

Impact of Climate Change on Marginalized Women

An Exploratory study across 6 districts in Assam





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This Report has been prepared by the Centre for Environment, Social and Policy Research (CESPR), and Rashtriya Gramin Vikas Nidhi (RGVN) in collaboration with Indian Network on Ethics and Climate Change (INECC).

CESPR is a Guwahati based organization engaged in research and advocacy on various social and environmental issues, which includes climate change, across the North East of India.

RGVN is a development support organization, and over the years it has been able to groom and support small organizations involved in various livelihood enhancement programmes.

INECC is a loosely structured national network comprising of individuals and organization representatives interested in the climate issue from a micro-macro perspective. It connects the issues of climate change to larger sustainable development and social justice concerns.

FOREWORD

The outcome of this research work, which was carried out in six locations across the state of Assam portrays how climate change is impacting the lives of marginalized women in the rural areas in the state.

Though there has been a lot of debate regarding climate change and its impacts on several issues such as food security, water shortage etc, attention has not been paid on the impacts of climate change on some very critical issues which includes impacts on marginalized women in the rural areas.

This study shows that impacts of climate change has already started taking place and it is predominately visible at various locations across the state, and unknown to many among the policy makers and at the government level, there has been impacts of climate change on the social security, education, health etc of marginalized women in the rural areas in the state.

The study also shows that people are shifting from their traditional livelihood source, which is usually agriculture to other means of livelihood which includes working as a daily wage labour as there has been a decline in the agricultural production and other traditional practices. Besides this, in many households, women who were earlier home makers have now started working to supplement the family's income as there has been a decline in the income through agriculture. In several households the families have also asked their daughter to quit her studies and spend time at the house for the household chorus.

The insights and findings from the research work, which was conducted in three phases gives an indication of the challenges that is ahead, and should also be able to convince everyone about the need to give a thought on this issue.

We sincerely hope that the government and also the other opinion makers take note of the research work and the findings, and develop policies that ensure such areas are taken into count.

Amarjyoti Borah,
Co-Convenor,
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CONTEXT

In the 21st century Climate Change is the most persistent topic that is talked and discussed in almost all international, national and state level conferences and meetings. In India, the policy makers are yet to focus deeply on the issues of climate change in North Eastern region. North East is one of the most fragile and environmentally sensitive regions of the world and is regarded as one of the ecological hotspot of the world because of the presence of rich flora and fauna.

Assam, which is a part of the region, has been witnessing adverse effect of climate change over the years. Climate change is affecting the economy of the state over time. Assam being an agrarian economy is largely bearing the brunt of climate change. Unnoticed to the policy makers, one of the major victims of climate change has constantly been the marginalized women of the society, who have always been the sufferer for being financially weak and also for lacking the power of decision making in the society.

The present study was undertaken to look into the complex web of climate change and its impact on the marginalized women in various areas in Assam which are fragile and more vulnerable to the adverse impact of climate change.

With climate change the study also focuses on the change in the livelihood option which has an invariable impact on women. They are forced to move out of home to seek employment elsewhere because agriculture has become unsustainable. The study was carried out in six different locations that showed distinct changes due to climate change.

Although much scope remains for further research into this problem, results of the study indicates that even small changes in the climatic pattern of the region causes unprecedented misery to the people of the state, magnified every year affecting them economically, socially and to a large extent politically.

However, change in political aspiration of the people is not under purview of the study and the researchers have limited themselves only to the economic and social changes brought about by climate change.

Women feel the challenge brought by climate change more acutely than others because they are more intimately associated with keeping food on the table, albeit not in the same way as men does. While men are still predominantly the bread earners of the family, it is the women who have to ensure that the food is enough for the family and to save some for adverse times.

Particularly in Assam, where women work as hard as the men in agriculture and other allied sector, the impact of climate change is very much a reality in every women's mind.

The impact of climate change has already forced many to abandon their existing professions and search for alternatives. Where flood and erosion have rendered many homeless, they were forced to take themselves out of their place of birth and migrate to safer places. This internal displacement is, in turn, causing issues of settlement among the people, with the existing population sometimes opposing new settlements.

There is no concerted effort so far on the part of the government agencies to address the issue of climate change as a whole, although work is being done to mitigate the effects of flood and erosion in the state. However, it is needless to say that unless the problem is treated at the root, the situation is only going to worsen gradually.



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EXECUTIVE SUMMARY

The report is part of a study conducted by the Guwahati based Centre for Environment Social and Policy Research (CESPR), and RGVN in collaboration with INECC on the impact of Climate Change on ¹¹Marginalized Women in the state of Assam, which is a part of the highly eco-sensitive and fragile eastern Himalayan region. (IPCC report)

During the course of the study, surveys were carried out at six different locations in the state which are ecologically fragile and vulnerable to the impacts of climate change, and it was followed by several sessions of discussions in different parts of the state.

Throughout the study period, focus was laid on such women and besides this, several such women also participated in the Focal Group Discussions (FGDs) and also at the consultation at Guwahati.

The study was carried out in six different locations in six districts—Dibrugarh, Jorhat, Lakhimpur, Sonitpur, Morigaon and Baksa, spread across the Brahmaputra valley in the state, and these locations were taken as they have already started experiencing impacts of climate change.

The overall study was carried out in three parts which included surveys using 150 questionnaires at every location, two focal group discussions at each location, and also a consultation at Guwahati which was attended by people from all section of the society including academicians, students, social activists, journalists, government officials from different departments, and also people who have been victims of the adverse impacts of climate change in different parts of the state.

From the government side, the consultation was attended by Ashutosh Agnihotri, deputy commissioner (DC) of the Kamrup Metro district, Bhaskar Phukan, who is a senior official of the Assam home and political department, Prazyan Saharia, who is a senior official of the Assam Chief Minister's Office (CMO) and attached to the social welfare department, Jaideep Baruah, head of the environment division of the Assam Science Technology and Environment Council (ASTEC), which is an autonomous Council of the Department of Science


Technology & Environment of the Assam government, and Monideepa Borkotoky, senior official of the Assam Social welfare department and member secretary of the Assam State Commission for Women.

During the course of the entire study, and also the subsequent discussions, focus was put on various social and economical issues surrounding the marginalized women, and also how further change in the climatic conditions could worsen things for them. Besides this, study was also done on the changes in the climatic conditions in the state.

According to the data gathered during the course of the study, there has been changes in the rainfall and the minimum temperature, and according to climate experts, it could have a major impact in the state.

The data points out that in the last 60 years there has

¹ The term marginalized women defines those women who are financially weak, and also weak socially, which means they don't have adequate decision making power both within their household and also in the society.



been a decline in the annual rainfall in the state, and there has been a rise in the minimum temperature by over one degree Celsius. According to experts it is a matter of very serious concern, and these could have major impact in Assam as it is very eco sensitive.

During the course of the study it was observed that women belonging to marginalized households and living in rural areas in the state are prone to the impacts of climate change, and it was also seen that the effects of climate change have already started gripping the marginalized women folk.

In several areas, the income of families who are solely dependent on agriculture for their livelihood has declined several folds as with climate change there has been a

change in the rainfall pattern and also there has been a decrease in the rainfall. It was also seen that there has been a rise in the frequency of drought like situation in the state which is also affecting the economic conditions of the farmers in the state.

The study found that as a result of the decline in the income, the women folk who were basically home makers, now have started to work to supplement the families income, and in many places they have even started working as daily wage labourers.

During the survey work, many families also pointed out that this is affecting the education of the girl child to a great extent, as once the mother decides to go out in search of work, the responsibility of the house usually rests on the girl child and she is asked to leave school.

The findings from the research work also points out that in some areas the adverse effects of climate change has also pushed many belonging to once prosperous farmer families to take up work as domestic help and daily wage labourers.

The study further revealed that in the last few years, change in climatic conditions in the state has had major impact on the economic conditions of several households which have also made young girls from the tea garden areas vulnerable to flesh trade, lured with promise of jobs.

The study has also found significant change in the livelihood options of the people, basically who were earlier dependent on agriculture, but have now been forced to take up other avenues of employment due to change in climatic pattern.

The report also shows that if climate change continues at this rate then the acute necessity of people having to uproot oneself from their original place of existence to seek livelihood somewhere else may arise.

During the study it was also seen that climate change is generally perceived by the marginalized women as the presence of more diseases, change in rainfall, change in climatic conditions and loss of agricultural output.

The study also brings out that as a result of excessive floods, communication is disrupted for long period of time and this broods ill more for girls who are often forced to drop out of schools and colleges. Besides, the adverse impact of the flood on the income of the family often forces the women of the house to step out and seek work elsewhere.

The study also mentions that in hundreds of households women who were earlier home makers are now compelled to take up weaving, daily wage labour and other related activities to make ends meet, and in many areas, women of the households are taking up fishing to make up for lost agricultural produce.

CLIMATE CHANGE

The United Nations Framework Convention on Climate Change (UNFCCC) describes climate change as 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, and also describes it as a long-term shift in the statistics of the weather (including its averages).

According to climate scientists as a result of climate change billions of people, particularly those in developing countries could face shortages of water and food, and also face greater risks to health and life as a result of climate change.

Experts working on the subject also points out that concerted global action is needed to enable developing countries to adapt to the effects of climate change that are happening now, and which could worsen in the future.

The UNFCCC, and the **Intergovernmental Panel on Climate Change** (IPCC) reports also mention that the developing countries are the most vulnerable to climate

change impacts because they have fewer resources to adapt: socially, technologically and financially.

Climate change is anticipated to have far reaching effects on the sustainable development of developing countries including their ability to attain the United Nations Millennium Development Goals by 2015 (UN 2007).

The IPCC reports also points out that even with a temperature rise of around 1– 2.5°C there could be serious effects including reduced crop yields in tropical areas leading to increased risk of hunger, spread of climate sensitive diseases such as malaria.

Reports by leading agencies which are researching on climate change also points out that the adverse effects of climate change will be felt most strongly by the poor.

Studies carried out all across the world also brings out that women are more vulnerable both to the short term recurring climatic events and long term climate induced changes because of gender differences in socially constructed roles and responsibilities.





HOW VULNERABLE IS ASSAM TOWARDS CLIMATE CHANGE

Environmentalists describe the North East region as a very fragile and ‘environmentally sensitive zone’, which is highly prone to climate change. Senior environment scientists who have worked extensively on environment and climate change in the NE region say Assam has already started witnessing climate change.

The IPCC report also describes the Eastern Himalayan range, of which Assam is a part, as highly sensitive to climate change.

Regarding climate change in Assam and the North East region, according to research work by climate scientists, rising temperatures in the region as a whole and decreasing rainfall in the eastern and southern areas have been observed. (Das 2004, Mirza et al.1998)

According to Meteorological scientists, who have been associated with studies related to climate in Assam, there has been gradual change in the rainfall pattern over the past 3-4 decades, and a steady rise in temperature has been observed.

According to the Regional Meteorological Centre (RMC) in Guwahati, between 2001 and 2011, the deficiency in monsoon rainfall of the Assam-Meghalaya subdivision was found to range between 21 per cent (2002 and 2010) and 37 per cent (2006).

Assam’s government’s strategy and action plan on climate change, (2011), prepared by the Assam Science Technology and Environment Council (ASTEC) states that the North East region of India including Assam is expected to be highly prone to consequences to climate change because of its sensitive geo-ecological set-up, strategic location with international boundary, presence of the Eastern Himalayan ranges, trans-boundary river systems, inhabitation of ecosystem by people of different ethnic groups and inherent socio-economic differences.

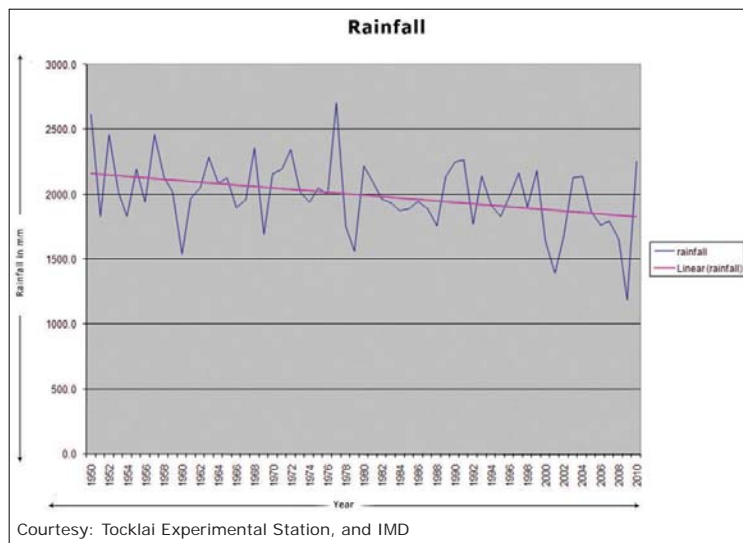
The report also mentions that Assam is highly vulnerable to floods, river bank erosion, sand casting, landslides, cyclonic storms, and the exposure to such hazards is also aggravated because of the location of the state in the North Eastern region which is one of the most seismically active regions in the world.

The Assam State Action Plan on Climate Change, 2012 – 2017, states that the region has experienced increase in the annual mean maximum temperatures, with increase at the rate of +0.11°C per decade and annual mean temperatures at a rate of 0.04°C per decade in the region.

In Assam, climate change is also expected to negatively impact the water resources sector by increasing the freshwater scarcity in the state.

1.1 IS CLIMATE CHANGE TAKING PLACE IN ASSAM

The Graphical representations below gives a clear idea about climate change in Assam.



The graph of rain-fall shows the downward trend over the years as indicated by the linear line.

This graphical representation of the rainfall data in Assam since 1950 till 2010 shows that there has been a steady decline in the annual rainfall in the state.

According to scientists at the Meteorological department, Tocklai Experimental Station in Assam, the decline in the rainfall is a matter of serious concern.

The scientists at the station also pointed out that in the past 92 years more than 200 mm of annual average rainfall in the state has been lost.

Monsoon rainfall deficient years in the North-East region has been growing since 2001 and the Assam-Meghalaya meteorological subdivision of the region have already recorded six monsoon rainfall deficient years since then.

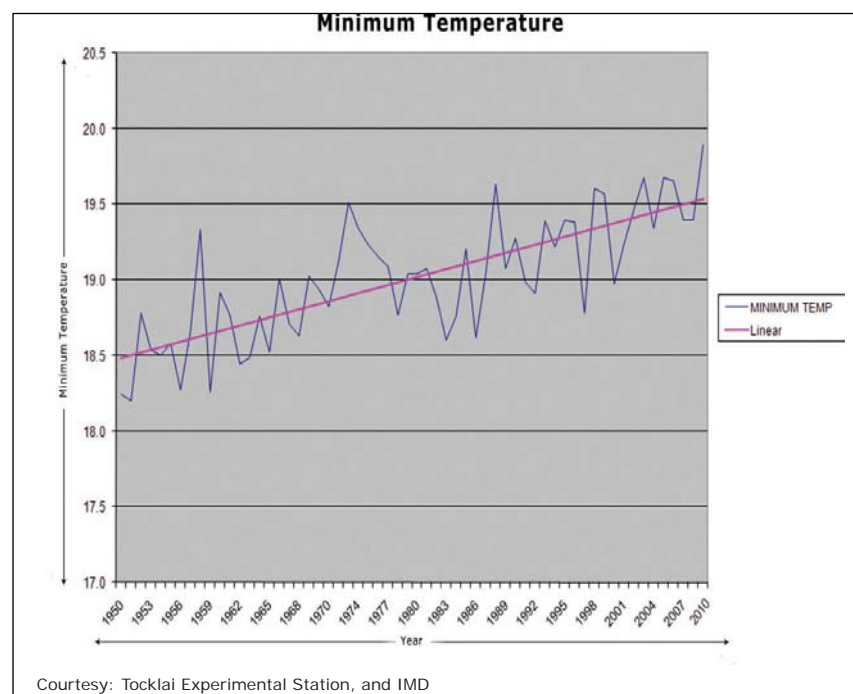
This is especially alarming since Assam-Meghalaya subdivisions recorded 35 per cent deficit monsoon rainfall, while the Nagaland-Manipur-Mizoram-Tripura (NMMT) subdivision recorded 41 per cent deficit monsoon rainfall in 2011.

Graphical representation showing the minimum temperature in the state since 1950 to 2010.

This graphical representation of the minimum temperature in Assam since 1950 till 2010 shows that there has been a steady rise in the minimum temperature.

According to Meteorology experts at the Tocklai Experimental Station, the minimum temperature on an average has risen from one degree Celsius to 1.5 degrees Celsius in the last over 90 years.

They also pointed out that according to estimates made by them, the carbon dioxide content was increasing at a rate of 1.5 ppm per year.



The graph of temperature shows an increasing trend of temperature over the years.



1.2 IS ASSAM CULTURALLY VULNERABLE TO IMPACTS OF CLIMATE CHANGE

According to leading academicians in the state, marginalized communities (tribals, peasants, fisher-folks, etc) especially women who are dependent on the critical ecological resources such as water, forest resources, are the most vulnerable, and their culture also naturally is most vulnerable to climate change.

According to Chandan Sarma, a professor of the department of sociology of the Tezpur University in Assam, riverside areas, river islands, hills and foothill areas are some of the most vulnerable areas in Assam.

Sarma also pointed out that climate change can affect culturally by changing the specific geographic context (flood, drought, erosion, etc) of a particular region dramatically, and can also seriously affect the traditional practices of communities which is manifested in their culture.

The renowned academician also mentioned that the constituents of culture do not take shape in vacuum, and they emerge out of the prolonged interaction of man with his specific environment, both physical and social.

Sarma also mentioned that this is the reason why, while all cultures have practices of eating, dressing, singing, building houses, etc, each culture does it differently. The geographical location, the specific nature of interaction of human beings with the immediate environment determines these differences.

1.3 OVERALL GOAL OF THE STUDY

1. To document the impacts, as a result of climate change on the marginalized section of the society in the rural areas of Assam, with more focus on the marginalized women. The study was also focused on the issues of livelihood, social security, education and health in the rural areas of the state. Besides this, the study also focused on the understanding of climate change, and also adaptation measures the rural village folks have started to take or planning to take.

In the study, focus was also made on the gender and other social differences in climate change and related issues.

1.4 THE STUDY AREAS

For the study one location in six different districts were selected, spread across three different areas of Assam. Out of the six locations—one was from lower Assam, two from central Assam and three from upper Assam.

The areas selected were:

1. Dibrugarh district in upper Assam: This district is highly vulnerable to problems of flood and erosion, and also has a sizeable number of tea gardens. In this district the survey was carried out among the labourers in the Mohanbari tea estate, located in the Lohwal Development Block.

2. Majuli, the largest river island in the world: Majuli is located in the Jorhat district of Assam, and is very vulnerable to climate change. The island is also severely affected by flood and erosion every year. The survey was carried out in the Alimur Mishing village, located in the Kamalabari Development Block in the island.

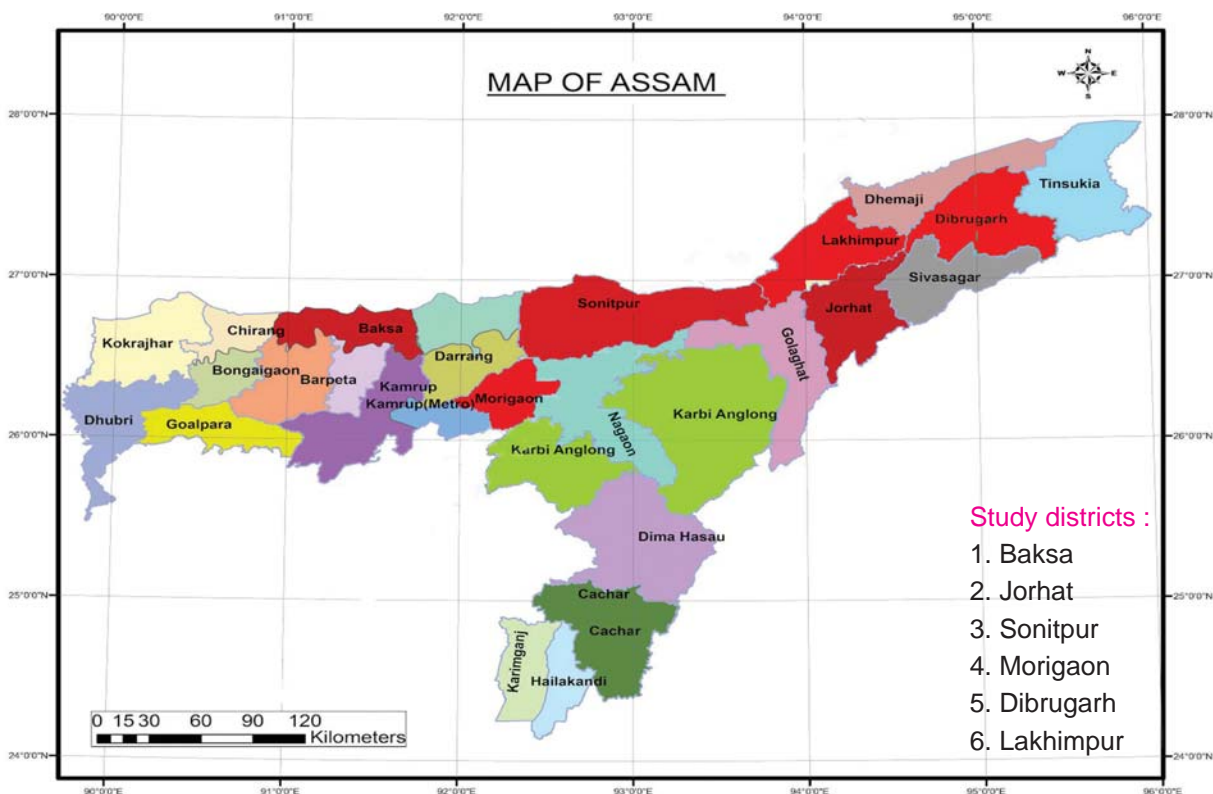
3. Lakhimpur district in the Northern bank of Assam: Lakhimpur district is highly vulnerable to climate change, and according to experts the district has already started experiencing the effects of climate change. In this district the survey was carried out in the Kathor Bari village, located in the Dhokuakhana Revenue Circle.

4. Sonitpur district located in Central Assam: In this district the survey was carried out in Komar Chuburi village located in the Bihaguri Development Block.

5. Morigaon district, located in the central part of the state. This district is highly prone to climate change, and has been witnessing the impacts of climate change on livelihood of the people. This district is also highly prone to flood and erosion which has been accelerating over the year.

In this district the survey was carried out in the Potua Kata village, located in the Lahorighat Revenue Circle.

6. Baksa district located in lower Assam: In this district the survey was carried out in the Pukhuri-par village, located in the Tamulpur Revenue Circle.



1.5 METHODOLOGY

The study was carried out using a very participatory and interactive process to understand the perception of climate change by the marginalized women folk, impacts of climate change on various social issues which surrounds their day to day life, impacts on their social security, future threats that are looming ahead of them, and also steps that are being taken at the community and the government level.

During the course of the study

a) Household surveys were conducted covering 900 sample households which were selected randomly. 150 sample surveys were done at every location, and

were conducted with semi structured questionnaire.

b) Two Focal Group Discussions (FGDs) sessions were conducted at each of the six study areas.

c) Interviews of different government officials, politicians, scientists, academicians, and different stake holders were conducted for their views.

d) A consultation was held where different stake holders were invited to share the preliminary findings of the report for their feedbacks.

e) Analysis of the information obtained during the study was done while preparing the report.



1.6 RESEARCH QUESTIONS

A different set of questions have been attempted to answer through this study. These include:

Q How do women perceive and experience climate change impact? What knowledge do women have of climate variations? What perceptions, knowledge and experiences do they share?

Q Are women more vulnerable to climate change? In which sectors women are more vulnerable?

Q What is their socio-economic condition? How does climate change affects their socio-economic condition?

Q Do women have decision making power? How does climate change affects their decision making power?

Q Do women think that during the last 10 years, women's social security has been deteriorated?

Q What are the things women had seen before that have now disappeared from their eye sight?

Q Is there any impact of climate change on culture?

Q What kinds of individual, collective action, and interface with local institutions is involved in adaptation to climate change by women and by men? What steps they have taken?



1.7 PROCESS OF DATA COLLECTION

The study followed multiple stages which include participatory approaches of data collection, interpretation and sharing the study findings with project components and stakeholders. The study followed the following steps:

- a) Core Team mobilization;
- b) Development of method and tools for data collection;
- c) Orientation of field team members;
- d) Testing and administrating of tools and formats for data collection;
- e) Field data collection, cleaning, processing and analysis; and
- f) Writing study documents, internal review and finalization.

1.8 DATA VALIDATION

Different strategies have been employed to collect data. Methods that included interview, participatory exercise and sharing findings with experts and eminent people of society have been applied to validate the data.



2.1 DATA INPUT AND ANALYSIS

The survey data have been edited and coded manually and processed. Qualitative data have been manually complied according to diverse issues considering the research sites.

The findings of the research work is being presented in four parts in this report.

a. The first part is on the findings on the socio-economic status of the households where the survey was carried out (which also shows the impact of climate change on the socio-economic conditions of the families),

b. Findings on the actual impacts of climate change on the marginalized women,

c. Findings about the impacts of climate change through Focal Group Discussions (FGDs),

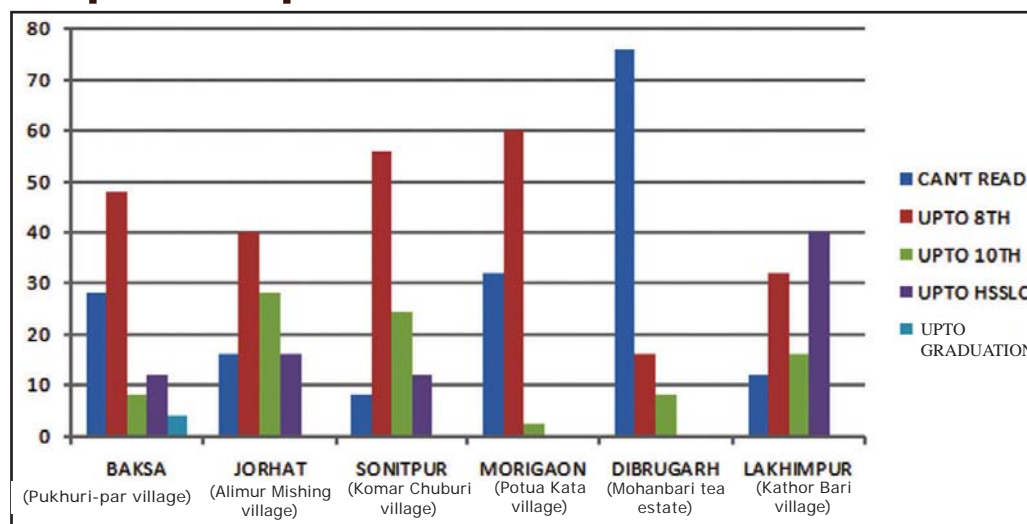
d. Findings regarding the impact of climate change on marginalized women through a regional level consultation which was held at Guwahati and was attended by academicians, government officials, social activists, journalists, and also women who have been victims of the adverse impacts of climate change.

PART 1

2.2 Education Status of the Households surveyed

Education	Baksa (in%)	Jorhat (in%) (Majuli)	Sonitpur% (in%)	Morigaon (in%)	Dibrugarh (in%)	Lakhimpur (in%)
Can't read	28	16	8	32	76	12
Upto 8 th Class	48	40	56	60	16	32
Upto 10 th Class	8	28	24	8	8	16
Upto HSSLC	12	16	12	0	0	40
Upto Graduation	4	0	0	0	0	-
Total literate (In Percentage)	72	84	92	68	24	88

Graphical representation



The survey shows that in Dibrugarh 76 % percent of the respondents are illiterate which is the highest among the 6 districts where the survey was carried out, with Sonitpur being the lowest.

Also in Dibrugarh district, the percentage of HSLC passed is nil.

It was also seen that Morigaon has the highest percentage of women who has been educated upto the level of primary education, with the Dibrugarh district being the lowest.

Regarding higher secondary level education, 40 % of the respondents in the Lakhimpur district had passed secondary education, which is the highest among the 6 districts.

Very few of the respondents have been educated upto the degree level, and only 4 percent of the respondents in the Baksa district were degree holders.

The respondents and also the participants at the Focal Group Discussion (FGD) pointed out that there has been a gradual impact of the effects of climate change, such as increase and unpredictability in the occurrence of flood on the household income which is generated through traditional livelihood sources like agriculture.

It was also pointed out that now majority of the families which are poor, usually doesn't encourages the female child to continue after high school.

In the survey, except in the Pukhuri-par village in the Baksa district, where 4 percent of the respondents have studied upto the level of graduation, in the other areas none of the respondents were educated upto the graduation level.

The graphical representation also shows that the education level is lowest among the respondents in the Dibrugarh district.

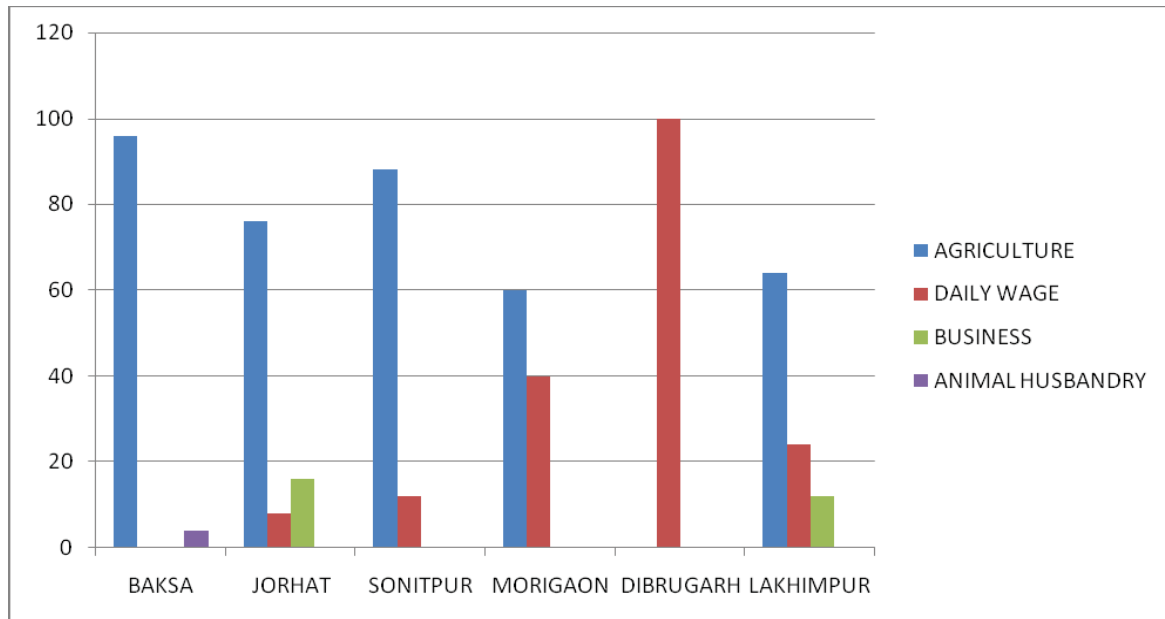


2.3 OCCUPATIONAL PATTERN OF THE HOUSEHOLDS SURVEYED

Primary Occupation of Household Heads

Pimary Occupation	Baksa (In %)	Jorhat (In%) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Agriculture	96	76	88	60	-	64
Daily wage Labour	-	8	12	40	100	24
Business	-	16	-	-	-	12
Job (Govt and Private Sector)	-	-	-	-	-	-
Animal Husbandry	4	-	-	-	-	-

Graphical representation



Agriculture is predominantly the primary occupation followed by work as daily wage earners. Percentage of households involved in agriculture is highest in the Baksa district (96%) followed by Sonitpur (88%) and Majuli (Jorhat) (76%).

The Dibrugarh site, however, exhibits a totally different scenario. There, daily wage labour is the predominant livelihood strategy as 100% of the respondents are engaged as daily wage labourers.

All the respondents at Dibrugarh are people engaged as labourers in tea gardens, and none of them own land. They live in quarters belonging to the tea garden which employs them.

On the other hand, some of the households in Dibrugarh district have also undertaken activities like pisciculture, bee keeping, piggy, and various small enterprises to supplement their income.

Respondents, during the survey pointed out that though agriculture has always been the primary income source for most of them, now over the years a shift from agriculture has been observed, which according to them is basically as a result of decline in production and income.

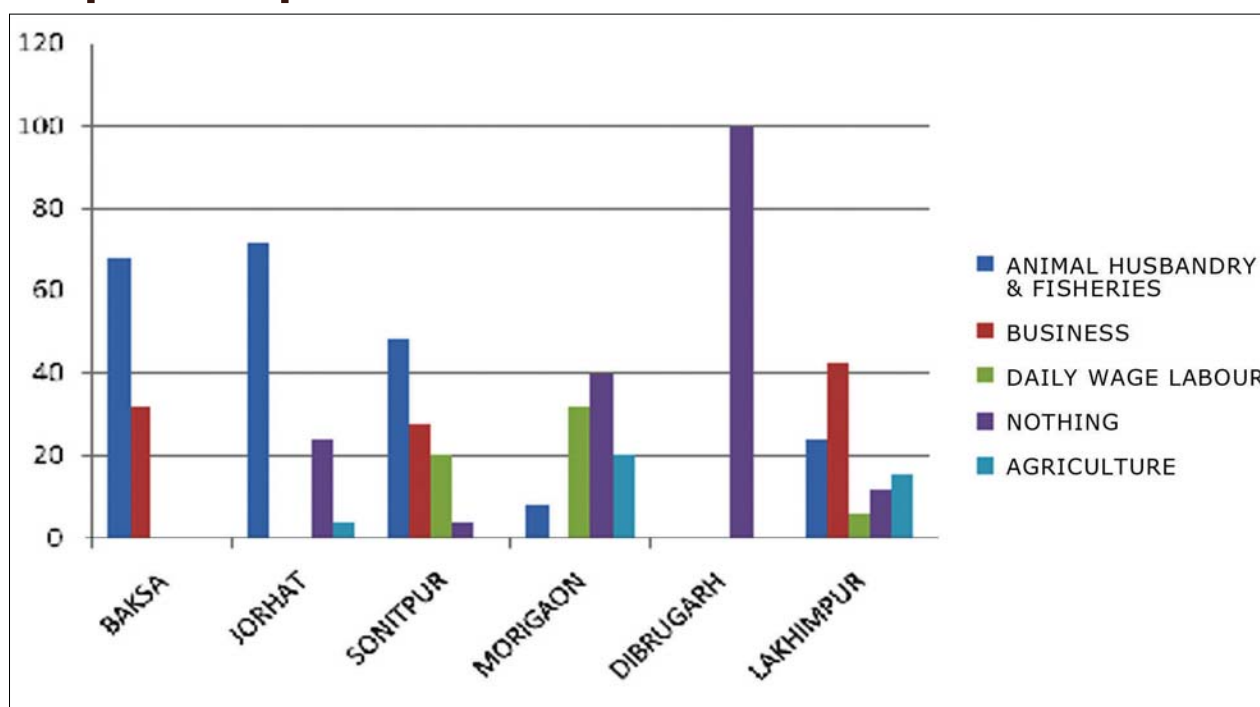
During the survey and also the FGD, majority of the participants also responded that as a result of flood and erosion, there has been a decline in the agricultural land, and besides this thousands of hectares of fertile agricultural land in different parts of the state has become waste land as a result of deposition of sand brought by the flood over the fertile land.

The respondents at Dibrugarh, all of whom were labourers at tea gardens pointed out that there has been a gradual decline in the tea production in the gardens which is something very worrying for them, and also said that many have started shifting from the job of tea garden labourers to daily wage labourers in nearby towns.

2.4 SECONDARY OCCUPATION OF THE HOUSEHOLDS SURVEYED

Secondary Occupation	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Animal Husbandry & Fisheries	68	72	48	8	-	24.2
Business	32	-	28	-	-	42.4
Daily wage Labour	-	-	20	32	-	6.1
Nothing	-	24	4	40	100	12.1
Agriculture	-	4	-	20	-	15.2

Graphical representation



Animal Husbandry and fishery are predominant as the secondary occupation in Majuli (72%) and Baksa (68%). This is followed by small scale business, with Lakhimpur (42.4%) being the highest in this.

It is noteworthy that many of the respondents mentioned that earlier agriculture was their primary

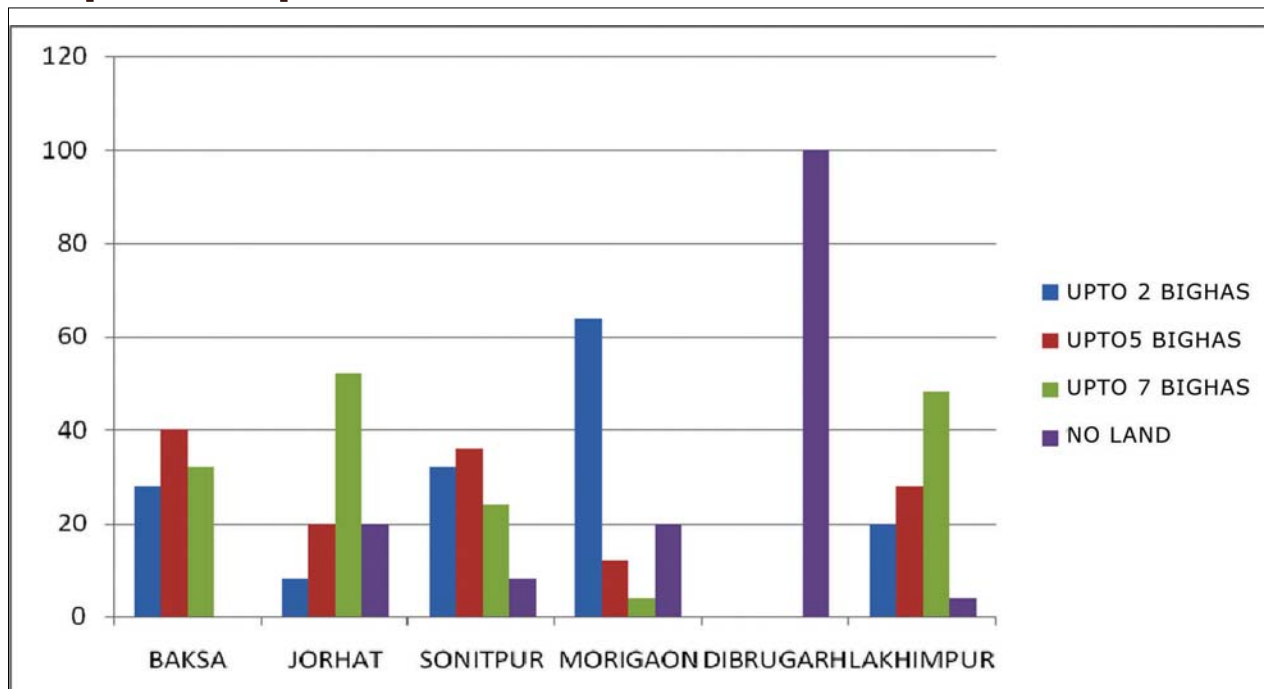
income source, but they have now shifted it as their secondary income source because of the low agricultural production in their agricultural field.

A majority of the participants said that there has been a decline in the income through agriculture, and as a result of this many have started shifting to other income means.

2.5 LAND OWNERSHIP PATTERN IN THE STUDY AREA

Size of the Land	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %) (Dhakuakhana)
Upto 2 bigha	28	8	32	64	-	20
Upto 5 bigha	40	20	36	12	-	28
Upto 7 bigha	32	52	24	4	-	48
No land	-	20	8	20	100	4

Graphical representation



According to government data, land holders of below 2 bighas of land are considered as functionally landless.

In the areas surveyed, the percentage of landless people is 100 percent in Dibrugarh and this is followed by the Morigaon district. The number of people living in extreme condition of poverty in terms of land ownership is higher in Morigaon than the other areas where the survey work was carried out.

The existence of large land holding category among the respondents (upto 7 bigha) was seen in Majuli

(52%), Lakhimpur (48%) and Baksa (32%).

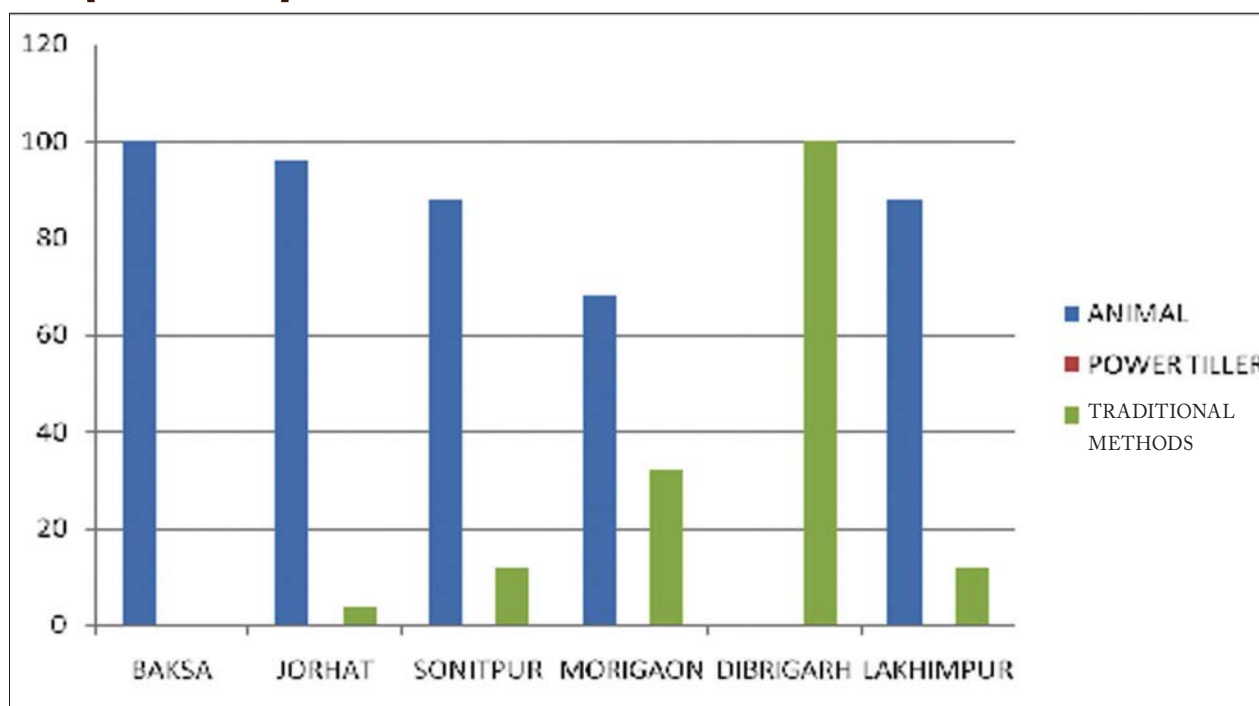
The respondents pointed out that over the years they have witnessed an increase in the intensity of the flood, and also added that the rate of erosion has increased over the years as a result of climate change.

Several of the farmers who were among the respondents also pointed out that over the last decade or so they have seen big portion of their agricultural land getting eroded, and also added that as a result of climate change, the intensity of flood has increased which has in turn increased the rate of erosion.

2.6 MODES OF AGRICULTURE

Sources	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Animal	100	96	88	68		88
Power tiller	-	-		-		-
Traditional Methods	-	4	12	32	100	12

Graphical representation

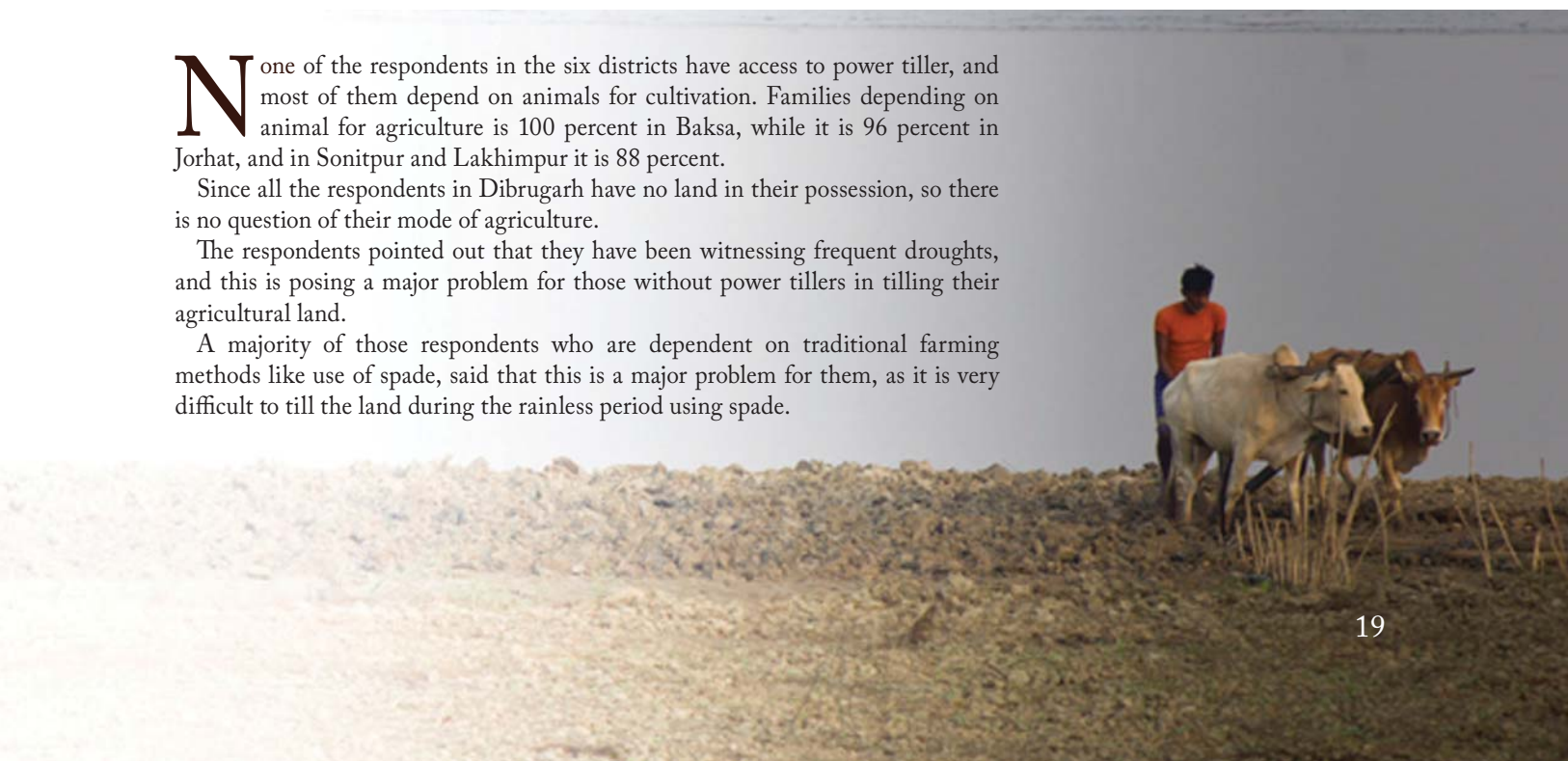


None of the respondents in the six districts have access to power tiller, and most of them depend on animals for cultivation. Families depending on animal for agriculture is 100 percent in Baksa, while it is 96 percent in Jorhat, and in Sonitpur and Lakhimpur it is 88 percent.

Since all the respondents in Dibrugarh have no land in their possession, so there is no question of their mode of agriculture.

The respondents pointed out that they have been witnessing frequent droughts, and this is posing a major problem for those without power tillers in tilling their agricultural land.

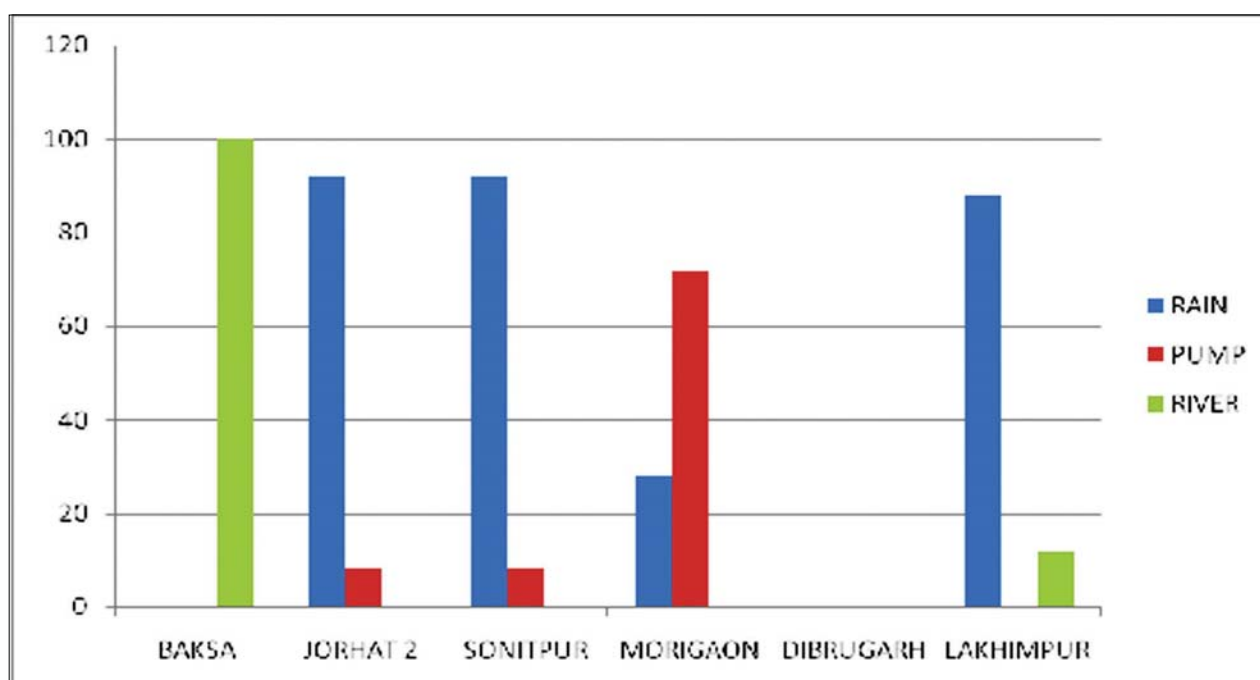
A majority of those respondents who are dependent on traditional farming methods like use of spade, said that this is a major problem for them, as it is very difficult to till the land during the rainless period using spade.



2.7 MODE OF IRRIGATION

Sources	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Rain	-	92	92	28	-	88
Pump	-	8	8	72	-	-
River	100	-	-	-	-	12

Graphical representation



The survey shows that majority of the respondents are dependent on the nature as there is no proper irrigation.

In Baksa 100 percent of the respondents depend on river water for irrigation.

On the other hand, 92 percent respondents in Majuli and Sonitpur and in Lakhimpur 88 percent people depend mostly on rain water. In contrast, 72 percent of the households of Morigaon depend on pump sets for irrigation.

Regarding irrigation as well, majority of the respondents and also the participants at the FGD pointed out that the decline in rainfall over the years and also the change in the rainfall pattern is becoming a major problem for the farmers who are dependent on the rain for their irrigation needs. Many of the farmers also pointed out that they are

not economically strong enough to be able to purchase pump sets for their irrigation needs, and as a result of this many of the farmers who are dependent on rain-water for majority of their irrigation needs are also trying to look for alternative income sources.

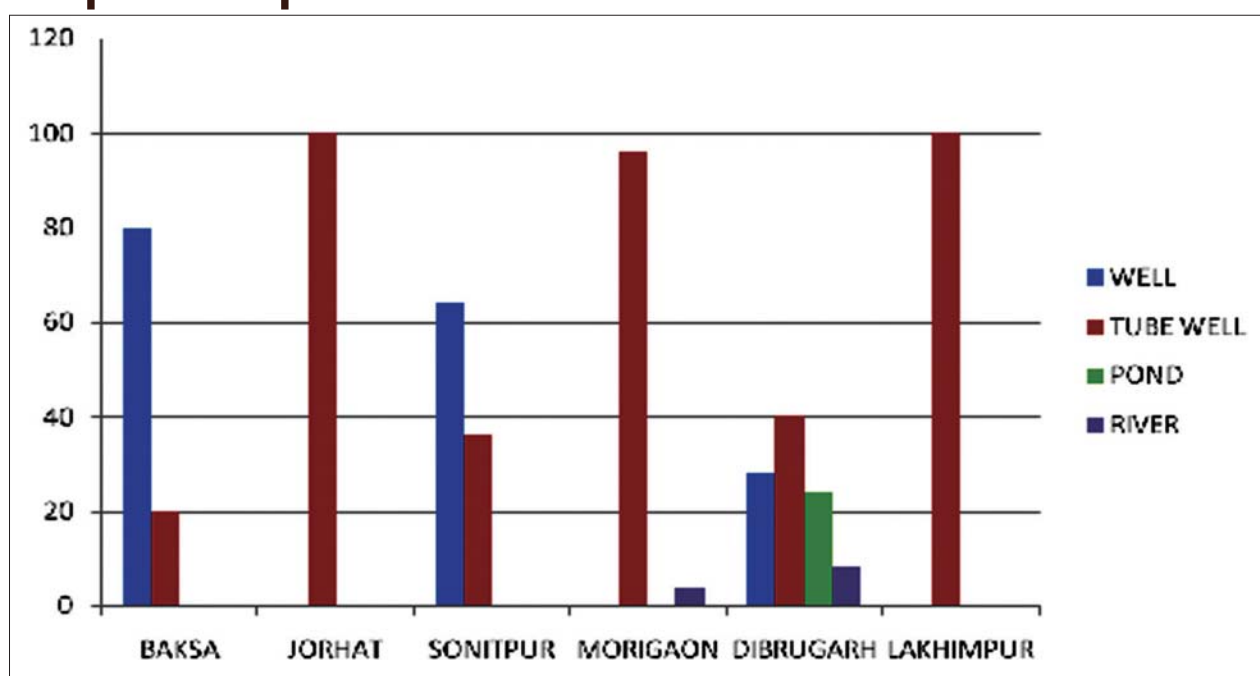
Majority of those farmers who are dependent on the river water for their irrigation needs pointed out that as their cultivable land is very near to the river, they become victims of flood which affects the cultivation, and moreover their land gets eroded.

During the discussion, the respondents also pointed out that over the years there has been an increase in the intensity of flood, and many also pointed out that flood has deposited sand over cultivable land of several farmers and have turned the cultivable land to waste land.

2.8 SOURCES OF DRINKING WATER

Sources	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Well (Open)	80	-	64	-	28	-
Tube Well	20	100	36	96	40	100
Pond	-	-	-	4	24	-
River	-	-	-	-	8	-

Graphical representation



100 percent of the surveyed households in Majuli and Lakhimpur, and 96 percent in Majuli have access to tube well water, which they use for their drinking purpose as well. 80 percent of the respondents in Baksa, and 64 percent in Sonitpur depend on wells for their drinking water. Water from wells is fetched for drinking by 80 percent of the households in Baksa and 64 percent in Sonitpur.

During the FGD, the participants pointed out that during adverse flood which is very common now a days, flood water damages the water sources such as wells (open) and makes the water from the source unfit for drinking for a long time. The participants also pointed out that in many areas people are also dependent on ponds, which is also rendered unfit for drinking when flood water enters it.

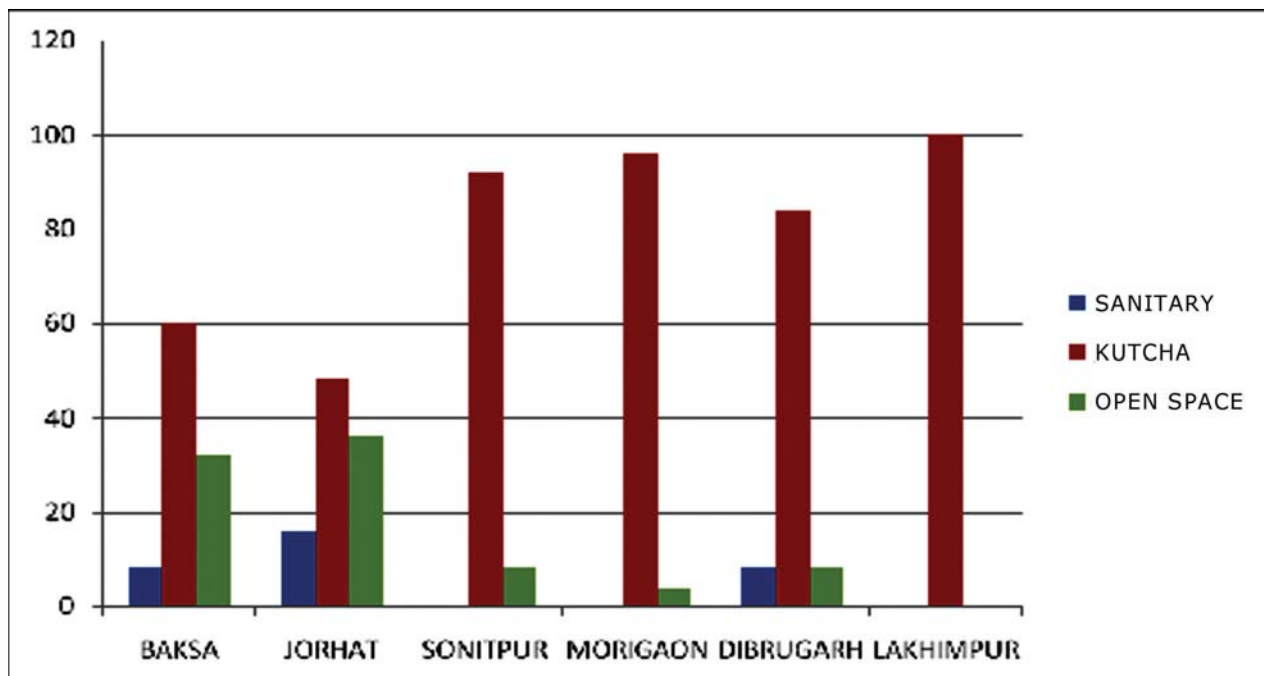
Participants also cited an example of the flood in Majuli in 2012 and said that it was the worst flood which the residents of the island had ever experienced, and during all the three wave of flood, hundreds of the drinking water sources such as wells (open) and ponds were made unfit for use.

Several of the participants also said that during the frequent droughts, the water level of the wells (open) goes down which makes it very difficult to fetch water, and besides this some of the shallow wells often dries up and this sometimes creates drinking water shortages.

2.9 SANITATION FACILITIES

Sanitation Facilities	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Sanitary	8	16	-	-	8	-
Kutchha	60	48	92	96	84	100
Open space	32	36	8	4	8	-

Graphical representation



Kutchha latrine is predominant in most of the areas surveyed. This type of latrine is being used by 100 percent of the respondents in Lakhimpur, 96 percent in Morigaon, 92 percent in Sonitpur, and 84 percent in Dibrugarh.

The sanitary latrines are used by some of the respondents in Baksa, Dibrugarh and Majuli. In Majuli these sanitary latrines are provided by the “Anamoi” scheme of the Government.

A majority of the respondents during the course of the survey and also during the FGD pointed out that most of them have been used to defecating in the open, and also said that majority of them have kutchha latrine and very few have sanitary latrines.

They also said that with the rise in flood every year as a result of climate change, now it becomes difficult to defecate in the open or use kutchha latrine.

The participants pointed out that flood used to be a regular phenomenon earlier but it used to be predictable and the period of occurrence was also predictable, but now the period of occurrence has become completely unpredictable and also it is not possible to determine the period of flood now, something which was possible earlier.

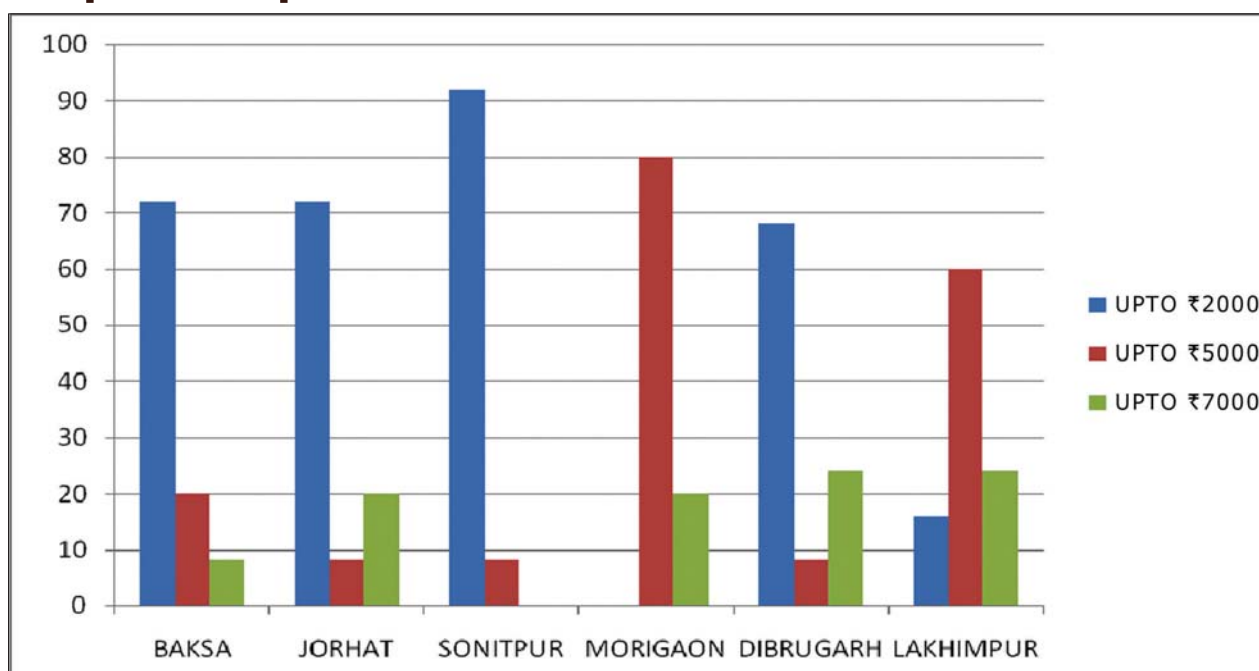
They said that now when the flood season starts, which is now a days spread over a very long period it is very difficult for the women folks to go out to defecate in the open on the river banks, and also in the open fields during the flood season.

Regarding kutchha latrine, the respondents mentioned that during the flood seasons it is difficult to use those as well as those are located outside the house and often at some distance away from their house.

2.10 HOUSEHOLD INCOME

Yearly Income	Baksa (In %)	Jorhat(In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Upto ₹2000	72	72	92	-	68	16
Upto ₹5000	20	8	8	80	8	60
Upto ₹7000	8	20	-	20	24	24

Graphical representation



Among the respondents about 92 percent in Sonitpur monthly earn ₹2,000 or less, compared to 72 percent households who earn the same level of income in Baksa and Majuli.

About 80 percent of the households in Morigaon earn ₹2,000 to ₹5,000 which is highest in that category, while in Majuli, Sonitpur and Dibrugarh it is 8 percent.

₹5,000-7,000 is the monthly income of 24 percent of the households in Dibrugarh and Lakhimpur.

From the survey it is evident that lowest income households are in Sonitpur while Morigaon has the highest income.

A majority of the participants pointed out that there has been a gradual decline in their income, and also blamed climate change for this. The respondents, majority of whom were farmers said that there has been a decline in their income as a result of the decline in agricultural

output, and also said that there are many farmers who have even sold off part of their agricultural lands as they have started to suffer from serious financial crisis.

Many of the respondents and also some participants at the FGD mentioned that as a result of climate change there has been a sharp decline in the muga silk production in the state, and this is affecting the muga silk farmers who numbers in lakhs in the state.

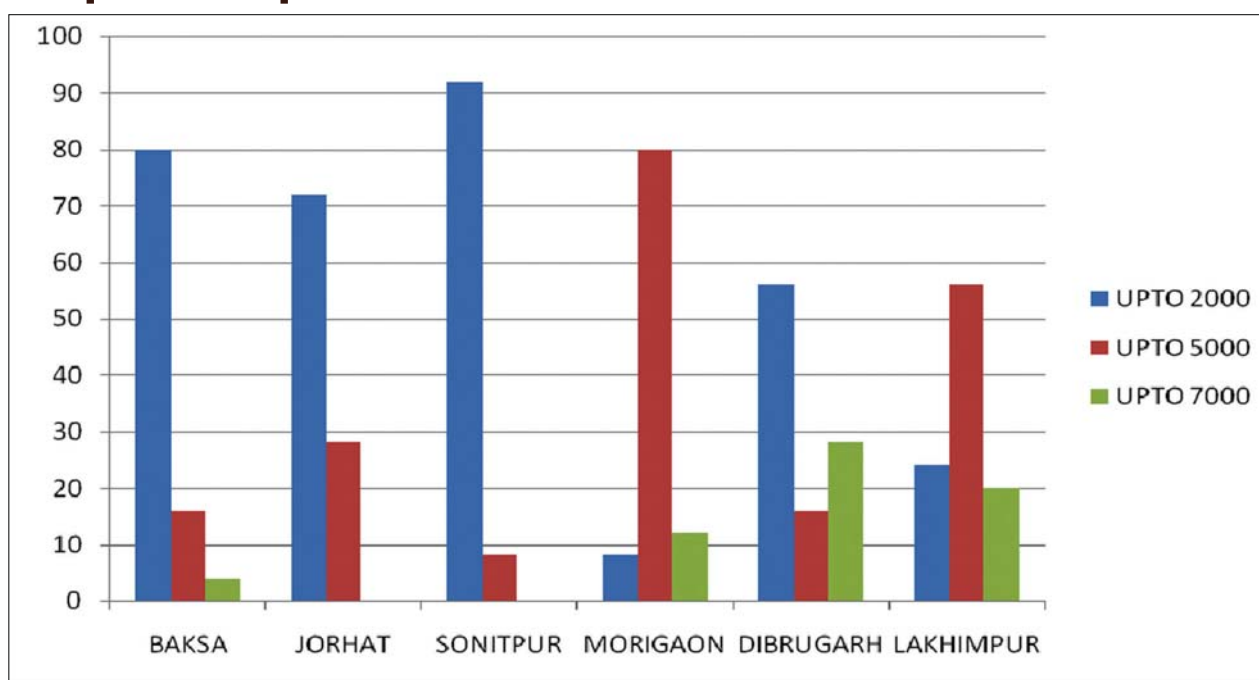
There were also cowherds among the respondents, who pointed out that with the flood situation in the state becoming adverse and unpredictable every year, many of their cattle gets washed off every year and this is contributing to their decline in income.

The cowherds also said that with adverse affects of climate change there has also been a sharp decline in the fodder and this is affecting the health of the cattle and also decreasing the milk out-put which in turn is affecting their income.

2.11 HOUSEHOLD EXPENDITURE

Yearly Expenditure	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Upto ₹ 2000	80	72	92	8	56	24
Upto ₹ 5000	16	28	8	80	16	56
Upto ₹ 7000	4	-	-	12	28	20

Graphical representation



From the graphical representation it is clear that some of the household of Dibrugarh and Lakhimpur run into deficit.

Some of the respondents in these two districts said that, to cover up this deficit, they have started to form 10 -15 members self help groups.

Whenever money is needed they take loan from this group at a very low interest rate.

Regarding climate change, the respondents pointed out that their expenditure has gone up as a result of climate change.

The respondents, majority of whom are from farmer families, pointed out that now they have to buy additional manures and pesticides, and added that it is becoming an additional burden on their pocket.

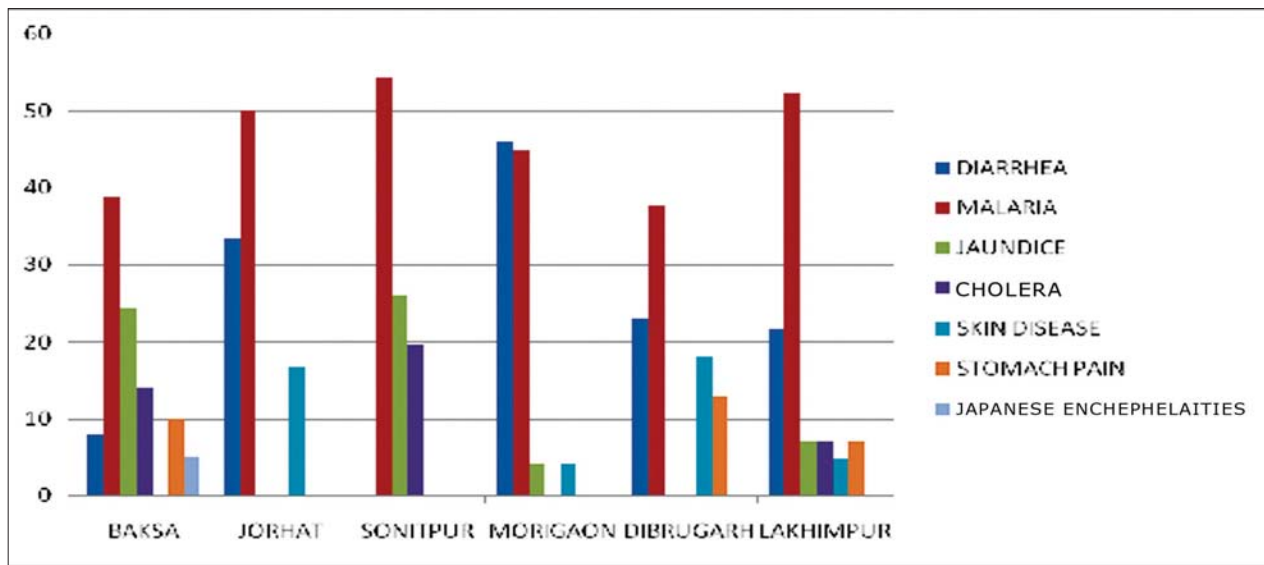
Similarly the respondents, households of whom are dependent on livelihood sources like fishery etc said that now their expenditure has gone up to a great extent as they are compelled to take measures to ensure their income doesn't go down further.



2.12 DISEASE

Disease	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Diarrhea	8	33.3	-	46	23	21.5
Malaria	38.7	50	54.4	46	37.7	52.4
Jaundice	24.3	-	26	4	-	7.1
Cholera	14	-	19.6	-	-	7.1
Skin disease	-	16.6	-	4	18	4.8
Stomach pain	10	-	-	-	21.3	7.1
Japanese Encephalitis	5	-	-	-	-	-

Graphic representation of Diseases the respondents feels are vulnerable to:



According to the survey carried out, a majority of the household in all the districts suffer from Malaria. In this regard, Sonitpur (54.4%) being the highest and Dibrugarh (37.7%) being the lowest. The highest number of diarrhea patients were seen in Morigaon (46%) followed by Majuli (33.3%).

Skin disease is highest in Dibrugarh (18%), followed by Majuli (16.6%).

In Dibrugarh most of the respondents being labourers in tea gardens, where heavy dose of pesticides are used, suffer from various skin diseases. A majority of the respondents informed that these days there has been a rise in the number of the pest attacks and to deal with this the tea gardens

use more pesticides than before, and also said that they are worried as it could harm them.

The respondents in Majuli pointed out that the cause of their skin disease is flood water.

The respondents further pointed out that with climate change and with the increase in the frequency and intensity of climatic events like flood and drought, there has been a rise in the occurrence of different diseases such as jaundice, diarrhea, malaria, skin disease etc.

The respondents and the participants at the FGD brought out that with frequent occurrence of flood it often leads to water logging which gives rise to diseases like Malaria, Cholera, Diarrhoea, skin infection, jaundice etc

PART II

3.1 Perception of the Impacts of Climate Change

The perception regarding the impacts of climate change has also been explored in the present study through qualitative and quantitative approach. The women think that due to the excessive misty weather, paddy is destroyed in the winter. It creates problems in agricultural activities.

On the other hand, excessive rainfall in monsoon submerges the paddy field. They stated that in the present time higher level of flooding damages the crop. Their house and toilets are destroyed. They construct platforms inside their house to live on this. Children are affected by different diseases like dysentery, jaundice, skin disease, malaria, cold and fever. They have stated that in the past it used to rain sufficiently, and at that period they applied less fertilizer in the land and it worked properly. The yield was satisfactory. Nowadays sometimes it rains very little and when it rains, it is excessive. As a result land is becoming unfertile, and they apply excessive fertilizer to cover up the lacking, which increases cost of rice production.

At the study site of Dibrugarh, the women informed about the gradually decreasing tea production. They think all these are happening due to impacts of climate change and uncertainty of rainfall. Furthermore, they believe that after flood, pest and insects attacks is on the rise in their crop fields, and they believe it damages both grains and vegetables. Their food and social security have become fragile because of the disasters.

Respondents have also pointed out that they have observed changes in seasonal cycles as well, and said sometimes it does not rain in the monsoon, or the winter does not appear when it is supposed to turn up, and also they do not follow a uniform sequence. It rains excessively when unexpected and does not rain when it is expected. They pointed out that they are hit by floods three times a year. First in the month of April, second in the month of June and lastly in the month of August-September. They are affected severely by the

June-July floods since they remain for a longer period. So people cannot predict anything. This is having a bad impact on agriculture and fisheries.

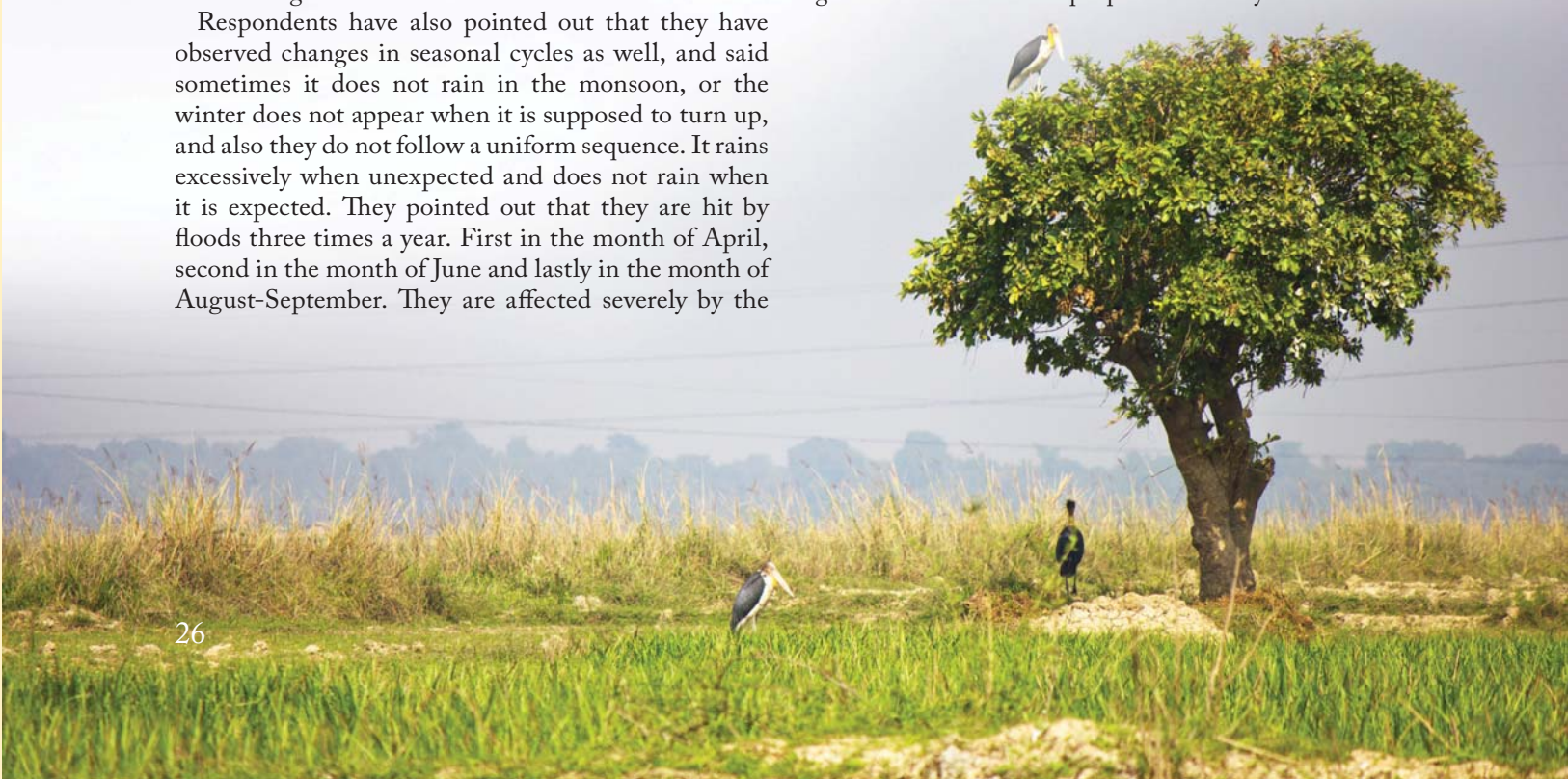
The respondents also pointed out that the seasonal vegetable are not growing properly due to the climate not getting sufficiently cold, and so vegetables supply is often insufficient in the market.

The survey data shows that majority of the population acknowledge that climate change is taking place. According to the survey, about 29.8 percent of the respondents in Dibrugarh, and 27.3 percent in Lakhimpur recognizes increased temperature as one of the sign of climate change.

Increase of flood intensity has been pointed out by 31.8 percent in Lakhimpur which is the highest followed by 25 percent in Morigaon. Increased drought as a common feature of climate change was addressed by very significant number of respondents (34.4% in Baksa and 26.1% in Sonitpur and Morigaon).

Water logging is seen as an impact of climate change by 17.8% respondents, and only in Dibrugarh. About 28.6% population in Dibrugarh recognizes excessive rainfall as one criterion to assess the climate change.

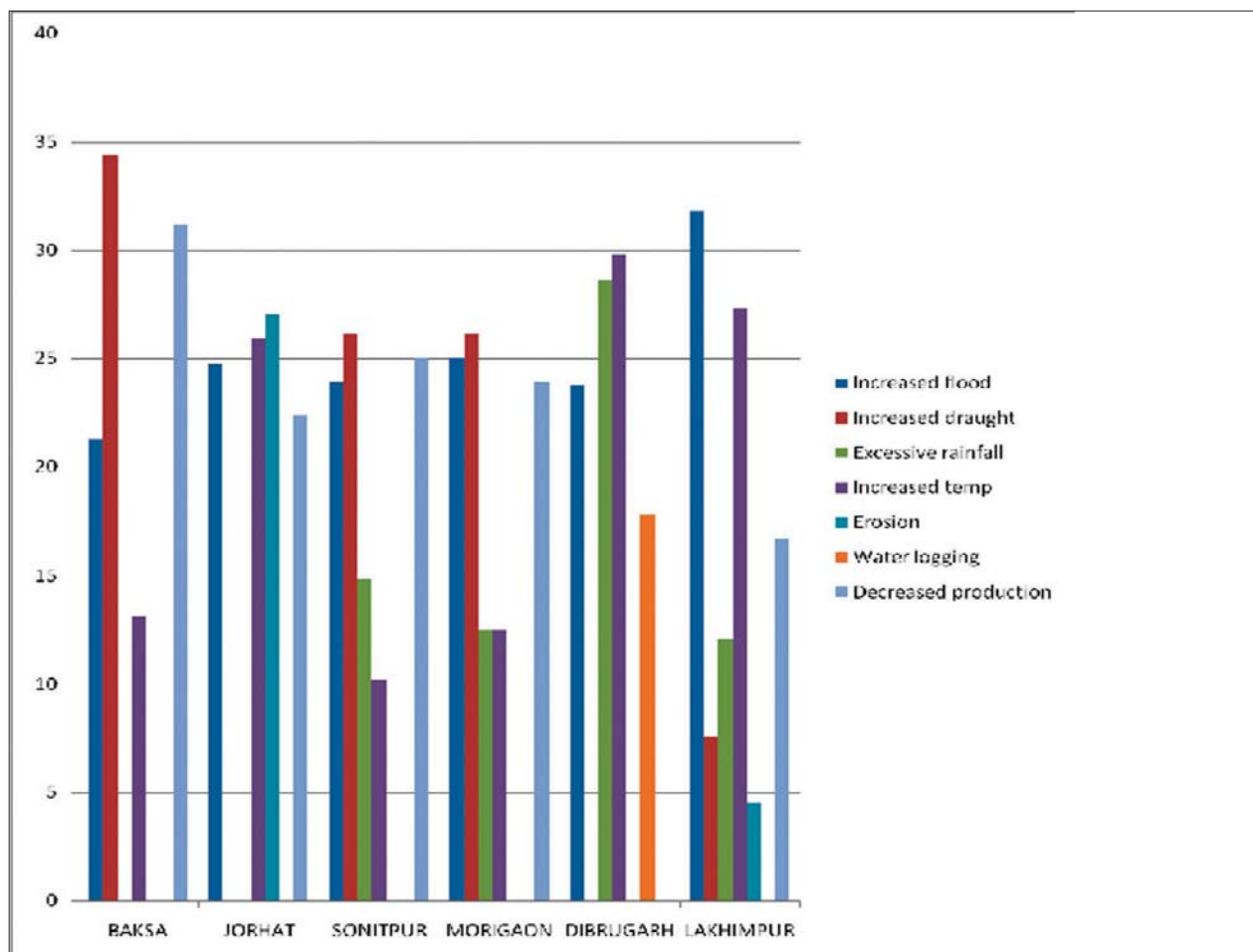
In contrast, increased erosion has been described as one of the major sign of climate change by 27 percent of the respondents in Majuli. Decreased agricultural production has also been addressed as a sign of climate change by significant number of the people at the study sites.



Perception of Climate Change

	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Increased flood	21.3	24.7	23.9	25	23.8	31.8
Increased drought	34.4	-	26.1	26.1	-	7.6
Excessive rainfall	-	-	14.8	12.5	28.6	12.1
Increased temperature	13.1	25.9	10.2	12.5	29.8	27.3
Increased erosion	-	27	-	-	-	4.5
Water logging		-	-	-	17.8	-
Decreased production	31.2	22.4	25	23.9	-	16.7

Graphic representation of perception of Climate Change



According to surveys data, the respondents viewed that there had been increase in temperature, flood, uncertainty of rainfall (e.g., erratic rainfall and heavy rainfall and decrease of rainfall).

3.2 Impact of Climate Change on the education of women

District	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Impact	76	16	72	76	-	80

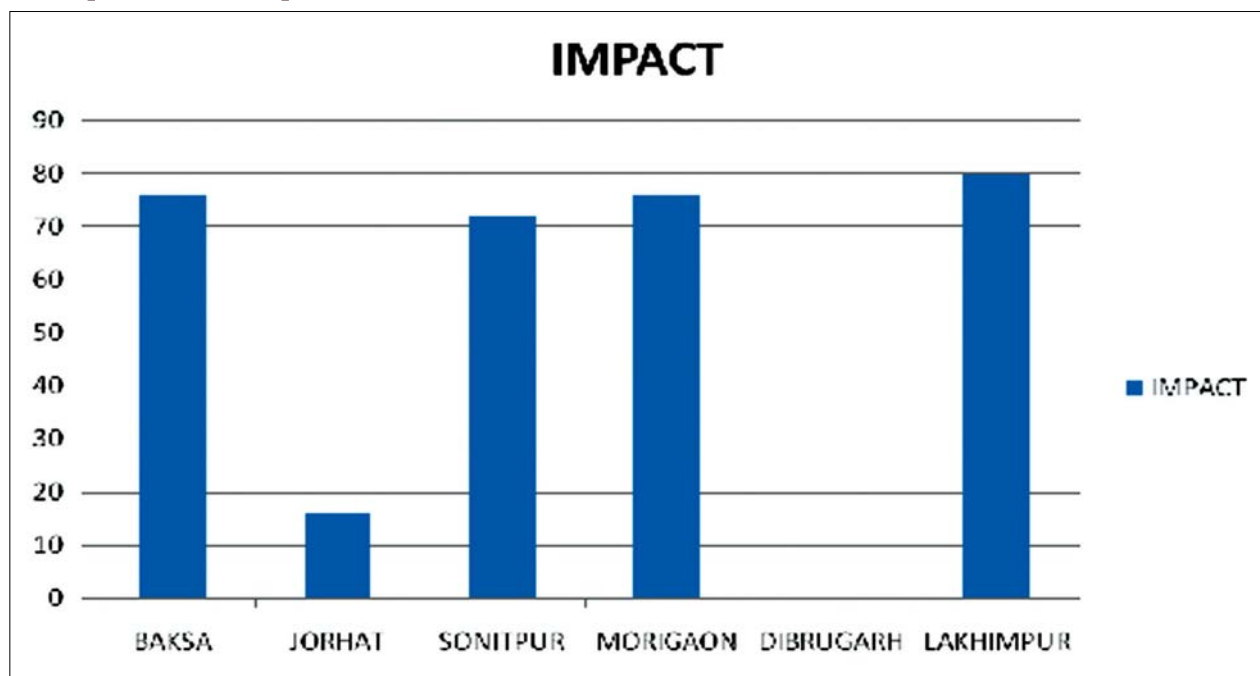
In the survey it was seen that 80 percent of the respondents from Lakhimpur believes that there has been impact of climate change on the education of marginalized women. In their response, most of the women had mentioned that damage to communication as a result of flood, and sudden and severe flood has been among the reasons how climate change has been affecting the education scenario in the district.

Many of the respondents also pointed out that flood adversely affects their income which in turn affects their education, and also mentioned that climate change has been intensifying this. Majority of the respondents also pointed out that whenever there is a financial problem in the family, it is the female members in the families who are asked to drop out from educational institutes.

The respondents from the Dibrugarh district, however, are of the opinion that climate change has not affected the education scenario.



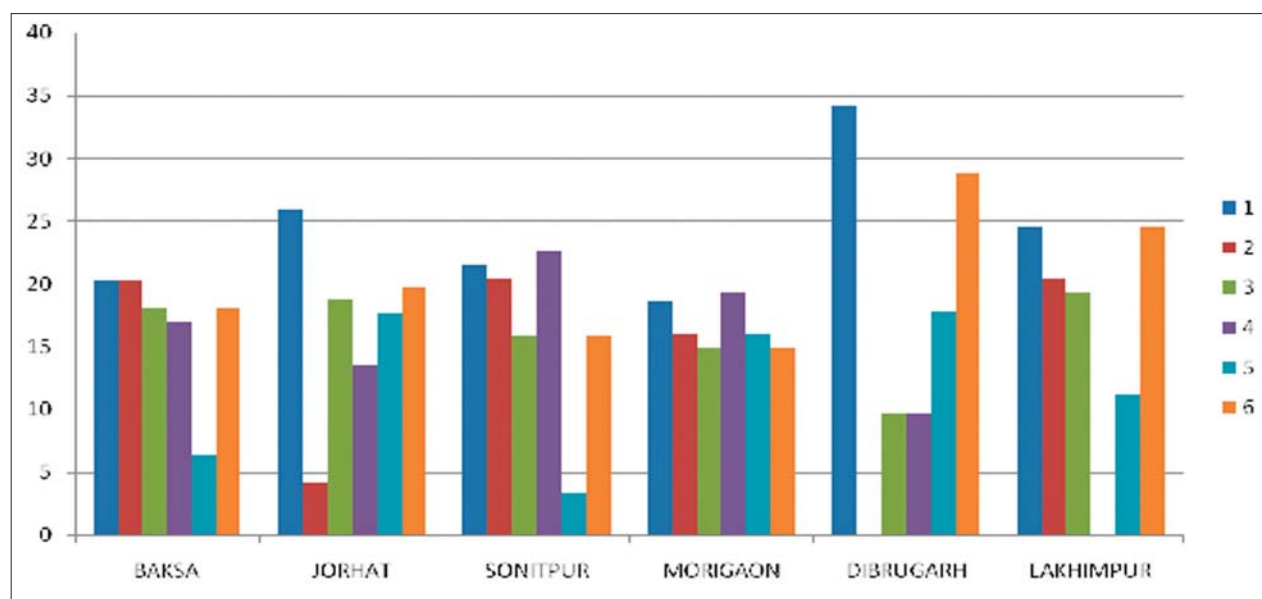
Graphical representation



3.3 Vulnerability of Women during disaster

	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Food	20.2	26	21.6	18.6	32.2	24.5
Education	20.2	4.2	20.5	16	-	20.4
Safe water	18.1	18.8	15.9	15	9.6	19.4
Collection of essential goods	17	13.5	22.7	19.4	9.6	-
Communication	6.4	17.7	3.4	16	17.8	11.2
Health	18.1	19.8	15.9	15	28.8	24.5

Graphic representation



1= Food, 2= Education, 3= Safe water, 4= Collection of goods, 5= Communication, 6= Health

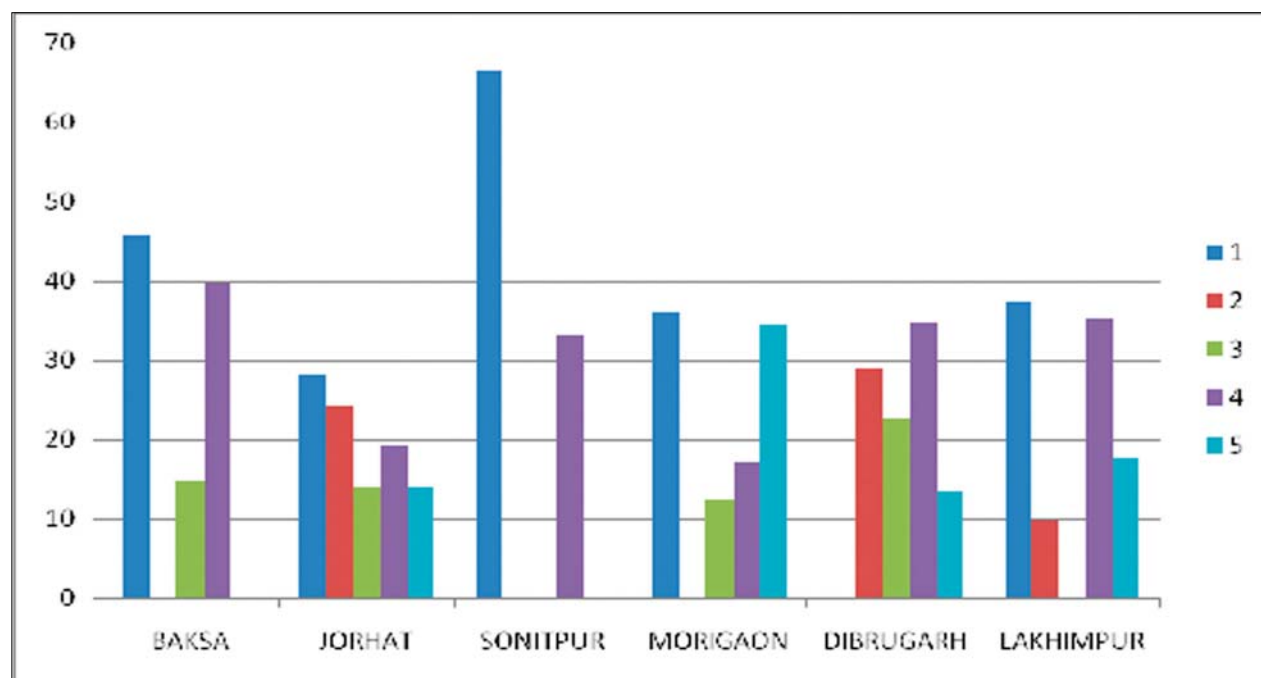
The information collected as part of the study reveals that during disaster, most of the women face problem in preparing food and also faces food crisis later on. They encounter problem in cooking the food as there is lack of firewood and dry material to set fire in the oven.

Again flood disrupt communication making women more vulnerable. This hampers their education and also gives problem in collection of essential goods. One of the major problem faced by women during disaster is lack of toilet facilities. They can't maintain hygiene, and also women can't maintain privacy when all men and women stay together in the shelter.

3.4 Impact of Climate Change on Income and Expenditure

Causes	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Decrease in production due to draught & flood resulting decrease in income	45.8	28.2	66.7	35.9	-	37.3
Increase of Expenditure due to Repairing of damaged houses caused by flood	-	24.4	-	-	28.8	9.8
Increase in Expenditure due to treatment	14.6	14.1	-	12.5	22.7	-
Cant work much due to in-creased temperature resulting decrease in Income	39.6	19.2	33.3	17.2	34.9	35.3
Communication problem due to flood resulting decrease in Income	-	14.1	-	34.4	13.6	17.6

Graphic representation of Climate Change Impact of on Income and Expenditure:



- 1= Decrease in production due to draught & flood resulting decrease in income
2= Expenditure due to Repairing of damaged houses caused by flood
3= Increase in Expenditure due to treatment
4= Cant work much due to increased temperature resulting decrease in Income
5= Communication problem due to flood resulting decrease in Income

The survey pointed out that income of the majority of the households are affected by drought and flood.

66.7% of the respondents of Sonitpur revealed that their agricultural production has declined as a result of rise in drought and flood. Many of the respondents also pointed out that as a result of increased and sudden flood situation, very often their livestock which they rear, gets washed off and it affects their income.

They also stated that higher level of flooding damages their houses and toilets, and they are forced to reconstruct and repair their houses and it results in increase of their expenditure.

28.8 percent household among the respondents in Dibrugarh suffers from this problem.

Several respondents also pointed out that due to

increased flood there is a rise in diseases in the family which also increases the expenditure in the families.

The respondents also mentioned that their expenditure increases accordingly, and 22.7 percent people in Dibrugarh reported about this.

Most of the respondents also mentioned about the rising temperature and how it has become unbearable in the summer due to over warming, and as a result of which they can't work for a longer period like before due to increase in temperature. As a result of this their income decreases.

This is highly evident in Baksa (39.6%) followed by Lakhimpur (35.3%).

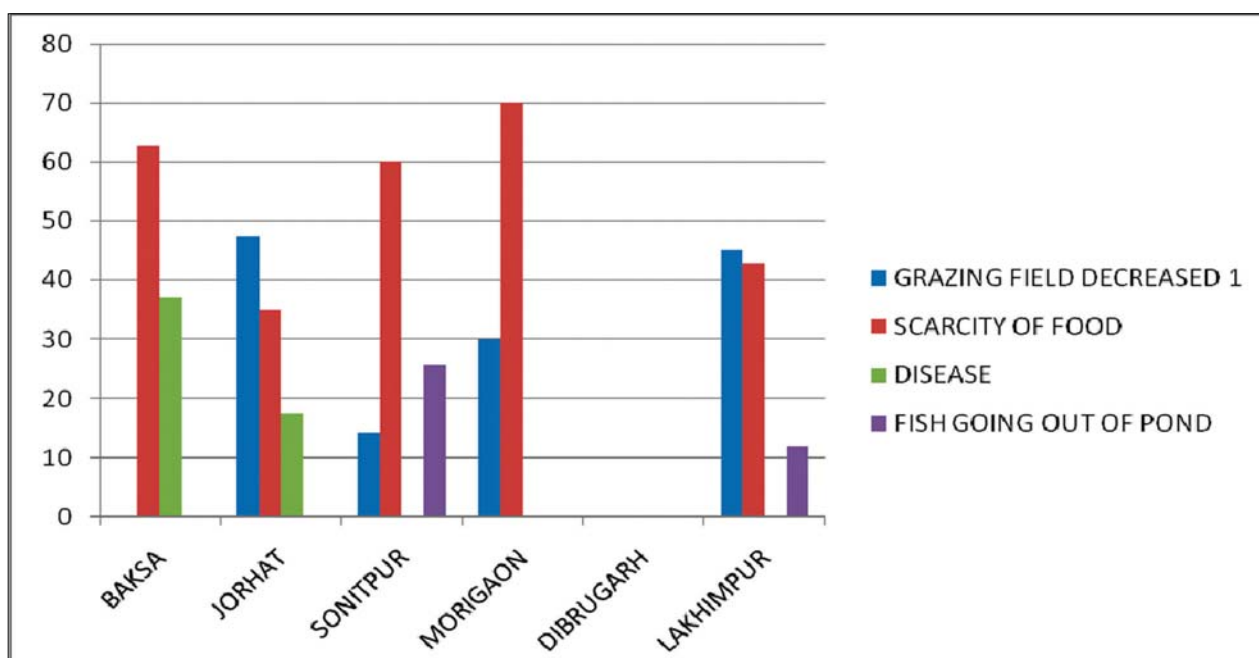
Also very often flood and water logging disrupts the communication facilities, as a result of which people can't go to work. This affects mostly the daily wage labourers.



3.5 Problem faced in rearing domestic animals due to Climate Change

	Baksa (In %)	Jorhat (In %) (Majuli)	Sonitpur (In %)	Morigaon (In %)	Dibrugarh (In %)	Lakhimpur (In %)
Decrease in grazing field	-	47.5	14.3	30	-	45.2
Scarcity of food	62.9	35	60	70	-	42.9
Diseases	37.1	17.5	-	-	-	-
Fish going out from pond due to flood	-	-	25.7	-	-	11.9

Graphic representation of problem faced in rearing domestic animals due to Climate Change



Many of the respondents who earn a living by rearing domestic animals pointed out that they are also facing a lot of problems as a result of climate change. Majority of them said that due to excessive rainfall, most of the grazing fields are submersed by flood water, which is creating a big problem for the domestic animals. In this regard Majuli reported the highest percentage (47.5%) followed by Lakhimpur (45.2%).

Besides this, river bank erosion is also another cause for decrease in grazing fields.

70 percent respondents in Morigaon mentioned that during both flood and drought fodder becomes scarce for the domesticated animals.

37.1 percent respondents from Baksa mentioned that as a result of various impacts of climate change, there has been an increase in the disease of the domestic animals.

Households which are engaged in fishery as their source of livelihood pointed out that excessive flood water damages their fisheries and often puts them in huge losses. This has been reported by 25.7 percent of the respondents in Sonitpur, and 11.9 percent in Lakhimpur.

PART III

4.0 Focal Group Discussion

At all the locations where the survey was carried out, two focal group discussions (FGD) were also held. The FGDs were attended by the respondents to the survey, senior citizens, social workers, social activists, political activists and common people.

A representative from CESPR was present at all the FGDs and took note of all the important discussions.

The FGDs were basically held on the following points:

1. Women's perception and experience on climate change and its impacts,
2. Climate change related disasters and vulnerability of women (according to household well being in terms of: Livelihood, Food, Clothing, Shelter, Safe Water, Health, Sanitation, Social Security, Agriculture, Fisheries, and Livestock),
3. Cultural and social values restricting mobility and decision making power of women
4. Specific problems that women have to face as a result of climate change,
5. Identify existing coping mechanisms for combating disasters individually or collectively by women and men.



SUMMARY OF THE DISCUSSIONS OF THE FOCAL GROUP DISCUSSION:

4.1 Baksa

(The Focal Group discussions at the Baksa district were held at Pukhuri-par village on June 20 and 21, 2012)

At Baksa, the primary source of livelihood is agriculture, and climate change has gradually started affecting this source of livelihood. During the discussion, the participants also mentioned that till about a decade back they used to raise two to four crops and used to earn enough for themselves, but gradually this has started falling down. Most of the participants at the discussion who were basically farmers, also said that now it is increasingly becoming difficult to be dependent



on the rain for their cultivation.

At the FGD, the participants also said that since the past 6-7 years in an effort to supplement the family's income as a gradual decrease of income from agriculture, the women folk in the villages have also started working in the field and also as labourers.

The women also said that now a days the intensity and frequency of flood has increased many folds, and this is affecting their economic condition. Few women also pointed out that this affects communication and transport to a great extent, and this puts them at major difficulties and crisis.

Majority of the women present at the discussion also said that they have now realized how climate change is gradually affecting them, and for this they have decided to work out ways to minimize its impacts.

Several of the women have also formed small groups through which they are doing their bit to solve the problem, which includes plantation, creating awareness about the importance of plantation and greenery etc. The women groups have also approached the district administration seeking help regarding creating awareness among the people in their area.

4.2 Sonitpur

(The Focal Group Discussions at Sonitpur district were held at Komar Chubri village on June 29 and 30, 2012)

At Sonitpur the basic source of livelihood is agriculture, and they are heavily dependent on rain water for their agricultural practices.

At the focal group discussion, which was conducted at the district, the participants informed that there has been significant impact of climate change on the marginalized women in the district.

During the discussion, the participants elaborated that earlier the women folk didn't go out to work and they were

occupied in the household chores, but now things and conditions have changed with increased unpredictability in the climatic conditions.

Majority of the participants pointed out that their primary livelihood source has been affected with impacts of climate change such as---increased and unpredictable rainfall, drought and increase in temperature.

Few of the participants also pointed that there has been instances in which families had to discontinue the education of the girl child as they wanted the girl child to supplement the work force at home while the elder members in the family had to look for work outside.

Krishna Nath, a social activist who was present during the focal group discussions pointed out that as a result of various impacts of climate change there has been impact on the basic and primary source of livelihood which is agriculture, and as a result of this the female folk of many of these families have been forced to look for alternate sources of income which includes working as daily wage labourers and as domestic help in households in nearby towns.

Many of the participants at the discussions also said that this has given rise to a sense of social insecurity among the women as it is something completely new for them. Earlier incidence of women folk in a family going out to work just to supplement the family's income was something very rare.

Another participant at the focal group discussion, Kaushik Goswami, who is a social worker pointed out that there has been impacts on the health of the women folk, and also said that this is somewhat related to climate change.

In his explanation, Goswami said that since the last decade or so there has been an impact of the earnings of the marginalized families, and this has affected the quality and quantity of food products purchased by the families, and since the women folk in this part of the world usually take their food after serving the food to the entire family, very often they are usually left with very little for themselves.

4.3 Jorhat

(The Focal Group Discussions at Jorhat were held at Alimur Mishong village, Majuli on June 24 and 25, 2012)

The basic livelihood of the populace of Majuli, the largest river island in the world depends on agriculture, with a small percentage being dependent by working as daily wage labourer.

At the focal group discussions held at Majuli, a majority of the participants pointed out that till around twenty five years back almost all the marginalized households in





4.4 Morigaon

(The Focal Group Discussions at Morigaon were held at Potua Kata village on June 20 and 21, 2012)

The basic livelihood source for the people of Morigaon is agriculture, and besides this a small portion is also engaged in rearing of cows, goats etc.

At the focal group discussions which were held at Morigaon, majority of the participants pointed out that as a result of climate change there has been a rise in temperature, and also the frequency and intensity of flood has increased, which is affecting their source of livelihood.

Few of the elderly farmers also said that earlier when there used to be flood, it used to be a blessings for them as the flood water used to be there on the field for one or two days and it used to bring fertility to their field. However now it is not so, as the intensity of the flood these days is much higher and it devastates their basic livelihood source.

Most of the farmers also said that their agricultural production has gone down over the years, and this is affecting their source of income for the families.

At the discussion the people who are engaged in animal rearing said that, since the last decade or so the animal which they rear for their livelihood have become more prone to diseases and as a result of this the profit margin has gone down.

Majority of the women participants also pointed out that since the last several years there has been a pressure on the women folk by the family in their area to contribute to the family's income, which is something completely new for the women in those areas.

This is giving rise to social problems for the women both in the family and outside, as it is something completely new for them. The participants said that most of these women have never gone out in search for work outside, and feels vulnerable while going out to work. Besides

the island were dependent on agriculture but now it is not so, as thousands of such families have started exploring other options for their basic livelihood.

The participants pointed out that climate change has affected the marginalized women of the island to a great extent, as it is severely affecting agriculture.

Most of the participants also pointed out that they have seen extremity in the climatic events, and now there is abnormal rainfall when it rains and extreme dryness during the dry period.

During the course of the discussions, participants pointed out that this has brought a change in the social scenario for the women in the island.

At the discussion, Bharati Borah, who is a social activist based at the river island said opportunities for women as daily wage labourers are limited in the rural areas of the island, and for this they have to go in search of work to the nearby towns and this makes them vulnerable to social problems.

Majority of the participants at the discussion also mentioned that the rate of erosion of the island has accelerated in the past few decades or so, and erosion has left several prosperous farmer families homeless and the women folk of these families have turned into daily wage labourers.



this it is also causing problem in their family as they are not able to devote much time for their family members like before, and in a few cases this has also given rise to domestic issues.

4.5 Dibrugarh

(The Focal Group Discussions at Dibrugarh were held at Mohanbari tea estate on July 5 and 6, 2012).

At Dibrugarh, the participants were mostly tea garden workers, and most of them are engaged as labourers in tea gardens, which also provides them accommodation.

During the course of the discussion, majority of the participants pointed out that with climate change the temperature is becoming much warmer, which is giving them a lot of hardship.

A majority of the respondents also pointed out that as a result of the climate becoming warmer they are not able to work as hard as they used to before, and this is hampering their earning.

The women participants at the focal group discussions (FGD) at Dibrugarh, most of whom were very poor also pointed out that to supplement their families income, the women folk since the past decade or so, have started going out in search of work to nearby areas in the towns.

Many of the women from such families have started working as daily wage laborers in nearby areas, and few have also started working as domestic help in houses in nearby areas.

Several of these women pointed out that this has created an imbalance in their family, as earlier they had never worked elsewhere to supplement the family's income.

The participants also mentioned that very often this creates a lot of problem in their families, as they are not able to devote adequate time to their husbands and children.

4.6 Lakhimpur

(At Lakhimpur the Focal Group Discussions were held at Kathori-bari village on July 8 and 9, 2012)

At Lakhimpur, during the focal group discussion (FGD), almost all the respondents mentioned that they have witnessed a rise in temperature, and also a change in the overall rainfall pattern. The respondents also said that as a result of increase in the flash and sudden flooding, very often sand and silt gets

deposited on the agricultural land which damages the fertile land and makes it unfit for cultivation.

As a result of this there has been a change in the occupation of many of these families, and many families have slowly started shifting from agriculture as the primary occupation.

Majority of the respondents also pointed out that these days it is a very common phenomenon for a woman to go out in search of work, but this was not something common a few years back.

Few respondents also mentioned that several farmer families which were once prosperous, have now asked their daughters to discontinue school and have asked them to find work at the earliest to supplement the families income.

Many of the women respondents said that as a result of all these changes, this has had a very severe effect on the livelihood of the families, and this is also hampering the social status of the women.

Many of the participants also pointed out that climate change is also affecting the silk industry in the area on which several lakh people, including women are dependent. Rising temperatures and changing weather patterns linked to global warming are threatening the silk industry in India's northeast, jeopardizing the livelihoods of several lakh people.

According to researchers, the ideal temperature for rearing silkworms ranges between 24 and 32 degrees Celsius, with a humidity level of 80 to 85 percent, but in the last few years, temperatures have risen and this is affecting production.



4.7 OBSERVATIONS FROM THE SURVEY AND FOCAL GROUP DISCUSSION (FGD)

From the survey and FGD which were carried out in six different locations across the state, it has been observed that Assam has already started witnessing the impacts of climate change and this is gradually increasing.

Most of the marginalized women are not educated upto the level of high school, and with this qualification it is not possible to find a decent job nearby, so as a result of this the only option left for them is to work as daily wage laborer.

It has also been seen that climate change is having a major impact on the poor and marginalized section of the society, and the women is always more vulnerable to the impacts of climate change.

It has also come to light that there is a major impact of climate change on the social security and social status of marginalized women in the rural areas.

Besides this there has been a decline in the income of most of the families as a result of climate change, and to supplement the families income many of the women folk have started working as daily wage labourers.

The overall research also shows that with an increase in climate change, the marginalized women are likely to face more problems which includes problems related to health, livelihood sources, and social security.

Another reason for concern is the impact of the declining household income on the female members in the families, which also includes the girl child in the family. In some of the areas surveyed, families have even opted to discontinue the education of the girl child to ask her to work, or to ask her to do the household chorus in the house while her mother goes out in search of work to supplement the families income.

PART IV

Report on Consultation on 'Climate Change and its impact on marginalized women'

As part of the research work, a regional level consultation on Climate Change and its impacts on Marginalized Women in Assam was held on October 28, 2012 by the CESPR and RGVN, in collaboration with INECC.

For the consultation people from different parts of the state were invited which included social activists, government officials, academicians, and also marginalized women from different parts of the state.

Apart from the presentation, there were discussions on the problems faced by the marginalized women and their households in the rural areas of the state, and how adverse affects of climate change such as change in the rainfall pattern in the state, and increasing drought are affecting the livelihood of the marginalized women.

There were also discussions on possible solution to these problems through both traditional wisdom and present scientific methods. The discussion also ranged

around issues of education, health, social security and also economic issues.

The meet was formally inaugurated by the deputy commissioner of Kamrup (Metro) District, Ashutosh Agnihotri who welcomed the initiative of CESPR in addressing an issue of vital importance, which, incidentally has not come to focus as yet.

He also hoped that the deliberations would go a long way in seeking solutions to the problem.

Siddharth D'Souza, associated with INECC said the excessive floods on the River Brahmaputra river is an impact of global warming and will continue to affect a large section of the population.

Film director and advisor, CESPR, Rupanjali Gogoi Hazarika, said women are severely affected by environment which has a negative impact on their health and social lives. She also referred to the largest river island Majuli, which is devastated by floods every year.



Kamrup Metro DC Ashutosh Agnihotri addressing the participants at the Consultation

SESSION I

A formal introduction of all the participants was made after the inaugural session. Various participants from Morigaon, Jorhat (Majuli) and Baksa also talked about the various changes that have come in their ways of life and livelihood options over a span of few years, mostly due to the devastating floods or lack of it.

While presenting the findings of the study, member CESPR, Manisha Medhi observed that experts have categorized the North East as a very fragile and environmentally sensitive zone which may be severely susceptible to climate change.

Peoples' perception of climate change

While not noticing any marked change brought by climate change, most people interviewed, perceived climate change as the presence of more diseases, more rainfall and change in weather pattern. According to the findings, while earlier, the rains used to be just adequate to fill the water bodies and water the crops, in the following years, change in the rainfall pattern has resulted in decreased agricultural output,

with a direct and indirect effect on the women.

Although flood is an annual problem in the state, earlier people knew how much rain to expect and what to do in case of floods. But due to climate change and the resultant unprecedented floods, standing crops are regularly destroyed, causing great economic loss. Besides, due to rise in temperature, farmers can no longer work in their fields as long as they used to.

Earlier during April and June, there used to be rain which would herald the arrival of monsoon, allowing farmers to take out their farming implements and prepare the fields. But due to climatic change and erratic rainfall pattern, farmers are left at the mercy of the rains.

The climatic condition also varies greatly from place to place, with drought on one hand in Baksa while heavy floods erode away huge tracts of land in Majuli and Dibrugarh.

Impacts of climate change

► **ON FLOODS:** While discussing the impact of climate change on people, it was found that because of flood, communication is often disrupted as surging water washes off roads and national highways, leaving the people marooned. Disruption of communication is a bigger hindrance for girls and women by affecting their mobility.

In Baksa, annual floods have brought much devastation

by damaging roads which causes many problems to the inhabitants in the area. Because of bad conditions of roads, people are forced to take alternative routes, time and money while travelling.

► **EXTREME EVENTS:** In the discussion that followed among the representatives from various districts, a representative from Majuli said they did not know what to do in situations of flood, as there was never a problem of such extensive flood earlier. In Sonowal Kochari area of the district, for instance, an embankment broke and silt and water covered the houses and fields of the entire area, rendering them inhabitable and unusable for almost the next 10 years.

► **ERRATICITY OF RAINS:** Another participant said it is the randomness of the rains that is causing much distress among the people in the district.

Effect of erratic rain: Because of the flood and erosion, people are encroaching forest lands after their own homes got washed away in the flood. But this is giving rise to man-animal conflicts with wild animals increasingly making foray into human settlements, damaging houses, destroying crops or carrying away livestock.

The economic fallout of flood results from having to bear additional expenses resulting from flood like repairing houses damaged in flood and loss of standing crop resulting in children dropping out of school, especially girls.

► **ON LIVELIHOODS:** Climate change is affecting production of crops while instances of diseases have increased, especially of the skin, with the result that many people are forced to change their mode of occupation, mostly to pisciculture and animal husbandry.

In Sonitpur district on the other hand, ¹eri cultivation has decreased considerably as the trees on which the silk worms feed are decreasing due to climatic change, forcing people to opt for other forms of livelihood option.

A number of indigenous fruits, animals and birds have disappeared or decreased in number.

► **EFFECT ON WOMEN:** The study found that women have to go a long way to procure the essentials of life, including pure drinking water, fuel and food items naturally available. There is also the problem of open defecation, which occurs when houses and toilets get submerged under water.

¹ Eri Silk comes from the worm *Samia cynthia ricini*, found in North East of India and some parts of China and Japan. The name Eri is derived from the Assamese word 'era', which means castor as the silkworm feeds on castor plants. Eri silk is also known as endi or errandi in India. The eri silk worm is the only completely domesticated silkworm other than *Bombyx mori*.

In Baksa, during winter seasons, the rivers dry up and women and children are forced to pick up stones from the river beds and sell them for few rupees. Children have to give up their studies to aid their parents in manual labour. There is often no easy access to drinking water while fields dry up, rendering them useless for agricultural purpose.

The numbers of child marriages have also gone up, according to a participant from the district, as parents of impoverished families find it an easy way to provide a better future for their girl children. With changing climatic conditions playing havoc with agricultural output, poor families with large family size, especially with a number of girls give away their daughters in marriage to anyone found eligible.

However, though such activities take place under the radar of law enforcement, there is no tangible record of the actual number of such marriages and the researchers had to satisfy themselves with the information provided by the participants.

Impact of changing climate on women

Such changes in livelihood option, consequent of which women are have forced women to move out of doors to seek employment elsewhere, is on the other hand, leading to repression of women, especially from rural areas where men traditionally were the bread earners but had to concede this right to the women after agriculture became unsustainable.

Although the Baksa district does not suffer the onslaught of flood, the soil does not retain water, as a consequence of which there is often drought during the dry season for which farmers suffer a lot. Besides, a general rise in temperature has increased the demand for local brew.

Besides, schools remain closed for a large part of the year either due to flood or due to absence of students.

Till the time the flood recedes in September—October, people are forced to sit back as they cannot farm and to sell off the livestock cheap.



SESSION II

Adaptation to climate change

COPING PROCESSES AND ADAPTATION MECHANISMS:

In Morigaon district, among the Tiwa community, people are taking to pig rearing and making local brew, the residue of which is used as fodder for pigs. Such is the demand of the local drink that whole families are engaged in preparation of the item, which is often sold at the house itself, in makeshift bars while children are made to work as waiters, due to which their studies suffer greatly.

Moreover, several NGOs and women welfare groups are working in the district to empower women and several self help groups have also been formed which are availing the several government schemes. In places where women were earlier kept indoors, they are coming out in large numbers and venturing in to various livelihood options, especially taking to weaving commercially which generate good source of income.

The participants were especially eager to explore alternative avenues of income generation in keeping with the changes brought by the erratic rains and flood. One suggestion that came from a participant was to upgrade the dry fish market in Jagiroad in Morigaon district, which can easily be developed into Asia's biggest dry fish market. He specially stressed the need for employing scientific methods for drying, packaging and marketing the fish to cater to popular demands.

In Dibrugarh, the changing climatic conditions have forced people to give up agriculture in favor of manual work, especially women, who work for cheaper rates. However, this has also given rise to illegal trafficking of women for prostitution and forced labour.

In Majuli, although the natural flood does not last long, the artificial flood caused due to release of water from dams in Arunachal Pradesh and China results in much misery for the people of the riverine island.

The situation in tea gardens is critical, especially for the women as they cannot participate in plucking tea leaves like before and hence do not earn much. The literacy rate is only 10 per cent and people there suffer immensely. The problem is compounded as most people do not have coping mechanism to flood.

A common complaint from all the participants was, however, that government benefits are not reaching to the deserving while others are reaping the benefit at the cost of the deserving, especially the MGNREGA schemes.



Expert's Opinion

When asked about their opinion from the panel of experts, member secretary, Assam State Commission for Women, Monideepa Borkotoky told the participants that the Deputy Commissioners (DC) of their respective districts should be informed of any lapses in performance of duties by departmental officials.

Stressing the need for more research, she said that the Commission is committed to working for women and their problems and urged women to come out of their homes and take advantage of the government schemes. She also laid stress on better education of the women so that they become more aware and empowered about their rights.

Head, environment division, Assam Science Technology and Environment Council (ASTEC), Jaideep Barua said there is much need for better scientific interpretation to discuss whether it is due to climate change or social change. He also laid stress on the importance of alternative livelihood.

Executive director of Rashtriya Gramin Vikas Nidhi (RGVN), Dr Amiya Kumar Sharma pointed out that climate change is a major issue and more indepth research is needed.

Project officer, Tata Institute of Social Sciences, Kankana Narayan Dev said the concept of alternative housing materials should be explored especially in the area of bamboo as it is a low cost material and its large scale plantation can also be used as fodder for wild herds of elephants in areas where there is man-animal conflicts.

Deputy Secretary, Home Department, Bhaskar Phukan, said the issue of climate change is a global issue which touches every one, but its impact has not been studied as yet. He said that although people are more concerned with rainfall pattern and flood, but global warming as a whole is a pertinent issue on its own and needs to be considered seriously.

He pointed out that a major cause of global warming is the extensive use of fossil fuel, for which hydroelectric

energy or nuclear energy may offer a sustainable alternative. Steps taken in the right direction can go a long way in meeting the challenges brought by global warming like sowing of Boro rice or jute cultivation in Baksa district which can survive flood to a large extent, he added.

Referring to the annual flood, Phukan said that the people will have to learn to live with it and adapt to the changes brought due to it. Because while the problem may be global, the solution should be local, he reasoned.

When suggestions were again sought from participants for steps to mitigate the problem of climate change in their immediate vicinity, most participants said that forestation can play a major role in stopping erosion and thwarting signs of global warming besides offering avenues of livelihood. Locally endangered plants and animals will also benefit from the step.

Apart from aforestation, shallow water bodies can be dug out and developed into place of tourist attraction while the beds of seasonal water bodies that dry up during the winter can be used for agricultural purposes.

Siddharth D'Souza said while a lot of people are looking at global warming as an environmental issue alone, it is also a political and economic issue. Global warming is the result of man's actions, especially in the advanced nations which have been causing much environmental degradation since the Industrial Revolution.

SESSION III

In the last session of the daylong convention, all the participants were divided into four groups and a question was put to each, seeking an answer to the queries. The questions were—

1. Change in the social status of women due to climate change
2. Gender disparity as a result of climate change
3. Social/Cultural impact of climate change on women
4. Change in economic status of women due to climate change.

In the discussion that followed the first question—'change in the social status of women due to climate change', participants identified this problem with the following situations—according to the participants, due to climate change, girls and women had to stop going to schools and colleges and were confined to the house, as the family could not afford to send them for higher education any more. This limits the scope of participation of women in important decision making process both in

the family as well as the society. Besides, the families who lost their homes to flood and erosion faced major problem in issues relating to sanitation for the women.

When the next group was asked their observations on the question, 'Gender disparity due to climate change', participants observed that with the loss of agricultural lands, men in villages have taken to drinking and harass their wives and other female members of the family. Besides, in such situation, the burden of running the family falls on the woman of the house who has to struggle hard for existence. Again, girls get pulled out of schools when the family falls into adverse situation, thus depriving them of education and other facilities. Specially, when both the parents work and young children are present, the elder siblings have to take care of them.

To the third problem put to the participants about the impact of climate change on the social and cultural lives of women, the general response was that due to loss of agricultural lands, houses and other properties to flood and erosion, people are becoming economically weaker compared to earlier years, with many families forced to relocate altogether for fear of natural disasters. This causes displacement, both socially and culturally, especially for the women, who form an intrinsic part of the cultural aspects of the Assamese society. Besides, some cultural functions have to be readjusted according to the change of seasons which are becoming erratic.

To the final problem about the economic impact of climate change on women, the participants were of the opinion that the problem is more visible in the tea gardens where women play a major role, as unusual rain pattern is playing havoc with tea plantation. In such places, people are forced to give up their traditional jobs and take to alternative profession, which mostly include manual labour, that may not be as economically feasible as tea leaf picking.

Besides, in houses which have looms and women are engaged in weaving clothes, suffer as prolonged exposure to rain and flood water may damages the loom and the raw materials used to weave.

Presiding over the discussions that followed, Sangeeta Rani Kalita, assistant professor of the BRM government Law College said climate change is a reality that all people should realize and if the change is adverse, they should endeavor to master it. She said that man's want are limitless and if his wants exceeds his needs, there is disharmony in the natural order of things.

She pointed out that there are a number of international and national laws that addresses the issues of global warming but they are not implemented successfully anywhere, as a result of which the environment continues to be degraded to satisfy man's wants.

But simply sitting in Guwahati or any other city and discussing the problems will not serve the purpose nor

will solutions formulated in such places. The urgent need of the hour is to go to the root of the problem and implement the solution there. However, constructive discussions will go a long way in finding a solution to the problem all the same.

Referring to the theme of the convention, she said that people will have to ascertain why climate change takes place. Environmental change does not only mean change in temperature or rainfall pattern, it symbolizes a whole set of social, cultural, political and economic changes that may affect man.

However, she refused to generalize the assumption that boys are preferred for preferential treatment by parents in adverse situations.

Pointing out the general situation in the country, she said that the effect of climate change in other parts of the country is harsher. Blaming indiscriminate setting up of industries for posing a threat to the environment and the people at large, she called for steps, to ensure a sustainable development of both man and the environment.

5. Key Asks

The team of CESPR and the experts who were part of the research suggests the following measures:

Social Security:

► Immediate measures for the economic security of the marginalized women in the rural areas. More than anything else, economic security is of utmost importance to such women and both the government and other agencies working with this section of people can try to improve their economic conditions by developing certain skills that have good marketability and can be developed commercially like weaving.

► Government agencies should explore the alternative livelihood options available for the marginalized women in these areas, and should initiate some schemes at the earliest. This is especially important for women who were primarily engaged with agriculture earlier, but now find themselves out of work because commercial farming is not sustainable any more.

► Government should take up dialogues with the tea gardens in the state regarding providing adequate facilities to their workers including raising their daily wages. An average tea garden laborer receives Rs 84.5 per day but young girls, who are primarily engaged in plucking tea leaves receive only Rs 42.25 per day. There is no job security and there has been several instances of young girls being lured into 'bonded

slavery' and flesh trade after being offered good jobs in far off places.

► Free vocational training and courses should be initiated in the rural areas, specially for marginalized women.

► Government should launch free and compulsory education programmes for everyone, including girl child and women.

Education on Climate Change:

► Awareness programmes on climate change in the rural areas of the state, specially for marginalized women.

☒ ► Encourage students and young children to be more sensitive about the needs of sustainable development and teach respect for the environment through sensitization programmes and workshops.

Sustainable development

► Educate the farmers regarding improving their production through modernize and sustainable farming methods.

► Discourage jhum (terrace) cultivation on the hills across the state to ensure people do not fell trees and burn down forests lands for cultivation of cash crops.

► Government should initiate facilities for irrigation all over the state. With the change in climatic conditions throughout the state, farmers face lot of problem during the dry season as water in many rivers dry up or become unusable for watering the fields. As a result crops suffer. However according to reports of the Assam government itself nearly 40 percent of the irrigation projects in the state are presently not functioning. With irrigation facilities, farmers will be in a better condition to grow their crops, even in dry seasons, especially before the monsoon season, instead of waiting for the rains to arrive.

Research

► Government should do an in-depth research on the impacts of climate change in the state. A comprehensive research on the subject is long overdue and a proper understanding of the problem only can help both the government and the public understand the magnitude of the problem and devise strategies to overcome it.

► Government should take up steps for massive specified tree plantation all across the state.

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