

Community Perception on Climate Change: The Perspectives of Food Security and Livelihood

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Abstract—The brunt of climate change is well discernible to everyone; the perception to climate change has been differential based on the occupation, education, ecology, surrounding and mobility of a person, group or community. By the term climate change we mean and understand the change in meteorological parameters over times, in term of both eventualities and predictabilities.. The agricultural sectors are going to be the worst hit economy and sociology in India and all over the world. The impact of human health especially for the farmers who are destined to work under scorching sun and torrential rain is going to be harsh and results into increased health hazards and diseases. The study includes variables Community Perception on Climate change, Community Perception on Climate Change effects on Biodiversity , Community Perception on Climate Change effects on Crop Production , Community Perception on Climate Change effects on Crop Disease and Pest , Community Perception on Climate Change effects on Human Health , Community Perception on Climate Change effects on Food Security , Community Perception on Climate Change effects on Livelihood , the following variables has been selected and customized as score of Predictants. Seventy (70) respondents comprising of different age and community category have been selected from two villages (Bhaluka and Hatikanda) from different district of WestBengal, Nadia and North 24 Pargana respectively. It has been found that the following variables have recorded strong and significant causal impacts on Climate change perception viz:-It has been found that the variable Family Income (Rupee value/capita) (X_8) has got highest decisive impacts due to climate change The correlation analysis has evinced that the variables X_2 (Family size), X_5 (Total size of holding), X_6 (Fragments) and X_8 (Family income), have been significantly correlated with climate change perception.

Keywords: Climate change, Perception, Global warming, Change dynamics, Crop ecology

1. INTRODUCTION

The whole world is being operationally and conceptually stormed with the imminent danger of climate change. It is probably the most complex and challenging environmental problem facing the world today. The effect of climate change has already being disarm-able through the decline of crop yield, withdrawal of biodiversity and simmering rise of sea level.

Currently, the intriguing questions include weather uncertainties, persistent climatic abnormalities, rampant environmental degradation and imminent food insecurity. Some of the complexities are exacerbated by increasing human population and demand for more agricultural land for food production, resulting in the destruction of the vegetation cover and subsequently rampant environmental degradation. The demand for food, fuel wood (charcoal and firewood) and other forest products (including timber and poles for building and construction) increase this problem.

2. CLIMATE CHANGE

Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It may be a change in average weather conditions, or in the distribution of weather around the average conditions (i.e. more or fewer extreme weather events).

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a *change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.*

However the IPCC (2007) defines climate change as a *change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.*

The main conclusions of the IPCC (IPCC Tar Working Group 1, 2001) on global warming were the following:

- The global average surface temperature has raised 0.6 ± 0.2 °C since the late 19th century, and 0.17 °C per decade in the last 30 years.

- There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities, in particular emissions of the greenhouse gases carbon-dioxide and methane.
- If greenhouse gas emissions continue the warming will also continue, with temperatures projected to increase by 1.4 °C to 5.8 °C between 1990 and 2100. Accompanying this temperature increase will be increases in some types of extreme weather and a projected sea level rise. On balance the impacts of global warming will be significantly negative, especially for larger values of warming.

One of the sectors most affected by a changing climate is agriculture; greatly impacting the global food supply. The IPCC's Fourth Assessment Report note that 40% of Earth's surface is currently being used for food production which underscores the importance of this sector to humankind's well being (IPCC 2007). To further exacerbate the problem, agriculture is sensitive to multiple stressors which all need to be accounted for when planning for adaptation to future climate change.

3. OBJECTIVES OF THE STUDY

- To estimate and elicit the perception level on climatic components and on socioeconomic impact as consequent characters to ultimately analyze climate change perception.
- To study the socio-economic, socio-personal and communication characteristics of the selected respondents as having consequential impact on climate change perception.
- To estimate and analyze the degree of relationship of these characters with the climate change perception.
- To introduce some suggestive measures to reduce the climate change impact as perceived by the farmers.

4. REVIEW OF LITERATURE

Rathore Aparna and Jasrai T Yogesh (March, (2013) reported in International Journal of Scientific and Research Publications and showed the biodiversity conservation will lead to strengthening of ecosystem resilience and will improve the ability of ecosystem to provide important services during increasing climate pressures. This review basically focuses on the importance of biodiversity, the consequences faced by the plants, animals, humans and ecosystem owing to the global warming and climate change and the possible mitigation and adaptation strategies in terms of biodiversity conservation which can protect the planet from the consequences of climate change.

Sharma Umendra (May, 2011) reported in Forest Bio diversity Earth's Living Treasure reported the effect of global warming on Biodiversity in India, biodiversity: what is it,

where is it, and why is it important? Global warming effects on biodiversity and animals.

Sharma Kumar Dushyant and Mishra J K (2011) reported on Indian J.Sci.Res.2 (4): 137-139 that the impacts of environmental changes on biodiversity.

5. RESEARCH METHODOLOGY

Locale of Research:

The present study was conducted at Bhaluka village of Amdanga block of North 24 Pargana and Hatikanda Village Haringhata block of Nadia District of WestBengal. The districts blocks and villages were selected purposively due to the following reasons:

Sampling Design:

The purposive as well as simple random sampling techniques were adopted for the present study. It may be termed as multistage random sampling procedure. The districts, sub-division and villages were purposively selected for the study. An exhaustive list of respondents was prepared with the help of block officials for villages. From the prepared list to seventy respondents were selected randomly from each village for the final data collection.

6. RESULTS AND DISCUSSION

Table 1: Co-Efficient Of Correlation between Community Perception on Climate Change (Y_1) and Fourteen Independent Variables (X_1 X_{14})

Sl. No.	Variables	R-value	Remarks
1.	Age (Chronological Age) (X_1)	-0.1343	
2.	Family size(Number of Family Member) (X_2)	0.3187	**
3.	Education(year of schooling) (X_3)	0.1478	
4.	Gender ratio (X_4)	-0.0966	
5.	Total size of holding (bigha) (X_5)	0.4038	**
6.	Fragments (X_6)	0.396	**
7.	Cropping intensity (X_7)	0.1955	
8.	Family income(Rupee value/per capita) (X_8)	0.4225	**
9.	Interaction with TV (X_9)	0.0435	
10.	Interaction with fertilizer dealer (X_{10})	-0.0466	
11.	Interaction with news paper (X_{11})	-0.0368	
12.	Market interaction (X_{12})	0.0773	
13.	Livestock (X_{13})	0.0660	
14.	Fertilizer dose/bigha (X_{14})	0.1966	
	$r > 0.220$ significant at $p = 0.05$ (*)		
	$r > 0.287$ significant at $p = 0.01$ (**)		

Table-1 presents the coefficient of correlation between **Community Perception on Climate change (Y₁)** and 14 independent variables.

Results: It is found that the variables, **Family size (Number of Family Member) (X₂)**, **Total size of holding (bigha) (X₅)**, **Fragments (X₆)** and **Family income (Rupee value/per capita) (X₈)** have positive significant correlation with the dependent variable i.e. **Community Perception on Climate change (Y₁)**.

Revelation: The Bigger size of the firm family has added to their dependence on land-based agriculture which is again has become subject to the permanent impact of climate change and global warming. The more the number of the family number the higher is the risk generating from the brunt of climate change and to be conjured by the practicing farmer.

The total size of holding depicts the resource enrollment of any practicing future where the bigger size of recourse there is the higher intensity of risk as well. For a bigger size of holding, both the crop biodiversity as well as scope for technological intervention are good enough to develop a risk perception regarding climate change.

Interestingly a number of Fragments (X₆) has rendered a positive correlation with Community Perception of Climate Change (Y₁). This indicates that with a higher number of fragments distributed over a geospatial directly including high land, low land-medium land, water holding, homestead land etc, help built up the form perception on climate change with higher understanding.

Since our agriculture overwhelmingly dependent on dependent on vagaries of monsoon along with other eco-environmental factors, farmers income is also suffering from uncertainties and uncontrollable variability in a response to inconsistent in preferences. Farmers are close to nature, recipient of bliss at the same time a sink for risk as well.

Table 2: Co-Efficient Of Correlation between Community Perception of Climate Change Effects on Biodiversity (Weed) (Y₂) and Fourteen Independent Variables (X₁.....X₁₄)

Sl. No.	Variables	R-value	Remarks
1	Age (Chronological Age) (X ₁)	0.0102	
2	Family size(Number of Family Member) (X ₂)	0.145	
3	Education(year of schooling) (X ₃)	-0.046	
4	Gender ratio (X ₄)	0.017	
5	Total size of holding (bigha) (X ₅)	-0.106	
6	Fragments (X ₆)	-0.030	
7	Cropping intensity (X ₇)	-0.015	
8	Family income(Rupee value/per capita) (X ₈)	-0.029	
9	Interaction with TV (X ₉)	-0.030	
10	Fertilizer dealer (X ₁₀)	-0.078	
11	News paper (X ₁₁)	0.161	
12	Market interaction (X ₁₂)	0.233	*

13	Livestock (X ₁₃)	0.306	**
14	Fertilizer dose/bigha (X ₁₄)	0.174	
	r>0.220 significant at p=0.05(*)		
	r>0.287 significant at p=0.01(**)		

Table-2 presents the coefficient of correlation Community Perception of Climate Change Effects on Biodiversity (Y₂) and 14 independent variables.

Results: It is found that the variables, Market interaction (X₁₂) and Livestock (X₁₃) have a positive significant correlation with the dependent variable i.e. Community Perception on Climate change effects on Biodiversity (weed diversity) (Y₂).

Revelation: Market interaction makes the farmer aware about which weed is obnoxious and should be removed. With the change in climate the weed phenology is also getting changed, they become more vigorous and dominant in nature. Weed is one of the main reasons of crop failure, viz in case of upland rice weed can make up to 90 to 100 percent loss of crop production.

Livestock is the other blood circulation system for the farmer that helps the farmer to get some extra benefits. With the change in weed diversity the number of livestock is also getting reduced. Weeds become toxic and non-palatable to the livestock. The cattle got sick frequently and become non-profitable for the farmer community.

Table 3: Co-Efficient Of Correlation between Community Perception of Climate Change Effects on Crop Production (Y₃) and Fourteen Independent Variables (X₁.....X₁₄)

Sl. No.	Variables	R-value	Remarks
1	Age (Chronological Age) (X ₁)	-0.077	
2	Family size(Number of Family Member) (X ₂)	0.289	**
3	Education(year of schooling) (X ₃)	0.085	
4	Gender ratio (X ₄)	0.099	
5	Total size of holding (bigha) (X ₅)	0.173	
6	Fragments (X ₆)	0.231	*
7	Cropping intensity (X ₇)	0.195	
8	Family income(Rupee value/per capita) (X ₈)	-0.069	
9	Interaction with TV (X ₉)	-0.070	
10	Fertilizer dealer (X ₁₀)	-0.106	
11	News paper (X ₁₁)	-0.022	
12	Market interaction (X ₁₂)	-0.075	
13	Livestock (X ₁₃)	0.158	
14	Fertilizer dose/bigha (X ₁₄)	0.024	
	r>0.220 significant at p=0.05(*)		
	r>0.287 significant at p=0.01(**)		

Table-3 presents the coefficient of correlation Community Perception of Climate Change Effects on Crop Production (Y₃) and 14 independent variables.

Results: It is found that the variables, Family size (Number of Family Member) (X₂) and Fragments (X₆) have a positive

significant correlation with the dependent variable i.e. Community Perception on Climate change effects on Crop Production (Y_3).

Revelation: Family size of the farming community become significantly affected by change in crop production due to change in climate and global warming. This is very obvious that if the crop production is getting hampered, there will be less marketed surplus and farmers have to go for distressed sale. This indirectly affect the family size because if the number of the family will be less there will be less demand for food and other consumption goods.

Fragmented land holding is one of the major problems for the farmer of West Bengal. More the fragmented land more problematic to manage, as it become very much difficult for the farmer to manage different crop in the different field at the same time and it affects the crop production. So, this variable no of fragments (X_6) is very much relevant with the dependent variable Community Perception on Climate Change Effects on Crop Production.

Table 4: Factor Analysis: Conglomeration of 14 variables in 6 factors

Factors	Variables	% of Variance	Cumulative %	Factors Renamed
Factor 1	Family size(Number of Family Member) (X_2) Family income(Rupee value/per capita) (X_5) Fragments (X_6) Total size of holding (bigha) (X_8)	23.156	23.156	Family Income
Factor 2	Education(year of schooling) (X_3) Fertilizer dose/bigha (X_{14})	12.496	35.652	Capita
Factor 3	Total size of holding (bigha) (X_5) Interaction with TV (X_9) News paper (X_{11})	10.383	46.036	Access
Factor 4	Cropping intensity (X_{10}) Fertilizer dealer (X_7)	9.234	55.270	Resource
Factor 5	Gender ratio (X_4) Livestock (X_{13})	8.327	63.597	Empowerment
Factor 6	Market interaction (X_{12})	7.657	71.254	

Principle Component Analysis (Factor Analysis) has been conducted to identify the conglomeration (component) of homogeneous variables based on factor loading and ultimately to identify the dominant factor, rather than variable under which more than one variable are accommodated.

7. CONCLUSION

Climate change is the grim reality for global agriculture with 1 °C change in nocturnal temperature, the rice, and wheat productivity will go down by 20 and 12 percent respectively. The third world countries will be the recipient of worst impact of climate change on 17600 km coastal line of India around 30 percent of the total area will be inundated by 2050 with shimmering seawater level and will trigger up the migration of 230 million of people thriving with coastal line eco-system. The vagaries of monsoon will account for uncertainties of wages and livelihood for millions of farm families.

Modeling Community Perception on Climate Change itself is a difficult work. However, the multivariate analytical techniques have associated us to assist the complexity of different agro-ecological and socio-economic variable contributing both in clandestine and calibrated way to estimate

the climate change on food security and livelihood. The empirical evidence can go extremely important for generating micro-level policies towards mobilizing community for ushering for effective adaptation and mitigation to combat the colossal effects of climate change.

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