

17. Please share your experience about the work with NGO regarding climate change issues/adaptation project

18. Please share your experience about the work with GO agencies regarding climate change issues/ adaptation project.

19. Have you gotten any Guideline/ instruction /circular/Booklet from Government regarding the role of LG on CC issue?

- Yes:
- NO:

20. Do you have designed any local plan regarding the hazard of disaster or identifying the risk of newly observed disaster?

- Yes:
- NO:

21. Do you have mentioned anything in previous 'Yearly work plan' of the Parishad regarding facing the climate change induced risk and anticipated disaster risk (observed in new intensified dimension).

- Yes:

➤ NO:

22. Do you have allocated (proposed or provide) fund for any special kind of adaptation project considering the climate change hazards in any of the previous financial year?

➤ Yes:

➤ NO:

23. Do you have proposed (or provide) any additional fund allocation for adjustment of any kind of existing general project (agriculture /fisheries/ Irrigation /Excavation /Drainage /embankment /Roads / Infrastructures etc) considering the climatic hazard or uneven natural disaster in any of the previous financial year?

➤ Yes:

➤ NO:

24. Do you have made any special project plan considering intensified uneven disaster risk of your locality or to cope with CC induced impact and send it to the authority.

➤ Yes:

➤ NO:

25. Do you have arranged any awareness program (in agriculture /fisheries/ Irrigation /Excavation /Drainage /embankment /Roads / Infrastructures issues etc) for the people regarding to cope with CC induced impact or uneven and intensified natural disaster.

➤ Yes:

➤ NO:

26. Do you have taken any program to introduce or facilitate any special technology or special equipments/elements (such as new variety for agriculture production /new species for fisheries or protection strategy/ introduce special kind of irrigation /excavation /drainage /protection of embankment /roads / infrastructures etc) to cope with climatic hazards /intensified uneven natural disaster for your people?

➤ Yes:

➤ NO:

27. Do you have discussed or took resolution in any meeting of the Parishad regarding climate change risk and adaptation.

- Yes:
- NO:

28. Considering climatic risk/newly intensified disaster hazards do you have taken any step to incorporate any measures in existing routine (development) works.

- Yes:
- NO:

29. Identify the limitation of your council to take program of adaptation to face the Climate change impact of your locality.

30. Mention at least one step that council can take to adapt with the CC Risk.

**Thanks for your kind Cooperation.s**

**Preparedness in Facing the Challenges of Climate Change: A Study on the Role of Local Government**

**(Questionnaire/Interview check list for officials of government's local department )**

1. Designation:

2. Duration in present work place:

3. Generally from whom do you inform about the disaster and natural calamities of the remote area of your work area, please mention (answer can be more than one)

- Village police /UP member/ Chairman/ Local elite/ Beneficiaries of the departments/ Subordinate office/ UNO office/other.

4. Is there any circular/guideline/instruction regarding climate change adaptation in relation to your works; please describe

- Yes (please describe)
- No

5. Please describe regarding any climate change adaptation project of your department

	Tick
--	------

There is climate change adaptation project(Special)	
There is clear instruction for consideration of climate change risk in routine project	
Neither special project of climate change adaptation nor any instruction for consideration of climate change in routine project	
There is no instruction regarding disaster hazards even	
Please mentioned details that are not described in the table (if any):	

6. Please describe the role of UP and UPZP regarding implementation and coordination of climate change adaptation program of your department

	UP	UPZP
There is no scope to consider their opinion to design/implement the program		
Yes, there is scope to consider their opinion to design/implement the program		
Participation of Parishad is compulsory		
Parishads have the direct participation in all project		

7. Do you have discussed or took resolution in any meeting of the UPZ Parishad regarding climate change risk and adaptation. Yes: No:

**Thanks for your kind cooperation.**

### **Preparedness in Facing the Challenges of Climate Change: A Study on the Role of Local Government**

(Questionnaire/Interview check list for local NGO officials )

1. Designation:            Organization:                            work place:                            Duration:

2. Please describe if any climate change adaptation project has been implemented or is going on in this area by your organization:

Name and nature of the project	Partnership status of your organization for implementing the project			Funded by	Participation of LG in the project		Beneficiaries (People/Organization)
	self	associated	joint		Yes	No	

3. Please describe about a project regarding climate change adaptation where you have worked/ are working with UP and UPZP (whether the LGs are direct and active partner of your project/level of their involvement/their organizational priority regarding the project/ their endeavours for continuation of the project/their ability and limitation)

4. Please describe the role of UP and UPZP regrading implementation and coordination of climate change adaptation program of your organization.How do they evaluate your program.

	UP		UPZP	
	Tick	Cross	Tick	Cross
There is no scope to consider LG’s opinion to design the program				
Genearily spontanous opinion is provided by the LG regarding desgin and implement of the program				
Despite having the scope to cooperate, expected cooperation is not provided by LG				
LG representatives participated in our program spountenously with their organizational priority				

4. A. Please mention details that are not described in the above table (if any):

**Thanks for your kind cooperation.**

### **Appendix-2: Table (Details)**

Findings of the following table are discussed in chapter five. Details of the tables are not shown in the chapter except indicating by foot note. Details of the tables are being attached here the. Table:i demonstrates that agriculture is the major occupation of the respondents . Table:ii presents educational qualification of the respondents.Table: iii shows the information of NGO activities known by LG representatives. Table: iv presents the details about training and orientation of the LG representatives. Table: v shows that NGO is the highest training (including orientation and workshop) provider in studied area and Table: vi presnts the information regarding the ability of LG representatives to identify at least one relavent role of LG on climate change issues.

**Table: i: Occupation of LG Representatives**

<b>Occupation</b>	<b>All Area's LG (%)</b>	<b>Coastal LG (%)</b>	<b>Non Coastal LG (%)</b>
Agriculture	32.4	37.5	20
Business	32.4	25.0	50
Service	8.8	8.3	10
House hold	20.6	20.8	20
Other	5.9	8.3	-
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table: ii: Educational Qualification of LG Representatives**

<b>Education Level</b>	<b>All Area's LG (%)</b>	<b>Coastal LG (%)</b>	<b>Non Coastal LG (%)</b>
Literate	2.9	4.2	-
Primary	2.9	-	10
Secondary	58.8	58.3	60
Higher Secondary	14.7	20.8	-
Graduate	14.7	16.7	10
Post Graduate	5.9	-	20
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100</b>

**Table: iii: LG representatives is informed regarding activities of NGO on CC issues in their locality**

<b>Informed</b>	<b>All Area's LG (%)</b>	<b>Coastal LG (%)</b>	<b>Non Coastal LG (%)</b>
Yes	70.6	100.0	-
No	29.4	-	100.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

**Table: iv: Training / Workshop /Orientation of LG Representatives on Climate change and Disaster or Environment Issues**

<b>Training / Workshop /Orientation On</b>	<b>All Area's LG (%)</b>	<b>Coastal LG (%)</b>	<b>Non Coastal LG (%)</b>
Only on Disaster Issue	5.9	8.3	-
Disaster or Plantation or Environment Issue but CC issues is addressed	32.4	45.8	-

Directly CC issue	2.9	4.2	-
No training/Workshop/Orientation at all	<b>58.8</b>	<b>41.7</b>	<b>100.0</b>
Total	100.0	100.0	100.0

**Table: v: LG Representatives Trained/Orientated by**

Trained/Oriented by	All Area's LG (%)	Coastal LG (%)	Non Coastal LG (%)
GO	<b>2.9</b>	4.2	-
NGO	<b>38.2</b>	54.2	-
<b>No One</b>	<b>58.8</b>	<b>41.7</b>	<b>100.0</b>
Total	100.0	100.0	100.0

**Table: vi:  
Number of LG Representatives who can identify at least one relevant role of LG (regarding climate change)**

	All Area's LG (%)	Coastal LG (%)	Non Coastal LG (%)
Yes	79.4	95.8	40.0
No	20.6	4.2	50.0
Total	100.0	100.0	100.0