



# **Analysis of Farmers' Respondents on Awareness and Knowledge of Climate Change in Agriculture in Nagaland State India**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors equally contributed in preparation of this manuscript. The authors read and approved the final manuscript for publication.*

## **Article Information**

DOI: 10.9734/IJECC/2023/v13i92598

## **Open Peer Review History:**

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/104449>

**Original Research Article**

**Received: 04/06/2023**

**Accepted: 07/08/2023**

**Published: 10/08/2023**

## **ABSTRACT**

The impact of climate change can be seen on several crops in various regions and gives considerable insight into the anticipated effects on the food production in the North East India. In India particularly North East is taking on a visible shift due to the impact of climate change. Seasons and rainfall patterns change, rivers run dry and springs water no longer sustains communities whose livelihood depends on the existing water system to provide livestock needs, agriculture and household activities. Unplanned urbanization and economic development, deforestation and unsustainable land use in the mountainous region leads to excess surface water runoff, depletion of topsoil and poor operation and maintenance of water have all contributed to the

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challenge. An attempt has been made to collect the data from 300 farmers respondents based on Population Proportionate to Size (PPS) technique to assess the awareness and knowledge level about the impact of climate change on agriculture. The results revealed that the majority of the respondents were aware of climate change aspects like 'terms and meaning of climate change', 'increasing temperature year after year', 'crop damages', 'changes in season pattern', etc. Regarding the knowledge level of the respondents more than half of the respondents (58.00 percent) had a medium level of knowledge followed by low (24.67 percent) and high (17.33 percent) levels of knowledge about climate change and related issues.

*Keywords: Impact; climate change; awareness; knowledge.*

## 1. INTRODUCTION

The effects of climate change in the agriculture and livelihood sectors due to increased frequency of extreme weather, floods, droughts and decrease in crop yield are in public discussions and a great cause of concern to the government of India. The food security of India seems to be at risk in the future due to the threat of climate change. It leads to an increase in the frequency and intensity of droughts and floods, thereby affecting production for small and marginal farmers. The impact on forests and biodiversity will have adverse socio-economic implications for forests dependent communities and the national economy. Warmer summer season and colder in winter season is the consequences of the changes in earth's tilt, whereas much less earth's tilt leads to colder summer season and milder winter season [1].

A large proportion of the population of North East India is rural; hence agriculture plays an important role in determining the economy of the region. Particularly in the hilly states, Jhum cultivation is a dominant cropping pattern. Jhum is a local name for slash-and-burn agriculture practiced by the tribal groups in the North Eastern states. Although North East is probably the country's richest in terms of natural resources, the region lags behind the rest of the country in terms of per capita income and poverty levels. North East states could be attributed to a higher prevalence of natural disasters (floods, droughts, cyclones, and earthquake) and weak institutional structures to manage natural resources.

Nagaland is a North- East hilly state with mountainous terrain and it is richly endowed with natural resources. Predominantly it is an agrarian state with 70.00 percent of its population engaged and dependent on agriculture. Traditional Jhum (or) shifting cultivation is a common practice in the State due to

topographical terrain. It is primarily a subsistence agriculture based economy where Jhum is central to not only the survival needs but to the very existence, thinking, and psyche of the inhabitants of the state of Nagaland. The adverse effects of climate change will be felt most strongly by the poor farmers of Nagaland, as they have fewer resources to adapt socially, technologically and financially. Therefore, the objective of this study is to know the farmers' awareness and knowledge level about climate change in agriculture in Nagaland.

## 2. METHODOLOGY

The present investigation was carried out in the Chunlikha block of Tseminyu district, Nagaland State in India. The objective of the study is to assess the awareness and the extent of knowledge of farmers about climate change and related issues. The respondents were identified and selected from six villages out of thirteen villages under the Chunlikha Rural development block. Population Proportionate to Size (PPS) technique was adopted to select a sample size of 300 respondents. A list of items was prepared in objectives types and the data were collected using a well structured and pre- tested interview schedule. The awareness of the farmer respondents about climate change is measured on a two-point continuum namely 'aware' and 'not aware' and scores of 2 and 1 were given respectively. Regarding the knowledge level of the farmer respondents about climate change and related issues, the selected items were administered to the respondents. According to the scores, the farmers were categorized as low, medium, and high using cumulative frequency. Descriptive statistics were used. Hejase and Hejase content that giving data meaning leads to useful information. Furthermore, according to Hejase and Hejase [2], "descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that

can provide a better understanding of the collected data” (p.272). Percentage analysis and cumulative frequency method were applied for drawing conclusions and inferences.

### 3. RESULTS AND DISCUSSION

#### a) Awareness of the farmer respondents about climate change

The extent to which a community is aware of climate change reflects its level of exposure to climate risks. This data regarding the awareness of the respondents about climate change and its effects of the study area were collected, analyzed and presented in Table 1.

It could be observed from Table 1 that majority of the respondents were aware of the climate change viz., ‘terms and meaning of climate change’ (98.00 percent), ‘increasing temperature year after year because of climate change’ (95.00 percent), ‘global warming due to climate

change’ (92.00 percent), ‘variation in temperature due to climate change’ (88.32 percent), ‘crop damages due to weather extremities of climate change’ (86.67 percent), ‘floods and high intensity of rainfall is due to change in climate’ (85.00 percent). Similar findings were also reported by Aarthi et al. [3].

The awareness level of respondents on some of the consequences of climate change are ‘changes in season pattern because of climate change’ (78.33 percent), ‘reduction in number of rainy days due to climate change’ (76.67 percent), ‘intense wind velocity and storms is due to climate change’ (71.67 percent), ‘frequent cyclones are because of climate change’ (60.00 percent), ‘flash floods in the river bank are because of climate change’ (58.32 percent), ‘uneven distribution of rainfall is due to climate change’ (53.00 percent), and ‘decreasing productivity due to climate change’ (50.00 percent). Similar findings were also reported by Nwagbara et al. [4].

**Table 1. Distribution of farmer respondents according to their awareness about climate change (n= 300)**

Sl. No.	Particulars	Aware	Percentage (%)
1	Terms and meaning of climate change.	294	98.00
2	Increasing temperature year after year because of climate change.	284	95.00
3	Global warming is due to climate change.	276	92.00
4	Variation in temperature due to climate change.	265	88.32
5	Crop damages due to weather extremities of climate change.	260	86.67
6	Floods and high intensity of rainfall are due to change in the climate.	255	85.00
7	Changes in season pattern because of climate change.	242	78.33
8	Reduction in number of rainy days due to climate change.	230	76.67
9	Intense wind velocity and storms due to climate change.	215	71.67
10	Frequent cyclones are because of climate change.	180	60.00
11	Flash floods in the river banks are because of climate change.	175	58.32
12	The Uneven distribution of rainfall is due to climate change.	159	53.00
13	Decreasing productivity due to climate change.	150	50.00
14	Increasing heat and cold waves is due to change in the climate.	132	44.00
15	Industrialization is one of the main causes of climate change.	108	36.00
16	Ozone layer depletion is because of climate change.	96	32.00
17	The melting of glaciers and sea level rise is all because of climate change.	90	30.00
18	Acid rain is mainly caused by climate change.	67	22.32

**Table 2. Distribution of farmer respondents according to their overall knowledge level about climate change (n= 300)**

Sl. No.	Category	Number	Percentage (%)
1	Low	74	24.67
2	Medium	174	58.00
3	High	52	17.33
<b>Total</b>		<b>300</b>	<b>100.00</b>

The awareness levels of the respondents was found to be minimum in the aspects like 'increasing heat and cold waves is due to change in climate' (44.00 percent), 'industrialization is one of the main causes of climate change' (36.00 percent), 'ozone layer depletion is because of climate change' (32.00 percent), 'melting of glaciers and sea level rising is all because of climate change' (30.00 percent), 'acid rain is mainly caused by climate change' (22.32 percent).

It could be concluded that majority of the farmers were aware about climate change and its adverse effects. This may be due to the fact that majority of the respondents had fairly better level of social participation, mass media exposure and scientific orientation. This finding is in line with the findings of Onyegbula [5] and Ado et al. [6].

**b) Knowledge of the farmer respondents about climate change**

Knowledge of the farmers about climate change is studied with respect to different variables like rainfall patterns, temperature aspects, relative humidity aspects, heat and cold waves, environmental pollution, adverse effects of climate change on agriculture and other aspects.

The findings on the overall knowledge level of respondents on climate change are presented in Table 2.

It is observed from the data in Table 2 that more than half of the respondents (58.00 percent) had medium level of knowledge followed by low (24.67 percent) and high (17.33 percent) levels of knowledge about climate change.

It could be concluded that the reason for the medium level of knowledge about climate change might be due to the fact that the majority of the farmers had education from primary up to middle school level with medium levels of mass media exposure and social participation.

The majority of the farmers possessed a medium knowledge level which is passed to them from

their ancestors. In contrast, science and technology are making a vast contribution to improving the farming system, the real problem is the lack of application of existing knowledge. This is due to poor distribution of knowledge or when it is available the information is not in a form that is usable.

The failure to apply knowledge that conflicts with traditional practices, social and legal conventions, and the existing power structures within communities and nations. Similar findings were also identified by Kanagasabapathi and Sakthivel [7] and Burton et al. [8,9].

**4. CONCLUSION**

It is imperative that farmers possess the necessary skills and knowledge to implement alternative production techniques. A clear and distinct role for strengthening research particularly on climate change and extension services in vulnerable regions is the need of the hour. Consequently new policies should focus on awareness and knowledge creation on climate change related to agriculture through different sources such as mass media, newsletters, articles and extension services to the rural populace, particularly in the developing and underdeveloped regions and countries.

**5. LIMITATION OF THE STUDY**

The study was conducted by a research scholar who had limited time and other resources at his disposal. Some of the major limitations faced by research scholar are furnished below:

1. The area of investigation is confined to only one block of Kohima district. Therefore, the finding has to be viewed in specific context and should not be generalized for wider geographical area.
2. Since the present studies of data were based on awareness and knowledge from the respondents and as well as from secondary sources, some personal bias become inevitable.

3. Time bound programme of the study and the limit of resources for carrying out the study was another constraint of the research.
4. Sufficient efforts were made in making the study objective and systematic as much as possible. But there may be some bias and prejudices on the part of the investigator. However, these findings will be applicable wherever similar conditions exist.

### ACKNOWLEDGEMENT

I feel privileged in taking this opportunity to express my heartfelt gratitude and indebtedness to our loving Almighty God for unceasing love and blessing. I express my sincere thanks to my guide Dr. K. Kanagasabapathi, Professor, Department of Agricultural Extension, Annamalai University for his guidance, suggestions and correction of my research paper. This research did not receive any specific grant from funding agencies in the public, commercial, or not for profit sectors. It is purely for educational purpose.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

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