

RESEARCH NOTE

Farmer's Perception about Climate Change in Plain Zone of Chhattisgarh

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ABSTRACT

In order to making informed decisions about climate change, timely and useful information is necessary about the possible consequences of climate change, people's perceptions of those consequences, available adaptation options, and the benefits of slowing the rate of climate change. To examine how farmer's have been perceiving the consequences of changing climatic conditions, a study was conducted in plain zone of Chhattisgarh state in the year 2013-14 & 2014-15. For the purpose, 240 farmers of 24 villages of Chhattisgarh plain were interviewed. Majority of the respondents were belonged to middle age group ranging from 46-60 years of age and more than two third of them belonged to other backward class. Among respondents more than half of them educated up to middle to higher secondary level. Most of the respondents were residing as joint family with 5 to 8 members in their family. A little more than half of them had 21 to 40 years of farming experience. Majority of the farmers (70.00%) were fully aware about rise in the risk of crop failure due to climate change has increased. Findings on farmer's perception regarding change in climate indicated that almost three fourth of the respondents perceived the timing of rain onset has increased and more than 83 per cent of the respondents were reported that rainy days frequency has decreased. They have been experiencing no change (58.75%) in total amount of precipitation over the past 15 years. The majority of farmers (76.67%) believed that the minimum temperature in winter season had increased. Decreasing trend in number of cool days was reported by 75.42 per cent of the respondents. Furthermore, about 76 per cent of the respondents said that maximum temperature in summer is increasing, while, nearly three fourth of them were responded that duration of summer season has increased. Moreover, about 63 per cent of the respondents perceived high level of changes in climatic condition in winter season because they felt that minimum & maximum temperature in winter has increased and number of cool & heavy fog days has decreased. Nearly 67 per cent of the respondents reported that high level of changes occurred in summer season due to increasing trend in minimum & maximum temperature, duration of season and number of hot days.

Key words: Socio-personal characteristics; Climate change; Awareness; Perception;

It is evidenced from various studies that climate change will have a strong impact on country like India and particularly in the areas of agriculture; land use, energy, biodiversity, health and water resources. Human expectations regarding weather and climate sometimes lead to perceptions of climate change which are not supported by observational evidences (Rebetz, 2000). A better understanding of how farmers' perceive climate change, ongoing adaptation measures, and the factors influencing the decision to adapt farming practices is

needed to craft policies and programmes aimed at promoting successful adaptation of the agricultural sector (Bryan *et al.*, 2009). The adoption and successful implementation of new technology and husbandry practices and farmers' adaptation to changes in their ecosystems depend on their tendency to perceive and react favourably towards changes in climate and environment. The lack of sufficient knowledge about climate changes and the impact on agricultural production is a setback to long term sustainable

agriculture in most developing countries, including Ghana (Kotei *et al.*, 2007).

As the understanding on global climate and its change is pre requisite to take appropriate initiatives to combat climate change. The only solution for these huge populations seems to be adequate and relevant adaptation strategies. It has been reported that there is a large deficit of information and knowledge in this vulnerable region which impedes decision making and assessment of climate related risks, and adaptation (McSweeney *et al.*, 2010). This study was carried out to measure perception of farmers about climate change in Chhattisgarh plain.

METHODOLOGY

The present study was carried out in Plains of Chhattisgarh state during the years 2013-14 and 2014-15. Chhattisgarh state is divided in to 27 districts and 3 agro climatic zones namely Bastar Plateau, Chhattisgarh Plains and Northern Hills in which four districts of Chhattisgarh Plains were selected for present study. A total of 240 respondents were selected from 24 villages of 8 blocks. Selections were done by using simple random sampling method. The primary data were collected through personal interview with the help of pre-tested structured interview schedule. To determine level of awareness of respondents regarding climate change 9 statements were considered and responses were recorded in three point continuum scale as scores were given 0, 1, & 2 for No, Partial and Complete awareness of respondents, respectively. Further, respondents were categorized into four categories according to scores obtained by them. To ascertain level of perception regarding climatic events/changes, respondents were asked about 09 selected events/changes occurred in each rainy season, winter season & summer season and 03 other events. Responses of respondents were collected on two point continuum scale viz. change (Increase or Decrease) and no change on climatic phenomena providing score 1 and 0, respectively.

RESULTS AND DISCUSSION

Socio-personal characteristics : The socio-personal characteristics of the respondents are associated with their understanding and may influence their perceptions on climate change. However, some socio-personal characteristics of respondents were identified namely

age, caste, education, type of family, size of family, farming experience and social participation. The findings on socio-personal characteristics are presented in Table 1. It shows that majority of the respondents (47.50%) belonged to middle age group (46-60 years), whereas, 33.75 and 18.75 per cent of them belonged to young age (35-45 years) and old age (more than 60 years), respectively. Most of the respondents (85.83%) belonged to other backward class, followed by 6.67, 4.17 and 3.33 per cent of them belonged to general, scheduled caste and scheduled tribe category, respectively. Among respondents more than half of them educated up to

Table 1. Distribution of respondents according to their socio-personal characteristics

Characteristics	No.	%
<i>Age</i>		
Young (30-45 years)	81	33.75
Middle (46-60 years)	114	47.50
Old (More than 60 years)	45	18.75
<i>Caste</i>		
Schedule Caste (SC)	10	4.17
Schedule Tribe (ST)	8	3.33
Other Backward Class (OBC)	206	85.83
General	16	6.67
<i>Education</i>		
Illiterate	13	5.42
Up to Primary	57	23.75
Up to Middle	65	27.08
Up to High & Higher Secondary	85	35.42
Up to Degree & Above	20	8.33
<i>Type of Family</i>		
Nuclear	104	43.33
Joint	136	56.67
<i>Size of Family</i>		
Small Family (< 5 Members)	40	16.67
Medium family (5-8 Members)	116	48.33
Large family (> 8 Members)	84	35.00
<i>Farming Experience</i>		
Up to 20 Years	65	27.08
21 to 40 Years	140	58.33
More Than 40 Years	35	14.58
<i>Social Participation</i>		
No participation	04	1.67
Member of one organization	37	15.42
Member of two organizations	139	57.91
Member of more than two organisations	28	11.67
Office bearer	32	13.33

Table 2. Distribution of respondents (%) according to their awareness about climatic variability

Particulars	Fully aware	Somewhat aware	Not aware at all	Overall awareness	Rank
Climate is getting warmer	54.58	40.42	5.00	74.79	IV
Weather has become unpredictable	52.50	42.08	5.42	73.54	V
Duration of seasons is changing	26.67	49.17	24.17	51.25	IX
Occurrence of extreme weather conditions	42.92	48.75	8.33	67.29	VI
Risk of crop failure has increased	70.00	25.83	4.17	82.92	I
Pollution is increasing in the atmosphere	65.00	30.00	5.00	80.00	II
Occurrence of natural disasters are increasing	55.42	41.67	2.92	76.25	III
Rainfall pattern has been changing	40.83	52.08	7.08	66.88	VII
Human and animal health problems are increasing	39.17	52.92	7.92	65.63	VIII

middle to higher secondary level. Most of the respondents were residing as joint family with 5 to 8 members in their family. A little more than half of them had 21 to 40 years of farming experience with membership of two social organisations and participated regularly in organisation like cooperative society. The findings are in line with results of *Ingle et al. (1999)*, *Karjagi (2006)* and *Yirga (2007)*, *Nhemachena and Hassan (2007)*, *Deressa et al. (2009)*, *More (2000)*, *Akponikpe et al. (2010)* and *Kulshrestha et al. (2010)*. *Awareness:* As the understanding on global climate and its change is pre requisite to take appropriate initiatives to combat climate change. Climate change with expected long-term changes in rainfall patterns and shifting temperature zones are expected to have significant negative effects on agriculture, food security and livelihood of the farmers. Most of the farming communities cannot classify the term climate change but are well capable of describing changes in weather. It can be observed from the Table 2 that majority of the farmers (70.00%) were fully aware that risk of crop failure has increased due to climate change, whereas, 65, 55.42, and 54.58 per cent of the farmers were fully aware about pollution is increasing in the atmosphere, occurrence of natural disasters are increasing and climate is getting warmer, respectively. With regards to

overall awareness for each phenomena, respondents were more aware about risk of crop failure has increased (82.92%), pollution is increasing in the atmosphere (80.00%) and occurrence of natural disasters are increasing (76.25%) with the rank of I, II and III, respectively. The level of awareness of the respondents about climate change is presented in Table 3. It reveal that about 55 per cent of them were moderately aware, whereas, 32.08 and 9.58 per cent farmers belonged to highly aware and somewhat awareness category. Similar findings were also reported by *Dietz et al. (2007)* and *Kotei et al. (2007)*.

Perception of farmers about climate change : People's perceptions are very much useful to establish the fact that the particular region is facing direct or indirect problems in agriculture and other activities due to climate change. Consequently, understanding the perception of climate change by farmers is important as perception can shape the preparedness of these actors to adapt and change their practices. This study also tried to quantify the people's perception on various seasonal climatic variability. Findings on farmer's perception regarding change in climate are presented in Table 4. The results indicated that most of the respondents (74.58%) perceived that the timing of rain onset has increased, whereas, about 73 per cent were responded that dry spell frequency has increased in rainy season over the past 15 years. The results for winter season (Table 4) show a similar uniformity of opinion across the sample. The majority of farmers (76.67%) believed that the minimum temperature in winter season had increased followed by maximum temperature in winter (68.75%) and starting of winter (68.75%). Decreasing trend in number of cool days, frequency of heavy fogged days and ending of winter were reported by 75.42, 72.08

Table 3. Distribution of respondents according to their level of awareness about climate change

Level of awareness about climate change	No.	%
Nil	08	3.33
Low (1 – 6 score)	23	9.58
Medium (7 – 12 score)	132	55.00
High (More than 12 score)	77	32.09

Table 4. Distribution of respondents according to their perception about climatic variability

Climatic variability	Increased		Decreased		No change	
	No.	%	No.	%	No.	%
<i>Rainy Season</i>						
Timing of rain onset	179	74.58	32	13.34	29	12.08
Timing of rain cessation/offset	42	17.50	168	70.00	30	12.50
Season duration	14	5.83	178	74.17	48	20.00
Dry spell frequency	175	72.92	41	17.08	24	10.00
Rainy days frequency	20	8.33	201	83.75	19	7.92
Uneven distribution of rainfall	147	61.25	17	7.08	76	31.67
Total amount of precipitation	11	4.58	88	36.67	141	58.75
Cloudy weathers/ cloudy days	123	51.25	26	10.83	91	37.92
Sunshine hours	25	10.42	123	51.25	92	38.33
<i>Winter Season</i>						
Starting of winter	165	68.75	09	3.75	66	27.50
Ending of winter	18	7.50	166	69.17	56	23.33
Intensity of cold	24	10.00	163	67.92	53	22.08
Minimum temperature in winter	184	76.67	45	18.75	11	4.58
Maximum temperature in winter	165	68.75	31	12.92	44	18.33
Winter duration	08	3.33	162	67.50	70	29.17
Number of cool days	03	1.25	181	75.42	56	23.33
Frequency of heavy fogged days	17	7.08	173	72.08	50	20.84
Winter rainy days	129	53.75	68	28.33	43	17.92
<i>Summer Season</i>						
Minimum temperature in summer	169	70.42	41	17.08	30	12.50
Maximum temperature in summer	182	75.83	31	12.92	27	11.25
Starting of summer	07	2.92	184	76.67	49	20.41
Ending of summer	141	58.75	22	9.17	77	32.08
Duration of season	179	74.58	19	7.92	42	17.50
Number of hot days	146	60.83	23	9.59	71	29.58
Intensity of loo	88	36.67	82	34.17	70	29.17
Prickly heat during summers	154	64.17	38	15.83	48	20.00
Summer rainy days	40	16.67	141	58.75	59	24.58
<i>Other Occurrences</i>						
Air pollution	224	93.33	04	1.67	12	5.00
Occurrence/frequency of storm	126	52.50	73	30.42	41	17.08
Thunderbolt/thunderstorm	06	2.50	02	0.83	232	96.67

Table 5. Distribution of respondents according to their extent of perception about climatic variability

Extent of perception	No.	%
<i>Rainy season</i>		
Low (Up to 3 score)	19	7.92
Medium (4-6 score)	74	30.83
High (More than 6 score)	147	61.25
<i>Winter season</i>		
Low (Up to 3 score)	24	10.00
Medium (4-6 score)	65	27.08
High (More than 6 score)	151	62.92
<i>Summer season</i>		
Low (Up to 3 score)	21	8.75
Medium (4-6 score)	58	24.17
High (More than 6 score)	161	67.08
<i>Other occurrences</i>		
Low (Up to 1 score)	46	19.16
Medium (1-2 score)	181	75.42
High (More than 2 score)	13	5.42
<i>Overall perception</i>		
Low (Up to 10 score)	23	9.58
Medium (11-20 score)	75	31.25
High (More than 20 score)	142	59.17

and 69.17 per cent of the respondents, respectively. Furthermore, about 76 per cent of the respondents said that maximum temperature in summer has increased, while, nearly 75 per cent of them were responded that duration of summer season has increased. Almost all the respondents (93.33%) were facing problem of air pollution. More than half of the respondents looked increasing trend in occurrence of storm.

Extent of perception about climatic variability: Table 5 elucidates extent of perception of the respondents about climatic variability. It shows that majority of the respondents (61.25%) in study area perceived high changes in climatic condition in rainy season due to changing rainfall patterns like shifting of timing of rain onset & withdrawal, increasing trend in dry spell frequency and decreasing trend in rainy days frequency. Moreover, about 63 per cent of the respondents perceived high level of changes in climatic condition in winter season because they felt that minimum & maximum temperature in winter has increased and number of cool & heavy fog days has decreased. Nearly 67 per cent of the respondents reported that high level of changes occurred in summer season due to increasing trend in minimum & maximum temperature, duration of season and number of hot days. With regards to overall

perception of climate change 59.17 per cent of the respondents reported high level of overall change in climatic condition. Similar findings were also reported by Akponikpe *et al.* (2010), McSweeney *et al.* (2010), Johnsen and Aune (2011) and Krishna *et al.* (2011).

CONCLUSION

It was found in the investigation that farmers' in the study area were able to recognize that temperatures have increased, intensity of winter decreased and there has been a fluctuation in the rainfall pattern. So the

present study disproved the hypothesis that climate change is merely a hoax as most of the sample population has experienced some changes in relation to different climatic phenomenon over the last few years. In general, most people's understanding of the underlying issues and causes of climate change varies a lot, with some taking a more scientific approach and others a more religious one. Some of the perceptions are unscientific, mainly because many subsistence farmers, who are by definition often poorly educated, resort to superstition to explain natural events because that is their only source of 'information'.

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