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Perception of Chickpea Growers towards Climate Change in Bemetara District of Chhattisgarh, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Climate change is the global phenomenon of climate transformation characterized by the changes in the usual climate of the planet regarding temperature, rainfall and wind) that are especially caused by human activities. Various detrimental effects have been recorded due to changes in weather patterns. The research explores the perception of chickpea growers towards climate change in Bemetara District of C.G. The study reveals that majority of chickpea growers exhibit a medium level of perception. The findings highlight the need for targeted interventions to improve respondents' perception and equipping them with necessary tools to manage the risk posed by climate variability.

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Keywords: Chickpea growers; climate change; perception; equipping.

1. INTRODUCTION

The long-term weather pattern in a specific location is known as its climate. "The average weather for a specific area and time period, typically spanning over 30 years, is another definition of it." According to the National Geographic Survey, it is indeed the typical weather pattern for that area. In addition to the natural climate variability seen over a similar time span, human activity that modifies the composition of the global atmosphere can be directly or indirectly blamed for climate change. The United Nations Framework Convention on Climate Change is known as UNFCCC.

Today, climate change has been recognized globally as the most pressing critical issue affecting the mankind survival in the 21st century.

Pulses in India have long been considered as the poor man's only source of protein as they are a low cost substitute for vegetables in periods of high prices of vegetables. India is the largest producer and consumer of pulses in the world.

After dry beans, chickpeas (*Cicer arietinum*) rank as the second most significant legume crop worldwide. India is the world's top producer of chickpeas, accounting for 68% of global production. It is India's most significant pulse crop. According to the most recent data, chickpeas are produced in 99.96 lakh hectares of land in India in 2021, yielding 119.11 lakh tons and 1192 kg/ha of productivity. (Bhopal, Directorate of Pulses Development) In Chhattisgarh (2021) area, production and productivity of chickpea are 3.02 lakh ha, 2.68 lakh ton and 887 kg/ha respectively. (Chhattisgarh Agriculture Statistics. Directorate of Agricultural, Raipur). The Bemetara district of Chhattisgarh is one of the most important chickpeas growing areas, and the increasing area under chickpea crop in the Bemetara district has changed the farmer's socio-economic status. The area under chickpea crop in the district is 67936 ha while the production is 59335 MT (DAA office report 2021-22).

Various detrimental effects have been recorded due to alteration in temperatures, like minimum and maximum temperature by 0.86 and 2.46°C along with decrease in rainfall by 268mm in a study on impact of climate change on productivity and adoption strategy for pulses (Dubey et al. 2011).

Therefore the present study was undertaken with the following specific objective:-

1. To assess the perception of chickpea growers towards climate change.

2. METHODOLOGY

The Bemetara district of C.G., which was purposefully chosen for the study out of the 33 districts of Chhattisgarh, was the site of the current investigation. The district has historically produced the most chickpeas, although in recent years, the region has seen a decrease in chickpea production. Saja and Bemetara were the two blocks that were specifically chosen since they produced the most chickpeas out of the four blocks. In each block, six communities were chosen at random. In order to create a sample size of 120, a list of chickpea growers from certain villages was created with the assistance of RAEOs. Ten chickpea growers were chosen at random from each of the specified villages.

Perception of chickpea growers about climate change was the centre point in the study. Perception is the process by which n individual receives an information or stimuli from the environment and transform it into psychological awareness. To ascertain level of perception regarding climatic events or changes, respondents were asked about 26 selected events/changes occurred in each on environment and agriculture. The responses are to be recorded on five points. The scoring for positive statements was 5,4,3,2 and 1 and for negative statements 1,2,3,4 and 5 for strongly agree, agree, undecided, disagree and strongly disagree.

3. RESULTS

3.1 Perception of Chickpea Growers towards Climate Change

Table 1, shows that the majority of respondents (70.00%) had a medium level of perception towards climate change, followed by (16.67%) had high level of perception and (13.33%) had low level of perception towards climate change.

Table 1. Distribution of respondents based on their perception towards climate change

S. No.	Category	Frequency	Percentage
1.	Low (Up to 99)	16	13.33
2.	Medium (100 -106)	84	70.00
3.	High (Above the 106)	20	16.67
Total		**120**	**100.00**
Mean = 103.34		**S.D. = 3.2185**	

From the result it is concluded that majority of the respondents possessed medium level of perception towards climate change

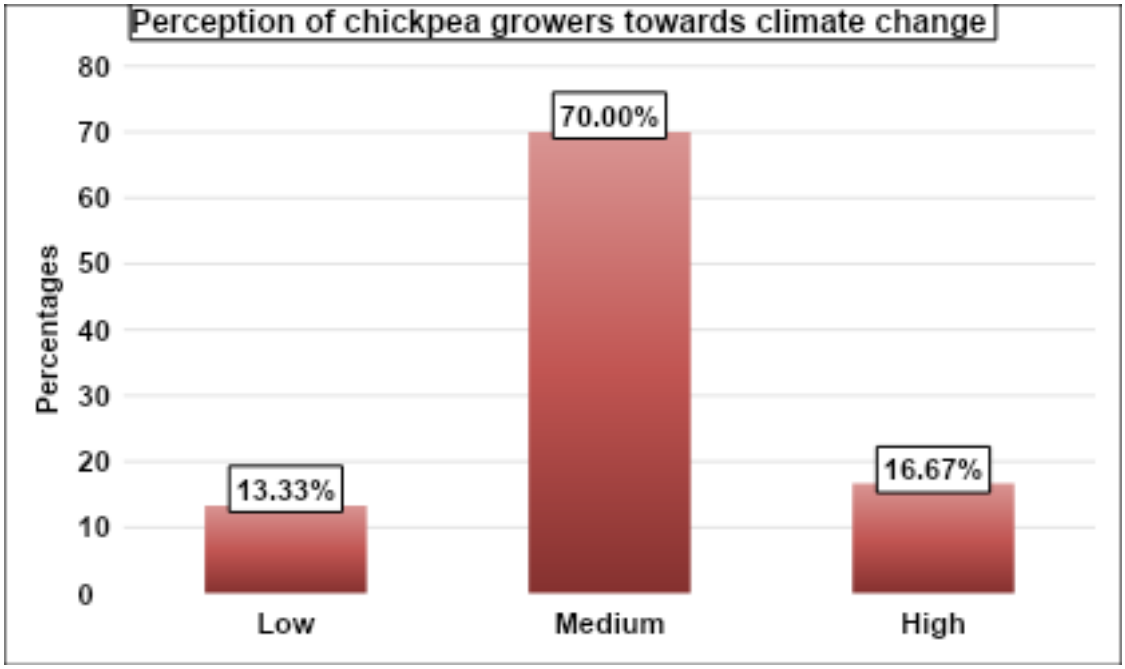

Fig. 1. Distribution of respondents based on their perception towards climate change

Table 2, shows that the majority of the chickpea growers 97.50 per cent strongly agreed with the statement that high temperatures affect the chickpea crop. While, 02.50 per cent agreed with this statement.

The majority of the chickpea growers 90.00 per cent agreed about the statement that weather variation makes chickpea cultivation more difficult. However, 09.17 per cent and 00.83 per cent strongly agreed and undecided, respectively, with this statement

The majority of the chickpea growers 56.67 per cent strongly agreed with the statement that chickpea sowing is done later due to the delay in the arrival of the monsoon in Kharif. While 43.33 per cent agreed with this statement.

About 49.17 per cent of chickpea growers were undecided about the statement that chickpea varieties are not adaptive to changing climatic conditions. However, 33.33 per cent agreed, but 09.17 per cent and 08.33 per cent strongly disagreed and disagreed, respectively, with this statement.

The majority of the chickpea growers 68.33 per cent strongly agreed with the statement that the number of irrigations change in chickpea crop due to high rainfall variation. while, 31.67 per cent agreed with this statement.

The majority of the chickpea growers 88.34 per cent undecided with the statement that traditional varieties of chickpea crop are getting extinct. While 11.66 per cent agreed with this statement.

The majority of the chickpea growers 90.00 per cent undecided about the statement that chickpea crop growth affected due to fluctuation in temperature during winter. However, 08.33 per cent and 01.67 per cent strongly agreed and agreed, respectively, with this statement.

Table 2. Distribution of respondents based on their perception of chickpea growers towards climate change

S. No.	Statements	SA		A		UD		DA		SDA	
		F	%	F	%	F	%	F	%	F	%
1	High temperatures affect the chickpea crop.	117	97.50	03	02.50	00	00.00	00	00.00	00	00.00
2	Weather variation makes chickpea cultivation more difficult.	11	09.17	108	90.00	01	00.83	00	00.00	00	00.00
3	Chickpea sowing is done later due to the delay in the arrival of the monsoon in Kharif.	68	56.67	52	43.33	00	00.00	00	00.00	00	00.00
4	Chickpea varieties are not adaptive to changing climatic conditions.	00	00.00	40	33.33	59	49.17	10	08.33	11	09.17
5	The number of irrigations change in chickpea crop due to high rainfall variation.	82	68.33	38	31.67	00	00.00	00	00.00	00	00.00
6	Rainfall fluctuation is commonly occurring more these days.	92	76.67	28	23.33	00	00.00	00	00.00	00	00.00
7	Traditional varieties of chickpea crop are getting extinct**.**	00	00.00	14	11.66	106	88.34	00	00.00	00	00.00
8	Chickpea crop growth affected due to fluctuation in temperature during winter.	10	08.33	02	01.67	108	90.00	00	00.00	00	00.00
9	Low temperature causes flowers abortion and delays pod set in chickpea crop.	103	85.83	17	14.17	00	00.00	00	00.00	00	00.00
10	Chickpea cropping techniques are changing due to climate change.	00	00.00	100	83.33	20	16.67	00	00.00	00	00.00
11	Water requirement increase in chickpea crop due to climate change.	62	51.67	58	48.33	00	00.00	00	00.00	00	00.00
12	Heavy fog affecting chickpea cultivation practices.	39	32.50	81	67.50	00	00.00	00	00.00	00	00.00
13	Chickpea maturity is affected due to more rainfall variation.	20	16.67	100	83.33	00	00.00	00	00.00	00	00.00
14	Decrease area of chickpea crop due to climate variation.	72	60.00	48	40.00	00	00.00	00	00.00	00	00.00
15	Cropping patterns are changing due to climate change.	73	60.83	47	39.17	00	00.00	00	00.00	00	00.00
16	Duration of summer season is prolonged.	103	85.83	17	14.17	00	00.00	00	00.00	00	00.00
17	Climate change causes more losses in the chickpea crop.	39	32.50	57	47.50	24	20.00	00	00.00	00	00.00
18	Pest attacks are more due to climate change in the chickpea crop.	74	61.67	46	38.33	00	00.00	00	00.00	00	00.00
19	More occurrence of diseases due to climate change in the chickpea crop.	61	50.84	59	49.16	00	00.00	00	00.00	00	00.00
20	The productivity of chickpea crops has changed due to extreme weather events.	92	76.67	28	23.33	00	00.00	00	00.00	00	00.00
21	The cost of cultivation increased due to more expenditure on pesticide, herbicide and fungicide.	17	14.17	103	85.83	00	00.00	00	00.00	00	00.00
22	The price of fertilizers and pesticides more increase due to climate variation.	00	00.00	48	40.00	72	60.00	00	00.00	00	00.00
23	Wages increase in chickpea cultivation according to weather changes.	22	18.33	88	73.33	10	08.34	00	00.00	00	00.00
24	Temperature change has little effect on chickpea production.	15	12.50	33	27.50	00	00.00	59	49.17	13	10.83
25	Quality of chickpea crop reduce due to extreme changes in climate.	00	00.00	120	100.00	00	00.00	00	00.00	00	00.00
26	The method of irrigation changes due to changes in rainfall patterns.	00	00.00	16	13.33	05	04.17	99	82.50	00	00.00

(SA - Strongly agree, A – Agree, UD – Undecided, DA – Disagree, SDA - Strongly disagree)

(F = Frequency, % = Percentage)

The majority of the chickpea growers 85.83 per cent strongly agreed with the statement that low temperature causes flowers abortion and delays pod set in chickpea crop. while, 14.17 per cent agreed with this statement.

The majority of the chickpea growers 83.83 per cent agreed with the statement that chickpea cropping techniques are changing due to climate change. while, 16.67 per cent undecided with this statement.

The majority of the chickpea growers 51.67 per cent strongly agreed with the statement that water requirement increase in chickpea crop due to climate change. while 48.33 per cent agreed with this statement.

The majority of the chickpea growers 67.50 per cent agreed with the statement heavy fog affecting chickpea cultivation practices. while 32.50 per cent strongly agreed with this statement.

The majority of the chickpea growers 83.33 per cent agreed with the statement that chickpea maturity is affected due to more rainfall variation. while 16.67 per cent strongly agreed with this statement.

The majority of the chickpea growers 60.00 per cent strongly agreed with the statement that decrease area of chickpea crop decrease due to climate variation. while 40.00 per cent agreed with this statement.

The majority of the chickpea growers 60.83 per cent strongly agreed with the statement that cropping patterns are changing due to climate change. while 39.17 per cent agreed with this statement.

The majority of the chickpea growers 85.83 per cent strongly agreed with the statement that duration of summer season is prolonged. while 14.17 per cent agreed with this statement.

About 47.50 per cent of chickpea growers were agreed about the statement that climate change causes more losses in the chickpea crop. However, 32.50 per cent and 20.00 per cent strongly agreed and undecided, respectively, with this statement.

The majority of the chickpea growers 61.67 per cent strongly agreed with the statement that pest attacks are more due to climate change in the chickpea crop. while, 38.33 per cent agreed with this statement.

The majority of the chickpea growers 50.84 per cent strongly agreed with the statement that more occurrence of diseases due to climate change in the chickpea crop. while 49.16 per cent agreed with this statement.

The majority of the chickpea growers 76.67 per cent strongly agreed with the statement that the productivity of chickpea crops has changed due to extreme weather events. while 23.33 per cent agreed with this statement.

The majority of the chickpea growers 85.83 per cent agreed with the statement that the cost of cultivation increased due to more expenditure on pesticide, herbicide and fungicide. while 14.17 per cent strongly agreed with this statement.

The majority of the chickpea growers 60.00 per cent undecided with the statement that the price of fertilizers and pesticides more increase due to climate variation. While 40.00 per cent agreed with this statement.

The majority of the chickpea growers 73.33 per cent agreed about the statement that wages increase in chickpea cultivation according to weather changes. However, 18.33 per cent and 08.34 per cent strongly agreed and undecided, respectively, with this statement.

About 49.17 per cent of chickpea growers were disagreed about the statement that temperature change has little effect on chickpea production. However, 27.50 per cent, 12.50 per cent and 10.83 per cent agreed and strongly agreed and strongly disagreed, respectively, with this statement.

The total numbers of the chickpea growers 100.00 per cent agreed with the statement that quality of crop produce reduces due to extreme changes in climate.

The majority of the chickpea growers 82.50 per cent disagreed about the statement that the method of irrigation changes due to changes in rainfall patterns. However, 13.33 per cent and 04.17 per cent agreed and undecided, respectively, with this statement.

4. CONCLUSION

It is concluded that the majority of respondents had a medium level of perception towards climate change. This suggests a critical need for targeted educational programs and support system to improve their understanding of climate change and building resilience against the challenges posed by climate change.'

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

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Details of the AI usage are given below:

1. https://www.statskingdom.com/correlation-calculator.html

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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