

Research Report
On
A Study of Policy Makers Understanding of and Responses to Climate Change in Bangladesh

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July 2015

124 JUL 2015

Acknowledgement

The report is a result of a rigorous and in-depth study on Policy Makers Understanding of and their Response to Climate Change in Bangladesh. The research team headed by Syed Mahboob Hasan has dedicated themselves to the research work. Indeed, sincere efforts and diligence of the team members have made it possible to bring out such a luminous report which will help enormously in taking steps for managing climate change in Bangladesh.

The research team is very much grateful to the treasured Rector of Bangladesh Public Administration Training Centre, Mr. A. K. M. Abdul Awal Mazumder for valuable advice regarding research work in different faculty seminars. His invaluable guidance and comments has inspired us to conduct the research in the right path.

Definitely, the research team expresses extreme gratefulness and thanks to the Project Implementation Office for financing the research work. The team members are vastly indebted and thankful to PD of SBPATC (Phase-III) Project, Mr. Md. Zaydul Haque Molla ndc for his generous all out cooperation and cherished suggestions in completing the study whole heartedly.

The team is highly indebted to Mr. Md. Kamrul Hasan, Senior Assistant Secretary of Cabinet Division and Mohammad Ehsanul Kabir, Deputy Manager (public Relations) of BPC for their enormous support in the research work.

The suggestions provided by the faculties and discussants in the faculty seminar held on 29 June 2015 at ITC Conference Hall of BPATC have helped enough to improve the research paper. We are, indeed, grateful to the discussants of the seminar, Mr. AKM Enamul Haque, Director and Dr. Mohammed Amjed Hossain, Deputy Director of BPATC for their valuable suggestions.

The comments provided by the external reviewer esteemed Professor Dr. M. Maksudur Rahman of Department of Geography and Environment, Dhaka University and internal reviewer reverend Dr. Rizwan Khair, Director of BPATC have certainly helped us immensely to shape the report a glowing one. We are expressing our uppermost gratitude and thanks to them for their strenuous and sincere efforts.

Certainly, it is our obligation to convey earnest gratitude and recognition to the respondents/interviewees of the study. All the respondents were very busy with their huge work, yet they have extended their hands of cooperation in responding the interview schedule. Actually, without their intensive support, the research work would fail tremendously.

-The Research Team

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EXECUTIVE SUMMARY

Climate change is one of the key issues to be tackled for safe living of all living organisms as well as for the sustainable development of the world; more specifically the issue is burning for the developing countries like Bangladesh. Due to the negative impact of climate change Bangladesh is continuously facing a lot of challenges in the arena of development, poverty reduction, health hazards leading to personal risks as well as catastrophic environmental degradation leading to frequent cyclones, tidal waves, draughts, earthquakes, landslides and river erosions. The issue of climate change not only affects human but also other animals and non-living things of the world. (Due to the negative impact of climate change all sectors like agriculture, fisheries, livestock, transport and communication, eco-system as well as environment will be seriously affected in future.) Considering the severity of the issue, emphasis has been given in the Perspective Plan, 6th Five Year Plan and some other documents related to climate change. A number of programs have been implemented and still some are running; even though there is a huge risk of affecting severely by the impact of climate change. To address the issue of climate change the present study emphasizes on the examination of the contextual determinants and dimensions of policy makers understanding and their response to climate change.

The study has been conducted on both primary and secondary data. Primary data were collected from the policy makers that include Standing Committee Member of Parliament, senior officials of the government from Joint Secretary to Additional Secretary, fund providers, and the experts in policy making arena of climate change from January to middle of June 2015. This is not a scientific study rather the study aims to knock the policy makers understanding and their response to climate change in Bangladesh. The study shows that more than 80% respondents think that climate change is a threat to human society and 98% respondents assume that it is a clear threat to non-human world or natural eco-system. 57.38% respondents strongly agree that climate change is induced by man and 37.70% agree it is induced by man. 63.93% and 34.43% respondents strongly agree and agree respectively that natural resources/systems will be severely affected by climate change.

Simultaneously, 44.26% and 40.98% of the respondents think that climate change will affect the economy, food security and infrastructure severely and moderately respectively. 75.41% of the respondents believe that climate change is a socio-political global and national issue. Study findings portray that climate change and development are inversely correlated.

Among the respondents 47.54% clearly say that public differ climate change from global warming. 46.62% strongly believe that climate change can be a personal risk while 8.20% respondents believe it to some extent. However, 75.41% respondents agree that climate change is a serious problem to Bangladesh like many other countries. To manage the problem of climate change, suitable policy/strategy/program is crucial. The study findings show that 68.85% respondents did not get any opportunity to participate in any training program or workshop or conference on climate change issues. 55.74% respondents strongly agree that clear policy is required to handle climate change issue while 32.79% agree and 1.64% agrees to some extent that a clear policy is required. Majority of the respondents believe that climate change is manageable or somehow adaptable.

A good number of recommendations have been put forward in line with the research findings to manage climate change. For tackling climate change formulation of clear policy, realistic action plan, enforcement of laws, creating awareness among all stakeholders and ensuring their participation, adaptation and mitigation measures, pro-poor and climate change resilient development initiatives, making strong group of climate change sufferer countries to press developed countries to reduce emission of greenhouse gases, and arrangement of proper training, conference/workshop for the policy makers have been suggested. Research on the issue of climate change has been given emphasize and a knowledge repository can also be made for providing all information regarding climate change. It is assumed that the findings of the study will help in adopting necessary steps in managing the climate change problem in our country. Moreover, the study is believed to open a wide range of scope for further research in the arena.

Abbreviations and Elaborations

Acronyms	Elaborations
BPATC	Bangladesh Public Administration Training Centre
CCT	Climate Change Trust
DoE	Department of Environment
GoV	Government of Bangladesh
GHG	Green House Gases
GWCC	Global Warming and Climate Change
IPCC	Intergovernmental Panel on Climate Change
MoEF	Ministry of Environment and Forests
MoPA	Ministry of Public Administration
PD	Project Director
SPSS	Statistical Package for Social Sciences

Introduction

1. Introduction

Climate change is one of the most significant issues to be considered with utmost importance in the present world. It may be man-made or natural. Man-made climate change threatens ecosystems and human health on a global scale (IUCH, 2010). It will have its greatest impact on those countries, which are already the poorest in the world, and it will deepen inequities, hinder development as well as worsen health condition of both man and animal. Nevertheless, this message has failed to communicate most public discussion about the climate change (The Lancet, 2011). During this century, earths average surface temperature raises are likely to surpass the safe threshold of 2°C above preindustrial average temperature. Rises will be greater at higher latitudes, with medium-risk scenarios predicting 2 to 3°C rises by 2090, and 4 to 5°C rises in northern Canada, Greenland, and Siberia (Costello et al., 2011). The average temperature of today's world has already increased by 0.6°C from the middle of the 1800s. In the last century, average temperature of earth has increased by 1.5 to 4.5°C leading to melting of polar and mountain ice and thus sea level rise.

Due to its disadvantageous geographic location, low-lying topography, high population density, dependence of livelihoods on climate sensitive sectors, particularly agriculture and fisheries; and inefficient institutional aspects Bangladesh is one of the top 10 nations that are mostly vulnerable to climate change (Climate Change Cell, 2006). By the end of the century, Bangladesh may be set to disappear under the waves.

The effects of the climate change will appear as destructive for poor and susceptible masses. Mitigating and adjusting the reality of GHG are challenging to the community (Rahman and Mallick, 2004). Similar risky information has been exposed by Doe (1994) as saying that the country and masses of Bangladesh will suffer from the impacts of floods and other disasters due to changes in climate. UNDP (2014) says that the effects of climate change will increase the susceptibility of disasters.

It is assumed that natural as well as man-made disasters will rise five-fold for the ensuing 50 years (Thomas and Kopczak, 2005). According to UNDP (2004), the impacts of catastrophic disasters are not stable in the place they occur; rather they generate huge consequence to lives as well as public policies of distant places.

UNDP (2014) exposed that Bangladesh is victimized by natural calamities for long period. From the year 1980- 2008, the country has been struck by 219 disasters which created damage of US\$ 16 billion. Similar information has been provided by Prevention Web (2013) which uncovered that the state has been attacked by 234 disasters amid the year 1980-2010.

Alterations in geo-climates convey diverse disasters all over the world recurrently. Both advanced and developing states are hit by common natural disasters like floods, earthquakes, cyclones, and so on which pass massive destruction and troubles to humans. Bangladesh which is known as a disaster-prone state is struck by the general disasters (Islam & Chik, 2011).

1.1. Research Problem

Scientific research has identified human-induced climate change as a serious threat to human societies and the non-human world. Recent biological and climatic trends suggest human-induced climate change is already affecting human and non-human life (e.g., Parmesan and Yohe, 2003). The IPCC conference in Denmark, 2009 revealed that 14% of the land of Bangladesh will go under water by 2028 for climate change impact and parts of the societies that dependent on natural resources may be jobless. It is likely to have deleterious effects on natural and human systems, economies and infrastructure. It will also affect national security as well as food security of the country.

Climate change has emerged over the past two decades as an issue of global political and social significance. The issue was given political legitimacy by key figures in the late 1980s, (e.g., Thatcher, 1988) and by the collaborative involvement of both political and scientific representatives in the production of the IPCC's reports. Climate change has become central to the development and poverty reduction agenda also. Now climate change is an issue with

major political, economic, socio-cultural, psychological, and ethical implications, which must be understood if policy-makers are to respond effectively to this issue.

The government and non-government organizations have a key role to play in managing the impacts of climate change. Many of the anticipated adverse affects of climate change, such as sea level rise, higher temperatures, enhanced monsoon precipitation, and an increase in cyclone intensity will aggravate the existing stresses that already impede development in Bangladesh, particularly by reducing water and food security and damaging essential infrastructure (MoEF, 2005). These impacts could be extremely damaging to the economy, the environment, national development, and the people of Bangladesh (Reid and Sims, 2007).

It is supposed policy makers are the key players among all stakeholders as mentioned by Mendelow (1991) for tackling climate change. In order to better management of the risks of climate change, policy makers need to know how important the problem is relative to other social concerns. Policy makers are also faced with the challenge of deciding how soon they need to respond to climate change. They also need to know how to prevent or adapt to climate change in ways that minimize costs to society. They also need to know whether certain response measures come into conflict with each other or with other societal functions and needs. Policy makers can be national representatives negotiating global and regional climate issues. They can also be political leaders and regional planners responsible for implementing any international or unilateral commitments on climate change, or simply concerned with avoiding the risk of catastrophic damage from climate change related events. Policy makers can also be government high officials or agencies and scientific advisory bodies responsible for prioritizing future funding or climate research. Hence, the research topic 'Policy Makers Understanding and their Responses to Climate Change in Bangladesh' has come to the present study.

1.2. Justification

Climate change is a vast issue for Bangladesh which can only be tackled collectively; where individualism and unconstrained personal choice are unlikely to offer adequate solutions for it (Cook, 2004). Effective, long-term action to address climate change therefore requires questioning the fundamental cultural, social, economic and political structures that have

given rise to them (O’Riordan and Rayner, 1991). Without understanding the context in which the public understands climate change, how their priorities may differ from those of decision-making bodies. Without this climate change policies are being useless (IPCC, 2001). Climate change is not simply a scientific issue; it is a fundamentally social, political, cultural and moral one. The causes, impacts and solutions cannot be separated from human societies and economies, their values and lifestyles. There is therefore a need for research on a study of policy makers understanding and their responses to climate change in Bangladesh.

1.3. Objectives of the Study

The broad objectives of this research are to examine the contextual determinants and dimensions of policy makers understanding and their responses to climate change in Bangladesh. The specific objectives of the study are:

1. To study the understanding of the policy makers regarding public perception on climate change and global warming.
2. To find out the opinion of the policy makers regarding whether climate change can be an issue of development and poverty reduction.
3. To know the view of the policy makers about the responsibility of managing climate change.
4. To provide recommendations for managing climate change to the concern bodies.

1.4 Research questions

The main research questions in line of the objectives are as such:

- I. What is the understanding and responses of the policy makers regarding climate change?
- II. What is the perception of the policy makers regarding public understanding of ‘Climate Change’, and how (if at all) does this differ from their understanding of ‘Global Warming’?
- III. What extent is climate change perceived as a personal risk, a priority environmental concern, or an issue of personal importance?

- IV. What is the view of the policy makers regarding the impact of climate change on development and poverty reduction?
- V. Who do policy makers think is responsible for tackling climate change?
- VI. How climate change can be managed or tackled in Bangladesh?

1.5 Scope

The value of this research will be in offering practical support for communicators and policy makers involved in engaging the public in the issue of climate change and developing workable mitigation policies for achieving participatory approach to policy making in respect of climate change. The policy makers are the key actors of development agenda. By them effective policies are made and the implementation of those are ensured. Different studies show that Bangladesh government's present strategy/policy/programme to adapt or cope with the climate change is ineffective for a number of reasons. Climate change not only poses a major threat to human welfare, it also represents a serious challenge to societal values and behaviors. In this study the decision maker's responses to climate change will be understood. Therefore, this study has a wide scope to understand the climate change issues of Bangladesh, their inter-sectoral relationships, policy makers' role and initiatives, Bangladesh government's strategies to cope with climate change. It also has a scope to develop a training module on climate change issue and policy makers' responses with opening a wide range of area for further study.

1.6 Limitations of the Study

Due to time and resource constraint it could not cover wider number of respondents. Hence, the study has limitations in terms of adopting sample size. The study is not a scientific one rather it has tried to find out the understanding and responses of the policy makers to climate change. Hence, opinions provided in the study may cause questions in some cases.

Literature Review

2.1 Prelude

Climate Change is a cross-cutting issue closely related to natural and human system, economy, infrastructure, development as well as poverty reduction. Due to its wide extent it has clear political, economic, socio-cultural, physiological and ethical implications. In this perspective the term weather, climate, climate change etc. have been clearly defined at the outset of the study.

2.2 Definition of weather, climate, climate change, global warming and policy maker

2.2.1 Weather

Weather is the state of the atmosphere, to which degree it is hot or cold, wet or dry, calm or stormy, clear or cloudy. Weather generally refers to day-to-day temperature and precipitation activity. It is the short-term condition of climate which has a much more direct and tangible impact on daily life. Since earliest times, weather has been essential part of the success of human activities, from agriculture to maritime, from conflict to leisure time. The universal belief in weather deities, the prominence of weather events in folklore, and the ever-present preoccupation with weather signs and indications are evidence that an awareness of weather, particularly a fear of inclement events, has been a major feature of the human psyche throughout history (Reiter, 2001).

2.2.2 Climate

Climate (from Ancient Greek *klima*, meaning *inclination*) is commonly defined as the weather averaged over a long period. The standard averaging period is 30 years, but other periods may be used depending on the purpose. Climate also includes statistics other than the average, such as the magnitudes of day-to-day or year-to-year variations.

The Intergovernmental Panel on Climate Change (2007a) glossary definition is as follows: "*Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as*

the statistical description in terms of the mean and variability of relevant quantities over a period ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system”.

Natural factors of climatic variability are fluctuations of the sun’s radiant energy, alterations in the clearness of the atmosphere, and cyclic changes of the earth’s rotation on its axis and its orbit around the sun. In addition, the circulations of the atmosphere and the oceans are also subject to internal variations on time scales ranging from weeks to millennia. It is the complex interaction of all these variables that generates the continually changing patterns of climate. As a result, just as the yearly averages of climatic elements— such as temperature, humidity, rainfall, wind, and airborne particles—differ from one another, so to do the averages for decades, centuries, millennia, and millions of years (Reiter, 2001).

As a major parameter in all ecosystems climate is always a basic factor in human settlement, economy, and culture. Episodes of second-order climate change, such as the end of the Ice Age, the drying of the Sahara, the waning of the Medieval Warm Period, and the onset of the Little Ice Age, have had an important impact on human history (Lamb, 1995). However, awareness of such change has remained shadowy at best, probably because the inherent time scales are beyond the span of individual human experience.

2.2.3 Climate Change

Climate change is an important and long-lasting transform in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It may be a change in average weather conditions, or in the distribution of weather around the average conditions. Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate tectonics, and volcanic eruptions. Certain human activities have also been identified as significant causes of recent climate change, often referred to as "Global Warming".

Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer (IPCC, 2014). Climate

change may be due to natural internal processes or external forcing such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use.

The Framework Convention on Climate Change (United Nations, 1992) in its Article 1 defines climate change as:

“a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.”

The earth's climate has always been in a state of change (Lamb, 1995; Chorley and Barry, 1998). For nearly three centuries it has been in a warming phase. This was preceded by a cold period, the Little Ice Age, which was itself preceded by a warmer phase known as the Medieval Warm Period, or Little Climatic Optimum. Such changes are entirely natural, but there is evidence that in recent years a portion of the current warming may be attributable to human activities, particularly the burning of fossil fuels (Houghton et al. 1996; Tett et al. 1999; Wigley and Schimel, 2000).

2.2.4 Global Warming

Global warming and climate change refer to an increase in average global temperatures. Natural events and human activities are believed to be contributing to an increase in average global temperatures. This is caused primarily by increases in “greenhouse” gases such as Carbon Dioxide (CO₂).

Global warming is defined by the Advance Dictionary of Oxford (Oxford University Press, 2010) as follows:

‘The increase in temperature of the earth's atmosphere that is caused by the increase of particular gases especially carbon dioxide.’

2.3 Global Climate Change and Bangladesh

The intensifying global climate change is adversely affecting both human and natural systems. Human systems include river and other water bodies, agriculture and forestry, coastal zones and marine systems including fisheries, human settlements, energy, and industry, insurance and other financial services, and human health. Natural systems include rainfall, glaciers, coral reefs and atolls, mangroves, boreal and tropical forests, polar and alpine ecosystems, prairie wetlands, and remnant native grasslands. The degradation of the environment in Bangladesh from human encroachment makes the impacts of climate change even more severe. Natural disasters such as floods, cyclones, and drought are

becoming more frequent and devastating in terms of economic and infrastructural losses and damages and health hazards (outbreak vector- and water-borne diseases). As a result of rising sea levels, a significant part of the coastal areas may be permanently inundated; displacing large numbers of people; and salinity will spread deeper and wider. Low rainfall will continue to cause drought, desertification in Barindra areas and inadequate groundwater replenishment in drier parts of the country. Large parts of the rural economy, including the coastal areas, are threatened by natural disasters which destroy crops, infrastructure, livestock, and economic activities. As a result, poverty may widen and deepen (Government of Bangladesh, 2012). There is a direct linkage between poverty and intensifying climate change.

It is now recognized internationally that Bangladesh is at the forefront of adverse climate change impacts. One key reason is the disadvantaged geographical location of Bangladesh at the bottom of the three mighty river systems—the Ganges, the Brahmaputra, and the Meghna, with a long coastal belt with much of the country low-lying and flat. The country has no control over its water resources as over 92 per cent of the annual run-off that flows through Bangladesh on to the Bay of Bengal enters the country from the upper riparian country. Another key reason is the extremely high population density. Thus, as a result of climate change, Bangladeshis are likely to face increasing risks to their security in terms of food, energy, water, livelihood, health, and habitat. Bangladesh urges, in association with the international community, that global warming be kept at 1.5°C - and in any case not to exceed 2°C - to be incorporated in a binding agreement.

2.4 Public Perspective to Climate Change

Humans are now indisputably concerned in triggering global climate change, and the impacts on human and natural systems will be severe, far reaching, and affect the most physically and economically vulnerable people around the world disproportionately. Society can respond to these threats through two distinct strategies: adaptation and mitigation.

Adaptation involves preventive measures to avoid, prepare for, or respond to potential impacts from climate change. The goal of adaptation is to reduce the associated risk to population health through a wide range of interventions including health behaviors, clinical procedures, or technical/structural measures. In Asia, adaptation is being facilitated in some areas through mainstreaming climate adaptation action into sub-national development

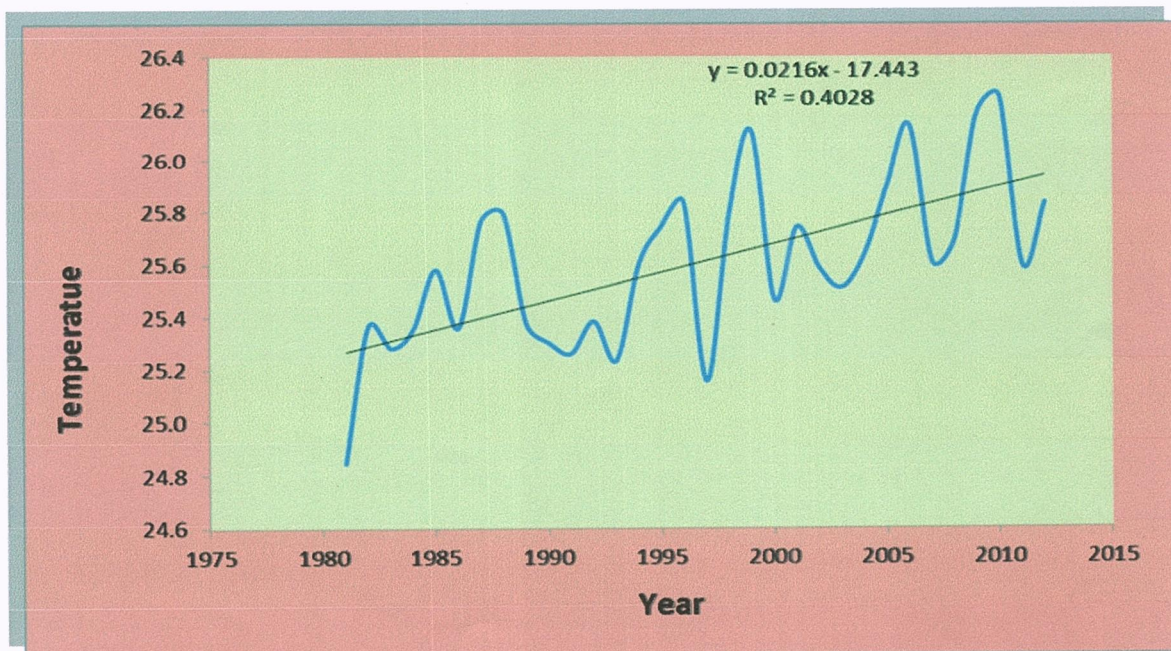
planning, early warning systems, integrated water resources management, agro-forestry, and coastal reforestation of mangroves (IPCC, 2014).

Mitigation efforts are focused on reducing the sources and augmenting the sinks (areas that absorb carbon dioxide, such as forests and oceans) of greenhouse gases. Effective mitigation benefits not only human systems but also all natural systems. Reduction in greenhouse gas emissions requires concerted efforts nationally and internationally and is likely to be slow, due to the inertia of the global climate system. Therefore, timely action to mitigate drivers of global climate change is critical but hampered by a lack of political commitment, institutional barriers, and technical hurdles.

2.5 Trend of climate variables in Bangladesh

The trend of yearly average temperature, rainfall (mm), humidity, mean maximum and minimum temperature (degree centigrade) were computed from the meteorological data of 1981 to 2012 collected from the meteorological department of Bangladesh. From linear regression analysis it was found that the fluctuation of mean temperature in the defined time ranges (Rahman, 2014). Temperature did not follow sequential increase or decrease which is presented in Figure 1.

Figure 1: Graphical illustration of relationship between year and mean temperature

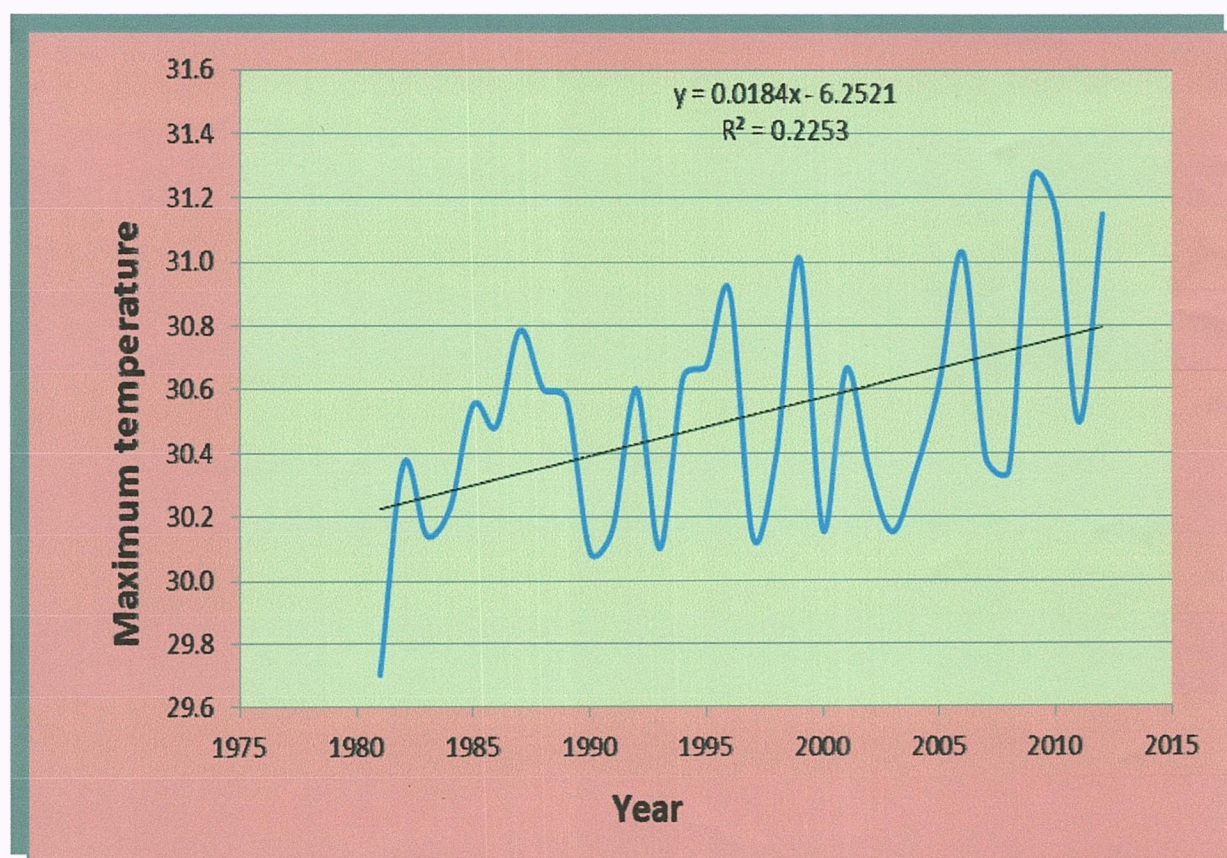


Source: Rahman, 2014

Figure 2 and 3 shows that there is an upward trend of both in mean maximum and minimum temperature. These upward trends showed that temperature is increasing day by day. In 1980 the average temperature was 25.2°C whereas in 2010 it crossed 25.8°C. So, it was found that by 30 years the average temperature has increased 0.6°C.

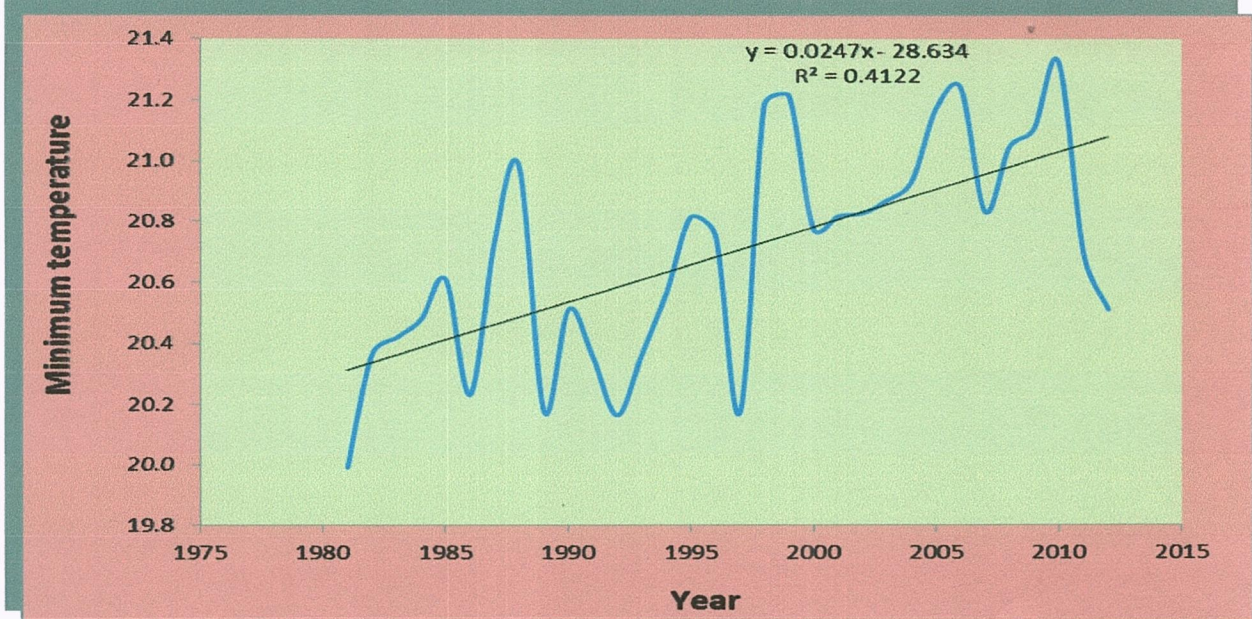
Similarly from analyzing the following figure it is found that maximum temperature in 1980 was 30.2°C or a bit more whereas in 2013 it has raised to 30.8°C. The average minimum temperature also shows the similar trend. In 1980 the average minimum temperature was 20.3°C whereas in 2012 it has raised to 21°C with an increase of 0.7°C.

Figure 2: Graphical illustration of relationship between year and maximum temperature



Source: Rahman, 2014

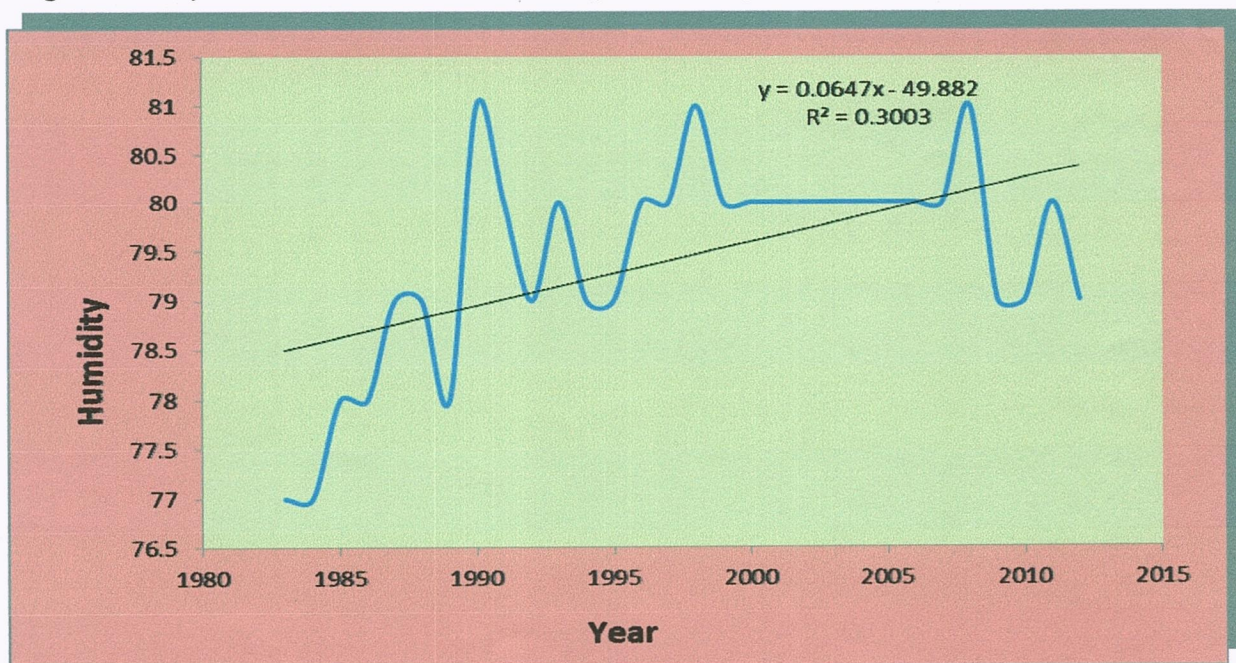
Figure 3: Graphical illustration of relationship between year and minimum temperature



Source: Rahman, 2014

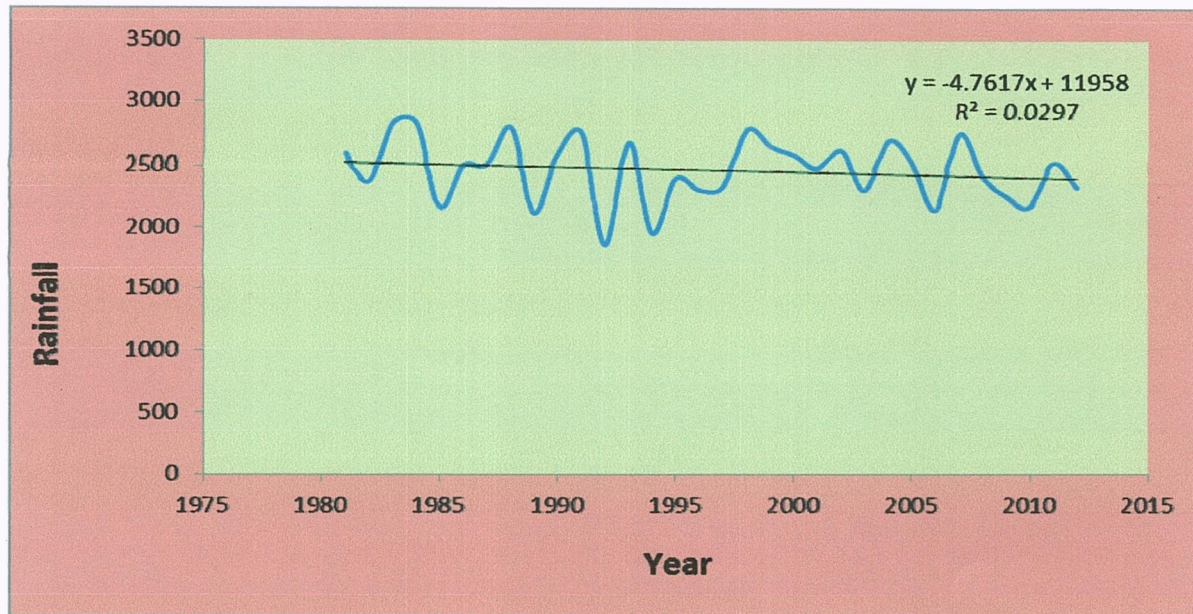
Not only the average temperature or average minimum or maximum temperature, there are an increasing trends in humidity is clearly visible (Figure 4). In 1988 the humidity of air was increased at 80.1. On the other hand, the average rainfall shows a decreasing trend. The average rainfall in 1980 was 2500 mm per year whereas in 2010 it has fall down to 2100 mm per year (Figure 5).

Figure 4: Graphical illustration of relationship between year and humidity



Source: Rahman, 2014

Figure 5: Graphical illustration of relationship between year and rainfall



Source: Rahman, 2014

Due to reduction of rainfall the probability of draughts has been increased. Due to draught there might be shortage of ground water, increase of salinity which might severely affect the climate again.

2.6 Policy Makers

Policy makers should know how to prevent or adapt to climate change with minimum costs to the government. They should also know well how to negotiate with regional and global countries or organizations as they may be national representatives regarding the issue. Policy makers can be political leaders, regional planners, high government officials, fund providers, academic experts in helping policy making or advisory bodies responsible for managing the issue. Some of them may be responsible for executing any national, international or unilateral commitments on climate change or simply concerned with avoiding the risks of catastrophic damage from climate change related events or some of them may be related with the issue for tackling the climate change problem in future.

It is supposed that policy makers are the key players among all stakeholders for handling climate change (Mendelow, 1991). Hence, the present study bears immense significance as it has been conducted on the understanding and responses of the above policy makers and thereafter proposes recommendations to manage the problem in Bangladesh.

Methodology of the Study

Both primary and secondary data has been used for the research. Quantitative approach has been adopted to explore a variety of potentially salient influences on perceptions of and behavioral responses of policy makers to climate change. It is clear that this study is built on the findings from previous research, by providing a more inter-disciplinary and in-depth analysis of policy makers understanding and response to climate change in Bangladesh. Quantitative approach has been used in the research work in order to give an insight into how individuals construct discourses of understanding and behavior, and to analyze a range of influences on understanding and behavior. Quantitative methods are generally associated with a 'positivist' paradigm; while qualitative methods are more typically grounded in a 'constructivist' epistemology. However, while these associations are often present, they should not imply that qualitative and quantitative methods are essentially incommensurate (Bryman, 1988).

To know about the policymakers understanding and response to climate change in Bangladesh the data was collected from the policy makers who include Members of Parliament (Standing Committee Member), government officials from joint secretary/equivalents to additional secretary, advisory bodies, academicians or experts who helps in policy making in the arena of climate change. Data has been collected from 61 respondents using Purposive Random Sampling Method from the primary source.

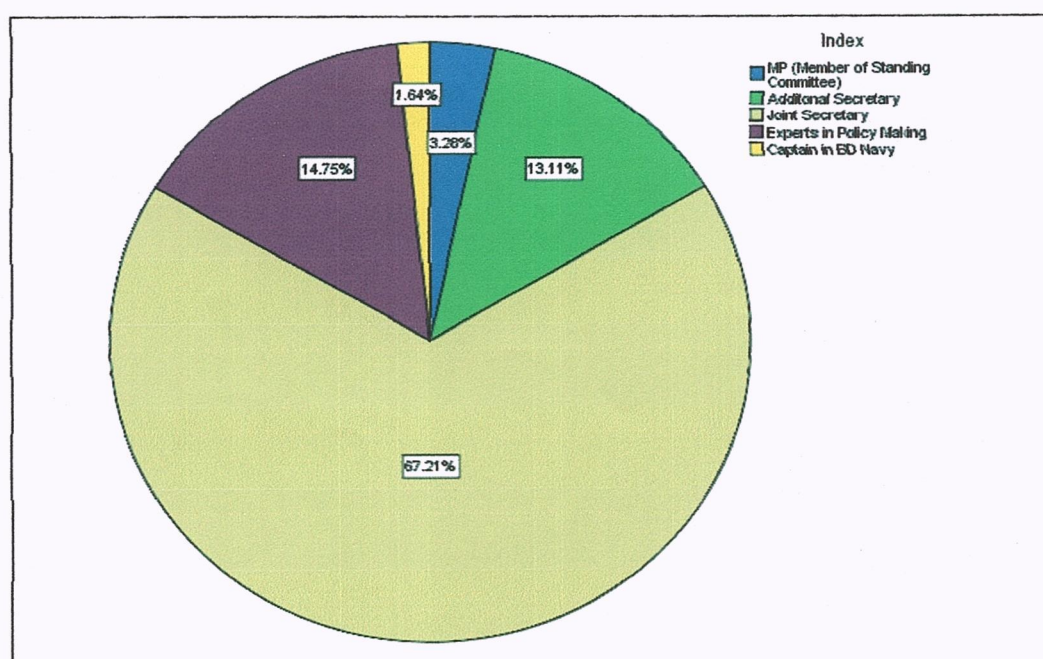
The interview schedule for collection of data has been finalized after pre-test and then the survey has been conducted neutrally. All data has been quantified and thereafter analyzed through descriptive, tables, diagrams, picture cause and effect relationship, frequencies and principal components analysis. For principal components analyses, statistical software SPSS has been used in the research work which has added extra value to the study.

Discussion and Analysis

As mentioned by IPCC, 2014 in recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate. Climate Change as a major issue needs to be addressed properly. To address the issue effectively and efficiently holistic approach should be needed. For effective policy formulation and implementation clear understanding regarding climate is crucial. Without in depth knowledge on climate change issues it is not possible to address properly.

The data is analyzed from different perspective which covers the threat of climate change to human societies, non-human societies as well as eco-system, economy, food security, infrastructure, development, poverty reduction, global warming etc. For better understanding on climate change category of the respondents (Total 61) need to be analyzed first. Figure 6 shows the category of respondents by designation:

Figure 6: Category of respondents by designation

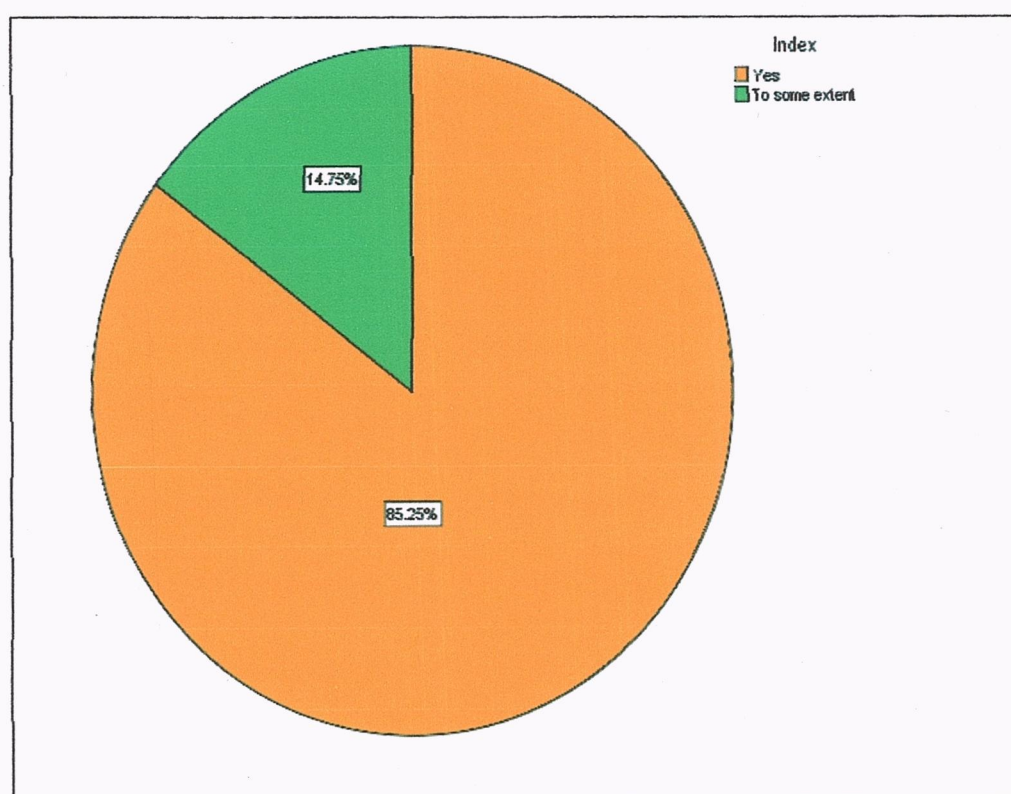


Source: Questionnaire Survey, 2015

The respondents combined both male and female where 53 respondents were male (86.89%) and 8 respondents were female (13.11%). Both genders have been covered in the research work so that it can be representative and more informative as well as gender neutral.

Since 2008, every year an average of 27 million people were forced to leave their homes as a result of disaster. Between 2008 and 2013, 46 million people were displaced in South Asia alone. According to IPCC, climate change is predicted to further increase the frequency and intensity of disasters, raise sea level, and change rainfall variability, threatening human settlement, infrastructure, natural resources, and livelihood and promoting even higher levels of population movements.

Figure 7: Opinion of respondents regarding climate change threat and human society

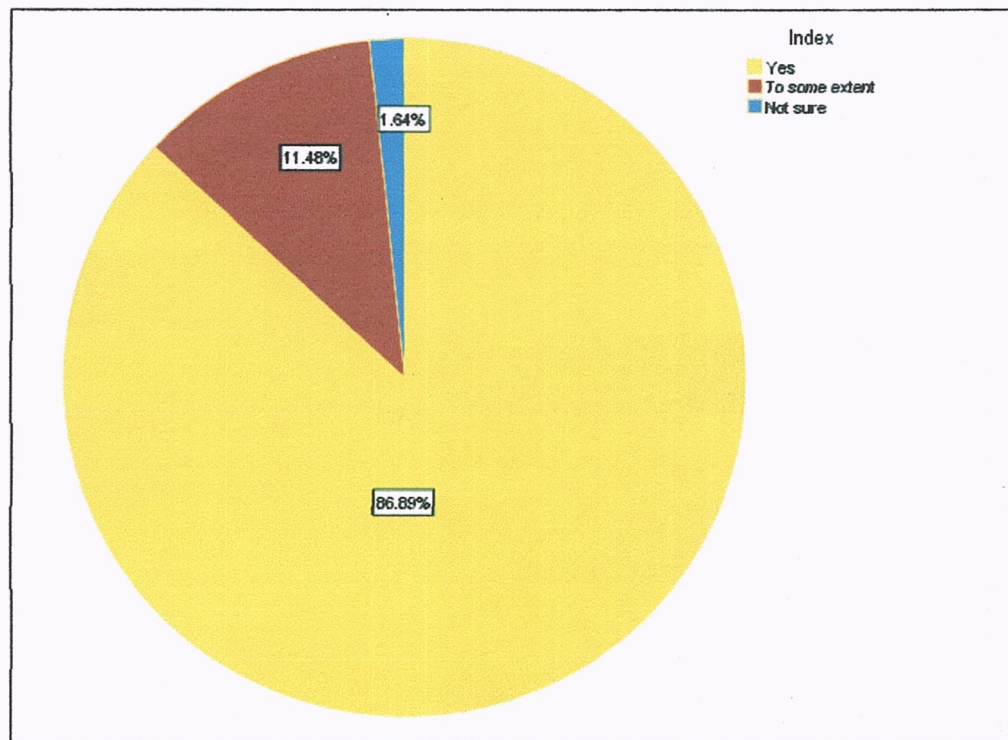


Source: Questionnaire Survey, 2015

Regarding the threat of climate change to human society the respondents were asked in five categories; either they think that the climate change is a threat or not or to some extent. They were also asked to tell whether they are not sure or they do not have any comment regarding this issue. The response was quite clear. 85.25% of the respondents think that

climate change is a clear threat to human society whereas only 14.75% respondents replied it can threat to human society to some extent (Figure 7).

Figure 8: Opinion on impact of climate change on non-human world/ eco-system



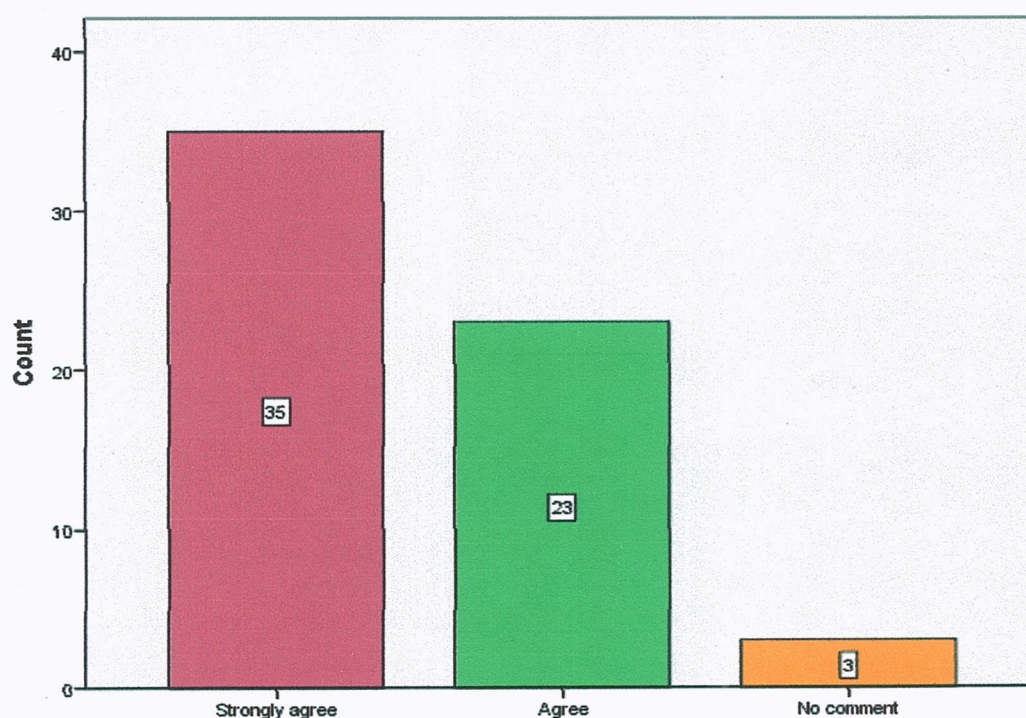
Source: Questionnaire Survey, 2015

The statistics show that climate change is a clear threat to human society. Subsequently it was asked that is it also a threat to non-human world or the ecosystem? Ecosystem means the interaction of all living and non-living things around the world. If there is any imbalance in the ecosystem total environment will be imbalanced. In response to this question 86.89% respondents clearly replied that the climate change will affect the non-human world or the natural ecosystem whereas 11.48% respondents said it will affect the non-human world or ecosystem to some extent. Only 1.64% respondents said that they are not sure about the impact of climate change on non-human world or the ecosystem (Figure 8). No one replied negatively. So, it is very much clear that the non-human world or the ecosystem will be clearly affected by the climate change according to the opinion of the respondents.

Now the question arises is the climate change is induced by human or is it the natural phenomenon. Hence, the respondents were asked how much they support the proposition 'climate change is induced by human'. In this regard it was asked that either they agree or

disagree the proposition or they strongly agree or strongly disagree the proposition or either they have no comment. Among the respondents no one replied negatively, i.e. no one disagree that climate change is induced by human. Only 3 respondent (4.91%) respondent said that they have no comment on the issues. Figure 9 shows that 35 respondents (57.38%) out of the total 61 respondents strongly agree and 23 respondents (37.7%) agree that it is induced by human.

Figure 9: Responses regarding climate change induction by human

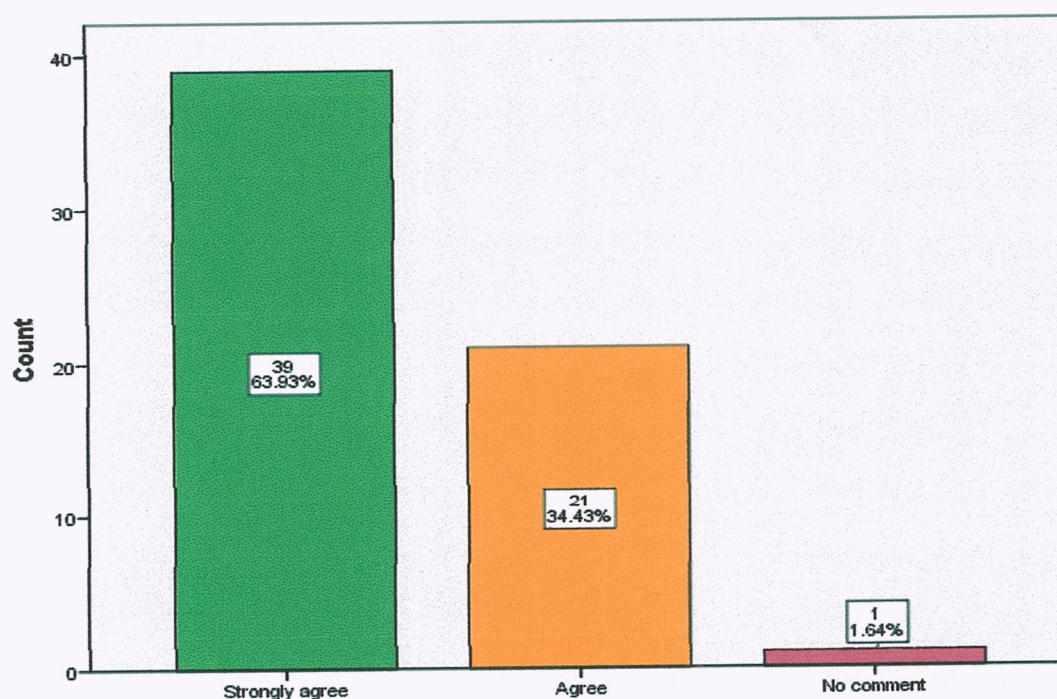


Source: Questionnaire Survey, 2015

As it is very clear that human activities all over the world is responsible for climate change and to reduce the impact of climate change clear understanding about it at policy making level is crucial. It is also supported by various statements by the world leaders at different time. So, it is warned by the Secretary General, Ban Ki Moon that political will needs to be mobilized to reach an ambitious agreed outcome based on science at the UN climate talks in Copenhagen. There is little time left. The opportunity and responsibility to avoid catastrophic climate change is in your hands (New Age, 2011).

Literature shows that Bangladesh will be the worst victim of climate change. Chimalaya (2011) mentioned that the country has already begun to experience the effects of the climate change as flood periods have become longer and the cyclones, droughts and earth quakes that hit the country cause greater devastation and adversely affecting the country's agriculture and land, and challenging water resources, occupational dislocations, food, health, energy and urban planning. To assess this statement it was asked to the respondents that do they agree climate change would severely affect the natural resources or natural system commonly known as ecosystem. In response to that 63.93% respondents said that they strongly agree and 34.43% agree that natural resources will be affected by climate change whereas 1.64% had no comment on it (Figure 10). Surprisingly there was none who opined against the statement.

Figure 10: Responses regarding effect of climate change on natural resources/natural system

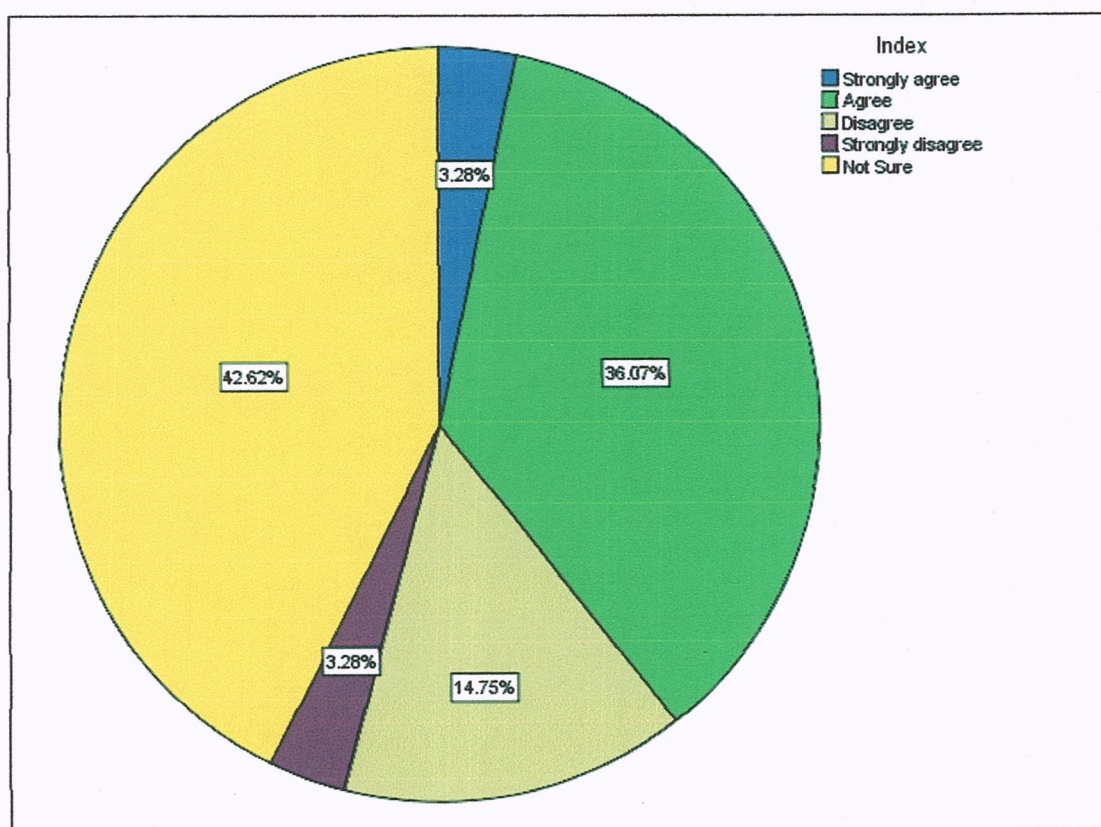


Source: Questionnaire Survey, 2015

From this statistics, it can be clearly concluded that climate change will severely affect the natural resources as well as the ecosystem. By the end of the century, Bangladesh is set to disappear under the waves as mentioned by US government's NASA space agency. The International Panel on Climate Change (IPCC) predicted that by 2050, Bangladesh is on

course to lose 17% of its land and 30% of its food production and as a result poverty will increase (Planetizen, 2008; The Independent, 2008). Another report of IPCC assumes that 14% of the land of the country will go under water by 2028. In response to their opinion on the above statement of IPCC 3.28% of the respondents strongly agree and 36.07% agree the statement of the report. Only 3.28% respondents strongly disagree and 14.75% respondents disagree the statement and the rest 42.62% respondents are not sure about the impact of climate change on the issue (Figure 11).

Figure 11: Responses regarding the question inundation due to climate change

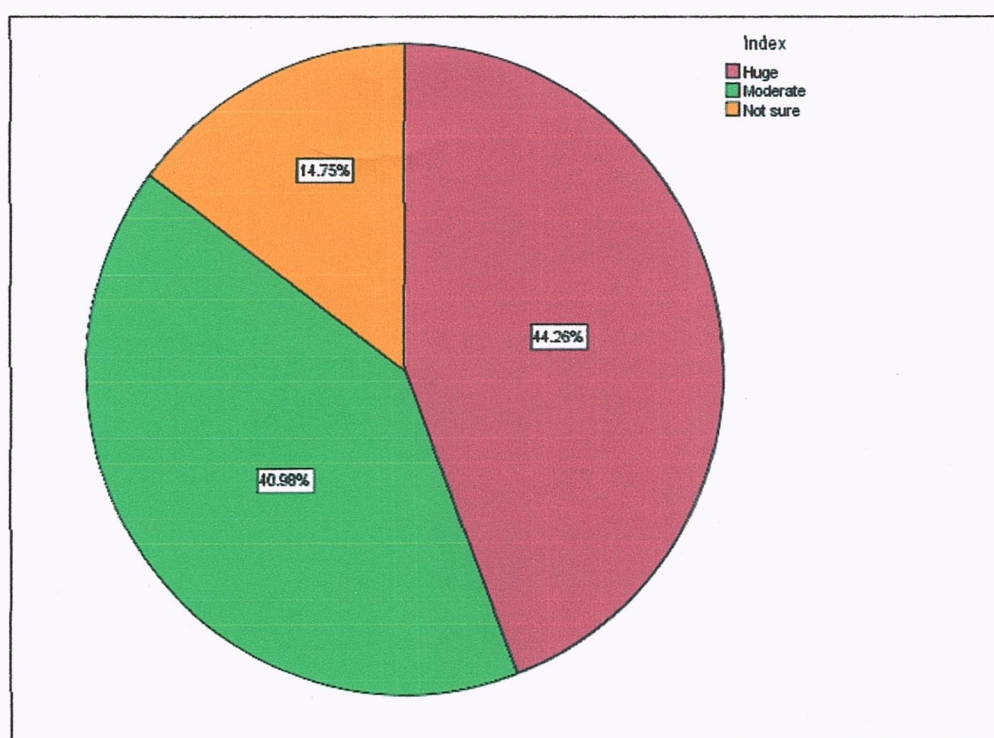


Source: Questionnaire Survey, 2015

Despite diversified agricultural production, a burgeoning ready-made garments sector, large-scale international labour migration, and effective small-scale business development supported by microfinance Bangladesh still has been identified as one of the countries to be most adversely affected by global climate change. It is also supported by the study. The study shows that 61 respondents at policy formulation and policy implementation level were asked about the effect of climate change on economy, food security and

infrastructure. The respondents were asked about the scale of impact i.e. huge, moderate, no effect or not sure about the impact. In response to this query 44.26% respondents think that climate change has huge impact on economy, food security and infrastructure, 40.98% respondents think that it will moderately affect the economy, food security and infrastructure and, 14.75% are not sure about the impact of climate change on economy, infrastructure and food security (Figure 12). Surprising there is none who replied that climate change has no impact on economy, food security and infrastructure. It indicates that climate change seriously affect the economy, infrastructure, food security and other related development issues which needs to be addressed properly.

Figure 12: Responses regarding the question impact of climate change on economy, food security and infrastructure



Source: Questionnaire Survey, 2015

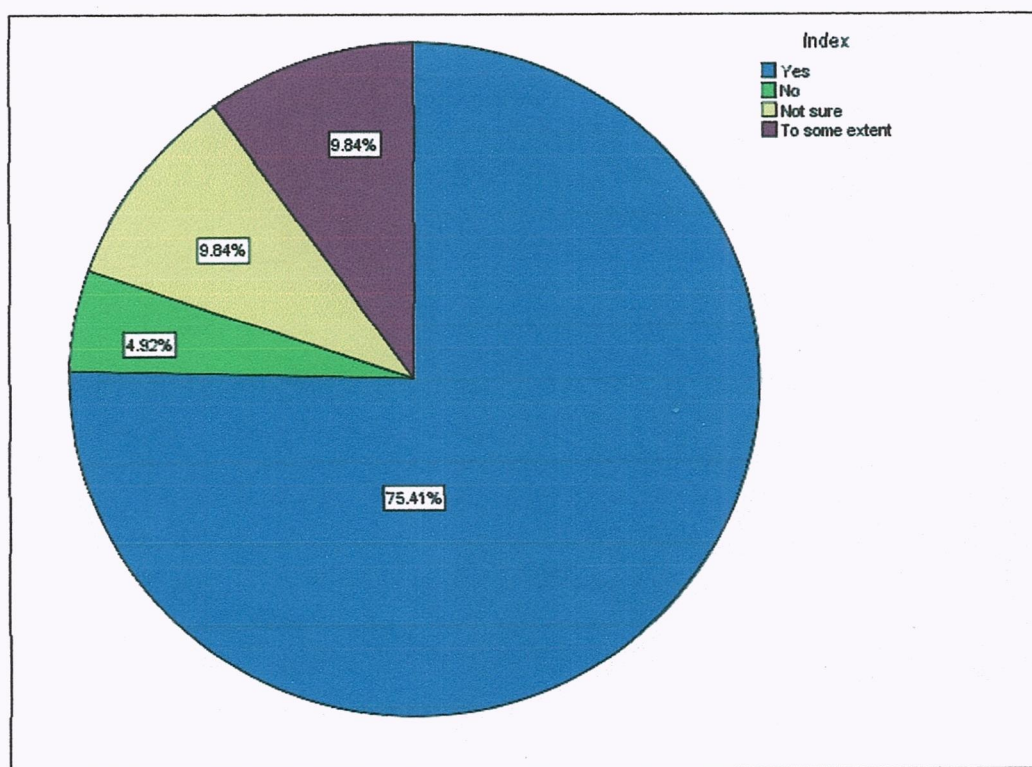
Now question arises is it the only Bangladesh will suffer from the impact of climate change? Literature supports that climate change is a global issue from economic, global and social perspective. Lancet (2011); Young et al. (2002); Yongyut (2009) says that climate change is

the biggest global health threat of the 21st century and is increasingly recognized as a public health priority. It is also supported by others study. Climatic variables are vital environmental factors, which establish ecological niches of tree species and their patterns of distribution (IPCC, 2001; Yongyut, 2009).

Species-distribution Models (SDMs), and forecasted global climate data, indicated that up to 43% of a sample of tree species in Amazonia could become non-viable by 2095 (Yongyut, 2009).

Based on the literature when it was asked that whether climate change is a national or global issue or not; 75.41% respondents replied positively and 9.84% replied that to some extent climate change is a global political and social issue. 9.84% respondents are not sure about the negative impact of climate change. Only 4.92% respondents say that it is not national or global political and social issue that is very negligible (Figure 13).

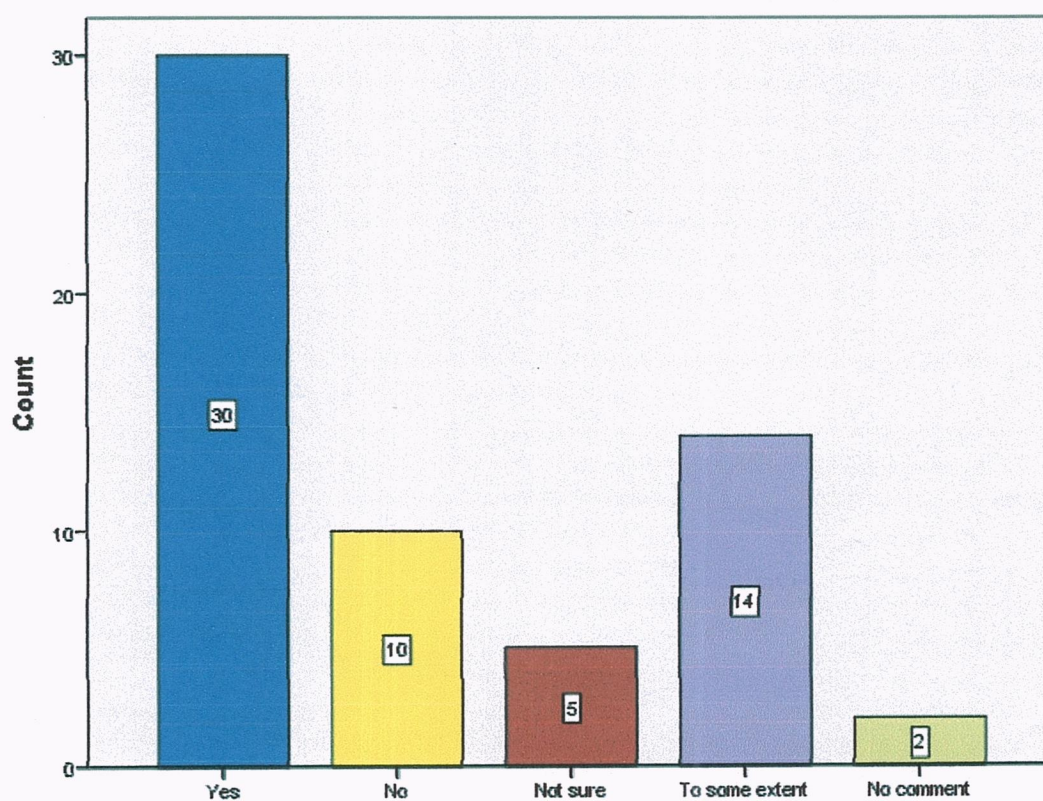
Figure 13: Responses regarding the question climate change issue in national and global political and social arena



Source: Questionnaire Survey, 2015

Climate change is clearly linked to the development. Development is a cross-cutting issue which covers infrastructure, economy, food security, agriculture, health, and bio-diversity as well as cultural diversity. It is also supported by the 6th Five Year Plan, Perspective Plan 2010-2021. It is mentioned in the perspective plan that effective operational procedures in different ministries/ divisions/agencies to be developed to cope up with the climate change impact. Bangladesh is committed to conservation and enhancement of the country's biodiversity, which has been severely affected in terms of species losses and threatened species. The Biodiversity National Assessment and Programme of Action 2020 continue collection of information and analyses on the current state of biodiversity in the country and outline an action plan (Government of Bangladesh, 2012).

Figure 14: Responses regarding climate change, development and poverty reduction issue



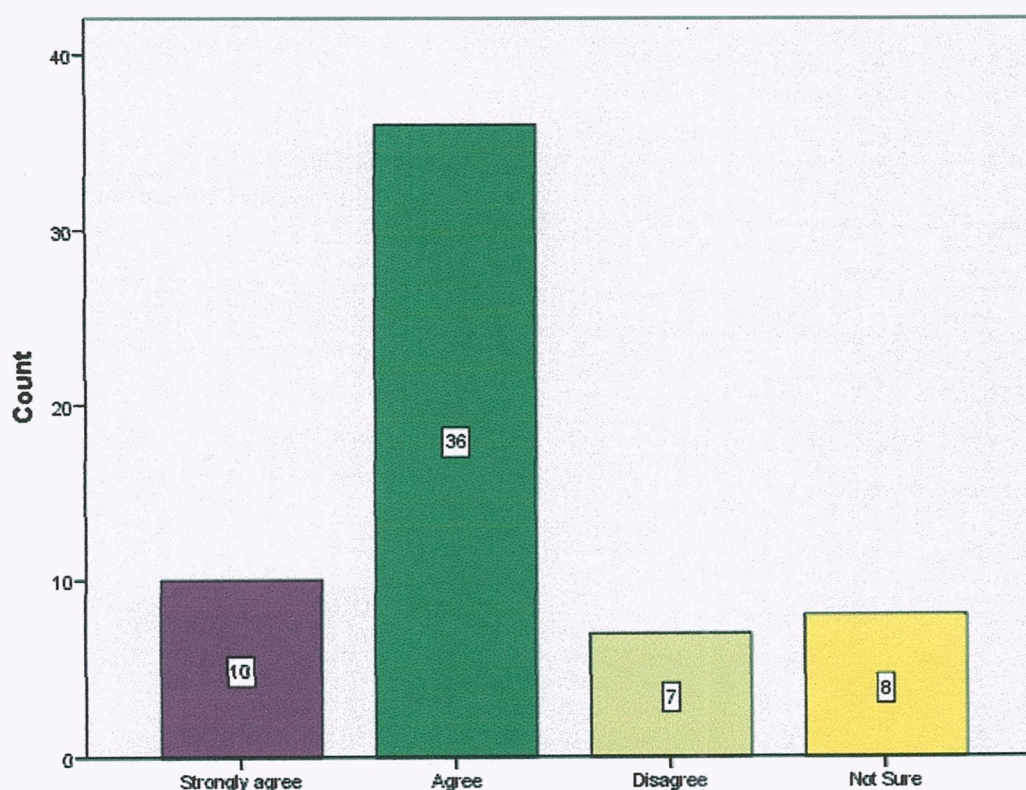
Source: Questionnaire Survey, 2015

As stated in the 6th Five Year Plan poverty, development and climate change have been given importance as a thrust sector. To have an idea the policy makers were asked to mention their views in that issue. In response to a question can climate change be a central issue to development and poverty reduction agenda the answer was manifold (Figure 14).

Among the respondents 30 respondents (49.18%) think that climate change is a central issue to development and poverty reduction. 14 respondents (22.95%) replied that to some extent climate change is a central issue to development and poverty reduction. Only 10 respondents (16.39%) replied negatively regarding the linkage of climate change, development and poverty reduction; 8.20% (5 respondents) are not sure about the relation of climate change, development and poverty reduction and only 3.28% (2 respondent) have made no comment on it.

The respondents were asked whether they support the assumption that climate change also put effects on cultural, psychological and ethical matters. In response to the question, 10 respondents (16.39%) strongly agree while 36 respondents (59.02%) respondents agree to the proposition. 7 respondent (11.48%) disagree and 8 respondent (13.11%) respondents are not sure about the effects of climate change on cultural, psychological and ethical matters. The following figure can be seen (Figure 15):

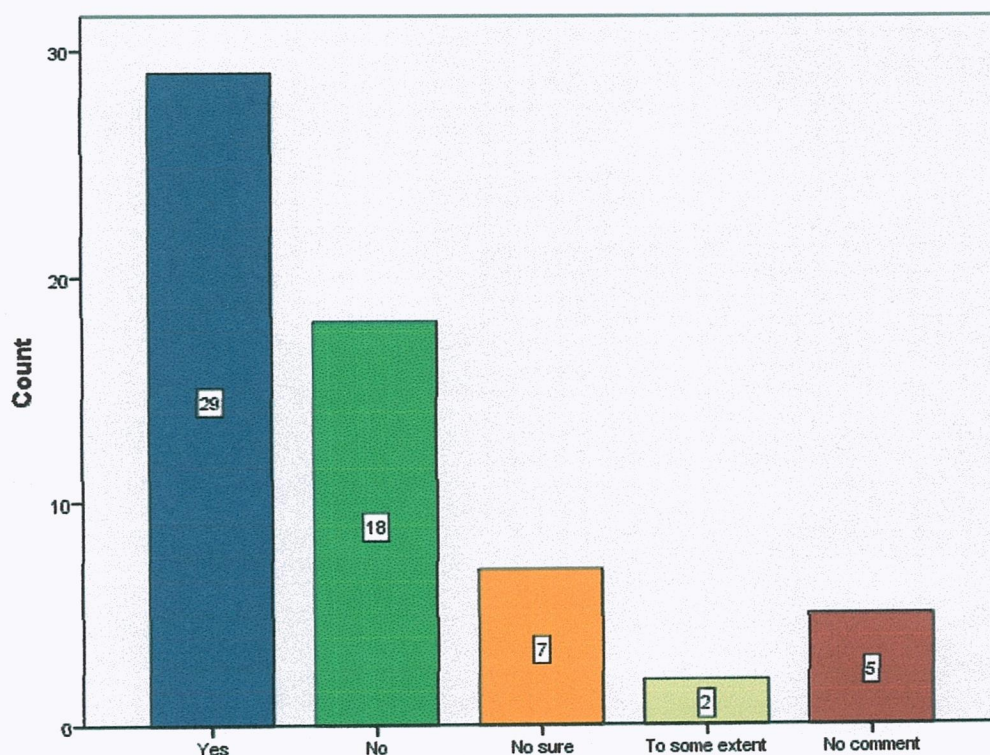
Figure 15: Responses regarding effects of climate change on cultural, psychological and ethical matters



Source: Questionnaire Survey, 2015

Governments around the world facing the problem of global warming and climate change (GWCC), the greatest challenges facing mostly caused by greenhouse gas concentrations due to human activities such as burning fossil fuels (IPCC, 2007b). It is also supported by multiple surveys of scientists' opinion on GWCC that it is real and human induced (Cook et al., 2013). Despite these indicators of a largely unified scientific agreement on GWCC, there are different public perceptions and even opposite opinions about the science community's assessment on the existence and fundamental cause of GWCC (Leisurowitz et al., 2012).

Figure 16: Opinion regarding public perception between climate change and global warming



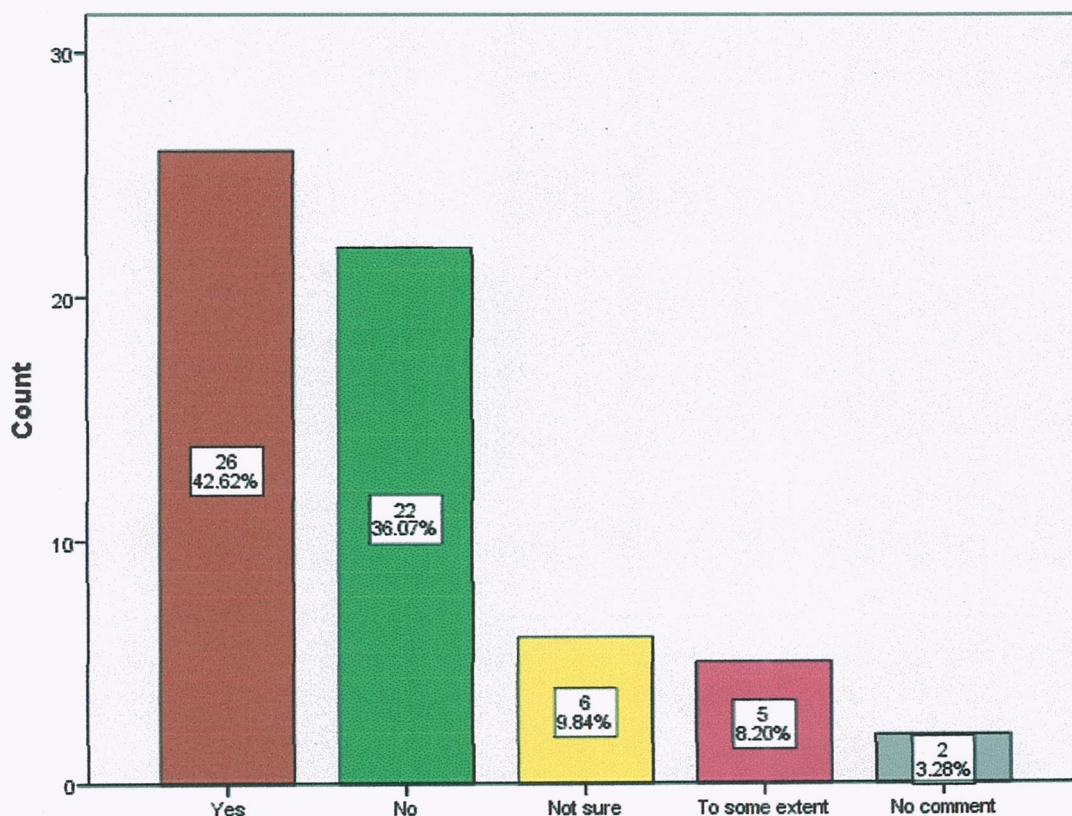
Source: Questionnaire Survey, 2015

Based on the above statistics of climate change and global warming the response were manifold (Figure 16). Among the respondents 29 respondents (47.54%) replied that public differ climate change and global warming, 2 respondent (3.28%) said that to some extent climate change and global warming are different in the public perspective. 7 respondents (11.48%) are not sure that climate change and global warming are different and 5 (8.20%) of the respondents have no comment on the issue. From the above discussion it is found

that almost half of the participants think that public perception is different regarding climate change and global warming.

Literature shows that human interference with the climate system is occurring and climate change poses risks for human and natural systems (IPCC, 2014). Subsequently it was asked to the respondents that do they think that climate change is a personal risk. In response to this question 42.62% of the respondents think that climate change can be a personal risk, 8.20% of the respondents think that climate change may be a personal risk to some extent and 9.84% of the respondents are not sure about it. 36.07% of the respondents think that climate change is not a personal risk whereas 3.28% have no comment on it (Figure 17).

Figure 17: Opinion of respondents on climate change and personal risk

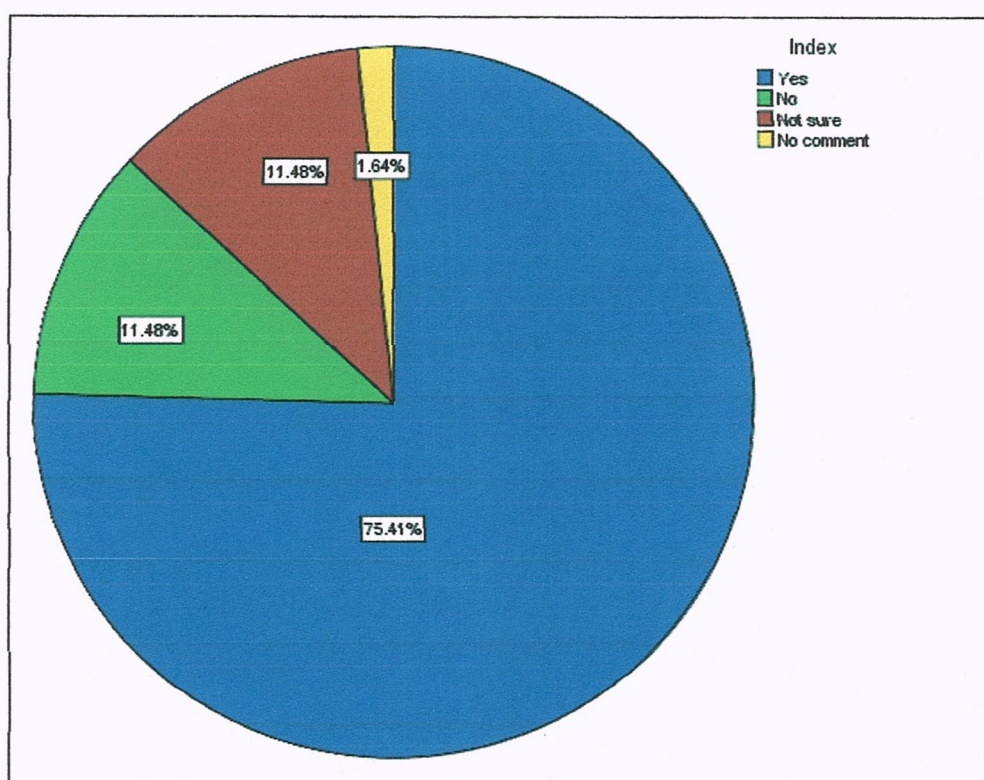


Source: Questionnaire Survey, 2015

Like many other developing countries Bangladesh will be one of the worst victims of climate change. A study conducted by the Action Aid Research shows that Bangladesh ranked fifth most vulnerable country to climate change and hunger. In the World Risk Index 2011, jointly conducted by United Nations University (UNU), Germany and the Institute of Environment

and Human Security said that Bangladesh ranked sixth among countries that are most vulnerable to natural disasters, while second among the Asian countries (Daily Star, 2011). By 2030, the best estimate projection is for monsoon rainfall to increase by 10 to 15% and winter rainfall by 5 to 10% (Kafiluddin, 2005). Regarding the aspect it was asked to the respondents that do they think climate change is a serious problem for Bangladesh like other countries or not. In response 75.41% respondents think that climate change is a serious problem for Bangladesh like other countries (Figure 18).

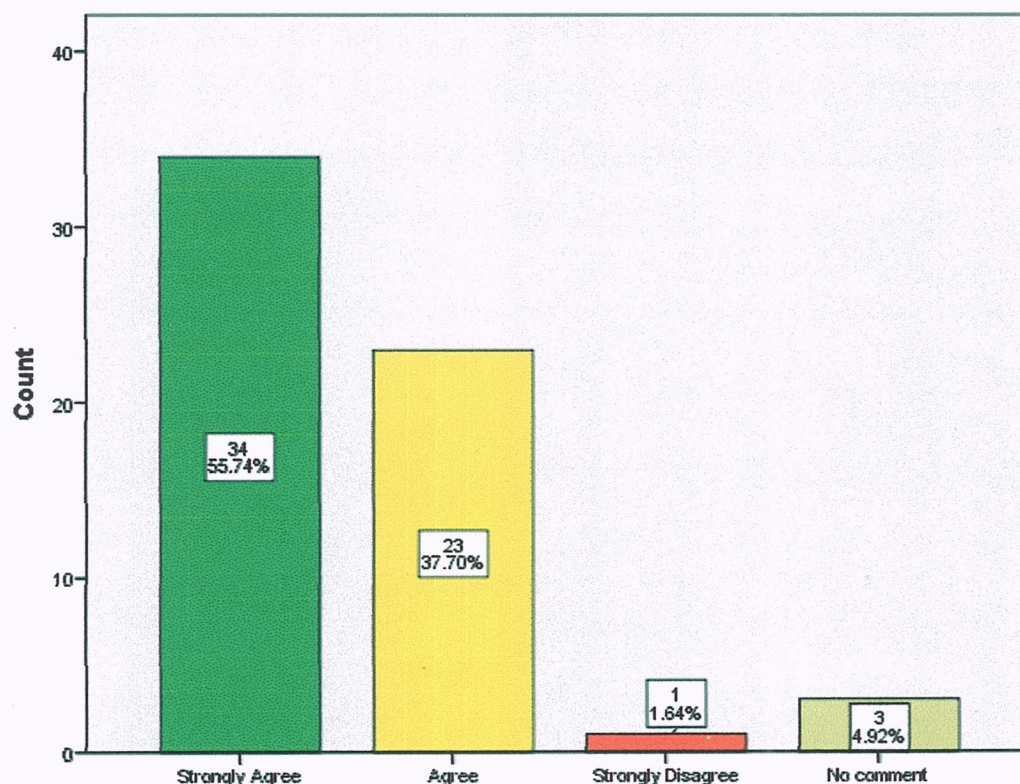
Figure 18: Opinion of respondents on whether climate change is serious problem for Bangladesh like other countries



Source: Questionnaire Survey, 2015

Among the respondents 11.48% think that climate change is not a serious problem for Bangladesh and same number (11.48%) of the respondents are not sure about the proposition. Only 1.64% have no comment on the issue (Figure 18). As majority of the respondents think that climate change is a serious problem for Bangladesh so it should be addressed with the utmost importance both from national and international level. The country should take initiative for mitigating this problem engaging all of its stakeholders including international communities.

Figure 19: Opinion of respondents on whether the risk of climate change needs to be addressed in managing climate change



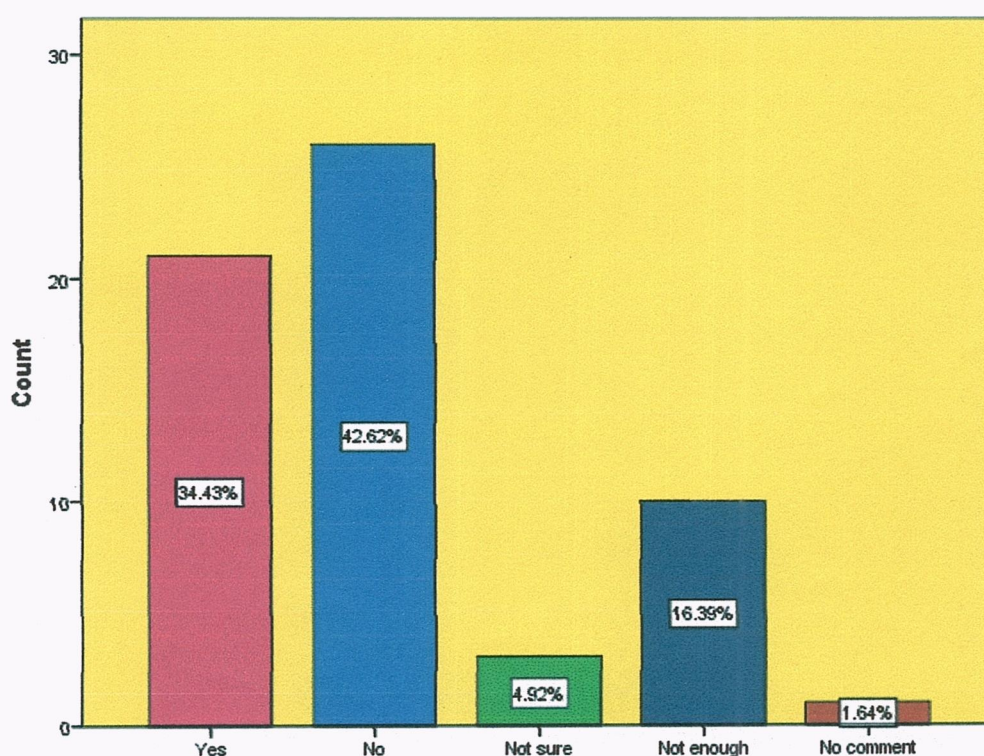
Source: Questionnaire Survey, 2015

Regarding opinion on the assumption 'to manage climate change, the risks of climate change need to be addressed', the response covers almost all the category. 55.74% of the respondents strongly agree and 37.70% agree that to manage climate change its risks of need to be addressed Figure 19). The response is probably so because without addressing the risks, other steps will bring less results. If the risks are addressed properly, then the effects of climate change will be reduced to a great extent. Only 1.64% respondents strongly disagree with the assumption while 4.92% respondents made no comment.

Bangladesh has developed some capacity for dealing with the impacts of climate change at the national level, and policy response options have been mobilized that deal with vulnerability reduction to environmental variability in general, and more recently, to climate change in particular. Bangladesh has formulated 10 years Climate Change Action Plan (2009-2018), Comprehensive Disaster Management Plan, Disaster Management Act 2012, and many other laws, rules and regulation to adapt with the climate change and mitigate climate

change. In these circumstances, the respondents were asked do they think that there are prevailing necessary strategies/policies/programme to address the issue of climate change in Bangladesh the response covers almost all the category. Among the respondents 34.43% think that prevailing strategy/ policy/ program is enough to address the issue of climate change in Bangladesh. 42.62% respondents replied negatively and 16.39% of the respondents think that the existing strategy, policy, programmes are not enough to meet the challenges of climate change. 4.92% of the respondents are not sure whether the prevailing strategies/policies/programmes are enough or not. 1.64% respondents said that they have no comment regarding this question (Figure: 20). Probably the respondents thought if the prevailing strategies/policies/programmes were enough then the effects were not so high. Hence, from the opinion of the respondents it can be found that to manage climate change Bangladesh needs more strategy, policy and programmes.

Figure 20: Opinion of respondents on prevailing strategy/ policy/ programme to address climate change in Bangladesh



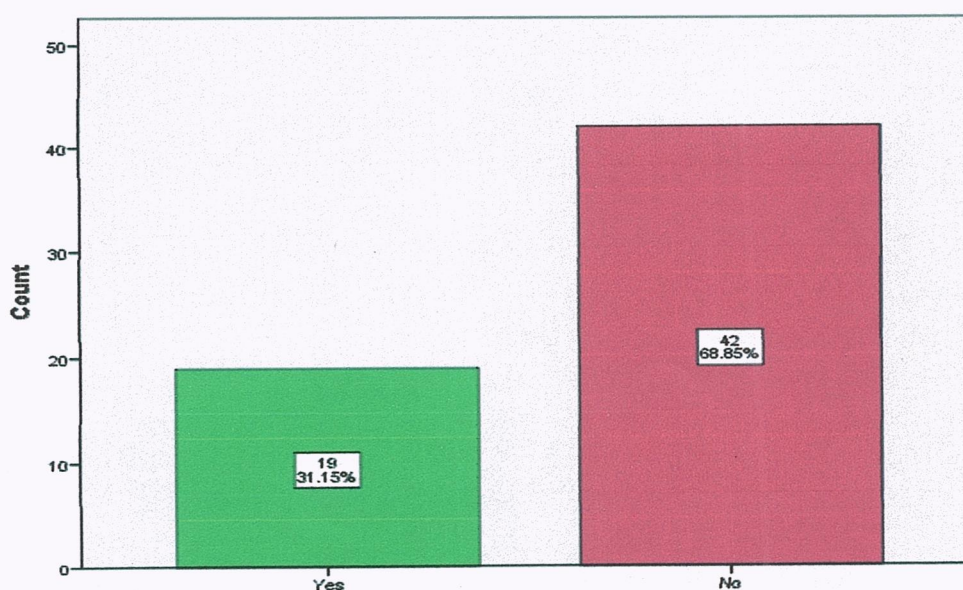
Source: Questionnaire Survey, 2015

To meet the current challenges of climate change policy makers need to be equipped. They should have clear idea about policy formulation. Capacity development can be made through participation in seminar, workshop, training and direct work at implementation level. To have an assessment on the issue of training on climate change respondents were asked either they have participated in any national or international training programme on climate change, only 22.95% respondents replied positively. Among the respondents 75.41% replied that they did not participate in any training program on climate change.

From the above discussion it is found there are visible gaps in participating in any training programmes at policy level. Hence, here is a clear lack of understanding on climate change issue at the policy level which may impede to meet the challenges of climate change.

Simultaneously it was asked that either they have participated in any national, regional or global conference on climate change. In response to this question 68.85% respondents have said that they did not attend in any national, regional or global conference whereas 31.15% replied positively (Figure 21). It indicates that policy level participations at any level of conference on climate change are at minimum level which should be increased. If it is not possible at global level it should be arranged at regional and national level and the effective participation of the policy makers should be ensured.

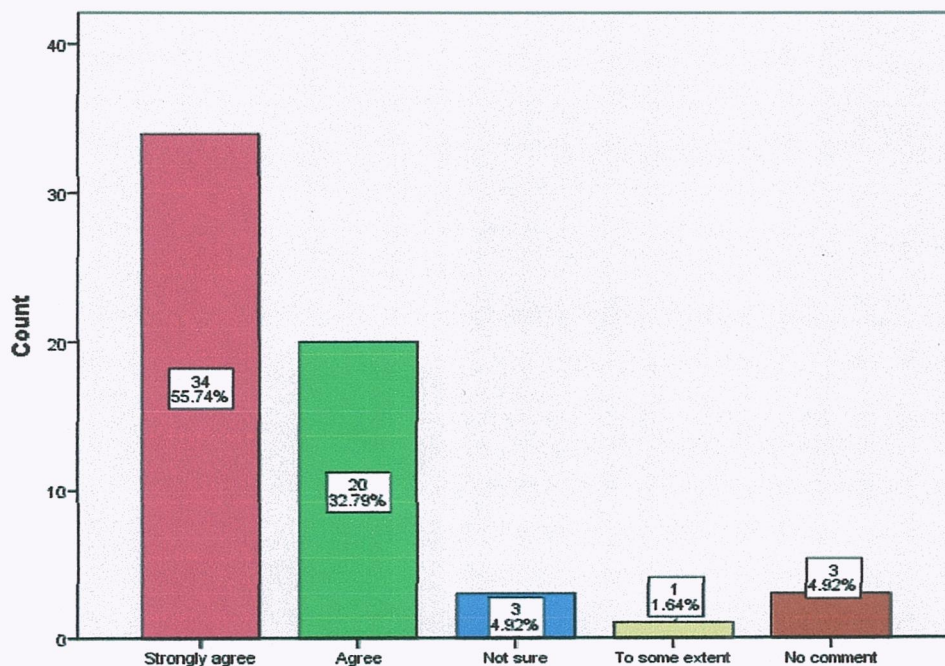
Figure 21: Participation of policy makers on climate change conferences/ programmes at different levels



Source: Questionnaire Survey, 2015

Although a number of policies are prevailing in Bangladesh to address the challenges of climate change. Even then they were asked for their opinion on the statement clear policy is required to address the climate change. Out of 61 respondents 34 (55.74%) strongly agree and 20 (32.79%) also agree that a clear policy is required and 3 respondent (4.92%) are not sure about the requirement of clear policy whereas same number participants (4.92%) have no comment. 1 respondent (1.64%) think that to some extent clear policy is required to address climate change (Figure 22) .

Figure 22: Opinion of respondents on requirement of clear policy to address climate change



Source: Questionnaire Survey, 2015

From the above data it can be assumed that majority of the respondents feel that to manage climate change the country should have clear policy which will help to manage the problem.

There are two ways of managing climate change. These are adaptation and mitigation. IPCC (2014) says that responding to climate related risks involves decision making in a changing world, with continuing uncertainty about the severity and timing of climate impacts and with limits to the effectiveness of adaptation. Adaptation and mitigation choices in the near

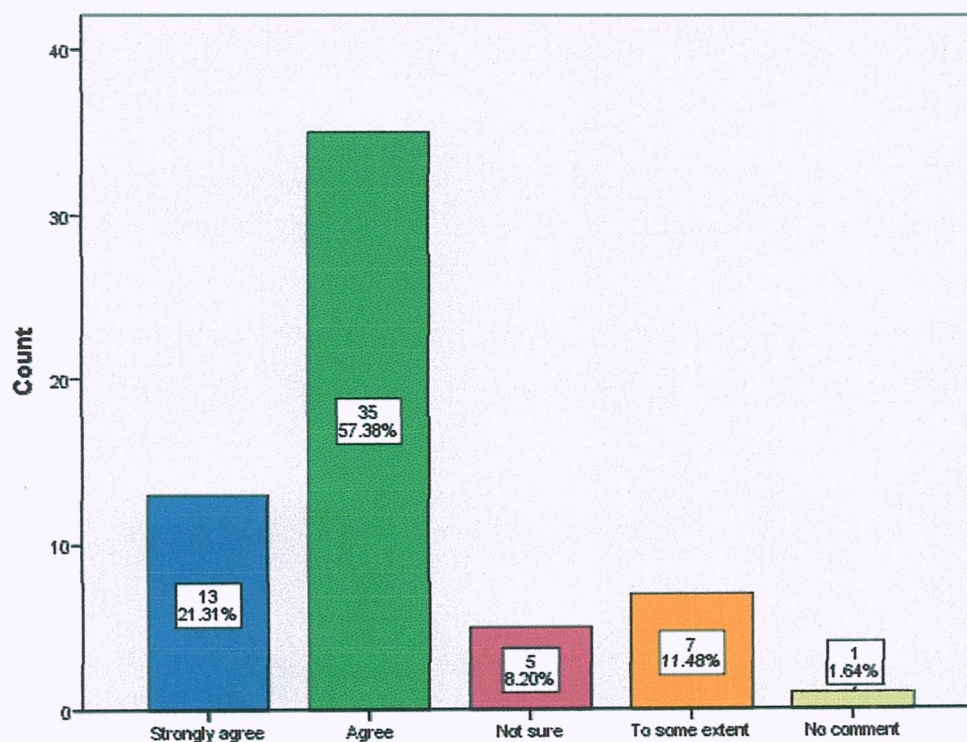
term will affect the risks of climate change throughout the 21st century. Literature also shows that to tackle global warming, most countries of the world have signed an international treaty - the UNFCCC (United Nations Framework Convention on Climate Change) - in June 1992. Till October 2009, 192 parties became members of the UNFCCC. The main purpose of the UNFCCC is to consider what can be done to reduce global warming, and to cope with whatever temperature increases are inevitable. The UNFCCC Secretariat supports all institutions involved in the climate change process.

The UNFCCC highlights two fundamental response strategies to address climate change.

- Adaptation and Mitigation.

While adaptation aims to lessen the adverse impacts of climate change through a wide-range of system-specific actions, mitigation looks at limiting climate change by reducing the emissions of GHGs (greenhouse gases) and by enhancing opportunities. Regarding the adaptation or mitigation the participants were asked that the challenges of climate change are manageable or somehow adaptable and how the policy makers think about it was asked to them.

Figure 23: Opinion of respondents on managing climate change issue

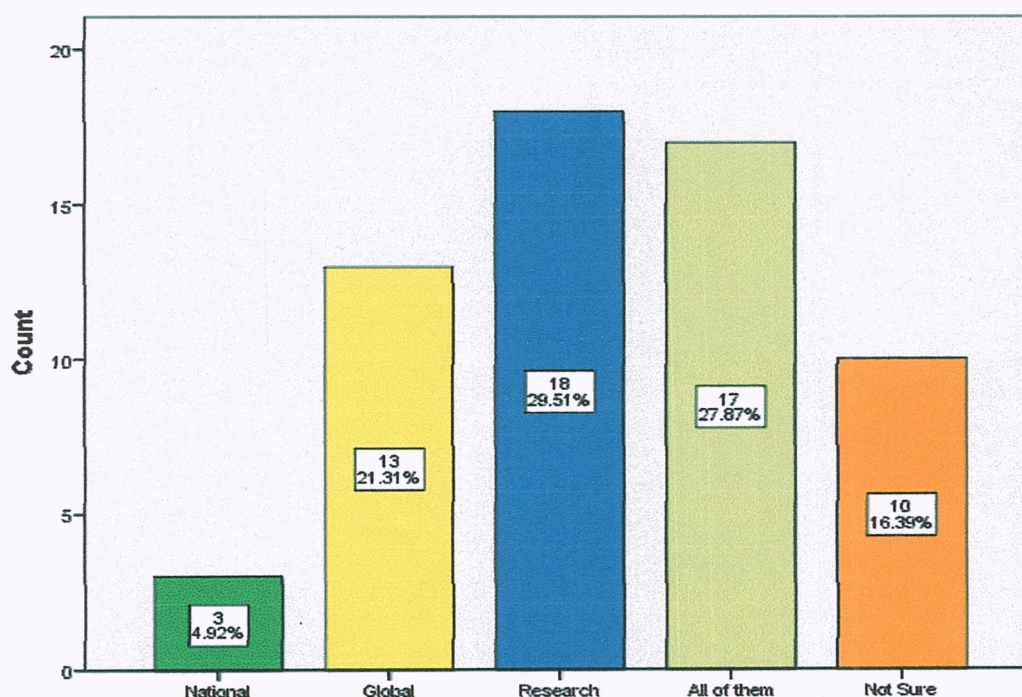


Source: Questionnaire Survey, 2015

In response to that question, among the respondents 21.31% strongly agree and 57.38% agree that climate change is manageable and somehow adaptable. 11.48% of the participants think that it is somehow manageable or somehow adaptable to some extent, 8.20% are not sure about it and only 1.64% has no comment on it (Figure 23). From the responses, it can be said that majority of the respondents believed that in spite of vast impact, climate change can be managed or adapted through proper measures.

To manage climate change requires information for making strategy, policy, programme and projects. Hence, policy makers were asked what sources of information on climate change can be most trustworthy or valuable to them. Regarding the source of information policy makers views were different. Data shows that among the respondents 29.51% think that research data are most trustworthy or valuable, 21.31% think that global statistics on climate change is valuable or trustworthy, 4.92% rely on the national statistics and 27.87% rely on all the sources of information for climate change issue. The rest 16.39% are not sure about the sources of information on climate change (Figure 24).

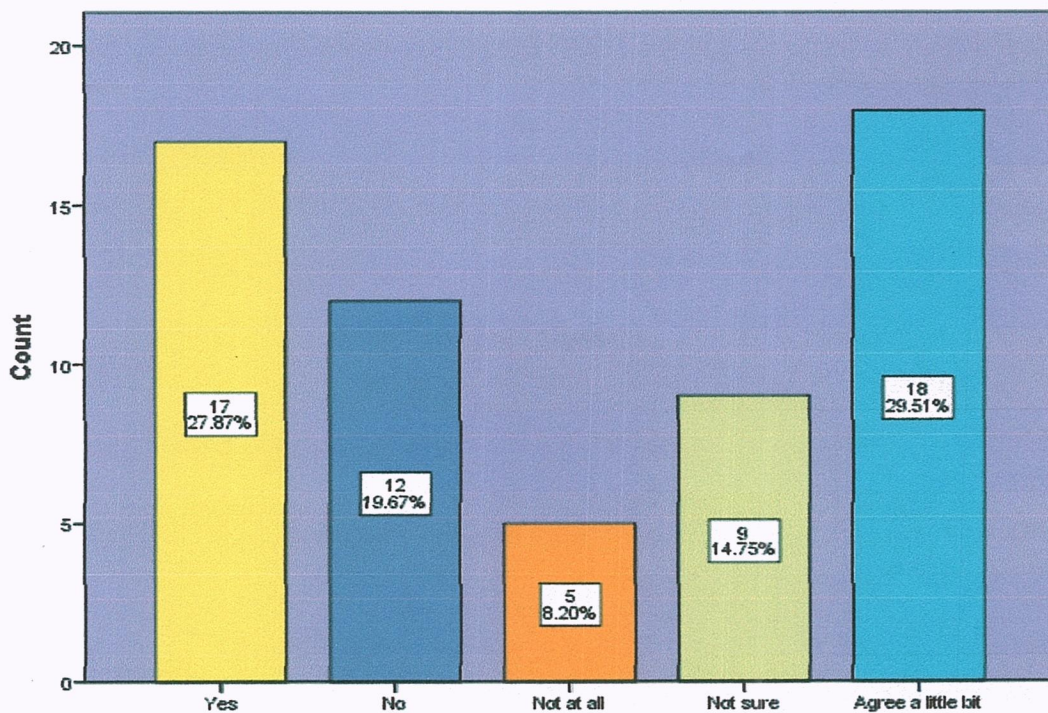
Figure 24: Opinion of the respondents regarding reliable source of information on climate change



Source: Questionnaire Survey, 2015

It is supposed policy makers are the key players among all stakeholders as mentioned by Mendelow (1991) for tackling climate change in Bangladesh. To have assessment the respondents were asked whether the policy makers for tackling climate change are in right track in five scale rating i.e. yes, no, not at all, not sure and agree a little bit.

Figure 25: Opinion of respondents on action of policy makers responsible for climate change



Source: Questionnaire Survey, 2015

Among the respondents 27.87% clearly agree that policy makers are responsible for tackling climate change are in a right way whereas 29.51% agree a little bit. Regarding this issue 19.67% viewed that policy makers are not in right way and 8.19% strongly viewed that the policy makers are not in right way while 14.75% respondents are not sure about the policy makers' track (Figure 25). The reason behind the varied responses on the action of policy makers may be due to various causes like that the problem is unsolved, the problem is aggravating or due to clear common understanding of the field.

For better future world tackling negative impact of climate change is crucial. To tackle it identification of stakeholders related to tackling climate change in Bangladesh is also very important. To assess the responsibility for tackling climate change in Bangladesh it was

asked to the respondents that whom do they think are responsible for tackling climate change; the responses given by the respondents are summarized in Table 1.

Table 1: Opinion of respondents on identification of stakeholder responsible for tackling climate change

Sl. No.	Stakeholder responsible for tackling climate change	Number of Respondents	Percentage (%)
1	Government as a whole	25	37.31
2	Industrialist	7	10.45
3	Policy Makers	6	8.95
4	Ministry of Environment & Forests	5	7.46
5	Other Ministries and Departments	5	7.46
6	International Organizations	4	5.97
7	Civil Society	4	5.97
8	NGO's, CBO's	4	5.97
7	Global Leaders	2	2.99
8	Developed Countries	2	2.99
9	All of the mankind	2	2.99
10	None	1	1.49
Total			100

Source: Questionnaire Survey, 2015

Note: Multiple responses have been considered.

From the table it is clearly understood that from the perspective of climate change tackling area of stakeholders cover a wide list. It is not the exhaustive list; there are many other who are also responsible for tackling climate change. Even then, analyzing the table 1 it is found that among the 61 respondents 25 think that government as a whole is responsible for tackling climate change in Bangladesh; many of the participants think that ministries entrusted with the job of tackling climate change like Ministry of Environment and Forests are responsible for tackling climate change. Some think that as industrialists are producing green house gases and other materials responsible for climate change so they are

responsible for tackling climate change in Bangladesh. Some of the respondents think that as developed countries are key players to produce green house gases and other substances related to climate change so they should take the responsibility for tackling climate change in Bangladesh as part of their social sensibility. They think global leaders as well as international organization should take the responsibility for tackling climate change in Bangladesh. 2 of the respondents think that it is the all who are responsible to tackle climate change so holistic approach to be needed.

With the identification of stakeholders respondents were asked about the areas which might be seriously affected in future by climate change in Bangladesh. The responses show that almost all the sectors will be affected by climate change in Bangladesh namely agriculture, livestock, fisheries, water resources, infrastructure, transport, human and animal health, environment, local small and medium enterprises, industry, bio-diversity, eco-system, and coastal region. This is not the exhaustive list; there are many others. So, it indicates that impact of climate change on Bangladesh is serious as it covers almost all the areas. It can be discussed categorically based on the responses of the respondents which are shown in table 2:

Table 2: Sector wise affect of climate change in future in Bangladesh

Sl. No.	Sector	No. of Respondents	Percentage (%)
1	Agriculture	38	35.85
2	Human Health	18	16.98
3	Environment and eco-system	18	16.98
4	Livestock and Fisheries	14	13.21
5	Transport and infrastructure	8	7.55
6	Coastal Zone	6	5.66
7	Water Sector	4	3.77
Total			100

Source: Questionnaire Survey, 2015

Note: Multiple responses have been considered.

Among the respondents it is found that in most of the cases they have identified more than one sector to be affected in future by climate change in Bangladesh. The statistics shows that among the respondents 35.85% have predicted that agriculture sector would be the worst victim of climate change. As a result Bangladesh may face severe crisis in ensuring food security for all. Next to the agriculture 16.98% of the respondents think that human health will be affected by climate change in Bangladesh. Same percentage of the respondents identified environment and eco-system which will be affected by climate change in Bangladesh and it is followed by livestock and fisheries which is 13.21% of the respondents.

Subsequently the respondents were asked how climate change can be addressed or managed in Bangladesh. A number of suggestions were given by the respondents. Some of the important suggestions are listed below (*Questionnaire Survey, 2015*):

- Holistic and collective approach is needed to address climate change;
- To reduce emission of carbon dioxides make a consensus at national and global level to reduce the green house effect;
- To address the issue of climate change build awareness to the people and implement law and rules on climate change;
- Reduce carbon emission, ensure sustainable development, ensure pollution free manufacture activity;
- Government, individuals, civil society, experts on environment, development, partners and the individuals should work together to reduce the climate change impact on the country;
- It is an international issue. So the problem should be solved by international process; the political leaders as well as public officials should work effectively;
- Climate Change should be integrated in the national planning process;
- Government and private sector can work together;
- Control over factories in the context of carbon release, plantation & green revolution should be ensured;
- By addressing the sustainable development concept during project approval time by the government; the sources of green house gases can be minimized and future impact of climate change can be mitigated;
- Implementation of forestation and plantation, well planned urbanization program in the city area;

- Industrial waste treatment is required, tree plantation is required, use of pesticides should be in suitable manner and use of natural fertilizers be increased;
- Formulation of clear policy, realistic action plan on the basis of the policy, and enforcement of existing laws strictly;
- Awareness building about the adverse effect of climate change;
- It is a global issue. Many aspects are common and should be addressed globally;
- In Bangladesh, tree plantation especially in the coastal area, modernization and limitation of brick field, cleaning the rivers, transfer of tanneries, garbage management are to be urgently addressed;
- Through land zoning manage the nature as intact, ensure optimum use of natural resources, manage all development activities sustainably;
- It can be addressed through education and research; and concerted efforts of the policy makers, scientists and researchers;
- Developed countries are responsible for emission of green house gases. So there will be a need of global consensus on the issue to restrict emissions and adopting mitigation actions through effective consultation with the world leaders who are mainly responsible for climate change and its impact ;
- Impose carbon tax on goods which causes carbon emission;
- Create climate change fund at national/global level, undertake projects/programmes to reduce risks;
- Industrialization with long term planning, establishment of Effluent Treatment Plant, and make awareness of the people to keep the earth safe;
- Adoption, Mitigation, Prevention (to some extent); and
- State, non-state collaboration and global networking through collective approach to keep the world safe and habitable to human and non-human elements.

Major Findings and Recommendations

In line with the objectives of the study, findings of the study have been summarized below and thereafter recommendations have been provided accordingly to address the problem.

5.1 Major Findings of the Study

Climate change is a cross-cutting issue which touches every sphere of life. It is not only a local, national or regional issue; it is also a crucial global issues. The wide areas of climate change are also supported by the present study. In fact, the present study, mainly the primary data analysis validates many other secondary or research findings. Findings of the present study can be summarized as follows:

- The study identifies from the view of policy makers that climate change is a clear threat to human society and it also affect the non-human world or the natural ecosystem severely. More than 80% respondents think that climate change is a clear threat to human society and more than 98% respondents think that it is a clear threat to non-human society as well as to ecosystem;
- Research findings also shows that policy makers think that climate change is induced by human and almost every respondents agree that it will affect the natural resources or natural systems hugely; among the respondents 57.38% strongly agree that climate change is induced by human and 37.7% of the respondents agree that it is induced by human;
- Study shows that 63.93% respondents strongly agree and 34.43% agree that natural resources/natural system will be severely affected by climate change. As no one replied negatively regarding the issue so it needs to be addressed with utmost importance;

- Research findings shows that 3.28% respondents strongly agree while 36.07% respondents agree that due to climate change by 2028 a huge area of land of the country will go under water as assumption made by IPCC. On the other hand, 3.28% respondents strongly disagree and 14.75% respondents disagree to the assumption. 42.62% respondents are not sure about the assumption of IPCC. However, 39.35% respondents think that climate change will take huge land under water as assumption (14%) made by IPCC. The matter requires further intensive study by experts. But if it happens, it will severely affect the agriculture mainly crop production which may lead to food insecurity of huge population. It can be assumed that due to loss of land the economy of the country may be jeopardized;
- It is also found that 44.26% and 40.98% of the respondents think that climate change will affect the economy, food security and infrastructure severely and moderately respectively. Among the respondents 14.75% are not sure about the impact but surprisingly no one replied negatively about the impact of climate change on economy, food security and infrastructure;
- 75.41% of the respondents think that climate change is a socio-political global and national issue. Since study findings indicate that climate change is a cross-cutting issue and global in nature, it is to be addressed not only locally rather international communities need to be engaged. International effort is necessary for adopting the real mitigation and adaptation measures;
- Study findings portray that climate change and development are inversely correlated. 49.18% of the respondents clearly says that climate change hinders development where 22.95% respondents thinks to some extent climate change hinders development leading to poverty of a major portion of its population;
- There is a difference of opinion regarding the public understanding on climate change and global warming. Among the respondents 47.54% clearly say that climate change is different from global warming and 3.28% think that climate change and global warming are to some extent different whereas 29.51% agrees that climate change and global warming are same;

- It is also found that it will not only affect the ecosystem but also affect the personal health; personal risks are also associated with the impact of climate which is clearly supported by the study. 42.62% of the respondents strongly believe and 8.20% respondents to some extent believe that climate change can be a personal risk;
- Research shows that climate change is a serious problem to Bangladesh like many other countries. 75.41% of the respondents agree with this proposition and 11.48% of the respondents are not sure and 11.48% of the respondents replied negatively about the impact of climate change on Bangladesh like other countries;
- To address this issue existence of competent policy/strategy/programme is crucial. Among the respondents 42.62% of the respondents believe that there is no perfect strategy/policy or program to address climate change; 16.39% of the respondents think that present strategy/policy/programmes are not enough to address the issue of climate change; So, 59.01% of the respondents either strongly agree or agree that strong policy is needed to address the challenges of climate change;
- Capacity Building in this arena is an important issue especially at the policy level to develop suitable policy/strategy/programme to address the climate change issue. But study findings show that 75.41% did not get any opportunity to participate in any training programme on climate change and 68.85% respondent did not get opportunity to attend any national, regional or global programme/conference;
- Among the respondents 55.74% strongly agree that there is a clear policy required for climate change, 32.79% agree that a clear policy is required and 1.64% agree to some extent that a clear policy is required. Only 4.92% of the respondents are not sure and the same percentage of respondents has no comment on the requirement of a clear policy on climate change.
- Among the respondents 21.31% strongly agree and 57.38% agree that climate change is manageable and somehow adaptable. 11.48% of the participants think

that it is somehow manageable or somehow adaptable to some extent, 8.20% are not sure about it and only 1.64% has no comment on it.

- As a trustworthy source of information on climate change 29.51% of the respondents think that research findings are trustworthy whereas 21.31% think that global statistics are important and 27.87% of the respondents think that all sources of information on climate change are trustworthy.

5.2 Recommendations

Based on the findings the research team suggests the following recommendations for managing the climate change problem in Bangladesh:

- Formulation of clear policy, realistic action plan on the basis of the policy, enforcement of existing laws strictly are to be ensured.
- Agriculture, human health, environment and eco-system as well as livestock and fisheries sectors will be highly affected by climate change. Hence, it is urgent to prepare proper action plan to prevent the future huge effects of climate change.
- Through the participation of all stakeholders building awareness about the adverse effect of climate change is to be ensured. The MoEF and Climate Change Trust should (CCT) should play necessary role in this field.
- Government, civil society, experts on environment, development partners and the policy makers have to work together with sincere commitment to reduce the impact of climate change to the country;
- As a global issue foreign policy should emphasize on the involvement of global leaders to give proper attention to reduce climate change impact. Bangladesh can make a strong group of climate change sufferer countries with view to press the counties highly responsible for climate change problem to reduce emission of greenhouse gases and to claim proper damages for climate change impacts.
- *Adaptation must be the main focus for a country like Bangladesh; but unless mitigation starts immediately with drastic reduction of greenhouse gases,*

particularly by developed countries, climate change will continue to intensify with ever more adverse impacts, which will make adaptation increasingly difficult. If overall greenhouse gas emissions continue to increase, climate change may become unmanageable in 50 years' time.

- All development initiative needs to be pro-poor, environmental sustainable, climate change and disaster resilient. Therefore, Planning Commission and relevant agencies should develop proper capacity building mechanism to ensure that development projects are designed in a sensible way to increase country's resilience.
- No programs should be taken which worsen the impact of climate change further;
- To enhance capacity building of the officials and members of parliament especially the policy makers scope of training, participation in conference, seminar, and workshop particularly on climate change issues should be increased. In this regard, MoPA and MoEF can arrange foreign or local short courses, seminars or workshops on climate change. BPATC can also play vital role in creating scope of training, seminar or workshop of international standard. The apex institution can also develop an excellent short course or develop a module on climate change of international standard for policy making level officers as well for mid-level officers.
- Research on the issue of climate change should be given stress by the government and the training institutions which will help to provide information and wide concepts to the policy makers. A knowledge repository combining national and global information and knowledge on climate change issues can be created. BPATC can play a crucial role both in the field of research and in making knowledge repository for greater interest of the nation.
- Further research on the related issues of climate change may help to get more specific suggestions to address the issue more effectively and efficiently.

Conclusion

From the study, it is found from the policy makers view that Bangladesh will suffer seriously due to deleterious effects of climate change on human societies, natural systems, resources, economies and infrastructure. Simultaneously, climate change can be a personal risk for the people which can put different sorts of affects on the individuals. In order to better manage the impacts of climate change, policy makers must understand the depth of the problem and need to know the way to address the issues effectively. Through this research, the most vulnerable sectors which will be affected by climate change in Bangladesh have been possible to identify and also a good number of suggestions have been originated for addressing the problem of climate change in Bangladesh by the policy makers. It can be expected that the findings and the recommendations put in this study report will help the policy makers immensely in adopting various effective measures for managing the climate change problem in Bangladesh.

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Appendix

Interview Schedule

Bangladesh Public Administration Training Centre
Savar, Dhaka.

Research Title: A Study of Policy Makers Understanding of and Response to
Climate Change in Bangladesh

[The information/data provided by the respondent will be used only for research purposes and the name of the respondent will not be disclosed]

Name of respondent:

Gender:

Designation:

Posting place/ working area:

[Please put a tick (✓) mark where applicable]

1. Do you think that climate change is a serious threat to human societies?

☐ Yes ☐ No ☐ To some extent ☐ Not sure ☐ No comment

2. Do you think that climate change will affect the non-human world/natural eco-system?

☐ Yes ☐ No ☐ To some extent ☐ Not sure ☐ No comment

3. Climate Change is induced by human. How do you support the claim?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ strongly disagree ☐ No comment

4. Natural resources/ natural Systems will be affected hugely by Climate Change. What is your assessment about it?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ strongly disagree ☐ No comment

5. One report assumes that 14% of the land of the country will go under water by 2028 due to Climate Change. How you will evaluate the assumption?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐ Not sure

6. What is your view about the effects of Climate Change on economies, food security and infrastructure?

☐ Huge ☐ Moderate ☐ Not sure ☐ No effect ☐ No comment

7. Can Climate Change be an issue for national and global political and social arena?

☐ Yes ☐ No ☐ Not sure ☐ To some extent ☐ No comment

8. Can Climate Change be a central issue to development and poverty reduction agenda?

☐ Yes ☐ No ☐ Not sure ☐ To some extent ☐ No comment

9. Climate Change also put effects on cultural, psychological and ethical matters. How far you agree to the assumption?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree ☐ Not sure

10. Do you think that public differ climate change and global warming?

☐ Yes ☐ No ☐ Not sure ☐ To some extent ☐ No comment

11. Climate change can be a personal risk. Do you agree?

☐ Yes ☐ No ☐ Not sure ☐ To some extent ☐ No comment

12. Do you think that Climate Change is a serious problem for Bangladesh like other countries?

☐ Yes ☐ No ☐ Not sure ☐ Not at all ☐ No comment

13. To manage Climate Change, the risks of Climate Change need to be addressed. How far you agree with the idea?

☐ Strongly agree ☐ Agree ☐ Disagree ☐ strongly disagree ☐ No comment

14. Do you think that there are prevailing enough necessary strategy/policy/program to address the issue of Climate Change in Bangladesh?

☐ Yes ☐ No ☐ Not sure ☐ Not enough ☐ No comment

15. As a policy maker or related with policy making, have you received any training on climate change at home or abroad?

☐ Yes ☐ No ☐ Not at all ☐ Not sure ☐ No comment

16. Have you attended any national, regional or global programme/conference on climate change?

☐ Yes ☐ No ☐ Not at all ☐ Not sure ☐ No comment

17. If you have attended any programme/conference on climate change, then please specify the type.

.....

18. To address climate change clear policy is required. How you will evaluate the assumption?

☐ Strongly agree ☐ Agree ☐ Not sure ☐ to some extent ☐ No comment

19. The Challenges of climate change are manageable or some how adaptable. How you will assess the assumption?

☐ Strongly agree ☐ Agree ☐ Not sure ☐ To some extent ☐ No comment

20. What sources of information on climate change can be most trustworthy/ valuable to policy makers of Bangladesh?

☐ National ☐ Global ☐ Research ☐ All of them ☐ Not sure

21. Whom do you think is responsible for tackling climate change in Bangladesh?
Please specify.

.....
.....

22. Do you think that the policy makers responsible for tackling climate change are in right way?

☐ Yes ☐ No ☐ Not at all ☐ Not sure ☐ Agree a little bit

23. What sectors will be seriously affected in future by climate change in Bangladesh as per your view? Please identify them in terms of severity.

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24. How can climate change be addressed/managed? Please give your suggestion.

.....
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Signature of interviewer

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Training Centre Savar, Dhaka.